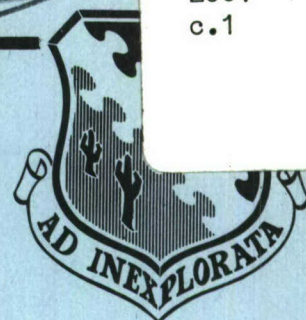


AFFTC
Z001
c.1



A
F
F
T
C

✓ AFFTC USERS' HANDBOOK

APRIL 1978

LOAN COPY: RETURN TO
AFRL/PSTL TECHNICAL LIBRARY
KIRTLAND AFB, NM 87117-5776

LOAN COPY: RETURN TO AFWL
TECHNICAL LIBRARY, KIRTLAND AFB, NM

This document has been approved
for public release and resale;
its distribution is unlimited.

20080208189

AIR FORCE FLIGHT TEST CENTER
EDWARDS AIR FORCE BASE, CALIFORNIA
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE



AFFTC USERS' HANDBOOK

This document has been approved
for public release and resale;
its distribution is unlimited.

FOREWORD

This handbook is provided as an overall guide and convenient source of information concerning the Air Force Flight Test Center, its mission and support capabilities, and the procedures by which these are provided.

The Introduction sets forth AFFTC's origin, mission, concept of operations, general policies, and official relationships that govern activities or apply at the Center. The remainder of the book summarizes the technical and support services and facilities which AFFTC provides and tells how to obtain these services.

For answers to any questions concerning AFFTC capability to support your test and/or test support requirements, please write Commander, Air Force Flight Test Center, Attention: Programs and Requirements Division (DOCQ), Edwards Air Force Base, CA 93523.


PHILIP J. CONLEY, JR.
Brigadier General, USAF
Commander

MISSION

The Mission of AFFTC is to

Plan, accomplish and report on Air Force -

- Development Test and Evaluation (DT&E) of manned and unmanned aircraft systems.
- Tests of manned experimental and research aerospace vehicles.
- Tests of parachute systems and aerodynamic deceleration devices.
- Aircraft/weapons compatibility tests.
- Test and evaluation of aircraft compatibility with arresting gear and engagement devices.
- Artificial icing tests, as well as tests for other government and commercial agencies.
- Aircraft/subsystems DT&E all-weather testing.

Support Initial Operational Test and Evaluation (IOT&E) of manned and unmanned aircraft systems as required.

Operate the USAF Test Pilot School.

Support operational functions and testing conducted by tenant organizations.

table of contents

	<u>Page No.</u>
LIST OF ILLUSTRATIONS_____	vii
LIST OF TABLES_____	viii
PART I - INTRODUCTION_____	1
Section A - General_____	1
Section B - Policies_____	1
Section C - Program Initiation_____	1
Section D - Mission_____	2
PART II - EDWARDS AFB AND VICINITY CHARACTERISTICS_____	5
Section A - Location_____	5
Section B - Physical Features_____	5
Section C - Weather Conditions _____	8
Section D - History_____	14
PART III - AFFTC TEST AND SUPPORT CAPABILITIES_____	15
Section A - Manned and Unmanned Aircraft Flight Test_____	15
Section B - Manned Aerospace Research Vehicle Testing_____	15
Section C - Aerospace Deceleration Testing_____	16
Section D - Aircraft Arresting System Testing_____	16
Section E - Test Pilot Training_____	16
Section F - Artificial Icing and Water Spray_____	17
Section G - Airspace and Test Ranges_____	17
Section H - Technical Support Capabilities _____	18
Technical Support Facilities_____	18
Aircraft Maintenance_____	21
Test/Test Support Aircraft_____	23
PART IV - GENERAL SUPPORT SERVICES_____	23
Section A - Weather_____	23
Section B - Communications _____	23
Section C - Civil Engineering_____	24

Architectural and Engineering_____	24
Maintenance_____	24
Fire Protection_____	24
Equipment_____	24
Housing_____	24
Section D - Commercial Transportation Office_____	25
Passenger_____	25
Freight_____	25
Section E - Administration_____	25
Section F - Information_____	25
Section G - Supply_____	25
Section H - Procurement_____	25
Section I - Legal_____	25
Section J - Finance_____	25
Section K - Medical_____	26
Civilian Personnel_____	26
Military Personnel and Dependents_____	26
Section L - Security and Law Enforcement_____	26
Section M - Safety_____	26
Section N - Base Fuels Management Office_____	27
Section O - Temporary Billeting_____	28
Section P - Contractor and Civil Aircraft_____	28
Section Q - Aircraft Maintenance_____	28
Section R - Physiological Support_____	28
Section S - Life Support_____	29
Section T - Base Operations_____	29
PART V - PROGRAM SUPPORT PROCEDURES_____	31
Section A - General_____	31
Section B - Support Focal Point_____	31

	<u>Page No.</u>
Section C - Major Programs or Projects_____	31
General_____	31
Program Documentation_____	32
Section D - Engineering Services Support_____	33
General_____	33
Submission of Support Requests_____	33
AFFTC Support Commitment_____	33
Section E - Support of Non-Governmental Test and Evaluation____	33
General_____	33
Processing of Support Requests_____	34
PART VI - SCHEDULING_____	35
Section A - Test Scheduling_____	35
Requirements_____	35
Procedures_____	35
Section B - Radio Frequency Assignments_____	35
User Requirements_____	35
Available Frequencies_____	36
Procedures for New Equipment_____	36
PART VII - DESCRIPTIONS OF AFFTC FLIGHT RANGES AND FACILITIES____	37
Section A - Precision Impact Range Area (PIRA) and Alpha Corridor_____	37
Section B - Dual Air-to-Ground Range (DAGRAG), Conventional____	38
Section C - Low Altitude, Medium Altitude and High Altitude Supersonic Corridors_____	42
Section D - Spin Areas and Dive Corridor_____	44
Section E - Tower Flyby Line_____	45
Section F - Photo and Infrared Resolution Range (PRR) and Photo and Infrared Tactical Range (PTR)_____	46
Section G - Takeoff and Landing Facility (TO/L) and Low Altitude Ground Speed Calibration Courses____	48
Section H - Rocket Test Hazard Control Area (RTHCA) and PB-6 Target Area_____	50

	<u>Page No.</u>
Section I - Radar Fidelity and Geometric Range (RADFAG)_____	51
Section J - High Elevation Test Complex_____	52
Section K - Hangars and Other Special Structures_____	53
EXPLANATIONS OF ABBREVIATIONS AND TERMS_____	55
REFERENCES_____	61
BIBLIOGRAPHY_____	63

list of illustrations

<u>Figure No.</u>	<u>Title</u>	<u>Page No.</u>
1	Edwards Air Force Base Schematic_____	6
2	Runway Complex/Landing Areas_____	7
3	Precipitation, Edwards AFB_____	10
4	Temperatures, Edwards AFB_____	11
5	Wind Rose - Edwards AFB_____	12
6	Sky Condition, Edwards AFB_____	13
7	Edwards Flight Test Range_____	20
8	Typical Workload - Programming Cycle_____	34
9	Precision Impact Range Area (PIRA)_____	37
10	Alpha Corridor_____	38
11	DAGRAG Gunnery Skip Bomb Target Configuration__	39
12	DAGRAG Altitude Restriction on South Range Traffic Pattern_____	40
13	DAGRAG Aircraft Final Approach to Target_____	41
14	Medium Altitude Supersonic Corridor_____	42
15	Low Altitude Supersonic Corridor Cords Road Corridor_____	43
16	High Altitude Supersonic Corridor_____	43
17	R-2515 Complex_____	44
18	Tower Flyby Pattern_____	45
19	AFFTC Photo Resolution Range_____	46

<u>Figure No.</u>	<u>Title</u>	<u>Page No.</u>
20	Photo and IR Tactical Range_____	47
21	TO/L Facilities and Low Altitude Ground Speed Calibration Courses_____	48
22	South Base Ground Speed Calibration Courses_____	49
23	RTHCA and PB-6 Target Area_____	50
24	Radar Fidelity and Geometric Range (RADFAG)_____	51
25	High Elevation Test Complex_____	52

list of tables

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
I	Dry Lakebeds_____	8
II	Climatological Data for Edwards AFB_____	9
III	Restricted Areas and Supersonic Corridors - Altitudes_____	19
IV	Hangars and Other Special Structures_____	54

PART I

INTRODUCTION

SECTION A - GENERAL

As an organization directly responsible to Headquarters Air Force Systems Command, the Air Force Flight Test Center (AFFTC) develops, maintains, and operates flight test facilities for development, test, and evaluation of manned and unmanned aerospace vehicles.

Under this mission, the Center capabilities include the planning, conduct and reporting of flight test programs, the acquisition, transmission, recording, processing and display of data, space positioning flight and ground instrumentation and communications, and various other technical facilities and capabilities needed to conduct manned and unmanned aerospace vehicle development and evaluation test operations.

AFFTC activities are primarily concentrated at Edwards Air Force Base, California. However, AFFTC frequently conducts flight test activities at remote sites and over various restricted areas.

AFFTC is responsible for obtaining and coordinating all government and contractor services needed to provide support to DOD, NASA, and other agency programs to be conducted at this Center, consistent with established national policies and priorities.

SECTION B - POLICIES

DOD policies govern national range use and joint-use property. Relations between AFFTC and other Air Force organizations, the Army, Navy, NASA, other Government agencies and non-Government agencies are conducted per DOD, USAF, and AFSC policies and direction and AFFTC directives.

The AFFTC is designated a DOD Test & Evaluation activity and governed by DODI 3200.11, Major Range and Test Facility Base. Reimbursement for AFFTC is in accordance with that directive.

All resident organizations are responsible for coordinating their activities through established channels with the Commander, AFFTC. Accordingly, organizations at AFFTC work through a designated, assigned element of the Center in relation to their activities. Each agency using test facilities and test areas provides a project officer who serves as a focal point for matters pertaining to its programs, activities, and requirements. In the cycle of AFFTC mission planning, it is the responsibility of facilities users to document and submit support needs.

SECTION C - PROGRAM INITIATION

Future requests for AFFTC support should be initiated as early as possible by submission of a Program Introduction (PI) Document. See page 31 for details. AFFTC will respond with a formal commitment. Upon user concurrence, a project order or similar funding documentation should be provided AFFTC. The Project Order (PO) should refer to the AFFTC Job Order Number (JON) identified in the AFFTC commitment document Statement of Capability (SC). Also the accounting classification should be included along with the amount of funds certified available for support of the program. Four copies of the PO should be submitted to AFFTC (ACB) for obligation of funds. Two signed acceptance copies will be returned to the customer.

SECTION D - MISSION

The Air Force Flight Test Center (AFFTC) conducts Development Test and Evaluation (DT&E) of manned and unmanned aircraft systems and aerodynamic decelerator devices for the Air Force and other Government agencies, and supports Initial Operational Test and Evaluation (IOT&E) for these programs as required. AFFTC is also tasked with the responsibility for DT&E all-weather testing, and operation of the USAF Test Pilot School. A capability has been developed from in-house resources to conduct flutter tests of modified aircraft or of stores added to aircraft and to perform analysis of minor aircraft structural modifications. Test and base support also is provided to tenants, including the Air Force Rocket Propulsion Laboratory, US Army Aviation Engineering Flight Activity, and NASA Dryden Flight Research Center. A clear understanding of the roles of the developer, testing agency, and potential user along with early identification of test support needs will continue to be critical. AFFTC recognizes that valid flight test data will be required during all phases of system development from research through production. The current AFFTC Improvement and Modernization (I&M) Program is designed to enhance the Center's capability in this area to support the future AFFTC mission.

The AFFTC total resource projection is aligned to develop complete test and support capabilities in the following headquarters assigned areas of lead center responsibilities: (1) aircraft flight test, (2) remotely piloted vehicle flight test, (3) aerospace research vehicle test, and (4) aerospace deceleration test.

For the lead center responsibilities assigned, AFFTC normally provides the following test services to the user:

- a. Assistance in RFP preparation, source selection, and negotiation.
- b. Test concepts, plans, and procedures.
- c. Preparation and consolidation of cost estimates.
- d. Test conduct/support.*
- e. Data Collection, reduction, and analysis.
- f. Test results/data evaluation.
- g. Reporting, as appropriate.

*Includes installation, maintenance, and operation of instrumentation, common support, and service required for testing.

For the designated lead center assignments, AFFTC will also use, in addition to its resources, facilities of other test centers and ranges when applicable and required. Factors such as workload and availability of test resources will be dictating factors in the assignment of tests and utilization of other test center/range resources.

Aircraft Flight Test

The AFFTC maintains a professional engineering and operations capability to plan, conduct, and report on the quantitative and qualitative test and evaluation of manned aircraft and associated performance and functional capabilities of aircraft subsystems, personnel subsystems test and evaluation, all-weather testing, maintainability, reliability, and the

integration of these factors. There is available the engineering knowledge and computing equipment with associated hardware to simulate complex aircraft under flight conditions. AFFTC also conducts tests and provides support for artificial icing and rain test conditions by using a tanker aircraft to provide a water/icing spray in which the test aircraft flies. A limited capability to accomplish structural and flutter flight testing has been established.

Aerospace Vehicle Test

AFFTC, as lead center for aerospace research vehicle tests, possesses the capability, with some limitation, to conduct advanced development and experimental flight test programs. This capability includes a hardcore contingent of engineers and pilots with research vehicle experience. It also includes applicable simulation facilities, facilities for rocket engine maintenance and overhaul, range support, and data processing. The Edwards area also has certain natural resources, such as clear weather, sparse population, and dry lakebeds for normal and emergency recovery, which make it well suited to this type of testing.

Advanced development programs and testing of research vehicles provide new technology required for the design of new weapon systems. These programs also provide an early exposure to new concepts and technology that form the basis for new weapons and support systems. New test techniques, data acquisition processing, and analysis methods are developed to permit development testing of these vehicles. This new technology is then introduced into the test and evaluation cycle of more conventional aerospace systems to provide more efficient procedures. Examples include techniques for testing variable or high gain flight control systems, stability derivative extraction techniques, and the methodology permitting instrumented systems tests to be feasible.

Aerospace Decelerator Testing

The mission of the lead center for aerospace decelerator testing is to conduct development testing of aerodynamic deceleration systems. Specifically, AFFTC supports and performs development testing of aerodynamic deceleration devices and systems for DOD and other government agencies. Past non-DOD users of this testing service have been NASA, AEC, ARPA and the Coast Guard.

Advanced Unmanned Aircraft Test

The 6514 Test Squadron conducts DT&E, IOT&E, operational test and evaluation (OT&E), and follow-on product improvement testing for unmanned vehicles including drones, Remotely Piloted Vehicles (RPV), cruise missiles, Harassment Weapon Systems, and the associated ground/air launch and recovery systems.

The squadron maintains professional engineering, operations, and maintenance capability to plan, conduct, and report the quantitative and qualitative test and evaluation of unmanned aircraft and supporting systems. The squadron also maintains a capability to design, fabricate, and employ analog and digital instrumentation telemetry systems in support of unmanned vehicle testing or for special projects. Additionally, the squadron is the sole AF activity with the capability to test and evaluate Mid-Air Retrieval Systems (MARS). Expertise exists on unmanned aircraft performance analysis, subsystem performance, and functional capability analysis, maintainability, reliability, system safety, and system integration.

