

No. 18842

**UNITED STATES OF AMERICA
and
HONDURAS**

**Arrangement for hydrographic and nautical cartography
(with attachment and annex). Signed at Tegucigalpa on
30 August 1976**

Authentic texts: English and Spanish.

Registered by the United States of America on 30 May 1980.

**ÉTATS-UNIS D'AMÉRIQUE
et
HONDURAS**

**Arrangement relatif à l'établissement de cartes hydrogra-
phiques et nautiques (avec pièce jointe et annexe). Signé
à Tegucigalpa le 30 août 1976**

Textes authentiques : anglais et espagnol.

Enregistré par les États-Unis d'Amérique le 30 mai 1980.

ARRANGEMENT¹ FOR HYDROGRAPHIC AND NAUTICAL CARTOGRAPHY BETWEEN THE AGENCIES OF THE REPUBLIC OF HONDURAS AND THE UNITED STATES OF AMERICA

1. The National Port Authority of Honduras (ENP), represented by the Ministry of Economy, the Ministry of Communications, Public Works and Transportation representing the National Geographic Institute (IGN), and the Department of Defense of the United States, represented by the U.S. Naval Oceanographic Office (NAVOCEANO), the Defense Mapping Agency Hydrographic Center (DMAHC), the Defense Mapping Agency Inter-American Geodetic Survey (DMAIAGS), agree under the terms of this Arrangement to participate in hydrographic surveys of the ports and coastal waters of the Republic of Honduras and to the publication of nautical charts of these areas. This joint cooperative effort is to be conducted under the theme of the Harbor Survey Assistance Program (HARSAP) of the United States Naval Oceanographic Office. The purpose of HARSAP and general instructions for conducting the surveys are provided in attachment (1) and form a part of this Arrangement.

2. Under the terms of this Arrangement and subject to the availability of funds, the responsibilities of the participating agencies are as follows:

a. *United States Department of Defense participation*

(1) NAVOCEANO will provide:

- (a) Technical advice during periodic visits to Honduras by the HARSAP Coordinator stationed in the Panama Canal Zone or by other technical personnel as available; daily contact with the HARSAP Coordinator can also be made during normal working hours through the DMAIAGS radio networks;
- (b) Adequate technical equipment, as available, for temporary use in conducting the hydrographic surveys, including the measurement of sea currents and the gathering of bottom samples;
- (c) The necessary supply of technical materials required for conducting the hydrographic surveys, such as boat sheets, smooth sheets, and miscellaneous reference manuals and publications;
- (d) Training of ENP personnel in the hydrographic disciplines in support of the programs as related to this Arrangement.

(2) DMAIAGS will provide:

- (a) In-country liaison with the appropriate agencies through the DMAIAGS Project Office in Honduras;
- (b) Technical assistance by a nautical cartographer in the compilation and color separation of the charts to be published;
- (c) Materials required for compilation of nautical charts such as scribe coat, mylar and type;
- (d) Logistics support in the shipping of technical materials and equipment to and from Honduras;
- (e) Training of IGN personnel in the cartographic disciplines in support of the programs as related to this Arrangement.

¹ Came into force on 30 August 1976 by signature, in accordance with paragraph 6.

(3) DMAHC will provide:

- (a) Chart production technical assistance in the form of recommendations, comments, and editorial review of proofs for the charts to be published by IGN;
- (b) Recommended standard chart symbols and abbreviations as shown in U.S. Chart No. 1 (Spanish equivalents for abbreviations to be substituted or added, if desired, by ENP and IGN);
- (c) Reproduction of selected IGN charts for incorporation into the DMAHC distribution and sales system;
- (d) Four-hundred (400) copies of charts of Honduras published by DMAHC to Honduras free of charge (two hundred (200) copies for each agency participating under this Arrangement).

b. *Republic of Honduras participation*

(1) The National Port Authority will provide:

- (a) A minimum of seven (7) individuals, including a supervisor, who will receive the necessary training in order to conduct the hydrographic surveys;
- (b) Suitable boat or boats to be used in conducting the hydrographic surveys;
- (c) Fuel, oil, lubricants and the necessary crew for the hydrographic boat;
- (d) Other available facilities which may help the hydrographic group in performing its mission;
- (e) Arrangements for duty-free customs clearance of technical equipment and materials into Honduras;
- (f) Repayments of expenses incurred by IGN in establishing the necessary geodetic control, such as per diem and transportation, and other expenses mutually agreed upon by ENP and IGN.

(2) The National Port Authority assumes liability for the loss or damage to any technical equipment which may be made available pursuant to subparagraph 2, a (1) (b), above.

