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required for loading and unloading radar vans and for removing small boats from the water during bad weather in case there is no sheltered anchorage available.)

g. A base maintenance and boat repair shop 800 sq. ft.

h. A seaplane anchor float (and beaching facilities, if practicable).

i. Housekeeping facilities for fifty personnel on temporary and intermittent occupancy basis. (one or two caretakers and guards will be present at all times.)

(1) Small building (200 sq. ft.) to house evaporator.

(Note: The evaporator may be included in the power house provided it is located reasonably close to the shore).

(2) Water storage tank, 5,000 gallons.

(3) Quarters for 50 persons on a temporary occupancy basis.

(4) Messing facilities.

3. OUTLYING STATIONS. The following facilities will be required at each of the three outlying stations in each instrument group.

a. A 150' tower (same as tower at the main station).

b. Weatherproof room in the tower base (same as at the main station).

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ANNEX "E"

APPENDIX 5

INSTRUMENTATION EQUIPMENT REQUIRED FOR THE EL CENTRO-GULF OF CALIFORNIA RANGE WITH COST ESTIMATES.

1. General. This section deals only with the actual instruments required to instrument and to support the instrumentation of the range. The physical means required for mounting the instruments, consisting of towers, concrete platforms, and other devices, are covered in appendices 3 and 4 of this Annex.

The cost of the instruments and supporting equipment at the main base is estimated to be approximately $6,740,000.

The cost of the instruments required at each observation station, down-range, is estimated to be about $2,205,770, total cost for 13 stations would be approximately $28,675,000.

The cost of impact point observation instruments will be about $2,475,000.

Grand total for the instrumentation costs of the main base and all down-range stations would be approximately $37,890,000.

2. Instruments required at the main base.

a. Optical instruments consisting of:

Five high speed movie cameras of the Mitchell or ribbon frame type, total cost $25,000.

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Three Bowen-Knapp or specially modified Mitchell cameras to measure acceleration, response to steering, and orientation during take-off, total cost $30,000.

Three groups, each group consisting of three (total of nine) cinetheodolites of the modified Askanias, Akely, or Mitchell type for optical tracking total cost $450,000.

Three high magnification photographic telescopes of the "brighteyes" type of 16" reflecting telescopes for photographs of the orientation of the missile, total cost $225,000.

Three ballistic cameras for making especially precise tracks of the missile and checking the precision of other instruments, total cost $75,000.

b. Electrical instruments consisting of:
One group, consisting of one transmitter and four receivers,for DOVAP (radio doppler-velocity-and position) and 4 data tabulating equipments, total cost $700,000.

Tracking radar plus accessory recording positioning equipment, total cost $1,300,000.

Two telemetering reception facilities, total cost $200,000.

c. Communication equipment used in connection with instrumentation. Emergency command radio for fuel cut-off or

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destruction circuits to the missile for use in the event of emergency, total cost $200,000.

A primary time standard connecting all control points, observation stations and observation points, by means of hard wire, cost $25,000 (does not include hardwire).

d. Complete weather observation and recording equipment including means for sounding the upper atmosphere, total cost $10,000.

3. Instrumentation equipment required for that portion of the range outside of the main base area.

There will be a total of 13 instrumentation stations located along the peninsula of lower California beyond the limits of the main base. Each observation station will require the following equipment, to be located at observation points, surrounding the station. (To obtain the total amount of equipment required multiply the items as listed below by thirteen).

a. Optical instruments consisting of:

Average 1.6 cinetheodolites.

Two long range, high powered photographic telescopes, alternate stations (which can be moved from station to station and point to point as required).

Average cost per station of optical instruments, $320,770.

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b. Electrical equipment consisting of:

One DOVAP set, consisting of one transmitter and four receivers, 4 data tabulating equipments and auxiliary apparatus, total cost $800,000.

Tracking radar and radar beacon receivers, total cost $500,000.

One half search radar (alternate stations) total cost $250,000.

Telemetering receivers, total cost $100,000.

c. Communication equipment used in connection with instrumentation.

Equipment for the reception of the primary time standard, total cost $25,000.

Emergency command radio for fuel cut-off or destruction circuits to the missile for use in the event of emergency, total cost $200,000.

d. Complete weather observation and recording equipment including means for sounding the upper atmosphere, total cost $10,000.

4. Impact point instrumentation.

Very little can be said about instrumentation of the impact point, at this time. It would be desirable to determine the aspect

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of the missile, the time-space path, the velocity and deceleration for the terminal leg. At least, the location of the impact point with relation to the launching site, and the time of impact must be determined. In addition, it is highly desirable to receive and record data telemetered from the missile, to be able to effect recovery of ejected components and to be able to destroy the missile by remote control in case of emergency.

Since the impact areas cannot in general be on or near land, it is tentatively recommended that ship-borne instrumentation be provided on at least three ships for locating the water impact point. Ship-borne stations should have telemetering reception of primary time standard, command radio circuits, and emergency destruction circuits to destroy the missile, total cost about $2,475,000.

For more remote areas over deep water, a SOFAR net will be required.

5. Facilities connected with instrumentation common to both the base and the range.

a. A central data reduction center should be provided to perform two functions. First there should be a data reduction center where immediate but approximate information is computed. This would consist of film developing machines, film readers, doppler cycle counters, computing machines, and provisions for supporting a

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staff of approximately 30 mathematicians. Second, there should be a precise data reduction center where high speed automatic computing machines are available and manned with the necessary trained personnel.

b. An instrumentation laboratory, fully air-conditioned, for the maintenance, repair, and storage of the various types of instruments used on the range. It is anticipated that 300 individuals would be required in this work, cost of equipment approximately $3,500,000.

c. The entire range should be covered by a LORAN type of network.

6. Personnel required to man and support the instrumentation contained on the range.

a. Main base area.

Optical	63	
Electrical	51	
Timing and communication circuits	27	
Readings, reductions and evaluations	30	
Overhead for main base operating group	29	
Instrumentation laboratory	300	
Sub total	500	500
b. Observation stations down-range. 13 stations ea.requiring 55 men	715	715
c. Impact point observation teams. 3 teams of 18 men each	54	54
GRAND TOTAL REQUIRED		1,269

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THE JOINT RESEARCH AND DEVELOPMENT BOARD
WASHINGTON 25, D.C.

COMMITTEE ON LONG RANGE PROVING GROUND

PG 27/4.3

9 July 1947.

MEMORANDUM:

TO: ALL HOLDERS OF THE REPORT OF THE
COMMITTEE ON LONG RANGE PROVING GROUND, PG 27/4, JRDB, 20 JUN 47.

1. The Joint Research and Development Board at its ninth meeting on 8 July 1947 approved the report of the Committee on Long Range Proving Ground, PG 27/4, JRDB, 20 June 1947, with the following exceptions:

The Board directed that the report be amended by the deletion in Annex "G" of

a. The NOTE at the end of paragraph 2.b., and

b. Appendix 2 to Annex "G".

2. It is to be noted that these amendments do not in any sense change the intent of the report, except in the attempt to project the impact of the report into the Secretariat of National Security in the event of unification of the Armed Forces.

3. It is requested that you make the necessary changes in your copy of the report of the Committee on Long Range Proving Ground, PG 27/4, JRDB, 20 June 1947.

PAUL J. MALINE
Major, CAC
Executive Director

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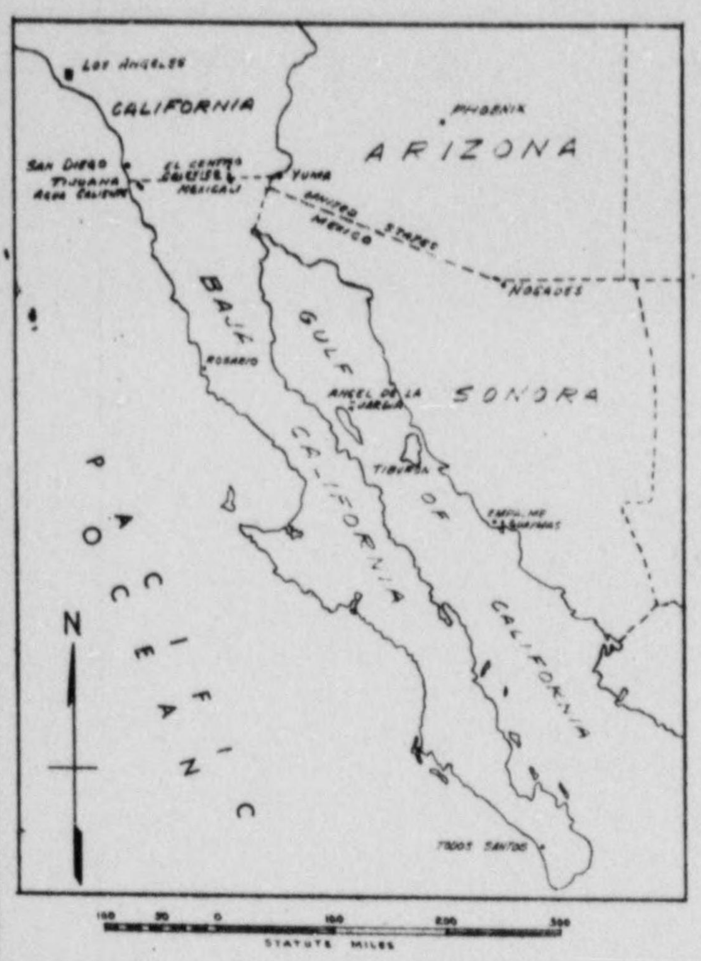
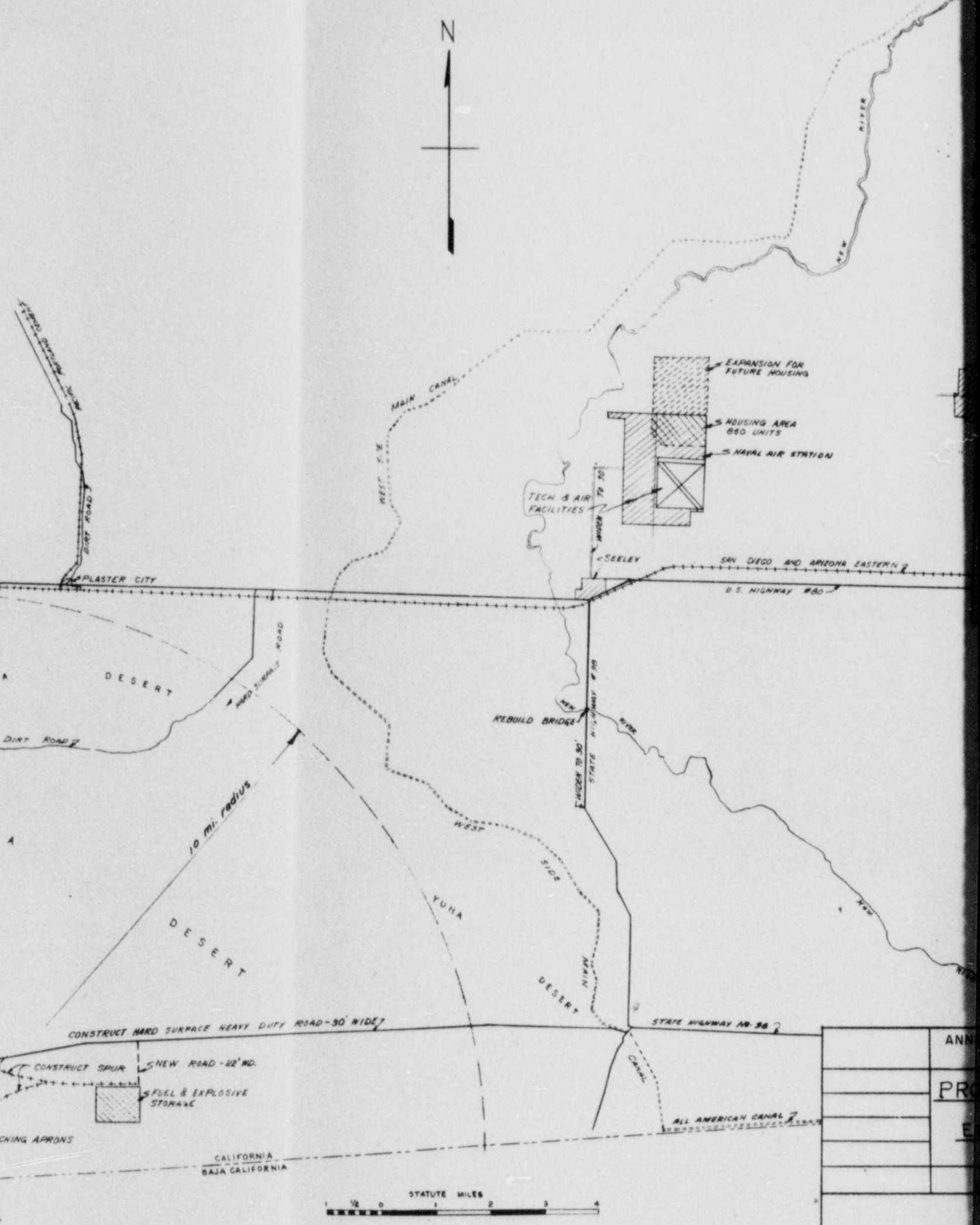
ANNEX – E
APPENDIX-6
(FIGURE - NO. 4).





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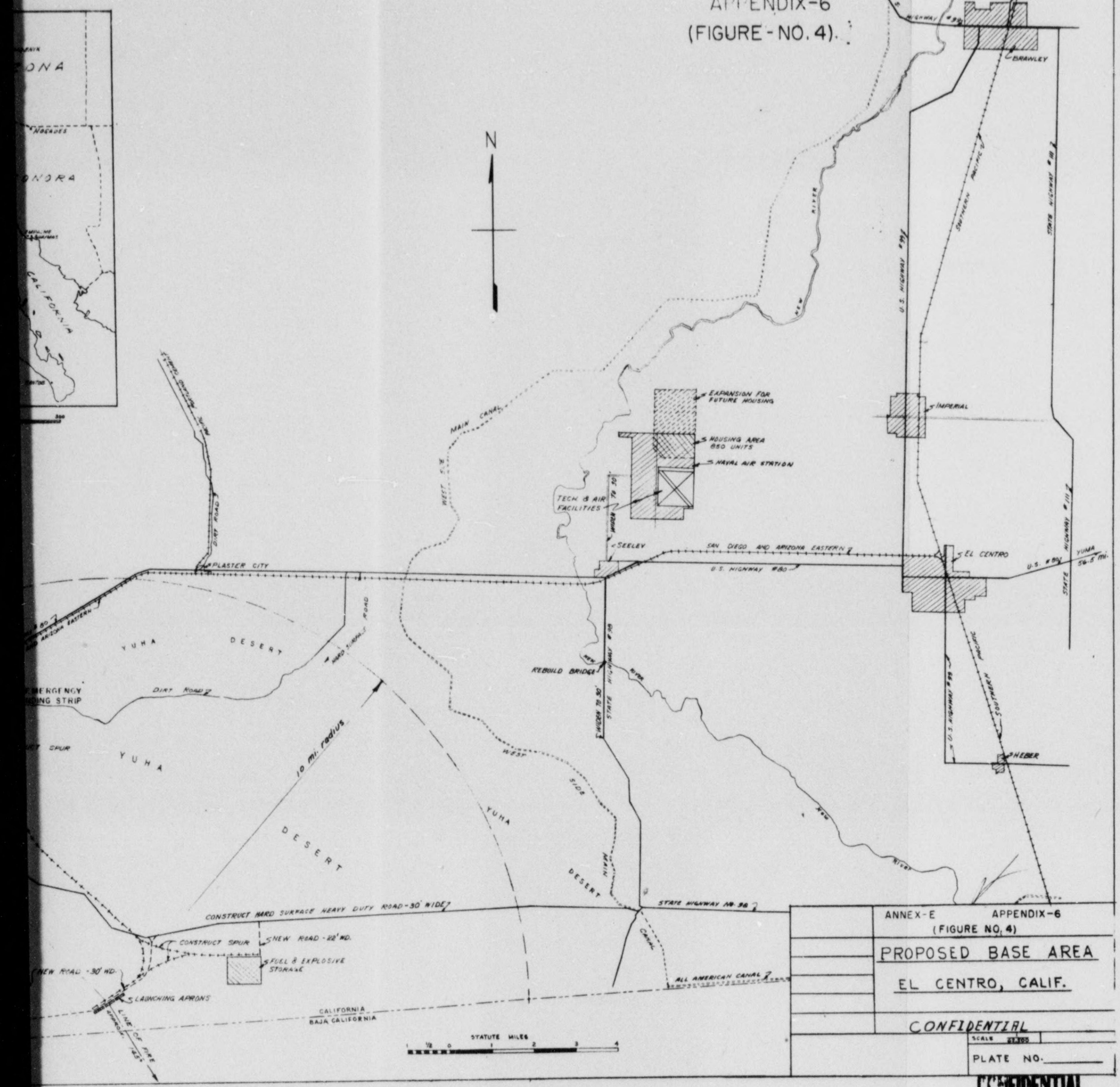
ANNEX – E
APPENDIX-6
(FIGURE - NO. 4)



ANNEX-E APPENDIX-6
(FIGURE NO. 4)

PROPOSED BASE AREA
EL CENTRO, CALIF.

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SCALE 1" = 1 MI.

PLATE NO. _____

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ANNEX E

APPENDIX 7

(FIGURE NUMBER 5)

AREA CHART SHOWING GENERAL LAYOUT OF PROPOSED EL CENTRO-GULF OF CALIFORNIA RANGE

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ANNEX E

APPENDIX 7

(FIGURE NUMBER 5)

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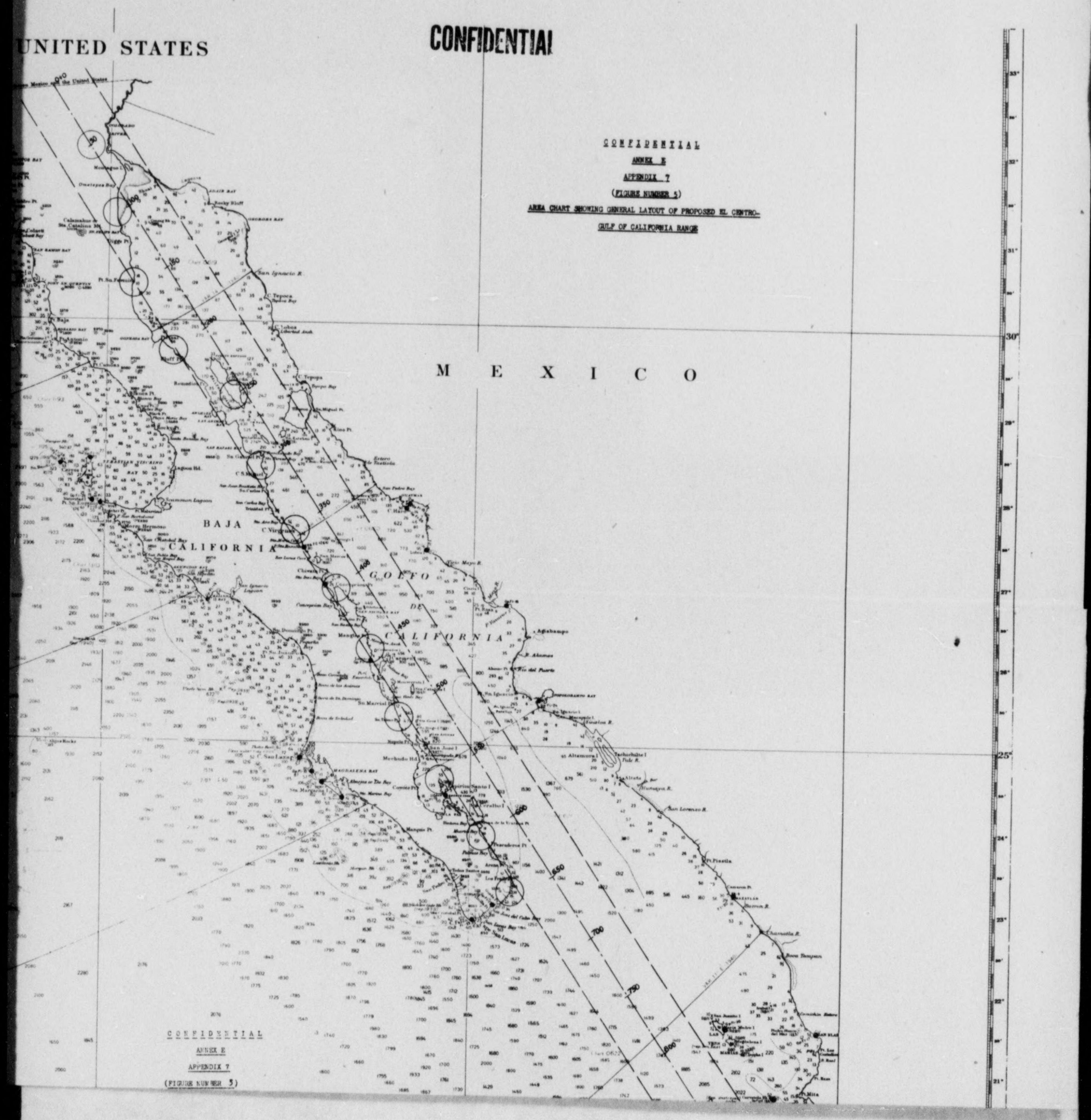
ANNEX E

