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MAPLAN, Caribbean Defense
Command, CDC - 1941-1948

PERMANENT

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MAPPLAN

CARRIBBEAN Defense

Command

1941 - 1948

M A P P L A N

C A R I B B E A N D E F E N S E C O M M A N D

And other Mapping and Charting
projects in the Caribbean area
during and after World War II

1941 - 1948

PREPARED IN THE

OFFICE OF THE STAFF SECRETARY

CARIBBEAN COMMAND

September 1948

OFFICE OF THE STAFF SECRETARY
WARRY BELTON, CAROLINE ISLANDS
SEPTEMBER 1944

INTRODUCTION

A realization of the far-reaching plans of an important member of the Staff of the Budget, the Inter-American Decade Survey, a multi-million dollar project under the leadership of Colonel Frederick S. Dandy, has advanced one of the leading missions of the Caribbean Command in building for better relations with the nations of Central and South America and in providing geographic intelligence of incalculable value for organizing the defense of the area. With surveying parties in the jungles, photographic reconnaissance planes in the air, pack animals, supply concentrations, and a small fleet of vessels of every sort, the project has the compass of a small-scale military operation, all with the friendly cooperation and direct assistance of the very independent governments involved. The story of the organization, diplomatic contacts, and admirable leadership involved is one of the most interesting in the area. Although the undertaking involved continuous staff effort of the highest quality involving the Army, the Air Force and the Navy, the project was first to the Caribbean Command on 31 July 1943, and its accomplishment in its formative period adds significance to the record of the Caribbean Command and its predecessor, the Caribbean Defense Command.

This study was prepared from military records and other reliable government documents by Captain Cecil S. Menden and Captain Arthur L. Clark of the Historical Section, Caribbean Defense Command and Staff Secretariate, Caribbean Command, and revised and augmented by Captain Arthur L. Clark of the Staff Secretariate. Further corrections were made by Captain Arthur L. Clark of the Staff Secretariate.

CARIBBEAN COMMAND
Office of the Staff Secretary
Quarry Heights, Canal Zone
September 1948

A realization of the farsighted plans of an important member of the Bureau of the Budget, the Inter-American Geodetic Survey, a multimillion dollar project under the leadership of Colonel Fremont S. Tandy, has advanced two of the leading missions of the Caribbean Command in building for better relations with the nations of Central and South America and in providing cartographic intelligence of inestimable value for organizing the defenses of the area. With surveying parties in the jungles, photographic reconnaissance planes in the air, pack animals, supply concentrations, and a small fleet of vessels of many sorts, the project has the compass of a small scale military operation, all with the friendly cooperation and direct assistance of the many independent governments involved. The story of the organization, diplomatic contacts, and admirable leadership involved is one of the most interesting in the area. Although the undertaking involved continuous staff effort of the highest quality involving the Army, the Air Forces and the Navy, the project was lost to the Caribbean Command on 21 July 1948, but its accomplishments in its formative period add significance to the record of the Caribbean Command and its predecessor, the Caribbean Defense Command.

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MAPPLAN, CDC

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M A P P L A N , C D C

C h r o n o l o g y

- 1890 International Bureau of American Republics established at First International Conference of American States (in Washington)
- 1907 International Bureau of American Republics reorganized at Second International Conference of American States
- 1908 Geodetic Surveys were begun in Panama
- 1910 Name of International Bureau of American Republics changed to Pan American Union
- 1911 First U.S. Army forces arrived in Panama; Canal Zone troops placed under jurisdiction of Commanding General, Eastern Department, at Governor's Island, N.Y.
- 1917 Panama Canal Department established as a geographical division of the War Department
- 1920 American Geographic Society began work on its "Map of the Americas," a 107-sheet task completed in 1944; scale: 1:1,000,000
- 1928 Pan American Institute of Geography and History (PAIGH) formed at Sixth International Conference of American States (in Habana, Cuba); purpose: To compile maps, charts, and a geographical history of the Americas
- 1929-35 At its first three meetings PAIGH considered the affect of the various laws of the different states on its proposed work
- 1935 Military survey of Panama was instituted but discontinued (8 April) when PCD was directed to establish sub-areas and a progressive plan for mapping annually
- 1936 Inter-American Conference for the Maintenance of Peace (at Buenos Aires, 1-23 Dec) adopted a convention for joint attitude of neutrality by all in the event of hostilities between any two of them

1938

Foreign ministers of the Americas (at Lima, Peru) drafted the "Declaration of Lima" (24 Dec) which; 1) affirmed the absolute sovereignty of the various states; 2) expressed their determination to defend themselves against "all foreign intervention or activities that may threaten them;" 3) provided for further consultations in case "peace, security, or territorial integrity" of any state should be menaced; and, 4) pledged mutual assistance to any state upon call

1940

Robert H. Randall, chief examiner, Division of Surveying and Mapping, U.S. Bureau of the Budget, conferred (early in the year) with various federal and civil agencies about the lack of maps of the Western Hemisphere, and decision was reached to present the matter to PAIGH

Congress reaffirmed (18 Jun) the policies contained in the Monroe Doctrine

U.S. Government issued a warning (19 Jun) against the transfer of territory in the Western Hemisphere by one non-American power to another

American foreign ministers (in Habana, 21-30 Jul) reached an agreement (Convention of Habana) for united action against "Fifth Column" activities, provided for joint administration in trust of derelict European colonies of the Western Hemisphere, and established procedures to implement the (1938) "Declaration of Lima"

The President pledged U.S. military aid to any American state upon request by it

A series of bilateral conferences between U.S. and each of the American states was initiated, in which agreements were made for use of the territory, communications, and air space by U.S. forces in going to the aid of any state (at its request or the request of another), or in defense of the hemisphere

Photo reconnaissance planes of the Panama Canal Department made mosaics of proposed defense sites, posts, camps, and stations in the Panama area

Aerial charting of Nicaragua was begun, and similar operations were scheduled in Costa Rica (and Cocos Island) by PCD

1941

A military aerial-photo mapping mission to Bolivia was not favorably considered (1 Jan) because the altitude of 25,000 feet required in the task was above the ceiling of the B-18 aircraft

War Department authorized air units of the Puerto Rican Department to conduct photo mapping missions over Surinam and British Guiana (21 Jan)

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1941

War Department authorized PCD to negotiate directly with the Latin American countries over which it was necessary to conduct military flights and/or to operate aerial photo mapping missions (7 Mar)

A Commission on Cartography, for the purpose of making cartographic charts of the Western Hemisphere, was created within PAIGH of the Pan American Union at a meeting (of the Institute) in Lima, Peru (in Apr), when the charting plan presented by Dr. Pedro C. Sanchez of Mexico, director of PAIGH, was approved (based on Randall idea)

Caribbean Defense Command was established (8 May) with tactical responsibility over all military establishments in the area
Japan attacked U.S. installations at Pearl Harbor, Hawaii (7 Dec);
U.S. declared war on Japan (8 Dec) and Germany (9 Dec)

1942

Ten countries of Central and South America, upon request by U.S., gave prompt consent (9 Jan) to operations of aerial photo squadrons over their territory in making air navigation charts

U.S. air photo squadrons began operating over the Amazon river basin and the vicinity of Manaus, Brazil; around Barranquilla and Cali, Colombia; Iquitos, Lima and Talara, Peru; and Salinas, Ecuador

Military aircraft conducted photographic missions over the west coast of South America as far south as Chile, and along the disputed Peru-Ecuador boundary

Installation of Aircraft Warning Stations (AWS) in the CDC area caused expansion of aerial photo units

Engineer Reproduction Plant in the Canal Zone, formerly under the direct control of the Chief of Engineers, War Department, was placed under direct control of PCD to assist in the air mapping program

Aerial photo charting operations were increased over Brazil and British Guiana, and were extended over the routes of the Air Transport Command (ATC) to Africa and Asia

Army engineer units began the reflagging of existing triangulation points in the Panama area

1943

(After 1942 all aerial photo mapping operations directly under PCD were limited to the Canal Zone area)

Aerial charting was expanded in Brazil and Colombia and extended to Venezuela (in January)

Air photo mapping of the Pacora-Chepo-Chepillo and the Fort Kobbe-Howard Field areas was completed

First consultation of the Commission on Cartography (of PAIGH) was held at Washington (25 Sep-14 Oct); work reviewed and means of increasing it considered

1944

Aerial mapping was increased in Peru and begun in Chile and French Guiana by Sixth Air Force craft
Trimetrogon photographic missions were conducted over Uruguay and parts of the Plata river area on CDC plans
Aerial mapping of Haiti, the Dominican Republic, and Cuba was instituted by CDC
U.S. Navy began an aerial mapping survey of the Atlantic and Pacific coasts of Central America
A review of mapping policies and priorities in South America was submitted (11 Jul) to the War Department
Second consultation of Commission on Cartography (PAIGH) held at Rio de Janeiro (14 Aug-2 Sep), with 19 American states represented, tentatively adopted as standard the Army Air Forces mapping scale of 1:100,000 for use in hemisphere cartography
Efforts by British delegates at the International Air Conference in Chicago to have the conference adopt the scale of British air charts as standard on air navigation maps were defeated
War Department advised CDC (15 Sep) that the charting program had been coordinated with the State Department, Army Air Forces, Operations Division, and General Staff for completion of the program
A Cooperative Board for the utilization of all sources and facilities in the mapping project was designated by PCD
Mapping completed of 33 of 3,375 quadrangles within the PCD area (Dec)

1945

Shortage of personnel and lack of equipment caused slowing-up of beach and map-intelligence surveys in Antilles Department
Area of CDC mapping responsibility expanded (26 Jan) to include all countries south of Mexico except Brazil, Uruguay, and Paraguay
War Department announced future mapping commitments would depend upon funds made available to that project (29 Mar)
A geodetic survey team was despatched to Chile to work with completed aerial charts and obtain ground data (Jun)
Colombia approved (10 Jul) aerial charting of Medellin, Cali, and coastal areas
Changes in Army Regulations (17 Aug) made the Chief of Engineers and Chief of Air Forces responsible for all peacetime military and aeronautical charting
War Department announced (21 Aug) establishment of control catalog and files for all topographic maps and information
Diplomatic clearance from Ecuador for aerial charting of the Galapagos archipelago was obtained (9 Sep)

1945

Summary (1 Oct) on state of completion of mapping commitments showed; Ecuador-Peru, 90 percent; Colombia, 12 percent; Venezuela, 70 percent; British, French, and Dutch Guiana, 40 percent.

War Department issued (Oct) "Charting Plan for Central and South America (less Mexico and Brazil)" and (Nov) "Mapping Plan, Western Hemisphere," which marked the beginning of a new period in the photo charting project of Central and South America and the Caribbean islands

CDC organized (19 Nov) "Reconnaissance Section" for aerial photo mapping

War Department outline for Western Hemisphere mapping received (11 Dec) by CDC

1946

CDC reestablished the Theater Engineer Section to take charge of charting and mapping projects in an operational area of 10,000,000 square miles (5,000,000 land area). Initial plan called for charting of 1,893,633 square miles and mapping of 1,706,214 square miles; areas within a radius of 1,400 miles from Panama to have first or second priority; cost estimate set at \$12,000,000 to be accomplished over a period of twenty years (8 Jan)

CDC proposal (5 Feb) to War Department to combine type of surveying used in area with that proposed in "Mapping Plan, Western Hemisphere" or "Charting Plan for Central and South America (less Mexico and Brazil)" approved.

MAPPIAN, CDC, published, and Colonel F. S. Tandy was designated Theater Engineer

Inter American Geodetic Survey (IAGS) proposed as name for agency to carry on inter-American program and minimize military angle; proposal approved by Chief of Staff (6 Jun) without submission to War Department

PCD responsibilities delineated in Panama, IAGS to supervise activities (14 Aug)

Third consultation of Commission on Cartography (PAIGH) held in Caracas, Venezuela (October)

Approval of MAPPIAN (with IAGS in charge) given by Ecuador (23 Sep); Bolivia (11 Oct); Cuba (16 Oct); British Honduras (8 Nov)

MAPPIAN work was reported progressing (3 Dec) in Guatemala, El Salvador, Honduras, Costa Rica, and Nicaragua

1947

Republic of Colombia gave approval to MAPPIAN, CDC (2 Feb)
Brazil Mapping and charting project assigned to CDC program by War Department (5 Apr)

Argentina's diplomatic objections to U.S. planes on Chilean map project passing over boundary caused orders to issue protecting Argentina's territory

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1947

Reorganization of the mapping and charting program in CDC was effected (22 May) to comply with changes in Army Regulations

A report (31 May) as to state of completion of mapping projects showed; Guatemala, 72.5 percent; El Salvador, 100 percent; Costa Rica, 9 percent; Cuba, 81.3 percent; Dominican Republic, 90 percent; Honduras, 35 percent; Nicaragua, 47 percent; Panama, 6.6 percent; Haiti, 75 percent

Retrenchment program was begun in CDC

New "Mapping and Charting Directive, Western Hemisphere" was issued (15 Jul) by War Department

Panama Canal Department was abolished (November) and a new Command, designated United States Army Caribbean, was established, with United States Army Forces Antilles (formerly Antilles Department) subordinate to USARCARIB; Caribbean Command

1948

Caribbean Defense Command was abolished (March)

IAGS (MAPPIAN) transferred (21 Jul) from Caribbean Command to USARCARIB

CHAPTER I

THE PURPOSE OF MAPPLAN

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The Purpose of Mapplan

Uniformity of Hemispheric Data a Joint Aim

Although considerable engineering activity has been carried on in the Panama area to provide maps for local defense, a far-reaching project of this sort, with hemispheric consequences in many fields, was not developed until the Collaborative Cartographic Program of the Caribbean Defense Command came into being in the form of MAPPLAN, CDC, after the termination of World War II.

Undertaken by the Inter-American Geodetic Survey in the then Caribbean Defense Command under the direction of Colonel Freemont S. Tandy, the program was in line with better orientation of the United States toward Latin America. With a growing consciousness that the future of the United States will be closely allied with that of the other republics in this hemisphere, American political, economic, and military leadership were beginning to realize that the republics of Latin America needed the understanding and cooperation of the United States just as the United States needed their understanding and cooperation. The spurt given this feeling by the war, air travel, and the surge of economic nationalism which brought Latin America more obviously within the field of European ambition, is among

*1. Capt Arthur L. Freer, I.A.G.S. MS, July 1948, Sec 1, p 1 ffg.
In I.A.G.S. Files.

the basic factors accentuating the need for hemispheric solidarity and defense.

The Economic Charters of the Americas as contained in the Act of Chapultepec in 1945 and the treaty of Reciprocal Assistance signed at Rio in 1947 were milestones toward improved hemispheric relations. These pacts moved in the direction of improved communications, economic exploration and development, and the desire for concrete information for furthering economic, political, and social progress. To accomplish these objectives there was a basic need for compact, logical knowledge understandable to all. One of the objectives of the Caribbean Defense Command was to provide a very essential part of this knowledge in the form of maps.

Most of the Americas Still Unmapped

Intelligence data known as cartography, the science of representing physical aspects of the earth, combine with permanence certain values of importance for military efforts in time of peace. In obtaining the data significant training for military personnel is accomplished, the results enhance the economic potentialities of the country by providing assistance to civil agencies, and the accomplishment of cartography missions maintains and extends the national influence by support of its foreign political objectives. Exclusive of the United States and small portions of several other countries, there is no certain cartographic knowledge of the land area of the Western Hemisphere, in which the United States and Alaska loom disproportionately large because of the warped effect of commonly used Mercator's projections. Most of the maps, whose color and delineations are in

general use are figments of the imagination, not being based on actual surveys of the areas. Yet in these countries where cartographic knowledge is virtually non extent, there are found sources of many raw materials lacking in the United States, or present in insufficient quantities. Cartographic information relative to economic resources in the Americas often gives a clew to conditions for information of which American industrial corporations are feverishly spending millions of dollars.

War Gave Impetus to Cartographic Work

In the closing phases of the last war it became recognized by a few foresighted military that we should obtain cartographic knowledge of probable military objectives. Military objectives were stressed with some lack of needed emphasis on economic resources. In some instances, by a fortuitous set of circumstances, it so happened that the directed military objective coincided with the obtaining of cartographic knowledge of sources of raw materials.

The one outstanding instance in this respect was the decision to map the Western Hemisphere. Particularly important were Central and South America, which are not only politically important but represent one of our foremost sources of economic resources other than those within the borders of our own country. This decision, selfish in most of its aspects as related to the United States, is proving and will continue to prove very helpful for our neighboring countries of the Americas. Politically, economically,

*2. Freer, IAGS, MS, July 1948, Sec 1, p. 2. In IAGS Files.

and militarily all twenty-one republics of the Americas, including the United States, benefit from such a mapping program.⁺³

The project called for the establishment of accurate geodetic data to tie in with the North American Datum and the establishment of a South American Datum that would make the Western Hemisphere one coordinated map pattern easily pictured on the types of maps and charts necessary to maintain that solidarity against any aggressor. Accomplishment of other objectives was a secondary target. These objectives included: introduction of American methods and equipment in geodetic surveying, establishment of goodwill through joint participation in joint efforts for the common welfare and development, intelligence incidental to operations within the various countries surveyed, and a related study of the technical and strategic factors included in tidal determinations, hydrographic surveying, beach photography, and studies in isostasy and geomagnetism.

The story of this program is contained in the following pages. What started as a token effort has progressed to a full scale collaborative program. Lt. General Willis D. Crittenberger, Commanding General, Caribbean Defense Command supported the plan. With this support, Colonel Tandy, Chief Engineer, lent energetic and vigorous prosecution to the accomplishment of the mission.⁺⁴

*3. Capt Arthur L. Freer, IAGS MS, Jul 48, Sec 1, p. 5. In IAGS Files.

*4. Freer, Sec 1, p. 6.

CHAPTER II

Emergency Stressed Need for Maps

Pan American Institute Joined in Project

The roots of the present **CHAPTER II** Program of the U. S. Army Caribbean, go back even beyond 1928 when the Pan American Institute of Geography and **EMERGENCY STRESSED NEED FOR MAPS** was undertaken by the American Geographical Society to produce the "Map of the Americas".

This series, on the millinch scale and conforming to standards established by the International Geographical Congress, consisted of one hundred five sheets. The effort was undertaken in 1920 and completed in 1924. Although ostensibly the work of the American Geographical Society, it was produced as a result of international cooperation. The collaboration of numerous public officials, cartographers, and experts throughout the Americas was required for its compilation.

The series is of sufficiently large scale for field reconnaissance work and for general research and reference purposes. "The Society's purpose in undertaking this project was to provide as accurate a cartographic base as existing information would permit, both for its own program of study and to satisfy the need of travelers and of research workers

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and investigators in a great variety of fields, who were finding the existing general maps inadequate."⁵

When the War in Europe started, some few forward looking individuals in the United States began to wonder, should the United States enter the conflict, if sufficient geographic and topographic information were available to defend the Panama Canal, properly and possibly, the entire Western Hemisphere. Investigation revealed that available information was scant and sketchy. About the best available map was the none-too-reliable Map of the Americas published by the American Geographical Society.

Need for Maps Recognized

Confronted with this situation and realizing just how vital such information was, Mr. Robert H. Randall, Chief Examiner, Surveying and Mapping, Bureau of the Budget, Executive Office of the President, was instrumental in promoting several discussions among members of interested organizations and representatives of various governmental agencies concerned with mapping activities. These meetings included an imposing array of representatives from the State Department, United States Geological Survey, United States Coast and Geodetic Survey, the National Archives, the Tennessee Valley Authority, Department of Agriculture, Hydrographic Office of the Navy, the Air Force, the Aeronautical Chart Service, Office of the Chief of Engineers, and the American Council of

5. Proceedings of the Consultation of Geodesy, Aeronautical Charts, and Topographic Maps, Sep 29 - Oct 14, 1943, Washington, D.C., edited by Dr. Andre C. Simon Pietri, p. 181, Op Cit, Sec 2 p. 2.

Learned Societies as well as the American Geographical Society. These efforts spurred on by the cognizance of the strategic importance of the Panama Canal and the importance of South America to any war effort, were underwritten by a basic and long term philosophy that the more we know of our neighbors, the more friendly our relations would be.⁶

The problem presented to these representatives was what ought to be done to improve the quality and quantity of mapping in South America. The desire to accelerate progress in cartography in that area had a companion problem of what means were available or could be created to achieve the cooperation of these other countries in order to exchange information and techniques.

Overall Unity Sought

There were two choices of an instrumentality for such cooperation and procedure:

- (1) A new organization built exclusively along the lines of exactly what we wanted to do, or
- (2) An old organization which would lend itself primarily to an improvement in mapping, and secondarily to the fostering of the Good Neighbor policy.

The latter was, of course, the definitely preferable choice. It was found that the only existing organization which might be utilized was the Pan American Institute of Geography and History.

The Institute is an official inter-American organization, in which this government (The United States) and the governments of all the

6. Freer Op Cit, Section 2, p. 2.

American Republics have membership. It was founded in Habana in 1928, at the Sixth International Conference of American States. It has its permanent headquarters in Mexico City, where the Mexican Government furnishes a building for its use and it is supported by the quotas paid by the member governments on a basis of population assessments. Its purpose is to serve as a medium of exchange between governments as well as between scientific societies of the member governments, in all matters pertaining to Geography and History and their related fields. The Institute meets periodically in General Assemblies, attended by delegates of all the American Republics.⁷ This organization made resolutions at its two previous assemblies expressing the desire to improve the science of Cartography in the Americas.

"In the very first meeting of the Institute held in Mexico City in September 1929, the delegates were designated by the various governments to consider the statutes which were to serve as a basis for its activities insisted upon the urgent necessity of completing basic mapping throughout the Hemisphere. This objective was given equal emphasis later, in the meetings of the Institute at Rio de Janeiro 1932, and at Washington in 1935."⁸

Commission on Cartography Formed

The first step to determine if the Pan American Institute of Geography and History would be interested was to formulate an outline

7. PROCEEDINGS, op. cit., p. 33. In Freer op cit, Sec 2, p. 4.

8. Ibid, p. 20. In Freer op cit, Sec 2, p. 4.

for a Commission on Survey and Mapping (later changed to Cartography as there is no exact Spanish equivalent) subordinate to the Institute. This Commission would be specifically interested in expediting mapping and charting in accordance with their needs and our needs. It was necessary next to reorient such a plan from a primarily United States viewpoint to an International viewpoint. Finally, the proposal had to be introduced, preferably by some Latin American at the next meeting the 3rd General assembly of the Pan American Institute of Geography and History, to be held at Lima, Peru, in April 1941. Mr. S. Whittermore Boggs, Chief, Division of Geography and Cartography, Department of State, undertook the task. On his way to Lima to present the proposal, Mr. Boggs fortuitously met in Panama the Director of the Insitute, Dr. Pedro C. Sanchez, Director, Pan American Institute of Geography and History, Tacubaya, D.F., Republic of Mexico, who was also journeying to Lima. They continued on together. On the way, Mr. Boggs explained the idea as developed by the recent discussions in Washington by cartographers officially or professionally interested in Hemispheric mapping progress. Thus, the plan was suggested as a base of an idea which Dr. Sanchez could feel free to modify as he saw fit.

The Director was very much impressed with the proposal. His remarks at a later date are indicative of his impression. He said "When I was asked to express my ideas in respect to such a program, I emphasized that the most important work which the Institute could undertake was to promote and bring to the earliest possible completion the basic mapping of the American Hemisphere, while naturally at the same time carrying on

its other activities. This mapping of the Americas had long been a major objective of the Institute, one might almost say the "obsession" of the three General Assemblies."⁹ The Director of the Institute, therefore, presented the idea, only slightly modified, to the Assembly. Proposing the Commission as his idea auspiciously avoided any taint or suspicion of possible ulterior United States motives.

Inasmuch as the broad proposal to attempt a completion of mapping of the Americas according to uniform standards was basically a good idea, contained nothing initially controversial, nor involved an immediate expenditure of money, the proposal was well supported - it was unanimously approved as a means to implement the Institute's previous resolutions.

Delegates of the twenty-one Republics empowered the Institute, by resolution, to constitute a Commission on Cartography. That resolution stated:¹⁰ "The Pan American Institute of Geography and History hereby creates a Commission on Cartography for the purpose of facilitating and expediting progress in map-making in the nations in the Western Hemisphere in accordance with their own map needs.

"The Commission shall be organized under the Institute's first section of Geography.

"Officers of the Commission shall be a chairman, and a secretary, who, in addition to secretarial duties, shall act as the Commission's traveling representative and maintain liaison with the Institute's principal offices and all members."

9. PROCEEDINGS, op. cit. p. 22. Quoted in Freer, op. cit. Sec 2, p. 6.

10. Ibid, p. 28.

Commission Activities Outlined

Activities of the Commission included the following:

Promulgation of standards for the various classes of maps needed in, and produced by, the various nations, to the end that uniform standards may be adopted;

Provision for the regular exchange of information, as between the various nations, on their current mapping activities;

Interchange of ideas and information, between the nations on mapping activities proposed for each ensuing year;

Regular exchange of information between the various nations on technical methods currently employed in all mapping operations;

Provision for a similar exchange of information on methods in the experimental or developmental stages; and for the advancement of education and training in the science of map-making by organizing courses in the universities and technical schools for advanced studies in the various methods that are employed in the production of maps; for the exchange of professors and instructors for such courses; and finally for similar exchange of technical personnel between mapping agencies in the various nations, including exchange of assignment of junior personnel for in-service training.

The basic interest of all countries in furthering mapping progress achievements was thus evidenced. The stage was now set for active collaborative implementation of a program to achieve those interests.

Organizational Activities 1941-1945

Following the Lima Conference, Dr. Sanchez took a tour of the South American capitals, talked over the development and sounded out the interest of the various countries. Meanwhile, the American Congress on Surveying and Mapping was holding its conference in Washington. It was arranged that on the return of Dr. Sanchez in the summer of 1941 to Mexico via the United States that he would come to Washington. Here he conferred with Mr. Randall, Mr. Boggs, and other prominent Americans interested in cartography. They promised him the support of the United States and urged him to issue invitations to the various governments to appoint representatives so that the commission might start to function. Additionally, Dr. Andre C. Simonpietri, secretary General Commission on Cartography, Pan American Institute of Geography and History, was appointed as secretary. His task was to be to travel throughout the American Nations as often as necessary. He would gather facts and statistics on surveying, mapping, and charting activities of each nation, determine the needs and wishes of each, discuss with those officially or professionally responsible for Cartography progress the basic field and office methods which might be adopted to speed up the work in each country, promote uniformity in such matters as scales, standards of accuracy and conventional signs.¹¹

With this preliminary program in mind, Dr. Sanchez returned to the Institute headquarters in Mexico and issued the invitations. Early in

11. Freer's op. cit., Sec 3, p. 1.

1942 Mr. Randall was appointed United States member to the Commission. He was asked by the Institute to serve as chairman.

In April 1942 Mr. Randall and Dr. Simonpietri visited Mexico City to confer with Dr. Sanchez. It was decided there that the secretary would make a trip to Mexico and Venezuela where he would make a study of mapping activities, organizations and status.

Film Shows Accomplishments

On Dr. Simonpietri's return to the United States, he prepared a color film entitled "An Introduction to the Cartographic Activities of the United States" in which the various operations to making maps were described. The various United States Government agents concerned with mapping activities cooperated with its preparation. This film with both Spanish and English titling, was supplemented by slides of personalities and equipment. Both were to be taken by the secretary to the various American countries on his future trips. He was also to take enough equipment with which to make additional pictures of the various mapping officials. This arrangement not only created interest, but provided a means for these officials to know what other interested persons looked like before they were to meet them personally.

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In late 1942 Dr. Simonpietri took up residence in Mexico City where the headquarters of the Institute was located. With this office as a base of operations, he made liaison trips to most of the Central and South American countries. On these trips he conferred with the representatives of each government to urge the appointment of members to the

12. Freer's Op. Cit., Sec 3, p. 3.

Commission and collected data necessary for the preparation of a study for the Commission to show the complete status of Cartography throughout the hemisphere.

These trips became of immeasurable value not only to the functions of the commission but to wartime United States objectives. The secretary collected existing maps and geodetic data and was able to establish a system whereby new data would be sent automatically by the various countries to the Institute. Similarly he urged some measure of cooperation by his aid to Ecuador and Bolivia. Both of these countries had enough maps in manuscript form but no paper for printing them. Getting them paper made it possible to complete their maps and thus supply the Institute and the United States with copies.

During the first few years of operation, 1942-1945, the United States supported the commission financially, but the first consultation on the commission was held in Washington, D. C., on 25 September to 14 October 1943 on investments furnished by the American Geodetical Society of New York.

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Selection of Conferees Effected

This device made it possible to invite or select individuals. Two representatives from each country were invited, one for geodesy

13. Freer's, Op. Cit., Sec 3, p. 3.

and topographic mapping and one for aerial charting. Fourteen nations attended.

Results of this consultation, aside from the personal acquaintances made among members and representatives, were to establish three temporary committees, one on aerial charting, one on geodetic surveying and one on topographic mapping. Additional ideas as to the principal problems, what the commission might be able to do about them and what procedure should be adopted to secure results were other tangible results.¹⁴

Another significant result was the reinstating, via the Commission, of the interest and active membership of Brazil in the Institute. As a result of this development the next consultation was held in Rio de Janeiro.

The second consultation, 14 August to 2 September 1944, had nineteen countries officially represented. Basically they agreed to stimulate the exchange of personnel by pooling equipment and experience and by securing loans of equipment and facilities from the United States. At this time the group discussed standards for base aerial charts. The United States Air Force 1:100,000 charts was tentatively adopted as the standard.¹⁵

This development subsequently proved extremely beneficial. At the Chicago International Air Conference 1944, Great Britain attempted to get its charts adopted as standard but failed inasmuch as the Western Hemisphere countries presented a united front in favor of United States

14. PROCEEDINGS, op. cit., p. 103. Quoted in Freer's, op. cit., Sec 3, p. 4.

15. Freer's, op. cit., Sec 3, p. 4.

charts which they had already adopted as standard. The third consultation was scheduled to be held in Caracas, Venezuela, in December 1945, but was postponed to October 1946. During the interval between the second and third consultations other significant developments were taking place.

Value of the Cartography Commission Summarized

Following the Rio de Janeiro meeting and prior to the end of the war, Mr. Randall, by virtue of his federal position and as acting chairman of the Commission together with his many interested associates gave considerable consideration to the subject of the huge wartime investment of the United States in technical personnel and specialized equipment. They wondered if all of that would disintegrate with the termination of hostilities if there could not be some transfer of activities into a continuation for possible enlargement of the cooperation thus far achieved in the Americas. Mr. Randall approached the Chief of Engineers on this subject. However, too rapid demobilization shattered this possibility but provided the germ of an idea that coincided with War Department thinking and planning. This discussion will be treated in a later section of War Department planning.

✓ The Commission had been notably successful in stimulating Cartographic activities of the member states, in promulgating uniform standards of accuracy and making known the latest techniques. Perhaps if major achievement was to bring the technique experts of the member countries

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into direct personal contact and close cooperation with one another.

The widespread and continued support given to the Commission by the member countries is a tribute to a correct appraisal of their needs and of a logical approach to them it has been said. Such support was and is indicative of their latent interest in the commission and its recognized activities. To them there was a definite psychological appeal for a collaborative effort on a technique level. To the representatives involved it meant an association with other persons from other countries who were similarly interested in offering an opportunity for an exchange of information relative to techniques and methods and a possibility of securing badly needed equipment. All of which evidenced their necessity in orienting themselves to the technological ideology of the United States.

A long advance had been made through the establishment of this Commission towards real hemispheric solidarity. A feeling of mutuality was developed based not on words alone, but on common aims of benefit to all. Significant assistance had been given to the Air Force charting program during a critical period of the war. Members of the Institute and the Commission were instrumental in getting permission for the work. Without this aid, the task would have been immeasurably difficult. The trend toward United States methods and equipment was becoming an established fact.

16. Report on the organization and activities of the Pan American Institute of Geography and History, 17 Mar 48, prepared by the secretariat of the executive committee, P.A.I.G.H. p. 15. In Freer's op. cit., p. 5.

17. Freer's, op. cit., Sec 3, p. 6.

These returns alone would have been sufficient justification for the initial efforts. The Commission, however, was to prove to be one of the greatest sources of cooperation and impetus to later many active expressions of original aims -- the Cartography Program of the Caribbean Defense Command and the U. S. Army, Caribbean.¹⁸

CHAPTER III

POSTWAR MAPS AND CHARTS

18. Freer's, op. cit., Sec 3, p. 6.

CHAPTER III

POSTWAR MAPPING AND CHARTING

CHAPTER III

Postwar Mapping and Charting

War Department Plans Outlined

Mapping, unlike charting, was still a neglected subject as late as 1945. It will be remembered from the discussion of the formation and activities of the Commission on Cartography, Pan American Institute of Geography and History, that at this time when the stage was being set for a single charting plan, Mr. Randall, Chairman of the Commission and Chief Examiner, Surveying and Mapping, Bureau of the Budget, volunteered the suggestion to the Office, Chief of Engineers, relative to a continuation of cooperative cartographic activities in the Americas. It was also mentioned that this suggestion provided a germ of an idea that coincided with War Department thinking at the time. Mr. Randall's suggestion also included the idea of an agreement between Office, Chief of Engineers, and Venezuela for the preparation of several 1:25,000 sheets as an example of a joint operation.

Although the process of integrating charting activities were well underway in 1945 and needed no further stimulation, little thought had been directed towards mapping. Mr. Randall's prompting of the Office, Chief of Engineers received appropriate attention.¹⁹

19. Freer's, op, cit., sec 4, p. 1. This subdivision follows throughout this same source, the documentation being Capt Freer's.

General Policies

Upon query from the Office, Chief of Engineers, General Clayton Bissell, AC/S, G-2, WDGS, wrote in late March 1945²⁰ that no specific program for mapping in the postwar period could be prescribed at this time since it was anticipated that actual programming would be determined largely by funds made available for that purpose. The following points, however, were to be used as a guide for future planning: No change was contemplated in procedure and responsibilities as set forth in AR 300-15, new mapping would be done at scales of 1/25,000, 1/50,000 and 1/100,000; strategic map coverage of the world at 1/1,000,000 which would be kept current, would be a requirement; and reproduction facilities equal to the present Army Map Service establishment would be maintained. The following general policies were outlined for medium and large scale maps:

Medium Scale:

Desirable of coastal areas of continents, major islands (except coastlines of Polar and other inaccessible regions) in addition to terrain corridors leading to interior populous areas, main communications, industrialized centers, and other strategic areas. Since broad coverage might include an entire country, priorities would be indicated periodically by the War Department. It was anticipated that some charting photography might be utilized in the compilation of these maps.

20. Ltr, AC/S WDGS, G-2 to OCD, sub; Post War Mapping, 29 Mar 45, Tab 24
Title: Mapping and Charting General, Map and Photo Branch, MID.

Large Scale:

Required only of those areas pertinent to the defense of the United States and its Possessions, and in possible combat areas. For planning purposes, the borders of the continental United States to a depth of 100 miles, and all critical beach areas, communications and industrialized areas of United States' Possessions would be covered. Foreign coverage would be designated from time to time by the War Department.

On 17 August 1945 General Bissell wrote the Commanding General, Army Air Force and the Chief of Engineers²¹ asking that G-2, War Department General Staff, be advised of their plans for postwar implementation of the responsibilities set forth in paragraphs 43 and 44, AR 300-15, charging the Chief of Engineers with certain responsibilities in time of peace for military mapping and similarly charging the Chief of the Air Forces in connection with aeronautical charting.²²

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21. Ltr AC/S, G-2, WDGS, to CG, AAF and OCD, 17 Aug 45, sub: Postwar Mapping, Tab 24, File: Postwar Mapping, Map and Photo Branch, MID.
22. Par 43, AR 300-15, 1 May 45 states: Chief of Engineers - The Chief of Engineers is charged in time of peace with all military mapping in the United States, and with the preparation of procurement of such maps of foreign territory as may be prescribed by the Secretary of War. He is responsible for the procurement and custody of maps and map data pertaining to the United States and of territory garrisoned by its forces, and for the custody of such maps and map data of foreign territory as may be required. He is responsible for the supply of maps to authorized organizations within the zone of the interior as prescribed in paragraph 47, and for the initial

supply of such maps as may be needed in an emergency. In furtherance of this duty, the Chief of Engineers will operate the Army Map Service and such other facilities as may be necessary for:

a. Collection, cataloging, and storage of foreign and domestic maps and map information required by the War Department.

b. Map service required by the War Department General Staff, the Army War College, and other authorized agencies.

c. Compilation and reproduction of maps required for initial operations of field forces and reproduction of such other publications as may be authorized.

d. Development and improvement of mapping and map reproduction methods, with particular emphasis upon those methods most suitable for use in theaters of operations."

Par 44, AR 300-15, Change 4, 19 Jul 44, states: "Commanding General, Army Air Forces - The Commanding General, Army Air Forces, is charged in time of peace and in an emergency with all military aeronautical charting in the United States and its Possessions and with the preparation or procurement of such aeronautical charts of foreign territory as may be required by the Army Air Forces. He is responsible for the supply of aeronautical charts required in the theater of operations and the maintenance and supply of such charts which cannot be maintained or produced with facilities available to the theater commander. In furtherance of this responsibility, the Commanding General, Army Air Forces, will operate the Aeronautical Chart Service and such other facilities as may be necessary for:

a. Collection, cataloging, and storage of foreign and domestic aeronautical charts and special maps required by the Army Air Forces.

b. Chart supply and distribution required by the Army Air Forces staff and for operations.

c. Compilation and reproduction of aeronautical charts and related publications as may be required for planning, air navigation, contact flying, and tactical missions.

d. Development and improvement of charting and chart reproduction methods to be used in air operations."

"Casey Jones", the First Postwar Project.

The idea of extensive postwar mapping and charting was gaining momentum. The "Casey Jones Project" had been inaugurated the previous June. This undertaking was a postwar aerial mapping project carried out more or less jointly with the RAF. As early as 28 September 1944 the War Department had felt it highly desirable that the entire continent of Europe be covered by American photography suitable for use in our multiplex equipment. Later the Mediterranean and North African regions were added.

The project involved precision mapping photography but left the idea of accurate ground control to the future. It was felt that the opportunity was present for accomplishing the photography while the ground control, which could possibly be achieved later, would have been difficult to obtain and very time-consuming. As such, then, it was not a complete mapping scheme. Its later success (project officially ended 31 Dec 46) was to prove the capabilities of the Corps of Engineers and the Air Corps. It set an example of what could be done with vigorous prosecution despite many obstacles.

Lessons of World War II

Wartime operations had driven home the fact that most of the world's surface features are very poorly mapped and, further, that we had been extremely negligent before the war in collecting even what

23. AC/S, G-2 to C/MID, sub: Termination of Project, 5 Nov 1946, Tab 35, file; Policy Matter involving the British Mapping & Photo Br, MID.

relatively meager information as was available. Accurate, large-scale, up-to-date maps are a first essential to conducting successful modern warfare; this will remain true regardless of future development. Sufficient maps cannot be produced in time of war; a major joint peacetime effort must therefore be made to collect existing data covering all potential combat areas and routes thereto. This must be supplemented by a mapping program to initiate or complete such data.

The Joint Chiefs of Staff, fully conscious of these ideas, issued a policy memorandum, 21 August 1945, establishing a centralized catalog and files of topographic maps and map information. The Army Map Service was designated custodian and all agencies subject to JCS Directives would forward such suitable data and maps that would add to the existing collection.

Opinions, Office Chief of Engineers

The tenor of War Department thinking at the time in regard to the need for future mapping is exhibited in the following excerpts contained in a memorandum OCE to ASF. First of all, cognizance of the deficiencies in source material for adequate maps exhibited in World War II are shown.

"Only by the grace of our allies and not unmixed with Divine Providence did we meet the problem ((of adequate maps)) for our

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24. Ltr, TAG to CDC 24 Aug 45, sub: Establishment of a Centralized Catalog and file of Topographic and Topographic Map Information (JCS 1466) with JCS Policy Memo #24, 21 Aug 45 incl. In CDC 062, 24 Aug 1945.
 25. Memo OCD to ASF 21 Aug 45, sub: Postwar Mapping, TAB #8, file. Postwar Mapping, General, Map and Photo Branch, MID.

preparation in this respect was pitifully inadequate. . . . in aerial operations in the Pacific we probably lost more planes by reason of faulty navigation as a result of faulty maps than through the result of enemy action."

The significant points that maps cannot be made overnight nor a mapping organization spring into existence by the mere provision of funds necessitates our future mapping needs being met by an organization which functions continuously and carries on an intelligent, systematic, and coordinated world-wide program. That idea is summarized in the memorandums by:

"You cannot buy time in map compilation. . . if we lag, it should be with full knowledge of possible consequences."

A letter from the Chief of Engineers to the Assistant Chief of Staff, G-2, War Department, General Staff, on an overall plan for postwar mapping mentioned a mutual program in South America (the joint Venezuela OCD project) and summarized the basic needs and past lessons relative to world-wide mapping.²⁶ Paragraph 5 of this letter relative to map coverage, stated:

"Proper provision for an emergency requires the production of reproduction material and stocks of each map sheet sufficient for planning and emergency issue. The areas of military interest to be covered are conceived to be the Atlantic and Pacific shores of all continents bordering these oceans to a minimum depth of 50 miles, the principal ports, industrial centers and routes of communication into the interior of the bordering continents, all islands of the Atlantic and Pacific oceans north of 20°S. latitude, all of Europe and the shores of islands of the Mediterranean, all of Central America and the islands of the Caribbean and Gulf of Mexico. The information to be produced included topographic, geological, road, and 'goings' maps at appropriate scales, beach and off-shore hydrography, horizontal and vertical control, together with basic geodetic and geographic data, and data on the natural and

26. Ltr OCD to ACS, G-3, WDGS, 1 Oct 45, sub: Overall Plan for Postwar Mapping, Tab 21, file: Mapping and Photography, General, Map and Photo Branch, MID.

man-made physical characteristics of each area. The gathering of the required data in foreign areas requires a coordinated program involving the use of ground and aerial surveys, the collection of native produced data and exchange of basic materials and finished products with foreign nations, private and government agencies, institutions and individuals."

Paragraph 6 stated that thought had been given to subject of postwar mapping, and contained some pertinent notes relative to South America.

"A mapping program to provide the items mentioned in paragraph 5 above has been tentatively formulated and is in the process of detailed planning and promulgation. . . A mutual program of mapping geodesy in the Americas is being proposed and started on a small scale. . . Mapping of foreign areas for military purposes is a War Department responsibility. Basic topography and geodesy of an area are generally permanent in character while the works of man are subject to important changes in a short period of time, consequently, in the mapping of foreign areas primary emphasis will be placed on providing basic topography and geodesy in suitable form for later revision prior to an operation. . . . North American triangulation should be continued through the Caribbean area to South America. . . The force and equipment provided for map production are not sufficient for the task unless all efforts are pooled on first priority work, duplication of efforts eliminated, and wastage due to poor direction obviated. This requirement necessitates centralized coordination of all mapping activities. . ."

"Responsibility for the production of maps must be accompanied by the authority necessary to discharge that responsibility. Aerial surveys are the only means of surveying over enemy held territory. Therefore, aerial photographs constitute the most important category of information necessary for the production of operational maps. The mapping agencies must be furnished the requisite authority to insure the programmed procurement of these essential data. . . . Mapping staffs in each headquarters should be under the Chief Engineer of the Command. . . ."

Opinions, G-2, WDGS

The G-2 opinion of the time²⁷ stated:

27. Comment #2, G-2 attached to ltr mentioned in the preceding footnote.

"New developments in warfare and the possibility of devastating surprise attacks make it necessary to have the tools and information on hand for rapid preventive and retaliatory measures. Accurate current maps are a vital part of that information which should be on hand. Exploitation of photography will be a source material for terrain intelligence and mapping and charting where such information is now deficient or non-existent must be acquired; exploitation will have to be on a long term basis because of the vast areas involved. An orderly and continuous mapping and charting program based on priorities established by the War Department is desirable."