(3) The National Geographic Institute will provide:

- (a) The establishment and computations of the necessary geodetic control required for conducting the hydrographic surveys in accordance with Honduras' Hydrographic and Nautical Charts Plan;
- (b) Facilities and office personnel for the compilation and color separation of each nautical chart;
- (c) Prior to printing, a color proof to DMAHC through DMAIAGS for editing; DMAHC will return the color proof through DMAIAGS to IGN with appropriate recommendations;
- (d) Corrected reproducible materials (repro-mat) to DMAHC if requested by that agency for publication; also any subsequently acquired data that maintains the charts up-to-date;
- (e) A total of twelve (12) copies of each chart produced under this Arrangement to be distributed among NAVOCEANO, DMAIAGS, and DMAHC.

3. The areas to be surveyed will be selected by the Empresa Nacional Portuaria and through mutual agreement with the Instituto Geográfico Nacional will jointly accomplish the work program.

4. IGN will retain all geodetic data and compilation/reproduction materials, ENP will retain all hydrographic/oceanographic survey data. The pertinent data will be made available, when requested, to all participating under this Arrangement. NAVOCEANO will be provided a stable base copy of all smooth sheets at the conclusion of each provided

survey. Related information for Sailing Directions or other publications will also be provided to NAVOCEANO and DMAHC will be accorded the privileges of access to the original data in the future if the need arises.

The metric system will be used on charts prepared from these surveys.

The charts published by DMAHC from data obtained under this arrangement shall be bilingual (English and Spanish).

5. The status, privileges, rights and responsibilities of United States personnel, who may be present in the Republic of Honduras pursuant to this Arrangement, and the processing and settlement of claims, which may arise out of the acts or omissions of such personnel done in the performance of official duty or any other act or omission or occurrence for which a participating agency of the United States Department of Defense may be legally responsible, shall be governed by the applicable provisions of the Vienna Convention on Diplomatic Relations of April 18, 1961.¹ United States personnel present in the Republic of Honduras pursuant to this Arrangement shall be considered members of the administrative and technical staff of the United States mission in the Republic of Honduras within the meaning of the Vienna Convention on Diplomatic Relations and shall enjoy the privileges and immunities accorded by the Convention to such staff members.

6. This Arrangement, of which two original versions in English and Spanish of equal legal strength are being signed, shall take effect upon signature by representatives of all participating agencies in the city of Tegucigalpa, Central District, on Monday, this 30th day of August 1976.

For the Government
of Honduras:

[Signed]

Lic. VICENTE DÍAZ
Minister of Economy

Date: 30 agosto 1976

[Signed]

MARIO FLORES THERESIN
LTC, Infantry
Minister of Communications,
Public Works and Transport

Date: 30 agosto 1976

For the United States Department
of Defense Agency:

[Signed]

JAMES E. AYRES
Captain, USN

Commander

U.S. Naval Oceanographic Office

Date: 30 August 1976

[Signed]

SCOTT E. DRUMMOND, Jr.

Captain, USN

Commander

U.S. Naval Oceanographic Office

Date: 30 August 1976

[Signed]

JOHN W. PARK, Jr.
Colonel, USA

Director

Defense Mapping Agency
Inter-American Geodetic Survey

Date: 30 August 1976

¹ United Nations, *Treaty Series*, vol. 500, p. 95.

ATTACHMENT 1

U.S. NAVAL OCEANOGRAPHIC OFFICE
GENERAL INSTRUCTIONS
HARBOR SURVEY ASSISTANCE PROGRAM (HARSAP)1. *Introduction*

1.1. *Background.* The Harbor Survey Assistance Program (HARSAP) provides for a U.S. Naval Oceanographic Office (NAVOCEANO) mission to assist other governments in conducting hydrographic surveys of harbors, harbor approaches and coastal waters. The purpose of these surveys is to obtain information for the publication of accurate nautical charts and sailing directions and to provide technical training and guidance to personnel of the participating Government.

1.2. *Purpose of instructions.* These instructions provide technical guidance for conducting geodetic and hydrographic surveys under the Harbor Survey Assistance Program.

2. *Technical Requirements*

2.1. *Technical operations.* These surveys shall be accomplished within the limits of accuracy and in accordance with the instructions and procedures contained in the U.S. Naval Oceanographic Office Special Publication No. 4 (SP-4), the standard of the International Hydrographic Bureau (IHB), and the geodetic standard of the participating nation. Those parts of SP-4 referred to herein are contained in annex A to this document. The metric system will be used.

2.1.1. *Geodetic control.* If possible, any control net established should be connected to at least two stations of first-order triangulation. If first-order stations are not available, two stations of the next-highest accuracy should be used.