APPENDIX 7

(FIGURE NUMBER 5)

AREA CHART SHOWING GENERAL LAYOUT OF PROPOSED EL CENTRO-GULF OF CALIFORNIA RANGE



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APPENDIX 7

(FIGURE NUMBER 5)

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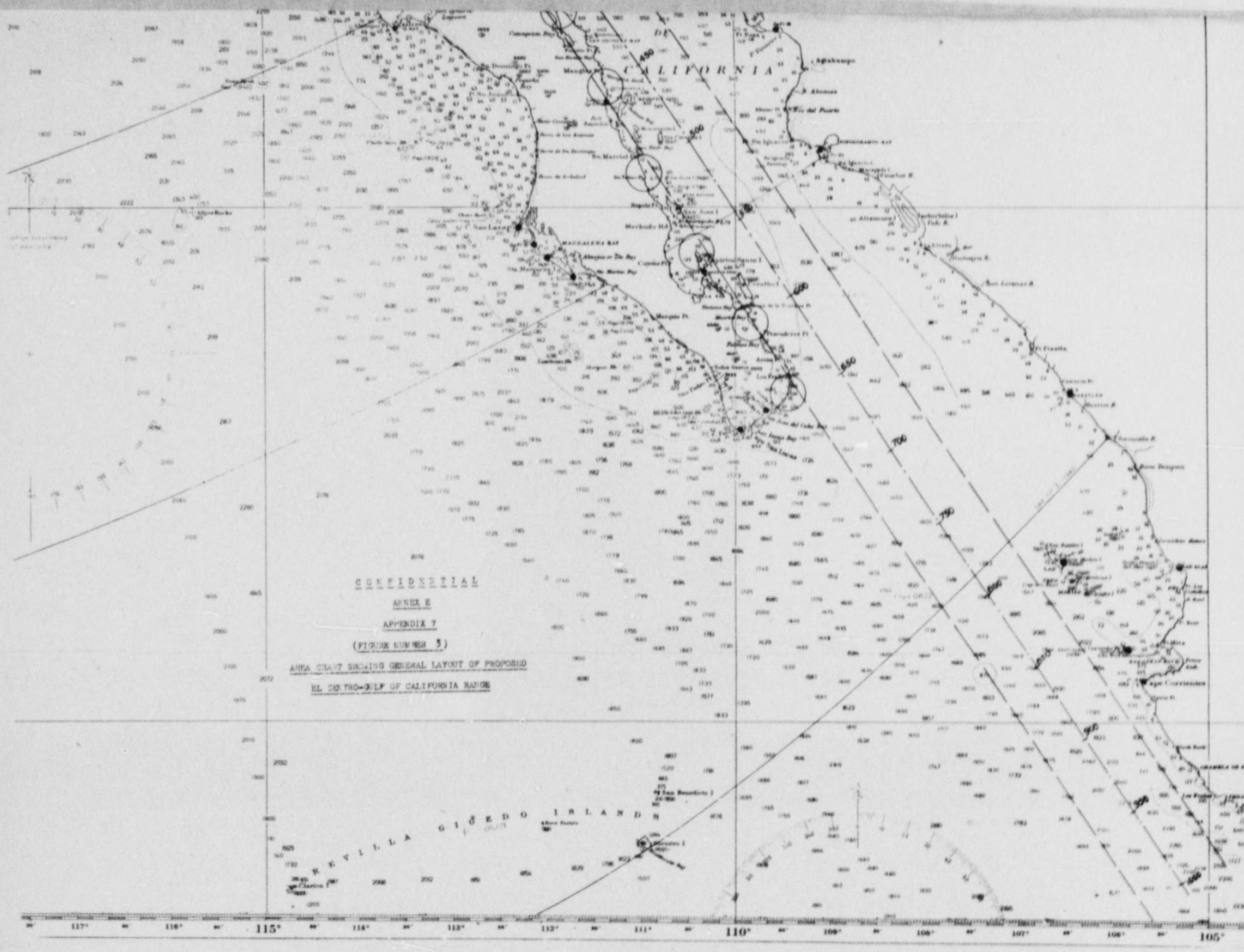

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ANNEX E

APPENDIX 7

(FIGURE NUMBER 5)

AREA CHART SHOWING GENERAL LAYOUT OF PROPOSED

EL CENTRO-GULF OF CALIFORNIA RANGE

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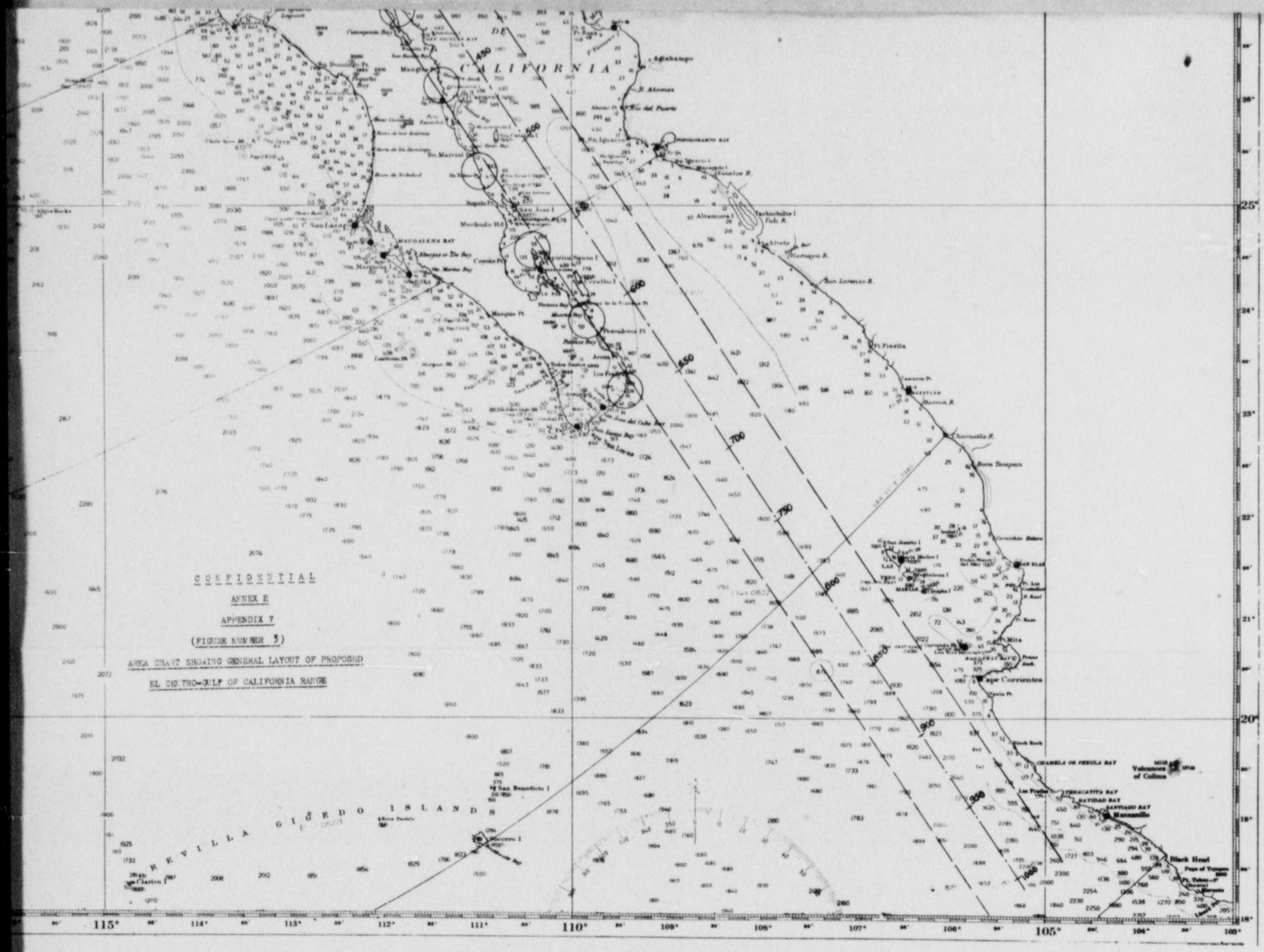

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ANNEX E

APPENDIX 7

(FIGURE NUMBER 5)

AREA CHART SHOWING GENERAL LAYOUT OF PROPOSED

EL CENTRO-GULF OF CALIFORNIA RANGE

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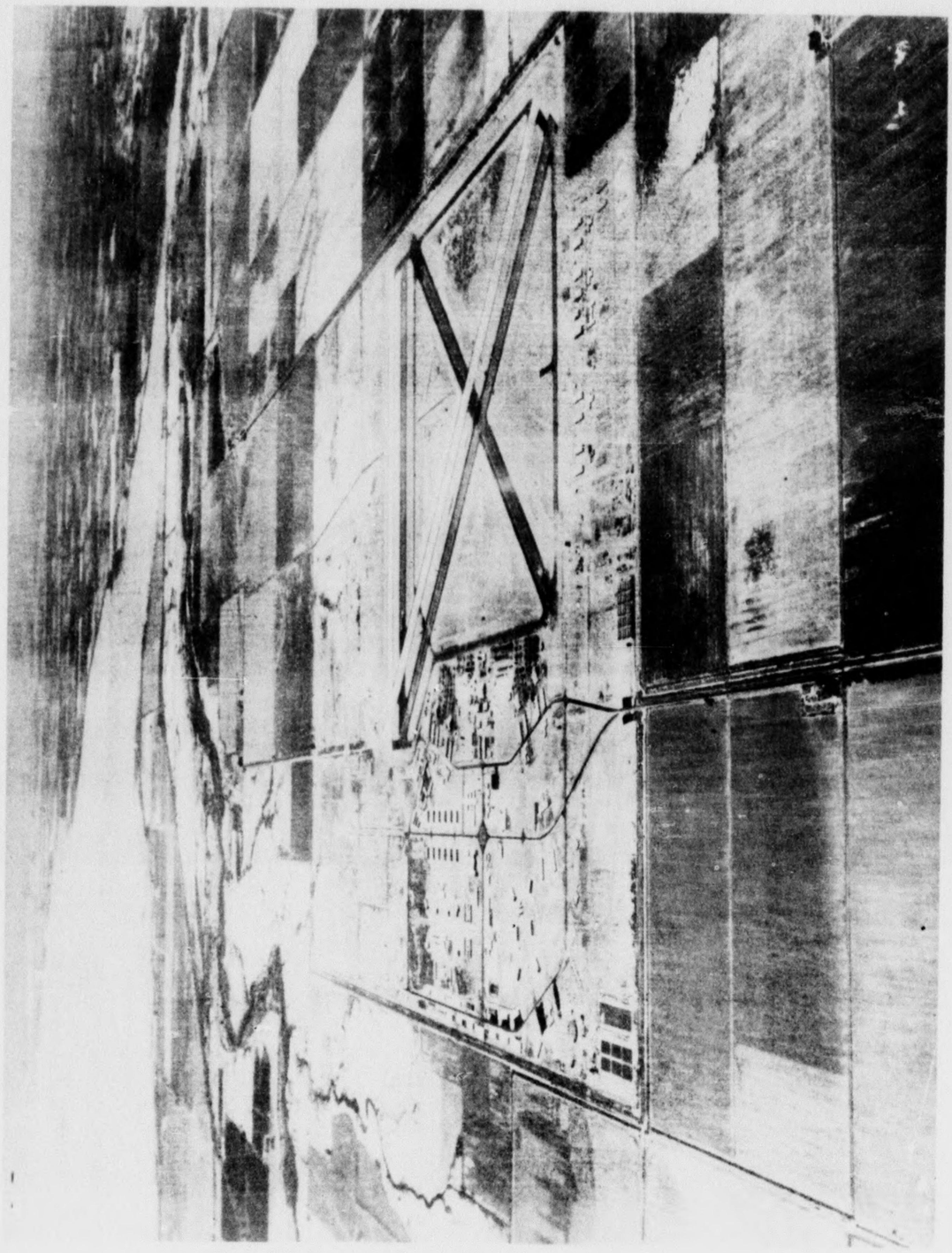
ANNEX "E"

APPENDIX 8

FIGURE 6



Naval Air Station El Centro, California, looking north.

Figure 6, Page 1.

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ANNEX "E"
APPENDIX 8
FIGURE 6

View of launching site area, El Centro-Gulf of California range looking south. Launching site would be located in middle of level area in foreground. Line of fire would be to the south.

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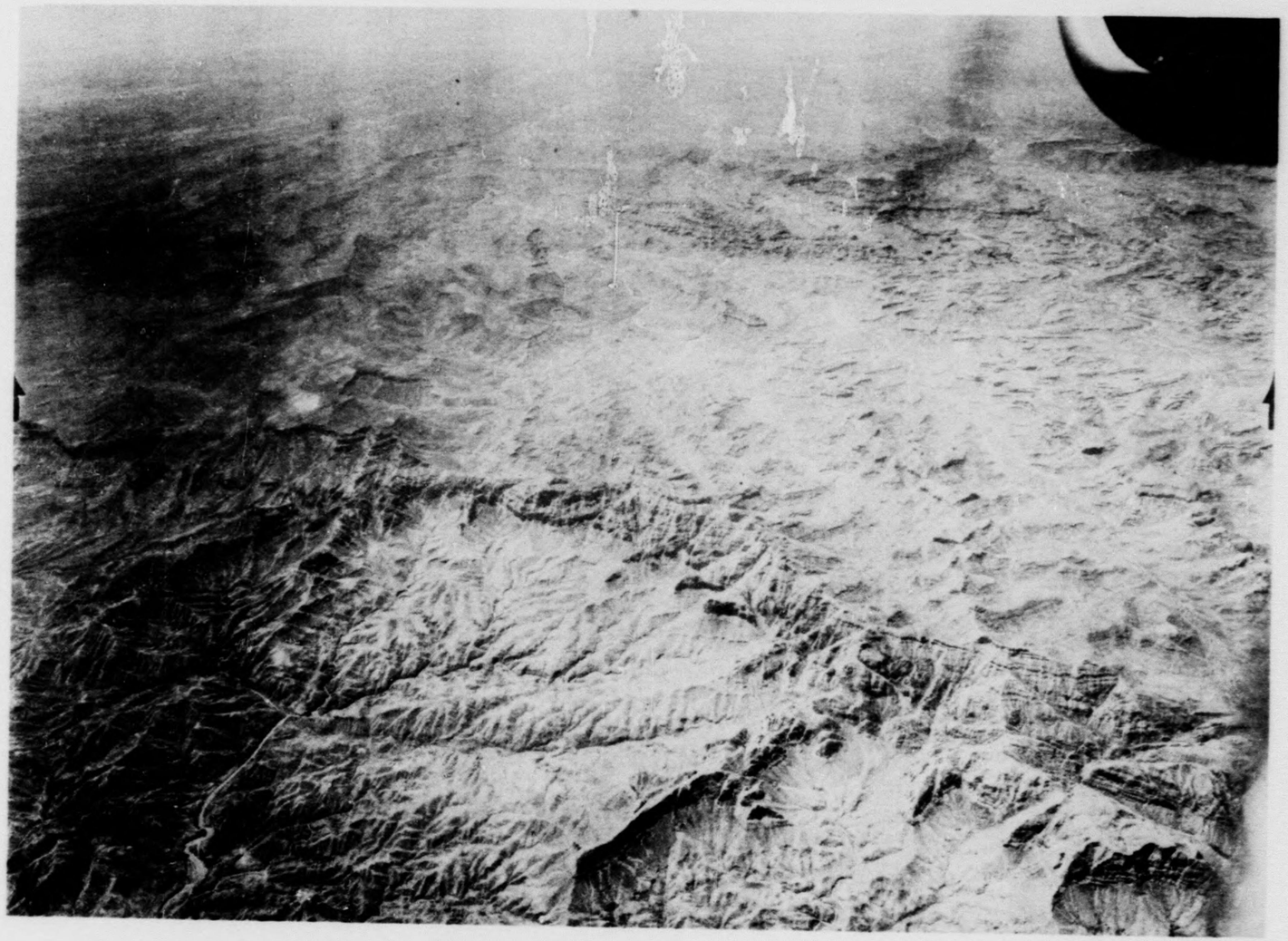

El Centro-Gulf of California range. Typical down-range terrain area shown in vicinity of San Telmo Point, Mexico. View is looking west toward Pacific Ocean. Instrumentation Station No. 10 - 500 miles from launching point will be located in this general area.

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A N N E X "F"

GENERAL FACILITIES AND SERVICES RECOMMENDED FOR THE BANANA RIVER - BAHAMA ISLANDS RANGE

Appendix 1. Discussion of basis of estimates for required base and range facilities for the Banana River - Bahama Islands Range.

Appendix 2. Estimates of Required Base Facilities with Cost Estimates.

Appendix 3. Estimates of Required Range Facilities with Cost Estimates.

Appendix 4. Details of Facilities required for a typical down-range observation station.

Appendix 5. Instrumentation Equipment Required for the Banana River - Bahama Islands Range with Cost Estimates.

Appendix 6. Layout of the Proposed Banana River - Bahama Islands Range.

Appendix 7. Area Chart showing general layout of the proposed Banana River - Bahama Islands Range.

Appendix 8. Photographs of Launching Site and Typical Down-Range Terrain.

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ANNEX "F"

APPENDIX 1.

DISCUSSION OF BASIS OF ESTIMATES FOR REQUIRED BASE AND RANGE FACILITIES.

1. Estimates of cost, based upon preliminary surveys, are not sufficiently accurate for budgetary purposes. However, an initial appropriation of funds, in amount of $25,000,000 would permit preparation of detailed plans for the first phase construction and the accomplishment of more urgently needed construction. Should it be possible to allocate funds for surveys of the selected site, in advance of appropriations for construction, the work would be speeded up.

2. A discussion of the information presented in tabular form follows:

a. Requirements, Base Facilities. The Panel on Base Facilities submitted a report on 31 January 1947 describing the base facilities required for ultimate use of a long range proving ground and indicated the increments of construction. The estimate of facilities was predicated on guided missile development schedules and experience at White Sands Proving Ground to date but is obviously little better than a guess in view of the indeterminate status of development of guided missiles. It is considered reasonable and forms the basis for determination of construction requirements

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as listed in Annex F, Appendices 2 and 3. Actual construction will necessarily proceed in accordance with development of missiles, but provision should be made for ultimate needs in planning and construction of ultilies.

b. Feasibility and Cost of Construction of Base Facilities.

Banana River, Florida, as a site, is acceptable, but is less satisfactory than El Centro, California. The time available for the survey was extremely limited. Cost data was obtained locally and more complete estimates have been prepared subsequently. Such estimates are satisfactory for general study purposes only. Detailed surveys and preparation of plans for the selected site are essential for budgetary purposes.

c. Geodetic Control. A project is now in progress to extend first order control by Shoran to the north coast of Cuba and islands to the east of the tip of Florida. Although still in the experimental stage, it offers the best solution to the problem of extension of control to nearby islands. No known method of geodetic surveying is sufficiently accurate to meet completely the requirements for location of observing stations down-range. Developments are in progress which should increase materially the accuracy of geodetic surveys and Shoran is susceptible to great improvement.

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It is therefore reasonable to expect that if development of more accurate equipment and methods is pursued that a satisfactory degree of accuracy may be attained.

d. Facilities for Observation Stations. Temporary occupancy only is contemplated with caretakers to maintain and guard equipment and facilities between launchings. A minimum of permanent construction is contemplated. Housing and other structures will be prefabricated for ready erection. For both sites, access by seaplane, amphibian aircraft or boat is most feasible and facilities are planned on that basis. Construction, also, can probably be accomplished best by working from an LST or other floating base which will provide quarters and messing facilities.

e. Increments of Construction. The increments of construction are governed largely by the program for the launching facilities. The first phase provides for one launching apron with five firing points and all the facilities necessary for operation, including supporting facilities and housing. The time required for the first phase construction is estimated at two years. Allocation of funds for advance planning, when the site is selected and construction authorized would accelerate construction. Also in case of need, operations might be initiated without waiting for completion of all facilities. In this case some interference

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between operations and construction activities will result. The second and third phases are based on adding a launching apron and facilities in proportion in each case. When the time comes for such increases the requirements should be more definitely indicated.