Most of the squadron test missions are conducted on the Hill/Wendover/Dugway Proving Ground Range Complex. This test range complex provides airspace over an area of up to 17,720 square miles for the conduct of test missions. The ranges are equipped with precision radar tracking systems, cinetheodolite coverage, instrumentation telemetry systems, communications, and a High Accuracy Multiple Object Tracking System (HAMOTS). In addition, the data from these facilities are transmitted via microwave communications to a Range Mission Control Center (RMCC) at Hill AFB where they are available for data reduction or display. The capability to microwave these data to the twin Cyber 74 computers at the Air Force Flight Test Center will exist by January 1979. The squadron also conducts test missions for unmanned aircraft at the Pacific Missile Test Center (PMTTC) and at the Edwards Flight Test Range.

Test Pilot Training

The USAF Test Pilot School provides training in two distinct courses--the Experimental Test Pilot Course and the Flight Test Engineer/Navigator Course. These courses are designed to train members of the flight test team in the latest methods of testing and evaluating aircraft and aerospace systems. Though they are separate, the two courses intermesh and supplement each other, instilling the pattern of cooperation and understanding between pilot and engineer or navigator, which is so necessary for successful flight test operations. In addition to members of the USAF, the school trains students from DOD agencies, FAA, NASA, aerospace corporations, and allied nations.



HH-53 HEAVY LIFT HELICOPTER WITH BQM-34F AFTER MID-AIR RETRIEVAL

PART II

EDWARDS AFB AND VICINITY

CHARACTERISTICS

SECTION A - LOCATION

Edwards Air Force Base is located on the western edge of the Mojave Desert, approximately 90 statute miles north of Los Angeles, California, by highway. The base includes parts of San Bernardino County, Kern County, and Los Angeles County. This desert location affords natural isolation which is essential for the testing of new and experimental aircraft. Community support is provided mainly by the towns of Palmdale (pop. 23,700), Lancaster (pop. 50,575), Rosamond (pop. 2,500), Boron (pop. 2,840), Mojave (pop. 2,600), California City (pop. 2,100), and Quartz Hill (pop. 7,350). Within 100 miles a technically skilled and highly professional labor market is available, as well as numerous highly accredited academic institutions that furnish specialized consultant services as required.

A unit not physically located at Edwards but an integral part of the AFFTC organization is the 6514 Test Squadron. First activated in May of 1970, the unit was transferred to Hill Air Force Base, Utah, in the summer of 1973. The 6514th was developed to consolidate Air Force Test and Evaluation of advanced unmanned vehicles.

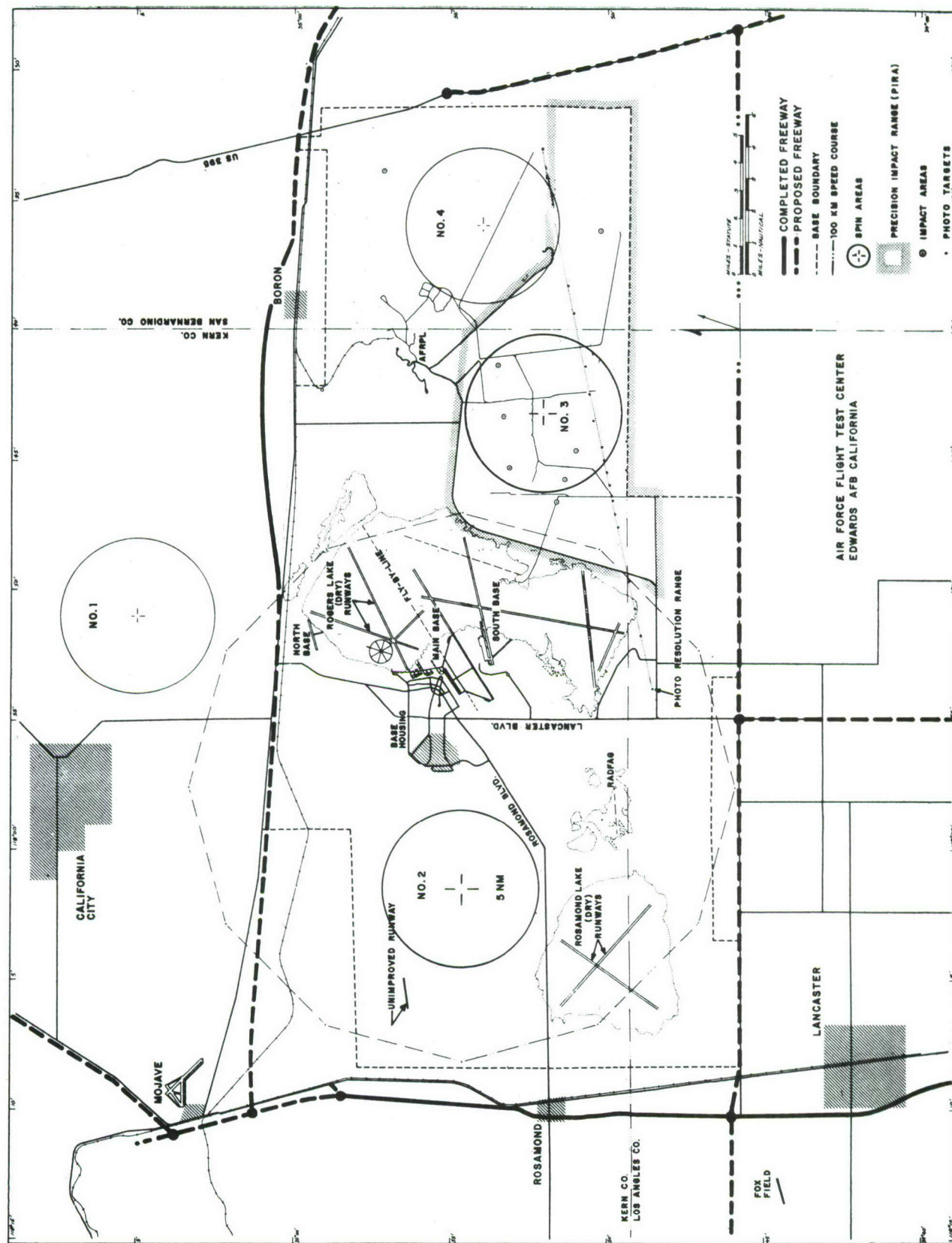
SECTION B - PHYSICAL FEATURES

Edwards AFB comprises over 301,000 acres of land encompassing a land area of approximately 15 by 35 statute miles (figure 1). Within the reservation are 65 square miles of usable landing area on Rogers and Rosamond Dry Lakes, including runway lengths up to 7.5 statute miles (figure 2).

These dry lakebeds, along with a number of off-base dry lakebeds (Table I), are used in support of the AFFTC mission as planned recovery areas for research aircraft, and as emergency landing sites for all aircraft tested at this Center.

Another distinct asset of Edwards AFB is the dry climate which results in excellent flying conditions year-round. Edwards AFB, at 2,302 feet MSL altitude and approximately 100 miles from the Pacific Ocean, is free of ocean fog and attendant humidity. The weather is typical for the high desert, warm and dry in the summer and moderately cool in the winter with frequent nighttime frost.

The scope and diversity of activities conducted at AFFTC require a correspondingly wide range of resources which include: administrative and engineering offices; shops and laboratories; hangars, ramps, and parking space; flight test ranges; data acquisition, processing, and display facilities; scientific/engineering computation and simulation facilities; aircraft arresting systems test facility; and other associated support and service capabilities.



(NOT TO SCALE)

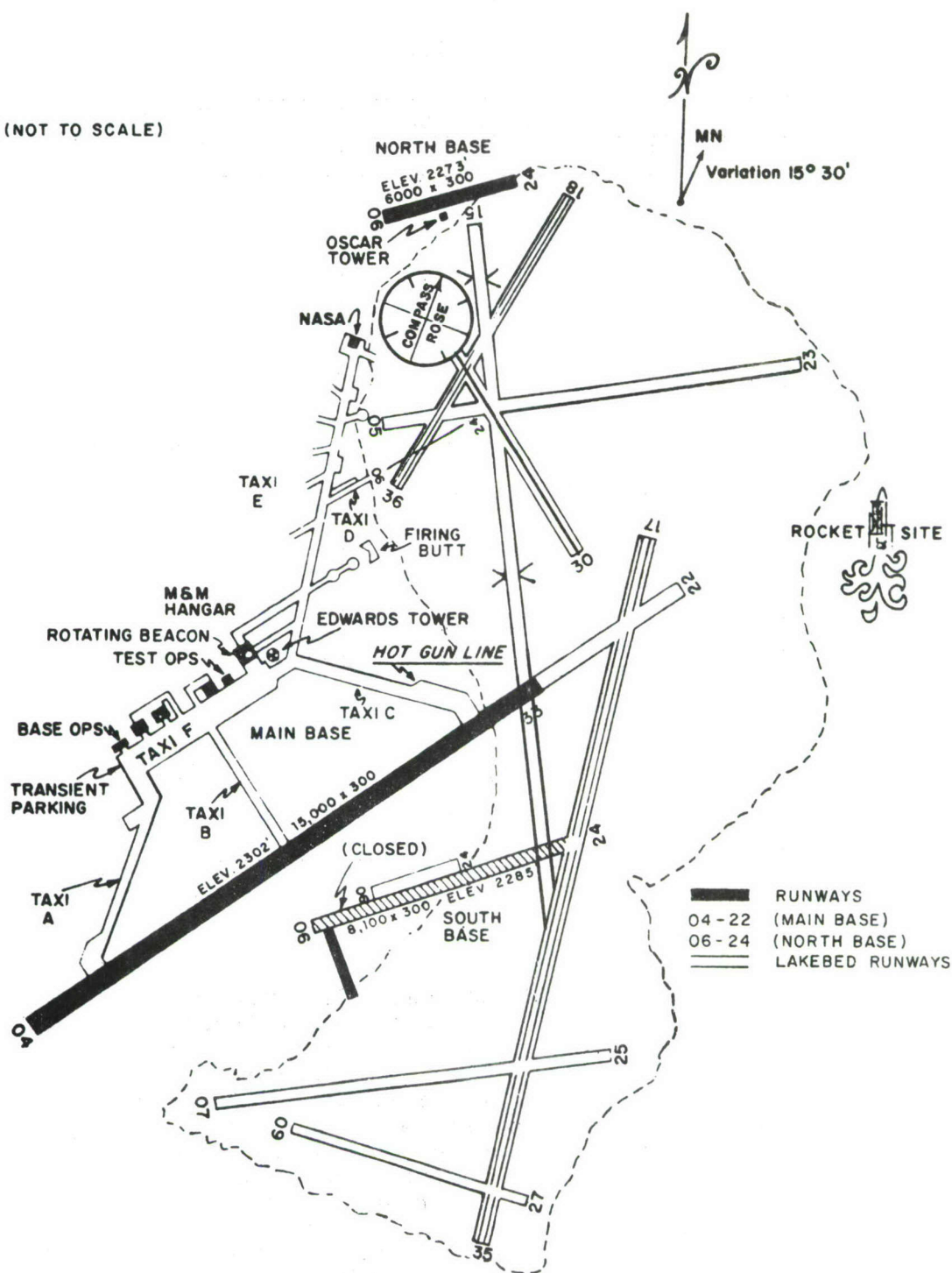


Figure 2 Runway Complex/Landing Areas

Table I
DRY LAKEBEDS

Runway Number	Usable Surface Length		Distance from Edwards AFB (nautical miles)
	Statute Miles	Feet	
Rogers (Edwards AFB)			
30	2.0	10,560	On-Base
05-23	5.2	27,450	
18-36	4.5	23,760	
35-17	7.5	39,600	
09-27	2.0	10,560	
07-25	4.0	21,120	
15-33	6.2	32,736	
Rosamond (Edwards AFB)			
02-20	4.0	21,120	On-Base
11-29	4.0	21,120	On-Base

SECTION C - WEATHER CONDITIONS

The location and altitude of Edwards AFB provide fairly distinct seasonal changes. The summer months, when temperatures reach over 100 degrees F, are usually dry and cloudless. Conversely, the winter months are characterized by increased cloudiness, windstorms, temperature often below freezing, and occasional precipitation. The annual average precipitation is slightly under 4 inches, with the largest amounts coming from the one to six rainstorms that occur each winter. Each storm brings from 0.25 up to several inches of rain and occasionally some light snow. In the summer, the only rain occurs during a rare thunderstorm, which usually brings only minimum rainfall. The windiest season occurs from March through May, with winds over 35 knots occurring fairly often. However, winds over 40 knots have occurred during every month of the year. Weather conditions at Edwards AFB are favorable for testing, which requires optical tracking, due to the infrequent clouds and good visibility. Visibility is 10 miles or better 96.0 percent of the time, but the airfield is closed because of poor visibility (less than 1 mile) 0.2 of 1% of the time. The infrequent low visibilities are caused by blowing dust or sand, haze, precipitation, and fog. The total cloud cover at Edwards varies from an average of one-tenth cloud cover in the summer to over three-tenths cover in the winter. However, ceilings low enough to close the airfield occur only 0.1 percent of the time. Ceilings less than 10,000 ft occur

5.6% of the time, while clear to scattered skies (1-5/10 coverage) occur 78.9% of the time. Table II and figures 3 through 6 present the annual Edwards AFB meteorological data histories for precipitation, temperatures, winds, and sky condition.

Table II
CLIMATOLOGICAL DATA FOR EDWARDS AFB, CALIFORNIA

Month	Temperatures (deg F)			Precipitation (inches)		Winds		Peak Winds		Avg Dew Point (deg F)	Avg Rel Hum (pct)
	Min*	Max*	Avg*	Liquid	Solid	Med Dir (degs)	Avg Speed (knots)	Dir (degs)	Speed (knots)		
JANUARY	30	57	44	0.66	0.6	250	06	290	59	27	53
FEBRUARY	34	61	48	0.74	T	260	07	270	67	29	50
MARCH	38	65	52	0.45	0.1	250	10	270	64	31	46
APRIL	44	73	58	0.26	0	250	11	250	55	36	45
MAY	51	80	66	0.04	0	240	12	290	56	39	39
JUNE	58	89	74	0.02	0	240	12	250	53	41	35
JULY	66	99	82	0.04	0	240	11	180	47	44	28
AUGUST	64	97	80	0.10	0	240	09	070	60	44	30
SEPTEMBER	57	92	74	0.14	0	240	08	270	47	41	34
OCTOBER	46	79	62	0.15	0	240	07	290	49	37	32
NOVEMBER	36	67	52	0.63	0.2	240	06	270	55	29	51
DECEMBER	30	57	44	0.71	0.2	250	06	290	58	27	57
ANNUAL	46	76	61	3.94	1.1	250	09	270	67	35	42

*Long-term average values.

