

21 July 1955

LORAN SITE SURVEY REPORT

AUTO 2A - GRAND TURKS ISLAND, B.W.I.

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PART I - GENERAL INFORMATION

PREPARED BY: CDR J. P. MARTIN (1536), USCG

A. Preliminary Discussion

A temporary LORSTA WALDO II was established in March, 1955. The cost of this station was defrayed by the Navy and the station was to be supported directly by the Naval Facility (NAVFAC) on this island. The transmitting antenna and Loran trailers were located on Crown land about 500 feet west of the Naval Facility boundary. This location is unsuitable for a permanent location and a new site has been selected about 2200 feet south of the NAVFAC. For further information see site survey report for WALDO II, dated January, 1955.

1. The NAVFAC on the island is under control of
 - a. Operational Control
Commander Surface Anti-Submarine Development Detachment,
Key West, Florida
CAPT Gallery
CDR Troy
COMSURFANTI-SUBDEVDET is under Commander Operation Development Force.
 - b. In September, 1955, the NAVFAC will be transferred to
COMCARIBSEAFRONTIER for operational control.
 - c. Military Commander
CINCLANTFLT.
 - d. Administrative Commander
SERVLANT - Norfolk
Outlying Activities Section
LCDR G. S. Huestis, Liaison Officer at Patrick AFB.
 - e. Management Control
BUSHIPS.
2. The Guided Missile Center is controlled by Patrick AFB. It is operated by PAA under contract to the Air Force. PAA further subcontracts electronics work to RCA. The Air Force has only one officer on the island, Major R. K. Rosa, who is Liaison with PAA.
3. The 332nd Engineers Aviation Construction Battalion under Major R. C. Bunnell, Corps of Engineers, is primarily concerned with construction and will leave the island about March, 1956

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A. Land for Site

1. Ownership and Control

The land south of the NAVFAC, bounded on the west by the public road and on the east by the sea, is apparently owned by as follows:

- a. John C. Crisson (deceased) owns about ten acres immediately south of the NAVFAC. A Mr. Bassett did some research on this property but there appears to be no adequate description.
- b. Hildren Elmus Miller, CBC Trailer Park, Davisville, R. I., property purchased from Anna Prior Murphy for the sum of 70 pounds sterling, containing approximately 10 acres measuring 600 feet from east to west and bounded on the east by the sea, on the north by vacant land of the estate of the late John C. Crisson, on the west by the public road leading to and from the lighthouse and on the south by vacant land of the estate of the late Mrs. Lola Manning.
- c. Mrs. Lola Manning (deceased)
 Leon S. Godet - Witness of Will
 L. E. Astwood - Justice of the Peace
 Plantation lot situated in the Northern suburbs of Grand Turk - 3 1/2 acres, bounded on the north by Murphy's (now Miller's) plantation, east by the sea, south by plantation owned by Oliver Lightbourn, west by the creek.
- d. SGT Manule who pointed out approximate property lines claims that he owns the land to the south of that belonging to Mrs. Lola Manning.

2. Jurisdiction

- a. U. S. Jurisdiction
 The U. S. Navy acquired property presently being occupied by WALDO II. The Navy has an agreement with the British Government for property presently held or which may be required in the future. Procurement of property may be expedited if acquired through the Navy Department, under existing agreement with British Government.
- b. Foreign Government
 All property records are held at the Crown Land Office, Grand Turk Island, B.W.I.
 (1) Mr. E. G. Lewis, HRM Commissioner, Grand Turk Island, B.W.I.
 (2) Mr. Sullivan, HRM Assistant Commissioner
 (3) ICDR G. S. Huestis, U. S. Navy Liaison Officer, Patrick AFB, also, Liaison Officer with Grand Turk Island Government for property.
- c. Private Owners
 (1) Owners of property desired were:
 (a) Mrs. Lola Manning (deceased)

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On basis of existing property as listed in paragraph B 1, above.

1. Description of Site

a. Geographic limits

See plot plan of Civil Engineering Report.

b. Type of terrain

Slight gradual rise for about one mile from the NAVFAC. Coral sand. See plot plan of Civil Engineering Report.

c. Accessibility

Macadam surfaced road from the PAA to the NAVFAC runs past the site.

d. Other details of interest - none.

Local Officials

1. Involved with construction

a. Commissioner E. G. Lewis.

b. Assistant Commissioner Sullivan.