Charting Plan for Central and South America

One immediate result of all this was the publication of the Charting Plan for Central and South America (less Mexico and Brazil) on 22 October 1945. Although as will be related, some activities of the sort had been carried on for years in the area, this development was outstanding in the organized project for mapping the Hemisphere.

This charting plan, received in Caribbean Defense Command 6 November 1945,²⁸ represented not only a consolidation of all preceding directives into one plan but was an integration of the better procedures. Past experiences during the evolutionary process had shown which were the better methods and procedures. Under this plan the War Department (Chief, MIS) was to prepare over-all plans in coordination with the State Department and assign responsibility for the accomplishment of necessary photography and ground survey to the Commanding General, Caribbean Defense Command. Previously, Caribbean Defense Command had been required to furnish only logistical support; now, it was responsible

28. Ltr TAG to CG, CDC, 1 Nov 45, sub: Photographic Projects in South America, Central America and Caribbean Area w/incl #1, Charting Plan for Central and S. America less Mexico and Brazil, See App. III.

for accomplishing the mission. The accompanying letter stated that the Commanding General, Army Air Forces, and the Chief, Military Intelligence Service, would furnish the required assistance or request of the Commanding General.

The plan included detailed responsibilities of certain staff officers of Caribbean Defense Command and of the Military Attaches. It was pertinent, the Plan stated, that the theater G-2, with assistance of the Reconnaissance Officer, would be the appropriate officer to prepare theater directives to implement the charting plan. If mapping photography were required, he would also be assisted by the theater Engineer. The inclusion of the Engineer was necessitated since it was contemplated that some large-scale mapping would be required and that the engineer would be responsible for specifications and for obtaining ground control.

The Charting Plan cited FM 30-21, Aerial Photography, Military Applications, as the authority for assignment of responsibilities for planning, administration, and operations. The following quotations, taken from different paragraphs of the Charting Plan, illustrate the specific designation of responsibility.

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The theater commander will be responsible for the accomplishment of aerial photography required under this plan to include staff supervision of the Echelons of the 311th Wing attached.
(par 6)

The theater commander will be responsible for obtaining horizontal and vertical control data required for aeronautical

29. Charting Plan for Central & South America (less Mexico and Brazil) (S). In G-2 CDC. See Appendix III.

charting in the areas to be photographed. (par 8)

The theater commander will be responsible that all necessary photographs, duplicate negatives, and plot maps required by contract are made and that this material is furnished the Military Attache for delivery to the appropriate foreign country. (par 9)

Accompanying maps indicated projects assigned and the plan reiterated the policy as outlined, 20 January 1945 by G-2, WDGS, relative to decision and handling of major and minor projects. New agreements pertaining to such projects would be formal and the Charting Plan set forth precisely what the United States would furnish each government when the photography was accomplished.

In accordance with the directive, Headquarters, Caribbean Defense Command, organized the Reconnaissance Section on 19 November 1945. Lieutenant Colonel Patrick B. McCarthy was designated Reconnaissance officer. He was to operate and function under the Air Officer, Caribbean Defense Command, and have the duties of assisting the Commanding General in monitoring the photographic projects, exercising staff supervision over attached photographic and geodetic control units, and effecting necessary coordination with the Military Attaches concerned.

War Department - Map Planning

Map Planning within the War Department was also coming to the fore. A directive was issued as a result of JCS Paper #756 which explained the strategic necessity for mapping in the Far East and Eastern Pacific islands. The Paper pointed out that it was opportune to carry on such work in view of future reduction of forces and, for political reasons,

30. CDC Adm. Memo #24, 19 Nov 45. In CDC Adm Memo, 1945 File.

that we were more apt to be cut off shortly from further future work. Other areas of the world would probably be almost as accessible at a later date. The War Department felt that this paper gave highest priority to the Far Eastern mapping. This, it might be pointed out, was later to prove a stumbling block to activities in Central and South America.

Mapping - Western Hemisphere

At that same time, however, along with the general momentum in map planning, plans were being drawn up for mapping of the Western Hemisphere, to include Central and South America. This effort was to supplement the already existing Charting Plan and was to place mapping, objectively, on a more formal basis than the mere inclusion of provisions for mapping photography in that plan.

The planning was based upon strategic considerations that in a future emergency the Western Hemisphere might have to stand alone and, secondly, that South America represented one of our principal exterior sources of supply. The mapping program, initially, was envisioned as more or less of a token effort costing about \$600,000 a year for approximately twenty years. In that time, it was felt, photography could be completed, a geodetic net established through Central America, and localized nets in the principal or important regions of the continent.

30a

30a. Ideas expressed by Lt Col Wirak, GSC, formerly of Policy Section, G-2, WDGS, who was instrumental in the preparation of a mapping plan.

The plan was written by 6 November 1945 and forwarded to Caribbean Defense Command where it was received on 11 December 1945.³¹ The purposes as set forth in the mapping directive were:

- a) To supplement the Charting Plan for Central and South America and the similar plans for Brazil.
- b) To establish a basic plan of mapping and photography in order to meet War Department requirements, and
- c) To outline responsibilities for photography and geodetic control.

The War Department (Chief, MIS) had the overall responsibility for coordination of activities. In Central and South America (less Mexico and Brazil), the Caribbean Defense Command was assigned the same responsibility as under the Charting Plan. The Commanding General, AAF and the Chief of Engineers were to make available photographic and survey units to accomplish the required photography and survey data. The Chief, MIS was to accomplish coordination and technical supervision and, when required, obtain diplomatic permission to operate in foreign countries.

The Commanding General, with the assistance of the Theater Reconnaissance Officer and the Theater Engineer, and utilizing units and personnel made available by the AAF and Chief of Engineers, was responsible for photographic and survey operations. As previously outlined in the Charting Plan, Caribbean Defense Command, through the various Military Attaches was to make diplomatic agreements to permit the accomplishment of these operations.

31. Ltr TAG to CG, CDC, 5 Dec 45, sub: Mapping Plan, Western Hemisphere w/incl: Mapping Plan, Western Hemisphere. See Appendix I.

Maps were included to show approved projects and priorities. Major and minor project additions would be handled as explained under the Charting Plan.

Joint Mapping in South America

Meanwhile the joint OCD- Venezuela project, previously mentioned, was virtually complete as it had been prepared for exhibition at the Third Consultation on Cartography, Pan American Institute of Geography and History, to be held at Caracas, Venezuela, in December 1945. The Office, Chief of Engineers, had liked the idea suggested by Mr. Randall to the effect that a joint operation for mapping in South America be undertaken. The Isle of Margarita was selected to be mapped. The Air Force accomplished the photography and Venezuela provided most of the ground control. A manuscript map, in six sheets, was prepared at the Army Map Service, Washington, D. C. The sheets were then sent to Venezuela for place names and corrections. It was printed in the United States and the final product was ready in October. However, the Third Consultation was postponed until August 1946. This, in one way, was helpful for it gave Caribbean Defense Command an opportunity to digest the charting and mapping plans and to organize itself for the accomplishment of its missions. Energetic leadership made it possible for Caribbean Defense Command to submit a spectacular proposal at Caracas which was to have import and far-reaching results to the nations themselves, the Commission, and the Cartographic program of Caribbean Defense Command.

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32. In tracing the development of MAPPLAN, it must be borne in mind that this project was a postwar development and was planned with a hemispheric-wide point of view.

CHAPTER IV

Earlier Regional Projects in Panama

Numerous Surveys Portrayed Little

During the years while the planning and organizing leading to MAPPLAN, CDC, were being advanced in Washington and in some other capitals throughout the hemisphere, work for proving maps of the Panama area was in progress on a small scale.

From 1520 until the present day, surveys of the Isthmus of Panama have been made. Until 1848 numerous surveys for routes for canals, roads, and railroads were made, but from such studies little of the terrain of Panama was learned, and knowledge of the topography of Panama was limited. ³³ Engineering surveys for a trans-isthmian railroad were made when gold was discovered in California in the middle of the nineteenth century. Adequacy of the surveys made for this railroad was reflected in the fact that in one section alone, whereas fifty-four bridges were estimated as necessary, 170 had ³⁴ to be constructed. The survey basis for the French Canal, a system of hatched maps prepared without the establishment of geodetic

33. Paper prepared by Col. Fremont S. Tandy, Chief Engr CDC, presented before the American Society of Civil Engineers, Panama Section in Balboa, C. Z., 8 Sep 47.

34. Ibid.

survey stations, was of such poor quality that the abandonment of that work by the French was due in some measure to the lack of topographical data upon which to establish firm routing. ³⁵ }

Geodetic Work Begun in 1908

Geodetic surveys were begun in Panama in 1908 after a history of four hundred years of exploration. The surveys are the basis of the Panama Canal primary system of triangulation upon which all other geodetic and topographic surveys in Panama are based, except those isolated systems used for US Navy hydrographic purposes. ³⁶ After four years of work on the Canal, integration and extension of the several engineering surveys were undertaken, for before this attempt, initial construction on the Canal was carried on with no integration of the various individual projects. ³⁷ A pentagonal system of geodetic figures was used, dependence on astronomic determinations being placed in two astronomic stations within Panama: the lighthouse at Colon, then Aspinwall, and the southeast tower of the Cathedral of Panama. These two stations had previously been established ³⁸ by the US Navy Hydrographic office in 1875.

However superior this initial geodetic effort in Panama over the old hatched maps used by the French and the non-integrated surveys during the first years of actual construction of the Canal, many discrepancies were discovered. There was much correction to be done between the geodetic and astronomic determinations: the base lines used were 1.3

35. Ibid.

36. Paper prepared by Col. Fremont S. Tandy, Chief Engr CDC, presented before the American Society of Civil Engineers, Panama Section, in Balboa, C. Z., 8 Sep 47.

37. Ibid.

38. Ibid

kilometers short of accepted length; and the average triangular closure of the geodetic system varied from 1.98 to 5.125 seconds. A discrepancy between the geodetic and astronomic determinations was 10 seconds or 340 meters in longitude and 21 seconds or 700 meters in latitude. Reduction of such discrepancies was obtained by the U. S. Coast and Geodetic Survey, adjustment being made by the use of the theory of Isostasy to 7.18 seconds or 132 meters longitude and 13.43 seconds or 246 meters in latitude. The corrections were made on twenty-five second order positions and sixty-seven third order positions. Gatun Lake, which now covers that area, long since has hidden the answer to the cause of such large discrepancies, but Colonel Tandy, Chief Engineer, CDC, proposed the theory that there was a failure to evaluate deviations from the vertical in the calculations.

Military Survey Started

In 1935 a Military Survey of Panama was started even though the original treaty with the Republic of Panama contained no specific reference to the privilege of the United States government's entering the Republic for any such mission. However, liberal interpretation of the Treaty covered the expeditions of the engineers undertaking this work. Projections of this program were made to the War Department twenty-one months in advance of the execution of the plans in order to meet the requirements of fiscal appropriations. This Survey was a part of an approved War Department ten-year basic mapping project which was

39. Ibid.

40. Paper prepared by Col. Fremont S. Tandy, Chief Engr CDC, presented before the American Society of Civil Engineers, Panama Section, in Balboa, C. Z., 8 Sep 47.

41. Ibid.

42. Memo to DE, 27 Dec 44, sub: Mapping Study, PCD. In Engr Dept 061 Maps and Mosaics 1945.

discontinued officially 8 April 1939 when each Department was given the responsibility of submitting areas of an annual mapping project.⁴³ This annual mapping project of the Panama Canal Department followed the accepted limits of the Military Survey of Panama, even though no definite limits were placed on the coverage. No new areas outside this Survey had been mapped in the sense of establishing a geodetic control net tied into one basic datum for territory theretofore lacking a primary system of triangulation,⁴⁴ so that the mapping program became more one of revision except for the promulgation of a program to map outlying defense sites within the area of Panama. As late as December 1944 little progress had been made under this program.⁴⁵

Department Area Was Vast

To cover the whole Panama Canal Department area would be a considerable undertaking. The Department contains 3,375 quadrangles, thirty-three of which had been mapped by December 1944.⁴⁶ Included in the Department tactical area is the Pan-American Highway, comprising with certain coast lines of the countries within the Department, 1,363 quadrangles of which 220 were defense sites. These quadrangles are divided between the Atlantic and Pacific Sectors, 1,031 on the Pacific side and 332 on the Atlantic side. The official unit of mapping was an image of mapped area of fifteen minutes of latitude and longitude, a

43. Ibid.

44. Memo to DE, 27 Dec 44, sub: Mapping Study, PCD. In Engr Dept 061 Maps and Mosaics 1945.

45. Ibid.

46. Ibid.

quadrangle composed of nine terrain units. This unit comprised that area best suited to tactical mapping as basic for defense.

Faucity of Personnel

In an effort to approach the mapping program within the Department at the rate of progress scheduled, numerous requests were made for personnel and equipment,⁴⁷ but increment in allotments was not approved. The first field work was accomplished by the Eleventh Combat Engineers, reorganized in March 1940 as a separate Panama Canal Department unit from its station at the Panama Pacific General Depot⁴⁸ and later absorbed in the 33d Infantry Regiment. This work consisted of second and third order triangulation,⁴⁹ third and fourth order transit-traverse,⁵⁰ and plane table work⁵¹ for topographic detail. This unit not only accomplished the field work connected with early mapping under the Military Survey of Panama but with approximately thirty men assimilated the field data in the publication of the required maps.⁵²

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47. Ltr, DE to CofS PCD, 10 Feb 44, sub: Inclusion of Survey Platoon in T/O of 662d TopoCo. In Engr Dept 061 Maps and Mosaics 1944.
 48. PCD Hist Study (S), Preliminary Study of Retrospective History of PCD Dept Engr, Vol. III. In CDC Hist Sec files.
 49. First, second, third, and fourth order triangulation are surveying nomenclature signifying the degree of accuracy in the measurement of degrees and length of base lines from which computation and actual measurements are made. First order triangulation signifies accuracy from repeated computations and measurements within most limited allowances of error, the succeeding orders denoting less requirements of accuracy. (Fr conv, Capt. M. L. Evans with Capt. Arthur L. Freer, Office of the Chief Engineer CDC, 10 Dec 47).
 50. Transit-traverse is the use of the Engineer's transit in the measurement of angles in the field.
 51. Plane table work is the measurement of angles from a plane table set up in the field and actual detail work done in field rather than from notes.
 52. PCD Hist Study (S, Preliminary Study of Retrospective Hist of PCD - Dept Engr, Vol. III, p. 35. In CDC Hist Sec files.

Much is encompassed in map making. Tasks included surveying, the establishment of ground control data by a field party that physically covers the ground to be photographed in order to fix certain tie-in points for use in correction calculations; photogrammetry, the preparation of the draft of a topographic map from the photographs and the ground control data by the location on the photograph of the known points actually surveyed; drafting, the retracing of the finished map in as many different sections for each area as there are to be colors to be printed; and printing, the reproduction from the draft in specified colors of all the data required. Surveying by a party of fifteen men working in reasonably good terrain could produce control for about six square miles of a similar map per day. Although actual production of the maps was chiefly in Washington, a five-color map requirement could be drafted by ten men in Panama to cover five square miles per day, and a one-color map could be drafted at the rate of twenty square miles per day. The printing establishment available in the Panama Canal Department could print several thousand copies of a five-color map at the rate equivalent to eight square miles per day. Photogrammetric personnel available in CDC could produce one and one-half square miles of three-inch map per one-shift day.⁵³ Normal basic mapping requirements were placed at five square miles per day, the equivalent of 300 square miles per year,⁵⁴ or an average on production of twelve terrain sheets.

53. Check slip, DE to G-2 CDC, 23 Sep 41, sub: Aerial Photography. In Engr Dept 004.5 Photography-Photographs 1940-1941.

54. Ltr, Engr & Contracts Sec DE, 29 Sep 44, sub: Aerial Mapping. In Engr Dept 061 Maps and Mosaics 1944.

Surveying Necessary for Ground Control.

Surveying is considered the basic work to establish ground control of any detailed map-making program destined to furnish all those types of information necessary in producing all types of informative tactical maps, in spite of the growing excellence of air photomapping and charting. The Caribbean Defense Command used ground surveying crews to establish and record for tactical mapping such details in surface surveying as topographic features, locations of tactical installations, ammunition and gasoline areas, roads, trails, and walks, and the location of buildings and drainage facilities as well as sub-surface power, water, and sewerage lines. The flagging of topographic features to aid aerial photomapping in the identification of specific small areas or points and the monumenting and bench marking of surveyed areas is continued in the field work. Such surveying has required especially qualified technicians not only to make the original ground survey but to maintain up-to-date revisions on existent maps.

Aerial Mapping Utilized

The air operations of the Caribbean Defense Command area included both mapping and charting work and in the case of regular projects were supported by ground activity to tie the maps into the terrain. As used in aerial photography there is considerable difference between mapping and charting. Mapping photography generally pertains to vertical photographic coverage for the production of large scale maps, and charting photography pertains to the use of two cameras taking oblique photographs at greater distance in addition to the vertical one (trimetrogon coverage) for small scale maps. Charting also applies to requirements for certain large

scale charts.

Both the initial and later mapping and charting photography were taken from high altitude, 20,000 feet. In addition to this high altitude work directed by the basic mapping program, certain special projects have been taken at altitudes as low as 4,600 feet. The mapping photography is taken by using a single vertical camera, mounted on a base which will revolve so as to permit the film at all times to remain approximately parallel with the horizon. The charting photography is approximately fifteen miles in width, whereas the flight strip of the mapping photography is only approximately four miles in width. Sufficient overlap is demanded in each case to meet Army specifications. The difference in the width of the flight strips creates the demand for more ground control points for the accomplishment of mapping photography. Mapping photography better permits the development of large-scale maps than does charting photography for the following reasons:

- (1) The use of a single vertical camera permits less distortion.
- (2) The narrow flight strips plus the high percentage of over-lap allows for more detailed photography of any single point.
- (3) The use of more ground control points creates a higher accuracy of details.

Orderly Coverage Desired

Mapping photography, as distinguished from reconnaissance or charting (trimetrogon) photography, was referred to as seeking orderly

55. FM 30-21, 22 Sep 44, Aerial Photography, Military Application. In G-2 CDC files.

photographic coverage for the preparation of new and revised maps, as a basis for orientation of subsequently detailed and localized reconnaissance photography, and to locate coordinates for artillery fire control.

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It is necessary to tie the air photographs into the terrain by the setting up of ground control points through which features on the air photographs can be connected with points on the ground. This step on the mapping project is accomplished by a method similar to that used in determining the location of a ship at sea by reading the angle made by the sun. Members of the ground party penetrate the jungles to a terrain feature which may be utilized for this purpose, set up a station, and establish their location for a control point. Comparatively few ground control points are needed to accomplish satisfactory alignment of the air photograph with the ground.

56. WD Cir, 18 Aug 43, sub: Mapping and Photomapping. In PCD 004.5-3-2-1 (1943).

CHAPTER V

Prewar and War Charting

Prewar Activities in Central and South America

Prior to the war, Army mapping and charting activities in the Central and South American countries were, for the most

CHAPTER V

part, negligible. Some evidence is shown

PREWAR AND WARTIME CHARTING

by the miscellaneous requests of the War Department for the purpose of supplementing existing map and chart information, and for objection folders.

In 1940 air units of the Panama Canal Department were equipped to perform limited aerial photography missions assigned by the Commanding General of the Nineteenth Composite Wing or less frequently by the Department. Most of the early missions were limited to the photographing of installations and defense sites. The Assistant Chief of Staff, G-2, War Department, was responsible for mapping and charting programs.

Earlier aerial photography work was frequently confined to the production of the mosaics. In 1940, the 44th

77. Prewar, Op Cit, Fifth Section, p. 1.

78. Ltr (C), 15th AB Op to CG PCD through 19th Mg, 7 Oct 40, as cited in PCD OCA, 5-1 (1940).

CHAPTER V

Prewar and War Charting

Prewar Activities in Central and South America

Prior to the war, Army and Air Corps mapping and charting activities in the Central and South American countries were, for the most part, negligible. Some interest had been already evidenced as shown by the miscellaneous requests of the War Department for the purposes of supplementing existing map and chart information, and for objective folders.⁵⁷

In 1940 air units of the Panama Canal Department were equipped to perform limited aerial photography missions assigned by the Commanding General of the Nineteenth Composite Wing or less frequently by the Department.⁵⁸ Most of the early missions were limited to the photographing of installations and defense sites. The Assistant Chief of Staff, G-2, War Department, was responsible for mapping and charting programs.

Earlier aerial photography work was frequently carried on farther than the production of the mosaics. In 1940, the 44th Reconnaissance

57. Freer, Op Cit, Fifth Section, p. 1.

58. Ltr (C), 16th AB Gp to CG PCD through 19th Wg, 7 Oct 40, no sub. In PCD 004.5-1 (1940).

Squadron made mosaics of defense sites⁵⁹ and of posts, camps, and stations⁶⁰ of the Panama Canal Department under the authority of the Commanding General of the 19th Composite Wing.⁶¹ Occasionally, the authority came directly from the Commanding General of the Department.⁶² Work was on a sufficiently leisurely scale for time to be taken to photograph for the author Samuel E. Morrison points visited along the Caribbean Coast by Columbus.⁶³

Under War Department Direction

Late in 1940, photo missions were being carried out in Central America by PCD on War Department assignment.⁶⁴ During November, two crews obtained vertical and oblique photographs of twenty-seven of forty locations to be photographed in Nicaragua. Photographing of localities in Costa Rica was scheduled. Another mission was coverage of the Cocos Islands, belonging to Costa Rica three hundred miles out in the Pacific.⁶⁵

For the purpose of supplementing existing map information and for objective folders, air photographs of Paraguay were requested through

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59. Ltr, CO 44th Recon Sq to CO Albrook AB, sub: Classification of Photographs. In PCD 004.5-1 (1940).
 60. 1st Ind, Hq PCD to TAG, 5 Apr 40 on Basic, PCD to TAG, 6 Mar 40, sub: Maps of Stations. In PCD 004.5-1 (1940).
 61. Ltr (C), CO 16th AB Gp to CG 19th Wg, 7 Oct 40. In PCD 004.5-1 (1940).
 62. Ltr, CO 16th AB Gp to CG 19th Wg, 2 Apr 40. In PCD 004.5-1 (1940).
 63. Ibid.
 64. Rad (C), Adams to CG PCD, 14 Nov 40. In PCD 004.5 (1940-1941).
 65. Ltr (S), Pan Canal AF to CG PCD, 10 Dec 40, sub: Progress Report on Aerial Photography Project in Central America.

diplomatic channels late in 1940. Airports, sea lane anchorages, sea-ports, cities, refineries, storage tanks, electric power plants, bridges, railroad yards and repair shops, and smelters were among objects to be covered.

⁶⁶ On 1 January 1941, a photographic mission to Bolivia was blocked on with disfavor because the twenty-five thousand foot elevation required for western Bolivia was above the ceiling of their B-18

⁶⁷ planes.

The northern portion of Guatemala had been photographed by the Fairchild Corporation prior to Panama Canal Department projects in Guatemala. Therefore, when Guatemala was approached, she agreed to provide negatives of the work done by the Fairchild Corporation in return for our photographing the southern half of the country. The negatives for the Guatemala mission were mislaid for some months in the

⁶⁸ vaults of G-2, PCD. In connection with the proposed photography of Guatemala and El Salvador, it was stated on 7 March 1941 that the Commanding General, Panama Canal Department, then had authority to arrange permission from all countries over which it was necessary to make flights. Requests were not for complete coverage. For several of the projects, the same objects were mentioned in nearly the same

66. Ltr (C), TAG to CG PCD, 16 Dec 40, sub: Aerial Photographs of Paraguay. In PCD 004.5 (1940-1941).

67. Check slip (S), CG PCAG to AG PCD, 3 Jan 41. In PCD 400.5 (1940-1941).

68. Incl 2 to dispatch 1591, 27 Nov 1940. PCD 004.5-17 (1941).

69. Ltr, CG PCD to TAG, 14 Feb 42, sub: Negatives of Aerial Photography Taken in Guatemala. In PCD 004.5-4 (1941).

language, airfields, seaplane anchorages, port facilities, utilities, repair shops, railroad bridges, stations and other critical areas. The purpose given was the same in each case: supplementing existing map information and for objective folders.⁷⁰

There was no reference to making the resulting mosaics real maps by typing them into the terrain through locations by ground crews.

The 1942 program, accomplished by the Eleventh Engineers, called for re-flagging of existing triangulation, the establishment of nets containing a total of 250 triangulation stations, and the location of picture control from these nets.⁷¹

Antilles Operations

On request of the War Department,⁷² air units within the Puerto Rican Department were given the mission of flying large areas in obtaining photographs of airfields, seaplane anchorages, cities, port facilities, railroad yards, and other such areas of critical importance within British Guiana and Surinam. Individual photographs seven by nine inches to a scale of 1:5,000 to 1:10,000 with an overlap of sixty degrees to the side were required. The 27th Reconnaissance Squadron was assigned these flights,⁷³ but due to the cloudiness along the Lesser Antilles and

70. Ltr, TAG to CG PCD, 20 Feb 41, sub: Aerial Photography in British Honduras. In PCD 004.5-17 (1941).

71. Ltr, Office of DE, 26 Nov 41, sub: Field Party for Mapping Operations, Military Survey of Panama, FY 1942. In PCD 061, 1940-43.

72. Ltr, TAG to CG FRD, 21 Jan 41, sub: Aerial Photography in Trinidad Br. Guiana and Surinam. In CDC 373.25 Photography and Mapping, Trinidad.

73. Ltr, 27th Recon Sq to CG 13th Comp Wg, 21 May 41, sub: Secret Projects. In CDC 373.25 Photography and Mapping, Trinidad.

on the coast of South America during the months of June following, no progress could be made. The suggestion that Air Corps tactical units undertake the flights in conjunction with their regularly scheduled operations from Trinidad fields was approved on assignment of the projects to the Commanding General, 19th Bombardment Wing.⁷⁴

Early in January 1942 permission was requested of the various countries of Central and South America to photograph their territories from the point of view of compiling air navigation charts.⁷⁵ Ten of the countries gave consent without qualification and previous arrangements with the Republic of Panama precluded the necessity of such arrangements. Those nations included Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, and the British government for British Honduras. Negotiations with Mexico were well advanced.⁷⁶ The Venezuelan government was, also, being requested to allow aerial photographic flights. The unit assigned the mission of securing this photography, the First Photographic Group, was not assigned to the Theater since its mission in the compilation of air navigation charts along air routes throughout all of the Central and South American countries often took planes into territory not under the

74. Check slip, CG CAF to CG CDC, 27 Jun 41, Note 2: Aerial Photography in Lesser Antilles. In CDC 373.25 Photograph and Mapping, Trinidad.

75. Memo Dept State for Lt. Col. J. G. Taylor, Chief Intel Div AC, 9 Jan 42. In CDC 373.25 Mapping and Photographic Opns-AVN thru 20 Sep 44.

76. Memo, Dept State for Lt. Col. J. G. Taylor, Chief Intel Div AC, 9 Jan 42. In CDC 373.25 Mapping and Photographic Opns-AVN thru 20 Sep 44.

jurisdiction of the Caribbean Defense Command. By the last of March

one plane of the Group had reached Puerto Rico, working out from

Borinquen Field down the line of the Lesser Antilles. Other planes

of the Group were outfitting in southern California for early operations

within the South American areas. The photographic missions included

photographing airfields, towns, and harbors, and to collect airport

information in making corrections on regional aeronautical charts.

Low-Altitude Photos Needed

In March 1942 with the expansion of the Aircraft Warning Service in the PCD, requests for aerial photography in locating stations were parts of the mission of the 72d Observation Group, Howard Field, C. Z. The photographs were required of as low altitude and large scale as practicable in order to show properly the topographical features and allow stereoscopic tracing of proper contours so as to produce clear and sharp lines. Six sets of such photographs were flown in determining the station at Jaque Point. Such a high degree of distortion was found at low altitudes and correspondingly large scale because of the unevenness of the terrain that an altitude of 4,600 feet was used with a corresponding scale of 1:9200. From these photographs enlargements up to five diameters were

77. 4th Ind, TAG to CG AAF, 15 Mar 42 on Memo, Dept State for Lt. Col. J. G. Taylor, Chief Intel Div AC, 9 Jan 42. In CDC 373.25 Mapping and Photographic Opns-AVN thru 20 Sep 44.

78. Ibid.

79. 5th Ind to basic above, 31 Mar 42, Hq AAF to CG, CDC.

80. Rad CDC to AM CONSUL, Belize, Br Honduras, 6 Oct 42. In file CDC-S 062 Photography Gen, fr Jan 41 to Dec 43.

possible in order to provide a scale of 1:3,000 or 1:4,000 as a means of
obtaining a usable scale for the purpose. ⁸¹ After 1942 Air Photography
directly under the Panama Canal Department was chiefly limited to posts, ⁸²
camps, stations and other military installations in the Canal Zone area.
The Department Engineer Reproduction Plant, operated from 1926 until 1942
under direct control of the Chief of Engineers, ⁸³ passed to the Panama
Canal Department in 1942.

Most of the then existing air routes throughout Hispanic America
were inadequately charted. ⁸⁴ Few, if any, of the charts were based upon
aerial photography; instead, interested commercial companies had compiled
their own from existing sources, such as the American Geographic Society's
Map of the Americas. Many of the German charts which fell into our hands
carried, purposely, incorrect altitudes. It was therefore difficult to get
reasonably good charts. With the advent of hostilities, the need for
charting in many of these countries was immediately recognized as a
necessary adjunct to the establishment of air transport routes. The Army
Air Force initiated charting projects to meet this need by assigning the
task of procuring ground data and charting photography suitable for
compilation of aeronautical charts to the 311th Reconnaissance Wing. ⁸⁵

81. Ltr CDC 3 Mar 42 to CG, CAF, "Aerial Photograph" with 6th Ind. In file
CDC-S 373.25 Mapping and Photographic Operations - AVN thru 20 Sep 44.

82. Items in PCD 004.5-3-2-1.

83. Memo (informal), EHK (initialed) for Col Cary, 22 Jul 45. In Engr
Depot 061 Maps and Mosaics 1945.

84. Freer, Op cit, Fifth Section, p. 2.

85. Tab A ltr D/I to CG, AAF, 9 June 1946 sub: Mapping and Charting
Activities prior to the publication of the Mapping and Charting
Plans, file MID, 062 (MP).

In the urgency to meet wartime requirements, arrangements for obtaining diplomatic clearances from foreign governments were accomplished as expeditiously as possible. Urgency and the lack of established procedures resulted in little standardization of commitments; activities proceeded on a formal, informal, or inferred basis. In many of these arrangements the foreign members of the Commission on Cartography played a very important role in facilitating clearances, assisting in the supply of existing data, and in performing beneficial liaison. ⁸⁶

Wartime Operations in the Latin Republics

The first unit of the 311th Wing to start operations in the area was the 3rd Photo Charting Squadron (1942). ⁸⁷ They photographed the coastal strip from Georgetown, British Guiana to Natal, Brazil for the Air Transport Command's African and Asiatic routes. They subsequently continued operations in Brazil, carrying the charting on to Victoria.

In Brazil, where Air Corps personnel found verbal agreements as binding as written, the Commission Cartography performed helpful liaison and aided in supplying ground control data. Dr. Simonpietri, for example, found 3,000 Astronomic stations which he turned over for the use of the Air Corps.

In January 1943 the 2nd Photo Charting Squadron was assigned a project to photograph the Colombia airways. Heretofore, the President of Colombia required that photographs be formally requested of the

86. Freer, Op, cit., Fifth Section, p. 2.

87. This and the following information on operations of the 311th Wing were extracted from the "Unit History 311th Wing", Vol I, 1942-45, on file Hq 311th Wing, Andrews Field, Maryland.

Colombian government. He finally consented that, in the emergency, it would be possible for the United States to take what photographs it needed provided nothing was put into writing.

88

Block Method Used

Commencing with this project the "Block Method" of photographing was utilized. This method, which is essentially photographic aircraft flying in formation, facilitated compilation and insured usable strips in case weather prevented further operations in a specific area.

89

The 4th Squadron did work in Central America during the first half of 1943. Here they found that channels, and methods, varied in each country. Later in the year the Squadron moved to Venezuela and Brazil where they supported the 2nd Squadron.

Entry into Venezuela had been a difficult problem as the constitution of Venezuela forbade such work by foreigners. Under the emergency of war, a solution was finally reached. Venezuela was important not only for its airways and its proximity to the Canal but to the Army-Navy Petroleum Board for her oil resources.

It was also a possible outlet of Amazon rubber which, at the time was important to the Rubber Development Corporation.

90

Up to 1 July 1943, very little vertical photography had been accomplished in comparison with the great size of the Caribbean area, and charting from trimetrogon photography was limited to the greater part

88. Memo, Dept of State for Chief Intel, Div., AC, 9 Jan 42. In CDC 373.25.

89. Freer Op. Cit, Fifth Section, p. 3.

90. Freer Op. Cit., Fifth Section, p. 4.

of Central America, most of the seacoast of northwestern South America, and all of Cuba and Hispaniola. There was limited coverage of the interior of South America. Mapping and charting of the region on any thorough-going basis had yet to be initiated.

While these squadrons were at work in South and Central America some progress was being made in matters of policy. The Caribbean Defense Command was concerned in provisions for a board to integrate mapping activities and in the carrying out of a new War Department directive.

Canal Zone and Panama Area

In July 1943, Colonel James R. Rundell of the Office of the Chief Engineer, Caribbean Defense Command, following up earlier correspondence, recommended to the Chief of Engineers, CDC, that the mapping program for the Canal Zone be studied by a Board of Officers in order to determine plans, standards and other correlative data for map making of all the agencies within the Zone. Other agencies within the area concurred in the establishment of a board to study the mapping program. The Board of Officers for Preparation of Mapping Program was constituted 26 August 1943 to study map requirements for the Panama Canal Department including the Canal Zone and the Republic of Panama and to develop a program for the revision of existing maps and the preparation of new ones.

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91. Ltr (C), G-2 WD to CG PCD, 25 Sep 43. In PCD 004.5-3-2-1 1943 (C).
 92. Memo to Chief Engr CDC, 16 Jul 43, sub: Recommendations for Mapping Program - CZ. In PCD 061-1 1940-1943.
 93. Ltr to Comdt 15th ND, 10 Aug 43, and Memo to The Gov Pan Canal, 10 Aug 43. In PCD 061-1 1943.
 94. Rpt of Proceedings of Bd of Off Appointed to Investigate Mapping Program, PCD, 28 Sep 43. In PCD 061-1 1943.

Meetings were held from 30 August to 25 September 1943, during which Navy mapping requirements and the mapping program of the Panama Engineer Division were studied and a comparison was made of the mapping programs of the Panama Engineer Division and the Panama Canal, photomapping supplementation. The board found that six general types of mapping were being made in the Canal Zone by the various agencies:

| <u>TYPE</u> | <u>AGENCY</u> |
|--|--|
| 1. Tactical Mapping | Engineer Reproduction Plant of Dept Engr using aerial photographs taken by 6th AF. |
| 2. Post Layout and Utility Maps | Panama Engineer Division. |
| 3. Topographic Strip Maps and Townsite Layout and Utility Maps of Panama Canal properties. | The Panama Canal. |
| 4. Nautical Charts of Certain Outlying Bases. | United States Navy |
| 5. Miscellaneous Aerial Photographs of Various Areas. | Sixth Air Force |
| 6. Miscellaneous Maps Showing Roads, AWS, S/L, Battery Positions, etc. | Panama Engineer Division, and in few instances, The Department Engineer |

Findings regarding the status of the Military Survey showed work completed in aerial photography, recommended for the Fiscal Year 1940, of 178 square miles in the Rio Hato-Chame Area and some field work in the completion of some subsidiary control of the same area; completed drafting in six colors for publication of the Tactical Sheets Chitre among others. Projected aerial photography yet to be accomplished included 356 square miles in the Rio Hato-Chame area, recommended for 1940; 430 square miles of the Pacora-Chepo area, recommended for 1942; and the 1943 recommendation,

95. Rpt of Proceedings of Bd of Off Appointed to Investigate Mapping Program, PCD, 28 Sep 43. In PCD 061-1 1943. See also Index Map to Military Survey of Panama in Appendix "E": Sheet Numbers 15, 21, 24, 26, 28, 41, 42, 43, and 45.

including 380 square miles of Chorrera-Arraijan area. Securing of subsidiary control of Rio Hato-Chame area after completion of the multiplex work as recommended for 1941, such subsidiary control of the Pacora-Chepo area as in the 1942 recommendation, and the field check of both areas were still to be affected. ⁹⁶ The 1941 drafting recommendation, including the accomplishment of drafts for publication in six colors of Tactical Sheets Mensabe, Ocu, Pese, Pequeni Indio, and Pina, and of eleven Terrain Sheets, ⁹⁷ drafting for publication in six colors of Terrain Sheets Numbers 148, 182, and 185 was still incomplete as well as the drafting for publication in six colors of an additional twenty ⁹⁸ Terrain Sheets. Total estimate of funds to accomplish the 1943 projected program was \$10,025.

Discrepancies in Scales

A wide discrepancy in the various scales used in preparation of layout maps of posts and utilities by the Panama Canal Engineer, the Panama Engineer Division, and the Navy was found, although the Board ⁹⁹ recommended that no attempt be made to standardize these types of maps. A study of the multiplex equipment in use by the Engineer Reproduction Plant was found to be obsolete, since the Air Force had abandoned the use of the T-3-A camera with which it was coordinated for reproduction.

96. Ibid.

97. Rpt of Proceedings of Bd of Off App to Invest Mapping Prog, PCD, 28 Sep 43. In PCD 061-1 1943. See also Index Map to Military Survey of Panama in App "E" Sheet Nos. 22, 23, 25, 27, 44, 48, 49, 52, 101, 197 & 198.

98. Ibid. Sheet Nos. 71, 76, 91-99, 144, 145, 149, 171, 181, 183, 184, 186 and 187 of the 1942 recommendations.

99. Ibid.

Continued use of the equipment required a considerable amount of "juggling" of the negatives and diapositives before they could be used with the cameras used on Air Force planes. ¹⁰⁰

The Caribbean Defense Command had meanwhile received War Department Circular of 18 August 1943 on Mapping and Map Photography ¹⁰¹ for timely and vigorous prosecution of systematic aerial photography with the facilities available locally. The photography referred to was the orderly photographic coverage for the preparation of new and revised maps. This circular also stated that theater commanders could request the War Department for the assignment of properly equipped and trained organizations for the performance of mapping missions. As it was within the prerogative of the theater commander to construe the broad principles and make modifications to cover local conditions, the Commanding General referred the circular to the Sixth Air Force and to the Board previously appointed by the Panama Canal Department to study mapping needs. Their recommendations were that the program be confined to mapping airfields, cities, and naval installations outside the accepted Military Survey of Panama. Photo mapping projects of the entire Republic of Panama was recommended if the units and equipment mentioned in the War Department Circular could be obtained. Shortages of available personnel and equipment caused by the pressure of actual combat in other theaters of operations, necessarily limited photographic operations in the command ¹⁰² to those few vitally needed at the moment.

100. Ibid.

101. WD Cir, 18 Aug 43, Mapping and Photo Mapping, PCD 004.5-3-2-1 1943 (C).

102. Freer Op. cit., Fifth Section, p. 7.

Special South American Projects

The Sixth Air Force in Panama requested oblique and vertical photography of various airports and towns on the West coast of South America. The project was given to flight "C" of the 2nd Squadron. The other two flights of the Squadron, "A" and "B", meanwhile, were at Talara, Peru, working on the border dispute between Peru and Ecuador. This dispute was an example of the necessity for accurate topographic portrayal. The Commission on Cartography, it might be pointed out, was instrumental in the work and in its specific settlement. The two flights accomplished not only this portion of the Peru-Ecuador boundary but an airways project of the entire coast line, 50 miles deep, from Tumbes (the most northern city in Peru) to the Chilean border. An attempt was also made to get an airway northeast from Talara across the Andes, but little was accomplished due to the continual cloudiness and lack of airports in the region.

In late 1943 the 2nd Squadron received two other projects: the Amazon Basin airway and aerial mapping for the Rubber Development Corporation (an RFC subsidiary). Most of the latter work was done by CDC aircraft with the 2nd Squadron furnishing the photographers. An attempt was made, rather unsuccessfully, to use the Sonne camera in connection with the identification of rubber trees. Trimetrogon photography, however, was used to good advantage to map, at small scales, unexplored areas for locating possible rubber sites and access road development.

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The Second Photo Charting Squadron, First Photo Group, ran into some difficulty in its tour of the South American and Caribbean area

103. Freer, Op. City., Fifth Section, p. 4.

mission in that its personnel were somewhat in the status of men without a country in so far as payment for their TDY status was concerned. It took from November 1943 until March 1944 for the fiscal peculiarities of per diem payment to be settled while indorsements after indorsements were shuttled from Headquarters, Bolling Field, D. C., to Headquarters, USAFSA, and finally to the Caribbean Defense Command in efforts to obtain authority on written orders of the theater in which the charting was done to substantiate payment of this transitory personnel. Areas in South America covered by the Second Squadron included Barranquilla and Cali, Colombia; Iquitos, Lima, and Talara, Peru; Salinas, Ecuador; and Manaus, Brazil, the last named of which lies within the jurisdiction of the Commanding General, United States Forces South Atlantic. ¹⁰⁴ This squadron was later replaced in this Command by the 91st Photo Mapping Squadron.

For Panama the fiscal year 1943 aerial photography of the Pacora-Chepo-Chepillo area was completed as well as that of the Anton and ¹⁰⁵ Agudulce quadrangle, and some photography of the Atlantic entrance to the Canal and the then new Fort Kobbe-Howard Field area. In the Panama Canal Department the Eleventh Engineers was replaced with the 662d Topographic Company which in December 1943 was reorganized as the Engineer Topographic Company, still charged with the accomplishment of ¹⁰⁶ the same work.

104. Ltr, 2d Photo Chart Sq, 17 Nov 43, "Overseas Orders" to CG, AAF w/14 Ind. In file CDC-S 062 Photography General, Jan 41 thru Dec 43.

105. See Index Map to Military Survey of Panama in Appendix "E".

106. Ibid. See also Ltr, DE to C of S PCD, 10 Feb 44, sub: Inclusion of Survey Platoon in T/O of 662d Engr Topo Co. In Engr Dept 061 Maps and Mosaics 1944.

In 1944 flight "A" of the 2nd Squadron formerly of Talara worked in Venezuela, Brazil, French Guiana, and Surinam. Flight "B" was continued in Peru and also working in Chile. In the latter country the United States Forestry Service was pursuing a project investigating sources of balsa wood. Flight "C" was in Brazil on trimetrogon photography for an extension of air routes and for vertical and oblique photography of harbors and bays. Additionally, the industrialized areas of San Paulo was covered with single lenses photography. Uruguay, at this time, was completely covered by trimetrogon photography.

Brazil Operations Difficult

Brazil was particularly important to us and in many ways a difficult problem. The primary importance of airways through Brazil is an undeniable geographic fact. Her mineral deposits were of equal importance to us and to our war effort.

The other problems in Brazil were not few. Operational, supply, and administrative difficulties were playing their roles. Lack of weather stations in the interior made it necessary to send weather patrols out in order to make reasonably accurate forecasts for operations. Supply of necessary parts, equipment, and even photographic materials continually interrupted numerous operations. Numerous administrative difficulties were naturally present as well as a few additional ones caused by the presence of representatives of various agencies with overlapping authority. The State Department and the United States Army South Atlantic Frontier, for example, often made it difficult to present a united front to the Brazilian Government in regard to our charting activities.