PRECIPITATION

EDWARDS AFB, CALIF

SEP 1943 - MAR 1972

ANNUAL MEAN = 3.94

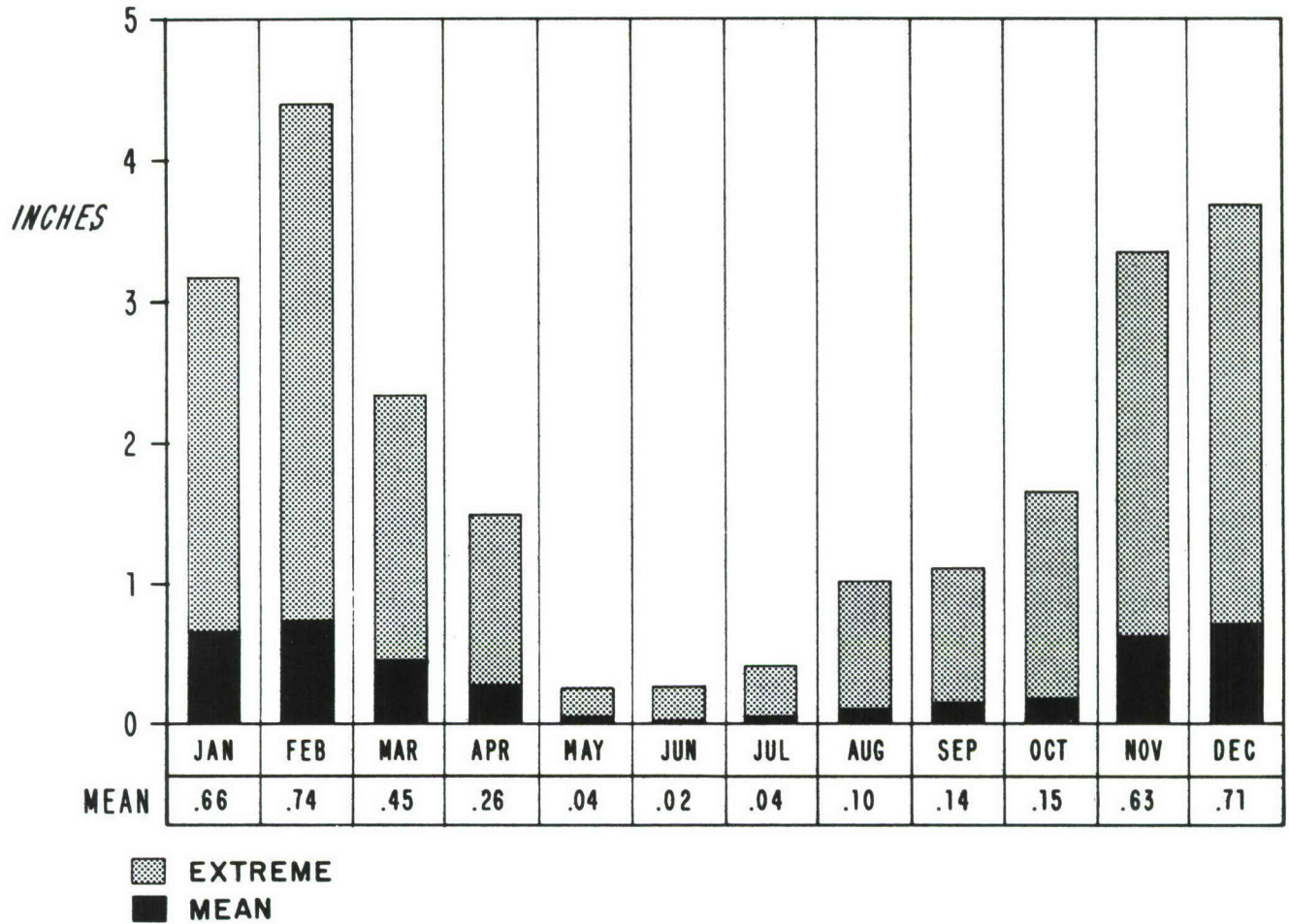


Figure 3 Precipitation, Edwards AFB

DEGREE FAHRENHEIT

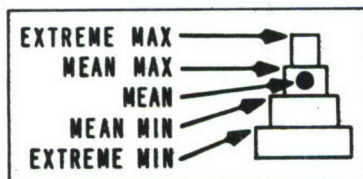
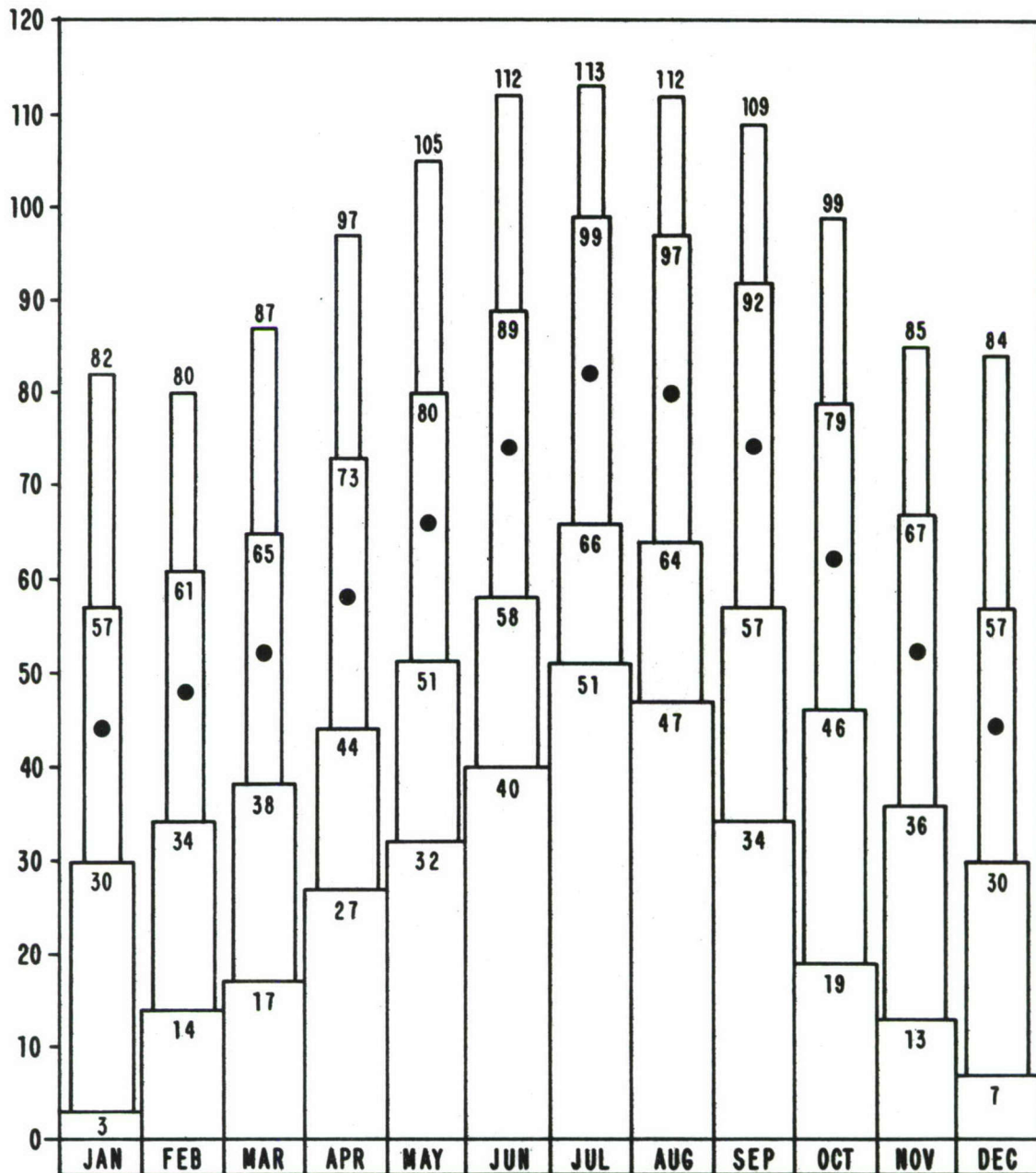
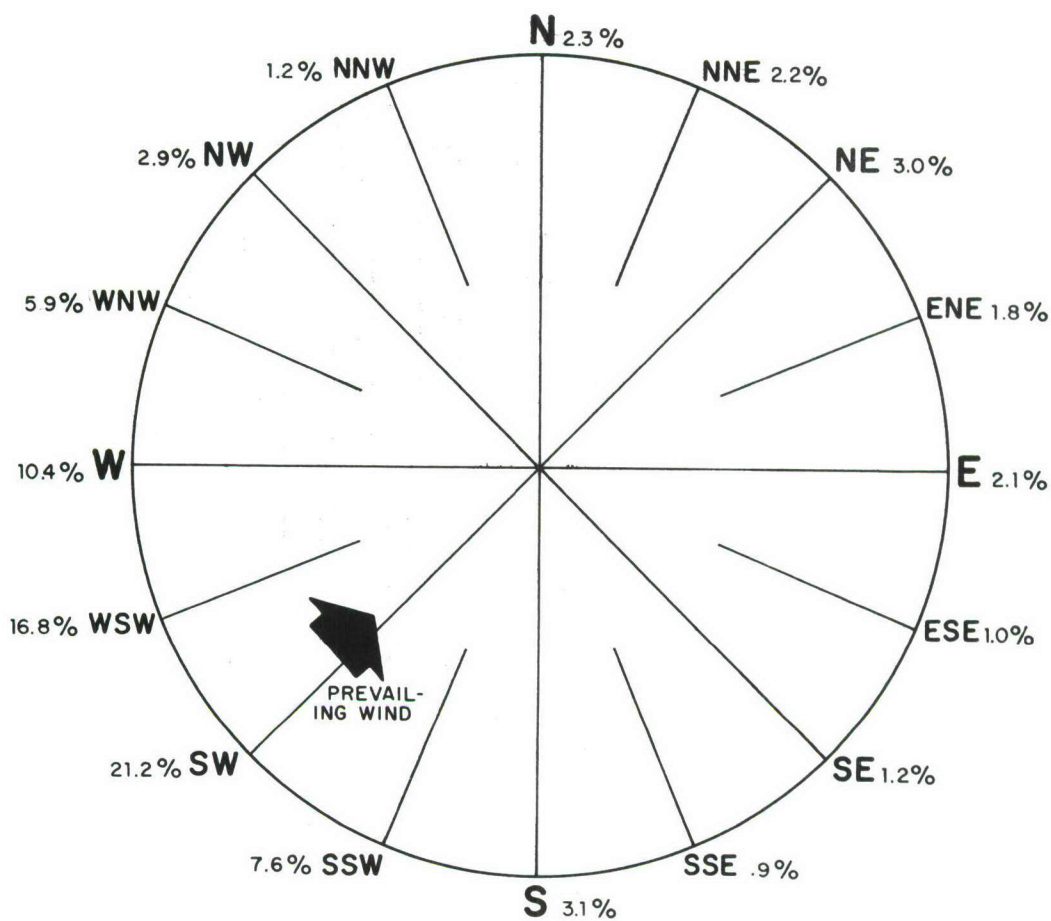


Figure 4 Temperature, Edwards AFB



NOTE: PERCENTAGES SHOWN INDICATE
FREQUENCY, BY DIRECTION OF
SURFACE WINDS.
(CALM WINDS EXIST 16.4% OF
THE TIME.)

Figure 5 Wind Rose - Edwards AFB

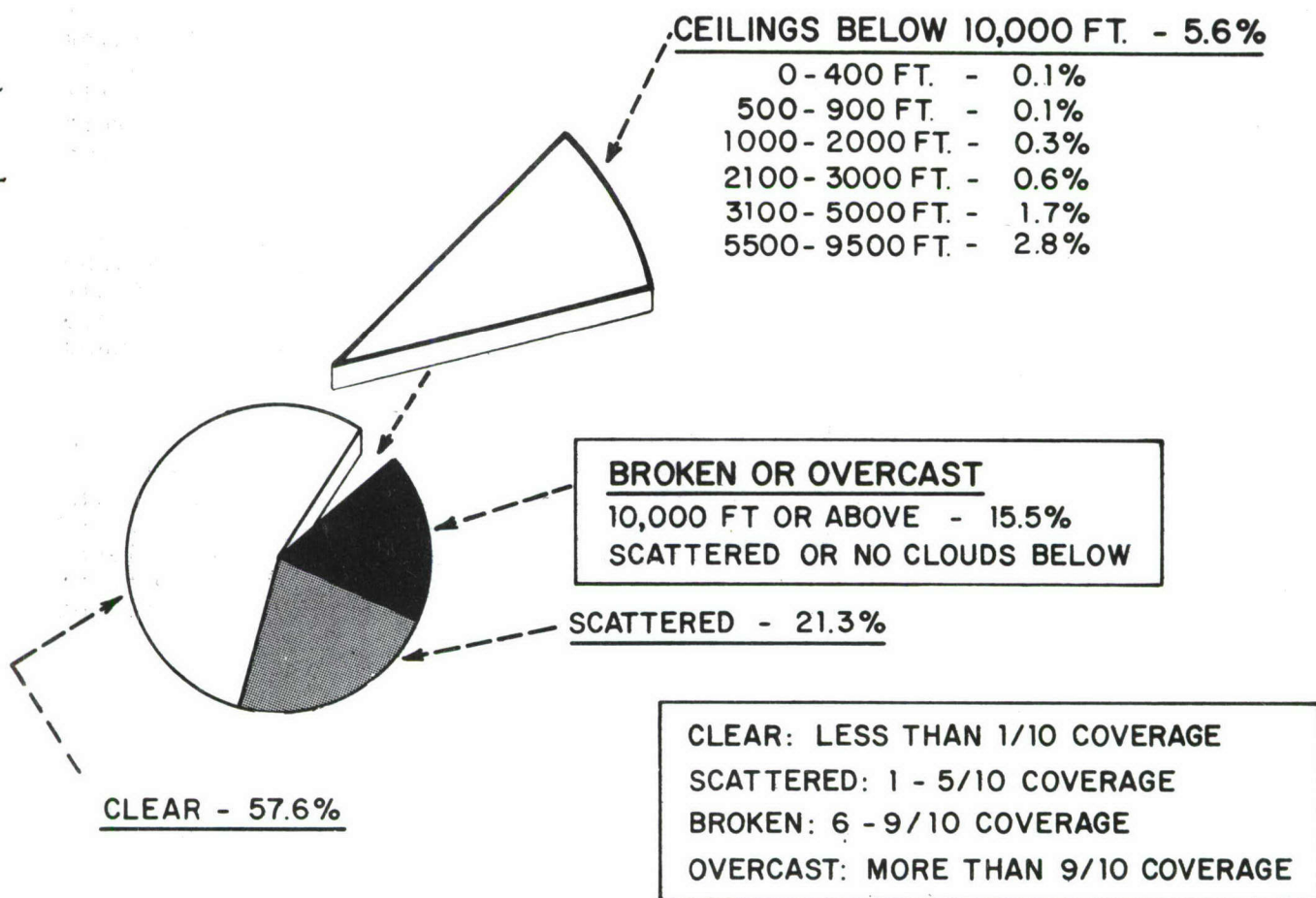


Figure 6 Sky Condition, Edwards AFB

SECTION D - HISTORY

The assets of what was to become the Air Force Flight Test Center were first recognized by the military in 1933 when a cadre from March AFB, Riverside, California, was sent to establish and maintain a bombing and gunnery range on the east side of Rogers Dry Lake. Between 1933 and 1940, the east and central areas of the base were acquired. These totaled 156,454 acres. In 1941 the Training Command constructed Muroc Army Airfield at the center of the west side of Rogers Dry Lake for the purpose of training pilots of World War II aircraft. In 1942 the Air Technical Service Command established North Base for development and testing of jet aircraft. In 1945 Muroc Army Air Field was transferred from the Training Command to Air Technical Services Command, thus consolidating the two bases into one unit. In 1949, Muroc Air Force Base was redesignated Edwards Air Force Base. Between 1950 and 1954, major land acquisitions to the west were made so that the present base could be constructed. The construction was completed in 1956.

During this same period, construction began on a wide-range of rocket engine test facilities in the northeast corner of the base on some 49,000 acres of land. These facilities, now greatly expanded and highly instrumented, are used for rocket research and development by the Air Force Rocket Propulsion Laboratory of the Air Force Systems Command. Land acquisition since 1954 has been relatively minor.

Air Force Systems Command has been directed by the Department of Defense to reduce land holdings by 10 percent. This was accomplished, in part, by returning nine dry lakes, totaling some 27,000+ acres, to the Department of Interior, Bureau of Land Management. This complex of emergency landing sites was used for fifty X-15 recoveries. These lands can again be withdrawn at a later date by the Air Force, if required, if mining operations, other construction, or open recreational use have not made them unusable.