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ANNEX F
APPENDIX 2

(FIGURE NUMBER 7)
ESTIMATES OF REQUIRED BASE FACILITIES WITH COST ESTIMATES FOR BANANA R

ULTIMATE REQUIREMENTS	AVAILABLE	FIRST PHASE CONSTRUCTION Approximately two years.	N
1. LAND			
Acquire land for expansion of housing, community and administrative facilities, fuel and explosive storage and launching facilities, providing a 10 mile safety radius from launching sites.	Navy owns 1,847 acres at Banana River, NAS, which may be used for the base and technical area. A small tract of land is owned by the Lighthouse Service at Cape Canaveral. In order to provide suitable safety area and security, it will be necessary to acquire all of Merritt Island which includes some 10,000 acres of valuable orange groves and miscellaneous dwellings and other structures. It may also be necessary to provide for relocation of the lighthouse since any suitable location of launching facilities on the Cape will be within one mile of the existing lighthouse structure.	Acquire approximately 65,000 acres of land, including Merritt Island and Cape Canaveral, for the launching site and safety zone and approximately 1000 acres south of NAS for housing and community facilities.	
ESTIMATED COST LAND $4,760,000		$4,760,000	
2. LAUNCHING FACILITIES			
a. Utilities Distribution Blockhouse. This blockhouse will be separate from the control blockhouses. It will house all utilities and control their distribution to all points in the launching area. It will include electrical, radio, telephone, telemetering instrumentation and other controls. Inside dimensions 60' x 120'.		Construct blockhouse to meet ultimate requirements and provide utilities, communications and controls necessary for one launching apron.	
b. Compressed Air Blockhouse. This blockhouse to house air compressors and compressed air distribution for all requirements in the launching area. Inside dimensions 30' x 40'.		Construct blockhouse to meet ultimate requirements and provide utilities, communications and controls necessary for one launching apron.	
c. Railroads. A rail spur from the main spur to the launching area with sidings to each launching site.	The main line of the Florida East Coast Railway passes thru Cocoa, Eau Gallie, and Melbourne on the mainland. No rail facilities available at the site.	None	Init Gall brid and
d. Roads. Hard surfaced, all weather road to all launching sites capable of handling heaviest anticipated loads. Adequate vehicle parking area adjacent to launching site and the utility distribution blockhouse, roads, connecting all observation posts, tracking posts, theodolite and camera stands, and the utilities distribution blockhouse.	State Highway 140 extends along the coast passing through all proposed areas and is accessible from the mainland by three bridges across the Indian River and Banana River.	Widen to 30 ft. & strengthen State Highway 140 between Eau Gallie & the proposed static test area (about 33 mi.). Construct access roads to various areas and structures as required. Strengthen highway bridge across Indian River.	
e. Communications. Adequate telephone trunk lines and master switchboard, radio transmitters, and receivers, including VHF, hardwire communication facilities to all manned positions in launching area.	Available communications to vicinity of launching site inadequate.	Construct pole line between base area and launching and fuel storage area (approximately 20 miles) and to instrumentation stations in vicinity of launching area.	
f. Security. Fence in the entire launching areas with man proof type fence.		Construct fence around entire launching area.	
g. Utility Landing Strip. Adjacent to launching sites length 4,000 feet, minimum width 150 feet.		Construct utility landing strip.	
h. Control Blockhouse. Three Control (CIC) Blockhouses for controlling launchings and for visual observations of missiles. Control of safety and fire fighting would be exercised from this blockhouse. Inside dimensions 40' x 60'.		Construct control blockhouse with necessary controls and equipment for one launching apron.	
i. Launching Aprons. Three heavy concrete aprons 1500' x 150'.		Construct one launching apron.	
j. Lighting. Flood lighting for launching site.		Construct flood lighting for one launching apron.	
k. Fire Fighting. Appropriate fire extinguishing facilities. Estimated water requirements are 200,000 gallons reserve and 6,000 gallons per minute at minimum pressure of 75 lbs. per square inch at outlets.		Construct fire fighting system (salt water if practicable) including storage, pumps and facilities for one launching apron.	
l. Gantry Crane & Heavy Haulers. 1 heavy portable Gantry crane (on rails), at each site. 2 light portable (rubber tired) cranes, at each site.		Provide gantry crane and haulers for one hauling apron.	
ESTIMATED COST LAUNCHING FACILITIES: $7,960,000		$2,760,000	

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ANNEX F
APPENDIX 2
(FIGURE NUMBER 7)

ESTIMATES OF REQUIRED BASE FACILITIES WITH COST ESTIMATES FOR BANANA RIVER-BAHAMA ISLANDS RANGE

ANNEX F
APPENDIX 2
(FIGURE NUMBER 7)

AVAILABLE	FIRST PHASE CONSTRUCTION Approximately two years.	SECOND PHASE CONSTRUCTION	THIRD PHASE CONSTRUCTION
Navy owns 1,847 acres at Banana River, NAS, which may be used for the base and technical area. A small tract of land is owned by the Lighthouse Service at Cape Canaveral. In order to provide suitable safety area and security, it will be necessary to acquire all of Merritt Island which includes some 10,000 acres of valuable orange groves and miscellaneous dwellings and other structures. It may also be necessary to provide for relocation of the lighthouse since any suitable location of launching facilities on the Cape will be within one mile of the existing lighthouse structure.	Acquire approximately 65,000 acres of land, including Merritt Island and Cape Canaveral, for the launching site and safety zone and approximately 1000 acres south of NAS for housing and community facilities.	None	None
	$4,760,000		
	Construct blockhouse to meet ultimate requirements and provide utilities, communications and controls necessary for one launching apron.	Add utilities, communications and controls as required for second launching apron.	Add utilities, communications and controls as required for third launching apron.
	Construct blockhouse to meet ultimate requirements and provide utilities, communications and controls necessary for one launching apron.	Add utilities, communications and controls as required for second launching apron.	Add utilities, communications and controls as required for third launching apron.
The main line of the Florida East Coast Railway passes thru Cocoa, Eau Gallie, and Melbourne on the mainland. No rail facilities available at the site.	None	Initiate construction of spur line fr. Eau Gallie incl. approx. 33mi. of track, trestle bridge with swing span across Indian River and necessary structures.	Complete rail facilities to meet ultimate requirements.
State Highway 140 extends along the coast passing through all proposed areas and is accessible from the mainland by three bridges across the Indian River and Banana River.	Widen to 30 ft. & strengthen State Highway 140 between Eau Gallie & the proposed static test area (about 33 mi.). Construct access roads to various areas and structures as required. Strengthen highway bridge across Indian River.	Construct additional access roads as required.	Construct additional access roads as required.
Available communications to vicinity of launching site inadequate.	Construct pole line between base area and launching and fuel storage area (approximately 20 miles) and to instrumentation stations in vicinity of launching area.	Extend as required.	Extend as required.
	Construct fence around entire launching area.	None	None
	Construct utility landing strip.	None	None
	Construct control blockhouse with necessary controls and equipment for one launching apron.	Construct control blockhouse with necessary controls and equipment for one launching apron.	Construct control blockhouse with necessary controls and equipment for one launching apron.
	Construct one launching apron.	Construct one launching apron.	Construct one launching apron.
	Construct flood lighting for one launching apron.	Construct flood lighting for one launching apron.	Construct flood lighting for one launching apron.
	Construct fire fighting system (salt water if practicable) including storage, pumps and facilities for one launching apron.	Extend firefighting facilities to second launching apron.	Extend fire fighting facilities to third launching apron.
	Provide gantry crane and haulers for one hauling apron.	Provide gantry crane and haulers for one hauling apron.	Provide gantry crane and haulers for one hauling apron.
	$2,760,000	$2,700,000	$2,500,000

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ULTIMATE REQUIREMENTS	AVAILABLE	FIRST PHASE CONSTRUCTION
3. TECHNICAL FACILITIES		
a. Administrative building to include the following: Test director and staff, including aerodynamic, propulsion and electronic experts; project or proof officers; liaison (technical and public information); scientific personnel; secretarial staff; technical library; reports and reproduction; files; large projection rooms and conference rooms; small projection rooms for proof officers - total square feet 50,000.	Suitable existing structures are available at NAS to house all of the administrative facilities for the technical area, classrooms and demonstration laboratory, using separate smaller structures for administrative facilities where practicable.	Modify existing structures to meet ultimate requirements.
b. Classrooms with training items, such as motion pictures, blackboards and demonstration equipment - total square feet 5,000.		
c. Demonstration laboratory. Assembly of study items and demonstration "breadboard" set-ups - total square feet 5,000.		
d. Air Conditioned (all year constant temperature) laboratory — total square feet 32,000.	Laboratory facilities not available and existing structures inadequate.	Construct air conditioned laboratory building to house electronics, mechanism control and photographic laboratories.
(1) Electronics laboratory: Radar, radio-control; homing, guidance and computers; circuit design and analysis; circuit and functional tests, etc. — 10,000 sq. feet.		
(2) Mechanism laboratory, including vibration testing		
(a) Gyroscopes: Test, repair and adjustment — 8,000 square feet.		
(b) Mechanical Computers, including instrumentation equipment — 1,000 square feet.		
(c) Instrument repair, calibration and modification — 3,000 square feet.		
(3) Servo and Control Mechanisms (including hydraulics) — 2,000 square feet.		
(4) Photographic laboratory; processing; camera maintenance and repair; film and chemical storage — 8,000 sq. feet.		
e. Chemical Laboratory: Fuel analysis for qualitative check; surveillance tests — 2,000 square feet total.	Existing structure may be used with some modifications.	Modify existing structure to meet ultimate requirements.
f. Static Test Stand. Facilities for static testing of rocket motors, comprising the following:	Characteristics of this installation make it better suited to a hillside or cliff location rather than on the flat beaches available in the vicinity of Banana River. Also, soil bearing values in this vicinity will increase the cost of construction and introduce some difficulties in economical design for the thrusts contemplated.	Not required during this phase of construction.
(1) Motor mounting capable of withstanding an instantaneous thrust of up to 600,000 pounds with asix of motor inclined not more than 45 degrees from vertical and providing a free path for the flame for at least 100 feet.		
(2) Protected fuel tanks, pumps, piping and control system to meet requirements of motor being tested.		
(3) Protected observation and instrumentation positions not in line with blast from motor and adequately ventilated.		
(4) Fire fighting and deluge water system to meet safety requirements.		
g. Assembly Shop Buildings, four at 40,000 sq. feet each - 160,000 sq. feet total. Each building with suitable heating, cooling and sanitary facilities for 300 persons; power at 110, 220 and 440 volts, three phase; 25 foot clearance under crane hooks (one building will require 100 foot clearance); lighting at 35 ft. candles, trackage in floor for dollies as required with supporting shops as follows:	Two seaplane hangars and two landplane hangars of about 38,000 sqare feet each and an assembly and repair building of about 105,000 square feet are available. Any may be utilized, with modification, to provide assembly shop space to meet ultimate requirements. (See "Air Facilities" below for utilization of remaining hangars.)	Modify hangar and shop to meet requirements during first and second phase operations.
(1) Machine Shop: General purpose high accuracy machine tools - 4,000 square feet.		
(2) Sheet-metal shop: Airplane repair type equipment — 2,000 square feet.		
(3) Electrical shop: General wiring (not to include electronics, radio, radar equipment, etc.) — 1,000 square feet.		
(4) Pipe and tube shop: Equipment for forming, bending and welding — 1,500 square feet.		
(5) Electronic operational test equipment storage - 1,000 sq. ft.		
(6) Shop storage facilities, including tool cribs- 5,000 sq. ft.		
(7) Design and drafting rooms; offices for contractors' personnel and proof officers — 3,000 square feet.		

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AVAILABLE	FIRST PHASE CONSTRUCTION	SECOND PHASE CONSTRUCTION	THIRD PHASE CONSTRUCTION
Suitable existing structures are available at NAS to house all of the administrative facilities for the technical area, classrooms and demonstration laboratory, using separate smaller structures for administrative facilities where practicable.	Modify existing structures to meet ultimate requirements.	None	None
Laboratory facilities not available and existing structures inadequate.	Construct air conditioned laboratory building to house electronics, mechanism control and photographic laboratories.	None	None
Existing structure may be used with some modifications. Characteristics of this installation make it better suited to a hillside or cliff location rather than on the flat beaches available in the vicinity of Banana River. Also, soil bearing values in this vicinity will increase the cost of construction and introduce some difficulties in economical design for the thrusts contemplated.	Modify existing structure to meet ultimate requirements. Not required during this phase of construction.	None Initiate construction Static Test Stand	None Complete construction of Static Test Stand.
Two seaplane hangars and two landplane hangars of about 38,000 sqare feet each and an assembly and repair building of about 105,000 square feet are available. Any may be utilized, with modification, to provide assembly shop space to meet ultimate requirements. (See "Air Facilities" below for utilization of remaining hangars.)	Modify hangar and shop to meet requirements during first and second phase operations.	Modify hanger to meet ultimate requirements.	It may be necessary to construct a new shop building to meet ultimate requirements (in the event that existing structures cannot be modified to provide facilities to meet future developments.)

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ULTIMATE REQUIREMENTS	AVAILABLE	FIRST PHASE CONSTRUCTION
3. TECHNICAL FACILITIES (CON'T)		
h. Service Shop, including foundry (non-ferrous) pattern shop, forging and heat treating shop, welding and heavy-duty machine shop, 7,500 square feet.		Construct service shop.
i. Propulsion shop: Calibration of fuel equipment, such as pumps, flow meters, etc. (calibration of more delicate mechanisms to be carried out in mechanism laboratory) — 3,500 square ft. total.		Construct Propulsion Shop.
j. Technical Facilities Maintenance Shop — 1,000 sq. ft. total.	Utilize existing structure.	Modify existing structure as required.
k. Storage Facilities in Technical Area.		
(1) Technical supplies: Sheet-metals, electronics, piping, tubing, bars and rods; missiles components. (General storage for technical division; to be centrally located in technical area.) 25,000 square feet.	Utilize existing structures.	Modify existing structure as required.
l. Messing Facilities in Technical Area. Small cafeteria in technical area (seating capacity 250 people) 8,000 square feet.	Existing structure may be utilized.	Modify existing structure to meet ultimate requirements.
m. Fire Fighting Facilities in Technical Area. Fire fighting facilities - 2,400 square feet.	Existing structure may be utilized.	Enlarge existing structures to meet ultimate requirements.
ESTIMATED COST TECHNICAL FACILITIES: $4,665,000		$2,045,000
4. EXPLOSIVE STORAGE FACILITIES., Total Area 5 Square Miles.		
a. Explosive Storage Facilities - Magazines will be required for storage of war heads, rockets and pyrotechnics.	Suitable area for fuel and explosive storage is available. A magazine area adjacent to the NAS Airfield provides approximately 50,000 square feet of magazine storage, however, part of this area will be required for runway extensions and the remainder may be used for housing expansion.	Prepare entire area for ultimate requirements, including security and fire fighting facilities. Construct storage facilities to meet expected requirements for operations during first and second construction phases.
b. Fuel Storage. Facilities for storing fuel and chemical components of a highly dangerous character will be required.		
ESTIMATED COST EXPLOSIVE STORAGE FACILITIES: $900,000		$600,000
5. AIR FACILITIES		
a. Location - Air facilities should be located in an area remote from the launching area to avoid interference in the respective operations.	Existing landplane facilities include three 4000' runways and one 4350' runway, all 200' wide, of asphalt concrete and 60,000 pound capacity. Only two of these may be extended to 8000 ft. 50,000 sq. yards of landplane parking area and 125,000 square yards of seaplane parking area are available. Due to the probable use of seaplanes as well as landplanes at this site, it is proposed to utilize about one third of the seaplane parking area (40,000 square yards) and provide 140,000 square yards for landplane parking aprons.	Strengthen and extend one 4350' (SE-NW) and one 4000' (NE-SW) runway. Strengthen taxiways and extend as required. Strengthen and extend parking aprons as required.
b. Runways and Taxiways. The following is the ultimate requirement for runways and taxiways: (1) Two runways 8000' x 200', 140,000 lb. capacity. (2) Two taxiways 8500' x 75', with 140,000 lb. capacity. (3) Parking aprons, 140,000 lb. capacity, 180,000 sq. yds.		
c. Buildings. The following buildings are required: (1) 3 hangars 300' x 240' (2) 3 hangar leantos 40' x 200' (3) Operations building, including control tower, aerology room, reading room, chart room, communications, etc. 8,000 square feet. (4) Base engineering shop - 20,000 square feet. (5) Paint and dope shop - 1,000 square feet. (6) Fire and crash station - 4,000 square feet. (7) Headquarters building - 4,000 square feet. (8) Aviation warehouses - 60,000 square feet. (9) Cafeteria, seating capacity 250 - 8,000 square feet.	Two seaplane hangars and one landplane hangar, each 160' x 240'; one landplane hangar 158' x 200' and one landplane hangar 175' x 201' are available. Two of these will be used for assembly shops in connection with the technical area. It is proposed to retain one seaplane hangar for use of seaplanes. Structures are available in which to house all of the other air facilities required.	Modify existing structures to house air operations, shop, service, storage and cafeteria facilities.
d. Miscellaneous.		
(1) Aviation gasoline storage - 1,000,000 gallons.	Gasoline storage adequate (1,000,000 gallons.)	None
(2) Radio communications, radio range, localizer, etc.	Available structures may be utilized with some modifications.	Modify existing structures as may be necessary to meet ultimate requirements.
ESTIMATED COST AIR FACILITIES: $4,785,000		$2,915,000

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AVAILABLE	FIRST PHASE CONSTRUCTION	SECOND PHASE CONSTRUCTION	THIRD PHASE CONSTRUCTION
	Construct service shop.	None	None
	Construct Propulsion Shop.	None	None
Utilize existing structure.	Modify existing structure as required.	None	None
Utilize existing structures.	Modify existing structure as required.	None	None
Existing structure may be utilized.	Modify existing structure to meet ultimate requirements.	None	None
Existing structure may be utilized.	Enlarge existing structures to meet ultimate requirements.	None	None
	$2,045,000	$1,620,000	$1,000,000
Suitable area for fuel and explosive storage is available. A magazine area adjacent to the NAS Airfield provides approximately 50,000 square feet of magazine storage, however, part of this area will be required for runway extensions and the remainder may be used for housing expansion.	Prepare entire area for ultimate requirements, including security and fire fighting facilities. Construct storage facilities to meet expected requirements for operations during first and second construction phases.	Construct additional facilities as required.	Complete storage facilities to meet ultimate requirements.
	$600,000	$200,000	$100,000
Existing landplane facilities include three 4000' runways and one 4350' runway, all 200' wide, of asphalt concrete and 60,000 pound capacity. Only two of these may be extended to 8000 ft. 50,000 sq. yards of landplane parking area and 125,000 square yards of seaplane parking area are available. Due to the probable use of seaplanes as well as landplanes at this site, it is proposed to utilize about one third of the seaplane parking area (40,000 square yards) and provide 140,000 square yards for landplane parking aprons.	Strengthen and extend one 4350' (SE-NW) and one 4000' (NE-SW) runway. Strengthen taxiways and extend as required. Strengthen and extend parking aprons as required.	Complete parking aprons.	None
Two seaplane hangars and one landplane hangar, each 160' x 240'; one landplane hangar 158' x 200' and one landplane hangar 175' x 201' are available. Two of these will be used for assembly shops in connection with the technical area. It is proposed to retain one seaplane hangar for use of seaplanes. Structures are available in which to house all of the other air facilities required.	Modify existing structures to house air operations, shop, service, storage and cafeteria facilities.	Construct one hangar with leanto.	Construct one hangar with leanto.
Gasoline storage adequate (1,000,000 gallons.)	None	None	None
Available structures may be utilized with some modifications.	Modify existing structures as may be necessary to meet ultimate requirements.	None	None
	$2,915,000	$935,000	$935,000

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ITEM	OFFICERS	Civilians of Officer Status	Enlisted Personnel.	Civilians of Enlisted Status	TOTALS	AVAILABLE	FIRST PHASE CONSTRUCTION	ULTIMATE REQUIREMENTS
6. HOUSING AND COMMUNITY FACILITIES								
a. Estimates of Personnel								
	PERMANENT PERSONNEL							
Permanent personnel required*	400	500	2,400	1,000	4,300			
	TEMPORARY PERSONNEL							
Transients	150	150	-	-	300		300 (Plus construction force)	
Military personnel in training	100	-	1,000	-	1,100		25	1
	250	150	1,000	-	1,400		0	
							25	
*Breakdown of permanent personnel required.								
Single workers -25%	100	125	600	250	1,075			
Married workers -75%	300	375	1,800	750	3,225		75	
Dependents (2.8 per married worker)							225	
	840	1,050	5,040	2,100	9,030			1,
	1,240	1,550	7,440	3,100	13,330		630	3,
Total ultimate population - permanent workers, dependents, transients and trainees					14,730		930	
							955	

It will be noted that the above figures are based on the assumption that 75% of the enlisted personnel will be married. It is believed that, in view of the skilled and experienced type of enlisted personnel required, this is a realistic assumption.