2. Persons that should be contacted in the area

a. LT K. L. Dahson, Acting Commanding Officer, U. S. Naval Facility, Grand Turks Island, B.W.I.

b. LCDR R. Himmell, assigned Commanding Officer (enroute) U. S. Naval Facility, Grand Turks Island, B.W.I.

c. Major R. K. Rosa, USAF, Liaison Officer, located at PAA Base, Grand Turks Island, B.W.I.

d. Mr. J. Hartlein, PAA Base Manager, Grand Turks Island, B.W.I.

e. Major R. C. Dunnell, with 332nd Engineers Aviation Construction Battalion, Grand Turks Island, B.W.I. (this outfit scheduled to depart Grand Turks no later than March, 1956).

f. Paul Smith Construction Co. (contact through PAA Base Manager).

g. SOT Manule, information ^{on} property lines.

3. Local Population

a. General

All Islanders are of Negroid type, British Subjects. The population is about 1500 Negroid and about 30 white. Standard of living very low. English spoken only.

b. Possible conflicts, ameliorating conditions, local officials to contact. Leon Gedet, Island Labor Leader, should be contacted for any

None exist. Formal restrictions on encroachment of property, right of way, etc. There are local restrictions regarding wage scales.

4. Small arms allowance. Two .45 cal. pistols and two .30 cal. carbines.

British Government hospital and doctor available for emergencies. Limited facilities, no x-ray machines or such drugs as Aureomycine, etc.

I - h

a. Medical

Very temporary, one first class hospital compound, only first equipment available, penicillin is available.

c. Dental

Dental patients are sent by the Navy to NAS, Opalaca, Florida. No resident dentist available.

d. Emergency

Coast Guard aircraft upon request or Air Force aircraft requested from Patrick AFB. Marine Corps aircraft from Opalaca, Florida.

3. Pay and other records

a. Seventh CG District handles all pay records, all other records should be maintained at the unit.

4. Dependents. No dependents allowed at this time. At present, there are two PAA employees families on the island, but this is only by arrangements with local people for housing.

5. Mail

a. Service twice a week by air, Tuesday and Friday.

b. Official mailing address: Commanding Officer
CG Loran Station
c/o Navy #104
FPO New York, N.Y.

6. Vehicular or water transportation required

a. Vehicles

Two vehicles will be required, namely a jeep for carrying personnel and light supplies and a weapons carrier or a power wagon for handling heavy cargo. During the construction period a 2 1/2 ton truck also should be provided.

b. Spare parts required

Yes. A full allowance of spare parts should be provided. Navy and PAA have limited quantity of spares.

7. Environment

a. Settlements nearby

Cockburn Town and Back Salinas approximately 4 miles to the south - NAVFAC 800 yards to the north - PAA Base 5 miles to south.

b. Population types. Cockburn Town and Back Salinas - Negroid (1500), approximately 30 white, British people.

c. Language. English.

a. Relations with local population. Island Commander should be contacted for all dealings with local authorities.

b. Customs. Under Air Force Officer.

c. Commercial practices. All merchandise, food, clothing, etc., is shipped from Kingston, Jamaica.

d. Taxes. U. S. Government units not taxed upon any government shipments.

9. Recreation

a. On station. NAVFAC - combined, tennis, volleyball, basketball court, recreation quonset, pool table, fishing equipment available. Recommend provisions be made for movies, ping-pong, pool table, and similar activities at Coast Guard Station.

b. Off station. Swimming. Fish, spear and line. Swimming beach is on southern end of island, 5 miles away. The towns offer nothing.

c. Limitations. Swimming from beach limited to leeward side of island. No NAVFAC boats for fishing or swimming.

d. Precautions required. No remarks.

e. Uniforms. Whites or civilian clothes are worn on liberty.

10. Health conditions

a. Endemic diseases. None.
Precautions.

b. Precautions against venereal disease, fungus infections resulting from swimming with unhealed sores, cuts, etc.

11. Local fauna and flora

a. General. Low scrub brush, cacti, very few palm trees - mosquitoes troublesome after a rain, no snakes or wild animals on the island. There are numerous salt ponds covering a good portion of the island.

b. Special problems for station personnel.

12. Morale. Presently is very good. The logistic flights to San Juan are a great help to morale.

13. Berthing and messing. At present, personnel and spare parts are in quonset hut on NAVFAC - the plan for permanent buildings will improve berthing and messing, service distinction, personnel morale, etc.