PART III

AFFTC TEST AND SUPPORT CAPABILITIES

SECTION A - MANNED AND UNMANNED AIRCRAFT FLIGHT TEST

The AFFTC aircraft flight test capability includes:

1. Air Force Preliminary Evaluations (AFPEs) and development testing and evaluation of manned and unmanned aircraft systems, including aircraft flying qualities, aircraft performance and functional capability, safety, reliability, maintainability, compatibility, and personnel subsystems test and evaluation (PSTE) of aircraft systems and subsystems under conditions which match an operational environment as closely as possible; and artificial icing test support for Air Force, other government agencies, and commercial users.
2. Support and participation in Air Force operational test and evaluation tests, follow-on development tests, and evaluations and other general tests related to manned aircraft systems and subsystems.
3. Flight test of weapons systems with all systems integrated and flying in a mission environment. This includes such tests as firing missiles and guns against maneuvering targets and dropping bombs in all delivery modes for accuracy evaluation. These tests are accomplished over instrumented ranges using instrumented aircraft so that subsystems performance can be evaluated and modified as required to achieve the required performance.
4. Engineering simulations to analyze the critical areas of specific aircraft flight envelopes and other flight characteristics, and to provide the test pilot with data concerning problems prior to the flight experience.
5. Professional engineering and operating capability to plan, conduct, process test data, and report the quantitative and qualitative test and evaluation of manned and unmanned aircraft and associated systems. Expertise exists on airplane performance flying qualities, subsystem performance (functional operation and capability of avionics, propulsion, weapons integration, pneudraulics, air refueling qualifier action, etc), maintainability, reliability, PSTE, climatic evaluation, and instrument flight evaluations.

SECTION B - MANNED AEROSPACE RESEARCH VEHICLE TESTING

The Center has the capability to conduct flight tests of advanced technology programs (currently, the Space Shuttle program) and hypersonic research vehicles. This capability includes a hardcore contingent of engineers and pilots with research vehicle experience in the fields of performance, stability and control, and subsystems performance. It also includes facilities and personnel for flight test simulation, rocket engine maintenance and overhaul, range support, and data processing. Further, the

Edwards area has certain natural resources, such as clear weather, sparse population, and dry lakebeds for normal and emergency recovery, which make it well suited to this type of testing.

At Edwards AFB the testing of research vehicles provides early exposure to new concepts and technology that form the basis for new vehicles, weapons and support systems. New test techniques and data acquisition, processing and analysis methods are developed which permit developmental testing of these vehicles. This new technology is then applied to the test and evaluation cycle of more conventional aerospace systems to provide more efficient procedures. Examples are stability derivative extraction techniques and the methodology which makes instrumented systems tests feasible.

SECTION C - AEROSPACE DECELERATION TESTING

The present aerospace decelerator test capability includes: development testing of personnel parachutes and aerodynamic escape systems, supply and cargo aerial delivery systems, guided missile, re-entry, and remotely piloted vehicle parachute recovery systems, aircraft deceleration parachutes, aerodynamic retardation devices performing functions similar to those of parachute systems for the delivery of environmental control devices. The Systems Engineering Division provides the necessary technical guidance and supervision of the test programs.

SECTION D - AIRCRAFT ARRESTING SYSTEM TESTING

Testing the compatibility/suitability of new aircraft with arresting systems is another capability of AFFTC. The Center's responsibility in this area is to demonstrate that each new Air Force aircraft, with a capability for arresting gear engagements, is compatible with Air Force arresting systems. This includes demonstrating operational suitability and preparing pilot handbook procedures.

The facility used for these tests consists of an 8,000- by 300-foot concrete test strip with paved overrun onto Rogers Dry Lake, a runway edge tie-down pad and below ground equipment pits, an under-runway tunnel for pit access, and maintenance building. Arresting systems available on site which can be or are installed in configurations representative of field installations are the BAK-12, Dual BAK-12 and BAK-13.

SECTION E - TEST PILOT TRAINING

The USAF Test Pilot School provides training in two distinct courses--the Experimental Test Pilot Course and the Flight Test Engineer/Navigator Course. These courses are designed to train members of the flight test team in the latest methods of testing and evaluating aircraft and aerospace systems. Though they are separate, the two courses intermesh and supplement each other, instilling the pattern of cooperation and understanding between pilot and engineer or navigator, which is so necessary for successful flight test operations. In addition to members of the USAF, the school trains students from DOD agencies, FAA, NASA, aerospace corporations, and allied nations. Pilots, engineers and navigators attend the same academic classes except for those areas which are more pertinent to the flight test engineer or navigator, such as instrument calibration, computer programming, operation of range instrumentation, and engine testing. These areas are then covered in greater depth. Pilots and engineers/navigators are assigned as teams to data groups in which they plan, fly, reduce data, and prepare both written

and oral reports on their results. The flying program for the pilot is organized so that he will develop the knowledge, flying precision, and powers of observation necessary to aircraft testing. The flying program for the engineer is designed to provide him with a comprehension of the inflight problems which the test pilot may encounter and to thoroughly familiarize him with those airborne tasks which the flight test engineer is normally required to perform. In addition to those skills taught to the flight test engineer, the flight test navigator also learns additional practical application of flight test techniques for airborne navigation and weapons systems.

The overall curriculum is divided into three approximately equal phases: (1) Performance, (2) Stability and Control, and (3) Systems Test. The entire course duration is 46 weeks with all three phases having highly integrated academic and flying training programs. School training resources are augmented by visiting guest lecturers, contracted flying activities, and field trips to appropriate government and contractor flight test facilities. The academic instruction and flying training are designed to give the student the engineering knowledge necessary to evaluate the total aircraft system. This evaluation includes the performance of the aircraft; its stability and control characteristics, and the effectiveness of its supporting and mission-oriented systems. The extensive theoretical and practical training received by the student enables him to contribute to vehicle and systems design as a flight test pilot, engineer, or navigator, and to be a test project manager.

SECTION F - ARTIFICIAL ICING AND WATER SPRAY

Artificial icing and water spray conditions are provided through modified tanker aircraft. Icing conditions can be applied to aircraft from trace icing into the freezing rain regime. By icing selected areas of an aircraft, anti-icing systems and engine operating characteristics may be evaluated prior to evaluation of the total aircraft in natural icing conditions. The water spray capability allows evaluation of rain removal subsystems and engine water ingestion capability against design specifications. Measured spray conditions allow simulation of rainfall from light to cloudburst proportions.

A C-130 aircraft with palletized water tanks can be made available with approximately 90 days' notice for icing/water spray support of low speed aircraft and helicopters. Speeds of 100 to 150 knots indicated airspeed (KIAS) and altitudes below 25,000 feet MSL are covered by this aircraft. An NKC-135 aircraft is used to test from 175 to 300 KIAS.

Maximum liquid water content available is 1.75 grams per cubic meter. Rainfall conditions in excess of 4 inches per hour can be simulated. The maximum water to air percent ratio for engine ingestion tests is approximately six.

SECTION G - AIRSPACE AND TEST RANGES

Flight Test operations are conducted primarily within the following areas:

1. Restricted Area R-2515. This area encompasses Edwards AFB with areas to the north and northeast; it includes airspace from surface to unlimited altitudes. This area is controlled by Edwards AFB, and is used for tests requiring instrumented test support, limited gunnery, impact tests, and hazardous tests.

2. R-2508 California Restricted Area Complex. This area extends approximately 130 NM north, 80 NM east, and 40 NM west of Edwards AFB. It extends from 20,000 feet to unlimited altitudes. R-2508 complex is governed by the R-2508 Complex Control Board under a shared-use agreement between Edwards AFB, China Lake, George AFB, AF Plant No. 42 at Palmdale, and Ft. Irwin. Prior approval for shared use of R-2508 complex is not required except for specific restricted areas within the R-2508 complex. This area is used primarily for nonhazardous test activities and Test Pilot School training.
3. Military Operating Area (MOA). This area is established outside of controlled airspace below the R-2508 Complex with operating procedures agreed upon by FAA and users. Altitudes vary from 200 feet above ground level (AGL) to 18,000 feet mean sea level (MSL). FAA entry/exit clearance through Edwards RAPCON is required; however, the military assumes responsibility for separation of aircraft when the area is used for test or training missions.
4. ATC Assigned Airspace Area (ATCAAA). This area was established with operating procedures agreed upon by FAA and users. FAA clearance through Edwards RAPCON is required for use; however, the military assumes responsibility for separation of aircraft when the area is used for test or training missions.
5. Long-range test missions are conducted outside the R-2508 complex. Edwards out-range technical support installations at Ely and Shoshone, Nevada, provide data acquisition capability for missions conducted within 200 NM of a facility. The area of Edwards north range is roughly bounded by Lake Mead, Nevada, Ft. Bridger, Utah, Jackson Hole, Wyoming, Boise, Idaho, Mono Lake, California, and Santa Cruz, California.

Table III presents a list of restricted areas and supersonic corridors available for use by AFFTC.

SECTION H - TECHNICAL SUPPORT CAPABILITIES

Technical Support Facilities

Flight test data acquisition facilities available at the AFFTC include instrumentation engineering, range facilities, airborne and ground photography, and television and specialized ranges. Range facilities include precision instrumentation radars, Askania and Contraves Cinetheodolites, Central Timing Station, telemetry acquisition, remote site communications/telemetry/radar acquisition and microwave relay, and instrumented impact areas. Specialized ranges include RADFAG, photo-resolution range, photo and IR tactical range, and weapons impact range.

Instrumentation engineering support is provided for planning, definition of instrumentation equipment, and procurement, installation, and operation of particular or universal on-board system (ATIS - Airborne Test Instrumentation System).

The Flight Test Mission Control Complex (FTMCC) is the main AFFTC scientific data processing and display complex. Two large scale scientific computers are used in conjunction with smaller computers to form a distributed network capable of real time and post flight batch processing on a time-shared basis. A Center Technical Facilities Handbook with detailed descriptions of all facilities will be available in June 1978.

Table III

RESTRICTED AREAS AND SUPERSONIC CORRIDORS - ALTITUDES

Area	Altitude	Location/ Controlling Agency
R-2502	Surface to unlimited	Ft. Irwin
R-2505	Surface to unlimited	China Lake
R-2506	Surface to 6,000 feet	China Lake
R-2508	Flight level 200 to unlimited	China Lake
R-2509	Surface to unlimited	George AFB
R-2515	Surface to unlimited	Edwards AFB
R-2524	Surface to unlimited	China Lake
MOA/ATCAAA*	Flight level 200 to flight level 600	R-2508 Complex /FAA
Medium Altitude Supersonic Corridor	10,000 feet to 30,000 feet MSL	Edwards AFB
High Altitude Supersonic Corridor	30,000 feet MSL to unlimited	Edwards AFB
Low Level Supersonic Corridor	Surface to 10,000 feet MSL	Edwards AFB
Alpha Corridor	Surface to unlimited	Edwards AFB

Military Operating Areas/*Air traffic control assigned airspace areas.

Multiple display rooms are available to test engineers for simultaneous conduct of multiple test missions. Display capability includes raw telemetry and radar data, engineering units telemetry data, and real time analysis data through the use of the Automated Flight Test Data System (AFTDS). A library of standard flight test analysis computer programs is maintained and mathematician services are available to adapt programs to unique needs. An adaptable preprocessor capability permits interface with a variety of data formatting schemes to allow use of standard software programs.

A major facility utilizing many of the above services is the Edwards Flight Test Range (EFTR) figure 7. The EFTR consists of sub-facilities and instrumentation systems combined and configured to provide a real-time command and control capability for conducting manned and unmanned aircraft development and flight testing. The EFTR interfaces with the Pacific Missile Range (PMR), Point Mugu, and the Space and Missile Test Center (SAMTEC), Vandenberg AFB (100 NM west), NASA/Dryden Flight Research Center

(FRC) and other AFFTC flight test facilities at Edwards AFB, and NASA facilities at Ely (300 NM north). Data transmission facilities to Hill AFB and Dugway Proving Grounds will be complete by April 1979. Ft. Huachuca and White Sands Missile Range (WSMR) are presently linked to the AFFTC by telephone (leased) data and communication lines. Total acquisition coverage extends from over the PMR to approximately 600 NM north of Edwards AFB. The EFTR out-ranges, north and west, are high altitude ranges with a 400-NM wide base at 30,000 feet MSL extending to above 400,000 feet MSL. Detail is provided in the Center's Technical Facilities Handbook. Questions concerning technical facilities should be addressed to the Programs Branch (DOCQP), Programs and Requirements Division, telephone 805-277-4340.



Figure 7 Edwards Flight Test Range

Aircraft Maintenance

Aircraft maintenance support capability includes organizational maintenance, field maintenance, test support maintenance communications and electronics (CE), and munitions maintenance, plus Class II modification. Organizational maintenance provides flightline maintenance on all AFFTC-assigned test and support aircraft. Full field level maintenance is provided through highly specialized shops in support of test missions, base and tenant organizations. Communications and electronics support, including avionics and airborne instrumentation, is also available. Avionics areas, shop space, environmentally controlled test stations, aerospace ground equipment (AGE), and instrumentation shops, calibration laboratory and a precision measurement equipment laboratory (PMEL) are part of this capability. Munitions support includes weapons storage, loading, maintenance, assembly, and functional checkout of nuclear and non-nuclear weapons. Technical facilities and capabilities exist in the following areas:

Propulsion.

The Propulsion facilities are among the finest to be found in the Air Force with a capability to support, repair, maintain and test virtually any size turbojet and turbofan engine presently in the USAF inventory. The test cell complex is a permanent structure consisting of four test chambers with a thrust capability of 50,000 pounds and an expansion potential (with modification) to 65,000 pounds thrust. This test cell facility is equipped with the San Antonio Air Logistics Center (SA-ALC) developed PACER COMET MK II automated (computer controlled) jet engine test system. PACER COMET is a closed loop system operating in a real time mode in which all engine controls and most cell functions are automated. The system tests engines to technical order requirements. It contains built-in safeguards to revert engine control to the cell operator for manual operation upon sensing certain dangerous trends or can automatically shut down the engine if continued operation would result in damage. The PACER COMET MK II configuration will be installed at the two AFLC engine overhaul facilities (SA-ALC/OC-ALC) and will be supportable with common technical data, software and spares.

Weight and Balance.

This facility is capable of accommodating all aircraft in the USAF inventory with weights and size up to and including that of the C-5A. It consists of a set of four flush-mounted platform scales, each with a capacity of 300,000 pounds which measure in increments of 20 pounds. The functions of the scales are to determine the gross weight, provide data to compute the center of gravity, obtain data for the design of inflight center of gravity control systems, and to perform aircraft fuel system calibration.

Aircraft Horizontal Thrust Stand.

The Aircraft Horizontal Thrust Stand Facility, located at Pad 18, is designed to measure installed engine thrust. Four thrust platforms are available which can each measure up to 125,000 pounds forward thrust or 60,000 pounds reverse. Thrust can be measured on up to three platforms simultaneously. The thrust data, wind speed, wind direction, barometric pressure, ambient air temperature, and time are processed, printed, and plotted by an HP-9830 programmable calculator.

Moment of Inertia Facility.

This facility measures the pitch, roll, and yaw moments of inertia of aircraft. Its use is restricted to aircraft weighing between 50,000 and 300,000 lbs with measurement accuracies improving with aircraft size and weight. Excellent measuring accuracies (3% and less) about the yaw rotational axis are available over this aircraft weight range. Pitch and roll accuracies are not as good (10 to 20%). The facility itself consists of a 110-by-80 foot cruciform-shaped table which is oscillated at low frequencies and small amplitudes. The test aircraft is positioned on the table and the period of oscillation of the table with aircraft is measured about the pitch, roll, and yaw axis of rotation. This period data together with other measured or known test parameters is then applied to an empirically formulated mathematical model of the facility and the measured inertias of the aircraft determined.