Many of the community facilities required may ultimately be provided in Eau Gallie, Cocoa and other nearby towns, therefore this estimate of requirements represents the maximum and may undoubtedly be scaled down as the area develops and outside communities begin to absorb the population. Existing facilites will care for initial requirements, but are inadequate for ultimate population.

b. **Housing:** The following housing will be required on the basis of the assumptions regarding personnel requirements:

	UNITS	AVAILABLE	FIRST PHASE CONSTRUCTION	ULTIMATE REQUIREMENTS
(1) Quarters for married officers and married civilians of officer status.	675	Three (3) married officers quarters and a low cost housing development are available at NAS. These are estimated to provide about 25 units of housing.	Construct 250 units.	Pro
(2) Quarters for married enlisted personnel and married civilians of enlisted status.	2,550	About 25 units of housing for married EM available at NAS.	Construct 975 units.	Pro
(3) Quarters and messing facilities for single officers and single civilians of officer status (includes 100 officers in training.)	325	Existing structures adequate with some modifications	Modify sufficient quarters to provide approximately 125 units	Pro
(4) Quarters and messing facilities for single civilians of enlisted status.	250	" " " "	Modify sufficient quarters to provide approximately 100 units.	Pro
(5) Hotel accommodations for transients.	300	" " " "	Modify sufficient quarters to provide approximately 120 units.	Pro
(6) Barracks and messing facilities for single enlisted personnel (includes 1000 in training.)	1,600	" " " "	Modify sufficient quarters to provide for approximately 600 units.	Pro
ESTIMATED COST HOUSING FACILITIES: $34,445,000			$13,285,000	$10,

c. **Community Facilities.** The following community facilities are required on the basis of the assumptions regarding personnel requirements:

	AVAILABLE	FIRST PHASE CONSTRUCTION	ULTIMATE REQUIREMENTS
(1) Theaters - two with 1,000 seats each.	One theatre (1020 seats) available.	None	None
(2) Chapels - three with 600 seats each	One chapel (400 seats) available.	Construct additional chapel.	None
(3) Schools			
1. Elementary schools - six for 360 pupils each.	None at NAS. Local communities will not be able to take care of all school requirements.	Construct two elementary schools.	Const
2. High School - one for 600 pupils and including a gymnasium, athletic field and auditorium.			and u school

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AVAILABLE	FIRST PHASE CONSTRUCTION	SECOND PHASE CONSTRUCTION	THIRD PHASE CONSTRUCTION
Many of the community facilities required may ultimately be provided in Eau Gallie, Cocoa and other nearby towns, therefore this estimate of requirements represents the maximum and may undoubtedly be scaled down as the area develops and outside communities begin to absorb the population. Existing facilites will care for initial requirements, but are inadequate for ultimate population.	300 (Plus construction force)	1,700	3,000 4,300
	25 0 25	120 400 520	210 300 750 960 1,100 1,400
	75 225 630 930	425 1,275 3,570 5,270	750 1,075 2,250 3,225 6,300 9,030 9,300 13,330
	955	5,790	10,260 14,730
	Construct housing adequate to care for estimated requirements during second phase of construction (see tabulation above.)	Construct housing to meet estimated requirements at beginning of third phase of construction (see tabulation above.)	Construct housing to meet ultimate requirements.
Three (3) married officers quarters and a low cost housing development are available at NAS. These are estimated to provide about 25 units of housing.	Construct 250 units.	Provide an additional 200 units.	Provide an additional 200 units.
About 25 units of housing for married [illegible] available at NAS.	Construct 975 units.	Provide an additional 775 units.	Provide an additional 775 units.
Existing structures adequate with some modifications	Modify sufficient quarters to provide approximately 125 units	Provide an additional 100 units.	Provide an additional 100 units.
" " " "	Modify sufficient quarters to provide approximately 100 units.	Provide an additional 75 units.	Provide an additional 75 units.
" " " "	Modify sufficient quarters to provide approximately 120 units.	Provide an additional 90 units.	Provide an additional 90 units.
" " " "	Modify sufficient quarters to provide for approximately 600 units.	Provide an additional 500 units.	Provide an additional 500 units.
	$13,285,000	$10,580,000	$10,580,000
One theatre (1020 seats) available.	None	None	Construct additional theatre if conditions during this phase indicates requirement.
One chapel (400 seats) available.	Construct additional chapel.	None	Construct additional chapel.
None at NAS. Local communities will not be able to take care of all school requirements.	Construct two elementary schools.	Construct two elementary schools and ultimate construction of high school, if required.	Construct two more elementary schools and complete construction of high school, if required.

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ULTIMATE REQUIREMENTS	AVAILABLE	FIRST PHASE CONSTRUCTION	
6. HOUSING AND COMMUNITY FACILITIES (CON'T)			
(4) A hospital, 500 bed capacity, to serve all military and civilian personnel. Includes a dental clinic, hospital laundry and quarters for nurses and corpsmen.	Hospital facilities for approximately 100 available.	Construct facilities for an additional 100 beds.	C a
(5) A shopping center to include retail stores of all types, a bank, post office, telephone exchange, telegraph office, bus terminal, cobbler shop, barber shop, beauty parlor, restaurant, professional offices, etc. It is estimated that 160,000 square feet of floor space will be required for these activities.	Some of these facilities are available in nearby communities, but not sufficient to meet ultimate requirements.	Construct minimum facilities to serve anticipated requirements during first and second phases.	E n
(6) A garage and filling station for non-military vehicles - 15,000 square feet area.		Construct to meet ultimate requirements.	N
(7) A community recreation center to include bowling alleys, dance floor, game rooms, swimming pool, snack bar, etc. - 80,000 sq. ft. area.	Existing facilities include a temporary swimming pool, gymnasium, tennis and handball courts and other miscellaneous outdoor athletic facilities.	Construct facilities to meet minimum requirements during second phase operations.	C a
(8) A community library - 3,000 square feet area.	Library available.	Modify to meet ultimate requirements.	N
(9) A laundry and dry cleaning plant - 60,000 sq. ft. area.		Construct minimum facilities required.	E
(10) A community bakery - 30,000 sq. ft. area.	About 75% adequate.	None	N
(11) A cold storage, ice making and ice cream making plant - 8,000 sq. ft. area.	Existing facilities inadequate.	Construct cold storage plant.	N
(12) Fire stations - two with three pieces of apparatus each - total 15,000 sq. ft. area.	Existing facilities inadequate.	Construct one fire station.	C
(13) Community administration building to include rental offices, police station, etc. - 10,000 sq. ft. area.	Suitable structure ayailable.	Modify existing structure to meet ultimate requirements.	N
d. Supporting Facilities for Personnel. The following supporting facilities will be required:			
(1) Club facilities for officers and civilians of officer status - 10,000 sq. ft. area.	Officers Club available.	Modify as required to meet ultimate requirements.	N
(2) Club facilities for top grade non-commissioned officers - 3,000 sq. ft. area.		Construct NCO Club facilities.	
(3) Recreation building for enlisted personnel. To be located in the barracks area and to include a gymnasium, bowling alleys, game room, library and reading room and a beer parlor - 15,000 sq. ft. area.	Welfare building of about 25,000 sq. ft. available.	Modify structure as required.	In m
(4) A post exchange to be located near the barracks area - 5,000 sq. ft. area.	Existing structure about 60% adequate.	Extend facilities as required.	N
(5) A guard house, capacity 35 prisoners.	Facilities for 21 prisoners available.	Construct additional facilities to meet ultimate requirements.	N
ESTIMATED COST COMMUNITY & SUPPORTING FACILITIES: $15,865,000		$4,515,000	$6,
7. ADMINISTRATION AND UTILITIES FACILITIES			
a. Base Administration Building to provide offices for the Commanding Officer and his staff, including supply, accounting, disbursing, security, communications, maintenance, personnel (labor relations and employment), etc. - 50,000 sq. ft. area.	No single structure of this size suitable for use as an administration building is available. Some existing smaller structures may be utilized during initial phases of operations.	Modify existing structures to meet minimum requirements during first and second phase operations.	Con bui qui
b. Operation, maintenance and repair of motor vehicles. (1) Motor pool dispatchers office - 4000 sq. ft. area. (2) Gasoline station - 25,000 gals. storage 1000 sq. ft. (3) Open paved parking area - 320,000 sq. ft. area. (4) First echelon maintenance shop (for periodic inspection, minor repairs and adjustments) 5,000 sq. ft. area. (5) Second and third echelon repair shop - 10,000 sq. ft. area. (6) Fourth and fifth echelon repair shop - 20,000 sq. ft. area.	Existing structures and facilities with some alterations, can provide about 50% of the ultimate requirements.	Modify existing structures as required to meet minimum anticipated requirements.	Exp as
c. Locomotive repair shop - 4,000 sq. ft. area.		None	Cons
d. Base maintenance facilities. (1) Carpenter shop - 10,000 sq. ft. area. (2) Electrical shop - 4,000 sq. ft. area. (3) Plumbing and sheet metal shop - 6,000 sq. ft. area. (4) Paint Shop - 4,000 sq. ft. area. (5) Building material warehouse - 20,000 sq. ft. area.	Existing structures may be utilized to provide about 50% of the base maintenance facilities.	Modify existing structures to provide minimum facilities required during first phase and second phase.	Expa as r

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	FIRST PHASE CONSTRUCTION	SECOND PHASE CONSTRUCTION	THIRD PHASE CONSTRUCTION
...ies for approximately	Construct facilities for an additional 100 beds.	Construct facilities for an additional 200 beds.	Complete to meet ultimate hospital requirements.
...cilities are available ...ities, but not sufficient ... requirements.	Construct minimum facilities to serve anticipated requirements during first and second phases.	Expand facilities as may be necessary.	Expand facilities as may be necessary.
	Construct to meet ultimate requirements.	None	None
...ies include a temporary ...ymnasium, tennis and ...nd other miscellaneous ... facilities.	Construct facilities to meet minimum requirements during second phase operations.	Construct additional facilities as may be required.	Complete facilities to meet ultimate requirements.
...e.	Modify to meet ultimate requirements.	None	None
	Construct minimum facilities required.	Expand facilities as required.	Complete facilities to meet ultimate requirements.
...e.	None	None	Provide additional facilities to meet ultimate requirements.
...ies inadequate.	Construct cold storage plant.	None	None
...ies inadequate.	Construct one fire station.	Construct one fire station.	None
...re available.	Modify existing structure to meet ultimate requirements.	None	None
...ilable.	Modify as required to meet ultimate requirements.	None	None
	Construct NCO Club facilities.		
...of about 25,000 ...	Modify structure as required.	Install additional facilities to meet ultimate requirements.	None
...re about 60% adequate.	Extend facilities as required.	None	None
... prisoners available.	Construct additional facilities to meet ultimate requirements.	None	None
	$4,515,000	$6,950,000	$4,400,000
...re of this size suitable ...inistration building is ...existing smaller structures ...uring initial phases of	Modify existing structures to meet minimum requirements during first and second phase operations.	Construct base administration building to meet ultimate requirements.	None
...es and facilities with ... can provide about 50% ...equirements.	Modify existing structures as required to meet minimum anticipated requirements.	Expand motor pool facilities as required.	Complete motor pool facilities to meet ultimate requirements.
	None	Construct locomotive repair shop.	None
...es may be utilized to ... of the base maintenance	Modify existing structures to provide minimum facilities required during first phase and second phase.	Expand base maintenance facilities as required.	Complete base maintenance facilities to meet ultimate requirements.

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ULTIMATE REQUIREMENTS	AVAILABLE	FIRST PHASE CONSTRUCTION
7. ADMINISTRATION AND UTILITIES FACILITIES (CON'T)		
e. General Storage Facilities.		
(1) General stores and supplies - 500,000 sq. ft. area.	Available storage facilities about 30% adequate.	Increase existing storage facilities to provide about 50% of ultimate.
(2) Quartermaster stores - 50,000 sq. ft. area.		
(3) Paint and oil stores - 20,000 sq. ft. area.		
f. Fire station - 3000 sq. ft. area.		Construct fire station.
g. Cafeteria, seating capacity 250 - 8,000 sq. ft. area.		Construct cafeteria.
(As through "g") ESTIMATED COST BASE ADMINISTRATIVE AREA FACILITIES: $3,330,000		$900,000
h. Utilities and Services for the entire area.		
(1) Electric power required - approx. 10,000 KVA. This may be provided by a new power plant or by purchase, or by a combination of the two, depending on location.	Insufficient electric power available at NAS to meet requirements. Prime station is located at Orlando, Fla., about 45 miles distance. Further detailed survey should be made to determine the most economical source.	Increase capacity of transmission line from Orlando, Florida to vicinity of sites to take care of ultimate requirements. (As an alternate consideration should be given to construction of a prime station at the site.)
(2) Electric distribution system as required.	Present distribution system inadequate for technical area and for housing expansion.	Increase capacity of local transmission lines, install additional transformers and extend distribution lines to meet ultimate requirements of technical and launching areas and portion of housing area.
(3) Water treatment plant - 1,500,000 gallons per day, 3,000,000 gallon reservoir.	Existing water supply capacity about 350,000 gal/day from 3 12 inch wells 300 feet deep. Storage facilities for 700,000 gallons in two concrete reservoirs and two elevated tanks.	Drill additional wells at base area and at launching site, install pumps and additional storage and treatment facilities to meet ultimate requirements.
(4) Water distribution system.	Present system inadequate.	Construct distribution system in launching area and extend system in base technical and housing areas as required.
(5) Sewage disposal plant for 15,000 population ultimately.	Sewage disposal, plant capacity 6,000 persons. Chlorination and sludge digestion.	Enlarge existing plant to meet anticipated requirements, or construct new plant for housing area. Install septic tanks in launching area.
(6) Sanitary sewer system.	Present system inadequate.	Construct sanitary sewer system as required.
(7) Storm sewer system.	" " "	" storm " " " "
(8) Telephone distribution system.	Present system about 50% adequate.	Expand telephone system as required.
(9) Streets, walks and roads as required.	Present facilities about 25% adequate.	Construct streets, roads, and walks as required.
(10) Street and road lighting system as required.	" " " " "	Construct street and road lighting as required.
(11) Railroad system and a small classification yard as required.		Not required during this phase, see "Launching Fa
ESTIMATED COST UTILITIES AND SERVICE FACILITIES: $4,070,000		$2,965,000
8. INSTRUMENTATION FACILITIES, MAIN BASE AREA:		
These facilities will consist of 6 towers 150 feet high; concrete slabs with tie downs; and pole masts for antenas.		
ESTIMATED COST: $500,000		$300,000
TOTAL ESTIMATED COST BASE FACILITIES: $81,280,000		$35,045,000

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ABLE	FIRST PHASE CONSTRUCTION	SECOND PHASE CONSTRUCTION	THIRD PHASE CONSTRUCTION
le storage facilities about equate.	Increase existing storage facilities to provide about 50% of ultimate.	Construct additional storage facilities as required.	Complete storage facilities to meet ultimate requirements.
	Construct fire station.	None	None
	Construct cafeteria.	None	None
	$900,000	$1,515,000	$915,000
ient electric power available meet requirements. Prime sta- located at Orlando, Fla., about distance. Further detailed hould be made to determine the nomical source.	Increase capacity of transmission line from Orlando, Florida to vicinity of sites to take care of ultimate requirements. (As an alternate, consideration should be given to construction of a prime station at the site.)	None	None
distribution system inadequate nical area and for housing ex-	Increase capacity of local transmission lines, install additional transformers and extend distribution lines to meet ultimate requirements of technical and launching areas and portion of housing area.	Extend distribution lines as required to meet housing and community expansion.	Complete distribution system to meet ultimate requirements.
water supply capacity about gal/day from 3 12 inch wells deep. Storage facilities for gallons in two concrete reservoirs levated tanks.	Drill additional wells at base area and at launching site, install pumps and additional storage and treatment facilities to meet ultimate requirements.	None	None
ystem inadequate.	Construct distribution system in launching area and extend system in base technical and housing areas as required.	Extend system as required to meet housing expansion.	Complete distribution system to meet ultimate requirements.
sposal, plant capacity 6,000 Chlorination and sludge digestion.	Enlarge existing plant to meet anticipated requirements, or construct new plant for housing area. Install septic tanks in launching area.	Expand facilities as required.	Complete system to meet ultimate requirements.
ystem inadequate.	Construct sanitary sewer system as required.	Extend sanitary sewers as required.	" " " "
" "	" storm " " " "	" storm " " "	" " " "
ystem about 50% adequate.	Expand telephone system as required.	Extend telephone system as required.	" " " "
acilities about 25% adequate.	Construct streets, roads, and walks as required.	Construct additional streets, roads, and walks as required by housing expansion.	Complete to meet ultimate requirements.
" " " "	Construct street and road lighting as required.	Construct street and road lighting as required.	" " " " "
	Not required during this phase, see "Launching Facilities" above.		
	$2,965,000	$620,000	$485,000
	$300,000	$100,000	$100,000
	$35,045,000	$25,220,000	$21,015,000

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ESTIMATES OF REQUIRED RANGE FACILITIES

WITH COST ESTIMATES FOR THE BANANA RIVER-BAHAMA ISLANDS RANGE

ULTIMATE REQUIREMENTS	AVAILABLE	FIRST PHASE CONSTRUCTION (About two years)
1. Land		
There will be some fourteen observations stations, each consisting of a headquarters area of about 5 acres and three outlying observation points of a total of about five acres. Total for twelve stations will be about 140 acres of British Territory.	None	Obtain clearance and title to all necessary land.
NO ATTEMPT IS MADE TO ESTIMATE THE ULTIMATE COST BUT THE VALUE OF MOST OF THE LAND IS NEGLIGIBLE.		
2. Geodetic Surveys.	First order geodetic control has been established in the base area and a limited number of stations have been located in a SHORAN network being established between Florida, the Bahamas and the north coast of Cuba.	Locate main and outlying stations along range with greatest accuracy obtainable.(Probably no better than 1/25,000 using existing equipment.)
ESTIMATED COST GEODETIC SURVEYS: $700,000		$600,000
3. Facilities for Range Instrumentation. (See Appendix 4 for detailed list.)	Map study and aerial reconnaissance over a portion of the range indicates that suitable sites exist on various islands of the Bahama and other groups.	Construct main and outlying stations and facilities throughout range as shown in appendix.
ESTIMATED COST RANGE INSTRUMENTATION FACILITIES: $8,550,000		$5,850,000
4. Hard Wire Communications from Launching Site to Range Instrumentation Groups.		Procure and install deep sea submarine cable to as many stations as practicable from launching site down range.
ESTIMATED COST HARD WIRE COMMUNICATIONS: $12,560,000		$10,000,000
TOTAL ESTIMATED COST RANGE FACILITIES: $21,810,000		$16,450,000

RECAPITULATION OF COSTS

ESTIMATED TOTAL COST FOR BASE FACILITIES	$ 81,280,000
ESTIMATED TOTAL COST FOR RANGE FACILITIES	$ 21,810,000
ESTIMATED TOTAL COST FOR INSTRUMENTATION EQUIPMENT	$ 38,965,000
ESTIMATED TOTAL OVERALL COST FOR ENTIRE RANGE	$142,055,000

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ANNEX F

APPENDIX 3

(FIGURE NO. 8)

ANNEX F

APPENDIX 3

(FIGURE NO. 8)

ESTIMATES OF REQUIRED RANGE FACILITIES

WITH COST ESTIMATES FOR THE BANANA

RIVER-BAHAMA ISLANDS RANGE

AVAILABLE	FIRST PHASE CONSTRUCTION (About two years)	SECOND PHASE CONSTRUCTION	THIRD PHASE CONSTRUCTION
None	Obtain clearance and title to all necessary land.	Improve liveability as necessary.	
First order geodetic control has been established in the base area and a limited number of stations have been located in a SHORAN network being established between Florida, the Bahamas and the north coast of Cuba.	Locate main and outlying stations along range with greatest accuracy obtainable.(Probably no better than 1/25,000 using existing equipment.)	Locate stations beyond the instrumented flight path as required to meet anticipated developments. Relocate stations along main base line more accurately if suitable new equipment has been developed.	Extend surveys as required, refining previous locations, if more accurate instruments, equipment and methods have been developed by this time.
	$600,000	$50,000	$50,000
Map study and aerial reconnaissance over a portion of the range indicates that suitable sites exist on various islands of the Bahama and other groups.	Construct main and outlying stations and facilities throughout range as shown in appendix.	Construct facilities as required at stations beyond main base line range shown in appendix.	Extend facilities as required to meet anticipated future developments.
	$5,850,000	$1,350,000	$1,350,000
	Procure and install deep sea submarine cable to as many stations as practicable from launching site down range.	Complete procurement and installation of cable to remaining stations.	
	$10,000,000	$2,560,000	
	$16,450,000	$3,960,000	$1,400,000

ANNEX F

APPENDIX 3

(FIGURE NO. 8)

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A N N E X "F"

A P P E N D I X 4

DETAILS OF FACILITIES REQUIRED FOR A TYPICAL DOWN-RANGE INSTRUMENTATION STATION.

1. An instrumentation group, as referred to herein, consists of a main station plus three outlying stations located at distances of ten to thirty-five miles from the main station. Fourteen groups of this type will be required along the first 725 miles of the range at intervals of about fifty miles.

2. MAIN STATION. The following facilities will be required at the main stations of each group:

a. A 150' tower with an 8' x 8' open platform at the top. Instrument load at the top of the tower will not exceed one ton. There is no objection to guy wires, if desired.

b. A weatherproof room in the tower base (200 sq. ft.)

c. An electronics hut, 800 sq. ft. air conditioned.

d. Three concrete slabs 20' x 20' with tie down lugs for anchoring radar vans.

e. Powerhouse, 400 square feet.

f. A small boat pier capable of handling one LST alongside and including a twenty ton crane. (The crane will be

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required for loading and unloading radar vans and for removing small boats from the water during bad weather in case there is no sheltered anchorage available).

g. A base maintenance and boat repair shop 800 sq. ft.

h. A seaplane anchor float (and beaching facilities, if practicable).

i. Housekeeping facilities for fifty personnel on temporary and intermittent occupancy basis. (one or two caretakers and guards will be present at all times).

(1) Small building (200 sq. ft.) to house evaporator.

(Note: The evaporator may be included in the power house provided it is located reasonably close to the shore).

(2) Water storage tank, 5,000 gallons.

(3) Quarters for 50 persons on a temporary occupancy basis.

(4) Messing facilities.

3. OUTLYING STATIONS. The following facilities will be required at each of the three outlying stations in each instrument group.

a. A 150' tower (same as tower at the main station).

b. Weatherproof room in the tower base (same as at the main station).

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c. Small generator building, 100 square feet.

d. A small boat pier and five ton crane (where required).

e. A seaplane anchor float (where required)

f. Housekeeping facilities for ten people on a temporary occupancy basis plus a permanent guard.

(1) Evaporator building, 200 sq. ft. (may possibly be combined with generator house).