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a. Initial Status to general locality. All logistics are being supplied by the Navy at no cost to the Coast Guard. When this situation is made permanent, primary logistic support should continue to be obtained from the Navy locally on reimbursable basis. All non-emergent supplies are moved via LSM type vessel departing Miami, Florida, twice monthly. This vessel moves supplies in support of the NAVFAC, and associated activities. The time of the trip is two days to San Salvador, and an additional 2-3 days to Grand Turks. Supplies may be sent by contacting the U. S. Naval Supply and Fiscal Officer, Marine Corps Air Station, Miami, Florida.

b. General locality to site. The unloading site for the LSM is just north of the PAA site and south of the Island Commissioner's house. Supplies are moved from the unloading site to the NAVFAC via Navy trucks. Fuel (diesel oil) is moved in bulk by pumping oil from the vessel into tank trucks. Gasoline and lube oil is shipped in 55 gallon drums. The NAVFAC has indicated that they would truck any fuel for Coast Guard use.

c. Emergency. By request from MCAS, Opalaca, Florida, this has been done on two different occasions. Coast Guard aircraft from Miami or San Juan, Air Force aircraft from Patrick AFB.

2. Communications

a. Radio. RCA communications center and NAVFAC operates 24 hours a day.

b. Telegraph, teletype or cable. Cable to Patrick AFB and to various points in Bahamas, will eventually extend to Puerto Rico.

c. Telephone. Available from NAVFAC to PAA Base, also, available service from PAA Base to Patrick AFB and Bahama Chain. Cable to Puerto Rico in final stages of completion.

d. Messenger. Via vehicle to NAVFAC or PAA Base.

e. Crypto. Shore base allowance class 3 crypto guard at NAVFAC.

f. Emergency. All radio facilities and telephone available only for operational immediate and deferred traffic. Highly desirable that voice communications be established between Loran Stations.

3. Food

a. Locally available. None (all imported - except fish, conch, etc.) Food would have to be procured through Navy supply in conjunction with NAVFAC supply from Miami.

a. ~~Unskilled labor~~. Local unskilled labor readily available, contact
Naval Base, Island Labor Leader.

b. Military labor. Air Force Engineers Construction Battalion departs
about 1 March. Limited assistance from Naval Facility personnel.

c. Repair facilities. The repair facilities at the NAVFAC are not
extensive but would be adequate for most jobs.

G. Meteorological

1. Climate

a. General - Fair, warm, arid, yearly average temperature 78°F.

b. Wind - east to southeast, regular trade wind, 15 to 20 knots average.

c. Temperature - 75.5°F. Winter, 83°F. to 84°F. Summer.

d. Precipitation. Monthly maximum 7.96", minimum 0-01". Yearly average
for five year period ending 1941 was 28.56". The rainfall in 1951 was
36.29", 1952 21.27", 1953 26.45", 1954 28.33", 1955 to 1 July 9.18".
Rainfall is very local and often falls only on small portion of the island.
The small quantity of rainfall makes it mandatory to provide sufficient
roof surface and storage capacity to ensure that there is sufficient water
during the dry period. Salt water must be used for fire and sanitary systems.

e. Visibility. Height of eye 10 feet - 10 to 15 miles usually very clear.

f. Sky coverage. Predominantly cumulus clouds less than 45%. Hurricane
season - 15 June to 15 October, slightly greater than 45%.

2. Forecasts. None available at the present time. Hurricane cycle every
15 to 20 years. Last hurricane 1945. Patrick AFB sends available emergency
warnings.

3. Special considerations

a. Local land conditions. Dry, sandy, highest point of land is on
eastern mid portion - 70 feet.

b. Harbor facilities affected by the weather. Open roadstead on western
side of the island

c. Severe conditions. It was reported locally that during January,
February, March, winds will shift to northwest causing heavy seas on
normally leeward side of island. This shift of wind is not indicated
in meteorological tables available.

H. Oceanography

1. Tide. Range 3-5 feet.
2. Current. Not significant factor.
3. Seasonal changes. Not significant.
4. Shore conditions. Sandy - coral cliffs on north and northeast part of island. Rest of island all sandy beach.
5. Offshore conditions. Bounded by coral reefs clockwise from northwest to southeast, about average of one mile - southeast to northwest - sand and coral reefs out to approximately 500 yards.
6. Local harbors. None.

I. Hydrography

1. General. See HO Chart No. 1000 and sailing directions for the West Indies, Vol I, HO Publication 128.
2. Anchorages. Leeward, on western side of island. Usually anchor in about 6 fathoms just outside coral ledge.
3. Approaches. No remarks.
4. Charts available. HO Chart No. 1000.
5. Boat landings. Jetty ramp near Commissioner's Office, Cockburn Town. Jetty and mooring buoys near PAA Base. South Turks Island, Salt Co. Pier. Government pier 75' north of other pier.
6. Photographs. See Civil Engineer's Report.

J. General Comments and Recommendations

The present location of WALDO II is considered to be unsatisfactory for a permanent station. A new site has been selected about 2200 feet south of the NAVFAC, which appears satisfactory for a permanent station. All logistic support will have to be provided from the United States, and should be coordinated with the Navy so that the regularly scheduled biweekly logistic vessel (LSN) from Miami could carry supplies to the LORSTA. An airfield is operated on the island by PAA under contract to the Air Force. Present biweekly logistic trips by CG Aircraft are made primarily as a morale factor by transporting personnel to San Juan, Puerto Rico for recreation.