Other activities in 1944 included that of the 16th Photo Squadron. They did considerable work in Haiti, Dominican Republic, and Cuba. In May 1944, the 91st Photo Reconnaissance Squadron took over the trimetrogon projects previously assigned to the 2nd and 4th. This squadron was confronted with the same difficulties, and as well, the additional problem of clearing new personnel. However, the situation gradually resolved itself and the unit contrived to operate. Its 1944 operations took it into Venezuela, French Guiana, British Guiana, and Surinam, as well as Brazil.

Coordination Developed

Additional coordination and effort had been taking place during this entire period between the Air Corps photographic missions and the United States Geodetic Survey. In Northeastern Brazil, they explored for additional source of tantalite and beryl; in Goyas they searched for quartz crystals; in Minas Gerais they tried to outline completely the rich and extensive iron ore deposits. It might be noted, in passing, that this source of iron ore is one of the richest and most extensive to be found in the Western Hemisphere. Its development and future critical importance to the United States, whose richest and most abundant iron ore ranges are fast becoming seriously depleted, can almost be foreseen. In Peru, the Ancochuma region was investigated for sources of lead and zinc.

The Air Corps and the Geological Survey worked together on maps of the general mineral deposits of Central America, Mexico, and Cuba. The basis for the general geodetic map of Central America were Air Corps charts.

107. Freer, Op. cit., Fifth Section, p. 5.

In actual field work the Air Corps and the Geodlogic Survey collaborated by mutually exchanging ground control for photography. For field purposes of the Geodlogic Survey vertical photographic coverage was necessary since trimetrogon coverage was not suitable in that it provided too small a scale. The survey desired and extensively used 1/50,000 maps.

Navy Aids in the Program

In addition to aerial photography in Latin America undertaken by the U.S. Army, the Navy in late 1944 initiated an aerial survey of both the Atlantic and Pacific coastlines of the Central American Republics. Diplomatic clearances were obtained from all countries concerned, and orders were issued for the accomplishment of the mission by photographing both coastlines simultaneously. The photographic standards of the Navy were such that the aerial photography accomplished in this Central American project could later be incorporated into the Army Program. A cooperative board to utilize all sources available was established 23 October 1944 for the preparation and continuance of a mapping program within the Panama Canal Department.

The findings of the Board included: Determination of the status of the mapping as of that date to be inadequate and out-of-date resulting from a lack of new aerial photography and from lack of tactical mapping

108. Operation Order No. 5-44 (C), Commander Photographic Sq to Unit Commanders, 11 Dec 44. In CDC 062 (Photography - Policy).

109. Freer, Op Cit., Fifth Section, p. 6.

110. 1st Ind, Hq PCD to CG CDC, 18 Dec 44 on Ltr, 4 Nov 44, sub: Beach and Terrain Intelligence Surveys. In PCD 061.01, 1944.

in many areas of interest to various commands in the Department; evolution of a mapping program embracing 11,000 square miles of the Central American continental areas and 5,400 square miles within the Galapagos Island Group; adequate available ground control to allow for logical, tactical revision or intended expansion of the Military Survey of Panama; lack of availability of planes to accomplish required aerial photography unless planes were diverted from normal missions; the diversion of Element E of the 91st Photo Charting Squadron by the War Department to the Sixth Air Force on a temporary duty basis for aerial photography in accordance with current operational orders; reproduction facilities adequate normal maintenance and proposed expansion of the Military Survey of Panama with the activation of the Engineer Topographic Company less a survey detachment; the necessity of road maps of the Republic of Panama and the Canal Zone involving the publishing of seven new quadrangle sheets at scale 1:62,500; vital need for dependable aerial navigation charts within an area of 200-mile radius around the Canal Zone the production of which would entail additional equipment and personnel; requests from the Sixth Air Force for accurate large scale maps of eighteen airbases and airdromes, entailing extensive field survey work or additional personnel; proposed mosaic of the Canal Zone in accordance with requests from the Joint Command Post, the negatives necessary for which could be those made by Elements #, 91st Photo Charting Squadron as above; need for an aerial photographic survey of the coasts of Central America on request from the Hydrographer of the Navy to be accomplished by Navy aircraft; and

the revision of the index map for the Military Survey of Panama to include numerical designations and procedures established by Army Map Service.
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Activities of 1945 Clarified

Throughout 1944 and 1945 efforts were made to clarify the entire situation of charting and mapping activities. Besides these War Department projects which were underway in Latin America, requests for additional photography were being submitted continually by individual governments. These requests had become so numerous as to necessitate a complete review of the situation.

The Army Air Force therefore requested the Assistant Chief of Staff, G-2, War Department General Staff, to review War Department policies and priorities for photography in South America. The answer was that South American projects would take priority after photography in which the 311th Wing was already committed, or which may be required in active theater of operations, and after requirements for photography within the United States. The answering memorandum also stated;

111. Excerpt from Bd Proceedings. In Dept Engr 061 Maps & Mosaics, 1944.

112. Memo AAF for AC/S, G-2, WDGS, 11 July 44, sub: Policy and Priority for Photography in Brazil and other S. American Countries, File Tab #1, file Mapping and Charting, General, Photo Section, Mapping and Charting Branch, MID.

113. Memo AC/S, G-2, WDGS to AAF, 1 Aug 44, sub: Policy and Priority for Photography in Brazil and other S. American countries, file tab #2 file Mapping and Charting, General, Photo Section, Map and Photo Branch, MID.

" . . . numerous commitments for photographic projects in South America had been made in various South American countries and were in varying stages of completion by the 311th Photographic Wing. Lack of coordination on these projects has resulted in delay and confusion and, more recently, misgivings by certain South American countries as to our intent or capabilities to complete them. It is believed highly desirable to accomplish the incompleted portions of our commitments, with some additional coverage, both because of the value of photography itself and in interest of our relations in South America."

G-2 then requested that additional negotiations would be needed to implement unfinished portions, what would be necessary to obtain clearances for additional coverage, and what suggested groupings of projects to meet recommended priorities could be made as to best utilize weather and available aircraft.

A later memorandum from General Bissell, G-2, to the Chief, MIS 114 indicated that action had been initiated by G-2, and had been coordinated with the State Department, Army Air Force, and OPD, WDGS with a goal of coordinating plans for the completion of various aerial photographic projects in South America to which the War Department was already committed. 115 The memorandum also indicated that planning and coordination had been instituted for discussions with appropriate military and diplomatic authorities of the respective countries relative to desired changes and amplifications in previously agreed upon photographic coverage.

114. Memo A/S G-2, WDGS to C/MIS, 15 Sep 44, sub: Coordination of Aerial Photographic Program in South America, Tab #10, file, Mapping and Charting, General, Mapping and Photo Branch, MID.

115. Freer, Op. Cit., Fifth Section, p. 6.

Overall Policy Developed

As a result of these activities and the still numerous requests from foreign governments in addition to the already approved projects a determination of overall policy was necessary. A general policy to that effect was issued by the Assistant Chief of Staff, G-2, WD General Staff.

"It is believed that compliance with such requests, where practicable, will be of value to present and future relations with countries concerned, and should be given, provided the following criteria can be met:

- a. Project does not interfere with demands of combat operations of higher priorities, or unduly delay accomplishment of existing projects.
- b. Personnel, aircraft and equipment are on the spot or readily available.
- c. Results will provide material of value to the War Department and to the country concerned.
- d. Project is not formulated solely for benefit of any commercial enterprise or corporation.
- e. Project meets with approval of the Military Attache and does not involve necessity of further diplomatic negotiations."

Whether or not the projects requested by foreign governments could be included in the program was to be decided by the U.S. Military Attache or other military representative concerned, in coordination with the U.S. diplomatic representative present. Requests which were not considered minor were to be coordinated with the diplomatic representative

116. Memo AC/S, G-2, WDGS to CG AAF, 16 Sep 44, sub: Increase in Program of Photo Mission. In CDC 322 (Photo Project).

and referred to the Chief, Military Intelligence Service, War Department, for action.
117

Besides the formal agreements which were necessary in any foreign country where aerial photography was accomplished by the War Department, implementing agreements for each project had to be made. This was the responsibility of the U.S. Military Attache in that country, working either in coordination with or through the U.S. diplomatic representative present, whichever method had been previously employed. Agreements to be concluded with each country provided that the foreign country concerned would be furnished the following:
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- (1) Two complete sets of prints of all photography accomplished with the necessary plot maps therefor.
- (2) Two sets of base compilation sheets at the scale of 1:500,000 "if and when such compilations are completed."
- (3) Two hundred copies each of aeronautical charts of a scale of 1:1,000,000 as produced, no time limit being set since the date of completion of the photographic program could not be accurately forecast.

When new agreements were negotiated, the War Department authorized the promise of one set of duplicate negatives on topographic base film in addition to the material listed above. This set of duplicates would be furnished, however, only upon agreement by the foreign government that no prints in addition to those listed in (1), above, would be requested.

117. Ltr (C), AC/S, G-2, WDS to CG, CDC, 30 Jan 45, sub: Coordination of Aerial Photographic Program in South America. In CDC 322 (Photo Project) (S). In Freer, Op. Cit., Fifth Section, p. 9.

118. Information obtained in a personal interview with Col. F.S. Tandy, Chief Engineer, CDC, on 18 August 1947. (par. 5).

Special Requests Numerous

Past experience in mapping and charting procedures had shown that from time to time various projects, both of minor and major significance, needed to be added to the basic program. The foreign countries at times made requests for various projects which they felt of necessity; at other times, the U.S. Military attaches desired certain mapping work for the accomplishment of intelligence missions. Definite policy for the handling of such projects as were desirable was included in the Charting Plan. The policy which was adopted followed the same general principles as were outlined in a letter dated 30 January 1945 from the Assistant Chief of Staff, G-2, WDGS.¹¹⁹ Requests of foreign governments for minor projects, defined as ". . . photographic projects which will put no appreciable burden on aerial photograph flights in the field and will not interfere with normal photographic projects or the priority therefor",¹²⁰ would be routed through the appropriate U.S. Military Attache who would coordinate the request with the diplomatic representative and then forward it with appropriate comments to Headquarters, CDC for consideration and necessary action. Requests initiated by the Military Attache had to be concurred in by the diplomatic representative and then forwarded to CDC for consideration and action. The determination of whether the minor project should be accepted was made by Headquarters, CDC, without recourse to the War

119. Ltr (C), ACofS G-2, WDGS to CG CDC, 30 Jan 45, sub: Coordination of Aerial Photographic Programs in South America. In CDC 322 (Photo Project) (S). Discussed in this monograph on p. 41.

120. Charting Plan for Central and South America (less Mexico and Brazil) (S), par 3b. In G-2 CDC. See Appendix "C".

Department based upon the conditions first outlined in the letter dated 30 January 1945 from General Bissell, Assistant Chief of Staff, G-2, WDGS. Actually after 1946 much of the negotiating with foreign governments was done by Colonel Tandy on a somewhat unofficial basis.

Channels were Devious

Major projects, those which could not be considered minor in nature, had to be forwarded to the Chief, Military Intelligence Service, for consideration and action. If the major requests originated in the theater, it was to be submitted directly to the Chief, MIS. If it was initiated by a foreign government, however, it was to be forwarded through the Military Attache to the Headquarters, CDC, to the Chief, MIS. In either case, appropriate recommendations and comments by the handling agencies would accompany the request to Washington. All information regarding areas to be mapped or activities connected with the accomplishment of any aerial photography or ground control data was, in all cases, restricted to the United States and the country concerned. No third nation was to share in this information.

A concerted, more extensive War Department aerial photography program was initiated in early 1945. It had become necessary to augment the 91st Recon Squadron, already working in South America, with additional equipment. Contemplated operations called for photography not only on the West Coast but throughout all of South America, excluding Argentina and South Chile. Since much of this territory

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121. Radio W-89975 C/S, USA to CG CDC, 11 Jan 45. In CDC 322 (Photo Proj).

was sparsely settled and far removed from available airfields, it
was believed that aircraft of the B-17 type was necessary. 122

Progress during 1945 in the accomplishment of beach and terrain
intelligence surveys in the Antilles Department was slow because of
the shortages in personnel and equipment. 123

Later the War Department notified CDC of the following assignments
in relation to the photographic program for South America. CG, AAF
was responsible for the aerial photography, CG, CDC was responsible
for providing logistical support and for administration and discipline
of the mapping units operating in his area. 124

Defense Command Responsibilities

The territory in South America in which CDC had these responsi-
bilities included all countries except Brazil, Paraguay, and Uruguay.
The CG, AAF, later redelegate his responsibility for projects in
Latin America and the Caribbean area to the CG, 311th Photo Wing. 125
After a few months of operations of the photographic program and at
the suggestion of the CG, USAFSA, the War Department considered it

122. Freer, Op. Cit., Fifth Section, p. 10.

123. Ltr AntD to CG CDC, 2 Jan 45, sub: Beach and Terrain Intelligence
Surveys. In CDC O60 Maps, Charts and Tables - Policy. See also
Map in Appendix "F".

124. Radio W-20878 C/S USA to CG, CDC and CG, USAFSA, 14 Jan 45. In
CDC 322 (Photo Projects).

125. Ltr CG, AAF to CG, 311th Photo Wing, 26 Jan 45, sub: Photographic
Projects in S. America, C. America and the Caribbean Area. In CDC
322 (Photo Projects).

feasible to make certain changes in the methods of cooperation. The
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following suggested changes were submitted to CDC:

(1) Assign the responsibility for execution of the project to the theater commander rather than to Headquarters, 311th Photo Wing.

(2) Attach the photographic units to the theater while performing work in that particular area.

(3) Technical and special assistance would be afforded by the 311th Photo Wing as required and as lay within its abilities.

(4) Determination of photo mapping projects and assignments of priorities remained the responsibility of the War Department. (127)

(5) Major additions to approved photographic projects would be referred to the War Department for approval.

(6) Minor additions to approved projects would be approved or rejected by the theater commander after coordination with the U.S. Military Attache concerned. The Military Attache would coordinate with the U.S. diplomatic representatives and the foreign government concerned.

(7) A special Reconnaissance Staff Section, consisting of a Colonel and a Major, would be organized within the theater Headquarters for monitoring assigned photographic projects, exercising staff supervision over assigned photographic units, and affecting necessary coordination with the U.S. Military Attaches concerned.

The above War Department suggestions were concurred in by CDC and represented the policy under which operations were to continue for the remainder of 1945. The stage was finally set for the establishment of

126. Ltr, TAG to CG, CDC, 18 Apr 45, sub: Photographic Projects in S. America, C. America, and Caribbean Area. In CDC 322 (Photo Projects).

127. Freer Op. Cit., Fifth Section, p. 10.

a completely uniform policy in regards to charting in the Western Hemisphere. The evolutionary process which led to a final integration into one overall plan was completed.

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Air Missions were Varied

At this time the proposed missions for the chief air photographic units were various. The operations and establishments of the 91st Reconnaissance Squadron in the CDC area, as of 28 February 1945, were as follows:

- (1) Headquarters, Flight "B", located at Howard Field, C.Z.
 - (a) Operated a photographic laboratory and had a ground echelon of five officers and twenty enlisted men.
 - (b) Laboratory personnel, still located in Santiago, Chile, planned to move to Howard Field in approximately two weeks.
 - (c) Four F-2 aircraft, located and working in Chile, would report back to Howard Field upon completion of the Chilean project, which still had about 600 lineal miles remaining to be flown.
 - (d) One B-17 was working on a State Department project, the boundary dispute problem, out of Salinas, Ecuador.
- (2) Detachment, Headquarters, Flight "B", Villavicencia, Colombia.
 - (a) To be established about 1 April 1945, using one B-17 and three amphibious type aircraft. Ground echelon: eleven officers and fifteen enlisted men.

128. Freer, Op. Cit., Fifth Section, p. 11.

129. Memo (S), Air O CDC for C/S CDC, 28 Feb 45, sub: Summary of Operations of 91st Photo Charting Sq. In CDC 322 (91st Recon Sq) (S).

- (b) To include photo control parties, who were away from headquarters most of the time.
 - (c) A radio station small dispensary, and a mess to be operated.
 - (d) Two more B-17's scheduled to depart for Villavicencio about 1 May.
- (3) Headquarters, Flight "C", Atkinson Field, British Guiana.
- (a) Operated a photographic laboratory and a radio station. Ground personnel: five officers and twenty enlisted men.
 - (b) Two B-17's operated there with two more scheduled for arrival about 1 May.
- (4) Three F-2 aircraft, working on Panama Canal Department projects, were based at Howard and France Fields. At the completion of the PCD projects, these planes were to be sent to Atkinson Field.

The organization of personnel and equipment in South America and in the islands of the Caribbean was well enough established by the end of February 1945, the date of the above report, to permit functioning of the basic photographic program in these areas. The ensuing seven or eight months provided time for much productive activity, intermingled with the usual transfer of crews to take advantage of existing good photographic weather and to avoid the bad weather areas and the changes in personnel and equipment as the existing situation demanded. The principal problems which confronted the accomplishment of the photographic projects during this period were created by the large amount of weather in the Caribbean Defense Command area unfavorable to the operation of high altitude photographic planes and the serious shortage of trained and competent manpower resulting from revised War

Department directives permitting the discharge of many of the officers and enlisted men following VE-Day, 8 May 1945, and VJ-Day, 2 September 1945.

Air-Ground Work

On 28 February, the Commanding Officer, 311th Photo Wing, notified Headquarters, CDC, that four ground control parties, each consisting of one officer and one enlisted man, would be established at Atkinson Field for work in the Guianas about 1 April. In order to provide transportation for these parties, canoes and outboard motor boats would be employed on the rivers and a Grummann OA-13 would be used if such could be procured. In March, the Commanding Officer of the group of planes working on the PCD project -- three F-2 aircraft -- reported that the approach of the rainy season with its many days of dense cloudiness had about ended the possibilities of further operations in the Panama Area. Efforts were being made, stated this report, to combat the corroding effects of the salt in the air upon the metal surfaces of the planes.

The fact that photographic planes, flying the entire length of most of the countries being mapped, often had to fly some distance, for at least "turn-around" flights, over neighboring countries led to

130. Ltr (S), CO 311th Photo Wg, Mapping and Charting to CG CDC, 28 Feb 45, sub: Photo Control in British Guiana, Surinam, and French Guiana. In CDC 062 Photography - Policy (S).

131. Ltr (S), Element B of 91st Recon Sq to CO 16th Photo Sq, Buckley, 13 Mar 45, sub: Project Status Report. In CDC 322 91st Recon Sq (S).

certain diplomatic problems. In March 1945, Headquarters, 311th Photo Wing, issued the following statement of the existing policy on such matters:

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It is the policy of the 311th Photo Wing, Mapping and Charting, that unless special clearance has been obtained through the State Department from the country concerned, no prints or negatives of any bordering country will be furnished to any foreign country. This applies to all photography accomplished by units of this command.

In early April 1945, Headquarters, CDC, requested clearance for one B-17 to proceed to Lima, Peru, for about two months operations in order to complete holes which had previously been left in the mapping program of that country. Permission for the B-17 to enter Peru was given almost immediately, and the airplane arrived in Lima on 26 May, almost two months later. On 4 April the Commanding General, AAF, requested concurrence of Headquarters, CDC, to the initiation of a B-29 training program which would involve photographing certain areas in Cuba, Haiti, Dominican Republic, Jamaica, Virgin Islands, Trinidad, Aruba, and Curacao. The project was to be carried out by planes and crews based in the continental United States and was assigned the 311th Photo Wing with the highest priority pending CDC concurrence. Agreement by Headquarters, CDC, was given only two days later.

132. Ltr (R), CO 311th Photo Wing, Mapping and Charting, to CO Flight "B" 91st Photo Recon Sq, 15 Mar 45, sub: International Boundary Photographs. In CDC 322 (91st Recon Sq) (S).

133. Rad # -63210 (C), CG AAF to CG CDC, 4 Apr 45. In CDC 062 (Photography - General (S), Cuba, Haiti, and Dominican Republic had given consent in 1942 for photographing their territories for air navigation charts (See ante).

Personnel Reduction a Problem

The problem of reduction in personnel began rather early in the photographic program to affect the operations of the component parts of the organization. Late in April 1945, Flight "C", at that time operating at Atkinson Field was disbanded and made a detachment of Flight "B".¹³⁴ The radio station maintained by Flight "C" at Belem, Brazil, was reassigned for purposes of administration and supply to Flight "A", located in Brazil. Concurrence in this change was requested and given by Headquarters, CDC, about a month later. The indicated reason for the change was that the flight was operating on a reduced Table of Organization, leaving only two flights engaged in mapping procedures which it was believed did not justify the maintenance of a laboratory and headquarters at Atkinson Field.¹³⁵

The four F-28 aircraft of the 16th Photo Squadron, attached to the 91st Reconnaissance Squadron, operated throughout the islands located in the Antilles Department and in the countries of Northern South America. Permission was requested by the Antilles Department on 30 April and granted by the Commanding officer of the 16th Photo Squadron, Buckley Field, shortly thereafter for a pilot of one of the planes and operating from Bourne Field, St. Thomas, to perform special

134. Ltr, CO 91st Photo Charting Sq, Buckley Fld, to CO Flight "B" 91st Photo Charting Sq, Howard Fld, 25 Apr 45, sub: Flight Assignments. In CDC 322 (91st Recon Sq) (S).

135. Ltr (C), CO 311th Photo Wing, Mapping and Charting, to CG CDC, 22 May 45, sub: Movement of Laboratory from Atkinson Field. In CDC 322 (91st Recon Sq) (S).

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photography for the Assistant Chief of Staff G-2, Antilles Department at such time as weather conditions prevented his carrying on his regularly assigned duties. The weather, reported Headquarters, AD, was holding up this pilot's regular photographic program, moving his estimated completion date from June 1945 to February 1946. He was directed to photograph at such time as he could not perform his principal assigned duties the shorelines of certain British islands in the Caribbean in order to complete the G-2, AD, files. Permission for the aerial surveys were obtained by the Antilles Department from all of the local governments.

As late as May 1945 the deficiency of personnel in Panama was felt in the accomplishment of assigned survey work. Of the thirty-two crews available in 1944 only sixteen remained of which number three were in Aguadulce for the Sixth Air Force; three in La Campana on the target range and in Rio Hato for the Sixth Air Force; four were on malaria control work on the Pacific side and two on the Atlantic side; two were checking contractor's work on the Pacific side and one on the Atlantic side; and one was assigned to miscellaneous work.

Retention of the crews was a problem, as within the first months of the year, three survey chiefs had resigned to enter the Service or to work for higher wages, and resignation of another party chief was

136. Ltr (C), AC/S G-2, AD to CDC LnO 311th Photo Wing, 30 Apr 45, sub: Aerial photography in the Antilles Department. In CDC 062 (Photography - General) (S).

137. Rad TT, V GFO CA NR2 GFO V TVI, 25 May 45. In Engr Dept 061 Maps and Masaics, 1945.

138. Ibid.

anticipated shortly. In order to alleviate the tight position of the survey crews, contractors were required to do their own layout work and occasional check by the Department Engineer was done.

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Some Progress in South America

Progress was made in other parts of the CDC area during 1945 in spite of the serious handicaps of weather and personnel shortages which appeared. Permission was requested and granted by the Government of Ecuador for two C-45 (F-2) aircraft to depart from Howard Field about 26 May for operations out of Esmeraldas. These planes were in addition to a B-17 (F-9) already working at Salinas. The new operating crews consisted of two officers and four enlisted men. A geodetic survey party, composed of two officers and two enlisted men, proceeded to Chile in June 1945 to work on an unfinished mapping project in that country. Previous mapping planes had already taken the necessary photographs, but the work of the geodetic survey parties was necessary to establish the control points prior to the assembly of the aerial map of Chile. Repeated requests had been made by the Chilean Government as to when the finished product would be produced, and the dispatching of the geodetic survey parties was in response to these requests. Colonel David E. Ellis, U.S. Military Air Attache in

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139. Check slip, Chief Engr Construction Sec to DE, 19 May 45, sub: Post Layout, Boundary & Utility Surveys and Drawings. In Engr Dept 061 Maps and Mosaics 1945.

140. Ibid.

141. Rad C-33892 (C), CG CDC to M/A Ecuador, 22 May 45. In CDC 062 (Photography - Ecuador) (S).

Chile, in his report of the forthcoming geodetic survey work to the Chilean Minister of National Defense, passed on information given him by the War Department relative to the delays necessitated by the demands of war. Stated Colonel Ellis:

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Army Air Force compilation facilities are being totally utilized at present for chart production to meet war requirements. It is therefore impossible to establish a definite future date for completion. Photography of the forestry area in Chile had first priority and was not received in the U.S. until the early part of April 1945, and this is now in the process of being indexed and reviewed by the Army Air Forces Aeronautical Chart Service.

Although the Chilean Army had two officers in Washington assisting in the mapping work there, the prediction was expressed that the first advance sheets of the completed maps could not be issued prior to early 1946. The acquisition of as much ground data as possible by the geodetic survey personnel was desirable in order to expedite the work and increase the accuracy of the finished product.

On 10 July 1945, clearance and approval by Colombia was requested for the operation of two C-45 photographic aircraft to work out of Cali and Medellin on coastal projects. The Government of Colombia approved the project for an area following the Pacific coastline from the Panamanian border with a width of 150 miles inland. The two aircraft were scheduled for arrival at Medellin on 17 July.

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142. Ltr (R), M/AA Chile to Chilean Minister of National Defense, 8 Jun 45, no sub. In CDC 062 (Photography - Chile) (S).
143. Rad, C-35605 (C), CG CDC to M/A Colombia, 10 Jul 45. In CDC 062 (Photography - Colombia) (S).
144. Rad 557108 (C), M/A Colombia to CG CDC, 12 Jul 45. In CDC 062 (Photography - Colombia) (S).

The photo control program of the Guianas was seriously handicapped by the lack of suitable equipment with which to work. The senior control officer of the detachment working in this area in July reported that the use of a Grumman OA-9 was badly needed. He estimated that 80 percent of the work could be accomplished with such a plane, thereby relieving the problem of having to travel most of the time by slow and unpredictable river boats. The control party, it was reported, sometimes had access to the Grumman based at Atkinson Field, but competition with weather, repairs, and base use of the plane made this arrangement highly unsatisfactory. Under the existing system of unsatisfactory transportation facilities, it was estimated, the Guianas project could not be completed before the spring of 1948. ¹⁴⁵ No action was taken, however, in furnishing the desired aircraft.

Galapagos Archipelago

Diplomatic clearance for the mapping of the Galapagos Archipelago ¹⁴⁶ was obtained in September 1945. This Archipelago, 900 nautical miles southwest of Panama City and approximately 700 nautical miles to the west of Guayaquil, Ecuador, is the last outpost of the outer

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145. Ltr (C), Senior Photo Control O, Photo Control Detachment, 91st Recon Sq, to CO 7th AAF Geodetic Control Sq, Buckley Field, 9 Jul 45, sub: Acquisition of Grumman OA-9. In CDC 322 (91st Recon Sq) (S).
146. Ltr, Rep of Ecuador, Ministry of Ntl Defense to CG, CDC, 9 Sep 45 to sub Aerial Survey Colon Archipelago. In DERP "Galapagos Islands."

defense circle on the Pacific side of the Isthmus. It is composed of sixteen major islands of volcanic origin. Since the available charts and maps of this area were prepared by the British in 1836,¹⁴⁷ it was felt that the extreme inaccuracies in altitudes and geographical locations presented hazards to flying and navigation.¹⁴⁸

Plans for the mapping of the Archipelago called for field control work to flag established stations and prove elevation and vertical angles. This problem called for the manning of landing parties of some thirty men operating from a ship as a supply and operational base. These parties were to use barometers and altimeters rather than trigonometric levels as a time saving element of sufficient accuracy for mapping. Each island had a base line already established but bench markings were difficult to find. The first estimate of the time involved in this program was thirteen months, including the final publishing of the maps. Authority was obtained for the use of a small vessel to house and feed twenty-five Engineer Topographic Company personnel for approximately one hundred days beginning on or about 1 January 1946 to establish the necessary triangulation.¹⁴⁹

Specifications for the aerial photographs for the proposed Galapagos Archipelago photomapping included a flight altitude of 20,000

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147. Ltr, Hq Beta Air Base, Galapagos to CG 6th AF, 12 Apr 45, sub: Photo Mapping of Galapagos Archipelago. In DERP "Galapagos Islands."
148. Galapagos Archipelago Mapping Program. In DERP "Galapagos Islands."
149. Check slip, DE to DCT, 14 Dec 45, sub: Request for Information on Availability of Boat. In DERP "Galapagos Islands."

feet above sea level of a sixty percent overlap line of flight and a thirty percent sidelap between flight lines in the use of six inch focal length lens. Approval was obtained subject to final approval for diplomatic clearance of the State Department.

On 1 October 1945, Headquarters, 311th Reconnaissance Wing, Buckley Field, submitted a progress report on work accomplished by units of the 91st Reconnaissance Squadron in South America and the Caribbean area. This report illustrated the size of the entire program and the amount of work which had been accomplished to that date. Pertinent information revealed included the following.

| <u>PROJECT LOCATION</u> | <u>TYPE OF PHOTOGRAPHY</u> | <u>AREA TO BE PHOTOGRAPHED</u> | <u>PERCENT COMPLETED</u> |
|---------------------------------------|---|--------------------------------|--------------------------|
| 1039 Ecuador - Peru | Tri-metrogon, boundary | 56,250 sq. mi. | 90 |
| 2015 Ecuador | Tri-metrogon | 67,500 sq. mi. | 40 |
| 2014 Ecuador, Peru and Colombia | Tri-metrogon, air routes | 158,500 sq. mi. | 50 |
| 2016 Colombia | Tri-metrogon, coastal and areas southeast of Bogota | 232,550 sq. mi. | 12 |
| 4013 Venezuela | Tri-metrogon | 307,000 sq. mi. | 70 |
| 4017 British, French, & Dutch Guianas | Tri-metrogon, coastal areas | 60,000 sq. mi. | 40 |
| 4026 French Guiana | Singel-lens mosaics, Cayenne vicinity | 400 sq. mi. | -- |

150. 5th Ind on Ltr, Hq USAB APO 662 to CG 6th AF, 12 Apr 45, sub: Photo Mapping of Galapagos Archipelago. In DERP "Galapagos Islands."
151. Report Status (S), Rpt No. 4 Part IV, Hqs 311th Recon Wing, Buckley Field, 1 Oct 45. In CDC 322 (91st Recon Sq) (S).

The status report of the 311th Reconnaissance Wing also included seven large projects, totaling about 1,500,000 square miles, in progress in the Brazil and Paraguay areas. These projects fell within territory under the supervision of the Commanding General, USAFSA, but undoubtedly affected progress within the CDC area in as much as the two regions inevitably sought the available personnel and equipment.

CHAPTER VI

CONSEQUENCES OF FINANCIAL SHORTAGE

152. Status Reports (S), Rpts Nos. 5,6,7, Hq 311th Recon Wg, Buckley Field, 1 Nov 45, 1 Dec 45, 1 Jan 46. In CDC 322 (91st Recon Sq) (S).

CHAPTER VI

Consequences of Piecemeal Charting

Two Plans Evolved for Caribbean Area

As has previously been stated, two directives, "Charting Plan for Central and South America (less Mexico and Brazil)" (October 1945) and "Mapping Plan, Western Hemisphere" (November 1945) marked the beginning of a new period in the overall photographic program in Central and South America and in the islands of the Caribbean area.

CONSEQUENCES OF PIECEMEAL CHARTING

The "Charting Plan for Central and South America (less Mexico and Brazil)" arrived at Headquarters, CDC, as an inclosure to a War Department letter dated 1 November 1945; the "Mapping Plan, Western Hemisphere" was inclosed in a War Department communication dated 6 December 1945; "MAPPLAN, CDC" was issued on 15 April 1946. Colonel Wendell S. Tandy was assigned as theater engineer. His duties in relation to the mapping and charting program, as outlined in the

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Charting Plan were:

When mapping photography is involved, qualified mapping units under the theater engineer will be responsible for obtaining necessary ground control data required for the mapping program. The Theater Engineer will also be responsible that accomplished mapping photography meets mapping specifications.

183. Charting Plan for Central and South America (less Mexico and Brazil) (A), par 3. In G-2 CDC. See Appendix "C".

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153. Charting Plan for Central and South America (less Mexico and Brazil) (S), par 2. In G-2 CDC. See Appendix "C".

The reconnaissance officer, the theater engineer, and the Assistant Chief of Staff, G-2, CDC, who acted as coordinator of the entire program, were the staff officers in whose hands rested the responsibility for the actual operation of the mapping program in the CDC area. The photographic program itself, that part begun under the old system, was at a virtual standstill, as shown in the progress reports of the

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late months of 1945. The combination of poor photographic weather conditions and shortage of personnel were other factors. The status reports submitted on the first of November, December and January

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revealed the following information:

PERCENT OF PROGRESS

Nov. Dec. Jan.

PROJECT LOCATION

REASONS FOR INACTIVITY

| | | | | | |
|------|--------------------------|----|---|----|---|
| 1039 | Ecuador-Peru | 0 | 0 | 0 | Lack of personnel (Nov. & Dec.) No aircraft (Jan). |
| 2015 | Ecuador | 10 | 0 | 0 | Lack of personnel (Nov. & Dec.) No aircraft (Jan). |
| 2014 | Ecuador, Peru & Colombia | 0 | 0 | 0 | Lack of personnel (Nov. & Dec.) No aircraft (Jan). |
| 2016 | Colombia | 0 | 0 | 0 | Lack of personnel (Nov. & Dec.) Weather, no aircraft (Jan). |
| 4013 | Venezuela | 0 | 0 | -- | Lack of personnel (Nov. & Dec.) |

154. Status Rpts (S), Rpts Nos. 5, 6, & 7, Hqs 311th Reconnaissance Wg, Buckley Field, 1 Nov 45, 1 Dec 45, and 1 Jan 46. In CDC §22 (91st Recon Sq) (S).

155. Progress Rpts issued on the first of Oct, Nov, and Dec 45, and Jan 46.

PERCENT OF PROGRESS

Nov. Dec. Jan.

| <u>PROJECT LOCATION</u> | | | | <u>REASONS FOR INACTIVITY</u> |
|--|----|----|----|--|
| 4017 British, French, Dutch Guianas | 0 | 0 | -- | Lack of personnel (Nov. & Dec.) |
| 4026 French Guiana | 0 | 0 | -- | Lack of personnel (Nov. & Dec.) |
| 91RS5M3 Galapagos (added 1 Dec) | -- | -- | ? | Total of 54 minutes photography. Flown from 1 Dec. to 1 Jan. |

Total inactivity in all projects except one in the USAFSA area was reported for the same period from 1 October 1945 to 1 January 1946. Approximately 48,384 square miles of territory in Brazil, involving tri-metrogon photography of airways strips, were mapped during the period from 1 October to 1 November.

Operational Responsibility to CDC

The War Department Charting Plan and, later, the Mapping Plan assigned complete operational responsibility to CDC. This resulted in temporary surprise and confusion within CDC. The staff was initially somewhat dubious about how the problem should be approached. Various suggestions were proposed. One possibility was to re-delegate the mission to the Panama Canal Department; another was to requisition a qualified officer (a Lt. Col.) to supervise the project on a CDC level. Other numerous activities belied the initial confusion within CDC subsequent to the receipt of the Plans.

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156. Freer Op. Cit., Sixth Section, p. 1.

One of the problems of major importance to Headquarters, CDC, at the time that mapping and charting projects became its responsibility was the matter of personnel. Since the Charting Plan designated the 311th Wing (Mapping and Charting), Buckley Field, Colorado, as the source for furnishing the necessary personnel for accomplishment of aerial photography, the Commanding General, CDC, on 26 November 1945, requested the immediate dispatch of eleven officers and seventy-six enlisted men having appropriate MOS's to fill existing vacancies in Flight "B" of the 91st Reconnaissance Squadron. ¹⁵⁷ No immediate transfer of the necessary personnel was made. The same discharge regulations were affecting the 311th Wing.

A failure of proper coordination resulted in the landing at Vernam Field, Jamaica, on 25 October 1945 of a B-29 photographic plane without any prior notice to either the Antilles Department or CDC. On this date, Headquarters, AD, notified CDC that the Commanding Officer of Vernam Field had reported the landing of the plane with ¹⁵⁸ three more B-29's on the way in two days. The planes were from the 2d Air Force Photographic Unit, Clovis, New Mexico, and were sent to the Antilles area for about three months to photograph the entire Caribbean area. There was no advance notice of the arrival of the first plane; yet the plane commander had been led to understand that spare parts and supplies for all four aircraft would be

157. Rad C-38810 (S), CG CDC to CO 311th Recon Wg, 26 Nov 45. In CDC 322 91st Recon Sq (S).

158. Rad AD-1169, CG AD to CG CDC, 25 Oct 45. In CDC 062 (Photography - General) (S).

available. At the suggestion of Headquarters, CDC, a conference was held between Antilles Department representatives and the Air Forces liaison officer for solution of the resulting problems. After conferences at Headquarters, AD, and personal reconnaissance of Borinquen Field, request was made by the Air Force personnel to their headquarters that the aircraft be stationed at Borinquen during their stay in the Caribbean area.

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Special Projects Advanced

Certain special projects of aerial photography, comparatively minor in nature and not a part of the basic plan, were accomplished within the CDC area during the last two months of 1945. On 27 November 1945, Headquarters, CDC, notified the Commanding General, AD, that one F-2 aircraft and crew were being dispatched on or about 5 December to the Antilles area for the purpose of photographing the Leeward and Windward Islands.

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Captain Bullard, the officer in charge of this crew, in late January reported that he was in receipt of orders to return his crew to Headquarters, CDC, in order to send them to the United States for discharge.

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These orders necessitated abandonment of the project, partially completed. Work remaining to be done

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159. Rad AD-1347, CG AD to CG CDC, 29 Oct 45. In CDC 062 (Photography - General) (S).
160. Rad C-38814 (R), CG CDC to CG AD, 27 Nov 45. In CDC 062 (Photography - General) (S).
161. Ltr (c), CO Detachment 16th Photo Squadron (Sp) to CO 311th Photo Wing, 29 Jan, sub: Final Rpt on Project 5M28. In CDC 062 (Photography - General) (S).

included photography of about ten small islands and the obliques of about four others. With the amount of bad weather increasing, Captain Bullard estimated that it would take about three additional months to complete the project. On 19 December 1945, the status of the 91st Reconnaissance Squadron, less Headquarters and Flight "A", was transferred from temporary duty in CDC to a permanent change of station. Flight "A", on duty in Brazil, was attached on a permanent change of station basis to the South Atlantic Wing; the headquarters remained permanently assigned in the United States. Those units of the 91st Reconnaissance Squadron attached to CDC were subsequently re-attached to the 6th Air Force and, when this organization was changed, transferred to its successor, the Caribbean Air Command.

Shortages Delay Projects

Flying and photographic personnel were not all that were needed by CDC in order to proceed with the operation of the mapping and charting program. On 24 December 1945, the War Department was informed that qualified officer personnel for supervision of the ground control activities were not available with CDC. Previous communications had stated the same facts, but the Office of the Chief of Engineers had replied that such personnel could not be furnished until a later date.

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162. Ltr, TAG to CG CDC, 19 Dec 45, sub: 91st Reconnaissance Squadron, Long Range, Photo. In CDC 322 91st Recon Sq (S).
163. Ltr, CDC to C/S USA, 29 Mar 46, sub: Mapping Plan, Western Hemisphere - Assignment of Officer Personnel. In CDC 322 Photo Project in Central and S. America and Caribbean Area, Jan 45-Sep 46.
164. Rad C-39081 (S), CG CDC to TAG, 24 Dec 45. In CDC 322 Photography General (S).

Because of the necessity for immediate action, Headquarters, CDC, arranged clearances and made preliminary reconnaissances to determine whether any control data were available within the countries concerned. The officer personnel available were subsequently dispatched to the various countries to search through existent files and to uncover any of the needed information which might already be on record. A very small number of photographic missions also were flown in the Galapagos Archipelago during December 1945. Eventually seven aerial survey sheets were published from data obtained in this project, and the Archipelago was added to Index Map of the Military Survey of Panama as completed.

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In December 1945, Headquarters, CDC, inquired of the War Department relative to certain photography which it was understood that Navy had accomplished in the Galapagos Archipelago early in the war. The War Department replied that what photography the Navy had accomplished was not of such quality as would meet specifications established for the new mapping program and should be completely disregarded in making new plans. The control data, however, were forwarded for use by CDC. The photography of the Galapagos Archipelago was later initiated and assigned to the 6th Air Force for accomplishment.

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165. Ltr, Rep of Ecuador, Ministry of Natl Defense to CG CDC, Sep 45, sub: Aerial Survey Colon Archipelago. In DERP "Galapagos Islands."

166. Rad #-88060 (S), WD to CG CDC, 11 Dec 45. In CDC 062 Photography - Galapagos (S).

167. Ltr (S), CG CDC to CG 6th AF, 9 Apr 46, sub: Instructions on Project #9. In CDC 062 Photography - Galapagos (S). See also note 73, p.33.

An important preparatory step for accomplishment of the photographic program was initiated early in January 1946 when the Engineer Reproduction Plant, Panama Canal Department, located at the Post of Corozal, C.Z., was made available for developing and printing the aerial photographs. ¹⁶⁸ With the addition of certain equipment and facilities, it was felt in Headquarters, CDC, that the reproduction plant at Corozal could accommodate the requirements of the mapping and charting program. The reproduction plant located at San Juan, Puerto Rico, was later designated as an auxiliary plant to assist ¹⁶⁹ in the program.

SOP Needed

Although much charting and some mapping photography had been accomplished under relatively uncoordinated and piecemeal efforts, and with no standard operating procedure to deal with countries, the experiences and the attempts were steps in the right direction. They were to pave the way for an overall, completely integrated program for mapping and charting of most of Central and South America. The efforts were valuable not only as an attempt in the right direction but provided lessons learned through bitter experience of how

168. Ltr (S), CG CDC to OCD, 3 Jan 46, sub: Mapping Plan, Western Hemisphere. In CDC 062 Photography - Policy (S), See App. "A".

169. Ltr (S), CG CDC to CG's AD and PCD, 15 Apr 46, sub: Mapping Plan, CDC Initial Directive. In CDC 322 (Photo Proj) (S). See App. "B".

the overall task could best be accomplished.

Two of the chief pitfalls were: the lack of adherence to fixed specifications, and the lack of uniform written agreements with the various governments. This lack of adherence to fixed specifications, variation in types of cameras used, and flying at varying altitudes resulted in the accomplishment of much unusable photography. The lack of written agreements resulted in a shallow basis upon which to build a completely new program. From a political as well as practical view point, it was better to coordinate the hodge-podge affairs born of wartime necessity and utilize the old agreements only as a starting point in achieving the goal of formal written agreement between this country and each American Republic.

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170. Freer Op. Cit., Fifth Section, p. 11.

CHAPTER VII

MAPPLAN PROGRAM INAUGURATED

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Mapplan Program Inaugurated

Reestimate of Situation

On 8 January 1946, Colonel Fremont S. Tandy, CE, reported to General Crittenberger for duty. The Commanding General assigned him two tasks.

1. Re-establish the Engineer Section, CDC.
2. Take charge of the charting and mapping plans.

The immediate task of Colonel Tandy as Chief Engineer was to study the plans, review the situation, and to reduce the problem to an operational basis even though most of the factors were unknown. The program, reduced to its simplest elements, would consist of negotiations, geodetic control, and photography. The factors as to how to operate, where, logistical support, qualified personnel, etc. had to be assumed or rationalized. Then too, after basic policy, objectives, and responsibilities had been decided, operational plans would have to be devised.