Runway Meteorological System.

The Runway Meteorological System is a ground based, automated data acquisition system designed to provide accurate estimates of mean wind and temperature conditions in the vicinity of the main runway (04-22). Primary use of this data is for standardizing aircraft takeoff and landing performance. Major system components include 15 dual axis sonic anemometers placed alongside the runway, an SDS-910 computer to control system operation and process measured data, and various hardware devices for output of data. Each sonic sensor provides a measurement of the ambient air temperature and wind components parallel and perpendicular to the runway. Raw data from each sensor as well as statistically averaged data from all sensors is available to the user in a wide variety of selectable formats. A complete description of this system is provided in AFFTC-TIH-77-3, Runway Meteorological System User's Handbook.

Flutter and Ground Vibration Testing.

The Center has a capability to conduct ground vibration tests of aircraft in support of flutter programs or to investigate aircraft vibration problems. The system includes eight electrodynamic shakers, accelerometers, and data display equipment. An aircraft soft suspension system is available to isolate aircraft rigid body modes during testing.

The flutter test capability includes a dedicated flutter facility with a state-of-the-art digital time series analysis minicomputer system. Data filters, strip chart recorders and a spectral analyzer are available for real time and post flight operations. A variety of software algorithms permit data smoothing/noise reduction and modal analysis of transfer functions or autospectra.

Antenna Radiation Pattern Measurement System.

The Antenna Radiation Pattern Measurement System is designed to measure antenna patterns on aircraft communication antennas in flight. The system is located in building 0275 and is presently designed to record signal strength on VHF AM and UHF AM communication Transceivers. The data received is recorded and processed with the base computer system to procure polar plots of the antenna patterns measured.

Test/Test Support Aircraft

As the testing agency for manned and unmanned aircraft and aerospace research vehicles, AFFTC maintains an aircraft test support fleet capable of supporting mission requirements throughout the performance envelopes of most test vehicles. In addition, support is provided to test activities at remote sites, such as the test and evaluation of helicopters and STOL aircraft at the high elevation test complex in the vicinity of Bishop, California. Multiple Drone Launch and Control plus Mid-Air Retrieval of Remotely Piloted Vehicles is accomplished at the Hill/Wendover/Dugway range complex.

The AFFTC inventory, on the average, consists of approximately 80 aircraft in both test (EI code) and test support (EH code) roles. EI coded aircraft are assigned for developmental and follow-on testing. EH coded aircraft provide test support including launch, drop, and retrieval platforms, provide chase/pace and other escort support. In addition, support of the Test Pilot School is provided in EH coded aircraft. Continuing efforts are made to update and modernize the test and test support fleets to insure a proper mix of aircraft to satisfy mission objectives and requirements.

PART IV

GENERAL SUPPORT SERVICES

SECTION A - WEATHER

The mission of the weather group is to provide meteorological and associated services to all organizations including designated contractors.

Weather forecasting services are available for aircraft operations, diffusion of toxic propellants, and to provide severe weather warnings.

Surface and upper air observations are made, recorded, and disseminated.

In addition to operational services, the weather group provides advice and guidance on natural environmental effects.

SECTION B - COMMUNICATIONS

Telecommunications

Normal administrative telephone and message service is available to government users. Service, including key telephone systems to nongovernment agencies, will be on a reimbursable basis unless otherwise indicated in contracts.

Special communications services, such as data transceivers, commercial telephone longlines, private line TWX, etc., will be funded by the user and provided by AFFTC.

Ground-to-Air Radio

HF, VHF, and UHF radio facilities are available to all users from the AFFTC Electronic Switch Facility. This service is provided by use of a radio control unit at the operating location terminated on a computerized patching console at the Electronic Switch Facility. The cost for the radio control unit use is reimbursable to the AFFTC. Service is available on a scheduled basis to all users.

Air Traffic Control

Air Traffic Control services are available for VFR/IFR arrivals and departures on the main, south and north base runways as well as any lake bed runway. IFR clearances are delivered as required. Navigational aids available include a VORTAC and an ILS.

SECTION C - CIVIL ENGINEERING

Civil engineering is responsible for the design, construction, maintenance, and allocation of the physical plant of the base. Major capabilities are as follows:

Architectural and Engineering

Services are available for design of new facilities and for major alteration, repair, or minor construction.

Maintenance

Maintenance and repair services are provided for existing facilities on a recurring or emergency basis.

Fire Protection

Continuous fire protection and aircraft rescue service is available on a 24-hour basis. Fire suppression and crash rescue capability consists of sufficient emergency equipment to accommodate the largest size aircraft in operation. Firefighting agents for aircraft rescue includes carbon dioxide, aqueous film forming foam (AFFF), protein foam, and chlorobromomethane (CBM). Ground support first aid equipment is available with carbon dioxide and CBM agents. Additional support is available for wet runway and runway foaming operations in the form of two 5,000-gallon capacity tank trailers. This equipment is available for wet runway operations, brake tests, gear-up emergency landings and similar operations.

Equipment

Equipment available is the same normally available to any base civil engineer. However, Edwards AFB has an especially designed and constructed vehicle for large aircraft fire and crash rescue support.

Housing

On-base housing is provided to permanently assigned military personnel of all grades on an "as available" basis. The housing area consists of over 2,000 homes and apartments, the majority of which are two-, three-, and four-bedroom Capehart or Wherry housing. Normally, a waiting list is in effect and assignment is in accordance with standard Air Force priorities. A mobile home park is located on-base for use by all eligible military personnel and their families.

Off-base housing of all types (that is, homes, apartments, motels, and mobile home parks) are available, but limited in the communities which surround Edwards AFB. The driving distance varies from 10 to 40 miles. The city of Lancaster is the largest center of population in the Antelope Valley.

SECTION D - COMMERCIAL TRANSPORTATION OFFICE

Passenger

The Scheduled Airline Traffic Office (SATO) makes arrangements for government travel transportation. It provides information, reservations, tickets, and airfreight arrangements on scheduled airlines for both official and personal travel.

Freight

Arrangements are made for household goods shipment within the United States and overseas, plus the related functions of packing, unpacking, crating, nontemporary storage, and storage in transit for personnel moves. All arrangements for shipment of freight, surface, military, and commercial air, are made by this office. Railroad car switching is available by contract service for main base handling.

SECTION E - ADMINISTRATION

Printing and duplicating services, and normal administrative services are available through the Director of Administration.

SECTION F - INFORMATION

An Office of Information authorizes and issues news releases both internally and to the public.

SECTION G - SUPPLY

The Supply Division provides materiel support, equipment management, fuel services (standard POL and nonstandard propellants) to direct mission base support. Tenant organizations and DOD contractors are supported as agreed upon between AFFTC and tenant/contractor in the individual host-tenant support agreement or applicable contract.

SECTION H - PROCUREMENT

The Procurement Division provides research and development and base procurement contracting support to base and tenant organizations. This division negotiates contracts for design, fabrication of R&D components, flight test equipment, contractual maintenance, utilities services, etc.

SECTION I - LEGAL

The Office of the Staff Judge Advocate will render such legal services as are agreed upon between AFFTC and tenant in the individual tenancy agreement or contract.

SECTION J - FINANCE

The Accounting and Finance Branch will provide cost accounting, statistical, and other finance services to tenants as authorized by support documentation.

SECTION K - MEDICAL

Civilian Personnel

Medical services are provided to contractor personnel on an emergency basis only. Neither AFFTC medical facilities nor ambulance services will be established or assigned to contractors within contractor facilities. Contractor personnel will be provided emergency outpatient care on a reimbursable basis. If admitted to the hospital, necessary emergency care will be provided, but the patient will be transferred to a civilian medical facility as soon as conditions permit. Transportation arrangements from USAF Hospital Edwards to a civilian hospital will be made by the contractor. USAF vehicles will not be used. Contractor will provide reimbursements to USAF Hospital Edwards for all services provided at the current AF rate.

Civil Service employees are entitled to inpatient or outpatient treatment in AFFTC medical facilities for occupational diseases or on-the-job injuries.

Military Personnel and Dependents

USAF Hospital Edwards is a 25-bed hospital with specialists assigned in pediatrics, obstetrics-gynecology, surgery, internal medicine, psychiatry and radiology. Patients with general medical problems are seen in the Primary Care Clinic. Dental care is provided to military personnel and to dependents on a space available basis.

SECTION L - SECURITY AND LAW ENFORCEMENT

The Security Police Squadron provides normal security functions for all assigned and tenant organizations. Edwards Air Force Base is a controlled base as defined in AFR 125-37 (reference 3). AFFTC will provide center civilian guard service to contractors requiring such service on a reimbursable basis. Areas are controlled as designated by the Base Commander. Entry to the flightline area is controlled and the Security Police Office is the issuing authority for all controlled area passes. A 24-hour information center is maintained at Security Police Headquarters, Bldg #2850.

SECTION M - SAFETY

The mission of the AFFTC Safety Office is to conduct a comprehensive accident prevention program for all assigned and attached units. In the fields of flying, systems, ground, explosive, missile, and nuclear safety, the safety office provides the following services:

1. Insure that safety is a consideration during all phases of design, development, acquisition, testing, acceptance, operations, modernization, and retrofitting of new systems and subsystems.
2. Provide technical guidance on AFFTC requirements, technical orders, and codes.
3. Coordinate waiver requests to higher headquarters and make required recommendations.
4. Conduct investigations of accidents or incidents when required.

5. Coordinate and approve operating procedures in all activities, including research and development areas.

SECTION N - BASE FUELS MANAGEMENT OFFICE

Aviation fuels available at Edwards AFB through the base fuels management office are JP-4, JP-5, JP-7, JP-TS, and 115/145 AVGAS, as well as AVOILs.

Storage Capacities:

<u>Fuel</u>	<u>Tank No.</u>	<u>Rated Capacity (gal)</u>	<u>Comments</u>
JP-4	19	840,000	
JP-4	28	420,000	
JP-5	22	50,000	
	23	50,000	
JP-4	Hydrant	200,000	Four pumping stations each rated at 600 gpm.
115/145	15	25,000 (ea)	
Demineralized Water		32,800	Water-alcohol made as needed
Jet A-1	1,2,3,4,5,6	120,000 (Total)	

Aviation Fuel Units (tank trucks):

<u>Type</u>	<u>No. Available</u>	<u>Capacity (gal)</u>	<u>Max Pumping Rate (gpm)</u>
R-5	4	5,000	600
R-8	2	1,500	300
R-9	21	5,000	600
R-10	1	6,000	600
F-6	3	5,000	600
A-2	2	2,600	150

Ground products available at Edwards AFB through the base fuels management office are regular and unleaded MOGAS, diesel, kerosene and heating fuel.

Storage Capacities:

<u>Fuel</u>	<u>No. Taks</u>	<u>Total Capacity</u>
Reg Gas	6	68,000
Unleaded gas	4	31,000
Diesel	2	22,000
Kerosene	Drums	Unlimited
Heating Fuel	44	187,500

Ground Fuel Units:

<u>Fuel</u>	<u>No. Units</u>	<u>Capacity (Gal)</u>
Reg Gas	1	1,200
Reg Gas	1	1,600
Unleaded	1	600
Diesel	1	1,500
Diesel	1	1,200

SECTION O - TEMPORARY BILLETING

Visiting officer's and enlisted men's quarters are available for transient and temporary duty military and civilian personnel. Advance arrangements or reservation are recommended because of limited availability of these quarters.

SECTION P - CONTRACTOR AND CIVIL AIRCRAFT

Contractors desiring to operate civil aircraft to or from Edwards AFB must comply with the provisions of AFR 55-20 (reference 4). The Chief, Base Operations Branch, will provide the necessary forms and instructional material to all prospective users.

SECTION Q - AIRCRAFT MAINTENANCE

The Chief of Maintenance, through the Organizational Maintenance, Field Maintenance, and Avionics Maintenance Squadrons, provides aircraft and intermediate level maintenance support to direct mission, base support and tenant (DOD contractor) organizations.

SECTION R - PHYSIOLOGICAL SUPPORT

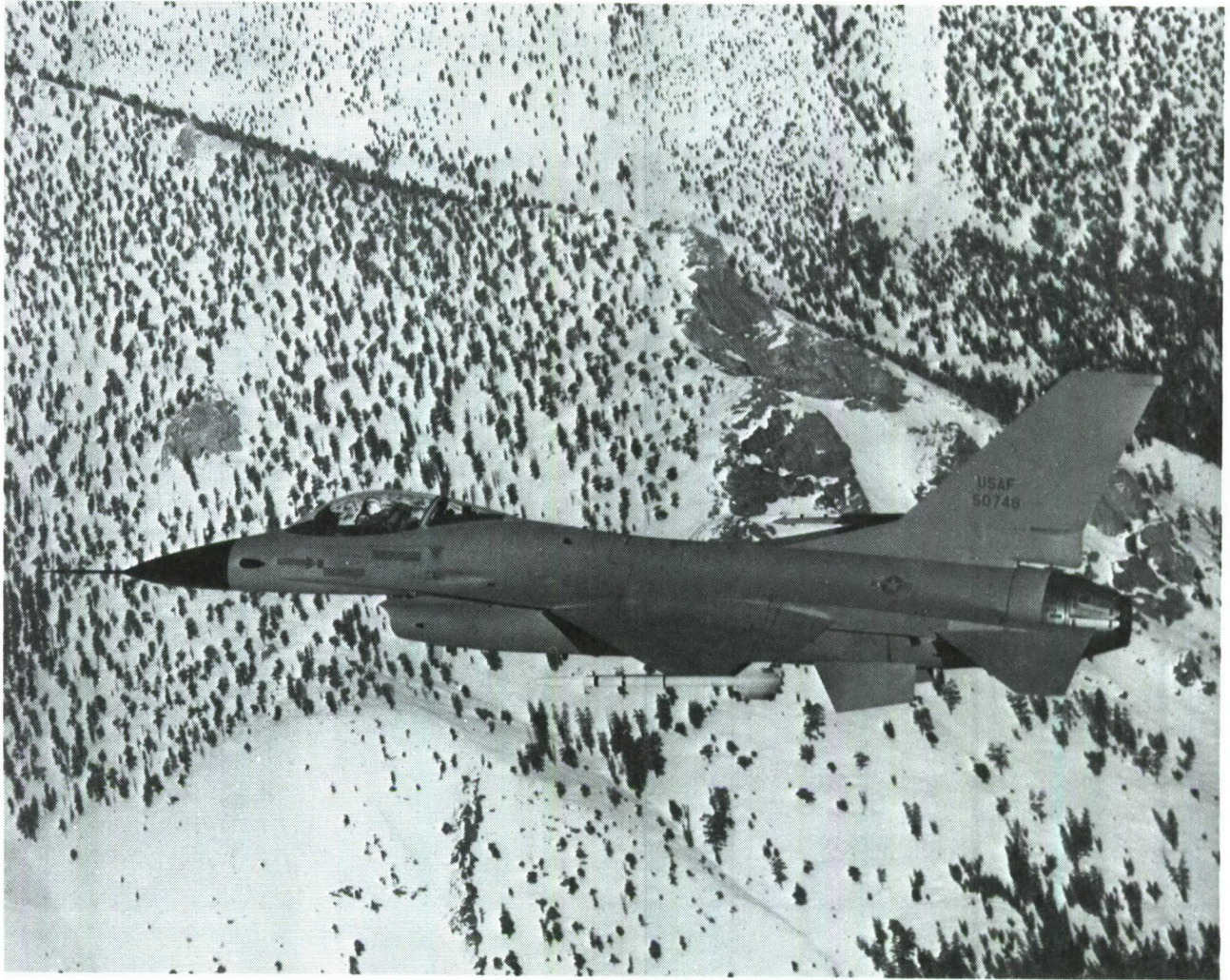
The Physiological Support Division provides consultant service on oxygen system build-up and training in Aviation Physiology and related subjects. Physiological Refresher, Original, and Passenger training is offered to all Military, Civil Service, and Government Contractor personnel. Physiological Training for other civilians is given in accordance with the USAF/FAA agreement. In addition, this organization provides training in and support of Full Pressure Suit assemblies for aircrews, provides depot maintenance for Full Pressure Suits, and conducts a Full Pressure Suit Maintenance and Repair Course (ATC Course 5AZ092250B).