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The primary problem at the LORSTA will be the provision of adequate fresh water since the quantity of rainfall is slight. Sufficient rain catchment area and storage capacity is mandatory to cover periods of dry weather. To conserve fresh water the fire and sanitary systems should be salt water.

If cost considerations necessitate use of this site in preference to Cape Viejo Frances, the site selected will be satisfactory for construction of a permanent LORSTA to be operated independently of the Navy, except for co-ordination of logistic support.

Recommended Personnel Requirements:

	<u>FIRST YEAR</u>	<u>AFTER FIRST YEAR</u>
LTJG	1	1
ETC	1	1
ET1	1	1
ET2	1	—
ET3	3	3
EN1	1	1
EN3	1	1
FN	1	1
DC2	1	1
CS1	1	1
SN	*6	*3 (Loran Watch) (Mess Cook)
RM2	— (Navy Radio)	— (Navy Radio)
RM1	— (Navy HM)	— (Navy HM)
TOTAL: OFF	1	1
ENL	17	13

* Native galley helper may be authorized in lieu of 1 SN.

J. P. Martin
J. P. MARTIN

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LORAN SITE SURVEY REPORT

AUTO 2A - GRAND TURK ISLAND, BAHAMA ISLANDS

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PART II - ELECTRONICS ENGINEERING

PREPARED BY: LT F. H. ACHARD, JR. (4305), USCG

The vicinity of the presently operating Loran Transmitting Station, WALDO II, Grand Turk Island, Bahama Islands, was selected for survey in connection with the proposed AUTO Loran chain Station, AUTO 2. The Electronics Engineering portion of the Loran Site Survey Report AUTO 2A is contained below.

A. Site

1. Reference is made to Electronics Engineering Site Survey Report WALDO II of January, 1955, which was made in conjunction with the construction of the presently operating Loran Transmitting Station, Grand Turk Island, Bahama Islands. Analysis of operating difficulties and potential interference problems shows that the present installation of ~~the electronic plant is considered not satisfactory for permanent~~ operation. Although the present operation has proven essentially acceptable, the proximity of the Loran antennas to the NAVFAC antennas (500 feet) and to various vertical and guy wire structures (500-700 feet) contribute to the presence of Loran noise on all bands at NAVFAC below 3000 kc, as well as outside noise visible at the Loran timers. In view of these and other considerations cited below it is recommended that the new proposed location is suitable as the site of the permanent AUTO 2 station. In addition, in view of the considerations cited below, it is recommended that the present frequency and basic pulse repetition rate (3L-) be retained for permanent operation, and that the electronic plant be housed in a permanent type signal building in lieu of the present trailers.

2. The proposed site is a 400 by 1300 foot strip of land oriented north and south between the road and the eastern foreshore cliff edge which places the Loran transmitting antenna some 750 yards southward from the NAVFAC boundary fence, and approximately 200 feet in from the foreshore cliff. The ground system would be 600 feet in diameter flattened along the road and cliff face. The foreshore beach extends some 400 feet from the cliff to the sea. The Loran remote receiving antenna would be located 800 feet northward (azimuth 003°T) from the transmitting antenna and about 75 feet from the cliff edge. The transmitting antenna take-off path extends from a minimum of 400 feet overland at 090°T, increasing gradually to 450 feet at 121°T. (azimuth to Cape San Juan, AUTO 3), to the full length of Grand Turk (the shoreline is nearly straight); from the maximum of 7 miles to southward, the overland path diminishes to 2 1/2 miles at 270°T., and from there diminishes more rapidly to 1 mile at 310°T. (azimuth to San Salvador, AUTO 1), to 1/2 mile to northward, and to 400 feet at 090°T. This gives a normally

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undesirable 1 mile overland take-off to the paired station at San Salvador (AUTO 1), but the deleterious effects are offset somewhat in view of the short baseline (240 miles) giving a calculated poor soil field strength of 750 uv/m and a measured value (night 2200 hours) of 1100 uv/m. This latter might be explained in that most of the land path is over semi-marsh and salt pond, making it at least good soil or better average. It may be noted also that all but the immediate southward to westward sector would be mostly over salt ponds, semi-marsh, or salina beds. It is to be noted also that it would be impracticable to locate the transmitting antenna on the foreshore because of: (a) extreme vulnerability to worst quadrant hurricane seas damage, (b) inaccessability, and (c) a sharp 40 foot cliff blocking from southward clockwise to northward.