Here, in review, is the situation confronting the Chief Engineer:

1. Scope: The AREA of his responsibility included Central and South America, less Mexico and Brazil, but including the Caribbean

171. Freer's, Op. Cit., Sixth Section, p. 2.

Archipelago. This is an operational area of 10,000,000 square miles and a pertinent land area of nearly 5,000,000 square miles. For purposes of comparison the area of the United States is 3,000,000 square miles. The two plans initially called for 1,983,633 square miles of charting and 1,766,214 square miles of mapping. Generally speaking, only the areas within a 1400 mile radius in the Panama Canal had been placed in first or second priority; the more remote regions carried lesser priority.

Time and Cost Estimates

As to TIME and COSTS, the War Department had estimated twenty years to complete at an estimated budgeted cost of \$12,000,000 (\$600,000 annually). It might be noted that mapping and charting of a similar area within the United States would cost up to \$500,000,000. Such costs would have stopped the program before it got started. However, the Chief Engineer decided that collaborative efforts between each of the countries and the United States would enable CDC to prosecute the Program with such moneys as would be made available. Costs under such a system would drop to an estimated \$50,000,000 but the program would then require diplomacy and very successful negotiations with the other countries. Collaborative effort would increase coverage obtainable and would seem the only way other nations could or

would accept our leadership in cartographic affairs.

2. Programs in Existence: No firm written agreements existed with any country. There had been no overall or completely coordinated plan for mapping and charting until the present plans, which were even to some extent, still rather nebulous. In fact, the Republic of Panama had not even been included. Previous attempts at photography, and charting and mapping had been more or less haphazard and piecemeal. The wartime photography accomplished under such conditions was, in addition, poor and generally unsuitable due to the type of camera, varying altitudes, and lack of adherence to fixed specifications. Existing topographic maps of certain areas in the Canal Zone and surroundings had been made by the Military Survey of Panama, conducted under the Department Engineer (the 11th Engineers). Since 1914 this had represented an attempt by land survey methods to map certain local areas. The area called for under the Map Plan was 444 times as large as the area covered during the period 1914 to 1945.

Missions Defined

The Chief Engineer defined the missions to be:

Geodetic - to establish a system of first order triangulation, the backbone of any Mapping Project, and the minimum requirement.

172. Freer Op. Cit., Sixth Section, p. 3.

Photographic - to accomplish photography meeting the requirements of efficient compilation by photogrammetric methods.

Cartographic - to integrate the geodetic and photographic data¹⁷³ in order to compile aeronautical charts and large scale topographic maps, also to compile and collect airport data, city maps, etc.

Hydrographic - to provide for mutual assistance and close liaison in respect to United States Navy hydrographic charting programs in the area.

Washington Conferences

The determination of general, over-all missions was far from sufficient; detailed and specific objectives had to be outlined, and basic policy and methods had to be completely crystalized as these operations were to be international in scope.¹⁷⁴

Discussions with CDC provided some of the vast amount of details needed, but additional conferences with various agencies and authorities in Washington would be necessary to complete the picture. Colonel Tandy and Lieutenant Colonel McCarthy, therefore, left the Canal Zone on 23 January 1946 in order to secure this vital information and to talk over the situation with interested officials in Washington.

173. (1:1,000,000 the standard scale as adopted Chicago International Air Conference).

174. Freer Op. Cit., Sixth Section, p. 4.

Following their return on 3 February each submitted a report to the Commanding General.

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The Reconnaissance Officer reported that action had already been taken by the War Department to place the manning of the 91st Reconnaissance Squadron on a first priority basis so that replacement could be sent to the theater by 1 April. Training of the personnel, however, would have to be completed within the theater. He made the recommendation that the Commanding General, AAF, should furnish the Caribbean Defense Command with prints of existing coverage for reconnaissance purposes and for the placement of control points in large scale mapping. He further recommended that units of the 311th Wing attached to CDC for administration, maintenance, supply, and training be coordinated with and attached to Headquarters, 6th Air Force. His final recommendation concerned funds necessary for expected operations.

Foundation of Basic Policy

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The Chief Engineer, in his report to General Crittenberger well summarized his success in reaching agreement on basic policies and procedures. The results of these initial conferences in Washington were of critical importance because they formed the basis of all later policy and procedure inherent to the Cartographic program of the Caribbean

175. Ltr, Recon O to CG, CDC, 8 Feb 46, sub: Rpt of Trip. In CDC 322, (Photo Projects).

176. Memo Engr CDC to CG, CDC, 5 Feb 46, sub: Mapplan Western Hemisphere. Initial Progress Rpt. In CDC 319.1 Progress Rpts, 1946.

Defense Command. His memorandum also included a list of the numerous War Department and other agencies concerned with or interested in the implementation of a mapping plan for Central and South America.

Colonel Tandy singled out Mr. Randall and Dr. Simonpietri, Pan American Institute of Geography and History, for discussion in his report as to their willingness and ability to assist, and in particular, to provide introductions to pertinent foreign technical officials. Here, then, was the first direct contact with the Commission on Cartography whose objectives were almost identical with those of the proposed Cartographic program of CDC. The liaison thus established between CDC and the Commission was to prove of singular and paramount importance.

Rear Admiral Bryan was also mentioned as being willing to furnish assistance and to integrate, insofar as the Navy is able, their plans with ours.

Colonel Tandy also pointed out that although agreement had been reached as to overall policy and procedure to be followed, much remained to be done. In particular, requirements relative to funds, equipment, and personnel had to be determined. Most important he pointed to the diplomatic arrangements necessary for entry into the various countries and jurisdictions within the Caribbean Defense Command.

177. Freer, Op. Cit., Sixth Section, p. 5.

178. Rear Adm. George B. Bryan, USN, Chief Hydrographer, Hydrographic Office of the Navy, Washington, D.C.

In this connection he said:

At this date there remains the solution to securing diplomatic approval for the entry of United States personnel into the various countries and jurisdiction. This problem is so important and so critical that I believe action should be initiated on the highest possible level in the War Department and CDC. Particularly the engineering and reconnaissance offices must be guided by the policy and decisions of the Commanding General, and by such diplomatic requirements as are determined by the several United States Ambassadors or Consuls. I recommend that the War Department should be queried immediately as to which countries have indicated their agreement for the entry of United States personnel to accomplish the mapping project. I also recommend that lists be prepared to the various United States Ambassadors and Consuls within the first and second priority countries and jurisdiction informing them of the plan and asking that initial conferences be arranged with representatives of CDC to explain the possibilities of affecting immediate entrance into the countries or jurisdictions concerned.

Program for All Countries

Another significant point was that all countries would soon know of the activity. They would undoubtedly request, virtually simultaneously, that the United States engage in mapping and charting in each one. The Chief Engineer, therefore, recommended that planning should include provisions for entry not only into first and second priority countries but any country or jurisdiction included within the sphere of Caribbean Defense Command.

A final recommendation was made that all mapping agencies and survey activities in the Panama Canal Department and Antilles Department should be placed immediately under the control of the Engineer,

179. Freer, Op. Cit., Sixth Section, p. 6.

Caribbean Defense Command. Centralized control of all mapping and major survey projects would be a necessity.

The various points of agreement were included as an inclosure which listed the specific policy and procedures to be followed. These basic concepts, though still unofficial and representing agreement in principle only, were basically what would be approved or used as operating procedure. Because of their supreme importance to later operations and later directives, the inclosure listing them is reproduced here
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as a whole.

Policies and Procedures

1. Immediate implementation of the Mapping Plan, Western Hemisphere as pertains to CDC.

2. Expeditious entry into all Central and South American countries and other jurisdictions included in the first and second priorities and those additional countries and political jurisdictions included in the SHORAN project.

3. Upon revision of directives previously issued by G-2, WDGS, prepare to enter additional countries and political jurisdictions included within the boundaries of the Caribbean Defense Command.

4. Military aspects of the Mapping Program are to be held to the very minimum. Initial entries of operating American personnel into the various countries and jurisdictions are to be made by exceptionally qualified civilian geodetic personnel. The Charting Plan to be accomplished mainly by Military personnel.

5. CDC to execute all planning and field operations in accordance with directives issued by G-2, WDGS, except that cartography will be executed by the Chief of Engineers.

180. Freer, Op. Cit., Sixth Section, p. 7.

6. G-2, WDGS, to coordinate immediately with the State Department and to initiate action to secure required high-level diplomatic clearances.

7. Chief of Engineers and CDC to coordinate with the U.S. Navy and to integrate pertinent Hydrographic Office programs into the Army's mapping program for CDC. The Navy should provide all available geodetic and other information and coordinate its programs in the area with CDC.

8. Pan-American Group, OPD, WDGS, to process CDC papers regarding mapping and charting and to monitor action taken.

9. The word "means" contained in the War Department directive is construed to mean funds, personnel, and equipment.

10. Immediate allotment of funds to the CG, CDC by the Chief of Engineers in the amount of \$500,000 for mapping, and provision of \$1,500,000 for CDC in 1947 budget.

11. The Chief of Engineers to initiate the assembly of precise survey instruments and other necessary equipment at Engineer Depots or General Depots in the United States and to be prepared to effect shipments of all classes of property to each country upon notice from CDC.

12. The Chief of Engineers to act as an employment agency for CDC and to initiate the procurement of qualified civilian geodetic, and other personnel not otherwise available in CDC.

13. The Chief of Engineers to determine adequacy of existing control and to furnish all available geodetic and other information needed by the CDC Engineer and to act as a liaison agency with the Navy, the Coast and Geodetic Survey, the P.A.I.G.H. and civilian firms such as the United Fruit Company and Standard Oil Company whose agencies have executed surveys and mapping projects in the CDC area. The Aeronautical Chart Service to provide similar data for charts.

14. The Pan-American Institute of Geography and History to make available all geodetic and other information known to it and to use its good offices, when requested, to assist CDC in its mapping efforts, particularly as regards to introductions to Central and South American personnel engaged in geodetic and mapping activities.

15. Centralize all mapping and charting activities under the Assistant Chief of Staff, G-2, CDC, who would prepare CDC directives to implement charting and mapping plans and be responsible for coordinating mapping and charting plans.

16. G-2, CDC, to make local diplomatic arrangements for entry of U.S. military supervisory and civilian geodetic personnel into the countries and jurisdictions included in the first and second priorities, and the SHORAN project. Sub-offices to be established in Puerto Rico and in other locations as needed.

17. The Engineer and Reconnaissance Officers of CDC to be on an equal special staff basis and to be coordinated by directives issued through the G-2, CDC. The Engineer and the Reconnaissance Officers to be designated as the responsible officers for implementation of the mapping and charting directives and to be fully responsible for operations within their respective fields.(181)

18. Military topographic personnel are to be integrated into the mapping program for training purposes, but are not to be permitted to enter foreign areas except Panama, until after the entry of supervisory military personnel and civilian geodetic personnel, and, then only upon written permission of the government concerned.

19. All military mapping personnel in CDC to be assigned to CDC. (Immediate assignment of the Engineer Topographic Company, PCD, to be accomplished.)

20. All precise survey sets and instruments in CDC to be inventoried and reported immediately.

21. PCD and AD to furnish CDC, the Chief of Engineers, and the Navy Hydrographic Office with records of all previously executed mapping and major survey projects, and, for new projects, to furnish copies of data as directed by CDC.

22. PCD and AD to report immediately geodetic and survey personnel now available and to be prepared to furnish, upon directives issued by CDC, such personnel surplus to their urgent needs.

23. PCD and AD are not to engage in mapping or major survey projects unless cleared with CDC. (182)

181. Freer, Op. Cit., Sixth Section, p. 8.

182. Freer, Op. Cit., Sixth Section, p. 9.

The tactical mapping program for the Canal Zone vicinity for 1946 did not include preparation of any extensive areas outside the Military Survey of Panama objectives, and a recommended mapping of the entire area of the Republic of Panama, outside that already planned, was not feasible, even with the use of photomapping then being done extensively throughout the Army. It was found that a considerable amount of trimetrogon photography had been flown by the War Department in Operating units within the Panama Canal Department. At the time of the report from the Board, no information as to the index of completed and contemplated aerial mapping was available.

Antilles Area Program

Because of increasing demands for photography in the Antilles area, Headquarters, CDC, in mid-January 1946 requested that the Commanding General, AAF, attach a flight of thirteen F-2 aircraft to this command for use in completing the Antilles photography. According to the CDC plan, eleven of these planes would be assigned directly to photographic work throughout the Antilles Department and two of them would remain in the Canal Zone for local work and to act

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183. Rpt of Proceedings of Bd of Off Appointed to Investigate Mapping Program, PCD, 28 Sep 43. In PCD 061-1 1943. See Index Map to Military Survey of Panama in Appendix "E".
184. See notes 95, 96, & 100 on pp 52 - 53.
185. See notes 95, 96, & 100 on pp 52 - 53.
186. Ltr (S), CG CDC to TAG, 15 Jan 46, sub: Aerial Photography. In CDC 322 (Photo Project) (S).

as liaison between the planes in the Antilles and the laboratory.

Because of personnel shortage, the War Department had to refuse this
187
request. Plans were under consideration, reported the War Department,
for the dispatch of a flight consisting of ten F-2's, later to be
augmented with three more planes, for arrival in the CDC area on or
about 1 May 1946. The dispatch of this flight was dependent upon
availability of personnel.

In early 1946 flight line maps of Cuba, Trinidad, and Jamaica
were scheduled to be made. Preparations were being initiated for
similar maps in the Dominican Republic and in Haiti, and preliminary
control data were being checked and plotted on the Virgin Islands. 188

In 1946 permission was requested of the War Department to combine the
type of surveying used in the area with that proposed in the Mapping
Plan, Western Hemisphere, or in the Charting Plan for Central and
South America (less Mexico and Brazil). 189 The Caribbean Defense

Command felt that such combining of aerial photography could be
economically accomplished with the utilization of personnel and
190
equipment simultaneously and on the same priority. Comparison of
the proposed areas to be photographed with those already completed

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187. 1st Ind, TAG, 16 Feb 46, on Ltr (S), CG CDC to TAG, 15 Jan 46,
sub: Aerial Photography. In CDC 322 (Photo Project) (S).
188. Ltr, DE to OCD, 2 Aug 46, sub: Mapplan, CDC; Progress Rpt for Jul 46.
In CDC 322 Photo Project Central & S.America and Caribbean Area.
189. Memo, Engr CDC for CG CDC, 5 Feb 46, sub: Mapping Plan, Western
Hemisphere. Initial Progress Rpt. In CDC 322 Photo Projects (S).
190. Ltr, CDC to TAG, 15 Jan 46, sub: Permission for Aerial Photography
and Beach Reconnaissance Surveys, w/10 Inds. In CDC 060 Maps, Charts
and Tables - Policy.

indicated that such economy was feasible, provided that additional offshore flight lines could be drawn so that low altitude oblique photos could be flown with those of the Mapplan. Necessary ground control was available from that obtained under direction of the Mapplan. Since the Navy, under the Commander in Chief, Atlantic Fleet, was surveying the coasts of Central America, it was determined to omit the low altitude offshore obliques until such time as more photographic planes were available. ¹⁹¹ No such activities were being carried out in the Panama Canal Department, and available information indicated ¹⁹² that such surveys had not been accomplished since 1939.

Original boundary monumenting of the San Jose Island Project had not been accomplished because of the indefinite status of the Island as a permanent base. No Real Estate Directive for the determination of such marking was ever issued and the consequent monumenting and maintenance was deferred until such time as present negotiations for defense sites within the Republic of Panama had reached a basis for dissemination to all personnel concerned with real estate activities. ¹⁹³

Basic Policy Letter of 20 March 1946

With this tentative agreement in the Caribbean Defense Command as to policy and procedure, the next steps were to put these ideas

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191. Ltr, CDC to TAG, 15 Jan 46, sub: Permission for Aerial Photography & Beach Reconnaissance Surveys, w/10 Inds. In CDC 060 Maps, Charts & Tables - Policy.
 192. Ltr (draft), Engr Topo Co PCD, 13 Dec 44, sub: Beach and Terrain Intelligence Surveys. In Dpet Engr 060 Maps & Mossaics - General, 44.
 193. 3d Ind on Ltr. Hq San Jose Project Div to CO San Jose Proj, 31 Jan 46, sub: Annual Inspection of Post Boundaries. In CDC 322 San Jose Proj.

into final detailed form for War Department consideration and approval; and, secondly, to plan operations based on these concepts. The first of these steps, incorporation into a basic policy letter, was completed and Colonel Tandy made a second trip to Washington with a draft in order to iron out any rough spots. When Colonel Tandy returned, the letter was forwarded by the Commanding General, CDC, to the War Department for formal written approval.

194

This basic policy letter contained a formal statement of the previously enumerated policies along with some explanation for the adoption of each policy. Generally speaking, the following represent the essence of the letter:

Immediate implementation and vigorous prosecution of Mapping and Charting Plans since a most opportune moment existed for expeditious entry into the Central and South American countries whereas delays would make it more difficult to effect necessary arrangements. (For further discussion of this point, see the Section on Diplomatic Negotiations). (195)

Ability of WD and CDC to meet commitments promptly to be a fundamental basis upon which negotiations would be conducted. In the past, many objects had been endangered and, in instances, even the relationships between foreign nations and ourselves strained, because of the difficulties arising from misunderstandings or outright failure to deliver necessary equipment or do something otherwise essential

194. Ltr, CG, CDC to C/S USA 20 Mar 1946, sub: Mapping and Charting Plan CDC. In CDC 008 (MP) Policy and Directives.

195. Freer, Op. Cit., Sixth Section, p. 8 $\frac{1}{2}$ (cq).

to the accomplishment of the project involved. It would be imperative, therefore, that entries be effected only on the immediate ability to meet commitments.

Military Aspects Minimized

Military aspects were to be minimized in the Mapping Plan. It is believed that better results could be obtained if only selected supervisory military personnel and expert civilian geodetic personnel were allowed access. The ability of U.S. technical personnel to set an example before these peoples is a vital factor to the successful execution of the plan. Further, the necessity of extensive ground operations under the Mapping Plan, in contrast to the Charting Plan, is bound to cause numerous difficulties which could be minimized by the employment of local people under the supervision of a few U.S. civilian personnel. Most important, an organization primarily of civilian geodetic experts under direct supervision of the military is to be preferred as it would be much more flexible and efficient, could integrate civilian experts better, and finally, the military has too few qualified personnel. Nevertheless, military personnel should be integrated for training purposes. The use of Topographic troops is considered unfeasible, except in Panama and remote uninhabited areas. The Charting program, on the other hand, was expected to be accomplished mainly by military personnel since it consists primarily of photography.

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196. Freer, Op. Cit., Sixth Section, p. 9.

Military and civil geodetic organizations and personnel of the various countries, as well as their other facilities and resources, should be utilized as much as possible. This would be in keeping with the endeavor of most of these countries to accomplish as much as they can themselves. Integration of their past and future mapping projects is desirable as it would increase coverage while at the same time reduce our work load and costs. By lending expert guidance and instructions we could reap the rewards of goodwill, understanding, and fullest cooperation. Augmentation of their limited facilities and resources would have to be done by the U.S.

The concept that each Nation should be afforded an equal basis of treatment is necessary for fullest future cooperation of all concerned. All work would soon be a matter of public record and if this concept were not in operation, jealousies and further demands might arise. This concept, however, in no manner conflicted with the principle of supplying different degrees of aid according to the available resources and needs of a particular country.

Coordination With Other Agencies

Maximum coordination with other interested U.S. agencies is necessary to provide mutual assistance, to promote efficiency, uniformity, and to avoid duplication and unauthorized or clandestine efforts.

All photography must be accomplished by the U.S. Most of these

countries do not have the necessary photographic resources available, therefore, for most efficient and consistent work as well as a pronounced selling point to the nations involved, U.S. equipment will be used exclusively.

197

The first indorsement by the War Department approved the policies, and supplied information on personnel, equipment and diplomatic matters. The indorsement also indicated the importance interested officials in Washington attached to the plan and its promulgation.

The following excerpts are indicative of this interest:

The implementation of the War Department Mapping Plan in the Western Hemisphere is a positive approach for promoting the solidarity of Pan American countries. These countries will receive benefits and improved air, sea and land navigation, and in greatly facilitated economic planning and development. The United States will acquire the minimum of mapping, charting and photographic data essential to the defense of the Western Hemisphere. Local mapping programs and interest in United States methods and equipment will be stimulated. (198)

The War Department is supporting the mapping and charting program to the fullest extent possible. The stringent personnel limitation imposed upon the War Department make it very difficult to meet important obligations and to provide for future contingencies. The lack of personnel combined with other difficulties may preclude realization of all the comprehensive and excellent policies prepared by the Caribbean Defense Command. But in no case should the objectives be abandoned. Photographic and ground control activities should continue to the fullest possible extent with available resources however meager. Local cooperation should be promoted

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197. 1st Ind, WD 5 Jan 46, to Ltr, CG, CDC to C/S U.S. Army, 20 Mar 46, sub: Mapping & Charting Plan, CDC. In CDC 008 (MP) Policy & Directives.
198. Freer, Op. Cit., Sixth Section, p. 10.

vigorously and exploited to a common advantage. Although the means of developing the Western Hemisphere mapping plan are limited, the War Department is confident that this limited means, diffused with energy and ingenuity, pursuant to carefully prepared plans, will produce appreciable results."

The penciled remarks of General Crittenberger to the indorsement indicated the feeling of the Caribbean Defense Command:

"We have no intention of abandoning this project which is of so much importance from a Hemispheric solidarity point of view. WDC"

Mapplan, CDC

The second step, that of planning operations based on the adopted concepts reached final form when the mapping directive or the "MAPPLAN, CDC" was issued on 15 April 1946. This first directive was the result of thorough study and discussion among various staff sections who were initially very much interested and eager to become an integral part of the operation, or at least to influence how it should be conducted.

The principal problem had been that of operational responsibility. G-3, CDC indicated that the line of action for executing the plan should be the responsibility of the Commanding General's 6th Air Force, Panama Canal Department, and the Antilles Department. The Chief Engineer, on the other hand, did not concur with this line of action. Even from the beginning, as indicated in his first report to the Commanding General, he not only believed centralized control necessary but that

there was little purpose in having a separate charting plan and a separate mapping plan -- they should be unified or at least prosecuted as a single entity since both involved the same two basic factors: aerial photography and geodetic control on the ground. He considered the whole operation to be one obligation and should, therefore, have unity of control. His argument, as outlined in a memorandum to G-3 CDC, was for this centralization. He felt that the accomplishment of the MAPPLAN would be primarily a technical operation which should be integrated without being subject to numerous command changes or the intervention of subordinate command agencies. A technical mapping agency, to operate efficiently, can not be subject to numerous changes. He intimated that "The present command structure in the Caribbean Defense Command is not likely to continue as long as the Mapping program".

He also went on to say that both of the War Department directives had outlined specific technical responsibilities for the Reconnaissance Officer and the Theater Engineer, and had made no reference to a re-delegation of responsibility. There was every indication that both plans contemplated confining engineer organization and work directly under the Engineer and that elements of the 311th Wing were to work under the Staff supervision of the Theater Reconnaissance Officer.

199. Freer, Op. Cit., Sixth Section, p. 11.

200. Memo Engr CDC to G-3, CDC, sub: MAPPLAN, CDC, Directive, 28 Mar 46. In CDC 008 (MP) Policy and Directives 1946.

These technical units were to be the operating field agencies. He summarized thus:

Technical organizations work efficiently when they are integrated, controlled, and coordinated by technical personnel. They work poorly otherwise.

He concluded his memorandum by commenting that valuable time had already been lost and more serious delays would result in the future if a decision to redelegate the responsibility for accomplishment of the missions were made.

Directive Issued

The Chief Engineer was overruled and operational responsibility of necessity therefor was split. Plans for the execution of the program were established by the Directive as follows:

Headquarters CDC would prepare overall plans for the execution of all projects of the MAPPLAN CDC, and initiate the Inter-American Geodetic Survey to execute these operations outside the jurisdiction of the Panama Canal Department and the Antilles Department.

Commanding General, Antilles Department would execute similar surveys in the Caribbean Archipelago, initially, in Cuba, Haiti and Dominican Republic.

Commanding General, 6th Air Force would submit plans and provide aerial logistical support to

operations for the accomplishment of photography.

The purposes of this operational plan were to:

1. Implement WD Directive.
2. Coordinate all mapping and charting photography, geodetic surveying, and related activities.
3. Assign responsibilities for planning, supervising, and executing mapping projects.
4. Coordinate, insofar as practicable, U.S. mapping projects with those of foreign governments and other U.S. agencies.
5. Insure efficient accomplishment of all mapping projects by preventing duplication of effort and unauthorized activities. 202

Staff Responsibilities

An attached memorandum to the Directive indicated the responsibilities of the Staff officers, CDC. Briefly, these are outlined as follows:

G-2 - Facilitate diplomatic agreements through Military Attaches, analyze and evaluate significance of requests, furnish pertinent information to other responsible staffs in order to assist and guide them regarding the various political situations.

Supervise and coordinate preparation of plans and policies.

202. Ltr, CG, CDC to CG's, AD, PCD, and 6th AF, 15 Apr 46. Mapping Plan CDC, Initial Directive, with 2 Incls; Priorities & Responsibilities of CDC Staff Officers. In CDC 322 (Photo Projects), see Appendix__.

Reconnaissance Officer - Monitor requirements for photography,

coordination of Air Force activities and staff supervision of attached Air Force units, coordinate agreements and priorities with other staffs.
203

Engineer - Provide civilian survey organization, prepare specifications, maintain records, obtain geodetic intelligence, establish liaison with other agencies and private companies, coordinate agreements and priorities with other staff officers.

To summarize, the MAPPLAN CDC stated in detail the overall concept of the aerial mapping program within CDC and assigned responsibilities to the organizations and key officials for carrying out the various projects. Much still remained to be done, however, before paper planning could be converted into productive action -- assembling of personnel and equipment, furnishing logistical support and, perhaps, of greatest importance, acquiring the necessary agreements with various countries and jurisdictions. The many benefits each Latin American Nation and all collectively would derive from the mapping program would make them receptive to the plan and facilitate the task of acquiring necessary agreements, but there were still many difficulties, technicalities, local political controversies and other related obstacles which could and would delay final accomplishment of agreements.

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203. Freer, Op. Cit., Sixth Section, p. 13.
204. Freer, Op. Cit., Sixth Section p. 14.

CHAPTER VIII

ORGANIZATION FOR MAPPLAN, CDC

INTER-AMERICAN GEODETIC SURVEY
ADVISORY COMMITTEE

COMMANDING GENERAL
CDC

CHIEF ENGINEER, CDC
COLONEL MOS - 7010

10 RECONNAISSANCE OFFICERS
- 1st OR 2nd LTS. -
TOPOGRAPHIC ENGRS. MOS-7915

MAPPING EXEC.
LT. COLONEL MOS-7915

GEODETIC ENGR. P-7

CHIEF OF ENGINEERS

EXPEDITING SECTION
(16) GEODETIC ENGR. P-5
(17) ADMINISTRATIVE ASSISTANT CAF-9
(6) CLK-STENO CAF-3
2 LIAISON OFFICERS
- CAPTAINS -
PHOTOGRAMMETRISTS
MOS-7916

GEODETIC CONTROL AND
COMPUTING SECTION
(8) GEODETIC ENGR. P-6
(9) GEODETIC ENGR. P-4
(10) 2 GEODETIC ENGR. P-3
(11) GEODETIC ENGR. P-2

GEODETIC OPERATIONS
AND PLANNING SECTION
(12) GEODETIC ENGR. P-6
(13) GEODETIC ENGR. P-4
(11) GEODETIC ENGR. P-2
(6) CLK-STENO CAF-3

LOGISTICS SECTION
PROPERTY AND
SUPPLY OFF. CAF-12
PROPERTY AND
SUPPLY OFF. CAF-9
(10) GEODETIC ENGR. P-3

GEODETIC RECORDS AND
ADMINISTRATION SECTION
(2) ADMINISTRATIVE ASST. CAF-9
(3) ADMINISTRATIVE ASST. CAF-7
(4) CLERK CAF-6
(5) CLK-SECRETARY CAF-4
(6) 2 CLK-STENO CAF-3
(7) LIBRARY ASST. SP-5

R.K. Franston

GENERAL AMERICAN SERVICE

INTER-AMERICAN GEODETIC SURVEY
 CENTRAL AMERICAN SECTOR
 ORGANIZATION CHART
 APPROVED 3 JULY 1946

| | |
|-------------------------|-------|
| CENTRAL AMERICAN SECTOR | |
| CHIEF OF SECTOR | P-6 |
| ENGR. DRAFTSMAN | SP-6 |
| CIK-STENO | CAF-3 |

- (18)
- (20)
- (6)

| | |
|----------------------|-------|
| NICARAGUA | |
| CHIEF OF PROJECT | P-5 |
| GEODETIC ENGR. | P-4 |
| GEODETIC ENGR. | P-3 |
| 2 GEOD. ENGR. | P-2 |
| PHOTOGRAPHER | CAF-5 |
| CLERK-PROP. & SUPPLY | CAF-5 |
| CIK-STENO | CAF-3 |

- (19)
- (13)
- (10)
- (11)
- (21)
- (22)
- (6)

| | |
|-------------------|-------|
| GEODETIC ENGINEER | P-4 |
| CIK-STENO | CAF-3 |

- (23)
- (6)

| | |
|---|------------|
| RECONNAISSANCE TRIANGULATION TRAVERSE & LEVEL PARTY | |
| GEODETIC ENGINEER | P-3 |
| 3 GEODETIC ENGINEER | P-2 |
| 3 ENGINEERING AIDE | SP-6 |
| 7 ENGINEERING AIDE | SP-4 |
| AXEMAN | Ungrd. G-2 |

- (24)
- (25)
- (26)
- (27)
- (28)

| | |
|---|------------|
| RECONNAISSANCE TRIANGULATION TRAVERSE & LEVEL PARTY | |
| GEODETIC ENGINEER | P-3 |
| 3 GEODETIC ENGINEER | P-2 |
| 3 ENGINEERING AIDE | SP-6 |
| 7 ENGINEERING AIDE | SP-4 |
| AXEMAN | Ungrd. G-2 |

- (24)
- (25)
- (26)
- (27)
- (28)

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| RECONNAISSANCE TRIANGULATION TRAVERSE & LEVEL PARTY | |
| GEODETIC ENGINEER | P-3 |
| 3 GEODETIC ENGINEER | P-2 |
| 3 ENGINEERING AIDE | SP-6 |
| 7 ENGINEERING AIDE | SP-4 |
| AXEMAN | Ungrd. G-2 |

- (24)
- (25)
- (26)
- (27)
- (28)

CHAPTER VIII

Organization for MAPPLAN, CDC

Section Responsibilities Placed

It has been repeatedly pointed out that there were three major problems: organization, requirements, and diplomatic negotiations. To consider the problem of organization first, under the MAPPLAN, CDC, the Reconnaissance Officer, CDC, was to operate on a special staff basis. Equal status was given the Reconnaissance Section when it was created on 18 April 1946. ²⁰⁵ Since November 1945, it will be remembered, the Reconnaissance Officer had operated as part of, and under the supervision of, the Air Officer, CDC. With its new status the Section undertook two primary duties: The first, preparation of a directive to the 6th Air Force for the accomplishment of photography for mapping and charting missions, and directing ground control, specifications, etc. The other primary duty was to act in an advisory capacity to the Commanding General, G-2, and the Chief Engineer in regard to technical aspects of charting, photography, and, in general, Air Force capabilities and limitations.

The accompanying organizational and functional chart of the Reconnaissance Section is self-explanatory.

205. CDC Administrative Memo #1, 18 Apr 46, CDC 322.

However adequate this section appeared on paper, in actual operation there was local opposition to it. The Air Force felt they were charged with the problem and should, therefore, have its responsibility and execute the mission as they saw fit. The basic relationship between the Reconnaissance Section and Air Force operations were not, then, as harmonious as possible. This resentment gradually built a wall between the Air Corps and CDC. It would seem that some other method would be advisable since the section was proving more of a hindrance than an aid. For example, technical information to the Commanding General and the Staff could be equally well supplied by qualified liaison personnel attached to G-2.

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The new AR 300-15 published 29 November 1946 and superseding those of May 42, with changes, called for a modeling of theater activities after the War Department organization: The Director of Intelligence is responsible for mapping and charting activities, with the Corps of Engineers and the Air Corps as operational agencies.

Following War Department example, the Reconnaissance Section would seem outmoded. It was deemed advantageous in this instance to follow the War Department model. As a result, on 22 May 1947 the Reconnaissance Section was abolished and its functions and personnel transferred to G-2, CDC and CG, CAirC.

207

206. Freer, Op. Cit., Seventh Section, p. 1.

207. Ltr, CG, CDC to CG, CAirC, 22 May 47, sub: Mapplan CDC (Mapping and Charting responsibilities). In CDC 322.

activities progressed slowly.

Inter-American Geodetic Survey

Mapping was at this time only one of the responsibilities of the Chief Engineer. His continued efforts to integrate mapping activities along technical lines gradually proved successful. The Initial Directive, 20 April 1946, stated that an organization, to be called the Inter-American Geodetic Survey (abbreviated to IAGS), would be initiated by the Chief Engineer for the accomplishment of geodetic survey operations incident to the accomplishment of the MAPPLAN CDC. Details as to its purposes were contained in paragraph 5g, of the MAPPLAN which stated:

- (1) Planning and supervising the execution of precise geodetic survey operations.
- (2) Securing geodetic data and analyzing and evaluating geodetic systems.
- (3) Preparing overall plans and specifications for the integration of existing geodetic survey systems.
- (4) Cooperating with and assisting foreign civilian and military geodetic survey personnel.
- (5) Assisting by the execution of precise survey operations which are beyond the capabilities of subordinate agencies or foreign governments.

The values of an essentially civilian group augmented and supervised by the military would be multiple. It would provide a flexible unit whose personnel and methods could be tailor-made to the situation

210. Par 2 and Par 15, a MAPPLAN CDC Initial Directive, 15 Apr 46.

as it developed. This was desirable as the field was new and readjustments were to be expected; however, these readjustments would have to be made easily, rapidly, and with a minimum disruption to basic plans and operations. IAGS provided a convenient means for integrating highly technical and specialized personnel, and would provide a means to explore and collect data on a variety of scientific subjects. The possible stigma of being primarily a military endeavor was avoided and a lower security classification was made possible. The name itself which typified the mission and the idea of joint effort, would be a rallying point to all American Nations.

A tentative organizational plan was set up and sent to the Chief of Staff, CDC. ²¹² With approval of a tentative organization the Chief Engineer could proceed with the organization of his control section, thereby adding impetus to the mapping plan.

A formal request for the organization was contained in a memorandum to the Commanding General 6 May 1946. ²¹³ In his memorandum to General Crittenberger, Colonel Tandy pointed out that the initial concept of an organization which could most efficiently accomplish the necessary surveys was an integrated geodetical organization which would parallel the field organizations of the United States Coast and Geodetic Survey and the United States Navy Hydrographic Office. This

211. Free, Op. Cit., Seventh Section, p. 3.

212. Memo Engr CDC to C/S CDC, sub: Organization of IAGS, 11 Mar 46. with 1st Ind. 28 Mar 46.

213. Memo Engr CDC to CG, CDC, sub: MAPPLAN CDC, Initial Directive, 6 May 46. In CDC 008.46.

concept was changed insofar as the first priority areas were concerned, because of lack of housing in the Canal Zone. Colonel Tandy expressed the opinion that such an organization would be more desirable and certainly more flexible and efficient than that originally contemplated in the Directive.

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Success of the overall mapping program will depend upon the manner in which diplomatic arrangements are made and upon the primary civilian organization which would operate under control of CDC. To forestall the objections to any element of Headquarters CDC undertaking operational functions, Colonel Tandy said in his memorandum:

The civilian organization operating under control of this headquarters does not constitute the undertaking of operational functions by this headquarters any more than do the two Departments or any other independent Commands operating under control of this headquarters constitute the undertaking of operational functions by this headquarters.

To negotiate effectively and to secure the geodetic control data required, wide latitude in controlling operations of such an organization must be granted. The necessary strength and specific operations it will have to undertake to secure the required data will depend on local conditions. He therefore requested:

That I be granted authority to organize and control the civilian geodetic organization authorized under paragraph 5g of the directive in accordance with sound technical practices and the requirements of the conditions found in each of the nations in which maps are desired.

This was approved and was followed by a request for the name,

214. Freer, Op. Cit., Seventh Section, p. 4.

INTER-AMERICAN GEODETIC SURVEY. To repeat, this name enabled a low security classification, placed no particular emphasis upon the military, was symbolic of the joint undertaking, and would appeal to the Latin Americans.

A finally approved organization was secured 3 July 1946.

Use of Engineer Units Limited

As already mentioned, military aspects were to be minimized and that, except for Panama and sparsely populated isolated areas, it was considered inadvisable to use engineer troops. Further, the unavailability of personnel because of the relatively low priority of CDC made it virtually impossible to use any but the minimum of supporting engineer troops.

On Colonel Tandy's second trip to Washington in March 1946, he explored the possibility of securing an Engineer Base Topographic Battalion. In his report of the trip he said:

It was learned that the War Department would consider the attachment of such type unit, less personnel to CDC upon request.

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- 215. Radio, CG to WD, 6 Jun 46, but not sent. Returned approved by C/S, CDC w/o reference to WD. In CDC 008 (MP).
 - 216. Check Slip, sub: MAPPLAN CDC Engineer Geodetic Survey Personnel, 27 Jun to 3 Jul 46. In CDC 321 (MP) 1946.
 - 218. Memo Engr to CG, CDC, Progress Report, 21 Mar 46, CDC 319.1, 1946.

His report also mentioned that the War Department decision to permit dependents of all military personnel to be sent overseas would require a major revision of projected survey operations due to the anticipated shortage of housing in the Canal Zone.

Here again was mention of the acute housing problem. Due to the situation that was developing, the proposed organization to handle Panama was changed from an exclusively civilian organization to a mixed Topographic organization consisting of engineers, quartermaster pack troops, and others.

The request for an engineer battalion to be attached to CDC over and above present and future authorized troop basis, was sent to the War Department 26 March 1946. It was contemplated that the Battalion and supporting units attached to the Command for the accomplishment of geodetic surveys would be re-attached to subordinate agencies for administration, quarters, supply, maintenance, and operational control.

On 9 May CDC received word that action would soon be taken to activate an Engineer Base Topographic Battalion, less one survey company, but personnel would have to be provided from sources under control of CDC. Specific authorization was later given in a War Department letter to CDC. CDC indorsed this to PCD, who by

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219. Ltr CG, CDC, to C/S ISA, sub: Attachment of Engineer Base Topographic Battalion to CDC, 26 Mar 46. In CDC 321, 1946.
220. Freer, Op. Cit., Seventh Section, p. 6.
221. Radio, WAR 87298, 9 May 46, in CDC 321, 1946.
222. Ltr TAG to CG, CDC, 20 May 46, sub: Activation and Organization of Certain Engineer Units in CDC.

General Order #68, 29 June 1946, reactivated the 660th Engineer Base Topographic Battalion, effective 1 July 1946, and attached to PCD for duty, with station at Fort Clayton. As a result, on 1 July 1946, the 660th Engineer Base Topographic Battalion was activated with the mission of effecting geodetic surveys in Panama only. It was to operate under the Department Engineer PCD. By PCD General Order #71, 12 July 1946, the station was changed to Fort Davis, effective 18 July 1946. An Engineer Boat Company and Quartermaster Pack Troop were also activated by this order. ²²³ This Battalion was composed of most of the ²²⁴ personnel of the old Engineer Topographic Company and others to fill the needs under the MAPPLAN, CDC. Its assignment was not only the work of the Plant but personnel were utilized in all phases of mapmaking, especially in the accomplishment of MAPPLAN, CDC.

In Panama, Inter-American Geodetic Survey was to be supervisory only; Mapping activities in Panama had been assigned by the initial directive to the Panama Canal Department. In carrying out a mission of long range mapping, units of Panama Canal Department had been requested to offer their cooperation and assistance in the provision of housing, messing, issuing supplies available, maintenance of vehicles and equipment, etc. ²²⁵

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223. Auth Radio WAR 93611, 8 Jul 46, and ltr Hq CDC, 9 Jul 46, sub: Activation of Engineer and Quartermaster Units.
224. PCD Hist Study (S), Preliminary Study of Retrospective History of PCD - Dept Engr, Vol. III. In CDC Hist Sec Files.
225. Ltr CG, PCD to CG 6th AF, CAirC; Co's 33d Inf, all posts and air bases, 15 Jul 46, sub: Assistance to Mapping Parties. In CDC OOB (MP) 1946.

Engineer Reproduction Plant

Additionally, Panama Canal Department had been given a responsibility of assisting the MAPPLAN with the facilities of the Engineer Reproduction Plant at Corozal. ²²⁶ Additionally, the Engineer Reproduction Plant in San Juan, Puerto Rico would operate as an auxiliary base reproduction plant under the CG, AD. Both plants would be used to supplement reproduction of standard and provisional maps and charts needed for MAPPLAN CDC current operations, training and for development of methods and equipment suitable for the reproduction of maps in the Caribbean Defense Command. Reproduction work for CDC would be given high priority.

The Chief Engineer, CDC felt it extremely desirable to expand and modernize the Corozal plant. He wished to have a modern establishment which would serve as an example to the various South American countries, whose capabilities of high caliber work would make it extremely desirable for these countries to have their reproduction work done here. It also was desirable that such a plant would be able to offer facilities for storage, map collection, and processing of geodetic data. For strategic reasons, it would act as a sub-depot for the Army Map Service. On 20 January 1947 the new building was started and was finished 22 July 1947. When installation was completed February 1948 the

226. Par 17, MAPPLAN CDC, 15 Apr 46.

plant represented one of the most modern establishments of its size available to the Armed Forces. As such it could be utilized as an outstanding example to collaborating nations and aid in reproduction of their material, as Colonel Tandy had suggested.

CHAPTER IX

WORK OF COAST AND GEODETIC SURVEY

CHAPTER IX

Work of Coast and Geodetic Survey

U.S. Civil Bureau Renders Assistance

The story of organization would not be complete without reference to the collaborative technical assistance furnished by the United States Coast and Geodetic Survey. As a Bureau of the Department of Commerce it has the responsibilities of making hydrographic charts of the coasts of the United States and its territories and its possessions; the establishment of primary geodetic control within the United States; and finally the preparation of aeronautical charts, within the United States and of strip charts of major routes outside of the United States where Army and Navy charts are not available.

Although its functions are primarily domestic it may under certain circumstances enter into work outside the jurisdiction of the United States. At the request of the State Department, or upon request of a foreign government or major agencies thereof for technical aid, the US & CGS had had a policy to cooperate and to undertake assistance whenever possible. They welcomed such requests and generously loaned personnel to supply such aid as they could. Extra-territorially, they may render advice and consultation through personnel loaned specifically for that reason, but they cannot operate,

i.e. spend money, outside the jurisdiction of the United States.

Further, the Director serves on the Advisory Board to the Chairman of the Commission on Cartography of the P.A.I.G.H. and can thus discuss Western Hemisphere mapping problems and exchange technical ideas.

With the latter point in mind, the Director sent one of his commissioned officers on a mission to Chile, Uruguay, Paraguay and Brazil.

The mission extended from April through December 1946, for the fol-

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lowing purposes:

1. Investigating the status of mapping and geodesy there.
2. Exchanging technical information and
3. Seeing how the native personnel trained in geodesy in the United States (at the request of the State Department) were being utilized.

At this particular time the MAPPLAN, CDC was just being formulated and little of it was known outside War Department circles. To CDC, however, such a mission reemphasized one of the basic principles being evolved: specifically, that a united front in regard to cartographic efforts must be presented to the South American countries. Piecemeal efforts such as these would have to be eliminated in the future as they would prove inconsistent with the idea of a single operating agency for United States cartographic activities in Central and South America.