SECTION S - LIFE SUPPORT

Maintains life support protective equipment for aircrews and provides augmented pararescue support for all AFFTC agencies. Provides life support and egress training; conducts classroom and field training in survival techniques and procedures to AFFTC aircrew members and support personnel. These services can also be made available on special request and space available basis to other Center project personnel.

SECTION T - BASE OPERATIONS

This organization provides normal flight planning facilities and clearance/dispatch services. Flight planning services include all required maps and charts and FLIP (Flight Information Publication) documents for approved programs, NOTAM (Notice to Airmen) service, direct lines to ARTCC (Los Angeles Air Route Traffic Control Center) and RAPCON (Radar Approach Control). For official calls, AUTOVON lines are available to all personnel. Airfield management provides detailed briefings on all landing areas including lakebed facilities and coordinates the use thereof for all AFFTC test programs.



F-16

PART V

PROGRAM SUPPORT PROCEDURES

SECTION A - GENERAL

AFFTC has the responsibility for conduct and/or support of all programs assigned to AFFTC under mission directives and those programs accepted and approved for support by AFFTC under other governing DOD, Air Force, and AFSC directives and regulations. These programs may take the form of major aerospace systems and subsystems destined for management and acquisition as prescribed by the AFR 800 series of system management procedures; support of programs or projects assigned as the management and engineering responsibilities of other Air Force activities, DOD agencies, and non-DOD Governmental agencies; as well as support to industry when such support is authorized as being in the best interests of the Government or the Air Force. This chapter is devoted to briefly summarizing the procedures by which a potential user of AFFTC technical facilities and capabilities may request support and obtain the necessary response.

SECTION B - SUPPORT FOCAL POINT

The Programs and Requirements Division, Programs Branch (DOCQP), has been designated by the Commander, AFFTC, as the AFFTC focal point for receipt, staffing, and processing of all requests for AFFTC conduct or support of programs and projects. This includes the responsibility for coordinating and documenting AFFTC support, and assisting or advising the customer on how to obtain authorized support. A potential user of AFFTC facilities or capabilities will initially submit his request for support to DOCQP for staffing and processing action.

Any support requirements involving laser or maser equipment, which is to be operated within the confines of the Edwards AFB reservation boundaries, must be documented per AFR 161-24 (reference 5). This documentation must be submitted to the AFFTC Programs Branch for approval. Any queries regarding the technical aspects of approval must be directed to the bio-environmental engineer, AFFTC/SGPB, AUTOVON 350-3272 or commercial exchange (805) 277-3272. Mail inquiries should be addressed as follows: AFFTC (DOCQP), Edwards AFB, CA 93523.

The succeeding paragraphs outline the general procedures and requirements for submitting requests for conduct/support of various types of projects. Additional details, clarification, or assistance in submitting support requests may be obtained by calling any AFFTC program manager or monitor (DOCQP) on Edwards AFB, AUTOVON 350-4340 (commercial exchange number (805) 277-4340).

SECTION C - MAJOR PROGRAMS OR PROJECTS

General

AFFTC participation is desired as early as possible during the conceptual or definition phase of a major aerospace system. This will permit a more orderly and comprehensive development of planning, contractual and programming documents which reflect the requirements and capabilities of the responsible management, test, and participating organizations. AFFTC participation during the early phases of a major program will be in accordance with AFR 80-14 (reference 6).

Requests for support of major programs and projects designated for management and acquisition under AFR 800 series system management regulations and procedures and/or test and evaluation per AFR 80-14 will be processed by the system project office (SPO) or project office, using the Universal Documentation System prescribed by Inter-Range Documentation Group/Range Commanders Council Document 501-70, reference 2, (501-70 Revised June 1977) and this handbook.

Program Documentation

Program Introduction (PI) Document

Potential users of AFFTC support capabilities should submit the PI containing the best available detailed information as early as possible. For a major program under the direction of a SPO or project office (PO), the PI should be signed by a responsible officer or the program manager/project officer. Major changes or revisions to the initial PI must be submitted by the requester as a numbered revision to the original PI. Whenever feasible, the PI should be prepared in sufficient detail and clarity so that it can stand alone as a comprehensive presentation of support required from AFFTC. Instructions in UDS Document 501-70 or sample PI formats provided by AFFTC to the potential user will serve as the guidelines for PI preparation. Although the Program Introduction (PI) document is the preferred format for test and/or test support requests, other formats such as letters and messages are acceptable.

Statement of Capability (SC)

AFFTC will prepare a Statement of Capability (SC) in response to a potential user's PI. This SC will contain either AFFTC's concurrence or non-concurrence in providing requested support to the user or will specify limitations or constraints under which AFFTC can support the potential user. An SC which denotes limitations or constraints in AFFTC support must be reviewed by the user, and comments/concurrence provided to AFFTC to indicate acceptance or rejection of AFFTC-expressed conditions for support. In no case will AFFTC commence support to a program or project until the user has indicated concurrence with conditions imposed by AFFTC.

AFFTC Project Directive (PD)

This is the local documentation which officially authorizes AFFTC conduct or support of a program or project. It is normally published after the following three conditions have been met:

a. Receipt of customer concurrence with the SC; b. Acceptance of the appropriate reimbursable order; c. Receipt, if required, of HQ AFSC or HQ USAF approval. (Primarily required for Engineering Service Projects, non-governmental testing efforts, and FMS programs.) The PD reflects the basic program information data (program element code, program structure or systems/program number, priority, and AFFTC Job Order Number (JON) for manhour and cost accounting tracking; identifies responsibilities of action and participating agencies; and provides implementing guidelines and other provisions for support of a program accepted by or assigned to AFFTC. A PD is published on all programs, regardless of the type or scope. If resources must be expended prior to the completion of the conditions listed above, the Project Directive must be approved by the Center Commander, or the 6510 Test Wing Commander as applicable, prior to publication.

Other Support Range Documentation

AFFTC, as a lead support agency, may be required to obtain support from other ranges in order to satisfy a user's requirements. In these instances, AFFTC will prepare and submit a Program Introduction document (PI) or portions of a PI to other ranges as required. These PIs and other supporting documentation (Operations Requirements [OR] document and/or Operations Directive [OD] will be processed as prescribed by the support range or agency under the Universal Documentation System (UDS).

SECTION D - ENGINEERING SERVICES SUPPORT

General

This section applies to all requests for support from any non-AFSC agency under the purview of AFR 80-14 (reference 6), and AFSC Regulation 27-5 (reference 7). Included in this category are other Air Force activities (non-AFSC), other DOD agencies (including ARPA), other Government agencies (including NASA), and DOD contractors. Excluded from the provisions of this section are major specific AFSC-managed systems or programs, non-DOD contractors, and services and agreements provided under AFR's 11-4, 26-12 and 172-3 (references 8, 9, and 10); AFM's 66-18, 67-1 (references 11 and 12); and AFSC Regulation 170-5 (reference 13).

Submission of Support Requests

In general, non-AFSC activities desiring engineering services support from AFFTC will submit their requests to the AFFTC Programs and Requirements Division, using the PI documents or letter or message format for minor urgent type support requests. When feasible, the PI, letter, or message request should be prepared in sufficient detail and clarity so it can be used alone as a comprehensive portrayal of the user's support requirements.

AFFTC Support Commitment

As previously stated, AFFTC will prepare a Statement of Capability (SC) in response to a potential user's PI. This SC will contain AFFTC's concurrence or non-concurrence with requested support. In the case of concurrence, the SC may specify limitations or constraints under which AFFTC can/will support the potential user. An SC which denotes constraints in AFFTC support must be reviewed by the user, and comments/concurrence provided to AFFTC to indicate acceptance or rejection of AFFTC-expressed conditions for support. In no case will AFFTC begin to support a program or project until the user has indicated concurrence.

SECTION E - SUPPORT OF NON-GOVERNMENTAL TEST AND EVALUATION

General

This section is devoted to procedures for submitting and processing requests for AFFTC support or for use of AFFTC facilities under AFR 80-19 (reference 15). It pertains to requests from non-DOD contractors, foreign governments, commercial concerns, and institutions which desire to use AFFTC's unique facilities to test and evaluate their products or techniques. It does not pertain to DOD contractors or Government-owned and contractor-operated industrial facilities whose non-Governmental use is in accordance with accountable contracts and regulations.

Processing of Support Requests

Any commercial non-Government business or contractor desiring AFFTC support must first obtain the sponsorship of a non-DOD Government agency as prescribed by AFR 80-19 (reference 15). The requesting agency must supply the Government sponsor with sufficient details and information per AFR 80-19 to enable the sponsoring agency to submit a clear and comprehensive test support request (TSR) through HQ AFSC to AFFTC Programs and Requirements Division. The TSR will contain the information required by paragraph 31, AFR 80-19, as a minimum.

Upon receipt of an approved TSR from HQ AFSC, AFFTC will provide the necessary staffing to ascertain its capability to provide the requested support and so notify HQ AFSC by an SC.

Upon receipt of AFFTC's SC, HQ AFSC will obtain HQ USAF approval or disapproval of the sponsoring agency's TSR and will notify the sponsor and AFFTC of approval status and actions to be taken.

The sequence of the above procedures is illustrated in figure 8.

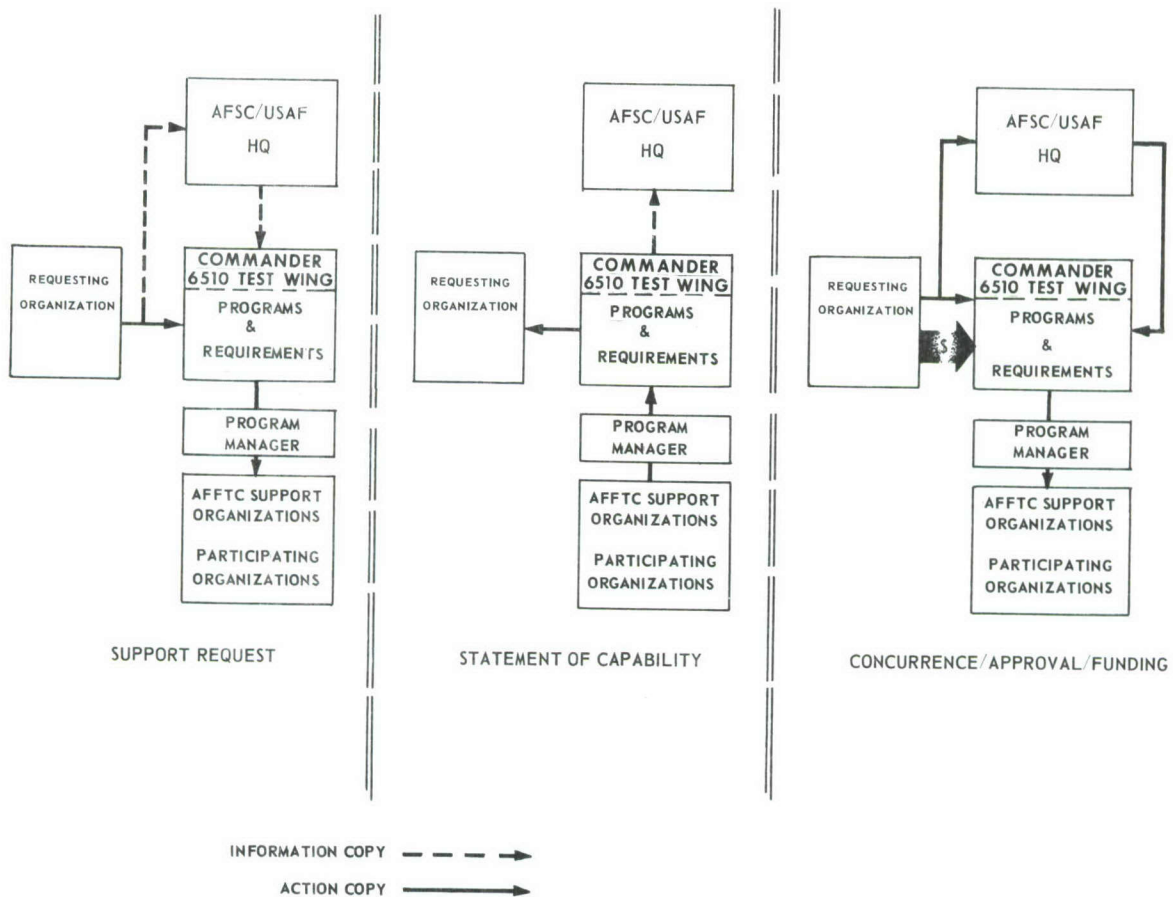


Figure 8 Typical Workload Programming Cycle

PART VI

SCHEDULING

SECTION A - TEST SCHEDULING

Requirements

The Center Scheduling Branch will consider only those projects having AFFTC approval and supplemented by sufficiently detailed plans for proper scheduling per AFFTC Regulation 55-15 (reference 16). Project documentation must be in the hands of all support and control agencies in advance of the mission date. For missions expending ordnance, as described in the Explanation of Abbreviations and Terms, project personnel will not submit a request for mission scheduling unless an approved and published range safety plan is in the possession of all key supporting agencies.

Procedures

All missions which use AFFTC resources or airfield facilities will be scheduled by the Center Scheduling Branch. AFFTC Form 16 will be used to officially document an authorized requirement for mission scheduling. The period of the weekly schedule is Monday through Sunday.

The AFFTC Form 16 must be delivered to the Center Scheduling Branch not later than 1300 hours on the Monday of the week before the date of the desired mission. Desired mission scheduling for the week following will be included on an AFFTC Form 16, including weekend and holiday missions.

AFFTC Forms 16 received later than 1300 hours on the submission day will be scheduled on a non-interference basis as "add-ons" unless the Commander 6510 Test Wing specifies that a particular request will be given special emphasis.

Once assigned a mission number, all missions are accountable as either completed, aborted (ground to air), or cancelled. Preparatory support to the point of mission cancellation will be reimbursable.

Agencies having submitted mission requests will inform the Center Scheduling Branch of mission cancellations or mission additions/deletions as soon as possible.

Requested changes in aircraft takeoff times and support activities will not be considered when the changes interfere with other scheduled mission activity.

SECTION B - RADIO FREQUENCY ASSIGNMENTS

User Requirements

Requirements for assignment of radio frequencies in support of a test program should be identified by the using activity as early as possible in the program documentation cycle (that is, Program Introduction Document). Application procedures are given in AFFTC Regulation 100-5 (reference 17). The Take-off and Landing Data Facility has a discrete frequency of 267.9 MHz (Jackson call sign).

Available Frequencies

Radio frequencies to satisfy certain categories of communications-electronics requirements are available from local resources on a scheduled basis and do not require formal application action. Included are UHF air/ground/air communications, HF air/ground/air communications, VHF air/ground/air communications and tracking beacon frequencies.

Procedures for New Equipment

If new communications-electronics equipment is developed specifically for a test program, or if new communications-electronics equipment not previously introduced into the military inventory is procured for the test program, it is the user's responsibility to ensure that the proper documentation (DD Form 1494) is submitted through channels to the Joint Frequency Panel of the Military Communications Electronics Board for approval of the equipment for use at the AFFTC. Procedures for submission of these applications for frequency allocation is contained in AFFTC Regulation 100-5 (reference 17). Further information can be found in AFM 100-31 (reference 19), IRIG 106-71 (reference 20), and IRIG 18-71 (reference 21).