3. The proposed position of the Loran receiving antenna would place it about 32° nearer San Salvador (AUTO 1) from the bisector of the baselines San Salvador - Grand Turk and Grand Turk - Cape San Juan, giving antenna factors on the order of 1.3 and 0.5 us respectively. The communications receiving antenna is to be located at 194°T and 550 feet from the Loran transmitting antenna.

4. The WALDO II equipment trailers were inspected, but, although properly preserved and in excellent condition, are considered not adequate for permanent installation due to: (a) age (3 years old) and (b) anticipated hurricane wind and spray damage (particularly loose coral sand scouring) in addition to normal continuous prevailing (20 knot) wind damage. It is recommended, therefore, that a permanent signal building be provided.

5. The proposed antenna layout would permit high power operation; however, high power would be advantageous only in increasing the signal at Hobe Sound, and extending the range beyond the Virgin Islands.

B. Propagation Data Observed and Computed (80% radiation efficiency, sea water path)

1. Grand Turk - San Salvador (AUTO 1)	240 miles	310°T (approx)
Grand Turk - Cape San Juan (AUTO 3)	360 miles	120°T (approx)
2. Grand Turk - Hobe Sound	595 miles	(approx)
Grand Turk - St Kitts (AUTO 5)	530 miles	(approx)
3. Calculated field strength received from 160 KW San Salvador (AUTO 1)		1520 uv/m
Calculated ditto, poor soil take off path		750 uv/m
Measured ditto 2200 7-18-55		1100 uv/m
Measured ditto 2100 7-19-55		1150 uv/m
4. Calculated field strength received from 128 KW Cape San Juan (AUTO 3)		365 uv/m

5. Calculated field strength received from 128 KW
St Kitts (AUTO 5) 45 uv/m
6. Calculated field strength received from 1000 KW
Hobe Sound 55 uv/m
Measured ditto 2200 7-18-55 30 uv/m
Measured ditto 2100 7-19-55 25 uv/m
7. Calculated field strength received at Hobe Sound
from 128 KW Grand Turk 20 uv/m
8. Noise level per Figs 5-28 to 5-32, Chapt 5, CG-281 60 uv/m
Measured long crash noise 2100-2230 7-18/19-55 70-80 uv/m
Measured storm static crash noise 2100-2230 7-18/19-55 120-150 uv/m
Measured daylight noise static 7-18/19-55 52-20 uv/m
NOTE: Yearly variation Jan:35; Apr:50; Jul:60; Oct:50 uv/m
9. Calculated interference to 1900 kc Loran
(above noise level range) none
Measured ditto 2100-2230 7-18/19-55 none
Measured ditto 0700-1800 7-19/20-55 none
10. 1900 kc interference to other facilities:
 - a. Communications: 2716 kc harbor frequency (dist 7 miles) reported some when using full gain while working San Salvador; however, no interference was reported for action.
 - b. Navigation Systems: None reported.
 - c. Amateur: None reported.
 - d. Commercial radio reception: NAVFAC (present distance 500 feet); from 1800-2000 kc drowned out in morale and personal receivers; personal receivers some noise on down to 550 kc. No formal complaint has been offered. This interference is considered partly due to numerous vertical metal sections (flag poles, ladders, etc.) and exposed elevated power wiring within the NAVFAC area, all augmenting the expected pulse effects from close proximity.

11. Observations and reported conditions of radio traffic.

- a. 1700-1850: crowded receivable level of mixed commercial, amateur, and communications - mostly all Spanish or French origin.
- b. 1720-1780: radiobeacon at PAA, Grand Turk facility, medium level.
- c. 1850-1950: sporadic nite reception low level same as above. NAVFAC (500 feet distance), blanked out 1900-75 kc by Loran pulse.
- d. 1950-2000: same as (a.) but diminished.
- e. 2000-3500: crowded, mainly of low level at full gain.
- f. 550-1650 : crowded reception; far points New Orleans, Cleveland, New York, and Florida, stations 24 hour reception.
- g. 4000-11000: generally crowded with all types at night; daytime medium crowded traffic.