Between 8-13 May, Colonel Tandy visited Washington again. Long

227. Freer, Op. Cit., Eight Section, p. 1.

an admirer of the USC & GS, he proposed the idea of collaboration with the Coast and Geodetic Survey to the Intelligence Division of Office, Chief of Engineer. At first OCE thought the idea impractical and all but ordered Colonel Tandy not to approach the subject with the Survey. Although he did not discuss the matter at that time with the Coast and Geodetic Survey, Colonel Tandy felt his primary mission was to achieve maximum results possible for the Commanding General CDC.

Aid Needed by Project

There were many reasons why such assistance was extremely desirable; the MAPPLAN CDC was an international program and the joint efforts of not only all United States agencies but of foreign technical agencies as well would be required. ²²⁸ It was obvious that much more could be accomplished for the good of geodesy if United States technical organizations were to work together.

The Army needed the assistance of the other agencies for it had never attempted so vast a cartographic effort involving such high standards of accuracy. There had been no need heretofore in the Army for precise geodetic work. Additionally since high order geodesy had previously been beyond the scope of the Army, there were few trained personnel—a matter of individuals. The Army not being fully qualified, therefore, would be enormously benefited if a technical organization of the caliber of the Coast and Geodetic Survey were to assume a

228. Freer Op. Cit., Eight Section, p. 2.

mission of assistance in the more technical and specialized portions of the program.

In a letter to the War Department, the Commanding General, CDC asked for the assistance of the Survey. The War Department indorsement indicated such aid could be provided. 229

Later at the Caracas convention of the Commission on Cartography (August-September 1946) the way was cleared for collaboration with the USC & GS and for implementation of the policy of a single operating agency. 230 Colonel Tandy, on a trip to Washington 6-13 November 1946, succeeded in his efforts to achieve this collaboration. He purposely arrived at a time when details could not be discussed with the Director. 231 The latter had but a few minutes before leaving to catch a train. Queried as to whether the USC & GS intended to cooperate, the Admiral answered "yes".

Colonel Tandy's sincere admiration for the organization and his earnest desire for their assistance won their support. Their willingness was further augmented by the realization that the Army, although a newcomer to the field, had the opportunity to accomplish something, whereas the USC & GS stood little chance. The Army had lines of communication; an existing organizational setup; facilities for securing

229. Ltr CG CDC to C/S USAR, 9 Aug 46, sub: Isostatic Combination and Mean Sea Level in the Caribbean Area with 1st Indorsement, file AGAO-C 000.93 (19 Aug 46) WD GID. In CDC 061.04.

230. Freer, Op. Cit., Eighth Section, p. 3.

231. Rear Admr Leo O. Colbert, Director, USC & GS, Dept of Commerce, Washington, D.C.

the required personnel, equipment and funds; and, with Colonel Tandy, the desire. The USC & GS, in such a prodigious undertaking would have a welcome opportunity to exchange ideas, explore methods, create interest in the design in new and better equipment, and to invoke not only the cooperation and fellowship of the Army but of the many Latin American countries. The USC & GS had been for several years preceding, cooperating with the State Department in the furtherance of Good-Neighbor policy. To them this was another opportunity of promoting mutual interests and understandings among the Americas, and importantly of acquiring additional geodetic and scientific knowledge of benefit to the world.

Use of USC & GS Plotted

When the detailed matter of assistance was later discussed, Admiral Colbert indicated that it could be anticipated that every possible assistance would be provided. The exact manner in which this assistance could be furnished were represented in the following three possibilities;

1. CDC could turn over funds to the USC & GS for the accomplishment of specific missions.
2. For specific technical features of importance to the plan, specialists could be requested on a temporary, reimbursable basis.
3. The USC & GS could allot certain of its personnel for full time working. In this case CDC would pay all expenses, including salaries.

252. Free, Op. Cit., Eighth Section, p. 4.

This headquarters believed the third to be the most desirable procedure. Acceptance resulted in two officers, who would act in a technical consulting and supervising capacity, being assigned for collaboration. Lieutenant Commander Joseph P. Luchene and Lieutenant Commander Philit C. Doran were assigned to CDC for a two year tour on 21 July and 17 May 1947, respectively. How these officers were to be utilized in the organization (IAGS) was left to the Chief Engineer. (See organizational and function chart page 112) Lieutenant Commander J. C. Bose was later assigned, 11 September 1947, for 1 year. His mission, specifically was to be tidal determination.

Additional assistance was furnished by the loan of technicians during the winter season. Normally, at that time of year, little work is accomplished by the USC & GS. Weather is naturally a hindrance but, additionally, the Survey has insufficient funds for year-round work. Furloughing technicians to CDC at such times was welcomed as it offered an opportunity to retain better personnel within the Survey. It was advantageous to CDC as well, for the winter season in the United States correspond to the dry season in Central America. Therefore, at a time when work could be most expeditiously accomplished, more and well qualified personnel were available.

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233. Freer, Op. Cit., Eight Section, p. 5.

Other Cooperating Agencies

International Collaboration a Factor

CHAPTER X

OTHER COOPERATING AGENCIES

endeavor to prevent... and to present a united front of the United States to Hispanic America as to... OTHER COOPERATING AGENCIES... other or former agents...
 The Commission of the United States Coast and Geodetic Survey... in detail... The Commission on Cartography of the... as a forerunner in the field of joint cartography... Their assistance and the contacts obtained through... personnel of the various countries were invaluable... was the Commission a powerful influence upon... but had representatives from the... on the Advisory Board to the Chairman... the Commission... the Commission... secure the assistance... program was, in... still is vital to

CHAPTER X

Other Cooperating Agencies

International Collaboration a Factor

In the endeavor to prevent duplication and to present a united front on the part of the United States to Hispanic America as to cartographic efforts, many agencies are to a greater or lesser degree automatically involved.

The collaboration of the United States Coast and Geodetic Survey has been covered in detail. The Commission on Cartography of the PAIGH has been mentioned as a forerunner in the field of joint cartographic efforts. Their assistance and the contacts obtained through them with the technical personnel of the various countries were invaluable. Not only was the Commission a powerful influence upon Latin American mapping activities, but had representatives from the various interested U.S. agencies on the Advisory Board to the Chairman.

Although it had no action program of its own, the Commission provided the means to establish a program that would secure the assistance of most United States and foreign agencies. A CDC program was, in essence, their program. Their indorsement was and still is vital to the success of the program.

U. S. Navy

The agencies within the United States Government interested in the program are numerous. The Navy for example had done both charting and hydrographic surveying in the various regions of interest to CDC. It would be absolutely essential, therefore, that their previous work be integrated and all future work coordinated with the CDC program. 234
Smaller islands mapping would be as consistent with Naval charting operations as with mapping. Additionally the coastal areas had to be definitely tied into the overall system. By mutual assistance and cooperation both their needs and our efforts could be facilitated. Each, by active cooperation, would receive more than the effort invested.

State Department

The State Department was naturally very interested since the program impinged upon their roll as the program was International in most of its aspects. They heartily approved as the effort could prove of decidedly beneficial influence in bettering our Latin American relations. Their assistance in a form of consultations, advise, contacts, and negotiating diplomatically would prove invaluable. They could materially expedite clearances and agreements. They, too, the Commission on Cartography of the PAIGH was in one sence a State Department sponsored organization. The interests of the Commission were, therefore, the interests of the State Department.

234. Freer, Op. Cit., Ninth Section, p. 1.

Bureau of the Budget

The Chief Examiner, Surveying and Mapping, Bureau of the Budget Executive Office of the President, Mr. Randall, (who was, it will be remembered, also chairman of the Commission on Cartography, PAIGH) provided the necessary top-level coordination of the program. It was here that it would be possible to insure that there would be no duplication, that CDC would be the only U.S. operative agency for cartographic efforts in Latin America. Support at this level virtually assured not only PAIGH cooperative, but also adequate support toward implementation of the postulate of unity of effort.

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Public Roads Administration

Public Roads Administration (PRA) had a sphere of interest which coincided in part with much of the area of the MAPPLAN. Their big interest was the Pan American Highway which was a link between North and South America. Mutual assistance, it is obvious, would aid their operations and the CDC program. Aerial photography could be coordinated and we could well serve to expedite their efforts in road reconnaissance and construction. Their surveying work, in turn, would be tied into our system, enlarging and strengthening it. CDC also received generous assistance in the form of personnel loaned for work in areas of primary interest to them. Thus, for a small investment on their part, they receive much assistance, and in return, we save considerable effort and achieve greater coverage.

235. Freer, Op. Cit., Ninth Section, p. 2.

Department of Agriculture

The Department of Agriculture is vitally interested in many islands of the Caribbean; particularly, Puerto Rico. Our photography would be of extensive value to them.. In return, their mapping work and their knowledge of the islands would assist our operations in that area. Photography and future results of our mapping program would greatly facilitate their efforts in agricultural analysis, planning and general economic development. It would aid them in determining mode and extent of production, soil conservation and proper rotation. Photography could also furnish clues as to new areas hitherto not arable.

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Geological Survey

The United States Geological Survey of the Department of the Interior has already only been mentioned in connection with geological exploration during the war years. Their work, though less extensive and isolated to areas of possible or potential mineral sites can be utilized by us and our photography and ultimately our maps, can be used by them. In the course of their geological work they must produce field maps to indicate what and where. Their control can be utilized and tied in with our photography to produce usable maps thereby increasing coverage with little additional effort on our part. Our photographing areas of interest to them expedites

236. Freer, Op. Cit., Ninth Section, p. 3.

the completion of a map, and makes it available that much sooner for their purposes. They have already compiled a Geological map of Central America. Their most extensive area of work is in Brazil.

Commercial Firms

Heretofore, many very valuable sources of material have been relatively untapped. There is an accumulated wealth of geodetic data, existing in the files of commercial mining, oil, agricultural and other firms. Those sources are immensely valuable but contain much unintegrated and uncoordinated data. Many of these firms are spending thousands of dollars annually in exploration, development and so forth. They have long conducted--and are conducting--geodetic and geological work in many areas within our sphere of interest, and in some cases are accomplishing photography. Previously, the United States has had no firm policy of exploiting or systematically collect-

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ing this information. Possibly, by liaison through the Office of the Chief Engineer, their programs could be placed in line with their own, and United States needs. Much effort has been expended by CDC to contact the various firms and to get their assistance. Their assistance is also valuable in not only supplying survey data but in furnishing first-hand knowledge of an area. This knowledge and other intelligence are great aids in reconnaissance.

What has been said previously about agriculture, road construction,

237. Freer, Op. Cit., Ninth Section, p. 4.

Adequate coverage aides both Government and private interests
in promoting wiser exploitation of timber, mineral and soil resources.
Discovery, development and conservation of resources and new areas
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are thereby aided.

239. Freer, Op. Cit., Ninth Section, p, 6.

CHAPTER XI

Equipment Requirements Varied

Many Devices Essential to Program

CHAPTER XI

EQUIPMENT REQUIREMENTS VARIED

It has been already noted that equipment requirements were one of the major problems in this long range program. The other two being successful diplomatic and military operations, the high calibre military and qualified civilian technical personnel. From the very beginning the problem of equipment had been recognized as one that would require many initial assumptions and rationalizations in order to provide the basic materials with which to prosecute this elaborate undertaking. Not only was the field vast and new but the activities would require precise and special instruments as well as normal items of issue.

Many questions would have to be met in devising proper and suitable methods of procurement, supply, maintenance, and replacement. These important procedures automatically involve another combination of circumstances, logistical support, which would also have to be solved. Progress in an operational field could be only as good as the logistical support.

The basic policy letter of 20 March 1946 explained the keynote of the situation; determination of requirements would be complicated by the

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The basic policy letter of 20 March 1946 explained the keynote of the situation: determination of requirements would be complicated by the

unavailability of detailed information regarding the extent, reliability, and usefulness of known and existing geodetic control and hence, what additional control would be needed for accomplishment of the Mapping Plan. With the exact extent of existing data unknown, assumptions would have to be made as to how much had to be done and where before type, quantity and other equipment requirements could be decided. Equipment requirements could not be drawn up on the spur of the moment. The basic policy letter further stated that projects and requisitions would be submitted as soon as local requirements could be determined.

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The Initial Directive of 15 April 1946 stated that an over-all supply project, Caribbean Defense Command Operational Project #46-1-OP and required initial requisitions for geodetic surveys both based upon Engineer Topographic and supporting troops were being prepared by the Caribbean Defense Command. The Commanding Generals, Panama Canal and Antilles Departments, had been required to submit through CDC revised initial requisitions based upon the proposed project and upon engineer and other supporting troops as were expected to be reattached to them. The Commanding General, 6th Air Force has been required to prepare an additional supply project for the accomplishment of aerial mapping photography. This project had been based upon elements of the 311th Reconnaissance Wing attached to this headquarters.

240. Freer, Op. Cit., Ninth Section, p. 1.

It was directed that requisitions for Army Air Force units would be submitted through their normal channels.

Explanation of Basis for CDC 46-1-OP

The tentative supply project as mentioned in the basic policy letter was forwarded by CDC to the War Department for approval 30 April 1946. ²⁴¹ The project and its inclosures outlined contemplated organization, initial operations, troop attachments, and explained the basis for determination of requirements and replacements. In short, it presented complete and concise picture of what was needed and why.

One of the general and basic thoughts in connection with the assembling and using of equipment was that it would be used to facilitate a technical penetration into the various countries. This desire was based upon the natural assumption that familiarity with American equipment and the results obtained through its use would stimulate Latin American interest in using more and more of our equipment in the future. It is well known that someone trained to use good equipment and who can get good results easily with such equipment, will prefer it to less familiar and possibly less reliable equipment material. ²⁴² The purpose, then, was to introduce American items to those technical peoples of Central and South America believing that once they utilized such equipment, they would continue, of their own initiative, to prefer it. If this succeeded, it would result in an additional reward of standardization of equipment throughout the Americas.

241. Ltr CG, CDC, to C/S USAR ATTN: OPD WDGS, sub: CDC Operational Project 46-1-OP Mapping Plan CDC 30 Apr 46. In CDC 400.312 (MP) Project 46-1-OP.

242. Freer, Op. Cit., Ninth Section, p. 2.

This, in turn, would tend to improve over-all results, would facilitate comparison, and would give a common basis to discussions of improved methods and techniques.

The concepts used in the compilation of the project were explained in an appendix to the transmittal letter mentioned above. It was explained that the project was tailor-made by a group of experienced military and civilian geodetic engineers to fit actual operational needs from the points of view of operations, organization, and geographic and climatic conditions. Additional suggestions and recommendations resulted from numerous conferences and correspondence with interested War and Navy Department agencies.

Uniqueness of Situation

The contemplated program had many salient and unique features. These, of course, had a decided influence upon the singular equipment requirements outlined in the project. One of the salient features was that operational units must be made self-sufficient as they would most often be widely separated geographically. This self-sufficiency would necessitate large cumulative reserves but was an operational necessity and would prove most economical in the long run.

The same personnel would often be called upon to perform diverse operations under extremely variable conditions. This would require some individuals and units to have more than one complete set of individual or organizational equipment. To illustrate, one squad operating in one country may be called upon to erect towers, clear jungles, or to perform triangulation

topographic reconnaissance, or to run precise levels and traverses. These operations may take place in swamps and tropical jungles, high mountains, or prairies and uplands. Similarly, because of the same extreme conditions under which civilian parties would be called to operate certain items of individual equipment not normally required or available to civilian employees were included for their use. Some items, such as machetes and canteens, would have to be provided for local labor who would be employed on the spot.

For personal protection and security medical equipment would be furnished for Medical Corps personnel assigned to the larger units and for first aid men with field units. Also for emergencies one individual in each field party should be armed with a revolver (in lieu of a carbine so as to minimize interference with his work). The several shotguns were to be provided for field use: hunting, signaling, and emergency defense.

Replacement and Losses

It was pointed out that the quantities specified were neither the maximum nor the minimum, but an operational optimum based on previous tropical experience. Conditions, it was felt, would actually approximate those of combat in many respects: racing for time during the short seasons in which operations would be possible, combating terrain, jungle and weather factors, lack of established transport and lines of communication, hard usage of

243. Freer, Op. Cit., Ninth Section, p, 3.

equipment, lack of proper maintenance, etc.

The replacement factor, as determined from past experience and extrapolated from contemplated operations, would be large. In addition to the conditions enumerated above, jungle moisture and molds would deteriorate fabrics and leather (even in normal storage) and subject optical equipment to unusual hazards. Mold would cloud lenses and moisture would cause the lenses to become unglued. Tropical weather, salt water, etc., would cause rapid deterioration of machinery. Maintenance facilities would most often not be available and assistance field maintenance would be almost impractical with the time, personnel and tools available. Finally, actual losses would be large. There would be unavoidable losses occurring in fording streams, landing on beaches, etc., and through theft by natives and local populations.

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Major Items of Equipment

These concepts would also apply generally to vehicles. A slight reserve would have to be maintained in a base or field headquarters in order to provide operational squads necessary to support in emergencies and, to a limited extent, appropriate types of vehicles to meet varying conditions. Battalion or Sector Headquarters, for instance, would be composed of six different units, each an operational entity. Vehicles had been provided to each unit for normal operation; for other than this minimum transportation requirement, each unit would have to call upon headquarters for

244. Freer, Op. Cit., Ninth Section, p. 4.

whatever additional vehicular equipment they might need to meet varying situations.

Air Force items, including aircraft, would be for specific assignment for support or for use of engineer personnel. Such material would be stored, operated, and maintained by the 6th Air Force. Uses of this equipment would include air supply to ground parties in isolated or inaccessible places, communications with far-flung operating units, emergency evacuation and rescue work, and engineer reconnaissance.

Marine equipment would be primarily for transportation of personnel, vehicles, and equipment to work areas difficult or impossible to reach by ground means. It was expected that under such circumstances, supply, communication, and control of operating units, would habitually be done by this means. Larger craft would be used as a floating base for operations over a considerable area. Marine equipment would normally be held by Battalion or Sector Headquarters (Boat Platoon Engineer Boat Company) for allocation and use as required. Engineer personnel would be expected to operate craft under fifty feet in length, while the Transportation Corps would be responsible for operating any larger craft assigned.

New Equipment Desired

The transmittal letter to the War Department for CDC Operational Project 46-1-OP contained the request that Supply Services be informed that the equipment furnished should be of the latest design and in new or good-as-new conditions. Inasmuch as one of the objectives of the program was the introduction of American equipment, items would be subject to the

closest scrutiny by technical officials of the Latin American Governments.

To create a favorable impression, therefore, the best available equipment must be used.

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From an operational standpoint, the equipment would be subject to hard usage and lack of maintenance, and would have to be able to stand up under extreme conditions. Equipment failure would have to be an exception rather than the rule since each failure of any critical or singular item would cause serious and expensive operational delays.

The tentative operational project was approved by the War Department on 14 August 1946. The letter further directed the CG NOPE, to take necessary action in editing requisitions received from CDC against the approved bill of materials, and to forward to appropriate Technical Services for supply action. The Technical Service would accomplish supply action on these requisitions and were specifically directed that the equipment furnished be new or as good-as-new. The Chief of Transportation was called upon to furnish necessary rail and water transportation in order to assure timely delivery at destination.

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This initial bill of materials was designed primarily as an authorized allowance rather than T/O&E. The Supply Services were, initially, rather understandably at a loss as to what specifically to supply. This perplexity was one that would remain difficult to solve but various modifications, amendments, substitutions and supplements were naturally made as operations

245. Freer, Op. Cit., Ninth Section, p. 5.

246. Ltr, TAG, to CG's of Technical Services and CG, NOPE, sub: Operational Project CDC 46-1-OP, 14 Aug 46. In CDC 400.312 (MP) Aug thru Dec 46.

progressed. Basically, however, 46-1-OP proved to be a far-sighted comprehensive requisition of materials.²⁴⁷ The wide and varied experiences incorporated in the thorough planning for the project produced sound results which were adequate to estimated needs. The operational project was a "shot-in-th-dark" but, by comprehensive analysis and cognizance of the many and varied contingencies, was an approved solution and formed the primary basis for later operational projects, 47-1-OP and 48-1-OP.²⁴⁸

Logistics

The logistical problem involved two channels: Supply to the Departments and, via IAGS, to the various countries.

²⁴⁹
CDC published a logistical directive in July 1946 in which PCD and AD were directed to requisition, store, and issue required supplies and equipment for MAPPLAN operations, with special attention to the items listed in Operations Project 46-1-OP. Both Departments were further directed to support units attached for Mapping Operations, and offer direct support for operations of the Inter American Geodetic Survey. PCD would, in addition, support the MAPPLAN by maintaining the equipment involved and supplying the various services normally available to a field operation, including water transportation as required.

The 6th Air Force of CAirC, would, the Directive stated, requisition,

247. Freer, Op. Cit., Ninth Section, p. 6.

248. Freer, Op. Cit., Ninth Section, p. 7.

249. Ltr, Hq CDC to CG's, AD, PCD & 6th AF, 19 Jul 46, sub: "Mapping Plan CDC, Logistic Directive", in CDC 400.312 (MP Supply Project 46-1-OP).

store, and issue required Air Force items listed in 46-1-OP. The Sixth Air Force was further directed to support by air MAPPLAN ground operations, to include air reconnaissance by Engineer personnel, contact and control work with ground parties, emergency evacuation, and air supply to survey parties. Aircraft for such support would be available upon request of Headquarters CDC.

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In general, the Directive stated that CDC Operational Project 46-1-OP, would be considered as a master table of equipment for all civilian and military organizations concerned. In cases of minor, non-technical requirements necessary for troop use, items not included in the project were to be requisitioned on the basis of applicable T/O&E's. Divergencies from the project should, however, be minimized. Each requisition would be forwarded to the Engineer CDC for information.

The supply activity of CDC for the MAPPLAN would be limited to the making of allocations within the project, effecting changes in authorizations, liaison, and coordinating local procurement involving significant expenditures. All other supply action would be the responsibility of the supply agencies of PCD, AD and CAIRC (6th Air Force).

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On 31 October 1946, the logistic directive just mentioned was amended to state that the Engineer CDC was designated the authority within CDC to make allocations within the project. Allocations and changes thereto, would

250. Freer, Op. Cit., Tenth Section p. 1.

251. Ltr, CG CDC to CG's, AD, PCD, CAIRC, sub: Mapping Plan CDC, Amendment to Logistic Directive, 31 Oct 46.

be sent direct to the technical service concerned in PCD and AD with information copies being supplied to G-4, CDC, and G-4 of the Department concerned.

Equipment Loans

The cooperative program established between the U.S. and each of the various Americas called for assistance in the form of an augmentation of the technical equipment and transportation possessed by the Latin American Countries, and expert technical guidance. The supply of technical equipment was considered an important factor in dealing with and concluding an agreement with the foreign technical agencies. ²⁵² As already mentioned, one of the major objectives was to use this equipment in effecting a technical penetration.

The exact method of loaning equipment would prove a problem. Considerable assistance to the various governments concerned could be given but the arrangement might be somewhat awkward. Most of the governments concerned did not have the facilities to effect compilation of charts and maps. Most of their equipment was of German or Swiss origin. All governments need assistance in obtaining United States equipment through surplus property channels or, in some cases, direct from the manufacturer. An important point with them was that none of our photography would be of use to them for compilation purposes since it could not be used in German or Swiss stereoplanigraph or multiplex equipment.

In November 1946 Colonel Tandy discussed this matter with the Service, Supply and Procurement Division of the War Department General Staff. The

matter of providing assistance to the various governments was discussed and General Daniel Noce, Chief of the Division, indicated there was no legal way in which equipment could be turned over to any of the Governments. However, the matter of joint use of equipment where items would be controlled by agencies of the United States was discussed. It was agreed, that so long as the equipment remained under control of an agency of the United States, joint use could be made of such equipment. 253

General Noce also indicated that other difficulties could be foreseen. First of all, there was, as a result of the war, a world-wide shortage of precise and special technical equipment. In U.S. itself, material shortages and post war labor difficulties would hamper general procurement. Other difficulties would be the Military Assistance Act which take a higher priority in obtaining certain items, and the competition from Veteran's Preference Buying would make more difficult the securing of sufficient standard Army automotive equipment. Partial solutions were always possible: Some of the captured German and Japanese instruments could be turned over for CDC use and vehicles from dead storage could be utilized even if they were not entirely satisfactory for our purposes.

Procurement

Special item procurement would probably be additionally difficult because of the inertia of procurement agencies. Each item would be an individual case and it would be probably necessary to have a man on the spot

253. Freer, Op. Cit., Tenth Section, p. 3.

to follow it through the various procurement processes. Special attention would be required of all personnel and agencies to keep the procurement chain informed, in advance, of all plans that might effect logistical work. Considerable delay is usually unavoidable in supply action and necessitates planning, information, and action far in advance of actual requirements. Proper planning and support could increase the efficiency of operations.

The Chief of the Logistic Section, IAGS, under direction of the Chief Engineer, CDC, was responsible for this planning and for preparation of supply projects as well as expediting the delivery of the required materials and equipment.
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The Chief Engineer was responsible for allocations of equipment for the accomplishment of the various mapping projects. Appropriate recommendations in that connection were submitted by Area Supervisors, through the Mapping Executive, to Chief Engineer. He allocated only the minimum amount of equipment necessary to accomplish the mapping objective of CDC in each country or necessary to sustain, or to stimulate, the interest of the collaborating technical agency in order to accomplish the objective. Any surplus equipment was immediately withdrawn. The Chief Engineer, under no circumstances, relinquished control of United States property, including any surplus material or equipment.

With proper logistical support from the US to the Cmd, and from the Command to the various countries operations could proceed expeditiously.

254. Freer, Op. Cit., Tenth Section, p. 4.

But, until the two primary agents, the Transportation Corps and the U.S. Air Force, could be convinced of the absolute necessity for adequate and timely support, logistical problems would prove an important deterrent to the desired scale and rapidity of operations in the field.

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CHAPTER III

PERSONNEL, EQUIPMENT & FACILITIES

255. Freer, Op. Cit., Tenth Section, p. 5.

DRAFT 111

Personnel Factor Appraised

By Trained Specialists Needed

CHAPTER XII

PERSONNEL FACTOR APPRAISED

... program on a satisfactory level,
... qualified personnel. The basic policy letter of 20
... relative to these personnel.
... called for expeditious entry into
... limited number of personnel who would collect
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... the contemplated program of 1958.
... and equipment could be made available, and required
... operations relating to the mapping and charting phase
...
... countries by U.S. personnel would be the
... by the remaining countries which im-
... ability to meet
... regulations. Per-

CHAPTER XII

Personnel Factor Appraised

Highly Trained Specialists Needed

Another primary need to initiate the program on a satisfactory level, was sufficient and qualified personnel. The basic policy letter of 20
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March 1946 set forth the pertinent thoughts relative to these personnel.

The policy of immediate implementation called for expeditious entry into the various countries by a limited number of personnel who would collect geodetic data, effect liaison, and coordinate, insofar as practicable, local projects already undertaken and the contemplated program of IAGS. As far as personnel and equipment could be made available, and required training effected, operations relating to the mapping and charting plans would be accelerated.

Since entry into various countries by U.S. personnel would become common knowledge to all, requests by the remaining countries would immediately follow. It was necessary, therefore, that our ability to meet commitments should be a fundamental consideration in our negotiations. Personnel as well as equipment would have to be available to meet those needs.

256. Ltr, C/S, USA from CG, CDC, 20 Mar 46, sub: Mapping and Charting Plan CDC, in CDC 008 (MP) Policies and Directives, 1946.

The personnel effecting these immediate entries would be only selected supervisory military and expert civilian geodesists who would be used primarily to augment and instruct local personnel made available by the foreign technical agencies. ²⁵⁷ Personnel would thus inculcate good will and cooperation on the part of the countries and their actions would be consistent with the fundamental intention of the plan to minimize military aspects.

Military personnel selected for assignment, particularly in command positions, would have to be the highest type available. Such personnel should have the ability to use precise equipment expertly and to provide competent instruction to local civilian and military personnel. Personnel was considered second only to the supply of equipment as a most vital factor influencing successful negotiations and prosecution.

On an individual basis a considerable number of officers and men could be integrated for training purposes. Young, unmarried officers, who are graduates of technical schools, or the United States Military Academy, were particularly desired as were enlisted men of outstanding ability. These personnel would have to be professionally competent and exemplary in personal conduct in order to create a favorable impression.

Contacts Important

Personnel contacts are a means of exchanging ideas between countries and of forming opinions of other peoples. Unless the officers and men could

257. Freer, Op. Cit., Eleventh Section, p. 1.

mingle satisfactorily and leave a good impression, much good will and cooperation might be lost. This would be detrimental to the interests and influence of the United States. High calibre personnel would be required to maintain technical proficiency and high professional standards while at the same time securing the pleasing personnel friendships necessary to establish more than the minimum cooperation and collaboration. 258

Mapping would, in contrast to charting, require extensive ground operations. Entry upon public and private lands would be a necessity in establishing stations, erecting towers, clearing lines of sights, etc. All this would result in many difficulties incident to damage to crops, timber, orchards, etc. These difficulties could be minimized by the employment of local personnel operating under a limited number of United States civilian and supervisory military personnel.

A minimum of highly proficient personnel would be in line with the endeavor of the Latin American countries to accomplish as much for themselves as possible. The United States personnel would execute, or assist in executing only those portions beyond the capacities of the foreign Government concerned. Guidance, instruction, and supervision would be undertaken in this manner whenever feasible and desirable. Personnel who could do the job competently and, at the same time, promote friendly relations would be an example, would do much to further "Good Neighborliness", and would accomplish more with a minimum expenditure of United States man-hours.

258. Freer, Op. Cit., Eleventh Section, p. 2.

The basic policy letter of 20 March 1946 had interpreted means to include units, funds, equipment, and personnel. Air Corps units and personnel had been previously discussed in conference and the results of these discussions relative to the expected assignments of Air Corps units, were also included. Mention was also made that a topographic unit could be employed profitably. Competent civilian personnel, particularly expert geodetic personnel, was mentioned and it was pointed out that few such persons were available within CDC and that the War Department agencies would have to assist in their procurement. The War Department reply indicated that personnel shortages would make it necessary to supply only part of the desired Air Corps units. It was further indicated that no ground officers, as requested, were available for assignment at that time. The earliest practicable date for such assignments would be in June 1947.

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Foot Larger Than Shoe

The War Department continued that it was supporting the program to the fullest extent but that stringent personnel limitations imposed upon the War Department made it difficult to meet important obligations and to provide for future contingencies. Lack of personnel might, it was noted, preclude realization of all the comprehensive and excellent policies prepared by CDC, but it was believed that the objectives should not be abandoned; in fact, activities should continue to the fullest extent possible with available resources, however meager.

259. Freer, Op, Cit., Eleventh Section, p. 3.

260. 1st Ind AGO to CDC CG, to Ltr, C/S USA from CG CDC, sub: Mapping and Charting Plan CDC 20 Mar 46, 5 Jun 46.

The Army Map Service was to recruit and otherwise assist in the procurement of expert geodetic personnel, but little significant results in fulfilling the need of CDC for competent personnel was accomplished through this medium.
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Later conferences with the War Department reveal the same sympathetic spirit and cognizance of the problem. As a result of Colonel Tandy's November 1946 trip to Washington, he learned that a large block of Pacific mapping had been eliminated and this stronger support of the MAPPLAN, CDC could be anticipated. CDC would be placed on an equal priority with other mapping agencies in respect to funds, equipment and personnel.

Officer and enlisted men requirements were also thoroughly discussed with General Trudeau, WDGS, Personnel and Administration Division. Colonel Tandy pointed out the quality of technical personnel provided up to that time could be vastly improved and that steps would have to be taken to get qualified personnel. The matter of high quality officer personnel for station in foreign countries was also discussed. Colonel Tandy indicated that only select engineer officers could be placed in such important countries as Venezuela, Ecuador, Peru, Colombia, and Chile. As a result of these discussions and of CDC's higher priority, it was expected that better qualified personnel would be made available in the future.

Nevertheless, no great improvement, even after specific needs were made known to the War Department, were forthcoming in regard to more personnel. Qualified, highly-trained personnel remained a problem. There were

261. Freer, Op. Cit., Eleventh Section, p. 4.

but few available even in the United States, but the War Department's responsibility therein, had fallen short of a specific and positive action that could have been taken. ²⁶² Personnel continued to trickle in from War Department sources and it became necessary therefore that greater leeway be exercised in selecting locally available officers.

Requests for both military and civilians were forwarded to the War Department (later Department of the Army) who turned them over to the Chief of Engineers, who sought, more or less unsuccessfully, to secure the necessary civilian and military personnel.

The collaborating personnel of the USC and GS is discussed under "Organization". When the Inter American Geodetic Survey was first organized, it operated with but a hand-full of personnel. As the planning phase evolved into actual operations, the number of civilian personnel expanded; gradually at first, and then accelerating.

Initially, little difficulty was expected in establishing operative ceilings for civilians. This was handled by G-1, PCD. The subsequent and continuous growth of the organization has often made it reach these ceilings and necessitate the establishment of a new and higher ceiling. It had been hoped, at one time, that personnel matters could be presented directly to the War Department. This would eliminate processing by a headquarters who had little interest or responsibility in the MAPPLAN; however, this idea was rejected.

262. Freer, Op. Cit., Eleventh Section, p. 6.

In such a new and expanding organization, administrative difficulties were to be expected. Failures and delays on the part of the Director, Civilian Personnel, PCD, were gradually eliminated. Continuous and successful efforts have been made towards rapid and efficient handling of requests and other personnel matters which, although significantly expanded in numbers, are now satisfactory.

CHAPTER XIII

PROGRESS RESUMED IN THE FIELD

CHAPTER XIII

Progress Resumed in the Field

Shortages Handicap Program at Outset

As the changes necessitated by the initiation of MAPPLAN, CDC, began to be worked out successfully, progress was resumed in the Field. Sufficient geodetic officer personnel was not available as late as March 1946 when a requisition for fourteen topographic engineers, geodetic reconnaissance and mapping executives, and two photogrammatrists, to be used as liaison officers, was forwarded in connection with the MAPPLAN, CDC. ²⁶⁴ One topographic engineer and two geodetic reconnaissance officers were requested for the Antilles Department, being assigned to Headquarters, CDC, and the remainder of the requisitioned personnel to be stationed in the Canal Zone. Since their personnel was to be used exclusively in connection with the MAPPLAN, CDC, it was requested that their assignment be over and above ²⁶⁵ the troop ceilings then or later to be imposed on the Command.

Even as late as June 1946, special effort was being expended to insure that proper personnel were available on allowance to the Command by the War Department. The Engineer School at Fort Belvoir, Virginia, had determined to reduce the scale of technical topographic training, especially

264. Ltr, CDC to CofS USA, 29 Mar 46, sub: Mapping Plan, Western Hemisphere - Assignment of Officer Personnel. In CDC 322 Photo Project in Central and South America and Caribbean Area Jan 45 - Sep 46.

265. Ibid.

survey, as no outstanding requisitions were on file other than some from
the occupied areas in the Pacific,²⁶⁶ and the CDC representative from the
Inter-American Geodetic Survey suggested early requisition of such per-
sonnel to insure continuance of that type of training.

Upon the discontinuance of the South Atlantic Wing on 1 July 1946,
Flight "A" of the 915 Reconnaissance Squadron was attached to the Joint
Brazil-United States Military Commission.²⁶⁷ On 27 April 1946, the War De-
partment had stated that it was believed advisable to move headquarters
and Flight "C" (formerly in the Command) back to the CDC area less personnel
and equipment, the personnel being held in the United States as casuals in
readiness for movement to CDC upon requisition.²⁶⁸ The flight, stated the War
Department, was approximately 74 percent manned and not fully trained, and
the accompanying aircraft had not at that date been completely modified
for photographic work. This was only planning, however, and the units
were not assigned to CDC at this time.

The War Department, in reviewing the personnel situation on 5 June
1946, named the following AAF units and their estimated readiness dates
to be attached to CDC:²⁶⁹

Headquarters and two Flights of the 91st Reconnaissance
Squadron -- 1 June 1946.

One Flight of the 16th Photomapping Squadron -- Midsummer 1946.

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266. WD Rad 23371, Stoneman to Engr CDC, 29 Jun 46. In CDC 322 Photo Pro-
jects in Central & South America & Caribbean Area, Jan 45 - Sep 46.
267. Rad W-94970 (C), CG AAF to JBISC (for U.S. Army member), 20 Jul 46.
In CDC 322 (91st Recon Sq) (S).
268. Rad W-85898 (R), CofS USA to CG CDC, 27 Apr 46. In CDC 322 (91st
Recon Sq) (S).
269. 1st Ind, TAG 5 Jun 46, on Ltr, (S), CG CDC to CofS USA, 20 Mar 46,
Sub: Mapping & Charting Plan, CDC. In CDC 322 (Photo Project) (S).

One Flight of the 6th Geodetic Squadron (Shoran) --
September 1946.

Clarification Made

In August 1946 the clarification of the topographic and boundary mapping of military reservations in the Panama Canal Department was made. The policy required that the District Engineer make the boundary survey and original boundary monumenting but that the using agency maintain the monuments. Other defense sites held in the Republic of Panama, except those transferred to the War Department, were not to be surveyed or monumented. This project was in connection with the compilation of "as built" mapping in the program of general layout mapping of installations. The compilation of the data of the "as built" was a continuing process which had been in practice for some years.

When circumstances prevented meeting these estimated dates, Headquarters CDC, on 5 August 1946 informed the War Department that planning and operations involved in the mapping and charting programs were being seriously handicapped by lack of knowledge as to when the headquarters and Flight "C" of the 91st Reconnaissance Squadron returning to Command and the one flight of the 16th Photomapping Squadron would arrive. Promptly, the War Department replied that the units of the 91st Reconnaissance Squadron would be attached to CDC, less personnel and equipment at the earliest

270. Ltr, DE to CG PCD, 6 Aug 46, sub: Responsibility for Topographic and Boundary Mapping of Military Reservations in PCD. In PCD 600.93 (1946-47).

271. Tad C-41142 (S), CG CDC to CofS USA, 5 Aug 46. In CDC 322 (Photo Project) (S).

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date. No definite date could be assigned as to the arrival of one flight of the 16th Photomapping Squadron since mapping work in the Zone of Interior was not completed, intensive additional training was needed prior to assignment to CDC, and less than one flight of the Squadron was operational and it was overloaded with work already. Headquarters CDC replied that, because of commitments made in this theater, the assignment of the flight of the 91st Reconnaissance Squadron was desired as soon as possible and that the flight of the 16th Photomapping Squadron was acceptable in its current condition. ²⁷³ In an order dated 26 August 1946, the War Department ²⁷⁴

assigned the following units of the 91st Reconnaissance Squadron to CDC:

Headquarters, then stationed at MacDill Field, Florida.

Flight "A", stationed at Natal, Brazil.

Flight "B", stationed at Howard Field, C.Z.

Flight "C", stationed at MacDill Field, Florida.

Flight "A" was to be attached to the Joint Brazil-United States Military Commission for supply, administration, and operational control. Headquarters and Flight "C", less personnel and equipment, would proceed from MacDill Field, Florida, to CDC and would be manned and equipped in this theater.

Men and Equipment Still the Need

Still in need of more personnel and equipment, Headquarters, CDC, again

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272. Rad W-96650 (S), CofS USA to CG CDC, 7 Aug 46. In CDC 322 (Photo Project) (S).
273. Rad C-41184 (S), CG CDC to CofS USA, 8 Aug 46. In CDC 322 (Photo Project) (S).
274. Ltr, (R), TAG to CG CDC, 26 Aug 46, sub: Assignment of 91st Recon Sq, Long Range, Photo, & Refilling of Hq & Flight "C" Thereof. In CDC 322 (91st Recon Sq) (S).

on 27 September inquired of the War Department as to the date of availability of the one flight of the 16th Photomapping Squadron, which CDC had agreed to accept in its current status. ²⁷⁵ If the flight could be assigned, stated the CDC communication, and at least six F-9 (B-17) aircraft could not be furnished with it, permission was requested to convert locally this number of B-17's previously declared surplus and awaiting ferrying to the United States. It was planned in CDC to supply the photographic planes by conversion of the B-17's and to train the necessary crews for operations in the early spring of 1947, but it was first necessary to get the flight transferred. It was also desired to convert one B-17 to a photographic status for use by the 91st Reconnaissance Squadron. Authority was granted by the War Department to retain the seven B-17's for conversion since no F-9's were available in the United States, but the date of arrival of the flight of the 16th Photomapping Squadron and the number of crews which could be sent were still ²⁷⁶ undertermined.

Projects Coordinated with Navy

In accordance with the statement of CDC policies in the execution of the mapping and charting programs submitted to the War Department on 20 March 1946, MAPPLAN, CDC, was coordinated with work already accomplished or planned by the U.S. Navy or other interested agencies in the CDC area. During a conference in Guatemala City between representatives of CDC and the Shell Oil Company, reference was made to the fact that this concern had hired a

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275. Rad C-41600 (S), CG CDC to CG AAF, 27 Sep 46. In CDC 322 (Photo Project) (S).
276. Rad W-28041 (S), CG AAF to CG CDC, 2 Oct 46. In CDC 322 (Photo Project) (S).

private company to photograph certain sections of Guatemala and British Honduras. ²⁷⁷ It was believed that the negatives were located in the

offices of the Shell Oil Company in London and that arrangements could be made for their use by the U.S. Army if they met the specifications.

In response to request from Headquarters, CDC, the Office of the Hydrographer, U.S. Navy, on 9 October furnished a set of indices showing photo coverage of Central and South America. ²⁷⁸ Also furnished were flight lines showing photography proposed for the fall and winter of 1946-47 with the assurance that CDC would be advised of any further mapping activities of mutual interest. As a result of coordination with the Navy program, the area for which the Commanding General, AD, was responsible for mapping was reduced to include only Cuba, Haiti, the Dominican Republic, and Trinidad. ²⁷⁹ It was discovered that Jamaica had already been adequately mapped and that the islands in the Caribbean would be mapped by the Navy. The Navy's photographic program covering the shorelines of Central America was also incorporated in the Army's program.

Panama Project Retained

In Panama the IAGS program was only supervisory in nature, the mapping objectives being assigned to the Panama Canal Department ²⁸⁰ for continuance

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277. Ltr, (S), CG CDC to Director of Intelligence WDGS, 16 Sep 46, sub: MAPPLAN, CDC, Adequacy of Existing Photography of PETEN Region in Guatemala & Portions of British Honduras. In CDC 322 (Photo Proj) (S).
278. Ltr, Hydrographer US Navy to CG CDC, 9 Oct 46, sub: Indexes of Aerial Photography & Proposed Flight Charts for Aerial Photography of Central & South America -- Forwarding of. In CDC 322 (Photo Proj) (S).
279. Ltr, (S), CG CDC to CG AD, 20 Nov 46, sub: MAPPLAN, CDC. In CDC322 (Photo Proj) (S).
280. See page 160.

closely allied with the overall policies of the Survey. In carrying out the long range mapping projection, the Panama Canal Department was requested to offer fullest cooperation and assistance from all military installations in the provision of housing and messing facilities, assurance of supplies available, maintenance of vehicles and equipment, and any help requested in any other way to the small field parties, military and civilian, which were to operate continually in the field and at long distances from their parent units.

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Operational Directive Number 6 was published 14 August 1946 and further delineated specific Panama Canal Department duties in establishing the required geodetic data in the Republic. The IAGS assumed the reconnaissance of first order systems, including base lines, the location of astronomic positions, and the evaluation and analysis of control data prior to submission to the Army Map Service for computations and adjustments. The PCD was to establish the scheme and effect all necessary work in respect thereto under supervision of IAGS personnel. No level datum for Panama was to be undertaken without further concurrence with the US Navy, the US Coast and Geodetic Survey, and The Panama Canal. Personnel to accomplish the work was limited to the 660th Engineer Base Topographic Battalion and temporary allocation of certain IAGS engineers for first order work. Determination of second order schemes was a primary PCD function after their submission to IAGS for approval. This Directive, in effect, placed the assimilation of

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281. Ltr, PCD to CG 6th AF, CG 33d Inf, all posts & airbases, 15 Jul 46, sub: Assistance to Mapping Parties. In CDC 060 Maps, Charts, Tables - Policy.
282. Operational Directive Number 6, 14 Aug 46. In File IAGS 062 Panama.

geodetic control in the Republic of Panama under direct control of the IAGS as an integral part of the whole Central and South American Project.