2.1.1.1 *Primary horizontal control.* All primary triangulated and traverses established shall conform to at least third-order accuracy standards as described in SP-4 (A-10201 and A-10202). All new stations shall be referenced and monumented, including sub-surface marks where practicable, and described in accordance with standard practice.

2.1.1.2. *Secondary horizontal control.* Stations to be used to control hydrographic and aids to navigation, such as lighthouses, tanks, etc., shall be observed in accordance with third-order standards.

All buoys should be positioned by at least three cuts from the main, or secondary, control stations.

Tangents shall be observed to all clearly defined points on shoreline and reef, with proper description as to debris, high water line, vegetation line, or other descriptive feature.

2.1.1.3. *Photogrammetric control.* The location of all control stations established or recovered shall be photo-identified on aerial photographs. These control stations are the basis upon which the final shoreline compilations are made, and it is imperative that they be photo-identified, in the field.

2.1.2. *Hydrography*

2.1.2.1. *Position control.* If electronic surveying systems are not available, control for hydrographic development will be by three-point sextant fix or from azimuth instrument bearings from shore stations. The probable error for each fix used for control of sounding lines shall not exceed 15 meters and no line shall be accepted that has more than two consecutively rejected fixes.

2.1.2.2. *Soundings.* Soundings shall be obtained by continuous recording echo-soundings equipment. Depth checks shall be taken at least two times during each day's operations to verify accuracy of all sonar depth soundings. Each depth check shall consist of a series of readings at 3-meter or 10-foot intervals to the maximum practical depth obtainable, not to exceed the maximum expected sounding depth for that day. The results of these comparisons will be entered in the sounding journals.

Corrections for transducer depth, zero setting, current frequency fluctuation, and tide shall be entered in the sounding journal.

Soundings lines shall have a minimum spacing of 6 millimeters at the scale of development, except where depth and character of the bottom will permit wide spacing. Standard scales will be used (SP-4), (B-20303). Normally, fix interval and sounding interval will be as follows; however, fix intervals should not exceed 2 to 4 centimeters and the soundings interval should not exceed the line spacing:

| <i>Scale of development</i> | <i>Fix interval</i> | <i>Sounding interval</i> |
|---------------------------------|-------------------------|------------------------------|
| 1:10,000 | 1 min | 15 sec |
| 1:2,500 | 3 min | 30 sec |
| 1:40,000 | 5 min | 1 min |

Cross check lines shall be run normal to the direction of the regular sounding lines and at intervals no greater than 7.5 centimeters at the scale of development. Agreement at intersections of check soundings and regular soundings shall be within -0.5 meters from 0 to 21 meters, -1 meter from 21 to 100 meters, and -1% for all depths greater than 100 meters. Any which does not meet the above criteria shall be resounded.

On completion of area development, a recommended channel will be selected and a minimum of four sounding lines shall be run along its entire length.

2.1.2.3. *Survey of piers.* Hand lead soundings shall be taken every 6 meters along the face or piers, using taped distances. Additional lines of soundings shall be run parallel to the piers at distances of 6, 12 and 18 meters. Pier dimensions and the azimuth of the axis of piers shall be carefully measured.

2.1.2.4. *Shoal investigation.* The area where a shoal is found or where the existence of a shoal is suspected shall be sounded by a series of closely spaced lines until it is certain that the least depth has been found and accurately positioned.

2.1.3. *Tide observations.* If a permanent tide gage is not located in the vicinity, a portable tide gage shall be established and maintained throughout the survey period (at least 29 days). All soundings shall be referenced to the same tidal datum as that of the largest scale chart in the area.

A tide staff should be established with any portable gage and tied to two or more bench marks by differential leveling. All leveling shall be in accordance with standard for third-order accuracy (SP-4, A-10303), and level line shall be double run or closed loops.

2.1.4. *Bottom samples.* Bottom samples shall be obtained at 7.5 centimeter square intervals at the scale of development to a depth of 31 meters. The bottom samples data records must be correlated by a fix number on the boat sheet and the sounding journal, and must identify the type of sediment.

2.1.5. *Current observations.* Current observations shall be made in the ship channels and in other areas indicated in the survey specifications. For each current station, at least 48 hours of continuous observations are to be made during the periods of springs and neap tide. Preferably, the current meter shall be submerged to one-half the draft of the largest ship entering the harbor.

2.1.6. *Aids and danger to navigation.* Dangers discovered during the survey shall be reported by message to the U.S. Naval Oceanographic Office, Washington, D.C.

2.1.6.1. *Sailing directions.* Complete, new sailing directions for harbor and approaches shall be written. Existing sailing directions for the survey area should be used as a guide in preparing the new directions. Photographs of coasts, harbor approaches (including port panoramas) landmarks, and navigational features and aids will be taken to fulfill requirements for the sailing directions.