PART VII

DESCRIPTION OF AFFTC FLIGHT RANGES AND FACILITIES

Narrative and graphical descriptions of AFFTC flight ranges and facilities are presented in the following paragraphs and attached charts.

SECTION A - PRECISION IMPACT RANGE AREA (PIRA) AND ALPHA CORRIDOR

The PIRA, located in the southeast corner of the Edwards AFB Reservation, is established for air-to-ground gunnery; precision bombing, rocket firing and store separation tests; evaluation of photo and infrared recon systems; and other tests requiring precision ground instrumentation, figure 9.

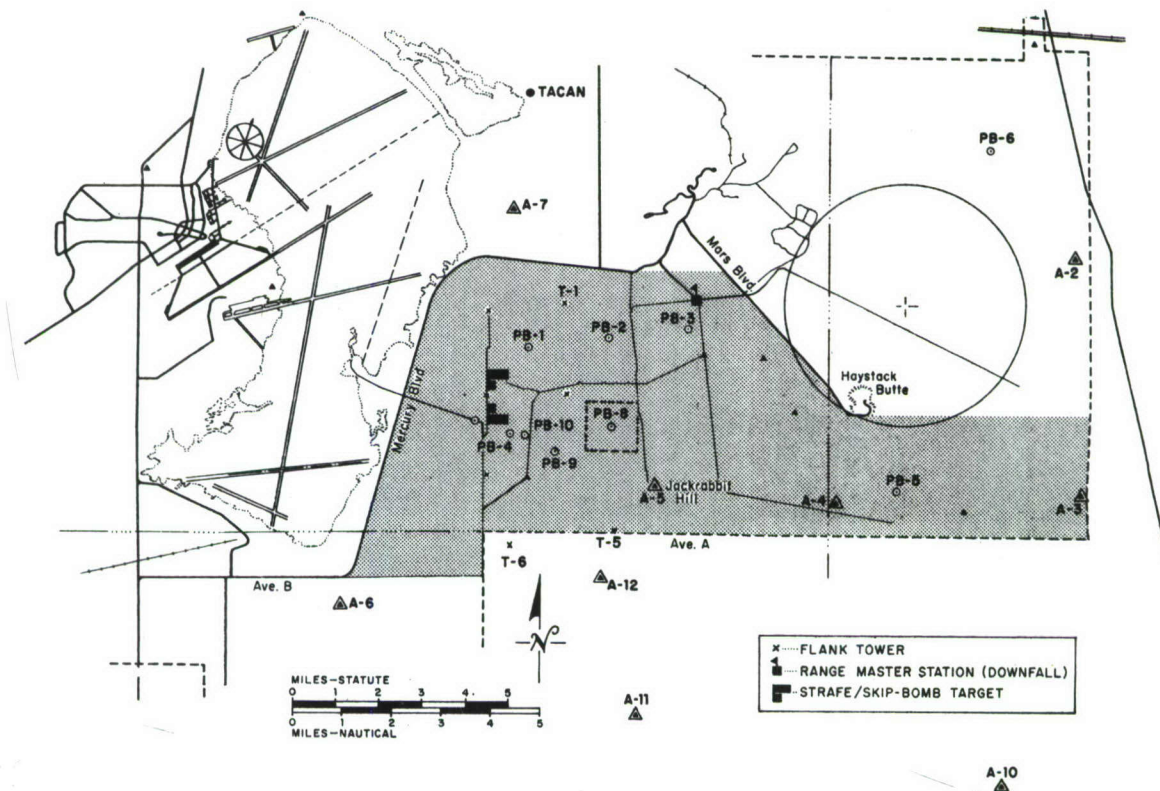


Figure 9 Precision Impact Range Area (PIRA)

Alpha Corridor is a west-to-east airborne entry corridor into PIRA. Alpha Corridor begins at the southwest corner of the Edwards reservation and extends east to the western boundary of PIRA. It is normally scheduled in conjunction with PIRA missions (figure 10).

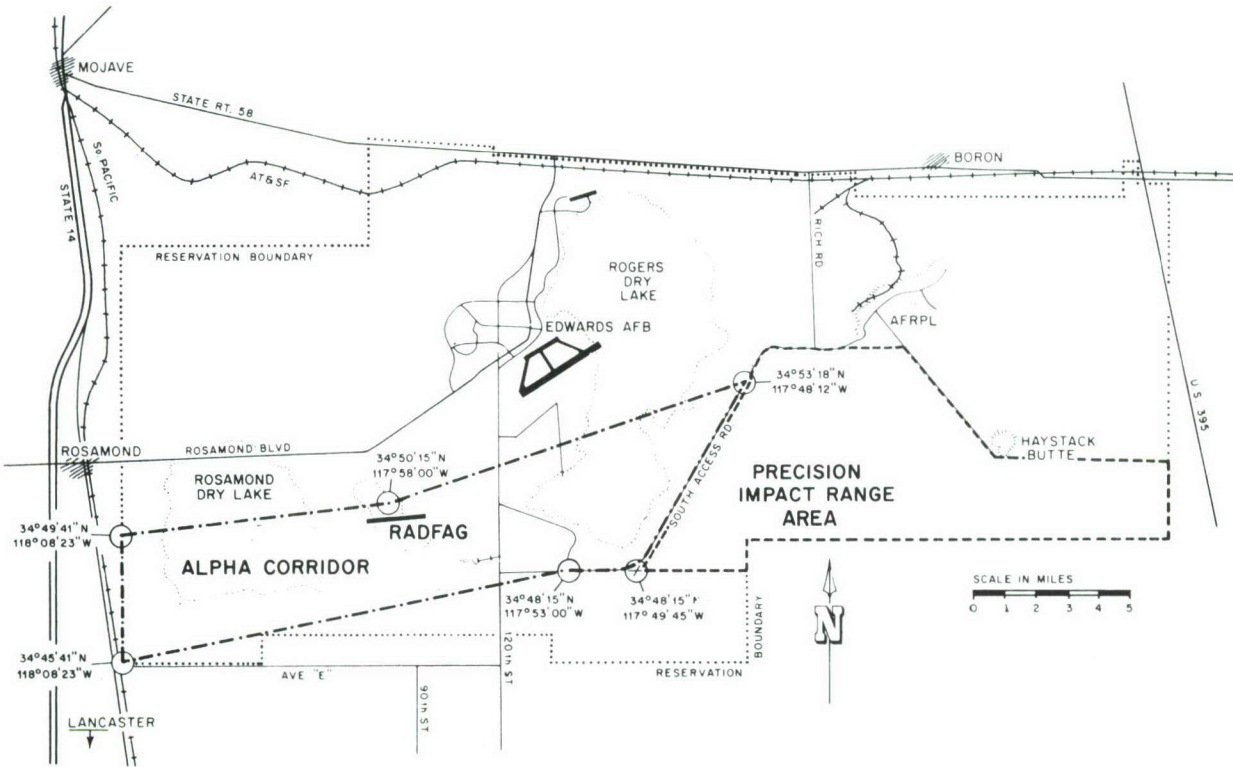


Figure 10 Alpha Corridor

SECTION B - DUAL AIR-TO-GROUND RANGE (DAGRAG), CONVENTIONAL

DAGRAG is a conventional low altitude air-to-ground gunnery, bombing, and rocket range with a defined airspace. DAGRAG is located on the western end of the PIRA and is part of it. DAGRAG configurations are defined in figures 11, 12, and 13. In general, DAGRAG is composed of a north range (right-hand traffic pattern) and a south range (left-hand traffic pattern). Each range consists of one bomb/rocket circle, ten strafe targets, two skipbomb targets, two flank observation towers, and one common range control tower.

DAGRAG airspace and traffic patterns are illustrated in figures 12 and 13. The vertical airspace required by AFM 50-46 (reference 22) extends to 14,000 feet MSL. The traffic pattern is limited to Mercury Blvd on the north, Avenue "A" on the south, and a west base leg approximately 1 NM east of the north/south lakebed runway. The eastern crosswind leg of the flight pattern will normally be established 1 NM beyond the target for a single aircraft on the range. When two or more aircraft are in the pattern, the eastern crosswind leg will be adjusted to maintain adequate separation. With the exception of flight safety considerations, there is no minimum altitude restriction on the north range right-hand pattern. The south

range left-hand pattern is restricted to a base leg minimum flight altitude of 4,800 feet MSL until passing over the extension to south base runway 24.