Engineer Unit Missions

The execution of the definite missions assigned the 660th Engineers was put in readiness by 30 August 1946 when the Battalion published Operational Directive Number 6 alerting the Battalion on a forty-eight hour notice for a continuous mission in leveling in the area from Panama City and Balboa westward along the National Highway to Concepcion and to the Costa Rican border in the vicinity of Progreso. By December 1946 serial reconnaissance of the second order arc from Colon to Chiriqui Lagoon was completed except for two stations, and ground reconnaissance on about five percent of the stations was completed. Training, both basic and on-the-job, limited ground operations of the Battalion, and rough weather and consequent limited visivility in the Chiriqui area caused a slowing up of the work of units sent out by boat. Recommendations for a mother ship to cover beach landings in this area were made. Ground reconnaissance on the Pacific Side was sixty percent finished by February 1947, but monumenting was deterred through the scarcity of bronze tablets. Quarantine in the Rio Hato area, imposed during a polio epidemic on the Isthmus, restricted all operations except the work on the Pacora base line. On the Atlantic side, ground reconnaissance for fourteen stations was completed and four prepared for occupancy.

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283. Operational Directive No. 6, Hq 660th Engr Base Topo Bn, 30 Aug 46. In file IAGS 062 Panama.
284. Work Progress Rpt, Mapping Br PCD, Dec 46. In File IAGS 062 Panama.
285. Work Progress Rpt, Mapping Br PCD, Feb 47. In File IAGS 062 Panama.

Seasons Affect Operations

The execution of geodetic operations in the Republic of Panama, projected on a 5-year basis, was governed in a great part by the duration and approximate dates of the rainy and dry seasons, as well as consideration of means of access, terrain, jungle cover, and native population. 286

The reconnaissance planned for Panama for the rainy season 1946 was that of the descriptions of such stations and lines of the main scheme as had not been proved by IAGS parties in the first order arc on the Pacific side, and the initial selection of second order arc in the Chiriqui - Colon areas. Only one small party of leveling operations worked from Balboa, Canal Zone, along the National Highway and thence along the railroad to the Costa Rican boundary in the vicinity of Progreso and southward to tide-water at Puerto Armuelles, where a tidal station was to be established. 287
Spurs to other tidal stations along the Pacific coast were planned.

Along the Trans-Isthmian Highway a precise level line was planned to supplement the one run in 1937 along the Panama Railroad. Data established then showed evidence of isostatic adjustment in the form of settlement due to the added weight of Gatun Lake. Connection between Mandinga and the Chiriqui Lagoon areas to the level datum in Colon was planned on completion of the other lines.

286. "Plan of Operations, IAGS - Panama Project", Incl to Ltr, PCD to CG CDC, 18 Jul 46, sub: MAPPLAN, CDC - Panama Project, Plan of Operations. In PCD 062 1946-47.

287. "Plan of Operations, IAGS - Panama Project", Incl to Ltr, PCD to CD CDC, 18 Jul 46, sub: MAPPLAN CDC - Panama Project, Plan of Operations. In File PCD 062 1946-47.

Because of a difference of 0.8 feet in the sea level determinations between Balboa and the Gulf of Colon, five new tidal stations were proposed for the Pacific at Puerto Armuelles, Remedios, Cape Mala, Rio Hato, and Sabanita, Republic of Panama, to aid in their connection by the first order arc. Connection by the second order by the establishment on the Atlantic side near San Cristobal and Mandinga of two tidal stations was proposed. With the final establishment of the three more tidal stations, enough data were hoped to be collected to help establish in the future an International Datum. These projections were planned for the dry season, and an impressive current program for the rapid completion of all first order work to be completed was proposed. By a vigorous execution of the projected coverage, it was determined that by the end of the dry season, 1946 - 1947, nearly 65 percent of the work could be completed, including photo control.

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Duties Difficult

Water transportation requirements for the most part for those operations on the Atlantic Side, around the Chiriqui Lagoon, included preparation for off shore reconnaissance of parties of not more than twenty men in thirty fathom water and a floating base camp from which the organic craft of the 660th Topographic Base Engineer Battalion would operate for specific missions. Provisions and equipment supplies were projected at

288. "Plan of Operations, IAGS - Panama Project", incl to Ltr, PCD to CG CDC, 18 Jul 46, sub: MAPPLAN, CDC - Panama Project, Plan of Operations. In File PCD 062 1946-47.

those for parties not to exceed 100 men. A Mother Ship Base with passenger and freight facilities capable of voyages up to three weeks' duration for maintenance of small flotillas and for convoying the organic craft to sheltered water was projected. The utilization of an LT-6 for the off shore reconnaissance parties requiring craft for thirty fathom anchorage was suggested; an H-6, a 150' retriever vessel was made available for small party reconnaissance and operations for periods of two weeks; the BK-3977 with supplemental cot placement in the main cabin was planned for the floating base camp required, with supplemental gas barge, and water barge for fuel and water delivery; the H-5, another 150' retriever vessel, was to be utilized as the mother ship base by the addition of extra cooks and mess attendants and the placement of cots in the Number 1 hold. Photo control parties were to use an 85' ST Tug and when

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close to land bases, J-boats. These plans, however, were fulfilled only in part as actual operations progressed. The BK-3977, only slightly used in the operations the first year, was sold to a firm in Venezuela, and two house-boats from the Navy were provided in its stead for the 1947-48 operations. The Department Transportation Corps furnished nine LCM's; three 50' J-boats; one pilot boat; 17 row boats; twelve swamp gliders, flat bottom shall draft boats used at first with airplane motors and later with outboard motors; and one mother ship, the H-5, a cargo ship that plied tri-monthly cargo and personnel trips through the Chiriqui Lagoon area.

289. Ibid.

290. Outline of water trans & equip for CDC Operational Project 46-1-OP as outlined in IAGS - Panama Project, atched to C/S as above.

291. Tel conv, Capt. M.L. Evans Hist O CDC with Capt. F.S. Donnell, TC 15 Nov 47.

Regular cargo barge runs by the Transportation Corps supplied the parties
292
on scheduled trips. The Maintenance of tidal station installations,
ten within the whole of the Republic, demanded the provision of a craft
capable of voyages up to 400 miles and return and the ability to stay out
for about two weeks.

Air Reconnaissance Flights

Proposed air support of the IAGS - Panama Project called for the use
of aircraft in area reconnaissance of 400-or-500-mile flights covering
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fairly wide areas for general reconnaissance by small parties, usually
not exceeding four men. Albrook Field or France Field, on the Atlantic
side, were designated points of departure for these missions which were
planned to begin 1 September 1946 and on two weeks' intervals through
1 November, five parties in all, to complete this type of reconnaissance.
Detailed site reconnaissance requirements called for hovering or very low
speed flights; hedge, mountain, and jungle hopping; and relatively long
range flying over continuing periods. These missions were to consist of
ten parties, one to begin operations 15 August 1946, two on 15 September
1946, and seven on 1 November 1946. In supplying construction logistics
connected with the program, the transportation of men and supplies to bases
294
of ground operations often required the use of auxiliary fields or air

292. Ibid.

293. Air Support of Operational Plan, IAGS - Panama Project, 13 Aug 46,
atcd to C/S, DE PCD to Engr CDC, 13 Aug 46. In PCD file 062 1946-47.

294. Ibid.

strips in terrain where ground units were working. Pin-point air drops on isolated mountain peaks where stations were to be established for observations by ground control engineers were planned for, each mission requiring from three days to about three weeks. Other such missions about 100 in number with added liaison and courier support were planned in the observation operations to be executed by ground control parties. In the establishment of photo control, landings and takeoffs in isolated expedient fields and emergency air strips of parties consisting of three to ten men moving rapidly from one location to another were planned. Air drops and scarring in the jungle by bombers for air photo control were estimated to require some 2000 missions.

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Low altitude photography in addition to the regular vertical mapping was planned to spot control through pin-point photography of the scarred areas. Facilities required included the outlying airfields at Jaque, Pito, Mandinga, Chame, Rio Hato, and David, all in the Republic of Panama. Liaison between the Air Command and the 660th Engineer Base Topo Battalion was requested in the assignment of an air officer to that unit.

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Some Levity Fails

Hard, rough work had its moments of levity, even though unappreciated in the Republic of Panama. One company of the 660th Engineers, the 3347th

295. Ibid.
296. Air Support of Operational Plan, IAGS - Panama Project, 13 Aug 46, atchd to Ck/sl, DE PCD to Engr CDC, 13 Aug 46. In PCD file 062 1946-47.
297. Ibid.

EE Company, marked of the triangulation point on Cerro San Miguel: "We arrived February 17, 1947. After sweat, blood, tears, difficulties, and obstacles, we captured and prepared this positions..." Panamanians read it and failed to see the GI humor of the tablet. Correspondence between the US Ambassador and the Minister of Foreign Affairs arrived at a satisfactory conclusion of the incident at a time when the entire Republic was in an upheaval over the settlement of the defense bases then in negotiation.

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New "Triangulation Trimmings" Used

Ground crews determine high points from which to establish triangulation nets usually in the time-old custom of the measurement of apparent prominence of elevation. Often this practice has caused an immediate waste of effort and time in consequent measurement of numerous prominent features. In an effort to eliminate the error of entering the wrong terrain for height measurement, CDC engineers, Colonel Tandy and Captain William Hatcher, made experiments in the predetermination of these features. By flying at estimated mountaintop level and noting on the plane's altimeter the exact height of each peak, the highest was determined. On its determination, tinsel in fifty pound boxes of strips two inches by one-sixteenth inch or like strips about two feet long, and rolls of tinsel, 325 feet by one-half inch, were dropped. These markings penetrated to the ground and remained for a period of some three weeks marking the area for the ground crews that must enter for visual reconnaissance. The wider rolls draped themselves on

298. Memo, V. Lansing Collins, Jr. to Ambassador, Panama, 30 Apr 47.

the foliage and were visible over long distances from the air. This technique of marking, referred to in the Christian Science Monitor as the "Christmas Tree" technique, was applied to Prominente, a high hill about twenty miles due east of the southern end of Madden Lake, in a series of experimental flights. Further experimentation with the process had eliminated the use of the short strips, as ground reconnaissance crews could not find the tinsel after three weeks, but the longer two-foot strips were still being used in conjunction with the rolls of tinsel as late as December 1947. 300

A Yuletide Effect

The first flights in the development of the technique were from the Sixth Fighter Wing when the bombing technique of using the open door of a G-47 through which to throw out manually the boxes containing the rolls and strips was developed. A true Christmas tree effect was gained through precision bombing when whole boxes seemed to settle like silvered cobwebs over the trees on top of the highest crests.

The chaff, surplus stock of material used during the war as a jamming device in radar detection, has a logical future use in the marking of ground trails through new territory and the eventual use by the Air Forces in rescue work of downed planes in tropical areas where its use has been proved. 301

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Other experimental mountain-top marking includes the use of unusable

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299. Christian Science Monitor, 5 Nov 47.
 300. Conv between Capt Hatcher and Capt Evans, 20 Nov 47 & 2 Dec 47.
 301. Conv between Capt Hatcher and Capt Evans, 20 Nov 47 & 2 Dec 47.
 302. Ibid.

sacks of flour which on being dropped mark in a wide circle in white and on being wet form a hard crust that remains until ants in the jungles remove it. Painting a white cross in cold-water paint primarily for visibility from the air but with a minimum of the penetration of some of the paint onto the ground for ground recognition had been approved by The Panama Canal for use on Balboa Hill, in the vicinity of the American town of Gamboa on the Chagres River. Experimentation within the Canal Zone of uninhabited hill using pure white carbide residue, a waste product in the manufacture of acetylene gas produced by The Panama Canal, was being planned in November 1947. This residue, inert and therefore presumably not harmful to vegetation or animal life, is relatively inexpensive. It is used in one pound sacks for dropping and has less likelihood of being carried away by ants.

Missions for the PCD pertaining to the Panama Project were included in Operational Directive Number 2, published 17 May 1946, which called for first order triangulation extending from the Panama-Costa Rican boundary capable of being extended without usual loss of figure strength into these systems being established in the neighboring nations. Three main base lines traversing the Republic and others necessary to maintain precision measurements were to be proved and monuments to be set at terminals of these base lines by 1 July 1946, one in the vicinity of David, one at Fenonome, and one at Chepo. Upon these were to be established a New Panama Datum as a temporary basic datum. Ties were to include one station on the

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303. Ibid.
304. MAPPLAN, CDC, Panama Project, Operational Directive No. 2, 17 May 46. In File IAGS 062 Panama.

Panama Costa Rican border and one on the Panama-Colombian boundary. Two triangulation stations of the main Panama Canal net were to be included in the ties in precision measurement. In constructing the terminal points of each base line and at each kilometer station, suitable monuments, including subsurface marks independent of and buried at least twelve feet below the monuments, accurately referenced to terminal marks, were directed. Reference by at least three permanent markers of substantial construction buried at least two feet below the surface were required. In the vicinity of each terminal, and elsewhere as required, astronomic stations were to be established. First order level lines, one from the vicinity of Balboa to David, Republic of Panama, and one from Balboa to Cristobal, Atlantic side, with permanent bench marks at intervals of approximately five kilometers and on all intervening bridges were directed. In order to insure ready establishment of picture point control, level monuments and intermediate stations were to be determined. The inclusion of existing monuments was directed, or, if not feasible, established as side shots. Based on existing Navy Hydrographic Office and US Army nets, second order triangulation nets were to cover the Republic: one extending from the Penonome base line to the north coast of Panama near Mandinga south to the Colombia border and westerly from Santiago to the Costa Rican border; one from Chepo along the south coast of Panama to the Colombia extensions of the system to include the Bahía de San Miguel and Río Tuira to Yavisa; and one from Chepo to Mandinga on the north coast of Panama tying-in the first order nets of the neighboring

305. Ibid.

countries.

Priority Schedule Changed

Submitted details based on the Directive brought a change in priority of execution, as the second order triangulation nets, ordinarily assigned lower priority, were considered parts of the first order net, and simultaneous accomplishment was directed. ³⁰⁷ Instructions called for the immediate execution of the first order triangulation net from Cristobal westward along the north coast of Panama to Chiriqui Lagoon to the boundary of Costa Rica as that of a critical area required by the Army Map Service, whose responsibility was the compilation of critical area data. This special request by the Army Map Service suggested the use of the US Navy Hydrographic triangulation net already established as the basis for these data to be compiled for use in the immediate preparation of maps at a ³⁰⁸ scale of 1:50,000 and 1:25,000. Photographic flights covering these critical areas were to be given first priority in flying a north-south line through Chepo and one through David.

Minor Projects Inserted

Certain minor projects were added to the aerial photographic program in the CDC area during the last half of 1946. These included: small projects in the Canal Zone and vicinity; required charting reflights in Central

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306. MAPPLAN, CDC, Panama Proj, Opera Directt No. 2, 17 May 46. In file IAGS 062 Panama.
 307. Ltr, CDC to PCD, 4 Jul 46, sub: MAPPLAN, CDC, Panama Project, Operational Directive No. 5. In File IAGS 062 Panama.
 308. Ibid.

and South America to complete the compilation of charts for which the majority of the photography had previously been flown; aerial photographing overseas U.S. Army cemeteries; and aerial photographing of post war posts, camps, and stations throughout the Caribbean Defense Command.

Peru-Ecuador Border

Relatively few photographic aircraft were dispatched for duty from Headquarters, CDC, to various areas for accomplishment of aerial photography. On 19 September, the Military Attache in Peru was informed that a B-17 aircraft was being dispatched to Talara for the accomplishment of the photography necessary for the survey of the Peru-Ecuador border. The boundary project had been initiated by the U.S. Department of State, and this plane was a replacement for one which had previously been wrecked.

Dominican Republic

In projecting plans for the geodetic surveys of the Dominican Republic, three engineer officers and one civilian engineer of the IAGS, Antilles Department, met with technicians of that government in October 1946 to discuss operations within that country. Headed by Lieutenant Colonel C. R. Rosenbaum, the group secured current mapping information from the Government and studied the existing ground control systems within the Republic. Of the six previously developed only skeletons of the various

309. Rad C-41531 (C), CG CDC to M/A Peru, 19 Sep 46. In CDC 062 (Photography - Ecuador) (S).

nets were of strength sufficient to include in the proposed survey. Considerable reconnaissance was anticipated in establishing new base lines and in recovering and replacing existing stations. Some data of the Ciboa Scheme of the Seaboard Oil Company was considered adequate on first order observation by the IAGS. Of the system established in 1882-1890 by the US Hydrographic Office, only the base lines were usable, and the level net covering topographic quadrangles prepared in 1919-1925 by the US Geological Survey showed no evidence of reduction to mean sea level. No tide gauges had been established in the Republic, and all geographic positions were based on the astronomical coordinates of the Santo Domingo Lighthouse at Ciudad Trujillo established during the 1882-1890 survey carried north and tied-in by triangulation to an astronomical position, also established at this time in the vicinity of Bahia de Samana, with a discrepancy of two minutes in latitude. Although the establishment of tide gauges and astronomical stations was included in the recommendations from this group of engineers, the CDC directed that such stations not be established pending further assistance of the USC & GS. Additional data, prepared by the Geographic and Geological Institute through local commissions, consisting of sketches of localized areas showing communal boundaries, drainage courses, prominent terrain features, and proper names of established localities, were to be made available for entry on the completed projected map.

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310. Ltr, Hq AntD to CG CDC, 30 Oct 46, sub: Plan for Geodetic Survey of the Dominican Republic. In CDC 062 Dominican Republic.
311. 1st Ind, Hq CDC to Hq AntD, 5 Nov 46 on Ltr, Hq AntD to CG CDC, 30 Oct 46, sub: Plan for Geodetic Survey of the Dominican Republic. In CDC 062 Dominican Republic.

On approval of the proposed plans by the CDC, one officer and four civilian technicians entered the Republic under conditions limited by lack of proper equipment for familiarization with the local terrain, locating of acceptable stations, and providing a nucleus for subsequent expansion.³¹²

As personnel and equipment should become available, observations of the US Geological Survey net and of the various Seaboard Oil Company schemes would be brought to first order accuracy. Expansion of established schemes and recovery of various stations would then be made. The establishment of six base lines, some extensions only being needed on some of those already determined by the advance party, was considered adequate for the MAPPLAN. By October 1947, the survey operations were

sufficiently advanced to warrant inspection and observation by geodetic engineers of the CDC office.³¹³ Measurement of base lines was completed early in November 1947. Operations contemplated for the fiscal year 1948 included completion of reconnaissance, the installation of tide gauges, and the initiation of precise levels and triangulation observations throughout the Republic.³¹⁴

Considerable aerial photography already accomplished was being reviewed for acceptability. The entire enterprise, a cooperative project of both governments, was being supervised in the Republic, in addition to IAGS personnel, by Dr. Aurelio Matillas, Director of the Institute of Geography and Geology of the Ministry of Education of the Republic.

312. Ibid.

313. Rad, O of Engr CDC to CG AntD, 27 Oct 47. In CDC Staff Reading file of 27 Oct 47.

314. Ltr, Hq CDC to US Military Attache Dominican Republic, 5 Sep 47, sub: MAPPLAN, CDC-Dominican Republic Project. In CDC 062 Dominican Republic.

Haiti

After clearance was obtained in October 1946 for entrance into the Haitian Republic, geodetic parties began field reconnaissance on first order triangulation and work on first order levels. This work was completed by 9 July 1947 as well as considerable aerial photography, which was being determined acceptable for photogrammetric mapmaking. Operations for the year 1948 included completion of reconnaissance, installation of tide gauges, and the initiation of precise levels and triangulation observations.

Island of Trinidad

In October (1946) Brazil requested aerial photo mapping of Trinidad Island flown for mosaic compilation based on ground control checked and approved by the Joint Brazil-US Military Commission, Air. The approval of such a flight was recommended as part of the implementation and special mission projects provided under the Mapping and Charting Directive, Western Hemisphere. Accomplishment of the mission was assigned the 91st Reconnaissance Squadron which then had planes based in Trinidad.

Photomapping Squadrons Assigned

On 17 October, the War Department notified Headquarters, CDC, that

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- 315. Ltr, Hq CDC to US Military Attache Haiti, 5 Sep 47, sub: MAPPLAN, CDC-Haiti Project. In CDC O62 Haiti.
 - 316. Ibid.
 - 317. Rad WD 87625, Intel Div SCAF to COMGENCARIB, 4 Oct 47. In CDC Staff Reading file of 4 Oct 46.

action was being taken to transfer Flight "E" of the 16th Photomapping
Squadron, less personnel and equipment, to CDC. ³¹⁸ Headquarters CDC con-
curred in this action but stated that no allowance existed in the troop
basis to permit manning the new unit. ³¹⁹ Almost a month later, the War De-
partment stated that the fourth flight of the 91st Reconnaissance Squadron
was proposed for shipment to CDC in lieu of the flight from the 16th Photo-
mapping Squadron. ³²⁰ Headquarters CDC concurred in this change. ³²¹ It was
contemplated, stated the CDC communication, that commitments of MAPPLAN,
CDC, would require that ten photographic crews be operational by 1 March
1947 and twelve crews by 1 June 1947. Eight crews were operational at
the date of the communication, 27 December 1946. Since the other four
crews would have to come from the fourth flight of the 91st Reconnaissance
Squadron, request was made that War Department action be expedited in order
to permit proper training of the crews. The War Department estimated that
authority to activate the fourth flight of the 91st Reconnaissance Squadron
would be forthcoming about 15 January 1947. ³²² The fourth flight, less per-
sonnel and equipment was subsequently authorized as promised.

The one flight of the 7th Geodetic Squadron (Shoran) which the War
Department planned to assign to CDC was never sent. Circumstances prevented

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318. Rad W-83215 (R), Cofs USA to CG CDC, 17 Oct 46. In CDC 322 (Photo Project) (S).
319. Rad G-41766 (R), CG CDC to CG AAF, 18 Oct 46. In CDC 322 (Photo Project) (S).
320. Un-numbered Rad (R), CG AAF to CG CDC, 13 Nov 46. In CDC 322 (Photo Project) (S).
321. Rad C-42151 (R), CG CDC to Cofs USA, 24 Dec 46. In CDC 322 (Photo Project) (S).
322. Rad W-88506 (R), CG AAF to CG CDC, 27 Dec 46. In CDC 322 (Photo Project) (S).

its assignment as planned, reported Headquarters, CDC, in January 1947 to the Commanding General of the Caribbean Air Force, and the small detachment of geodetic personnel, consisting of five officers, assigned to the air units would have to obtain the necessary data, insofar as they were able, until such time as the War Department could dispatch the flight to this theater. ³²³ These officers were dispatched to various countries to search through existent titles and to extract relevant data.

323. Ltr. (S), CG CDC to CG CAirC, 21 Jan 47, sub: MAPPLAN, CDC, (AAF Charting Control). In CDC 322 (Photo Project) (S).

CHAPTER XIV

DIPLOMATIC NEGOTIATIONS SLOW

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Diplomatic Negotiations Slow

Agreements With Republics Lag

Desired diplomatic negotiations did not proceed during the last half of 1946 even so well as did the troublesome struggle for personnel. Most of the South American republics failed to sign agreements permitting the operation of MAPPLAN, CDC, until after the beginning of 1947, and little aerial mapping photography was accomplished within that area. Agreements were concluded with the Central American republics, however, and with the republics located in the Caribbean area prior to the end of 1946. Most of the photography in the Central American and Caribbean area was accomplished during the dry season extending through the first three months of 1947.

Proposals Initiated in Colombia

On 17 August 1946, Colonel W. E. Shipp, Assistant Chief of Staff, CDC, visited the U.S. Embassy in Bogota, Colombia, to observe the progress of MAPPLAN, CDC, in that country. ³²⁴ The Colombian Foreign Office had already been contracted and was expected to act favorably on the proposal. For

324. Ltr, (S), ACofS G-2, CDC to CG CDC, 22 Aug 46, sub: Progress of MAPPLAN in Colombia and Ecuador. In CDC 322 (Photo Project) (S).

political reasons, Colombia would probably desire, it was reported, a face-saving device which would make it appear to the Colombians that their own government had initiated the mapping program and had invited the United States to aid since the Colombian Government had not the necessary equipment or trained personnel. This device was considered by the U.S. Embassy as harmless and acceptable.

Chile

Headquarters, CDC, on 17 September contacted the U.S. Military Attache in Chile relative to the progress of the diplomatic agreement with that country. A copy of MAPPLAN, CDC, had first been forwarded to the Military Attache in Chile on 5 July with the request that the initial phases of diplomatic negotiations be started. At an inter-American meeting of cartographers, held in Caracas, Venezuela, during the summer of 1946, the Chilean delegates had reported to a representative of Headquarters, CDC, that Chile would probably act favorably upon agreements for the MAPPLAN very soon. During this time a U.S. photographic plane was being operated upon the request of Chile on minor projects inside that country. The pilot and crew were stationed there on a temporary duty status, which would expire on 21 September. Upon the advice of the U.S. Military Attache that removal of the plane at the expiration of the temporary assignment to duty might adversely influence pending negotiations, the

325. Rad G-411510 (S), CG CDC to M/A Chile, 17 Sep 46. In CDC 062 Photography - Chile) (S).

pilot and crew were given an additional ninety-day extension of temporary duty.

Cuba

Much effort expended by Headquarters, CDC, working through the appropriate Military Attaches, during the months of October and November 1946 for the conclusion of necessary agreements with the Central American and Caribbean republics and jurisdictions. With the dry season approaching in these areas, it was planned to accomplish that photography which was proposed in MAPPLAN, CDC. On 3 October, the Military Attache in Cuba was informed that the delay of that republic in indicating agreement was delaying the planning procedures. ²³⁶ The Cuban delegate at the recent Caracas meeting had indicated that favorable reaction would be forthcoming, and the Military Attache was requested to assist in speeding acceptance. The Military replied that U.S. Ambassador Norweb had submitted the plan for Cuban approval on 24 September, that no prompt approval was anticipated, but that ³²⁷ another attempt would be made to rush the matter. ³²⁸ Efforts were apparently successful; the Cuban Cabinet approved the MAPPLAN on 16 October.

British Honduras

Request was forwarded to the Military Attache in Guatemala on 3

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- 326. Rad C-41642 (S), CG CDC to M/A Cuba, 3 Oct 46. In CDC 322 (Photo-Project) (S).
 - 327. Rad 10698 (S), M/A Cuba to CG CDC, 8 Oct 46. In CDC 322 (Photo-Project) (S).
 - 328. Rad 10702 (S), M/A Cuba to CG CDC, 17 Oct 46. In CDC 322 (Photo-Project) (S).

October that he clear with the Colonial Government of British Honduras
 for aerial photography necessary in conjunction with the forthcoming
 Guatemalan project. ³²⁹ Favorable reaction by the British Honduran Govern-
 ment was reported about a month later. ³³⁰ Agreements with Guatemala,
 Honduras, and Nicaragua had already been acquired for the Central American
 mapping and charting program according to a report from Headquarters, CDC,
 on 11 October. ³³¹ Copies of the completed agreement with El Salvador were
 forwarded to Headquarters, CDC, on 23 October, ³³² and the necessary clear-
 ances from Costa Rica were reported as having been obtained in a CDC re-
 port dated 5 November. ³³³ Agreements from all Central American republics
 were completed; orders from Headquarters, CDC, dated 5 November directed
 the Commanding General, Caribbean Air Command, to take action as expedi-
 tously as possible for the accomplishment of the aerial photography re-
 quired by MAPPLAN, CDC, in the Central American countries. ³³⁴

Ecuador

Further progress was made in securing diplomatic clearances in the
 South American republics during the last three months of 1946. Following

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- 329. Rad G-41643 (S), CG CDC to M/A Guatemala, 3 Oct 46. In CDC 322 Photo Project (S).
 - 330. Rad 746 (R), M/A Guatemala to CG CDC, 8 Nov 46. In CDC 062 (Photography - Honduras) (S).
 - 331. 1st Ind, CG CDC, 11 Oct 46, on Ltr, (R), Chief MID to CG CDC, 25 Sep 46, sub: Progress of Agreements & Estimated Expenditures on Mapping Plan during Fiscal Year 1947. In CDC 322 (Photo Project) (S).
 - 332. Rad 50273 (S), M/A El Salvador to CG CDC, 24 Oct 46. In CDC 322 (Photo Project) (S).
 - 333. Ltr, (S), CG CDC to CG CAirC, 5 Nov 46, sub: Mapplan Operational Directive (Central America). In CDC 322 (Photo Project) (S).
 - 334. Ltr, (S), CG CDC to CG CAirC, 5 Nov 46, sub: Mapplan Operational Directive (Central America). In CDC 322 (Photo Project) (S).

Colonel Shipp's visit to Quito, Ecuador, on 17 August, the U.S. Embassy contacted the Ecuadoran Foreign Office. The original note was sent on 29 August; the Ecuadoran Government replied on 23 September, expressing agreement with the proposal and appointing Lieutenant Colonel Marco A. Bustamante as the technical representative of that country for working out details of the final plans for accomplishment of the aerial mapping program.

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Bolivia 1946

A CDC report dated 11 October stated that necessary agreement for the accomplishment of MAPPLAN, CDC, had also been signed with the Government of Bolivia. This agreement provided only for aeronautic charting but also

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included a clause providing for a mapping program should Bolivia request such. By December, agreement in principle had also been reached with the

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Government of Chile for photography of airfields, some cities and other areas.

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Formal agreement was not reached until 4 April 1947.

Progress reports on the photographic program submitted by Headquarters, CDC, revealed the small count of progress made during October, November and

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335. Incl 1 to Ltr, (S), M/A Ecuador to CG CDC, 11 Oct 46, sub: Copies of Correspondence between American Embassy and Ministry of Foreign Affairs Regarding Mapping Plan for Western Hemisphere. In CDC 322 (Photo Project) (S).
336. 1st Ind, CG CDC, 11 Oct 46, on Ltr (S), Chief MID to CG CDC, 25 Sep 46, sub: Progress of Agreements and Estimated Expenditures on Mapping Plan During Fiscal Year 1947. In CDC 322 (Photo Project) (S).
337. Ltr (S), CG CDC to CofS USA, 3 Dec 46, sub: Mapping Plan, CDC, Report of Progress. In CDC 322 (Photo Project) (S).
338. Rad 12 (C), M/A Chile to CG CDC, 4 Apr 47. In CDC 322 (Photo Project) (S).

December 1946. During October several small projects were worked on in and around the Canal Zone. These included complete photography of Paitilla Point, Republic of Panama; 75 percent completion of areas for future Air Warning Stations in Panama; completion of two other small areas in Panama; and completion of the Corozal cemetery in the Canal Zone. In addition to this work, the U.S. cemeteries throughout the theater were 82 percent completed and work was again started on the Peru-Ecuador boundary photography. In November, the airfield photography in Chile was completed and limited additional amount of work was accomplished on the overseas cemeteries project. In December, aerial mosaics of cities, towns and small areas in Chile were almost completed. The program in Central America and the Antilles Archipelago was started. An overseas cemeteries project was completed.

Status of Projects in December 1946

A report of progress on MAPPLAN, CDC, was submitted by the Commanding General, CDC, on 3 December 1946. This communication reviewed the essential elements contained in MAPPLAN, CDC; pointed out the amount of progress which had been made; stated the difficulties which were being encountered; and summarized the general outlook for further progress. General satisfaction was expressed as to the progress made to that date; planes in operation in various countries and general progress of the

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339. Ltr (S), CG CDC to Chief MIS, 1 Nov 46 and ensuing months, sub: Report of Accomplishment of the Mapping Plan, Western Hemisphere & the Charting Plan for Central & South America (less Mexico & Brazil). In CDC 322 (Photo Project) (S).
340. Ltr (S), CG CDC to CofS USA, 3 Dec 46, sub: Mapping Plan, CDC Report of Progress. In CDC 322 (Photo Project) (S).

geodetic survey program. A reconnaissance of the first and second order of the geodetic systems had been completed in Panama, and such work was progressing in Guatemala, El Salvador, Honduras, Costa Rica, and Nicaragua. Other reconnaissances were scheduled to be started as soon as additional personnel were received. Shortages which were hampering the progress of the program were reported in the following personnel and equipment: AAF officers and enlisted men, liaison type aircraft, officers and enlisted men for the 660th Engineer Base Topographic Battalion, and geodetic engineers.

Illustrating the importance of the United States fulfilling its commitments in the aerial photography program General Crittenberger said: 341

Commitments of the United States Government in respect to charting and mapping are firm. Under the terms of the agreements reached, the United States has agreed formally to engage in cooperative charting and mapping programs with the various governments concerned. The United States cannot withdraw from these programs without formal notice and without the likelihood of serious repercussions and loss of prestige. The United States is criticized in numerous Latin American quarters for being long on promises and plans but short or unpredictable on performance. The War Department and the Department of State are equally interested in many factors relating to the Mapplan, CDC, particularly the political factors involved.

He summarized the general outlook of the mapping and charting program: 342

This important undertaking of mapping and charting is being supported vigorously by this headquarters. It is believed that good progress is being made. The additional support which is being given by the War Department

341. Ibid.

342. Ltr (S), CG CDC to CofS USA, 3 Dec 46, sub: Mapping Plan, CDC Report of Progress. In CDC 322 (Photo Project) (S).

to the efforts of this headquarters will accelerate in great measure the progress being made.

All of the countries in Central and South America are urgently in need of charts and maps for aerial navigation, engineering and economic development purposes. The program of charting and mapping has been endorsed enthusiastically by all the nations concerned. In every instance, the collaborating governments are augmenting their mapping agencies and providing additional funds.

When the benefits to the United States and to the nations cooperating jointly with it in the accomplishment of War Department charting and mapping objectives are measured against the cost to the United States, the investment appears logical and sound. The implementation of the Mapplan, CDC, has proved a positive approach for promoting solidarity of the nations in the Americas in respect to defensive measures and economic development.

Colonel Francis L. Rivard, reconnaissance officer, reported on aerial photography accomplished to 8 January 1947, showing the following photography as having been accomplished:

- (1) Mapping. No Mapping photography was accomplished in the CDC area prior to 15 November 1946. Since that time, the following work had been completed:

| <u>COUNTRY</u> | <u>SQUARE MILES COVERED</u> | <u>PERCENT COMPLETED</u> |
|----------------|-----------------------------|--------------------------|
| Guatemala | 3,045 | 6.6 |
| Honduras | 2,047 | 4.6 |
| El Salvador | 6,840 | 71.0 |
| Nicaragua | 13,430 | 25.0 |
| Panama | 0 | 0.0 |
| Cuba | 9,785 | 22.7 |
| Chile | 1,949 | 0.6 |

344. Memo (S), Recon O CDC for Deputy C/S CDC, 8 Jan 47, sub: Aerial Photography - Mapplan, CDC, (Brief for G-2 Conference, 13 Jan 47). In CDC 322 (Photo Project) (S).

(2) Charting. Prior to 15 November 1946, charting photography had been accomplished mainly during the war by units of the 311th Wing as follows:

| <u>PROJECT</u> | <u>COUNTRY</u> | <u>PERCENT COMPLETED</u> |
|----------------|--|--------------------------|
| 1039 | Central Ecuador | 99 |
| 2014 | Central and Northern Peru and Sougheastern Ecuador | 47 |
| 2015 | Coastal Ecuador | 63 |
| 2016 | Coastal, Southern, and Southeastern Colombia | 13 |
| 2017 | Northern Bolivia | 50 |
| 2019 | Northern Bolivia | 66 |
| 3011 | Southeastern Cuba and Hispaniola | 97 |
| 3017 | North Coastal Colombia, Central Venezuela, and Coastal Guianas | 56 |
| 4008 | Central America | 70 |
| 4013 | Interior Venezuela | 42 |
| 4015 | Uruguay | 78 |
| 4016 | Paraguay | 67 |
| 4017 | Interior Guianas | 45 |
| 4028 | Chile | 99.9 |
| 6001 | Bolivia | 0 |

Program in 1947

Future plans, stated Colonel Rivard, Envisaged all of South and Central America incorporated into MAPPLAN, CDC. This arrangement would

permit the movement of planes, personnel, and materials back and forth over the length of both Central and South America as the best photographic weather moved north and south. On this date, however, only two South American republics, Ecuador and Bolivia, had signed formal agreements permitting full scale operations within their borders. Photographic weather would move toward South America in the Spring of 1947, and unless agreements were signed within a short period of time much would be lost in the operations of the aerial photography program. Unless the agreement were confirmed by 1 February, only about three weeks away, proper logistical support could not be planned and the planes could not operate when photographic weather moved to the South American area, he said. Agreements were urgently needed with Colombia, Venezuela, Peru, and Chile if much valuable weather was not to be lost.

The problem of major importance facing Headquarters, CDC, in relation to MAPPLAN program at the beginning of 1947 was that of securing the necessary diplomatic agreements for continued operation in South America. Republics in Central America and in the Caribbean area and the foreign possessions in the Caribbean were in diplomatic agreement; and future photographic progress here depended only upon good weather and the normal problems of manning and supporting logistically the photographic crews.

El Salvador

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By February 1947 field work had begun in El Salvador when aerial reconnaissance of the neighboring boundaries and land reconnaissance in a

345. Rpts, weekly and monthly, of work in El Salvador. In File 062 El Salvador Reports, IACS files.

circle of six locations around the capital, San Salvador, for first and
346
second order triangulation points were made. Reconnaissance for base line
sites on the Pan-American Highway west of San Miguel and on new road con-
struction to the south was initiated. El Salvador's inability to assist in
the supply of cement for level and triangulation projects deterred some-
what the construction of monuments on the main network of stations. The
training of Salvadorans in precision leveling on new equipment furnished
by the United States assured the mutually cooperative policy adhered to by
the IAGS. The principal triangulation network through the interior of the
Republic was completed by May 1947 and monumenting along the coast was begun. 347

In keeping with the policy of assisting the various countries to
survey their own territories, IAGS was instrumental in providing that
two Salvadoran engineers be sent to Washington, D. C. to study tri-
angulation and multiplex methods thereby beginning the long range plan of
maintenance of geodetic control within the nationalities by their own
348
personnel. Provision was made for delivery in January 1948 of one multi-
plex unit for the compilation of a provisional map to be used in the 1949
census of El Salvador.

Work in the establishment of triangulation stations and their subse-
quent monumenting continued throughout the summer months in spite of de-
laying heavy rains. Reconnaissance was almost at a standstill, but bench
marking was completed and leveling was extended east and west of the

346. See Charts, Appendix "F".

347. Rpts, weekly and monthly, of work in El Salvador. In File 062 El
Salvador Reports, IAGS Files.

348. Ibid.

capitals and along the Highway. By September 1947 re-runs and first order observations along the Salvador-Guatemala border were made. Work was continuing during the latter months of 1947.

Costa Rica

Costa Rica was entered by geodetic personnel of the US by March 1947 but work progressed rather slowly because of the burning of the fields through which the proposed base line was to be established. ³⁴⁹ Poor supply of lumber, the insufficient manufacture of markers in the Republic, and the insistence of placing the base line near the Capital made the work of staking, clearing, and measuring costly. ³⁵⁰ Throughout the spring and summer months poor visibility, heavy rains, and generally bad weather as well as heavily wooded terrain impeded progress of the program. However, it was contemplated that completion of the arc San Jose to Panama and the first order scheme for the whole nation would be effected by June 1947. ³⁵¹

In July 1947 internal struggle within the Republic caused temporary cessation operations. In August 1947 clearing and monumenting the scheme to the Nicaraguan border was completed. Work continued, greatly accelerated by personal interest of Don Ricardo Fernandez Peralta, Senior Engineer of the Instituto Geografico Nacional, who was instrumental in placing before his government a request for thirty thousand colones, basic Costa Rican money, for continuance of the work. As in El Salvador and other countries, the

349. Weekly and monthly progress reports in Costa Rica. In file 062
350. Costa Rica Reports, IAGS files.
351. Ibid.
Ibid.

United States utilized whatever local personnel and equipment were available,
even in some instances of underwriting payment of necessary personnel from
US funds. ³⁵²

The Instituto requested in July 1947 gravity observations in
connection with the astronomic observations being carried on under USMC &
GS, and requested that an engineer be sent for training to the United States.

In September 1947 a tie-in of the Pacific and Atlantic nets was made 300
meters apart at Buenos Aires, some 30 miles northwest of the Panama border.

The work continued through the winter months of 1947, the Instituto being
cooperative in the furnishing of personnel, supplies, and fabricating
facilities. ³⁵³

Guatemala

The international agreement between the United States and Guatemala,
substantially the same as that made with all the Latin American countries,
summarized the map situation existent within the Republic in pointing out
that there was a noticeable lack of sufficient related control upon which
to base maps and charts that were, in effect, based on local geodetic systems
not interconnected with systems of other nations nor, in most instances,
with systems within the individual nation. Additional aerial photography
and the integration of existing systems of control were pointed out as
being mutually beneficial in the compilation of accurate aeronautical
charting and topographic mapping both to the United States and to the nation,

352. Weekly and monthly progress reports in Costa Rica. In File 062 Costa
Rica Reports, IAGS Files.

353. Ibid.

and it was suggested that a cooperative program be devised to include all elements of mapping and charting. ³⁵⁴ Mutually beneficial terms were decided upon to include the expeditious execution of the trimetrogon and vertical photography required, expert personnel to cooperate with technical agencies designated by the nation involved, information dealing with the entrance of US personnel within the foreign countries, and the furnishing of maps inaccessible to other nations - all these the terms provided by the United States. Guatemala, as well as other nations with whom like agreements were made, was to furnish capable collaborators to take active part in the work, commissions being appointed from ministries within the government, to place at the disposal of operating personnel such facilities and existing data, statistics, plans, and map information as available, and to coordinate a future program of cartographic work with the proposed program accepting security measures consistent with those of the United States. ⁵⁵⁵ In

Guatemala's accepting the points of individual interest, it was suggested that the largest number of personnel possible take part so that training and experience gained might help in the maintenance of maps produced, and that such maps as were to be retained in Guatemala be divided in preparation equally between the metric and mileage systems.

A board of engineers, Guatemala and American, met in November 1946 and agreed to the general technical plan for the development of photogrammetric maps to be undertaken immediately so as to take advantage of

354. Note No. 212 Embassy, Charge d' Affaires of US to His Excellency, Minister of Foreign Affairs, Guatemala, 12 Jul 46. In File IAGS 092.2 International Agreement, Guatemala.

355. Ibid.

the clear weather period and that the use of such equipment and funds then available for such work be used by the Mapping and cartographic Department, Government of Guatemala, as well as those facilities offered by the IAGS. ³⁵⁶ The government of Guatemala requested a special agreement for precise photographs at scales of 1:10,000 and 1:5000 of certain zones of local interest, such as "Llanos de la Gragua" and the principal cities of Guatemala, Antigua, Quezaltenango, and Puerto Barrios.

Geodetic work started as early as March 1947 when triangulation observation was begun, the first being on the base expansion of base at Guatemala City. Completed reconnaissance for the relocation of coastal stations from San Jose on the east to the El Salvadoran border on the west were completed during the month. ³⁵⁷ By July 1947 clearance for men and material into Mexico was being sought in preparation for the tie-in with the North American Datum through the Republic of Mexico. Through September 1947 work was being done in the vicinity of Mexico where base expansions were being made.