C. Propagation Systems In Vicinity

1. USN - NAVFAC, Grand Turk project; distance 500 feet: classified. It was reported that no Loran interference to this project has occurred to date.
2. USN - NAVFAC, Grand Turk communications: distance 500 feet: 2500 and 7500 kc bands ship to shore and point to point A1, A3, RAT; traffic on need arising and 24 hour guard basis. It was reported that no Loran interference has occurred to date.
3. Pan American Airways Guided Missile Division, Grand Turk guided missile control project: distance 6.5 miles: It was reported that no Loran interference has occurred to date. Operational plans during long range missile flights in the future possibly might require procedures for shutting down Loran operation during the period this project has (200 mc) telemetry and radar tracking control. Opinion states the possibility of interference to the 200 mc telemetry from any sizeable pulse source even at Loran frequencies. Opinion also states the probability of disrupting radar auto-track particularly since the sector of radar tracking passes across the Loran Station site.
4. Pan American Airways Guided Missile Division, Grand Turk guided missile control project; radio communication facilities; distance 6.5 miles: l.f. and ATC air-ground network. It was reported that no Loran interference has occurred to date.
5. Pan American Airways Guided Missile Division, Grand Turk Aircraft Beacon Station; distance 6.5 miles: ATC network. It was reported that no Loran interference has occurred to date.

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6. Cable and wireless (West Indies) Ltd., Grand Turk Terminal; distance 5 miles: It was reported that no Loran interference has occurred to date.

7. Amateur Radio installations; none installed: Ham stations may be established in accordance with Bahama Islands regulations via the Department of State.

8. Special Note: The frequencies in use during guided missile flights do not coincide with Loran (1900 kc) frequencies, or harmonics thereof. There appears to be a local misunderstanding regarding just what propagation facilities are to be shut down during these flights. It is recommended that the matter be clarified with the Department of Defense.

D. Officials And Cognizant Persons

1. ICDR D. E. GOUDY, USN (Consulted)
Commanding Officer, U. S. NAVFAC, Grand Turk
2. ICDR R. HINMAN, USN
Relieving C. O., U. S. NAVFAC, Grand Turk
3. LT K. L. DOBSON, USN, (Consulted)
Executive Officer, U. S. NAVFAC, Grand Turk
4. LTJG A. E. ROEDER, USN (Consulted)
Communications Officer, U. S. NAVFAC, Grand Turk
5. MAJ D. E. EVELYN, USAF (Consulted)
Base Commander (relieved) USAF Auxiliary Base, Grand Turk
6. MAJ R. K. ROSA, USAF (Consulted)
Base Commander USAF Auxiliary Base, Grand Turk
7. ICDR G. S. HUESTIS, USN (Consulted)
Senior Naval Liaison Officer to AFIC, Patrick AFB
8. ICDR S. A. HAMMICK, RN (Consulted)
Royal Navy Liaison Officer, Key West, Florida
9. LTJG R. D. PETERS, USCG (Consulted)
Commanding Officer, CG LORSTA, Grand Turk
10. LTJG R. H. BAETSEN, JR., USCG
POO, CG LORSTA, Grand Turk
11. Mr. J. F. ZENDER (Consulted)
Instrumentation Manager, Pan American Airways Guided Missile Division,
guided missile control project, Grand Turk

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Use is now and will continue to be on a space available basis only. Top priority is given to guided missile flights of which many are expected in the future. This facility is considered not suitable for Loran interstation communication; it may prove suitable for CONUS ROUTINE administrative traffic. Traffic to Cape San Juan (AUTO 3) is via NAVFAC cable lines (via San Juan; item 1b).

c. Radio: A1, A3, and RAT facilities similar to those of NAVFAC (item 1a) with similar traffic loading and traffic handling procedures. When the cable (item 2b) is completed, the radio facilities will become secondary. Continuous guard provision is in effect or contemplated. This facility is considered not suitable for Loran interstation communication, but is considered suitable for DEFERRED administrative traffic only.

3. Cable And Wireless (West Indies) Ltd.

a. Radio: A1 and some RAT used for inter-island administration matters as well as connection to islands not on the main cable (British). This facility can be used in an emergency for communication among the (British) West Indies. It is considered not suitable for USCG use because: (a) it is a commercial facility, and (b) the local traffic load is very heavy.

b. Cable: Main Halifax, Bermuda, Grand Turk, Jamaica, and Barbados telegraph cable; keyed time (mechanical) multiplexed telegraphy. The traffic is very crowded being involved with direct communication with British possessions to United Kingdom. This facility likewise is considered not suitable for USCG use.

4. It is to be noted that the above facilities are available for LORSTA OPERATIONAL IMMEDIATE traffic. In view of the above findings, it is recommended that the proposed permanent LORSTA, Grand Turk (AUTO 2A) and the others of the AUTO Chain be provided with type TDE or similar communications transmitters. This is predicated upon the requirement that interstation communications regarding Loran operation necessitates immediate contact to be of any use. ROUTINE administrative traffic could be handled in this arrangement, although, as noted above, such is not a separate requirement.

F. Conclusions

1. The present site of WALDO II is considered not suitable for permanent AUTO 2 operation, being located entirely too close to the NAVFAC electronics projects and facilities.