(2) Water storage tank, 2,000 gallons.

(3) Quarters for ten people.

(4) Messing facilities.

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ANNEX "F"

APPENDIX 5

INSTRUMENTATION EQUIPMENT REQUIRED FOR THE BANANA RIVER - BAHAMA ISLANDS RANGE WITH COST ESTIMATES.

1. General. This section deals only with the actual instruments required to instrument and to support the instrumentation of the range. The physical means required for mounting the instruments, consisting of towers, concrete platforms, and other devices, are covered in Appendices 3 and 4 of this Annex.

The cost of the instruments and supporting equipment at the main base is estimated to be approximately $6,740,000.

The cost of the instruments required at each observation station, down-range, is estimated to be about $2,125,000, total cost for 14 stations would be approximately $29,750,000.

The cost of instrumenting the impact area would be approximately $2,475,000.

Grand total for the instrumentation costs of the main base and all down-range stations would be approximately $38,965,000.

2. Instruments required at the main base.

a. Optical instruments consisting of:

Five high speed movie cameras of the Mitchell or ribbon frame type, total cost $25,000.

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Three Bowen-Knapp or specially modified Mitchell cameras to measure acceleration, response to steering, and orientation during take-off, total cost $30,000.

Three groups, each group consisting of three (total of nine) cinetheodolites of the modified Askanias, Akely, or Mitchell type for optical tracking, total cost $450,000.

Three high magnification photographic telescopes of the "brighteyes" type of 16" reflecting telescopes for photographs of the orientation of the missile, total cost $225,000. Three ballistic cameras for making especially precise tracks of the missile and checking the precision of other instruments, total cost $75,000.

b. Electrical instruments consisting of:

One group, consisting of one transmitter and four receivers, for DOVAP (radio doppler-velocity-and position) and 4 data tabulating equipments, total cost $700,000.

Tracking radar plus accessory recording and positioning equipment, total cost $1,300,000.

Two telemetering reception facilities, total cost $200,000.

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c. Communication equipment used in connection with instrumentation. Emergency command radio for fuel cut-off or destruction circuits to the missile for use in the event of emergency, total cost $200,000. A primary time standard connecting all control points, observation stations and observation points, by means of hard wire, total cost $25,000 (does not include hard wire).

d. Complete weather observation and recording equipment, including means for sounding the upper atmosphere, total cost $10,000.

3. Instrumentation equipment required for that portion of the range outside of the main base area.

There will be a total of 14 instrumentation stations located along the Bahama Islands chain beyond the limits of the main base. Each observation station will require the following equipment, to be located at observation points, surrounding the station. (To obtain the total amount of equipment required multiply the items as listed below by fourteen).

a. Optical instruments consisting of:

Two long range, high powered photographic telescopes, alternate stations (which can be moved from station to station and

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point to point as required).

Average cost per station of optical instruments, $240,000.

b. Electrical equipment consisting of:

One DOVAP set, consisting of one transmitter and four receivers, 4 data tabulating equipments and auxiliary apparatus, total cost $800,000.

Tracking radar and radar beacon receivers, total cost $500,000.

One half search radar (alternate stations) total cost $250,000.

Telemetering receivers, total cost $100,000.

c. Communication equipment used in connection with instrumentation.

Equipment for the reception of the primary time standard, total cost $25,000.

Emergency command radio for fuel cut-off or destruction circuits to the missile for use in the event of emergency, total cost $200,000.

d. Complete weather observation and recording equipment including means for sounding the upper atmosphere, total cost $10,000.

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4. Impact point instrumentation.

Very little can be said about instrumentation of the impact point, at this time. It would be desirable to determine the aspect of the missile, the time-space path, the velocity and deceleration for the terminal leg. At least, the location of the impact point with relation to the launching site, and the time of impact must be determined. In addition, it is highly desirable to receive and record data telemetered from the missile, to be able to effect recovery of ejected components, and to be able to destroy the missile by remote control in case of emergency.

Since the impact areas cannot in general be on or near land, it is tentatively recommended that ship-borne instrumentation be provided on at least three ships for locating the water impact point. Ship-borne stations should have telemetering reception of primary time standard, command radio circuits, and emergency destruction circuits to destroy the missile, total cost about $2,475,000.

For more remote areas over deep water, a SOFAR net will be required.

5. Facilities connected with instrumentation common to both the base and the range.

a. A central data reduction center should be provided to perform two functions. First there should be a data reduction center

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where immediate but approximate information is computed. This would consist of film developing machines, film readers, doppler cycle counters, computing machines, and provisions for supporting a staff of approximately 30 mathematicians. Second, there should be a precise data reduction center where high speed automatic computing machines are available and manned with the necessary trained personnel.

b. An instrumentation laboratory, fully air conditioned, for the maintenance, repair, and storage of the various types of instruments used on the range. It is anticipated that 300 individuals would be required in this work, cost of equipment approximately $3,500,000.

c. The entire range should be covered by a LORAN type of network.

6. Personnel required to man and support the instrumentation contained on the range.

a. Main base area.

Optical	63	
Electrical	51	
Timing and communication circuits	27	
Readings, reductions and evaluations	30	
Overhead for main base operating group	29	
Instrumentation laboratory	300	
SUB TOTAL	500	500

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b.	Observation stations down-range		
	Fourteen stations each requiring 55 men	770	770
c.	Impact point observation teams		
	Three teams of 18 men each	54	54
	GRAND TOTAL REQUIRED		1,324

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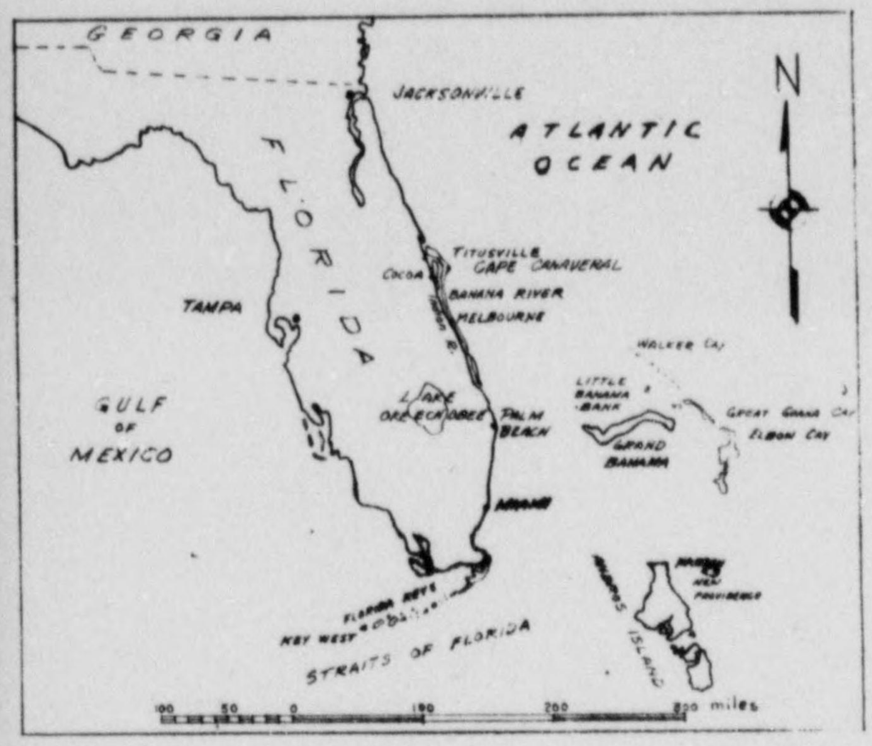

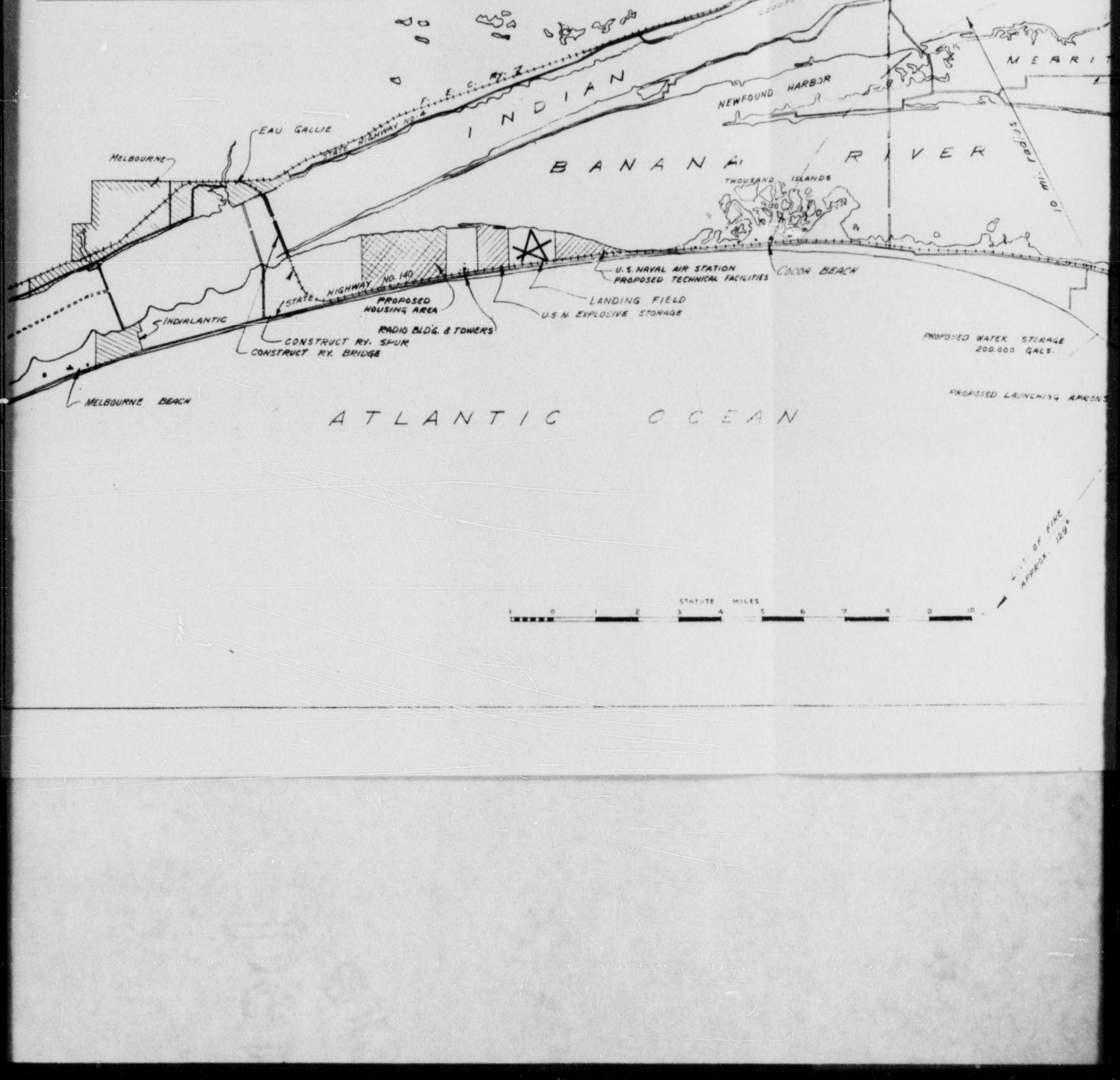

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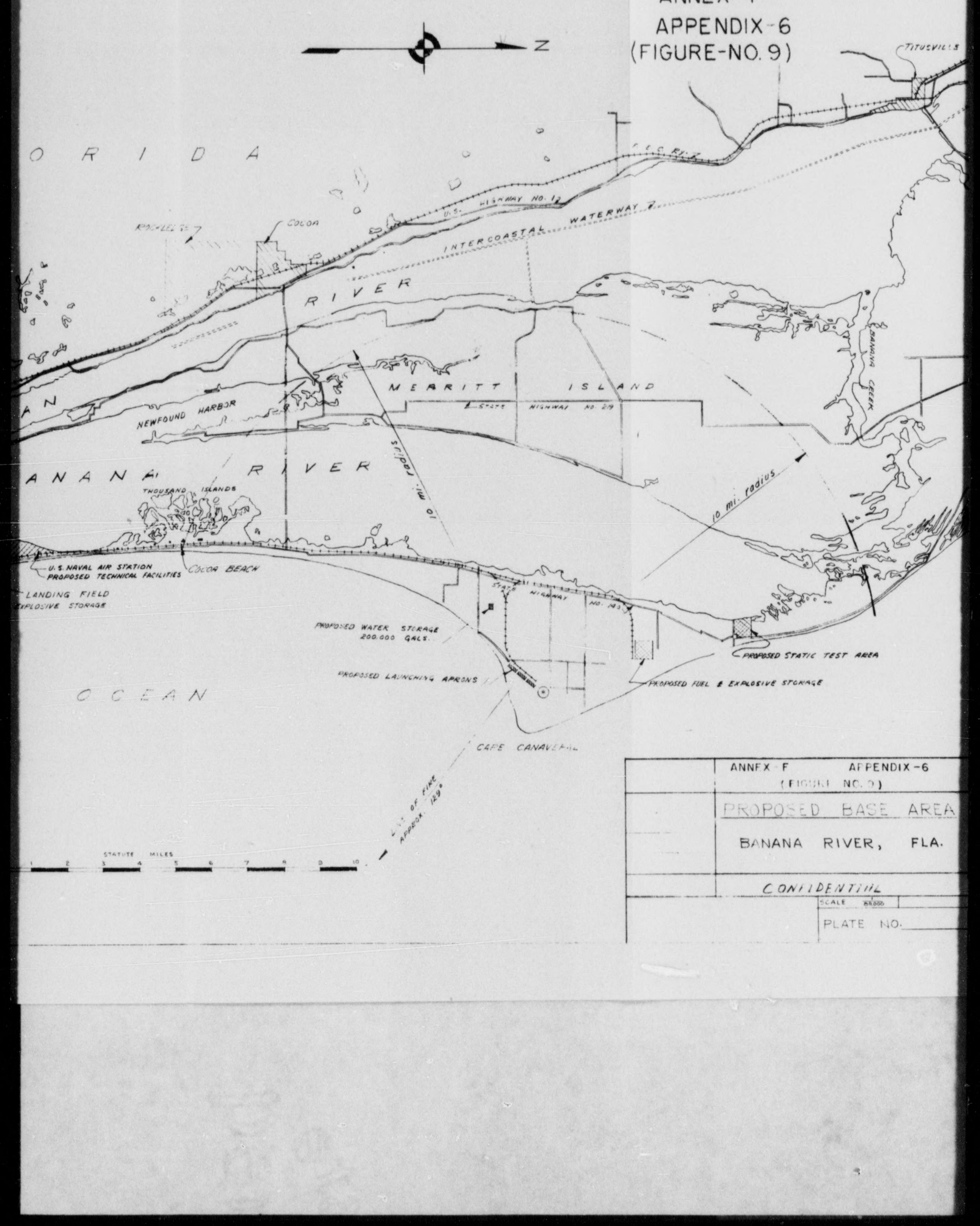
ANNEX-F
APPENDIX-6
(FIGURE-NO. 9)



	ANNEX-F APPENDIX-6 (FIGURE NO. 9)
	PROPOSED BASE AREA
	BANANA RIVER, FLA.
	CONFIDENTIAL
	SCALE 1/50,000
	PLATE NO.

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ANNEX F
APPENDIX 7
(FIGURE NUMBER 10)
AREA CHART SHOWING GENERAL LAYOUT OF PROPOSED PANAMA RIVER-
PANAMA ISLANDS BARGE

NAUTICAL MILES
50 0 50 100 150 200 250 300

REPUBLIC OF HAITI
DOMINICAN REPUBLIC
HISPANIOLA
PUERTO RICO
S C A R I B B E A N S E A
GUATEMALA
COSTA RICA
COLOMBIA
VENEZUELA

CONFIDENTIAL
ANNEX F
APPENDIX 7
(FIGURE NUMBER 10)
AREA CHART SHOWING GENERAL LAYOUT OF PROPOSED PANAMA RIVER-
PANAMA ISLANDS BARGE

DECLASSIFIED E.O. 11652, Sec 3(E) and 5(D) or (E) NND# 740132

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CONFIDENTIAL
ANNEX F
APPENDIX 7
(FIGURE NUMBER 10)
AREA CHART SHOWING GENERAL LAYOUT OF PROPOSED PANAMA CITY-
PANAMA ISLANDS RANGE

NAUTICAL MILES
50 0 50 100 150 200 250 300

CONFIDENTIAL
ANNEX F
APPENDIX 7
(FIGURE NUMBER 10)
AREA CHART SHOWING GENERAL LAYOUT OF PROPOSED PANAMA CITY-
PANAMA ISLANDS RANGE

FLORIDA
CUBA
BAHAMA
JAMAICA
REPUBLIC DOMINICAN
of HISPANIOLA
HAITI
REPUBLIC
PUERTO RICO
CARIBBEAN SEA
COLOMBIA
VENEZUELA
LAGUNA DE MARACAIBO

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Naval Air Station, Banana River, Florida.

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Typical terrain at Cape Canaveral, Florida.
Proposed launching site for Banana River - Bahama Island Range.

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ANNEX "F"

APPENDIX 8

FIGURE 11

Banana River - Bahama Island Range - down-range view showing typical type of island upon which instrumentation stations will be located.

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ANNEX "G"

RECOMMENDED ORGANIZATION OF THE JOINT LONG RANGE PROVING GROUND

1. General.

The Joint Long Range Proving Ground shall be organized on a joint task force basis, under the direct and primary supervision of the Secretary of War, or an appropriate agency of the War Department, as directed by the Secretary of War. All major service agencies using the Range shall participate in its management and contribute to its requirements.

2. Commanding Officer

a. The Commanding Officer of the Joint Long Range Proving Ground shall be appointed by the Secretary of War. He shall be an officer of the United States Army (incl the AGF, AAF, WD Technical Services) or the U. S. Navy, on active duty. In the event the selected officer is not under the jurisdiction of the War Department, the Secretary of War shall request the head of the service concerned to make the selected officer available.

b. The Commanding Officer of the Joint Long Range Proving Ground shall have all the responsibilities and authority of complete command, which he shall exercise in the interests of the National guided missiles program. While holding this assignment, he shall

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owe equal loyalty to all agencies and services whose interests are served by the Joint Long Range Proving Ground. In the discharge of his responsibilities, he shall be responsible to the Secretary of War and supported primarily by the War Department and shall be advised and assisted by the Advisory Council, and a joint staff, as provided for below.

~~NOTE: In the event of unification of the Armed Forces substitute "Secretary of Air Force" for "Secretary of War" and "Department of Air Force" for "Department of War".~~ DELETE PER MEMO JRDB. 9 July 1947

5. Deputies to the Commanding Officer

a. There shall be four (4) Deputy Commanding Officers, as follows:

(1) DCO (Army) appointed by the Chief of Staff, U.S.Army, to represent the AGF and the War Department Technical Services.

(2) DCO (Navy) appointed by the CNO, U.S.Navy, to represent the U.S.Navy.

(3) DCO (Air Force) appointed by the C.G., AAF, to represent the Army Air Forces.

(4) DCO (Civilian Scientific) appointed by the Chairman, Joint Research and Development Board, to represent civilian scientific and technical interests.

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b. The Deputies (except DCO (CS)) in order of rank shall succeed to the position of Acting Coimmanding Officer in the absence of the Commanding Officer.

c. The Deputies (except when occupying the position of Acting Commanding Officer) shall be responsible for the specific interests of the agencies, groups or individuals they represent, in matters pertaining to the Joint Long Range Proving Ground. They are authorized to maintain direct contact with such agencies, groups or individuals.

d. The service deputies, shall exercise command over the units and individuals of their respective service stationed at the Range. In matters of administration and supply peculiar to one of the services, the appropriate deputy shall, with the approval of the Commanding Officer, deal directly with the agency concerned.

4. Advisory Council

a. The four Deputy Commanding Officers shall constitute an Advisory Council. The functions of the Advisory Council shall be as follows:

(1) To determine the requirements of the services for the facilities of the Joint Long Range Proving Ground.

(2) To coordinate such requirements and recommend to the Commanding Officer as to their allocation.

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(3) To determine the requirements of the Joint Long Range Proving Ground for facilities and means with which to perform its mission.

(4) To recommend to the Commanding Officer the manner in which such facilities and means should be provided.

(5) To present suitable recommendations to the Commanding Officer, as they deem advisable on any matter pertaining to the Joint Long Range Proving Ground.

b. The recommendations of the Council shall be determined by majority vote. The Commanding Officer and Chief of Staff shall meet with the Council, but shall not vote.

c. The Commanding Officer shall give due consideration to the recommendations of the Council, but shall not be bound by them. By virtue of his command prerogative, his decisions shall be subject to review only by higher authority.

5. Joint Staff

The Commanding Officer and Deputies shall be served by a Joint Staff. Its membership shall include individuals from all interested agencies. It shall be organized as directed by the Commanding Officer. It shall have a Chief of Staff whose duties shall be to coordinate and supervise the activities of the various sections of the Staff.