Rain and Jungle Are Foes

The early surveying work in all of the Central American countries was a gruelling fight against rain and jungle. Men were stationed in lonely camps where supplies often had to be dropped by plane, and tropical jungles had to be hewn not only to gain access to those camps but yard by yard in

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356. Ltr, Rpt of Board of Proceedings between US Engrs and Guatemalan Engrs, 15 Nov 46. In File IAGS 092.2 International Agreement, Guatemala.
357. Weekly and monthly progress reports in Guatemala. In File IAGS 062 Guatemala Reports.

the long treks to proposed stations establishing the quadrangles to be surveyed. One such camp at Tacana, near the Guatemala-Mexico border, was three times washed away by torrential rains. The last unsuccessful attempt at determining the required astronomic data at this location was at the time of the crash of a trans-continental plane. The engineer had barely reestablished his tents and had found astronomical observation impossible during such weather when no stars were out and had gone to investigate the crash. He found the plane and its occupants so badly burned that they resembled the black beans of his diet and from that extra-reconnaissance found himself unable to prepare his usual black beans at mealtime.

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The determination of astronomic data usually required about fifteen hours of work but in order to find fifteen hours when sufficient stars were clearly in observation positions, engineers were required to establish camps in the jungles on the high points selected and await clear nights. These astronomic determinations were being made for two purposes: To establish the longitudinal and latitudinal positions of designated triangulation points to be used in the triangulation schemes of various countries and to further the compilation of data in the scientific search for the clarification of the now inexplicable deviation from the vertical in the surveying processes.

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Personnel who established the ground stations for tying the air photographs into the terrain pattern have had many interesting experiences and encountered unexpected obstacles.

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358. Conversation between Historical Officer and Lt. Col. Robert C. Miller, Mapping Ex CDC, 5 and 6 Nov 47.
359. Conversation between Historical Officer and Lt. Comdr. J.P. Luchene, USC & GS, 5 and 6 Nov 47.

"The muscles of my legs are now like a mule's" says Lieutenant James F. Heidenreich of the party operating in Guatemala. ³⁶⁰ "We travel as far as we can in jeeps. Then we continue as far as the mules will take us and go the rest of the way with our equipment on foot."

"We also have an L-5 plane. On one occasion we landed in what proved to be some kind of growth over five feet high. This was near the Mexican border. There were Indians there, and we talked them into clearing a runway for us nine hundred feet long and wide enough to give clearance to the plane. We had a hard time paying them. They were not interested in money and all we could do was strip off and give them our pants and shirts, which we did, returning to base in our underwear. And it was cold."

"The fact that we place our stations on the tops of prominent hills leads us into diplomatic complications with the Indians. For the Indians use the hilltops for their places of worship. Their religion is a combination of Christianity and the ceremonies of their ancestors.

Now the tops of the hills frequently contain open air places of worship consisting of masonry and statues. When they make a new statue, they bring the large block up to the top and carve it on the spot because the work is delicate and they do not want to break it getting it into position. The statues are like the ones in the ruins except they have worked in a cross. You can see they are not interested in having us set up our station in such sites. What we have to do is talk with the priest. We cannot pay them, because they will not let money or barter enter into

360. Informal interview with Major J.M. Baker, Quarry Heights, 25 Oct 47.

their religious observances. So what we do is explain to them that we are setting up a monument, and in a bench mark is that; we paint a cross on the white stake and draw a circle. That usually satisfies them. Once in a while some one comes along who does not know about our arrangements and tears up our stakes. Then we have to go back and set them up again."

Honduras Cooperates

Although work began in Honduras in March 1947, climatic conditions had held operations to a minimum through April. By August, first order level bench marks were completed from Nicaragua to El Salvador and triangulation and bench mark monuments were being set. The Government of Honduras had made office and storage space available to the IAGS representatives and gasoline and maintenance service were available at the National Garage.

Colombia Enters Project

On 2 February 1947, the U. S. Military Attache in Colombia notified Headquarters, CDC, that representatives of the Department of State had recently held a conference with the Colombian Minister of War relative to diplomatic agreement concerning MAPPLAN, CDC. This meeting resulted in the statement that both the President of Colombia and the Foreign Minister, as well as the Minister of War, were in complete agreement with the proposed mapping program and were desirous of rendering all possible

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361. Weekly and monthly progress reports in Honduras. In file IAGS 062 Honduras Reports.
362. Rad 57228 (S), M/A Colombia to CG CDC, 2 Feb 47. In CDC 062 (Photography - Colombia) (S).

assistance. It was necessary, however, before concluding the agreement that steps be taken to eliminate internal political reaction. It was desired by the Colombian officials that the United States should agree to the declaration by the Colombian Government that such a program should be carried out under the Instituto Geografico Militar, making it appear that Colombia had first initiated the program. Since Colombia had not the equipment and personnel necessary for carrying out the program, the United States would be requested to supply the deficiencies. In the contract thus awarded the United States, the same concessions would be made as were desired in the diplomatic agreement. The Military Attache recommended that Headquarters, CDC, concur in the Minister of War's request and present negotiations be suspended. Headquarters, CDC, complied with the Military Attache's recommendations but specifically demanded that the contract issued to the United States by the Colombian Government should parallel the usual diplomatic agreements signed with other countries. 363

After some delay, part of which was due to the absence of U. S. Ambassador Wiley from Colombia, the U.S. Military Attache on 10 April reported that he had on that date held further conferences with the Minister of War relative to MAPPLAN, CDC agreement. 364 The Military Attache had pointed out the danger of discontinuance of funds on 30 June and had used the occurrence of recent tragic airplane accidents in Colombia as a talking point for initiation of a mapping program. Agreement was also explained to the Colombian representative that past minor disagreements

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363. Rad G-42455 (S), CG CDC to M/A Colombia, 17 Feb 47. In CDC 062
Photography - Colombia (S).
364. Ltr (C), M/A Colombia to CG CDC, 10 Apr 47, sub: Mapplan, CDC.
In CDC 062 (Photography - Colombia) (S).

in the plan probably could be adjusted. On 3 June, the Military Attache had a personal conference with the new Minister of War, explained to him the details of the conference held on 10 April, and obtained from him a promise for favorable action within the very near future. ³⁶⁵ The Government of Colombia on 15 July 1947 accepted the MAPPLAN proposal with the modifications agreed upon by Headquarters, CDC. ³⁶⁶ Colonel Tandy, Chief Engineer, CDC, and two assistants went to Bogota on 5 August for final discussion of program planning. ³⁶⁷

Peru and Venezuela

Of the four countries with which Colonel Rivard, CDC Reconnaissance Officer, CDC, had stated that agreements were badly needed by 1 February 1947, only two, Chile and Colombia, had been consummated. Colonel Tandy, Chief Engineer, CDC, on 9 July wrote to Dr. Eduardo Calcano, Department of Cartography in Venezuela, reviewing the difficulties holding up the two countries would reach agreeable terms. ³⁶⁸ Stated Colonel Tandy:

As I understand the situation, the Government of Venezuela desires to continue the program of topographic mapping North of the Orinoco River and to have the United States complete the aeronautic charting which was undertaken during the war. Further, that the geodetic engineers of the United States and other technical personnel were desired to consult with the technical agencies of Venezuela from time to time and render such assistance as was desired and possible.

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365. Ibid.
366. Rad 57257 (S), M/A Colombia to CG CDC, 15 Jul 47. In CDC 062 (Photography - Colombia) (S).
367. Rad G-3741, CG CDC to M/A Colombia, 15 Jul 47. In CDC 062 (Photography - Colombia) (S).
368. Pers Ltr (C), Col. F.S. Tandy, CofEngrs CDC, to Dr. Eduardo Calcano, Dept of Cartography, Venezuela, 9 Jul 47. In CDC 062 (Photography - Venezuela) (S).

Since the dry season and favorable photographic weather was approaching and since the two nations were in accord as to the general principles of the plan, Colonel Tandy expressed the hope that complete agreement would be soon forthcoming.

In reference to the desired agreement with Peru, Colonel Tandy in a letter to Colonel Gerardo Dianderos, Director of the Peruvian Instituto Geografico Militar in Lima, on 2 August stated that he had learned informally that Peru was favorably considering the mapping proposal and that he hoped to receive soon the formal agreement. ³⁶⁹ Headquarters, CDC, on 11 August contracted the U.S. Military Attache in Peru asking that the agreement be furnished at the earliest possible date so that proper planning could proceed. ³⁷⁰

Several Small Projects

Certain additions were made to the mapping program in the CDC area during the first months of 1947. Upon the request of the Commanding Officer, Albrook Field, C. Z., Headquarters, CDC authorized the aerial photographing of areas within a fifteen mile radius of the airfields at San Jose, Guatemala; Guatemala City, Guatemala; La Joya, Republic of Panama; and Rey Island, Republic of Panama. ³⁷¹ These photographs were to

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369. Pers Ltr, Col. F.S. Tandy, Chief Engr CDC, to Col. Gerardo Dianderos, Director of Peruvian Instituto Geografico Militar, 2 Aug 47. In CDC 062 (Photography - Peru) (S).
370. Rad C-43305 (C), CG CDC to M/A Peru, 11 Aug 47. In CDC 062 (Photography - Peru) (S).
371. Ltr, CO Albrook Field to CG CDC, 9 Jan 47, sub: Request for Permission to Take Aerial Photographs. In CDC 062 (Photography - General) (S).

be used by alert and crash crews at the various airfields in locating off the base crashes. On 31 January, Headquarters, CDC requested permission of the War Department to add to the basic charting program certain portions of the Panama Coastal Frontier which had been omitted in the original charting operations. ³⁷² Charts of these areas were needed to provide a complete picture of the area and to tie together those areas already charted. The War Department authorized the requested addition to the program on 18 March. ³⁷³ On 26 February, Headquarters, CDC, requested authority to extend the limits of mapping areas within the South American republics lying along the Pacific coastline of South America -- Ecuador, Peru, and Chile. ³⁷⁴ The program, as originally set up by the War Department, called for mapping only narrow strips along the coastlines. Except for the sea-ports involved, this mapping would afford few benefits for the nations concerned since the bulk of their population lived on the plateaus inland from the seacoasts and outside the areas designated for mapping. Permission for the extension of the projects was granted by the War Department. ³⁷⁵

Project for Western Cuba

Authority was requested of the War Department on 3 February for stationing two F-9 aircraft from Jamaica at Key West, Florida, for the

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372. Ltr, CG CDC to CofS USA, 31 Jan 47, sub: Charting Project for Panama Coastal Frontier CDC. In CDC 322 Photo Project (S).
373. Ltr (C), Dir of Intel WDGS to CG CDC, 18 Mar 47, sub: Charting Project for Panama Coastal Frontier, CDC. In CDC 322 Photo Project (S):
374. Ltr (C), CG CDC to CofS USA, 26 Feb 47, sub: Revision of Mapping Limits in South America. In CDC 062 Photography - General (S).
375. 1st Ind, TAG, 31 Mar 47, on Ltr, (C), CG CDC to CofS USA, 26 Feb 47, sub: Revision of Mapping Limits in South America. In CDC 062 (Photography - General (S)).

mapping of the western area of Cuba.

The Chief of Naval Operations agreed to furnish fuel for the aircraft and housing and messing for eighteen officers and enlisted men in the crews. ³⁷⁷
 Only one aircraft was dispatched to Key West on 16 March, since it was believed that one plane and crew could complete the project in Cuba within ³⁷⁸
 thirty days.

A report on the activities of the Inter-American Geodetic Survey operations was submitted by Headquarters, CDC, on 15 February. The following progress was reported: ³⁷⁹

- (1) Preparation of flight line maps of priority areas were continuing.
- (2) Reconnaissance of first order triangulation nets for Guatemala, El Salvador, Costa Rica, the Dominican Republic, and Panama were continuing.
- (3) Reconnaissance of first order triangulation net for Nicaragua had begun.
- (4) One Joint U.S. - El Salvador first order level party had started work.
- (5) Field operations on the first and second order triangulation in Panama had been started by the 660th Engineer Base Topographic Battalion.

On 5 April 1947, the War Department stated that it was believed at that time that the Brazilian program, currently operating under the U.S. air member of the Joint Brazil-United States Military Commission, should

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376. Rad G-43285 (C), CG CDC to P&O WDGS, 3 Feb 47. In CDC 062 Photography - Cuba (S).
377. Rad un-numbered (C), Chief of Naval Operations to Cmdr Naval Base, Key West, Florida, 12 Mar 47. In CDC 322 (Photo Project) (S).
378. Rad G-42614 (C), CG CDC to Cmdr Naval Base, Key West, Florida, 13 Mar 47. In CDC 322 (Photo Project) (S).
379. Ltr (S), CG CDC to Director of Intelligence WDGS, 15 Feb 47, sub: Report of Accomplishment for the Mapping Plan, Western Hemisphere and the Charting Plan for Central & South America (less Mexico & Brazil). In CDC 062 (Photography - General) (S).

be assigned to CDC for completion. Colonel Tandy, Chief Engineer, CDC, concurred in the change, and the U.S. air member in Brazil was notified on 23 April that the change was being made but that he should continue to carry on the program for the time being.

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Argentina Retards Operations

Following the conclusion of diplomatic agreement with Chile, Headquarters, CDC, on 15 April directed the Commanding General, Caribbean Air Command, to initiate action as expeditiously as possible to accomplish the photography in Chile required by MAPPLAN, CDC. It was suggested that four photographic aircraft be assigned to the project. The following specific instructions were given to the Commanding General, CAirC:

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Under no circumstances, except in the case of an emergency, will any of the aircraft assigned to accomplish aerial photography in Chile, fly over the country of ARGENTINA for any reason, without authorization of this headquarters.

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The Commanding General, CDC, on 28 April 1947 reported to the War Department on a radiogram which U.S. Ambassador Bowers in Chile had dispatched to the Department of State. The senior officer in charge of the three photographic aircraft sent to Chile had contacted Ambassador Bowers

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380. Rad W-95585 (S), Chief Intelligence Div to CG CDC, 5 Apr 47. In CDC 322 (Photo Project) (S).
 381. Rad G-42810, CG CDC to US Air Member JBUSMC, 23 Apr 47. In CDC 322 (Photo Project) (S).
 382. Ltr (C), CG CDC to CG CAirC, 1 Apr 47, sub: MAPPLAN, Operational Directive (Chile, (S.A.)). In CDC 062 (Photography-Chile) (S).
 383. Ibid.
 384. Rad G-42827 (C), CG CDC to CofS USA, 28 Apr 47. In CDC 322 (Photo Project) (S).

and had explained to him what he termed the necessity of flying "turn around" flights about fifteen miles over the Argentine territory. Ambassador Bowers had instructed the senior officer that, unless he was otherwise instructed, he was to fly as outlined in the discussions with the Ambassador.

Flights Restricted

On the same date, 28 April, the Commanding General, CDC, cabled the U.S. Military Attache in Chile that, the Argentina border would not be crossed in any of the flights. ³⁸⁵ Two days later, the War Department notified CDC that the Department of State had requested the U.S. Embassy in Argentina to obtain permission for the "turn around" flights but that until such permission was received no U.S. aircraft was to fly over Argentine territory. ³⁸⁶

Personnel problems continued to trouble the operations of the MAPPLAN program during the first half of 1947 as they had done during the previous six months. On 29 April 1947, Headquarters, CDC contacted the Commanding General, CAirC, explaining the problems confronting the program and calling upon the Caribbean Air Command for suggestions or actions to assist in solving the existent problem. ³⁸⁷ MAPPLAN was growing in size, stated the CDC communication, because of the addition of the Brazilian program. Only the 91st Reconnaissance Squadron, attached to CAirC and authorized sixteen planes and crews, was actively engaged in the photographic operations. The

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385. Rad C-42928 (C), CG CDC, to M/A Chile, 28 Apr 47. In CDC 322 (Photo Project) (S).
386. Rad W-97113 (C), Director of Intelligence WDGS to CG CDC, 30 Apr 47. In CDC 322 (Photo Project) (S).
387. Ltr (C), CG CDC to CG CAirC, 29 Apr 47, sub: Accomplishment of MAPPLAN. In CDC 322 (Photo Project) (S).

War Department had directed a cut in personnel, reducing the 91st Reconnaissance Squadron to about 60 percent strength and permitting operation of only about nine of the photographic planes. The photographic squadron's laboratory was authorized a strength of fifty but was operating with about fifteen, thereby creating a bottle-neck in the entire program. The 311th Photo Wing had offered to furnish about forty laboratory technicians and to train new F-9 crews, but the existing manning levels precluded acceptance of additional personnel. Headquarters, CDC, requested that the Commanding General, CAirC, examine his assignment of personnel and see what could be done with that which the theater already had.

Headquarters, CAirC, replied that it had not enough personnel to man its key positions and to meet ordinary housekeeping demands and that there were no additional changes in personnel possible to augment the troops needed for the photographic program. ³⁸⁸ It was recommended that Headquarters CDC, request an increased troop ceiling to provide necessary increases in photographic unit strength. Upon reference of the problem to Washington, the War Department replied not too sympathetically regarding the personnel difficulties of the Caribbean Air Command. ³⁸⁹ Although the difficulties of the manpower shortage were appreciated, stated the War Department, it was intended that MAPPLAN would be executed with the means at the disposal of the command and with the most celerity possible. The War Department, in addition, commented on the fact that the Caribbean Air Command was within

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388. 1st Ind, CG CAirC, 10 May 47, on Ltr (C), CG CDC to CG CAirC, 29 Apr 47, sub: Accomplishment of MAPPLAN. In CDC 322 (Photo Project) (S).
389. 3d Ind, TAG, 27 Jun 47, on Ltr (C), CG CDC to CG CAirC, 29 Apr 47, sub: Accomplishment of MAPPLAN. In CDC 322 (Photo Project) (S).

95 percent of its authorized strength, whereas the 91st Reconnaissance Squadron had only 67 percent of its authorized strength. Considering the importance of the mapping program, the War Department felt that the strength of the photographic unit should be kept at a great or greater proportion than was the Caribbean Air Command.

Climate Injures Supplies

On 30 April 1947, Headquarters, CDC, submitted to the War Department Operational Project No. 47-1-OP, planning for supplies to the geodetic survey personnel for the fiscal year of 1948. ³⁹⁰ The new supply plan, approved by the War Department on 30 July 1947, replacing Operational Project No. 46-1-CP. In the new project, mention was made to the high rate of the replacement factor in the geodetic program, illustrating some of the problems encountered in operations in the tropics. The following reasons ³⁹¹ were advanced for the high rate of replacements:

- (1) In the tropics, fungus grew on optical instruments and the lenses became unglued.
- (2) Jungle moisture and molds deteriorated all fabrics and leather.
- (3) Tropical weather and the salt water caused rapid deterioration of machinery.
- (4) Actual losses were high as a result of fording streams, landing on beaches through the surf, and general lack of maintenance facilities.

390. Ltr, CG CDC to CofS USA, 30 Apr 47, sub: Caribbean Defense Command, Operational Project 47-1-OP, Mapping Plan, CDC. In CDC 322 (Photo Project) (S).

391. Ibid.

On 22 May 1947, Headquarters CDC, announced the reorganization of the mapping and charting set-up within this headquarters to comply with the organization set forth in AR 300-15, "Mapping and Charting", dated 29 November 1946.³⁹² Effective 22 May 1947, the Reconnaissance Section, CDC, was abolished; and the duties previously assigned this section were transferred to the Assistant Chief of Staff, G-2, CDC, and to the Commanding General, CAirC. A CDC Mapping Committee, composed of Assistant Chiefs of Staff, G-2, G-3, and Plans, the Chief Engineer, CDC, and the Commanding General, CAirC, was established. The Commanding General, CAirC, was made responsible for the logistical and fiscal support of all Air Force units employed in operations connected with MAPPLAN.

Engineers Confer in Mexico

An important meeting of Guatemalan and Mexican engineers, attended by Colonel Tandy, CDC Engineer, was held in Tapachula, Mexico, in June 1947.³⁹³ Following his return to Headquarters, CDC, Colonel Tandy promised prompt action in supplying technical personnel and equipment from the Inter-American Geodetic Survey organization in order to accomplish the work agreed upon.³⁹⁴

Progress reports submitted by Headquarters, CDC, indicate that most of the progress attained in the mapping and charting program during 1947

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392. Ltr (R), CG CDC to CG CAirC, 22 May 47, sub: MAPPLAN CDC (Mapping and Charting Responsibilities). In CDC 322 (Photo Project) (S).
393. Rad W-80667 (R), WD to CG CDC, 21 Jun 47. In CDC 062 (Photography - Guatemala) (S).
394. Rad C-13101 (C), CG CDC to M/A Mexico, 27 Jun 47. In CDC 062 (Photography - Mexico) (S).

was completed by the end of May. Considerable progress was made during January, February, and March on the Central American and Antilles Archipelago projects. The CDC report dated 1 April stated that all crews and aircraft had been withdrawn from Central America and the Antilles because of inadequate photographic weather. The following percentages of the work in these areas had been accomplished prior to withdrawal:

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|-----------------------|------|--------------|-----|
| Guatemala ----- | 72.5 | Honduras --- | 35 |
| El Salvador ----- | 100 | Nicaragua -- | 47 |
| Costa Rica ----- | 9 | Panama ----- | 6.6 |
| Cuba ----- | 81.3 | Haiti ----- | 75 |
| Dominican Republic -- | 90 | | |

Work in Ecuador and Chile

During the months of April and May, aerial photography was accomplished in Ecuador and Chile. Aircraft had been withdrawn from other active areas, and the program awaited diplomatic clearances in most of South America.

Discussions with representatives of the Instituto Geografico Militar, Chile, and the IAGS, involved a determination of the establishment of a new triangulation scheme, quadrilaterals, and precision level lines to be agreed upon. Reconnaissance work to start off the new program included

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395. Ltr (C), CG CDC to Director of Intelligence WDGS, 1 Feb 47, and ensuing months, sub: Report of Accomplishment for the Mapping Plan, Western Hemisphere and the Charting Plan for Central & South America (less Mexico and Brazil). In CDC 322 (Photo Project) (S).
396. Memo (C), AcofS, A-2, CAIRC, for AcofS, G-2, CDC, 10 Jul 47, no sub. In CDC 325 (Photo Project) (S).
397. Chile Reports. In file IAGS 062 Chile reports.

two field parties, one working north and one south from Vallemar. The IGM was detailed to build the monuments marking triangulation stations and underground markers with three reference points. Twelve locations for projected base lines were determined with a general plan for the first order arc and projected extensions toward the coast and the Argentine border. Tidal gauges were planned for Africa, Antofagasta, Coquimbo, Valparaiso, Talcahuano, Puerto Montt, and Punta Arenas, interconnected with precision leveling. The proposed quadrilaterals were to run astride the existing main communication system to facilitate reconnaissance and observations, and all existing geodetic control was to tie into points in the new arc measured. ³⁹⁸ Consideration of the AMS symbols and markings on the maps was given to meet special conditions in Chile.

By July 1947 some work had been accomplished in the recovery of previously established first order triangulation stations around Santiago to be used on continuing extensions. This work was done with Chilean personnel supervised by IAGS geodetic experts then stationed in the Republic. Delay in Chile's part of the program was caused by the change in the Ministerio de Hacienda, a change which delayed appropriation of funds to the Instituto. The actual beginning of the program was 25 August 1947 from which the continuous field work has done with the reconnoitering, monumenting, and describing points from Copiapo, 250 miles south of Antofagasta, northward to meet the crews working south from that city.

398. Ibid.

and those from Santiago north to Copiapo. 399

Retrenchment in Late 1947

Beginning with the new Fiscal Year 1948, there was necessary in almost complete retrenchment program in MAPPLAN operations. On 10 July 1947, the Commanding General, CAIRC, submitted for approval of Headquarters, CDC, the proposal that all aircraft and personnel working on MAPPLAN, CDC, be returned to Howard Field, C. Z., their permanent station, with the exception of two B-17's and crews in Brazil and one B-17 and crew in Chile. Headquarters, CDC, concurred in this request as a temporary measure to fall within the

budget limitations tentatively set up by the War Department, except for the withdrawal of liaison pilots and aircraft on temporary duty in Chile, Nicaragua, Guatemala, and Costa Rica. 401

When the final budget figures were received, directed CDC, it was desired to initiate plans for the operation of six photographic aircraft within Central and South America where diplomatic clearances had been obtained and where weather would permit. Operation of these aircraft would, of course, have to remain within the limitations of the existing funds. It was desired that ten of the authorized sixteen F-9's of the 91st Reconnaissance Squadron be made operational by 1 November 1947, the beginning of the dry season, in order to accomplish first priority mapping and charting duties in Colombia, Panama, and Costa Rica. It was also desired that the aircraft over and above the six which

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399. Chile Reports. In IAGS 062 Chile Reports.
400. Memo (C), ACofS A-2, CAIRC for ACofS G-2 CDC, 10 Jul 47, no sub. In CDC 322 (Photo Project) (S).
401. 1st Ind, ACofS G-2, CDC, 14 Jul 47, on Memo (C), ACofS A-2 CAIRC for ACofS G-2, CDC, 10 Jul 47, no sub. In CDC 322 (Photo Project) (S).

were to operate throughout Central and South America should operate from bases in Panama, from Borinquen Field in Puerto Rico, or from Waller Field in Trinidad in order to reduce the payment of per diem rates to the crews.

On 13 July, Headquarters, CDC, notified the War Department of the intended action in withdrawing the photographic planes. Although the War Department's reply dated 16 July requested that retrenchment await final determination of necessary funds, it subsequently became necessary to withdraw the planes as had been planned. The Commanding General, Antilles Department, on 18 July reported that the planning figure for the allocation of funds to that theater would not permit continued operations within Haiti, the Dominican Republic, and Cuba. If the figure could not be increased, stated the Antilles communication, plans were being made to suspend all operations in Cuba and to reduce expenditures by a reduction in force of

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the geodetic personnel in the other areas. Headquarters, CDC, replied by increasing the planning figure by some \$50,000 and directing that operations would not be discontinued in Cuba without specific instruction from Headquarters, CDC.

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- 402. Rad AD-9246 (S), CG AD to CG CDC, 18 Jul 47. In CDC 322 (Photo Project) (S).
 - 403. Rad C-43201 (C), CG CDC to CG AD, 18 Jul 47. In CDC 322 (Photo Project) (S).

CHAPTER XV

New Procedures Effected

Western Hemisphere Program Outlined

A new document, "Mapping **CHAPTER XV** Mapping Directive, Western Hemisphere", was issued by the War Department on 18 July 1945. This new directive provided and was substituted for the old mapping and charting plans:

- (1) "Mapping Plan, Western Hemisphere", 5 December 1945.
- (2) "Charting Plan, Central and South America (less Mexico and Brazil)", 1 November 1945.
- (3) "Mapping Plan, Brazil", 5 December 1945.
- (4) "Charting Plan, Brazil, 1 November 1945.

The following reasons were advanced by the War Department for the issuance of a new directive:

The original publications of War Department mapping and charting plans of the Western Hemisphere were contained in four separate plans covering various portions of the Western Hemisphere. Each plan varied to some degree, depending upon the particular circumstances in the area concerned as well as the command situation existing at that time. Since the publication of these plans, a relative stability in organization and objectives has been reached which makes it desirable to consolidate the four plans into one. The new plan follows the old one in continuity and has no detrimental effect on agreements concluded with foreign governments, nor does it disrupt operational plans of the commands now in effect.

1. War (S), TAG to CG CDC, 18 Jul 47, sub: Mapping & Charting Directive, Western Hemisphere. In G-3 CDC. See Appendix "B", 171A.

CHAPTER XV

New Procedures Effected

Western Hemisphere Program Outlined

A new document, "Mapping and Charting Directive, Western Hemisphere",
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was issued by the War Department on 15 July 1947. This new directive
rescinded and was substituted for the following mapping and charting plans:

- (1) "Mapping Plan, Western Hemisphere", 5 December 1945.
- (2) "Charting Plan, Central and South America (less Mexico and Brazil)", 1 November 1945.
- (3) "Mapping Plan, Brazil", 5 December 1945.
- (4) "Charting Plan, Brazil, 1 November 1945.

The following reasons were advanced by the War Department for the
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issuance of a new directive:

The original publications of War Department mapping and charting plans of the Western Hemisphere were contained in four separate plans covering various portions of the Western Hemisphere. Each plan varied to some degree, depending upon the particular circumstances in the area concerned as well as the command situation existing at that time. Since the publication of these plans, a relative stability in organization and objectives has been reached which makes it desirable to consolidate the four plans into one. The new plan follows the old ones in continuity and has no detrimental effect on agreements concluded with foreign governments, nor does it disrupt operational plans of the commands now in effect.

404. Ltr (C), TAG to CG CDC, 15 Jul 47, sub: Mapping & Charting Directive, Western Hemisphere. In G-2 CDC. See Appendix "D".

405. Ibid.

One of the greatest variances from past procedures established in the new plan was in the method employed in determining priorities of the various projects. In the past, all priorities of the overall projects had been determined in the War Department. The new directive stated:

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Priorities for mapping and charting projects covered by this directive are not shown. Past experience has proved that priorities alter or change from time to time and that this problem can be handled best by supplemental instructions from the War Department. However, as a general guide for setting up priorities, the Commanding General, Caribbean Defense Command and Alaskan Department, should each place highest priorities on projects within his jurisdiction which are of greatest strategic importance from a defense standpoint. Priorities should be reduced progressively as the radius from such key points increases. It is recognized that this pattern cannot be followed rigidly due to other considerations which apply, such as adverse seasonal weather conditions, diplomatic clearances, map or chart production schedules, etc.

In the "Mapping and Charting Directive, Western Hemisphere", topics relating to assignment of responsibility, duties, and procedure followed much the same pattern as had been detailed in previous directives. Basic responsibility for the overall mapping and charting activities was assigned, in accordance with AR 300-15, 29 November 1946, to the Director of Intelligence, WDGS, Chief of Engineers, and the Commanding General, AAF. Specific responsibility for the accomplishment of aerial photography and the establishment or procurement of ground control data for areas within the Caribbean Defense Command, including Brazil, was assigned directly to the Commanding General, CDC. In support of the accomplishment of the entire

406. Ltr (C), TAG to CG CDC, 15 Jul 47, sub: Mapping & Charting Directive, Western Hemispheres. In G-2 CDC. See Appendix "D".

mapping and charting program, the following responsibilities were assigned:

The CG, AAF, will provide the photographic squadrons required to perform all photography under the directive, and will also provide geodetic control squadrons, as available, to establish geodetic control by airborne methods. (par III A)

The Chief of Engineers will provide all necessary facilities, other than airborne geodetic control units, required to perform the geodetic control survey required, (par III B)

In areas under the responsibility of CG, CDC, engineer and Air Force units will be assigned to his command for operations and administration. (par III C)

The CG, AAF, and Chief of Engineers will furnish such technical and administrative assistance to the photographic and survey units in the Caribbean Defense Command, ...as may be required. Direct liaison between CG, AAF; Chief of Engineers; CG, CDC; ...is authorized for such purposes. (par III F)

The procedure for inclusion of additional minor and major projects in the overall mapping and charting plan remained unchanged, as was the direct use of all existing photography which met Army specifications. In regard to the inclusion in the CDC jurisdiction of aerial photography in

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Brazil, the following instructions were given:

Formerly, mapping and charting of Brazil were the responsibility of the U.S. Army Member (Air), JBUSM, and, during this time, certain commitments were made to that government. It is desired that continuity of the program already established in Brazil be maintained, including recognition of present commitments and maintenance of the rate of mapping and charting heretofore planned. Direct communication between CG, CDC, and the U.S. Army Member (Air), JBUSMC, is authorized for purposes of carrying out the objectives of the directive. (par IV I)

407. Mapping and Charting Directive, Western Hemisphere. In G-2 CDC. See Appendix "D".

408. Ibid.

Certain beach photography was added to the basic aerial photography program. Beach photography would be accomplished, directed the new War Department communication, of strategic coastal areas that were considered suitable for amphibious operations. ⁴⁰⁹ Any such photography already accomplished by the U.S. Navy was considered as meeting the requirements of this directive.

Diplomatic Channels Unchanged

Procedures already established for securing diplomatic agreements with foreign countries concerned remained the same. The initiation of negotiations by the Commanding General, CDC, was subsequently handled through the appropriate Military Attache in all Central and South American countries except Brazil. In Brazil, negotiations would be initiated and all subsequent arrangements made by the U.S. Army Member (Air), JBUSMC. In the negotiations of agreements with the foreign possessions of France, England, and Holland in the Caribbean area, primary agreements with the other countries were to be initiated by the War Department. The Commanding General, CDC, then had to negotiate secondary agreements with the local officials.

The benefits to which each foreign country which consented to execution of the mapping program was entitled were enumerated in detail in "Mapping and Charting Directive, Western Hemisphere."

409. See Notes 76-79, pp 46-47.

These benefits represented an enlargement upon former directives.
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The following statements were made:

Each foreign country which consents to the execution of the mapping directive will be entitled to the following resultant benefits covering the territory of that country:

1. One set of duplicate negatives on topo base film of all accepted trimetrogon photography or two sets of prints thereof.
2. One set of duplicate negatives on topo base film of all accepted vertical photography.
3. One set of plot maps of each type of photography indicating the line of flight and photographic coverage.
5. Two sets of the base compilation sheets for the aeronautical charts at scale of 1:500,000.
6. 200 copies each of the aeronautical charts on a scale of 1:1,000,000 and of the topographic maps of scales of 1:250,000, 1:100,000, and 1:50,000.

Other benefits may be added when required to successfully complete negotiations. These may include permission for observers of the foreign country to participate in flights and receive "on-th-job" training, except pilot training. However, any major benefit, other than those enumerated above or those covered under minor projects ... will be submitted to the War Department for approval.

From the date of the issuance of the "Mapping and Charting Directive, Western Hemisphere", 15 July 1947, to 25 August 1947, most of the effort in Headquarters, CDC, in relation to the aerial photography program was devoted to planning purposes. The two F-9 aircraft remained in Brazil and accomplished photography as weather conditions permitted. The same was true of one F-9 which remained in Chile. All other aircraft actually

410. Mapping and Charting Directive, Western Hemisphere. In G-2 CDC. See Appendix "D" (par VI C).

engaged in photographing processes were returned to Howard Field, C.Z., where they were then stationed. The ground control program of the Inter-American Geodetic Survey organization, under the supervision of the Office of the Chief Engineer, CDC, remains in operation. Geodetic survey parties are presently operating on the ground in the following countries:

- (1) In Central America: Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica. Operations are planned to begin again in Panama within the near future.
- (2) In the Antilles Department: Cuba, Haiti, and the Dominican Republic.
- (3) In South America: Chile.

In addition to the IAGS parties operating in the countries listed above, similar work is being accomplished at present by the 660th Engineer Base Topographic Battalion in the Republic of Panama. Operating in conjunction with and in support of the IAGS personnel are the liaison aircraft of the 161st Liaison Squadron stationed at Albrook Field, C.Z. This squadron has seven aircraft of the L-5 type assigned to it. Four of these aircraft are presently operating in the field. One each is based at the following locations: San Jose, Costa Rica; Guatemala City, Guatemala; Managua, Nicaragua; and Santiago, Chile. One L-5 is used locally for whatever purposes may arise, and two of the aircraft are in hangars at Albrook Field undergoing maintenance.

Dry Season Best for Work

Principal planning at present and during the months of July and

August 1947 had been pointed toward resumption of activities during the next dry season, beginning approximately 1 November 1947. On 20 July, the Commanding General, CAirC, inquired of the Commanding General, AAF, as to the possibility of furnishing by next November the necessary officer and enlisted personnel in order to bring up to 67 percent authorized strength the air units attached to that command for mapping purposes. The reply from the War Department, dated 30 July, was that given to an earlier request; due to overall status of the Caribbean Air Command, attempt to procure the necessary personnel from within the command.

On 22 July 1947, Headquarters, CDC, assigned to the Commanding General, PCD, the important task of extending the geodetic system eastward from Pacora, Republic of Panama, to the Colombian border during the ensuing dry season. In order to accomplish this task, Headquarters, PCD, was urged to bring the 660th Engineer Base Topographic Battalion up to full strength immediately. Added importance was given to project assigned to PCD because of the political significance involved. An inter-American meeting of geodetic officials has been scheduled for Buenos Aires in April 1948, and successful completion of the Panama Project will enhance the prestige of the United States. The Commanding General, CAirC, was also directed to render all aid support to the project as it is worked to conclusion in the difficult terrain existing in the eastern section of Panama.

Colonel Tandy, Chief of Engineer, CDC, in a letter to the Chilean

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411. Rad CAirC-7042 (C), CG CAirC to CG AAF, 20 Jul 47. In CDC 322 Photo Projects (S).
412. Rad W-83066 (C), CG AAF to CG CAirC, 30 Jul 1947. In CDC 322 Photo Project (S).
413. Ltr (R), CG CDC to CG PCD, 22 Jul 47, sub: Mapping, CDC-Panama Project. In CDC 062 Photography - Panama (S).

Minister of Defense in early August outlined the pending geodetic program⁴¹⁴ and expressed optimism generally for its successful completion. He stated:

From Panama northward, reconnaissance for the first arc of triangulation has been completed and monumenting is nearly complete. A connection to the North American Datum is now being effected at Tapachula, Mexico, where American and Mexican technicians have established and are now measuring the base line. The arc of triangulation along the west coast of South America is now under study. I consider this arc of extreme importance to the geodetic world as well as to the countries in which portions of the arc lie. The connection of the systems of triangulation in and about Santiago, Chile, to that existing in the vicinity of Antofagasta is of great importance. If this connection is made and extended to the border of Peru, it can be anticipated that within a very few months the arc of triangulation along the west coast of South America can be considered as fully connected.

Of immediate importance to the geodetic program is the problem, discussed by Colonel Tandy in the above letter, of filling in the various gaps that exist and tying together the bits of geodetic work which have been accomplished in North, South, and Central America.

IAGS Value Seen

The directive published 28 August 1947 for the fiscal year 1948 covering Inter-American Survey operations reasserted the importance of the IAGS program throughout the Western Hemisphere. It summarized the work completed during the preceding year as that "often under most difficult and trying conditions" that "can be considered as outstanding and reflects much credit upon all concerned, particularly those who were engaged in difficult reconnaissance missions."⁴¹⁵ Again the matter of the prestige of the United

414. Pers Ltr, Col F.S. Tandy CDC Engr to Vice Admiral J.A. Rodriguez Ministro de Defensa Nacional, 2 Aug 47. In CDC 062 Photography - Chile (S).
415. Directive for Fiscal Year 1948, IAGS Operations. In File IAGS files.

States was stressed in accomplishing rapidly all work necessary to extend the North American Datum to Panama by connecting with the South American Datum to improve the existing systems of control so that the specifications of the Pan-American Institute of Geography and History, adopted at Caracas, Venezuela, in 1946 could be effected. In order to coordinate all types of the work involved in these missions and in effecting connections between all primary systems of control in South America, a Caribbean Defense Command board of experts in the various types of work involved was established with Colonel Tandy, as president; Lt. Col. R. C. Miller as Mapping Executive; Mr. V. J. Hanrahan as chief geodesist; Lt. Comdr. J. P. Luchene, on loan from the Department of Commerce, USC & GS, as collaborating geodesists; and Mr. Wm. Mussetter as chief reconnaissance engineer. This Board served to develop overall plans for accomplishment

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of detailed missions established by the IAGS.

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Repeated negotiations with Colombia brought about a tacit agreement for her participation in the surveying program. In October 1947 work began, entirely of aerial reconnaissance between Medellin, in the interior 350 miles south of Barranquilla, and Yarumal, about 50 miles northeast of Medellin.

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Agreement with Peru Signed

Agreements with other South American countries took longer to effect.

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416. Directive for Fiscal Year 1948, IAGS Operations. In file IAGS Files.
417. See p. 123.
418. Colombia Reports. In IAGS 062 Colombia Reports.

As late as 15 October 1947 negotiations with Venezuela had not been terminated.
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Although some equipment for personnel of the Inter-American Geodetic Survey was transported in October 1947 to Lima, Peru, for use by geodetic control parties to be sent to that country in the near future, it was 8 November 1947 before the MAPPLAN agreement was finally signed by Major George B. Stevens, for the United States, and Commander Gomboa, for the Peruvian government. Notes of implementation had yet to be exchanged between the Foreign Minister, Peru, and the United States Ambassador.
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Surveying in Panama

By October 1947, in Panama, forty-one stations other than six base points on the Pacific side between Pacora and the Costa Rican border were prepared, cleared, and monumented when necessary, and eleven towers were erected. In the Atlantic net, twenty-nine stations from Chiriqui Lagoon to Colon were laid out and twenty prepared for observation. With the observing of two additional points, the Pacific net, which included three of the original Panama Canal points, and the Atlantic net, which included four of these original Panama Canal points, could be tied in independently. Accordingly, recommendation was made for the preparation of the two stations by the Panama Canal Section of Surveys to allow observation by the 660th Engineer Base Topographic Battalion.
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419. CDC Rad 43605, 15 Oct 47. In CDC Staff Reading file of 15 Oct 47.
420. Rad 105, Lima, Peru to CG CDC, 8 Nov 47. In CDC Staff Reading File of 8 Nov 47.
421. Ltr, IAGS to Chief Engr CDC, 20 Oct 47, sub: MAPPLAN, CDC, Panama Project. In File IAGS 062 Panama Datum Determination.
422. Ibid.

The surveying was not easy in these sections, for heavy rains and rough seas often made progress slow. In the Chiriqui Lagoon region, 2936 man-hours were lost during the June-July 1947 period when a 50 foot launch was beached near Coole del Norte, and one LCM got out of control in the Almirante area and beached. ⁴²³ Informal information records that of the original seventeen row boats assigned the 660th Engineers, only a dozen were in usable condition in November 1947. Native timber towers rotted or were attacked by insects during the wet season and replacements were necessary, and mules of the Pack Company were lost on slippery trails along the ridges of the Pacific. The Battalion remained from fifteen to twenty percent understrength and personnel for the IAGS was slow in being certified for the geodetic work in the Caribbean area. As late as 8 October 1947, eight geodetic engineers and one engineering aide were transferred from the US Coast and Geodetic Survey for work with the IAGS. ⁴²⁴

The Inter-American Geodetic Survey, continued with the Caribbean Command upon the inactivation of the Caribbean Defense Command in March 1948. Although the unit, provided for intables of Distribution 3-5-1025, had to do with all three major services in the theater and constituted a major contribution to the mission of the overall Command, original planning for the new highest command set up failed to clarify its importance as a staff element directly under the Commander in Chief, Caribbean, and, effective 21 July, the unit was relieved from Headquarters, Caribbean Command and

423. Monthly Rpts, Mar-Jul 47. In file IAGS 062 Panama Reports.
424. Rad, WD ENGTI 27934, 8 Oct 47. In file CDC Staff Reading file of 8 Oct 47.

attached to Headquarters, U.S. Army, Caribbean. ⁴²⁵ Retaining its location
and personnel, it was attached to the Engineer Section, Headquarters United
States Army Caribbean on the same day. ⁴²⁶

MAPPLAN an Unfinished Task

Mapplan is still an unfinished task as time permitted for this study runs out. In Cuba and the Antilles, in Central America, and on the Continent of South America the work goes on. Planes. Cameras. Auxiliary Launches and other Craft. Trucks. Specially equipped Jeeps. Theodolites. Tents. Supplies. Instruments for taking shots at the stars. Army Officers. Navy Officers. Enlisted men. Skilled Civilian Technicians. Highly trained Latin American engineer personnel. Native guides. There they are: Working. Waiting out interminable rains in the jungle. Doing their precision tasks. Checking. Rechecking. Waiting for equipment. Repairing equipment under the torrid sun and in the mosquito infested night. Slashing a trail through the jungles. Toiling up slopes with full packs. Sometimes wined and dined. Sometimes an object of suspicion. Sometimes in camp in the wilds with nothing to think about except malaria and coral snakes.