2. The proposed site (the subject of this report) is considered suitable as AUTO 2 with San Salvador (AUTO 1) and Cape San Juan (AUTO 3).

3. A permanent signal building should be erected particularly as the present trailers are the oldest of the WALDO trailers (former ELMO spare trailers).

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4. Shift to high power (megawatt) operation is considered desirable only to increase the range beyond Antigua and to increase the signal at Hobe Sound. The present power permits adequate signal for San Salvador (AUTO 1) and (as computed) Cape San Juan (AUTO 3).
5. Recommend provision for TDE type communications transmitter for inter-station operational use.
6. Calculated worst stormy season nite time 1900 kc signal to noise ratios:
 - a. Signal from San Salvador (AUTO 1) - 13.7:1 (From observed data).
 - b. Signal from San Salvador (AUTO 1) - 7.3:1 (From observed storm data).
 - c. Signal from Cape San Juan (AUTO 3) - 4.6:1 (From observed noise and computed signal).
 - d. Signal from Cape San Juan (AUTO 3) - 2.4:1 (From observed storm noise and computed signal).
 - e. Above signals to other 1900 kc signals - none significant (50:1).
7. Frequency traffic conditions indicate 1900 kc is best of those available for Loran use. It is recommended therefore, that the present frequency and basic pulse repetition rate of (3L-) be retained for permanent use.


F. H. ACHARD, JR.

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PART III - CIVIL ENGINEERING

PREPARED BY: CDR H. W. SCHLEITER (1568), USCG - LT. H. W. PAGEL (4102), USCG

A. Site and Antenna Location:

1. Local Name for Site: Grand Turk Island, B.W.I. 6 miles north of Airstrip located on southwest part of island, Cockburn Town.

2. Geographic Position of Loran Antenna: 21° 30' 08" N (approximate)
71° 07' 57" W (do)

Position obtained by transferring coordinates from TURK EPI whose position is: 21° 30' 38.43" W and 71° 08' 03.64" W.

3. Antenna Location Monument: Standard Coast Guard survey mark stamped "AUTO 2A, 1955" set in concrete cylindrical pier several inches above the ground. Ties to references are shown on Drawing 2162 attached.

4. Chart Showing Site Location: H. O. Chart 1000 and Air Navigation Chart 585.

5. Boundary Description: Beginning at a 5/8" iron pin which lies 199° 29' 634.4 feet from the USCG Survey Monument "AUTO 2A - 1955", thence 270° 00' 13 feet to a corner which lies 15 feet east of the centerline of the public road, thence northerly along a meandering line which lies 15 feet east of the centerline of the aforesaid public road to a point; thence 90° 00' 730 feet more or less along a line which passes 900.0 feet north of the aforesaid monument "AUTO 2A - 1955", to the Atlantic Ocean; thence southerly along the shore of the Atlantic Ocean to a point; thence 270° 00' 817 feet, more or less, along a line lying 598.1 feet south of monument "AUTO 2A - 1955" to the point beginning; containing 26.5 acres more or less.

6. Photographs: Terrestrial photos taken during the survey are enclosed.

7. Aerial Photos: One aerial photo taken during the survey is enclosed.

B. Conditions Affecting Movement of Gear to Actual Site:

1. Nearest Harbor or Anchorage: No harbor on the island. Anchorage at Cockburn Town.

2. Beaches for Landing: See Part I, F, 1.

3. Mobile Equipment Required: Over-the-road equipment only.

4. Existing Transportation Facilities: See Part I, F, 1.

5. Landing Craft Required: Only those needed by contractor to land construction equipment and material, such as LST, LSM, LCM's, LCVP's.

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B. Conditions Affecting Movement of Gear to Actual Site: (Contd.)

6. Availability of Stevedoring, Drayage and Local Labor: Limited stevedoring available. Medium weight trucks can be hired. Local labor is plentiful but is unskilled. Skilled labor and supervisors must be imported.

7. Road Construction Necessary: None except within site.

8. Air Transportation Facilities: See Part I, E and F.

C. Actual Site Conditions:

1. Topography of Site: The site is a sandy ridge about 400 feet wide (E and W) bounded by the public road on the west and rocky limestone cliffs 30-40 feet high on the east. From the cliffs the land slopes gradually to the sea about 400 feet away. Rock is believed to be 10-20 feet below the surface at the site.

2. Vegetation and Tree Cover: Low, arid-climate brush, cactus, low scrubby trees. To prevent dust and wind erosion, clearing the site of vegetation should be held to a minimum.

3. Ground Conditions and Geology of the Site: The top of the ridge is fine sand to an undetermined depth. The limestone rock is exposed at the cliffs on the east side. Below the cliff, the site is fine beach sand.