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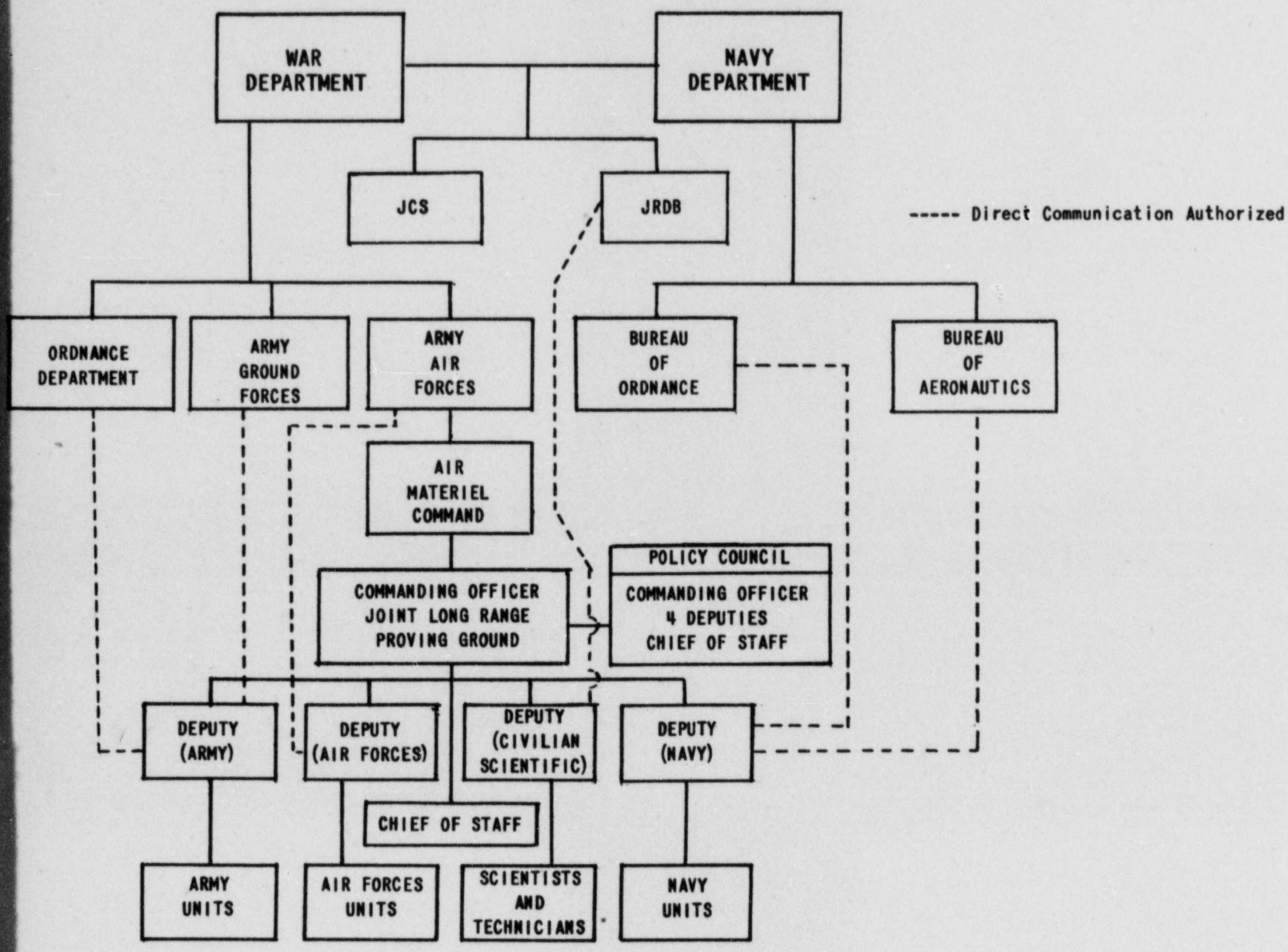
ANNEX G
APPENDIX I
(FIGURE NUMBER 12)

RECOMMENDED ORGANIZATION CHART FOR JOINT LONG RANGE PROVING GROUND UNDER PRESENT ORGANIZATION OF ARMED FORCES



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ANNEX G

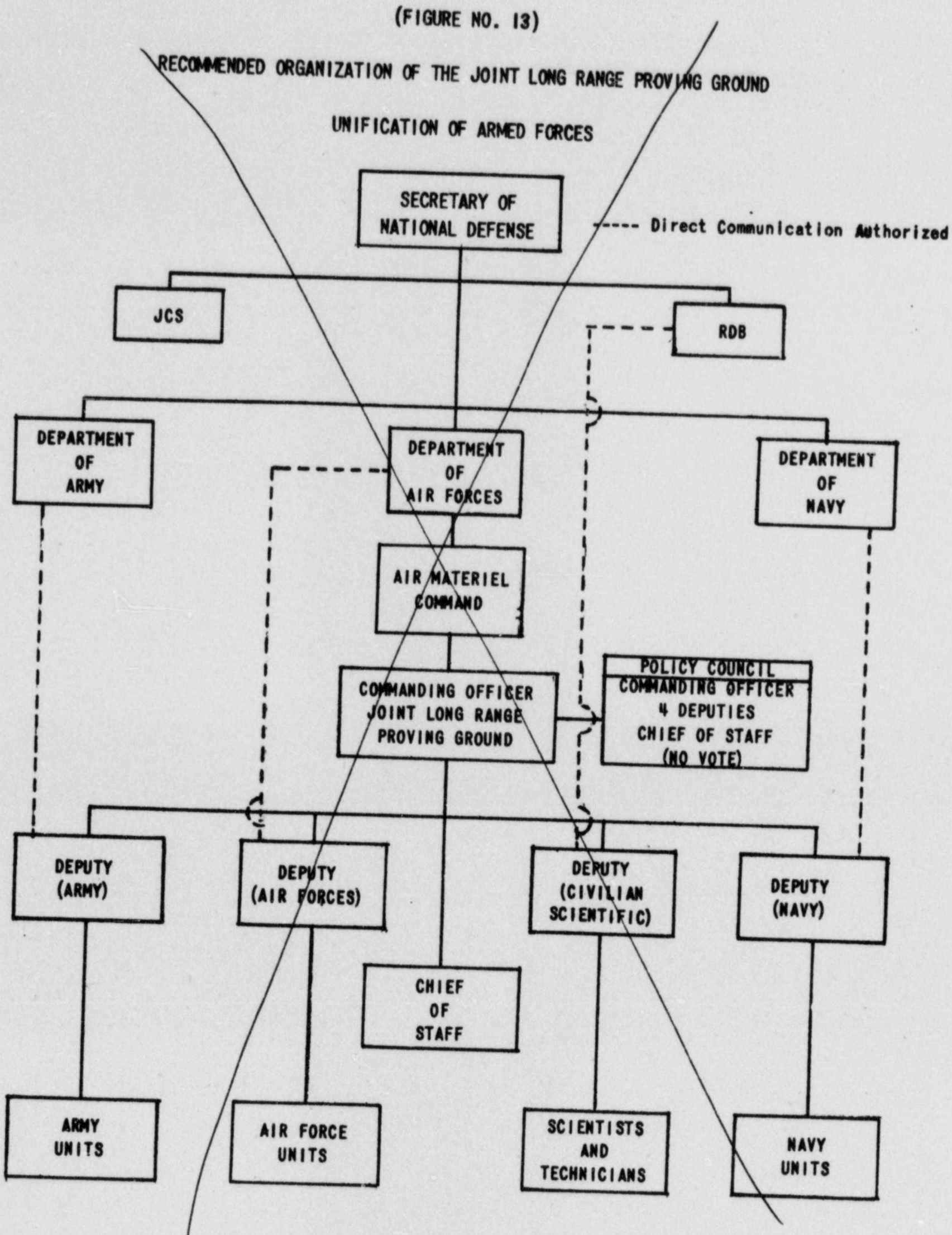
DELETE PER MEMO JROB, 9 July 1947

APPENDIX 2

(FIGURE NO. 13)

RECOMMENDED ORGANIZATION OF THE JOINT LONG RANGE PROVING GROUND

UNIFICATION OF ARMED FORCES



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A N N E X "H"

1. Annex "H" consists of two appendices.

Annex H, Appendix 1,is a copy of the statement of the Committee on Aeronautics.

Annex H, Appendix 2, is a copy of the statement of the Committee on Guided Missiles.

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C O N F I D E N T I A L

A N N E X "H"

A P P E N D I X 1.

STATEMENT OF CONCURRENCE OF THE COMMITTEE ON AERONAUTICS

THE JOINT RESEARCH AND DEVELOPMENT BOARD
COMMITTEE ON AERONAUTICS
WASHINGTON 25,D.C.

AR 33/1

10 June 1947

MEMORANDUM FOR: The Executive Director, Committee on Long Range Proving Ground.

Subject: Report of the Committee on Long Range Proving Ground.

References: (a) Subject report (PG 27/2), with attachments.

(b) JRDB Directive PG 1/1, dated 7 October 1946.

1. As orally requested, and in accordance with paragraph 11 of Reference (b), the subject report of the JRDB Committee on Long Range Proving Ground has been studied by the Secretariat of the JRDB Committee on Aeronautics as a matter of coordination.

2. It appears from such examination that there is no duplication between the facilities recommended by the Committee on Long Range Proving Ground and any now known to the Committee on Aeronautics or proposed by them. Since the Long Range Proving Ground is designed for testing of guided missiles, it also appears that this facility is not of a type which is needed for testing of inhabited aircraft. Consequently, the matter of management raised in the dissenting opinion included with PG 27/2 is not considered a subject proper for comment by the Committee on Aeronautics.

For the Committee on Aeronautics:

s/ John B. Jacob
JOHN B. JACOB
Executive Director

C O N F I D E N T I A L

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ANNEX "H"

APPENDIX 2.

STATEMENT OF THE COMMITTEE ON GUIDED MISSILES

THE JOINT RESEARCH AND DEVELOPMENT BOARD
COMMITTEE ON GUIDED MISSILES
WASHINGTON 25, D.C.

GM 22/7

19 June 1947

MEMORANDUM FOR: The Executive Director, Committee on Long Range Proving Ground

SUBJECT: Report of Committee on Long Range Proving Ground, PG 27/2 - Comments of Committee on Guided Missiles.

REFERENCE: (a) JRDB Directive PG 1/1, dated 7 October 1946.

1. Paragraph 11 of reference (a) provides for cooperation between the Committee on Guided Missiles and the Committee on Long Range Proving Ground. In accordance with this provision the subject report has been reviewed by the Committee on Guided Missiles.

2. Justification for the establishment of the National Guided Missile Range (paragraph 2.1 of subject report) is based on an estimated firing schedule for long range guided missiles, prepared by the secretariat of the Committee on Guided Missiles (GM 22/2), which is incorporated in a supplement to paragraph 2.1 of subject report. This firing schedule is subject to considerable revision. The number of missile contracts is expected to be substantially reduced in order to provide adequate financial support to contractors getting into the active experimental stage. Increased costs as development progresses will be particularly noticeable in the long range surface-to-surface field. The armed services together may not be able to support a total of more than about four projects in the stage where long range (greater than 150 miles) test missiles are fired in appreciable quantities.

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GM 22/7 (cont'd)

3. The number of missiles planned for launching at the proposed National Range is likely to be reduced as financial realities cause successive readjustments of the guided missiles program. This does not eliminate the need for such a range; the Committee on Guided Missiles considers it essential that adequate testing facilities be available for such long range missiles as are constructed. However, this Committee believes that detailed planning and implementation under recommendation 2.4.5 of subject report should be limited initially to minimum facilities that will constitute an operable proving ground adequate for the testing of a long range missile.

4. In paragraph 2.4 of its report the Committee on Long Range Proving Ground has made seven recommendations, numbered 2.4.1 through 2.4.7. The Committee on Guided Missiles concurs with these recommendations, subject to the provision that before implementation is carried beyond the minimum facilities referred to in paragraph 3 above, an up-to-date survey be made of then current and future testing needs.

5. Dissents to this action of the Committee on Guided Missiles have been received as follows:

a. Dr. E. R. Gilliland, member, dissents relative to recommendations 2.4.5, 2.4.6, and 2.4.7. He concurs with the position of the Committee on Guided Missiles relative to recommendations 2.4.1, 2.4.2, 2.4.3, and 2.4.4, and he concurs with the proviso of paragraph 4 above with regard to implementation beyond a minimum development.

b. Brig. General H. B. Sayler, member, dissents relative to references to Items 7.1, 7.2, and 7.3 under paragraph 2.4 of subject report. He concurs with the dissenting report submitted by the Ordnance Department and Army Ground Forces members of the Committee on Long Range Proving Ground.

c. Colonel H. Hewett, associate member, dissents in so far as recommendations 2.4.6 and 2.4.7 pertain to Items 7.2 and 7.3 of subject report. He has detailed his dissent as follows:

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GM 22/7 (cont'd)

"Objection is taken to so much of Items 7.2 as places the proposed Long Range Proving Ground in the chain of command from the War Department through the Commanding General, Army Air Forces and the Air Materiel Command for the following reasons:

"a. Such a recommendation is believed to be inconsistent with the proposed direct responsibilities of the Commanding Officer to the Secretary of War and the War Department as set forth in paragraph 2b, PG 33/2, Item 7.1.

"b. Latitude should be afforded Secretary of War and the War Department in placing the Joint Long Range Proving Ground wherever in the organization of the War Department the Proving Ground can receive the most effective administrative and logistical support and be most effectively supervised."

By direction of the Committee on Guided Missiles:

s/ S. D. Cornell
S. D. CORNELL
Acting Executive Director

47 12947

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LIST OF PAPERS

DECIMAL FILE NO. 684 RANGES, GUIDED MISSILES

SWNCC _____ Series. Part ____ From SWNCC _____ thru SWNCC _____.

ALTERNATIVE LOCATIONS FOR A GUIDED MISSILE EXPERIMENTAL RANGE.
(title)

Serial No.	From	Date	To	SYNOPSIS

DECLASSIFIED E.O. 11652, Sec 3(E) and 5(D) or (E) NND# 740132

CONFIDENTIAL

THE SECRETARY OF DEFENSE

WASHINGTON

3 December 1947

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Ended Mark

Dear Mr. Secretary:

At the meeting of the Committee of Two on 27 October, there was a discussion of the plans for setting up a National Guided Missiles Range. Prior to the meeting, the State Department had been informally advised of the decision that the most appropriate site for the range is from El Centro, Southern California, southward over the Gulf of California, Mexico, and that it might be necessary to approach the Mexican Government in this connection. At the Committee of Two meeting, Secretary Marshall pointed out the reasons why the State Department did not wish to approach the Mexican Government. The Committee therefore decided to request further study of alternate sites which could then be discussed with the State Department with a view to any necessary negotiations with foreign governments.

The Research and Development Board, to which the matter was referred, submitted its report on 13 November 1947. I believe that you have a copy of this report and its enclosures, including the memorandum of 13 November 1947 from the Chief of the National Guided Missiles Range Group, a copy of the original report of the Committee on Long Range Proving Ground dated 20 June 1947, and related maps.

As a result of this reexamination of the question of alternate sites, we have come to the conclusion that we must reaffirm the original conclusion that the best site is the one from El Centro, Southern California, southward along the Gulf of California, Mexico; an acceptable second choice is from Banana River, Florida, southeastward to the Bahama Islands; no other sites are satisfactory. In arriving at these conclusions we have carefully compared all possible sites with the characteristics which should be present in a satisfactory range. The most important of these characteristics are:

a. Overall length of range: 3,000 miles.
b. Accurately located, land-based instrumentation throughout the first 500 miles. This involves instrumentation stations at 50 mile intervals for that distance.
c. Weather and climatic conditions suitable for year-round operations from standpoint of personnel, materiel, electronics and communications.
d. Economy - initial cost and maintenance.
e. Readily accessible from research and industrial centers of the United States.

SWNCC SECRETARIAT

State Member
Army Member
Navy Member
Ass't State Member
Ass't Army Member
Ass't Navy Member
Executive Secretary
Ass't Exec. Secretary
State Adm. Assistant
Army Adm. Assistant
Navy Adm. Assistant
File

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f. Maximum provisions for safety.
g. Minimum conflict with commercial and private interests.

In the light of these requirements, fifteen sites in North America were considered and discarded as being deficient or objectionable to such an extent that they would be entirely inadequate to the need.

We have also given careful consideration to the possibility of utilising ranges outside the North American Continent, particularly the Australian range. However, there are formidable obstacles to this alternative, including prohibitive delays in research and development work, the difficulty of getting scientists and technicians to spend considerable time in the area, an excessive cost of transportation and communications, and strategic considerations. However, although the Australian range is not an acceptable alternative, we want to follow its development simultaneously with the development of any range of our own.

In view of these considerations, which are supported by the documents already in your possession, it is a matter of great importance to the National Military Establishment that negotiations be initiated with the Mexican Government in order to permit us to develop a range site at El Centro, Southern California-Gulf of California, Mexico. I will be glad to furnish you with additional information and to place personnel at your disposal to assist you in this matter.

Sincerely yours,

James Forrestal

The Honorable Robert A. Lovett
Acting Secretary of State

OSD:100:10:djh

CC: Mr. Ohly

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NORTH AMERICAN MAP WITH DRAWINGS SHOWING:

1. RECOMMENDED SITES
2. SITES VISITED BUT REJECTED
3. SITES REJECTED BY MAP ANALYSIS

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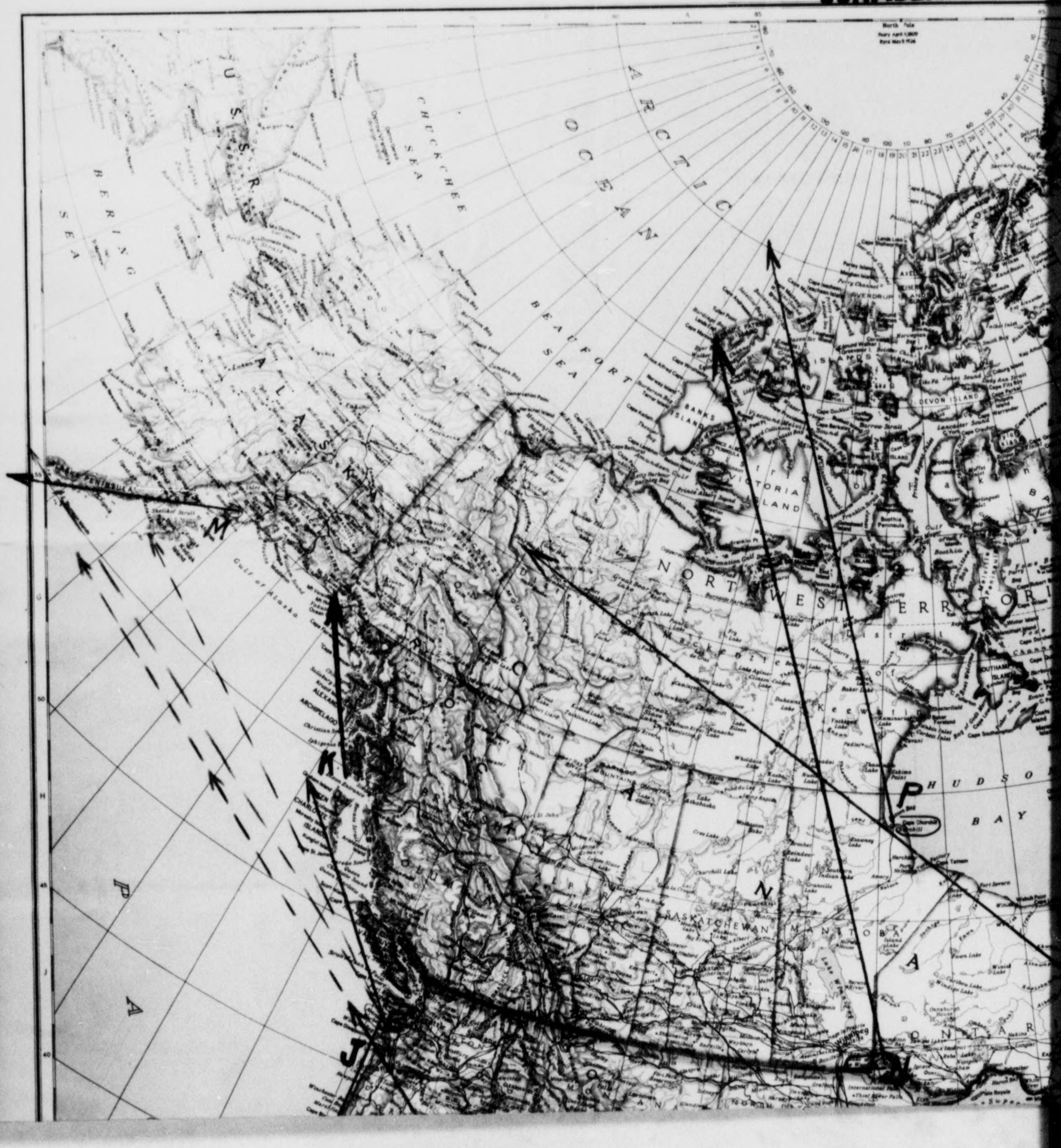