425. Ltr, TAG to CG CDC, 22 Dec 41. In CDC O60 Maps, Charts, Tables - Policy.

426. Note 5, Check slip fr Engr CDC, 14 Jan 42. In CDC O60 Maps, Charts, Tables - Policy.

HEADQUARTERS CARIBBEAN DEFENSE COMMAND
OFFICE OF THE COMMANDING GENERAL

CDC (H) 062

c/o Postmaster, New Orleans, La.
15 April 1946

SUBJECT: Mapping Plan, Caribbean Defense Command. Initial Directive.

TO: Commanding General, Antilles Department, San Juan, Puerto Rico.

Commanding General, Panama Canal Department, Quarry Heights, C. Z.

Commanding General, Sixth Air Force, Albrook Field, C.Z.
(THRU: Commanding General, Panama Canal Department).

1. References:

a. War Department letter AG 322 (25 August 1945) OB-I-E-M, dated 5 December 1945, SUBJECT: "Mapping Plan, Western Hemisphere".

b. War Department letter AG 322 (15 August 1945) OB-I-E-M, dated 1 November 1945, SUBJECT: "Photographic Projects in South America, Central America and the Caribbean (less Mexico and Brazil)".

c. War Department letter AG 061 (23 August 1945) OB-S-E-M, dated 24 August 1945, SUBJECT: "Establishment of a centralized File of Topographic Maps and Topographic Map Information (JCS 1466)".

d. Army Regulations No. 300-15, "Mapping and Charting". FM 30-20, "Military Maps". FM 30-21, "Aerial Photography, Military Applications". AAF Regulation No. 95-6, "Photography, Maps and Charts". AAF Regulation No. 95-7, "Photography, Maps and Charts".

2. Designation of Plan. The "Mapping Plan, Caribbean Defense Command" (Abbreviated to MAPPLAN, CDC) will comprise those portions of the "Mapping Plan, Western Hemisphere" assigned to this command for execution. Geodetic survey operations required for the accomplishment of the MAPPLAN, CDC will be executed under the name "Inter American Geodetic Survey" (abbreviated to "IAGS").

3. Purpose. The purpose of the MAPPLAN, CDC is to:

a. Implement War Department directives and to coordinate all aerial mapping and charting photography, geodetic surveys and related activities in the Caribbean Defense Command.

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- b. Assign responsibilities for the supervision, planning and execution of mapping projects.
- c. Coordinate in so far as is practical United States mapping projects with those of foreign governments and other United States agencies.
- d. Insure the efficient accomplishment of all mapping projects by preventing duplication of effort and unauthorized aerial photography, geodetic surveys, map compilations and reproduction.

4. Nations and Jurisdictions Included in the MAPPLAN, CDC.
Except Mexico and Brazil, all nations and jurisdictions in Central and South America, including the Bahama Islands, the islands of the Greater Antilles, the islands of the Lesser Antilles, the Galapagos Islands and the Falkland Islands are included in the MAPPLAN, CDC.

5. Policies.

- a. The MAPPLAN, CDC supersedes all mapping directives previously issued by the War Department and this headquarters, or by any of its subordinate agencies.
- b. The ability of the Caribbean Defense Command to meet commitments promptly shall determine the basis upon which negotiations for entry shall be conducted.
- c. Except in United States possessions and in Panama, the military aspects of the MAPPLAN, CDC will be minimized.
- d. United States equipment and civilian and military personnel will be employed to accomplish only those portions of the MAPPLAN, CDC which are beyond the capabilities of the foreign government concerned. The operations undertaken will not compete in a specific manner with current or projected operations of private companies engaged in similar surveys. As a gesture of good will and understanding, United States personnel may undertake the instruction of foreign personnel whenever it is found desirable and practicable to do so.
- e. To prevent duplication of effort and to provide for the greatest amount of mutual assistance, coordination with U. S. Navy Hydrographic Office charting programs is directed.
- f. Aerial photographic and geodetic survey missions will be coordinated prior to the commencement of operations and will be

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executed in accordance with operational directives issued by this headquarters. Charting and mapping projects will be established and executed as integral parts of a general mapping and charting plan for each nation.

g. A civilian geodetic survey organization will be established under the Chief Engineer, Caribbean Defense Command for the purposes of:

- (1) Planning and supervising the execution of precise geodetic survey operations.
- (2) Securing geodetic data and analyzing and evaluating geodetic systems.
- (3) Preparing overall plans and specifications for the integration of existing geodetic survey systems.
- (4) Cooperating with and assisting foreign civilian and military geodetic survey personnel.
- (5) Assisting by the execution of precise survey operations which are beyond the capabilities of subordinate agencies or foreign governments.

h. A mapping and survey subsection composed principally of expert civilian geodetic survey personnel will be established in each Department Engineer's office under a mapping executive to provide for continuity and other purposes.

i. Direct liaison on technical matters is authorized.

6. Implementation of the MAPPLAN, CDC. The MAPPLAN, CDC will be implemented immediately. As soon as diplomatic arrangements have been completed and operational directives have been issued by this headquarters:

a. The nations and jurisdictions indicated in Inclosure No. 1 as having first and second mapping photographic priorities will be entered immediately for the purpose of accomplishing aerial mapping photography.

b. The nations and jurisdictions have first geodetic survey priorities will be entered immediately for the purpose of accomplishing required additional geodetic surveys.

c. The nations and jurisdictions indicated as having second geodetic survey priorities will be entered immediately with a limited

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number of supervisory military and expert civilian geodetic personnel operating directly under this headquarters, or under the Headquarters, Antilles Department in the case of Area "S", for the purposes of establishing liaison, collecting geodetic data, effecting reconnaissance, executing incidental precise geodetic surveys when such surveys are beyond the capabilities of the country concerned, and coordinating in so far as is practical the current and future mapping programs of the various countries with the MAPPLAN, CDC.

d. Additional entries will be made upon receipt of operational directives issued by this headquarters.

7. Diplomatic Negotiations.

a. The initiation of formal diplomatic arrangements thru the appropriate Military Attaches for the entry of United States military and civilian personnel into the various nations and political jurisdictions included in the MAPPLAN, CDC, is the responsibility of this headquarters.

b. Responsibility for the initiation of diplomatic arrangements for entry into the nations and jurisdictions included in Area "S" is delegated to the Commanding General, Antilles Department.

c. The Assistant Chief of Staff, G-2, the Reconnaissance Officer and the Chief Engineer, Caribbean Defense Command, are authorized to establish liaison with Military Attaches. Liaison with Military Attaches accredited to countries included in Area "S" will be established by the Commanding General, Antilles Department. Other personnel will establish liaison with Military Attaches only upon specific directives issued by this headquarters.

8. Direct Correspondence. Direct correspondence by subordinate agencies with the War Department or its agencies, Military Attaches, United States diplomatic representatives or foreign governments on matters pertaining to the MAPPLAN, CDC is prohibited; except, that the Commanding General, Antilles Department is authorized to effect direct correspondence with foreign governments included in Area "S" and with the Military Attaches and United States diplomatic representatives concerned. All correspondence received from Military Attaches, foreign governments and other sources relating to major or minor mapping projects or specific aerial photography will be referred to this headquarters for action. The receipt of such correspondence will be acknowledged promptly and the agency originating the correspondence will be informed to correspond directly with this headquarters.

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9. Implementing Agreements. Before the Military Attache concerned is requested to make necessary diplomatic agreements to permit the accomplishment of aerial mapping photography and geodetic survey projects required under the MAPPLAN, CDC the Assistant Chief of Staff, G-2, assisted by the Reconnaissance Officer and the Chief Engineer will prepare an outline of the agreement desired. The tentative agreements for nations and jurisdictions included in Area "S" will be submitted by the Commanding General, Antilles Department to this headquarters for approval prior to submitting them to the Military Attache concerned. After the Assistant Chief of Staff, G-2, has made preliminary arrangements, the Reconnaissance Officer and the Chief Engineer acting jointly will establish liaison with the Military Attache concerned and will consult with him regarding the aerial photography and geodetic survey missions to be undertaken by United States agencies and the reciprocal arrangements desired. The Military Attache will be furnished maps in multiple copies covering the photographic and survey projects to be undertaken by the United States agencies, together with a statement regarding personnel to enter the country, dates of entry, equipment to be employed, technical procedures to be followed and other appropriate information. The tentative agreements drawn up will include as maximum commitments on the part of the United States provisions to furnish:

- a. One set of duplicate negatives on topographic base film.
- b. One set of duplicate plot maps (photo coverage maps).
- c. Duplicate copies of reduced geodetic control data, computations and plot maps.
- d. Other materials or data approved by the War Department.

10. Projects.

a. As prescribed in Army Regulations 300-15, a general mapping project and projects for each nation and political jurisdiction will be set up by this headquarters for the entire area of responsibility of the Caribbean Defense Command. Recommendations for mapping projects to be set up for each nation and separate political jurisdiction included in Area "S" will be submitted to this headquarters by the Commanding General, Antilles Department. Subprojects will be set up for individual islands, groups of islands or portions of the various nations and jurisdictions when required.

b. Each project will be designated by the name of the nation and subprojects thereof will be designated by the physical feature

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involved. For example, a mapping project for the Galapagos Islands would be designated as follows: MAPPLAN, CDC. ECUADOR PROJECT, GALAPAGOS ISLANDS SUBPROJECT.

c. Recommendations and requests for mapping projects or subprojects other than those included in the MAPPLAN, CDC will be submitted separately to this headquarters for action.

d. Incomplete topographic mapping projects previously undertaken by subordinate agencies which are in conflict with the provisions of this directive will be terminated immediately.

11. Compilation of Maps. The War Department is responsible for the compilation of all maps to be compiled from the aerial mapping photography and geodetic surveys accomplished under the MAPPLAN, CDC. When compilation for specific mapping projects is authorized by this headquarters, necessary compilation prints and multiplex diapositives will be prepared immediately and the original negatives forwarded as prescribed.

12. Existing Photography and Geodetic Data. All existing aerial photography and geodetic survey data including major survey data suitable for mapping purposes by photogrammetric means which has not yet been processed in accordance with the references cited in paragraph 1. above will be processed and delivered immediately to this headquarters for inspection, record purposes and forwarding.

13. Priorities.

a. General. Priorities indicated in the "Mapping Plan, Western Hemisphere" will be followed unless deviations therefrom are specifically authorized by this headquarters. In the assignment of priorities for the accomplishment of aerial photographic and geodetic surveys, primary consideration will be given to those areas of greatest strategic importance to the defense of the Panama Canal.

b. Photographic Projects. Priorities for the accomplishment of mapping photography are indicated in Inclosure No. 1.

c. Geodetic Survey Projects. Priorities for the accomplishment of geodetic surveys are indicated also in Inclosure No. 1.

d. Priorities for the accomplishment of aerial photography for charting and mapping purposes will be coordinated by this headquarters.

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14. Specifications.

a. Mapping Photography. All mapping photography will meet the specifications set forth in the quoted references. When exceptional difficulty is experienced in executing aerial photographic missions in exact accordance with the established specifications, the Chief Engineer, Caribbean Defense Command will be advised and consulted. Prior to revising aerial mapping specifications, the Chief Engineer, Caribbean Defense Command will consult with the Chief of Engineers.

b. Geodetic Surveys. Geodetic surveys will be accomplished in accordance with the quoted references and the procedures and specifications set forth in the publications of the United States Coast and Geodetic Survey.

15. Plans.

a. This headquarters will prepare overall plans for the execution of all projects of the MAPPLAN, CDC. The Chief Engineer, Caribbean Defense Command in coordination with Reconnaissance Officer will prepare immediately flight line plans for each project or sub-project included in the first and second mapping photographic priorities and will initiate the Inter American Geodetic Survey. Subordinate agencies will prepare detailed plans when and as directed for the execution of specific projects assigned to them.

b. The Commanding General, Sixth Air Force will submit plans immediately for the accomplishment of mapping photography in the nations and jurisdictions included in the first and second mapping photographic priorities. Coordination with assigned charting photographic missions and the geodetic survey missions to be accomplished by other subordinate agencies of this command will be indicated.

c. The Commanding General, Panama Canal Department will submit plans immediately for the accomplishment of second and third order geodetic surveys and picture point control surveys in Panama. Coordination with the Inter American Geodetic Survey will be indicated.

d. The Commanding General, Antilles Department will submit plans immediately for the accomplishment of second and third order geodetic surveys and picture point control surveys in the nations and jurisdictions in Area "S" having first geodetic survey priorities. Coordination with SHORAN Projects will be indicated.

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16. Supply Projects.

a. In accordance with the provisions of War Department Circular No. 5, dated 7 Jan 1946, an overall supply project, Caribbean Defense Command Operational Project No. 46-1-Op, and required initial requisitions for geodetic surveys both based upon the Engineer topographic and supporting troops indicated in paragraph 18.b. below, has been prepared by this headquarters. The Commanding Generals, Panama Canal and Antilles Departments will submit through this headquarters revised initial requisitions based upon this project and generally upon the Engineer and supporting units indicated as to be reattached. Requisitions for equipment in excess of the quantities indicated in the operational supply project as allocated to each Department upon the basis of reattached units will be submitted to this headquarters for review and action.

b. An additional supply project for the accomplishment of aerial mapping photography will be prepared by the Commanding General, Sixth Air Force. This project will be based on the elements of the 311th Reconnaissance Wing to be attached to this headquarters. Requisitions for Army Air Force units will be submitted through normal channels.

17. Base Reproduction Plants.

a. The Engineer reproduction plant located at Corozal, Canal Zone is designated the Base Reproduction Plant for the Caribbean Defense Command and will continue to operate under the control of the Commanding General, Panama Canal Department. The reproduction plant located at San Juan, Puerto Rico will operate as an auxiliary base reproduction plant under control of the Commanding General, Antilles Department. Both plants will be utilized to supplement the reproduction of standard and provisional maps and charts needed for the MAPPLAN, CDC and current operations or training; and, for the development of methods and equipment suitable for the reproduction of maps in the Caribbean Defense Command. The reproduction of such provisional maps, plot maps and other data needed for the accomplishment of the MAPPLAN, CDC will be given high priority.

b. Department Commanders are authorized to utilize the Engineer base reproduction plants to effect other reproduction after required funds for such reproduction have been made available from other than mapping and map reproduction funds; provided, that such reproduction does not interfere with map reproduction missions.

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c. All reproduction will be accomplished under a system of approved work orders.

18. Attached Units.

a. Army Air Force Units. Photomapping and geodetic units of the 311th Reconnaissance Wing attached to this command by the Commanding General, Army Air Force will be re-attached to the Sixth Air Force for general supervision of training, administration, supply, maintenance, quartering and operational control. The Commanding General, Sixth Air Force operating under directives issued by this headquarters will be responsible for the accomplishment of all aerial mapping photography and necessary reproduction and transmittal of films, plot maps and other required data. All attached aircraft of the 311th Reconnaissance Wing and any other aircraft of units made available to this command suitable for mapping photography will be employed exclusively on aerial mapping or charting projects unless released from these designated primary missions by this headquarters. Photomapping operations will be accomplished in strict accordance with photomapping operational directives issued by this headquarters. The War Department has indicated that the 91st Reconnaissance Squadron (Long Range), two flights of the 16th Photographic Squadron and two flights of the 7th Geodetic Squadron (SHORAN) will be made available for mapping and charting purposes.

b. Engineer Topographic Units. The War Department has been requested to attach to the Caribbean Defense Command over and above present and future authorized troop bases the following Engineer topographic and supporting troops (less personnel):

| Unit Name | T/O&E | Off | Strength | |
|---|--------------------------|-----|----------|----|
| | Number | | WO | EM |
| 1 Headquarters and Headquarters Company, Engineer Base Topographic Battalion. (To be re-attached to PCD) | 5 - 186 (29 Dec 1943) | 7 | 2 | 75 |
| 1 Lithographic Platoon, Engineer Base Reproduction Company, Engineer Base Topographic Battalion. (To be re-attached to PCD) | 5 - 187 | 1 | 0 | 47 |

CDC (H) 062 Ltr dtd 15 Apr 46, Subj: "Mapping Plan, Caribbean Defense Command. Initial Directive".

| Unit Name | T/O&E Number | Off | Strength | |
|---|----------------------------|-----|----------|------|
| | | | WO | EM |
| 3 Engineer Base Survey Companies, Engineer Base Topographic Battalion. (2 companies to be re-attached to PCD) (1 company to be re-attached to AD) | 5 - 188 (29 Dec 1943) | 18 | 0 | 660 |
| 1 Mapping Platoon, Engineer Base Photomapping Company, Engineer Base Topographic Battalion. (To be re-attached to PCD) | 5 - 189 (29 Dec 1943) | 2 | 0 | 79 |
| 1 Communication Section, Engineer Boat Company. (To be re-attached to PCD) | 5 - 175S (7 Apr 1944) | 1 | 0 | 20 |
| 1 Boat Platoon, Engineer, Boat Company. To be re-attached to PCD) | 5 - 175S (7 Apr 1944) | 2 | 0 | 83 |
| 1 Quartermaster Pack Troop (Company less two (2) platoons) (To be re-attached to PCD) | 10 - 118 (26 Sept 1944) | 2 | 0 | 45 |
| Total attachments requested for PCD | | 27 | 2 | 789 |
| Total attachments requested for AD | | 6 | 0 | 220 |
| Total attachments requested for CDC | | 33 | 2 | 1009 |

Engineer topographic and supporting units attached to this command for the accomplishment of geodetic survey operations will be re-attached to subordinate agencies of this command for administration, supply, maintenance, quartering and operational control.

c. Manning. The manning of attached units will be given high priority by the Commanding General concerned. Qualified personnel available within this command in excess of urgent current needs will be transferred into the various units in order to provide for their early activation and manning. Subsequently, replacements shipped to this command will be screened to secure additional qualified

CDC (H) 062 Ltr dtd 15 Apr 46, Subj: "Mapping Plan, Caribbean Defense Command. Initial Directive".

personnel. It is desired to have the units brought to their authorized strengths and to be equipped and trained as rapidly as possible. Requisitions for personnel to man attached Army Air Force, Engineer and supporting units will be submitted in the usual manner. Department Commanders will be prepared to furnish other troops to assist the survey personnel when necessary or directed.

d. Aerial Logistical Support During Field Operations. In addition to the supporting Army Air Force units, the Commanding General, Sixth Air Force will be prepared to provide logistical support of attached Engineer topographic and supporting units when necessary during the accomplishment of geodetic reconnaissance or survey missions.

e. Requests for Attachment of Units. All requests for the re-attachment of Army Air Corps photomapping and geodetic control units and Engineer topographic and supporting units needed for the execution of the MAPPLAN, CDC will be submitted to this headquarters for action.

f. Deviation from Primary Missions. The activities of attached Army Air Force photomapping and geodetic units and attached Engineer topographic and supporting units will be devoted exclusively to the accomplishment of or training in preparation for missions under the MAPPLAN, CDC (or CHARTPLAN, CDC).

19. Responsibilities of Staff Officers, Caribbean Defense Command.

a. The responsibilities of the Assistant Chiefs of Staff, G-2 and G-3, the Chief Engineer and the Reconnaissance Officer, Caribbean Defense Command in connection with the accomplishment of the MAPPLAN, CDC are outlined in Inclosure No. 2 attached.

b. Correspondence relating to the MAPPLAN, CDC will be addressed to the Commanding General, Caribbean Defense Command (Attention: (Staff Officer directly concerned)). Under the word "Subject": reference will be made to the MAPPLAN, CDC, the project, the sub-project if any, and the subject matter to be discussed. For example; correspondence relating to diplomatic arrangements for a geodetic survey of the Galapagos Islands would be addressed and titled as follows:

CDC (H) 062 Ltr dtd 15 Apr 46, Subj: "Mapping Plan, Caribbean Defense Command. Initial Directive".

SUBJECT: MAPPLAN, CDC. Ecuador Project,
Galapagos Subproject. Diplomatic arrangements
for Geodetic Survey.

TO: COMMANDING GENERAL, CARIBBEAN DEFENSE COMMAND
c/o Postmaster
New Orleans, Louisiana
(ATTENTION: Assistant Chief of Staff, G-2).

BY COMMAND LIEUTENANT GENERAL CRITTENBERGER:

/s/ G. M. Freeman
G. M. FREEMAN
Maj, AGD
Asst AG

2 Inclosures

Incl 1 - Priorities for Aerial
Mapping Photography.

Incl 2 - Memo, CDC (H) 062,
dtd 15 Apr 46,
Subj: Mapping Plan, CDC,
Responsibilities of
Staff officers.

APPENDIX V

MILITARY SURVEY OF PANAMA

(Delete)

APPENDIX VI

MAPPING PROJECTS, MAPPLAN, CDC

(Delete)

APPENDIX VII

IAGS PERSONNEL RESPONSIBLE FOR MAPPLAN, CDC, OPERATIONS

IAGS PERSONNEL RESPONSIBLE FOR MAPPLAN, CDC,* OPERATIONS

| | |
|------------------------------|---|
| Tandy, Colonel Fremont S. | Chief Engineer, CDC |
| Miller, Lt. Colonel R. C. | Mapping Executive, IAGS |
| Wallace, Major Ricardo F. | Assistant Mapping Executive, IAGS |
| | |
| Lushene, Lt. Commander J. P. | USC&GS Collaborator |
| Bose, Lt. Commander J. C. | USC&GS Collaborator |
| Doran, Lt. Commander P. C. | USC&GS Collaborator |
| | |
| Hanrahan, V. J. | Chief Geodesist |
| Mussetter, William | Chief Reconnaissance Engineer |
| FRANGIONI, RALPH K. | GEODESIST |
| | |
| Hansston, Lt. Colonel K. | Administrative Officer, Venezuela |
| Dantzler, Major E. A. | Administrative Officer, Colombia |
| Hart, Major H. L. | Administrative Officer, Chile |
| Rochford, Major A. B. | Administrative Officer, Ecuador |
| Stevens, Major G. B. | Administrative Officer, Peru |
| Stilmant, Major B. | Administrative Officer, Guatemala, El Salvador, Honduras |
| Acrivos, 1st Lt. H. M. | Administrative Officer, Costa Rica, Nicaragua |

Civilian Geodetic Engineers Responsible for Technical Operations:

Bendixen, A. C. Chile

* Conv, Capt. M.L. Evans Hist O CDC with Major Wallace, 26 Nov 47.

Fasset, R. E.
Galtz, Peter
Geo, D. J.
Kulhan, E. F.
Martin, P. R.
Ocel, F. N.
Rabito, Feliz. J.

- Colombia
Costa Rica
Nicaragua
Guatemala, Honduras
El Salvador
Ecuador
Peru

APPENDIX VIII

MAPS PREPARED BY FCD

MAPS PREPARED BY THE PANAMA CANAL DEPARTMENT

a. Quadrangle Sheets (1:62,500)

| <u>NAME</u> | <u>DATE</u> |
|---------------------------------|-------------|
| Colon | |
| Gamboa | 1942 |
| Balboa | 1944 |
| Picacho | 1938 |
| Majagual | 1944 |
| Sixaola (Black only - drainage) | 1944 |
| Sipurio (Black only - drainage) | 1944 |

b. Terrain Sheets (1:20,000)

| <u>SHEET NO.</u> | <u>DATE</u> |
|-----------------------------|------------------|
| 14 | |
| 16 | 1940 |
| 17 | 1943 |
| 44 | 1943 |
| 34 | 1944 |
| 65 | 1944 |
| 66 | 1943 |
| 82 | 1943 |
| 84 | 1943 |
| 89 | 1943 |
| 122 | 1943 |
| 132 (Black only) | 1943 (overprint) |
| 133 (Black only) | |
| 134 (Black only) | 1941 |
| 163 | |
| 316 | 1943 |
| 317 | 1943 |
| 393 | 1943 |
| 394 | 1943 |
| 399 | 1943 |
| 402 | 1943 |
| 404 | 1943 |
| 405 | 1943 |
| 406 | 1943 |
| 407 | 1943 |
| 408 | 1943 |
| 409 | 1943 |
| 491 | 1944 |
| 494 | 1944 |
| 495 | 1944 |
| 496 | 1944 |
| 497 | 1944 |
| 498 | 1944 |
| 499 | 1944 |
| 643 (Black only - drainage) | 1944 |
| 644 (Black only - drainage) | 1944 |

c. Special Maps.

NAME

Corozal and Vicinity (1:20,000)
Seymour Is., Galapagos Is.,
(1:20,000)

DATE
1943

Porto Bello Trail, Sec. 1,
(1:20,000)

1943

Porto Bello Trail, Sec. 2,
(1:20,000)

AWS Gridded Map

Republic of Panama w/AWS Grid,
(1:1,500,000)

1942

Road & Mileage Map, CZ & Vicinity
Uraba Prefecture, Colombia
(1:300,000)

1940

1943

Pacific Approaches to Panama
Canal, (1:125,000)

1943

Atlantic Approaches to Panama
Republic of Panama, (1:500,000)

1936

1936

w/2 color overprint showing
AWS Grid and airfields

Index Map - Military Survey of
Panama (1:500,000)

1943 (Nov.)

1943 (Nov.)

(Source: 1st Ind, Dept Engr to CG PCD, 1 Nov 44 on Ltr, O Chief of
Engrs to Engr PCD, 2 Oct 44, sub: Maps Prepared by The Panama Canal
Department. In file Engr file 061 Maps & Mosaics 1944 in files of
Department Engineer).

MAPS ON FILE AT OFFICE, CHIEF OF ENGINEERS
Scale 1:62,500

NAME

Portobello
Palenque
Pina
Colon
Requeni
Upper Chagres (Preliminary Drainage Sheet)
Indio
Lake
Gamboa
Pacora
Chepo
Ciri
Chorrera
Balboa
Chepillo
Penonome
Picacho
Chame
Otoque
Calobre (Black & White)
Nata
Anton
Majagual
Santiago
Aguadulce
Parita
Ocu (Black & White)
Pese
Chitre
Mensabe
Macaracas
Estibana
Canazas (B&W Drainage Sheet)

EDITION DATE

ERP 1929
PCD 1941
PCD 1941
ERP 1929
PCD 1943
PCD 1942
PCD 1941
ERP 1936
ERP 1938
ERP 1929
ERP 1933
PCD 1942
ERP 1940
ERP 1928
ERP 1928
ERP 1940
ERP 1940
ERP 1936
ERP 1929
PCD 1942
ERP 1940
ERP 1940
ERP 1940
ERP 1940
ERP 1940
ERP 1940
PCD 1941
PCD 1941
PCD 1940
PCD 1941
PCD 1941
PCD 1939
PCD 1942
PCD 1942

Scale 1:20,000

SHEET NO.

EDITION DATE

SHEET NO.

EDITION DATE

| | | | | | |
|----|-----|------|----|-----|------|
| 13 | ERP | 1927 | 38 | ERP | 1938 |
| 14 | ERP | 1929 | 39 | ERP | 1930 |
| 15 | PCD | 1943 | 41 | PCD | 1939 |
| 16 | ERP | 1927 | 42 | PCD | 1940 |
| 17 | ERP | 1928 | 43 | PCD | 1943 |
| 18 | PCD | 1943 | 44 | PCD | 1941 |
| 19 | ERP | 1929 | 45 | PCD | 1943 |

APPENDIX

V. Preparation and Storage of Maps

However important in the mapping responsibility of the Command the reconnaissance, geodetic surveying, and photography of large areas, the preparation and reproduction of all types of graphic data constituted a large part of the mission of the mapping personnel. Storage and supply of maps of all sorts took a measure of the efforts of the mapping program in the various Departments. Early in the War, the War Department took precautionary measures to insure the maintenance by theaters and using units of such maps and charts as would aid in their mission by requiring that a limited supply of maps of military value be maintained in the Command and its Sector headquarters.¹ As a precautionary measure against the destruction of map stocks, manuscripts, and lithographic plates, reproduction facilities of the Command and its major commands were required to submit to the Chief of Engineers color pulls of all standard maps produced locally. In order to assure adequate storage of this requirement retained in the Command, the Department Engineer, Panama Canal Department, was requested to make arrangements for the storage of the material assigned to the Command in addition to that for use of the personnel of the Department.²

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1. Ltr, TAG to CG CDC, 22 Dec 41. In CDC 060 Maps, Charts, Tables - Policy.
 2. Note 5, Ck/S fr Engr CDC, 14 Jan 42. In CDC 060 Maps, Charts, Tables - Policy.

Requests came from various units and agencies within the Command for maps showing boundaries of sites. On receipt of an inspection report from the Land Lease Board in reference to defense sites obtained from foreign countries, the Engineer, Panama Division, was authorized to survey and prepare the map of the site in question. Such maps were prepared in duplicate for distribution to the requesting agency. Post Map Books, furnished PCD in duplicate, were prepared and maintained by the Engineer personnel.

Within the first year of the war, the policy concerning these maps and tracings was established under the Intelligence Division. Initial distribution from the War Department of two copies of maps of areas within the Caribbean Theater were being sent to the Intelligence Divisions of the major commands as well as copies of maps of general interest and flight maps of adjacent areas. Each headquarters was required to maintain storage of those received and on receipt of instructions from the G-2, CDC, was to classify those maps to be reserved for War Reserve, current use, and distribution to lower echelons. A General Staff Collection of two copies of each map received was to be maintained in the headquarters of the Departments and the Caribbean Air Force. Strict surveillance of the War Reserve files of the several headquarters was maintained and their usage was reported to the G-2 Section, CDC, promptly. Reproduction of any

3. Ltr, Hq Engr Serv CDC, 5 Jan 43, sub: ESECDC Ful #16 "Real Estate". In file CDC Engr Bulletins, 1942-43.
4. Ltr, Hq CDC to CG PCD, PRD, TBC, CAF, 14 Oct 41, sub: Maps, War Reserve Maps, and Tracings. In file DERP War Reserve Vault file.

maps required was authorized in the Engineering Reproduction Plants in Panama and Puerto Rico for all the major commands.

Although the Corps of Engineers had been assigned the function of storage and distribution of maps pertinent to the prosecution of the war effort in 1942, the G-2 Section, CDC, had continued this performance. Early in March 1943 the Division Engineer undertook this responsibility and placed the Chief of the Maintenance District directly responsible for the proper storage and distribution of all war reserve and other maps. Permission was given to contact direct any other sections and districts for assistance or other matters pertaining to this responsibility. The maps were continued to be maintained in the vaults at the Post of Corozal. No definite policy for the maintenance was developed until 1945 when the Department Engineer Reproduction Plant to which this function had been assigned by the Division Maintenance Office suggested a method of streamlining the war reserve vaults. Storage space was critical, and the disposition of those maps used most infrequently which were taking up much needed space appeared mandatory. Capt. Allan Friedman, then in charge of the Plant, suggested a six-fold policy to include:

1. Retention in the files of fifty copies of all Terrain Sheets of CDC areas.
2. Retention in files of ten copies of all photo maps of CDC areas.
3. Retention of all National Geographic Maps for Staff and orientation use.

5. Ltr. Hq Engr Serv CDC, 5 Mar 43, sub: Responsibility for Storage and Distribution of Maps, CDC. In file Dept Engr file 061 Maps & Masaics 1943.

4. Retention of ten copies of all Air Navigation Charts, the remainder in file to be transferred to the Sixth Air Force.
5. Retention in files of ten copies of all city plans of South America, the remainder to be burned.
6. Destruction of all film positives and negatives which duplicated maps in file or were too large for publication.

The Engineer Reproduction Plant was made the office of record for the
 6
 issuance of all maps late in 1944 when permission was given to contact
 direct this organization for map requirements. The policy making action
 was reserved by the Department Engineer, as well as direct communication
 with the Chief of the Army Map Service.

In addition to the supply of maps furnished by the War Department
 and those produced from mapping efforts of the Eleventh Engineers, the
 Reproduction Plant, PCD, continued compiling tactical and terrain sheets
 and the special maps required under the Military Survey of Panama. In
 the one year period from September 1943 to August 1944 twenty-five new
 tactical and terrain sheets were published, twenty in five color edition
 7
 and the remainder in black only. Seventeen tactical and terrain sheets
 were redrawn with new data and six were republished with other revisions.
 A four color edition of a road and mileage map of the Canal Zone and
 vicinity and a map each of Uraba, District of Colombia, Republic of
 Panama, and of Seymour Island of the Galapagos Group were published.
 One eleven section map of the republic of Panama and one three section

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6. Ck/S, Dept Engr to OIC Engr RP, 29 Nov 44, sub: Responsibilities for Issuance of Maps. In file Dept Engr file 061 Maps & Mosaics 1944.
 7. Rpt of DERP Activities 1 Sep 43 - 31 Aug 44. In file DERP, Corozal.

map of the entire Republic were redrawn with new data. Revision of the index Map of the Military Survey of Panama and a five color map of Corozal and Vicinity were made. Multiplex production of seventeen terrain sheets and a three part map of San Jose Island of the Perlas Group was accomplished. Some of the other special maps reproduced by the Plant included AWS gridded maps, Panama and Its Relation to the World, the Caribbean Area, road maps of the Republic and Canal Zone, off-limits prints of both terminal cities of the Republic, certain posts and civilian areas, and the approaches to the Canal. An average level of stock of from 500 to 1,000 of each map produced was maintained. The plant issued and distributed 40,942 maps within the period, 3,045 Quadrangel sheets, scale 1:62,500; 12,955 Terrain sheets, scale 1:20,000; and 24,942 special maps.

The Puerto Rican Department had no topographic units in 1941 and the personnel of the Reproduction and Drafting Section of the Department Engineer's Office was not trained in laying a controlled mosaic. Dependence was placed on the 27th Reconnaissance Squadron, Borinquen Field, for such assemblage and on the 27th Engineer Battalion (C) for necessary second, third, and fourth order triangulation. No facilities for the assembling of controlled mosaics were available within the Department.

Within the Trinidad Base Command only one photostat machine and one blueprint machine were available for reproduction facilities during the

8. Rpt of DERP Activities 1 Sep 43 - 31 Aug 44. In file DERP, Corozal.
9. Ltr, PCD to TAG, 2 Apr 41, sub; Map Reproduction Facilities in Puerto Rico. In file CDC-S 060 Maps, Charts, Tables, Mar 41 - Dec 43.
10. Ibid.

mapmaking impetus.

Although no geodetic surveys or triangulations had been undertaken
 in the Antilles Department,¹² maps were produced from aerial photographic
 surveys of large areas and from layout drawings of transportation facilities
 and location of installations. These maps were, in the main, reproductions
 of quadrangles from black color pulls or photostats furnished by the United
 States Geodetic Survey.¹³ Some reconnaissance by the 78th Engineers and a
 representative of the Department resulted in the publication of road maps
 of Puerto Rico, Antigua, Island of St. Barthelemy, St. Eustatius, and
 St. Martins, and a city map of San Juan. Uncontrolled mosaics, photographed
 by units of the Air Forces, were published of the important installations
 and many of the islands within the Department.¹⁴

In conforming to the closely supervised program of the Office of the
 Chief of Engineers, exercised through the Army Map Service, Washington,
 the Panama Canal Department raised the problem of proper interpretation
 of the grid systems in common use. The Panama Grid System for military
 maps was established by the Engineering Reproduction Plant, Washington
 Barracks, Washington, to include the areas from 8°15' to 9°40' North
 Latitude and 79° to 81° West Latitude, using the 81°00' meridian as the

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11. Rad, TBC to CG CDC, 28 Jun 41. In file CDC 060 Maps, Charts, Tables, Mar 41 Dec 43.
 12. 2d Ind, AntD to CG CDC, 6 Sep 45, sub: Collection of Maps and Map Information on Ltr, TAG to CG CDC, 24 Jul 45. In file CDC 060 Maps, Charts, Tables (Policy).
 13. Ibid.
 14. Ibid.

15

central meridian. This meridian, fortunately, coincided with the central meridian of the "B" Zone Band I, US Grid System.

16

However, contemplation of a mapping program below the equator gave rise to the determination of a grid system to be used in this extended area. The Chief of Engineer's office was queried on the question, being asked to determine whether the Panama Grid should be abandoned and replaced by either the US Grid or the

17

World Polyconic Grid, by the manipulation of the "y" value in inverting the US system, increasing the "y" value toward the South Pole, or using a static "y" value of 10,000,000-Y in the World Polyconic Grid. The

Military Intelligence Division, Office of the Chief of Engineers, recommended the use of the World Polyconic Grid instead of the Panama grid in these areas, a separate drawing being prepared for each grid layout in preparation of a revision of the grid systems affecting this area.

18

The Department Engineer adopted the suggestion, superimposing the World Polyconic Grid on sheets already drafted with the Panama Grid System.

19

The continual pressure for equipment was lessened in the summer of 1945 when renewed interest by the Army Map Service in the growing mapping program of the Command resulted in an immediate shipment of Zip-a-tones to facilitate the conformance to specifications suggested by the Reproduction Plant, Panama Canal Department, in the showing of required symbols

-
- 15. Ltr, Col Frank C. Carey, Dept Engr PCD to Col A.G. Matthews, Chief MID, Office CofEngrs, 18 Jun 45. In Dept Engr 061 Maps 1945.
 - 16. Ibid.
 - 17. Ibid.
 - 18. Ltr, Col A.G. Matthews Office CofEngrs to Col Frank C. Carey, Dept Engr PCD, 10 Jul 45. In Dept Engr 061 Maps 1945.
 - 19. Ltr, Lt Col George S. Covert, Actg Dept Engr to Col A.G. Matthews, Office CofEngrs, 30 Aug 45. In Dept Engr 061 Maps 1945.

on terrain and other sheets prepared by that Plant.²⁰ Other equipment to handle 22 x 29 work was promised on its availability by the Office of the Chief of Engineers. The need of normal angle multiplex equipment, as stressed in 1943 by the Board of Officers to determine Mapping policies and Procedures within the Department, and of extra presses and 24 x 30 cameras to meet the proposed new standardization of field equipment was recognized.²¹

These requirements would eliminate the splicing of negatives in preparing maps from photographic mapping and would allow full utilization of the presses designed to be used with cameral equipment required by the Air Forces. Although not early available, the promise was given the Department Engineer that such equipment would be made a part of the future planning at staff level of equipment.²²

In accordance with concurrences obtained in Washington by Colonel Tandy in early 1946, those pertaining to the cooperation of the Chief of Engineers in the collection and supply of all available geodetic equipment and information,²³ close liaison was being maintained with the Engineer Board, Fort Belvoir, Virginia,²⁴ where a project was being set up for the development of an electronic method of measuring distances between geodetic stations. Colonel Tandy expressed the need for an electronic device which would measure distances beyond the Shoran means.

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20. Ltr, Col A.G. Matthews, Chief MID Office of CofEngrs to Col Frank C. Carey, Dept Engr, 10 Jul 45. In Dept Engr 061 Maps 1945.
 21. Ibid.
 22. Ltr, Col A.G. Matthews, Chief MID Office of CofEngrs to Col Frank C. Carey, Dept Engr PCD, 30 Apr 45. In Depat Engr 061 Maps 1945.
 23. See p. 78.
 24. Ltr, Engr CDC to President Engr Bd Ft. Belvoir, Va., 19 Mar 47, sub: Electronic Surveying Development Project. In CDC 060 Maps, Charts, Tables to 31 May 1947.

which accurately measures from 150 miles, particularly to be able to measure between the ordinary limits of theodolite observations, approximately twenty to twenty-five miles. If such distances could be electronically measured, observations through clouds of smoke, such as encountered in the Central and South American countries, would be possible during normally limited weather. ²⁵ Mr. Walter G. Stoneman, Chief of Logistics Section and Liaison Office, IAGS, then in Washington, discussed the possibilities of such measurement devices, the discussion revolving around measurement up to fifty miles as needed in this area.

Deficiencies in the mapping collection procedures prior to the war led the Army Map Service to institute a definite policy of gathering topographic maps and topographic map information. The Chief of Engineers, on receipt of a letter from the Army Map Service relative to the collection of such data from overseas areas, directed that the Caribbean Defense Command should undertake the preliminary work in the Americas in collection and correlation of such data as was available through the appropriate ²⁶ Military Attache in the various Latin American countries. Reproduction at scale was recommended at place of collection, but on its failure to have proper facilities for such reproduction, AMS would undertake full processing. As new offices within the Latin American republics were established, this function would expand, the IAGS being held responsible for

25. Ibid.
26. Ltr, AMS to OCE, 26 Feb 47, sub: Collection of Topographic Maps and Topographic Map Information by CDC. In CDC O60 Maps, Charts, Tables to 31 May 1947.

such collection only incidental to the mission assigned on high priority
in those countries in which were established offices. 27

In order to handle better the volume of reproduction work flowing
into the Reproduction Plant incidental to the work of the IAGS, the CDC
obtained permission to dismantle certain mobile map reproduction units
for use in the permanent plant and augment the facilities within the CDC
map reproduction plant. 28

A problem in the care and preservation of tracings and other drawings
of all installations in the Panama Canal Department, which acted as the map
depot for the Caribbean Defense Command, arose in late December 1945.

Approximately 14,000 tracing paper drawings indicating layouts of posts,
utility systems, boundaries, fortifications, certain technical data in
field surveys, field computation books, and the small amount of relative
correspondence were in metal and other types of filing containers. Some
of these were badly worn from age and tropical climate and were in various
stages of deterioration. Permission was requested for the micro-filming

of these data, as the conservative estimate of their replacement was put
at \$5,000,000, and some of the information imprinted on these various maps
such as underground utilities could not be reproduced by field survey and
investigation at any cost. A micro-filming project was approved by
Headquarters, CDC, in January 1946. When the request by CDC for bring-
ing up to date all layouts of posts was made in February 1946, much of

27. Ibid.

28. Ltr. Hq CDC, 7 May 47, sub: Motorized Map Reduction Units Authorized
by CDC OP 46-1-OP to OCE. In PCD 061 1947.

29. Ltr. DE PCD, 18 Dec 45, sub: Micro-filming of Records and Drawings.
In file CDC 062 Photo.

the information in PCD had thus been made available. A general policy of maintaining this information currently accurate was the general policy of the Command, and all major commands submitting general layout maps of the posts.

30

Late in 1947 it was found that film used in aerial reconnaissance work of the MAPPLAN, CDC, was being attacked by fungus when stored in the tropical climate of Panama. There had developed such a backlog of processing and compiling that the Commanding Officer of the 91st Reconnaissance Squadron, charged with the photography work as well as its processing and compilation, was sent to Washington for a conference relative to some means of saving the records from deterioration prior to their being made available

31

for mapping purposes. Headquarters, USAF, required that any film seriously affected be shipped to that office without delaying to process and compile the data.

Since the entire Caribbean area was responsible, during the war years, to the military agencies for the issuance of all types of maps as a security measure, many kinds were furnished. Latin American pilots were issued

32

aerial navigation maps on request. The Department of Interior was issued

258 prints of aerial maps of Guatemala and El Salvador as an aid to the

33

study of mineral disopits being made early in the war. Panamanian

-
30. Ltr, Hq AntD, 8 Feb 46, inclosing General Layout Maps of Major Posts. In File CDC 060.
31. Rad 43675, CDC to CG USAF, 2 Nov 47. In CDC Staff Reading file of 2 Nov 47.
32. Ltr, Hq CDC to CG 6th AF, 14 Oct 42, sub: Aerial Navigation Maps. In CDC 060 Maps, Charts, Tables, 14 Mar 41 - 29 Dec 43.
33. Ltr, Dept of Interior, 27 Nov 43, sub: Geological Survey. In CDC 062 Photo Policy, Jun 40 - Dec 45.

business firms were granted various maps of the Republic. Compliance with a request from the Governor of Puerto Rico for aerial maps of interior sections of the Island to show villages, farming terrain, and buildings was effected through the inclusion of this photography in the cultural detail photography in the plans of MAPPLAN, CDC, and the production of maps of the requested types were furnished the Insular government. 34

34. Ltr, Aotg Gov PR to Brig Gen Wm W. Bessell, 8 Jul 46. In CDC 062
F.C. Photo PR.