4. Earthwork Required: Slight.

5. Foundations for Structures, Engines, Etc.: Fine sand - excellent. Must be confined for stability.

6. Termite Proofing: Required.

7. Local Sources of Construction Materials: None except poor quality concrete aggregates. Coarse aggregate on the island is crushed coral or coral limestone which is very soft. Concrete made with this aggregate will probably not have a strength exceeding 2000 p.s.i. Unless the hardness and abrasion loss requirements in the Federal Specifications are waived, all coarse aggregate must be imported.

8. Pier or Wharf: None required.

D. Utility Report:

1. Potable Water Supply and Sewage Disposal: No public water or sewage systems exist. Conditions here are similar to those at AUTO 1 insofar as water is concerned. Rainwater caught on roofs or catchments is the only source of potable water. Efforts to develop fresh water wells have been unsuccessful. Due to the long dry period each year and the spasmodic nature of the rainfall, 100,000 gallon storage capacity with roof catchments, paved ground catchments and a salt water sanitary system are recommended. Rainfall statistics for the past 5½ years are enclosed.

D. Utility Report: (Contd.)

2. External Electric Power Supply: The NAVFAC power supply is inadequate for both facilities. Therefore local generators will be required.

3. Garbage Disposal: Burial or incineration.

4. Heating and Air Conditioning Requirements: None.

E. Climatology and Sea Conditions: Semi-tropical Climate - See Part I, G. See Part I, H and I for sea conditions.

1. Precipitation and Temperatures: See Part I, G, 1, for temperatures. Precipitation statistics for the past 5½ years are enclosed.

2. Winds, Storms and Earthquakes: Hurricanes are a constant threat during the summer and fall. All buildings and facilities should be hurricane resistant. Earthquakes are not considered a problem.

3. Atmospheric, Dust and Humidity Conditions: Windblown dust is a serious problem. To alleviate dust, only the absolutely mandatory clearing of brush and vegetation should be done. Humidity is not a problem except during summer rains.

4. Sea Conditions Affecting Landings: Not applicable.

5. Construction Season: Any season suitable.

F. Conditions Affecting Construction Force:

1. Nearest Habitation: See Part I, E, 7.

2. Endemic Diseases: None.

3. Transportation, Communications, and postal facilities: See Part I, E and F.

4. Construction Camp: Pan American Airways operates quarters and messing facilities at the guided missile test station under contract to the USAF. If arrangements to quarter and subsist supervisors and imported skilled labor can be made, no camp is necessary. Otherwise a camp will be required.

G. Miscellaneous:

1. Recommended Types of Construction: Hurricane-resistant, reinforced masonry buildings.

2. Recommended Storage Requirements:

a. Perishable Food - 3 months.

b. Dry stores - 3 months.

c. Other - 3 months.

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3. Fuel Delivery and Storage: Fuel storage - 3 months requirements. See Part I, F, 1 for delivery schedules.

4. Prospective Contractors:

- a. Paul Smith Construction Co., 3103 N.W. 20th St., Miami, Florida.
- b. Ash and Watson, Ltd., Eastern Main Road, Port of Spain, Trinidad.
- c. Holland, Hannan and Cubitts, Port of Spain, Trinidad.

5. Antenna Obstruction Lighting: Not required.

H. Drawings and Sketches: Drawing 2162 shows the layout of the station, property bounds, and topography.

I. Conclusion:

Complete lack of sound concrete aggregates, shortage of potable water and the necessity for importing all construction equipment, material and skilled labor will cause the greatest construction problems. The Paul Smith Construction Company of Florida has some heavy equipment at Grand Turk Island but this may no longer be on the island when construction of the Coast Guard facility is commenced. The lack of concrete aggregates will necessitate careful inspection of all concrete to assure concrete of adequate strength for the purpose intended. Salt water sanitary systems are essential to conserve potable water. An adequate potable water rain catchment in addition to the roof catchments appears mandatory. Consideration should be given to a soil-cement rain catchment to obviate asphalt surfacing which gives an undesirable color and taste to the water.

H. W. Schlitzer

H. W. SCHLITZER

H. W. Pagel

H. W. PAGEL

- Encl. C7CGD drawing No. 2162 AUTO 2A Site Plan and Plot Plan
Chart: H.O. 1000 Turks Islands (with original only)
Colonial Surveyor Map of Grand Turk March 1906 (two sheets) (with original only)
Photographs per list attached:
2-7 through 2-12
3-1 through 3-12
C7CGD Grand Turk No. 1, 2

References not enclosed:

Sailing Directions for West Indies, Vol. I.
Chart: Aeronautical 585

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