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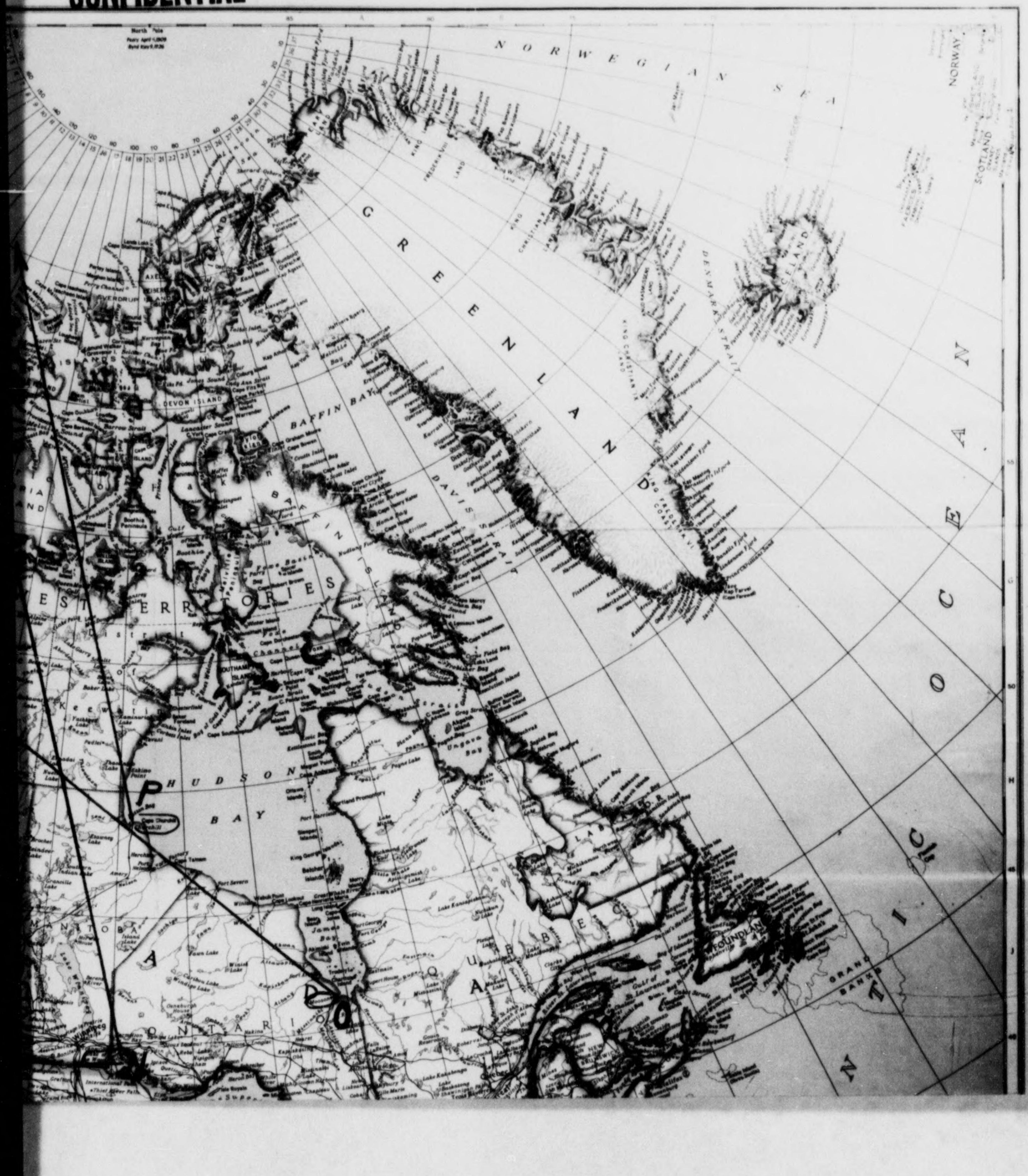

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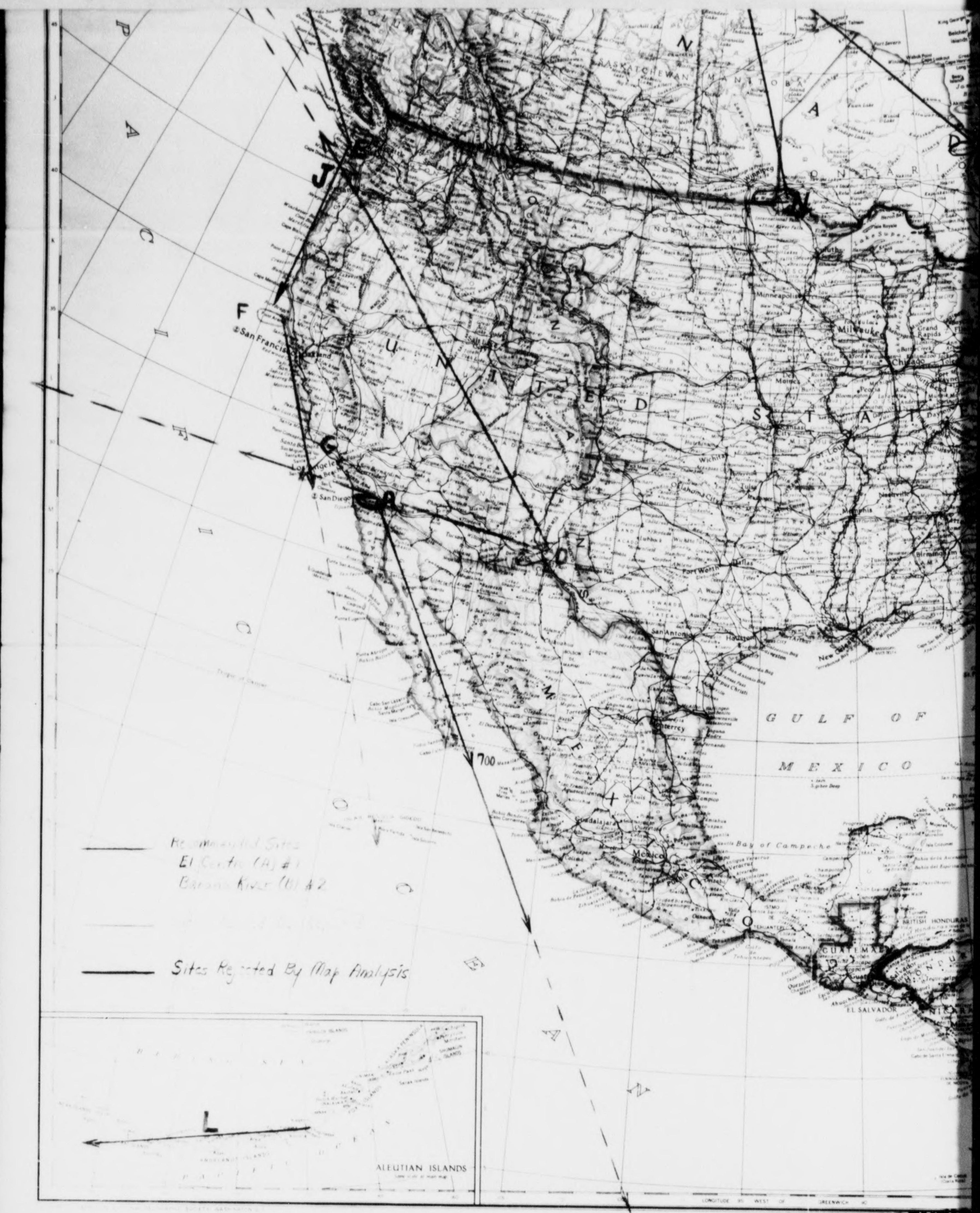

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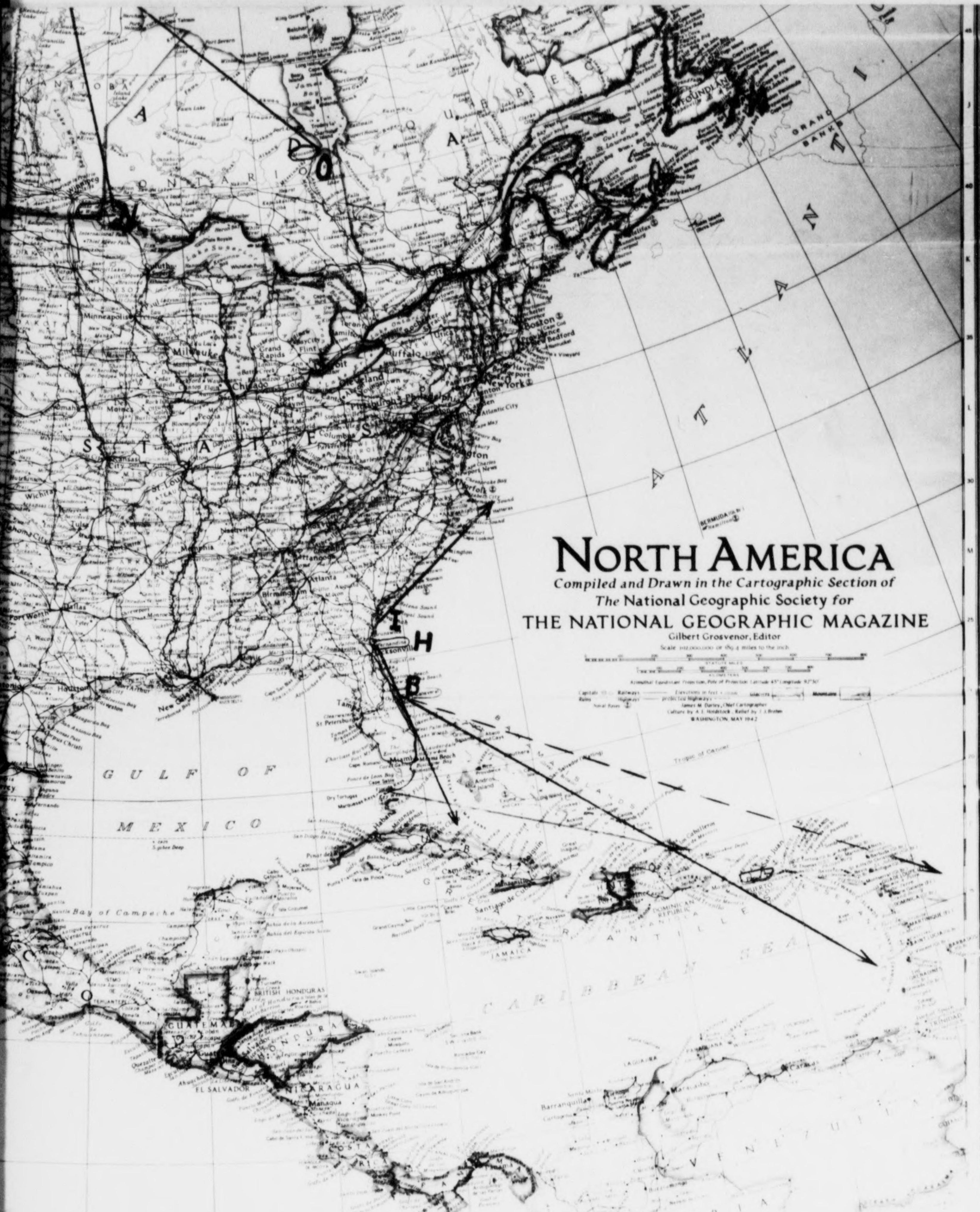

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SECRETARIAT
THE STATE-ARMY-NAVY-AIR FORCE COORDINATING COMMITTEE
Washington, D. C.

SANA-5825
19 November 1947

MEMORANDUM FOR THE SECRETARY OF STATE
THE SECRETARY OF DEFENSE

Subject: Alternative Locations for a Guided Missile Experimental Range.

References: a. SANA-5802 (Encl. "B")
b. SANA-5806 (Encl. "B")

Enclosure "A" prepared by the Joint Research and Development Board in response to Enclosure "B", is circulated for consideration by the Committee of Two.

W. A. SCHULGEN,
Acting Secretary

Enclosures:
"A" - Ltr dtd 13 Nov 47 from Chairman, JRDB
"B" - SANA-5802 and SANA-5806

Copies furnished:
The Secretary of the Army
The Secretary of the Navy
The Secretary of the Air Force

State Member
Army Member
Navy Member
Air Force Member
P&O
Op-35 (2)
AC/AS-5 (2)

SWNCC SECRETARIAT

State Member
Army Member
Navy Member
Ass't State Member
Ass't Army Member
Ass't Navy Member
Executive Sec'y, Navy
Ass't Exec. Secretary
State Adm. Assistant
Army Adm. Assistant
Navy Adm. Assistant
File

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THE JOINT RESEARCH AND DEVELOPMENT BOARD
WASHINGTON 25, D. C.

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November 13, 1947.

684 - Ranges, Guided Missile

MEMORANDUM FOR THE STATE-ARMY-NAVY-AIR FORCE
COORDINATING COMMITTEE

Subject: Alternative Locations for a Guided Missile Experimental Range

Reference: SANA-5802

1. The above matter referred to the Research and Development Board 1 November 1947 requests a study and recommendations on alternate locations for a guided missile experimental range.

2. This subject has accordingly again been reviewed. There is appended a memorandum dated 13 Nov.'47 (App A) to the Chairman, Research and Development Board, from the National Guided Missile Range Group giving further information as requested on alternative locations.

3. At its 9th meeting, the Joint Research and Development Board approved the report of its Committee on Long Range Proving Ground. This Committee made thorough studies of alternative sites. A copy of their report is also appended. (App B)

4. Should the material herewith transmitted be insufficient it is respectfully requested that guidance as to the general policy regarding the use of foreign territory, in whole or in part, in connection with a long range proving ground be furnished the Research and Development Board, in order that it may present a summary of its studies explicitly oriented in accordance with this policy.

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NOV 17 1947

/s/ V. Bush

V. Bush,
Chairman.

STATE-WAR-NAVY COORDINATING

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, ARMY AIR FORCES U.S. AIR FORCE
WASHINGTON

IN REPLY REFER TO:

AFOGM

13 November 1947.

MEMORANDUM FOR CHAIRMAN, RESEARCH AND DEVELOPMENT BOARD

SUBJECT: Selection of Site for the National Guided Missile Range

1. In accordance with a directive from Joint Research and Development Board, which approved the report (PG 27/4) of the Committee on Long Range Proving Ground, the Air Force has activated a staff group to pursue the project. This group, known as the National Guided Missile Range Group, includes representatives from the Army (Ground Forces and Ordnance Department) and Navy (Ops 57, BuAer, BuOrd), as well as the Air Force.

2. The Group desires to negotiate with appropriate Mexican authorities, through the Joint Mexican-U.S. Defense Commission, for the necessary rights to establish the range at the site of first choice (El Centro-Gulf of California). As a preliminary to such action, it was necessary to secure permission from the State-Army-Navy-Air Force Coordinating Committee to discuss matters classified as confidential with the Mexicans. The State Department representative on this Committee felt that policy guidance at a higher level was necessary and the matter was eventually referred to the Committee of Two (The Secretary of State and the Secretary of Defense). The discussion of the Secretaries disclosed certain difficulties in negotiations with some of the countries involved in either the first or second choice sites. Further information on alternate sites was desired and is furnished herewith.

3. After extensive study, the Committee on Long Range Proving Ground determined the characteristics which should be present in a satisfactory range. The most important of these are:

a. Overall length: 3,000 miles.

b. Accurately located, land-based instrumentation for first 500 miles. This involves instrumentation stations at 50 mile intervals for that distance.

c. Weather and climatic conditions suitable for year-round operations.

d. Economy; initial cost and maintenance.

e. Readily accessible from the research and industrial centers of the United States.

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ADDRESS REPLY TO: COMMANDING GENERAL, ARMY AIR FORCES, WASHINGTON 25, D. C.

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f. Maximum provisions for safety.

g. Minimum interference with commercial and private activities.

4. Application of the above criteria to possible sites disclosed that only two offered a satisfactory solution. All other sites were deficient or objectionable to such an extent that they would be entirely inadequate to the need. Tab "A" indicates the specific reasons in each case.

5. The Australian range was rejected only after careful deliberations. The principal objection is the distance which separates the centers of research and development in the United States from the test and proving area and which creates the following difficulties:

a. Reluctance of qualified civilian scientific and technical personnel to live there.

b. Prohibitive time delays and excessive costs in the transportation of materiel and personnel to Australia and the return of test data.

c. Requirement for joint use of the range with the British Empire.

d. Possibility of loss of use of range in war time.

6. As regards northern ranges on the Continent of North America it is considered that adverse weather conditions, electronic disturbances and inaccessibility of base and instrumentation stations would limit operations at any Canadian or Alaskan range to a small fraction of the desirable year-round operations. The initial tests and development of guided missiles present such difficult problems that they can only be solved under the most favorable conditions. Extremes of weather complicate the problem. It is only after the missile has reached the service test stage that it should be tested under all conditions of climate and weather.

7. If you consider such action appropriate, it is requested that you discuss the sites selected and rejected with the Secretary of Defense. If, as a result of this discussion, the Secretary of Defense concurs in the recommendations of the Long Range Proving Ground Committee, it is suggested that he be requested to reopen the matter with the Secretary of State with a view toward securing the latter's approval to negotiate with the Mexican military authorities on the matter.

William L. Richardson

WILLIAM L. RICHARDSON
Brigadier General, U.S.A.F.
Chief, National Guided Missile
Range Group.

1 Incl:
No. 1 - Tab "A"

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annex "A" to appendix "A"

ACCEPTABLE SITES (RED)

MAP REFERENCE	LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE (AZIMUTH)	APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRU-MENTATION SITES (COUNTRY)	REMARKS
A	20 miles west of El Centre, California	145°	4500	0 - 700	Base - U.S. to 700 - Mexico	Best site.
				2900	Galapagos Is (Ecuador)	
				4500	Chile	
		140	1000	775 - 875	Mexico	
B	Cape Canaveral, Florida (Banana River)	129°	1500	0 - 50	U.S.	Acceptable - Less de than A because: 1. More expensive 2. Inferior instru tation 3. Inferior weathe 4. Possible local objections 5. Possible foreig objections
				150 - 485	Bahamas (Br)	
				525 - 800	" "	
				875 -1000	Dominican Rep.	
				1025 -1075	Puerto Rico	
				1500	Grenadine Is (Br)	
		120°	3000	1375	Leeward Is (Br. & Fr.)	
				3000	Brazil	
				3000	Brazil	
		110°	5500	3900	Ascencion Is (Br.)	
				4300	St. Helena (Br.)	
				5500	So. Africa (Br.)	

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annex "A" to appendix "A"

ACCEPTABLE SITES (RED)

LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE (AZIMUTH)	APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRU-MENTATION SITES (COUNTRY)	REMARKS
20 miles west of El Centro, California	145°	4500	0 - 700	Base - U.S. to 700 - Mexico	Best site.
			2900	Galapagos Is (Ecuador)	
			4500	Chile	
	140	1000	775 - 875	Mexico	
Cape Canaveral, Florida (Banana River)	129°	1500	0 - 50	U.S.	Acceptable - Less desirable than A because: 1. More expensive 2. Inferior instrumentation 3. Inferior weather 4. Possible local (U.S.) objections 5. Possible foreign objections
			150 - 485	Bahamas (Br)	
			525 - 800	" "	
			875 -1000	Dominican Rep.	
			1025 -1075	Puerto Rico	
			1500	Grenadine Is (Br)	
	120°	3000	1375	Leeward Is (Br. & Fr.)	
			3000	Brazil	
			3000	Brazil	
	110°	5500	3900	Ascencion Is (Br.)	
			4300	St. Helena (Br.)	
			5500	So. Africa (Br.)	

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SITES VISITED AND REJECTED (BLUE)

MAP REFERENCE	LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE	APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRUMENTATION SITES (COUNTRY)	REMARKS
C	15 miles East Key West, Florida	110°	850	~~0-50, 70-505 565 - 805~~ 0 - 50 70 - 505 565 - 805	~~to 50 mi - U.S. to 805 - high Seas~~ U.S. High Seas High Seas	Discarded because: 1. High initial and maintenance cost. 2. Weather 3. Isolation and lack of communication to base 4. Poor instrumentation. 5. Extreme difficulty of construction. NOTES: a. First 450 miles shallow water. b. By use of foreign tory this range co have an approximat 5000 mile range.
D	White Sands New Mexico	330° 270°	1300 6000	0 - 1300 0 - 600 2800-3500 Beyond 3500	U.S. U.S. Hawaii (U.S.) Pacific Atolls	Discarded because: 1. Fires over populated U.S.Area 2. Difficulty of obtaini Impact Areas. 3. Believed impossible t obtain necessary lan titles and permissio

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SITES VISITED AND REJECTED (BLUE)

LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE	APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRUMENTATION SITES (COUNTRY)	REMARKS
15 miles East Key West, Florida	110°	850	~~0-50, 70-505 565 - 805~~ 0 - 50 70 - 505 565 - 805	~~to 50 mi - U.S. to 805 - high Seas~~ U.S. High Seas High Seas	Discarded because: 1. High initial and maintenance cost. 2. Weather 3. Isolation and lack of communication to base. 4. Poor instrumentation. 5. Extreme difficulty of construction. NOTES: a. First 450 miles shallow water. b. By use of foreign territory this range could have an approximate 5000 mile range.
White Sands New Mexico	330° 270°	1300 6000	0 - 1300 0 - 600 2800-3500 Beyond 3500	U.S. U.S. Hawaii (U.S.) Pacific Atolls	Discarded because: 1. Fires over populated U.S.Area 2. Difficulty of obtaining Impact Areas. 3. Believed impossible to obtain necessary land titles and permissions.

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SITES VISITED AND REJECTED (BLUE) Cont'd.