3. *Data reduction reports*

3.1. *Data reduction.* Records of all survey and observational data obtained shall be processed as rapidly as possible and to the fullest degree practicable with the object of identifying, in the scene, any work that must be repeated because of failure to meet desired standards.

ANNEX A

U.S. NAVAL OCEANOGRAPHIC OFFICE
HORIZONTAL CONTROLA-10201. *Triangulation*

(1) The limits of accuracy required for first-, second- and third-order triangulation are listed in the following table:

REQUIREMENTS FOR HORIZONTAL CONTROL

TRIANGULATION

| <i>Item</i> | <i>First order¹</i> | <i>Second order²</i> | <i>Third order</i> |
|--|--------------------------------|---------------------------------|--------------------|
| Strength of figure: | | | |
| Desirable limit, R_1 between bases | 80 | 100 | 125 |
| Maximum limit, R_1 between bases | 110 | 130 | 175 |
| Desirable limit, R_1 single figure | 15 ($R_2 = 50$) | 25 ($R_2 = 80$) | 25 ($R_2 = 120$) |
| Maximum limit, R_1 single figure | 25 ($R_2 = 80$) | 40 ($R_2 = 120$) | 50 ($R_2 = 150$) |
| Discrepancy between computed length and measured length of base or adjusted length of check line, not to exceed | | | |
| | 1 in 25,000 | 1 in 10,000 | 1 in 5,000 |
| Triangle closure: | | | |
| Average, not to exceed | 1 sec | 3 sec | 5 sec |
| Maximum, not to exceed | 3 sec | 5 sec | 10 sec |
| Side checks: | | | |
| Regular quadrilaterals; maximum difference of sides in unit of diff. of 1 sec. in sixth place of log sine of smallest angle involved | 2 times dif | 4 times dif | |
| Side equation test: | | | |
| Approximate average correction to a direction, not to exceed | 0.4 sec | 0.8 sec | |
| Usual number of observations: | | | |
| Position with 0.2 sec. direction theodolite | 16 | 8 | 4 |
| Position with 1 sec. direction theodolite | 24 | 8 | 4 |
| Base measurement: | | | |
| Probable error of base not to exceed | 1 in 1,000,000 | 1 in 500,000 | 1 in 250,000 |
| Discrepancy between two measures of a section not to exceed | | | |
| | 10 mm | 20 mm | 25 mm |
| Astronomical azimuth, probable error of result, not to exceed | | | |
| | 0.3 sec | 0.5 sec | 2.0 sec |

1, 2. Classes III and II, U.S. Triangulation Standards for First and Second Orders.

A-10202. *Traverse*

(1) Control surveys by traverse should be executed with an accuracy comparable with that of triangulation of a corresponding gage. The limits of accuracy for first- second- and third-order are given below:

TRAVERSE

| <i>Item</i> | <i>First order¹</i> | <i>Second order²</i> | <i>Third order</i> |
|---|--------------------------------|---------------------------------|--------------------|
| Closing error in position, not to exceed | 1 in 25,000 | 1 in 10,000 | 1 in 5,000 |
| Probable error of main scheme angles | 1.5 sec | 3.0 sec. | 6.0 sec |
| Number of stations between astronomical azimuths | 10 to 15 | 15 to 25 | 20 to 35 |
| Correction for azimuth closure discrepancy per main angle | 1.0 sec | 2.0 sec | 5.0 sec |
| Astronomical azimuth, probable error or result | 0.5 sec | 2.0 sec | 5.0 sec |

1, 2. Classes III and II, U.S. Triangulation Standards for First and Second Orders.

HYDROGRAPHY

B-20303. *Scale of survey*

- (1) In general never less than that of the published chart and preferably:
- (2) For rivers, lakes, harbors, channels, and pilot waters:
 - (a) Multiples of 1:1000 for scales to 1:10,000;
 - (b) Multiples of 1:25000 for scales from 1:10,000 to 1:20,000;
- (3) For coast and oceans:
 - (a) Depths generally less than 60 meters: 1:50,000 or larger;
 - (b) Depths generally less than 200 meters: 1:100,000 or larger;
 - (c) Depths generally greater than 200 meters: 1:250,000 or larger.

VERTICAL CONTROL

A-10303. *Third-order leveling*

(1) Third-order leveling may be used in subdividing loops of first-order or second-order leveling, where additional control may be required. Third-order lines should not extend more than 30 miles from lines of first or second order; they may be single-run lines but must always be loops or circuits closed upon lines of equal or higher order. Closing checks are not to exceed 12 mm kilometers in circuits or 0.05 foot miles in circuit.