MAP REFERENCE	LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE	APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRUMENTATION SITES (COUNTRY)	REMARKS
E	15 mi N Grays Harbor, Wash-ington	340°	550	0-100 100-550	U.S. Canada	Discarded because: 1. Adverse weather 2. Interference with commercial interests. 3. Excessive cost of base installations. 4. Spotty instrumentation.
		335°	1500	0- 75 1250-1500	U.S. Aleution Is (U.S.)	
		330°	2500	0- 75 1750-2500	U.S. Aleution Is (U.S.)	
		270°	5000	0- 75 Beyond 75	U.S. Various Mid-Pacific U.S. Islands	
F	Point Arena, Calif.	135°	1600	0 - 480 1550-1600	U.S. Mexican Islands	Discarded because: 1. Too short range. 2. Limited base area. 3. Isolation and cost of ba installation. 4. Parallels costal shippin routes. 5. Interference with other commercial interests. 6. Fires near heavily populated area.
G	Point Mugu, Calif.	225°	150 mi	0 - 150	U.S.	Discarded beeause: 1. Range too short. 2. Launching site too clos to populated area.

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SITES VISITED AND REJECTED (BLUE) Cont'd.

LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE	APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRUMENTATION SITES (COUNTRY)	REMARKS
15 mi N Grays Harbor, Wash-ington	340°	550	0-100 100-550	U.S. Canada	Discarded because: 1. Adverse weather 2. Interference with commercial interests. 3. Excessive cost of base installations. 4. Spotty instrumentation.
	335°	1500	0- 75 1250-1500	U.S. Aleution Is (U.S.)	
	330°	2500	0- 75 1750-2500	U.S. Aleution Is (U.S.)	
	270°	5000	0- 75 Beyond 75	U.S. Various Mid-Pacific U.S. Islands	
Point Arena, Calif.	135°	1600	0 - 480 1550-1600	U.S. Mexican Islands	Discarded because: 1. Too short range. 2. Limited base area. 3. Isolation and cost of base installation. 4. Parallels costal shipping routes. 5. Interference with other commercial interests. 6. Fires near heavily populated area.
Point Mugu, Calif.	225°	150 mi	0 - 150	U.S.	Discarded beeause: 1. Range too short. 2. Launching site too close to populated area.

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SITES CONSIDERED BUT DISCARDED FROM MAP STUDY (BLACK)

MAP REFERENCE	LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE	REASON FOR DISCARD
H	Fernandina, Florida	South	1. Only 300 miles instrumentation. 2. Fires near heavily populated costal area.
I	Savannah, Georgia	Northeast	1. Only 450 miles instrumentation with gaps. 2. Fires near heavily populated costal area.
J	Anywhere on Gulf of Mexico	Approxi-mate direction.	1. Limited to 150 miles instrumentation. 2. Heavy population and shipping.
K	Cape Flattery, Washington	South	1. Spotty instrumentation up to 500 miles. Remote chance of instrumentation beyond. 2. Costal shipping and fishing. 3. Weather
L	Dall Island, Alaska	North	1. Spotty instrumentation 500 miles. 2. Inaccessible launching site. 3. Weather
M	Island of Four Mountains, Alaska.	West	1. Spotty instrumentation to 50 miles. 2. Inaccessible 3. Weather

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SITES CONSIDERED BUT DISCARDED FROM MAP STUDY (BLACK)

LOCATION OF LAUNCHING SITE	APPROXIMATE DIRECTION OF FIRE	REASON FOR DISCARD
Fernandina, Florida	South	1. Only 300 miles instrumentation. 2. Fires near heavily populated costal area.
Savannah, Georgia	Northeast	1. Only 450 miles instrumentation with gaps. 2. Fires near heavily populated costal area.
Anywhere on Gulf of Mexico	Approximate direction.	1. Limited to 150 miles instrumentation. 2. Heavy population and shipping.
Cape Flattery, Washington	South	1. Spotty instrumentation up to 500 miles. Remote chance of instrumentation beyond. 2. Costal shipping and fishing. 3. Weather
Dall Island, Alaska	North	1. Spotty instrumentation 500 miles. 2. Inaccessible launching site. 3. Weather
Island of Four Mountains, Alaska.	West	1. Spotty instrumentation to 50 miles. 2. Inaccessible 3. Weather

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SITES CONSIDERED BUT DISCARDED FROM MAP STUDY (BLACK)

MAP REFERENCE	LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE	REASON FOR DISCARD
N	Homer, Alaska	West	1. Spotty instrumentation 2000 miles. 2. Inaccessible. 3. Weather
O	Lake of the Woods, Canada.	North	1. Inaccessible instrumentation 2000 miles. 2. Electronic disturbances. 3. Weather
P	Moosonee, Canada	Northwest	1. Remoteness of launching site and instrumentation stations from centers of civilization. 2. Weather. 3. Electronic disturbances. 4. Excessive cost.
Q	Churchill, Canada.	North	1. Isolation 2. Weather 3. Electronic disturbances. 4. Excessive cost.

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SITES CONSIDERED BUT DISCARDED FROM MAP STUDY (BLACK)

LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE	REASON FOR DISCARD
Homer, Alaska	West	1. Spotty instrumentation 2000 miles. 2. Inaccessible. 3. Weather
Lake of the Woods, Canada.	North	1. Inaccessible instrumentation 2000 miles. 2. Electronic disturbances. 3. Weather
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DEPARTMENT OF THE AIR FORCE
**********U.S.AIR FORCE

AFOGM

13 November 1947.

MEMORANDUM FOR CHAIRMAN, RESEARCH AND DEVELOPMENT BOARD

SUBJECT: Selection of Site for the National Guided Missile Range

1. In accordance with a directive from Joint Research and Development Board, which approved the report (PG 27/4) of the Committee on Long Range Proving Ground, the Air Force has activated a staff group to pursue the project. This group, known as the National Guided Missile Range Group, includes representatives from the Army (Ground Forces and Ordnance Department) and Navy (Ops 57, BuAer, BuOrd), as well as the Air Force.

2. The Group desires to negotiate with appropriate Mexican authorities, through the Joint Mexican-U.S. Defense Commission, for the necessary rights to establish the range at the site of first choice (El Centro-Gulf of California). As a preliminary to such action, it was necessary to secure permission from the State-Army-Navy-Air Force Coordinating Committee to discuss matters classified as confidential with the Mexicans. The State Department representative on this Committee felt that policy guidance at a higher level was necessary and the matter was eventually referred to the Committee of Two (The Secretary of State and the Secretary of Defense). The discussion of the Secretaries disclosed certain difficulties in negotiations with some of the countries involved in either the first or second choice sites. Further information on alternate sites was desired and is furnished herewith.

3. After extensive study, the Committee on Long Range Proving Ground determined the characteristics which should be present in a satisfactory range. The most important of these are:

a. Overall length: 3,000 miles.

b. Accurately located, land-based instrumentation for first 500 miles. This involves instrumentation stations at 50 mile intervals for that distance.

c. Weather and climatic conditions suitable for year-round operations.

d. Economy, initial cost and maintenance.

e. Readily accessible from the research and industrial centers of the United States.

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f. Maximum provisions for safety.

g. Minimum interference with commercial and private activities.

4. Application of the above criteria to possible sites disclosed that only two offered a satisfactory solution. All other sites were deficient or objectionable to such an extent that they would be entirely inadequate to the need. Tab "A" indicates the specific reasons in each case.

5. The Australian range was rejected only after careful deliberations. The principal objection is the distance which separates the centers of research and development in the United States from the test and proving area and which creates the following difficulties:

a. Reluctance of qualified civilian scientific and technical personnel to live there.

b. Prohibitive time delays and excessive costs in the transportation of materiel and personnel to Australia and the return of test data.

c. Requirement for joint use of the range with the British Empire.

d. Possibility of loss of use of range in war time.

6. As regards northern ranges on the Continent of North America it is considered that adverse weather conditions, electronic disturbances and inaccessibility of base and instrumentation stations would limit operations at any Canadian or Alaskan range to a small fraction of the desirable year-round operations. The initial tests and development of guided missiles present such difficult problems that they can only be solved under the most favorable conditions. Extremes of weather complicate the problem. It is only after the missile has reached the service test stage that it should be tested under all conditions of climate and weather.

7. If you consider such action appropriate, it is requested that you discuss the sites selected and rejected with the Secretary of Defense. If, as a result of this discussion, the Secretary of Defense concurs in the recommendations of the Long Range Proving Ground Committee, it is suggested that he be requested to reopen the matter with the Secretary of State with a view toward securing the latter's approval to negotiate with the Mexican military authorities on the matter.

1 Incl:
No. 1 - Tab "A"

WILLIAM L. RICHARDSON
Brigadier General, U.S.A.F.
Chief, National Guided Missile
Range Group.

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THE STATE-ARMY-NAVY-AIR FORCE COORDINATING COMMITTEE
Washington, D. C.

SANA-5802
30 October 1947

MEMORANDUM FOR THE SECRETARY, JOINT CHIEFS OF STAFF:

Subject: Alternative Locations for a Guided Missile Experimental Range.

At the meeting of the Secretaries of State, Defense, Army, Navy and Air Force (or their representatives) on 27 October 1947, it was agreed that the Joint Chiefs of Staff should be requested to study and make recommendations for alternate locations for a guided missile experimental range. An extract of the Minutes of this meeting is set forth in Enclosure "A".

This matter arose as a result of the Division of Mexican Affairs of the Department of State having been approached informally by officers of the Research and Development Board (Colonel Perry W. Brown, Army and Captain D. A. Harris, Navy). The Department of State was advised that it had been determined by the Research and Development Board that the most appropriate site for a guided missile experimental range is in the area of Southern California-Lower California (Mexico), and that it was being contemplated that the Department of State should approach the Mexican Government in this connection. The views of the Department of State on this matter are indicated in Enclosure "A".

There is also enclosed for your information in Enclosure "B" a copy of a memorandum from the Air Force Member of the Subcommittee on Military Information Control of the State-Army-Navy-Air Force Coordinating Committee requesting that that Subcommittee authorize the disclosure to the Mexican Government of certain information pertaining to the establishment of the guided missile range.

As the Secretary of SANACC also acts as secretary for the Committee of Secretaries (now the Committee of Two), this matter is accordingly referred for consideration and recommendation.

For the State-Army-Navy-Air Force Coordinating Committee:

H. W. MOSELEY,
Secretary.

Enclosures:
"A" - Extract of Minutes
"B" - Memo to MIC

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ENCLOSURE "A"

Extract from the
Minutes of the Meeting of the Secretaries of State, Defense, Army, Navy and Air Force (or their Representatives, October 27, 1947.

* * * *

II. Plans for Guided Missile Experiments over Mexican Territory

Decision:

It was agreed that the problem should be referred to the Joint Chiefs of Staff with a view to recommending alternative locations for a guided missile experimental range, which locations could then be discussed with the State Department for the purpose of deciding upon which would meet technical requirements and those of foreign relations.

Implementing Action:

The Secretary of the Committee to refer the matter to the Joint Chiefs of Staff.

Discussion:

SECRETARY MARSHALL said that the State Department has been approached by officers of the Research and Development Board who advise that it has been decided that the most appropriate site for a guided missile experimental range is from Southern California southward over the Gulf of California, Mexico, with the possibility that sometime in the future the range would be extended as far as the Galapagos Islands. It would be necessary to build control stations on Mexican territory. The State Department has been requested to consider approaching the Mexican Government in this connection. He said that the State Department did not wish to approach the Mexican Government at this time in this connection for the following reasons: (a) the fact that certain disclosures would have to be made to the Mexicans is a factor insofar as security is concerned, (b) there is also the possibility that the project could be built up into an anti-American campaign by one of several Mexican factions, (c) the fact that two objects have allegedly recently landed and exploded near Juarez, Mexico will make it difficult if not impossible to obtain permission, (d) that if guided missiles are sent over populated areas of any other country, the immediate assumption will be that the United States has less regard for these people than it has for its own. Furthermore, it is not inconceivable that ratification of the Inter-American Treaty on Reciprocal Assistance signed at Rio de Janiero in September might be jeopardized if we proceed with this proposal at this

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time. SECRETARY MARSHALL summarized by stating that we are having some difficulties with the Mexicans now which should not be agitated, and that it was the opinion of the State Department that it was inadvisable to take up this matter with the Mexican Government at this time. He said that the State Department wished to propose that this problem be referred for study to the JCS to determine alternative locations for a guided missile experimental range, which sites could then be discussed with the State Department with a view to any necessary negotiations with foreign governments.

SECRETARY SYMINGTON said that he understood that Banana River, Florida - Bahama Islands was a second choice for an experimental range of this type and the feasibility of using this location should be further explored.

SECRETARY FORRESTAL said that he was agreeable to having the JCS look into this matter.

* * *B* * *

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ENCLOSURE "B"

14 October 1947

MEMORANDUM FOR THE CHAIRMAN, SUBCOMMITTEE FOR MILITARY INFORMATION CONTROL OF THE STATE-ARMY-NAVY-AIR FORCE COORDINATING COMMITTEE

SUBJECT: Disclosure of Classified Guided Missile Range Information to Mexico.

1. The Research and Development Board (JRDB) has designated Headquarters, United States Air Force as the executive agency to initiate action with a view to establishing the National Guided Missile Range. It has been determined by the Research and Development Board that the most appropriate site for the range is in the area Southern California-Lower California (Mexico).

2. In order to ascertain the views of the Mexican Government regarding the establishment of the Range, it will be necessary for U.S. Military representatives to disclose to that government general information concerning the proposed project.

3. As an exception to Paragraph III e. SWNCC 206/29, it is requested that the Department of the Air Force be authorized by the Committee to disclose to the Mexican Government, through the Joint United States-Mexican Mission, information classified no higher than CONFIDENTIAL pertaining to the proposal to establish the National Guided Missile Range. Preliminary discussions will not include classified information concerning the missiles.

4. It is further requested that in the event agreements are reached which will result in the establishment of the proposed Range that the Department of the Air Force be authorized by the Committee to exchange information classified no higher than CONFIDENTIAL with the Government of Mexico on installation, instrumentation and operating techniques as is necessary for the development of the National Guided Missile Range.

B.A. SCHRIEVER
Colonel, USAF
USAF Member, SANAC-MIC

Copies Furnished:
Army (Col. H.H.Mole)
Navy (Capt. Taylor)

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ENCLOSURE "A"

THE JOINT RESEARCH AND DEVELOPMENT BOARD
WASHINGTON 25, D. C.

November 13, 1947

MEMORANDUM FOR THE STATE-ARMY-NAVY-AIR FORCE
COORDINATING COMMITTEE

Subject: Alternative Locations for a Guided Missile Experimental Range

Reference: SANA-5802

1. The above matter referred to the research and Development Board 1 November 1947 requests a study and recommendations on alternate locations for a guided missile experimental range.

2. This subject has accordingly again been reviewed. There is appended a memorandum dated 13 Nov. '47 (Appendix "A") to the Chairman, Research and Development Board, from the National Guided Missile Range Group giving further information as requested on alternative locations.

3. At its 9th Meeting, the Joint Research and Development Board approved the report of its Committee on Long Range Proving Ground. This Committee made thorough studies of alternative sites. A copy of their report is also appended. (Appendix "B")

4. Should the material herewith transmitted be insufficient it is respectfully requested that guidance as to the general policy regarding the use of foreign territory, in whole or in part, in connection with a long range proving ground be furnished the Research and Development Board, in order that it may present a summary of its studies explicitly oriented in accordance with this policy.

/s/ V. Bush
V. Bush
Chairman

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APPENDIX "A"

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, U.S. AIR FORCE
WASHINGTON

In Reply Refer to:

AFOGM

13 November 1947.

MEMORANDUM FOR CHAIRMAN, RESEARCH AND DEVELOPMENT BOARD

SUBJECT: Selection of Site for the National Guided Missile Range

1. In accordance with a directive from Joint Research and Development Board, which approved the report (PG 27/4) of the Committee on Long Range Proving Ground, the Air Force has activated a staff group to pursue the project. This group, known as the National Guided Missile Range Group, includes representatives from the Army (Ground Forces and Ordnance Department) and Navy (Ops 57, BuAer, BuOrd), as well as the Air Force.

2. The Group desires to negotiate with appropriate Mexican authorities, through the Joint Mexican-U.S. Defense Commission, for the necessary rights to establish the range at the site of first choice (El Centro-Gulf of California). As a preliminary to such action, it was necessary to secure permission from the State-Army-Navy-Air Force Coordinating Committee to discuss matters classified as confidential with the Mexicans. The State Department representative on this Committee felt that policy guidance at a higher level was necessary and the matter was eventually referred to the Committee of Two (The Secretary of State and the Secretary of Defense). The discussion of the Secretaries disclosed certain difficulties in negotiations with some of the countries involved in either the first or second choice sites. Further information on alternate sites was desired and is furnished herewith.

3. After extensive study, the Committee on Long Range Proving Ground determined the characteristics which should be present in a satisfactory range. The most important of these are:

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a. Overall length: 3,000 miles.

b. Accurately located, land-based instrumentation for first 500 miles. This involves instrumentation stations at 50 mile intervals for that distance.

c. Weather and climatic conditions suitable for year-round operations.

d. Economy: initial cost and maintenance.

e. Readily accessible from the research and industrial centers of the United States.

f. Maximum provisions for safety.

g. Minimum interference with commercial and private activities.

4. Application of the above criteria to possible sites disclosed that only two offered a satisfactory solution. All other sites were deficient or objectionable to such an extent that they would be entirely inadequate to the need. Annex "A" indicates the specific reasons in each case.

5. The Australian range was rejected only after careful deliberations. The principal objection is the distance which separates the centers of research and development in the United States from the test and proving area and which creates the following difficulties:

a. Reluctance of qualified civilian scientific and technical personnel to live there.

b. Prohibitive time delays and excessive costs in the transportation of material and personnel to Australia and the return of test data.

c. Requirement for joint use of the range with the British Empire.

d. Possibility of loss of use of range in war time.

6. As regards northern ranges on the Continent of North America it is considered that adverse weather conditions, electronic distrubances and inaccessibility of base and instrumentation stations would limit operations at any Canadian

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or Alaskan range to a small fraction of the desirable year-round operations. The initial tests and development of guided missiles present such difficult problems that they can only be solved under the most favorable conditions. Extremes of weather complicate the problem. It is only after the missile has reached the service test stage that is should be tested under all conditions of climate and weather.

7. If you consider such action appropriate, it is requested that you discuss the sites selected and rejected with the Secretary of Defense. If, as a result of this discussion, the Secretary of Defense concurs in the recommendations of the Long Range Proving Ground Committee, it is suggested that he be requested to reopen the matter with the Secretary of State with a view toward securing the latter's approval to negotiate with the Mexican military authorities on the matter.

1 Incl.
No. 1 - Tab "A"
(Annex "A" to
Appendix "A")

/s/William L. Richardson
WILLIAM L. RICHARDSON
Brigadier General, U.S.A.F.
Chief, National Guided Missile
Range Group.

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ANNEX "A" TO APPENDIX "A"

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ACCEPTABLE SITES (RED)

MAP REFERENCE	LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE (AZIMUTH)	APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRU-MENTATION SITES (COUNTRY)
A	20 miles west of El Centro, California	145°	4500	0 - 700	Base - U.S. to 700 - Mexico
				2900	Galapagos Is (Ecuador)
				4500	Chile
		140	1000	775 -875	Mexico
B	Cape Canaveral, Florida (Banana River)	129°	1500	0 - 50	U.S.
				150 - 485	Bahamas (Br.)
				525 - 800	Bahamas (Br.)
				875 -1000	Dominican Rep.
				1025 -1075	
				1500	Puerto Rico Grenadine Is (Br.)
		120°	3000	1375	Leeward Is (Br.& Fr.)
				3000	Brazil
				3000	Brazil
		110°	5500	3900	Ascencion Is (Br.)
				4300	St.Helena (Br.)
				5500	So.Africa (Br.)

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ACCEPTABLE SITES (RED)

APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRU-MENTATION SITES (COUNTRY)	REMARKS
4500	0 - 700	Base - U.S. to 700 - Mexico	Best site
	2900	Galapagos Is (Ecuador)	
	4500	Chile	
1000	775 -875	Mexico	
1500	0 - 50	U.S.	Acceptable - Less desirable than A because: 1. More expensive 2. Inferior Instrumen-tation 3. Inferior weather 4. Possible local (U.S.) objections 5. Possible foreign objections
	150 - 485	Bahamas (Br.)	
	525 - 800	Bahamas (Br.)	
	875 -1000	Dominican Rep.	
	1025 -1075		
	1500	Puerto Rico	
		Grenadine Is (Br.)	
3000	1375	Leeward Is (Br.& Fr.)	
	3000	Brazil	
	3000	Brazil	
5500	3900	Ascencion Is (Br.)	
	4300	St.Helena (Br.)	
	5500	So.Africa (Br.)	

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SITES VISITED AND REJECTED (BLUE)

MAP REFERENCE	LOCATION OF LAUNCHING SITE	APPROX-IMATE DIRECTION OF FIRE	APPROX-IMATE RANGE (MILES)	APPROX-IMATE INSTRUMEN-TATION (MILES)	LOCATION OF INSTRUMENTATION SITES (COUNTRY)	Disc
C	15 miles East Key West, Florida	110°	850	0 - 50 70 - 505 565 - 805	U.S. High Seas High Seas	1. 2. 3. 4. 5
D	White Sands New Mexico	330° 270°	1300 6000	0 -1300 0 - 600 2800 -3500 Beyond 3500	U.S. U.S. Hawaii (U.S.) Pacific Atolls	

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