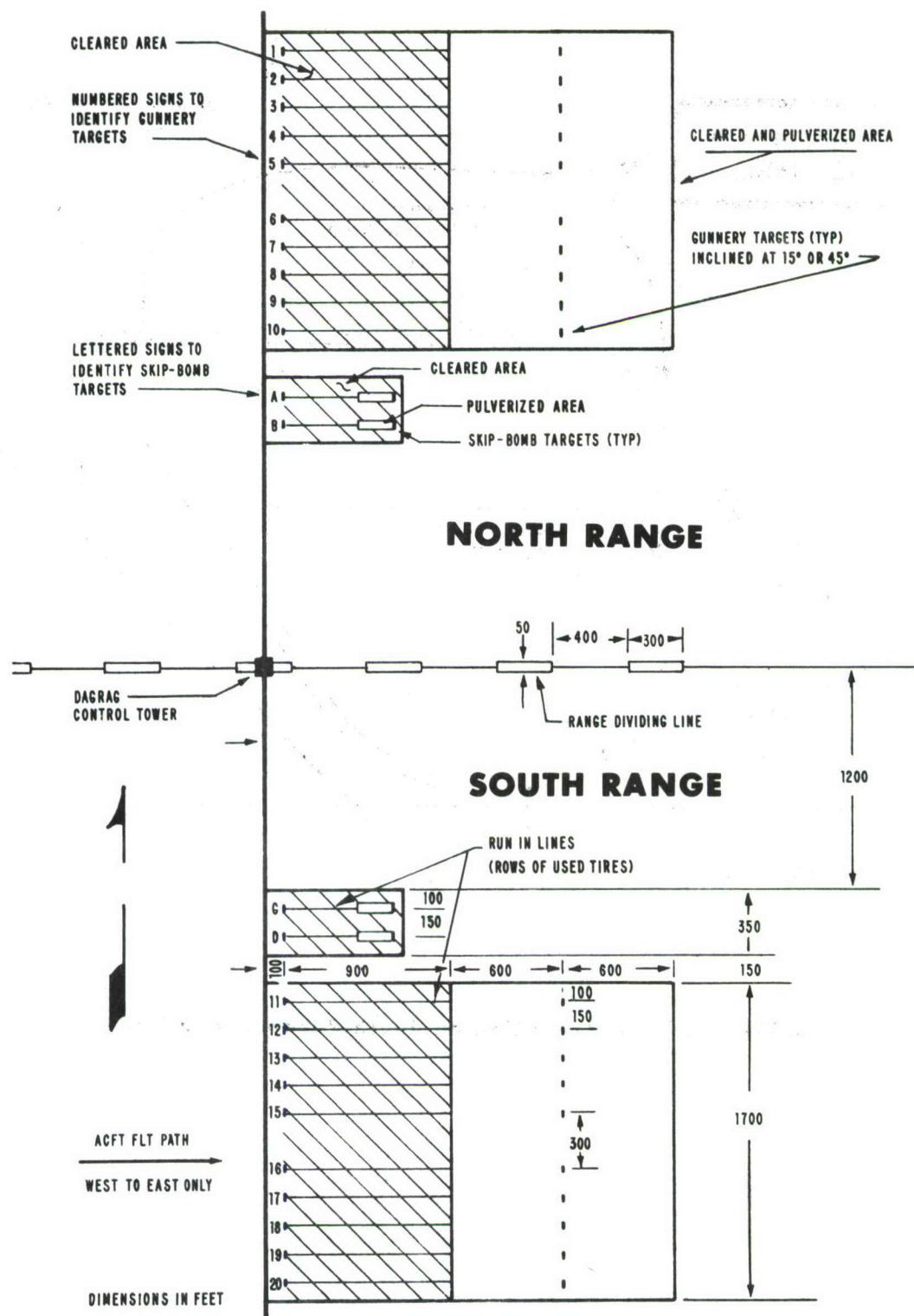


Figure 11 DAGRAG Gunnery Skip Bomb Target Configuration

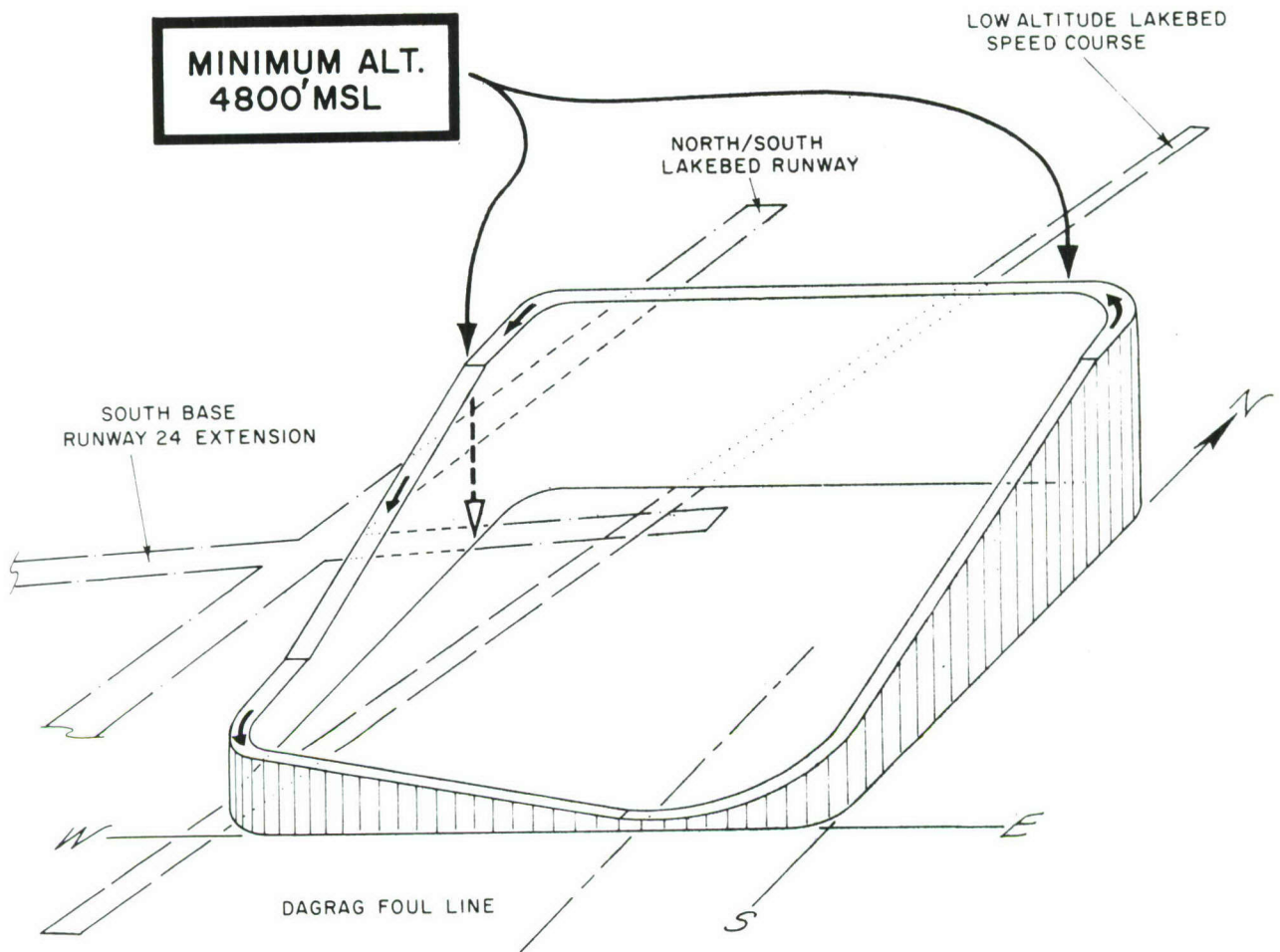


Figure 12 DAGRAG Altitude Restriction on South Range Traffic Pattern

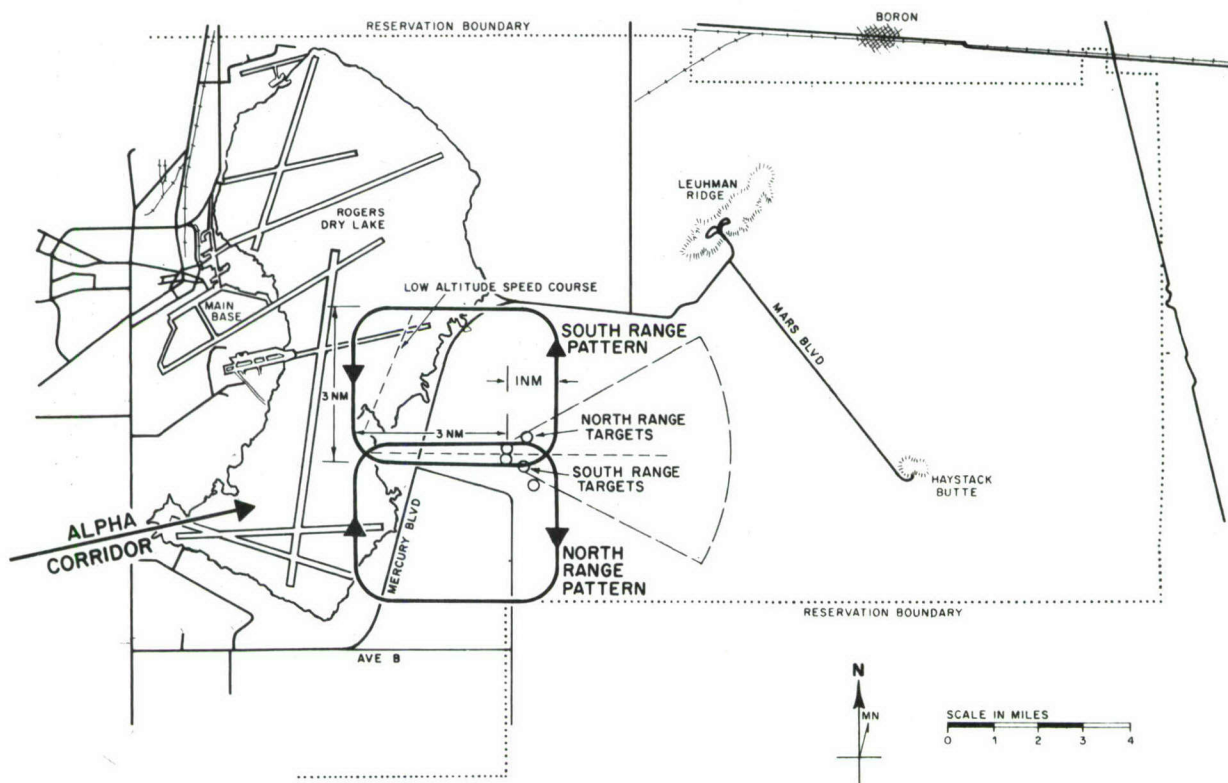


Figure 13 DAGRAG Aircraft Final Approach to Target

SECTION C - LOW ALTITUDE, MEDIUM ALTITUDE, AND HIGH ALTITUDE SUPERSONIC CORRIDORS

The low altitude supersonic corridor is an elongated test area 4 NM wide with an altitude from surface to 10,000 feet MSL located across the northern section of R-2515. The corridor centerline is between $35^{\circ} 10' N - 116^{\circ} 35' W$ and $35^{\circ} 10' N - 117^{\circ} 45' W$ with route width extending 2 NM either side of centerline. Minimum mission altitude is 1,000 feet AGL with supersonic flight only between U.S. Highway 395 and the eastern boundary of R-2515. The corridor is 57 NM long on a heading of $075^{\circ}/255^{\circ}$ magnetic (figure 15).

The medium altitude supersonic corridor is an elongated area 7 NM wide, from 10,000 to 30,000 feet MSL, located across the northern section of R-2515. The corridor is 46 NM long on a heading of $075^{\circ}/255^{\circ}$ magnetic (figure 14).

The high altitude supersonic corridor is an elongated area 15 NM wide, from 30,000 feet MSL to unlimited, with centerline between Lake Mohave on the Colorado River and Mt. Pinos west of Edwards AFB. The centerline is generally aligned on the $064^{\circ} - 244^{\circ}$ degree radial of the Edwards VORTAC. The entire route is 224 NM long (figure 16).

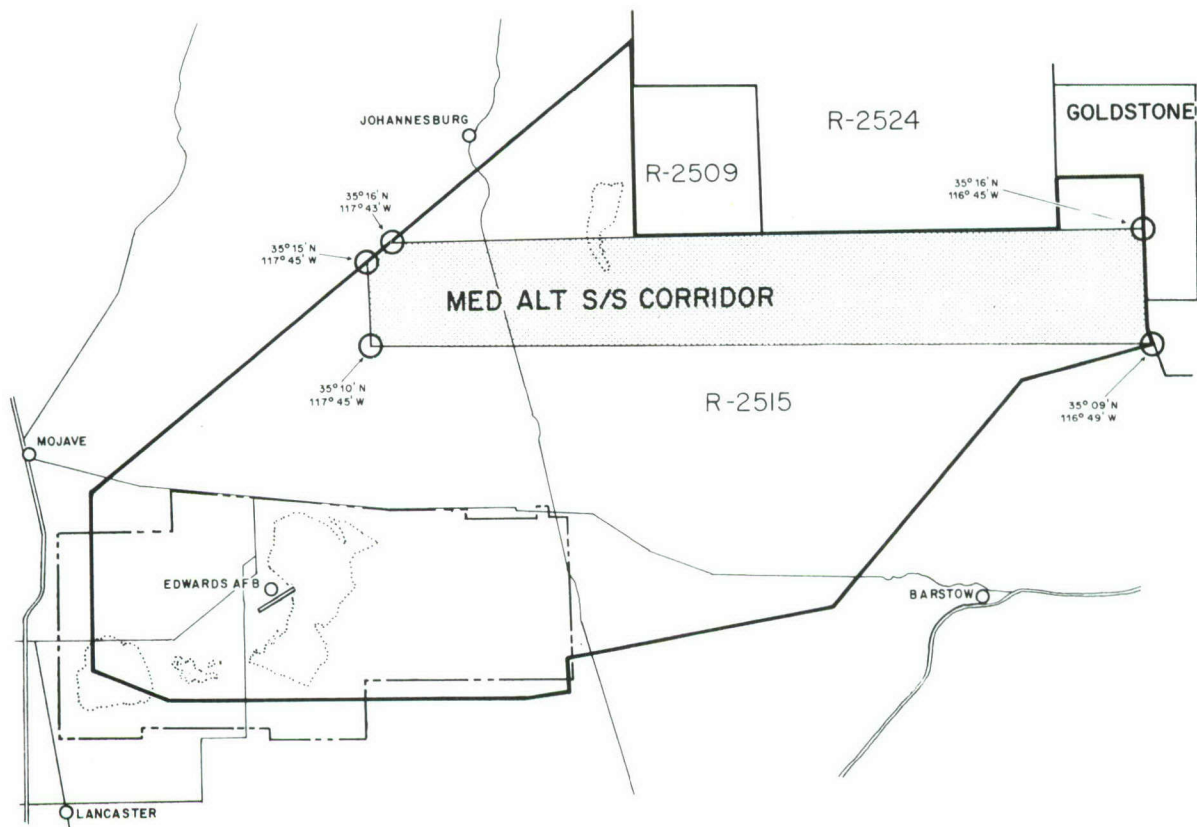


Figure 14 Medium Altitude Supersonic Corridor

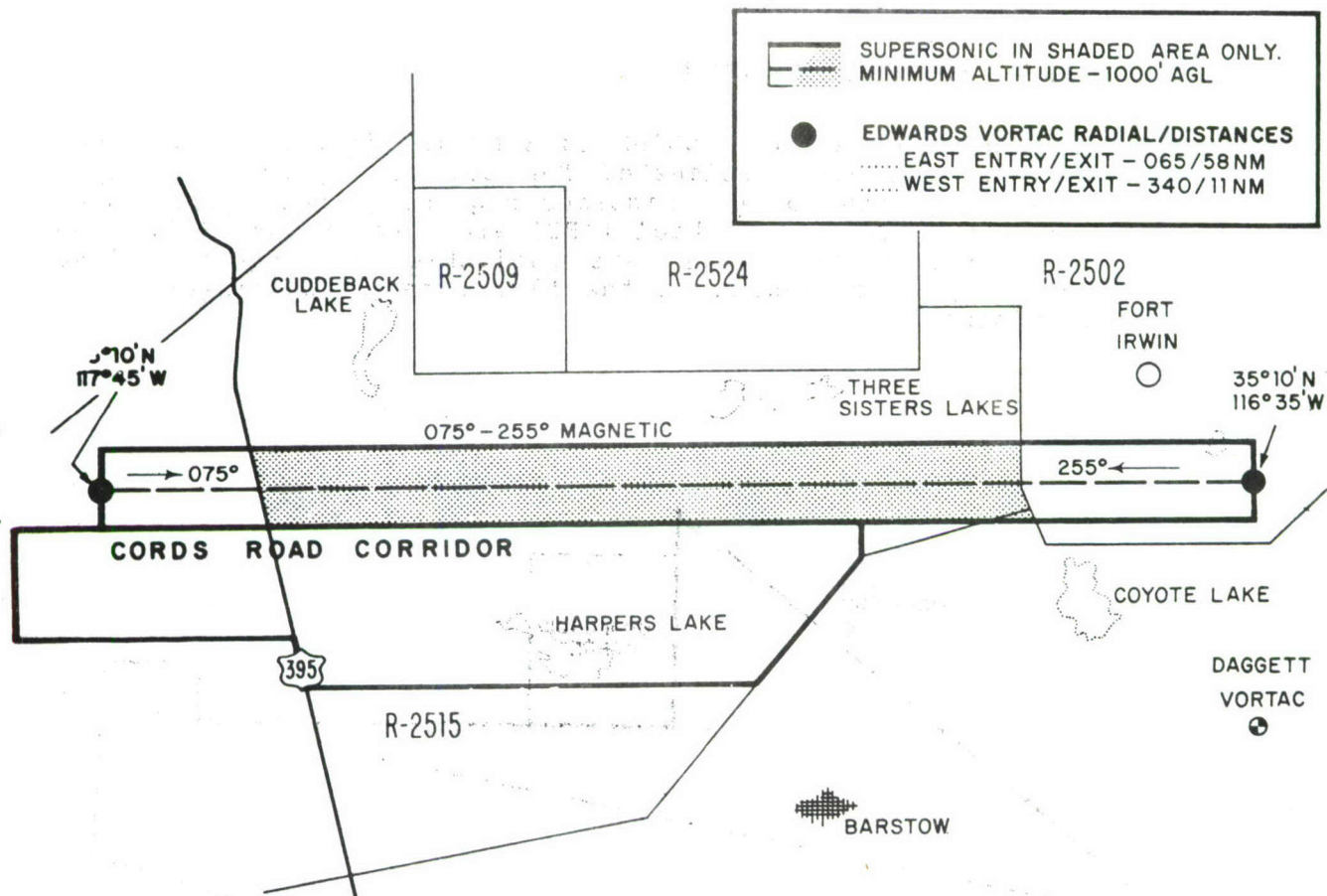


Figure 15 Low Altitude Supersonic Corridor Cords Road Corridor

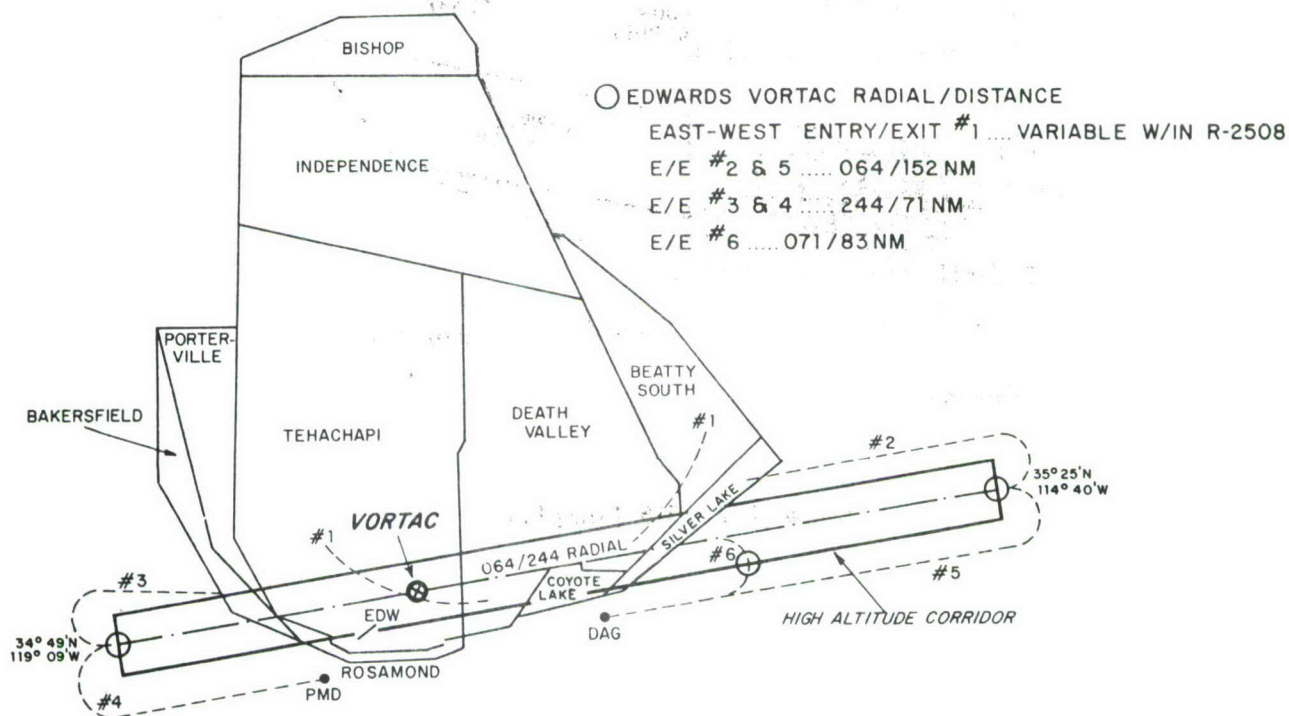


Figure 16 High Altitude Supersonic Corridor

SECTION D - SPIN AREAS AND DIVE CORRIDOR

There are 4 spin areas, each of which is 5 NM in diameter from 10,000 feet MSL to unlimited altitude, designated for all spin programs. Spin Area No. 1 or 2 is restricted to test missions requiring space positioning support and missions by Test Pilot School (TPS) aircraft (figure 17). Two additional non-instrumented spin areas are available on request. Dive Corridor capability may be scheduled in the PIRA area or combinations of the supersonic corridors.

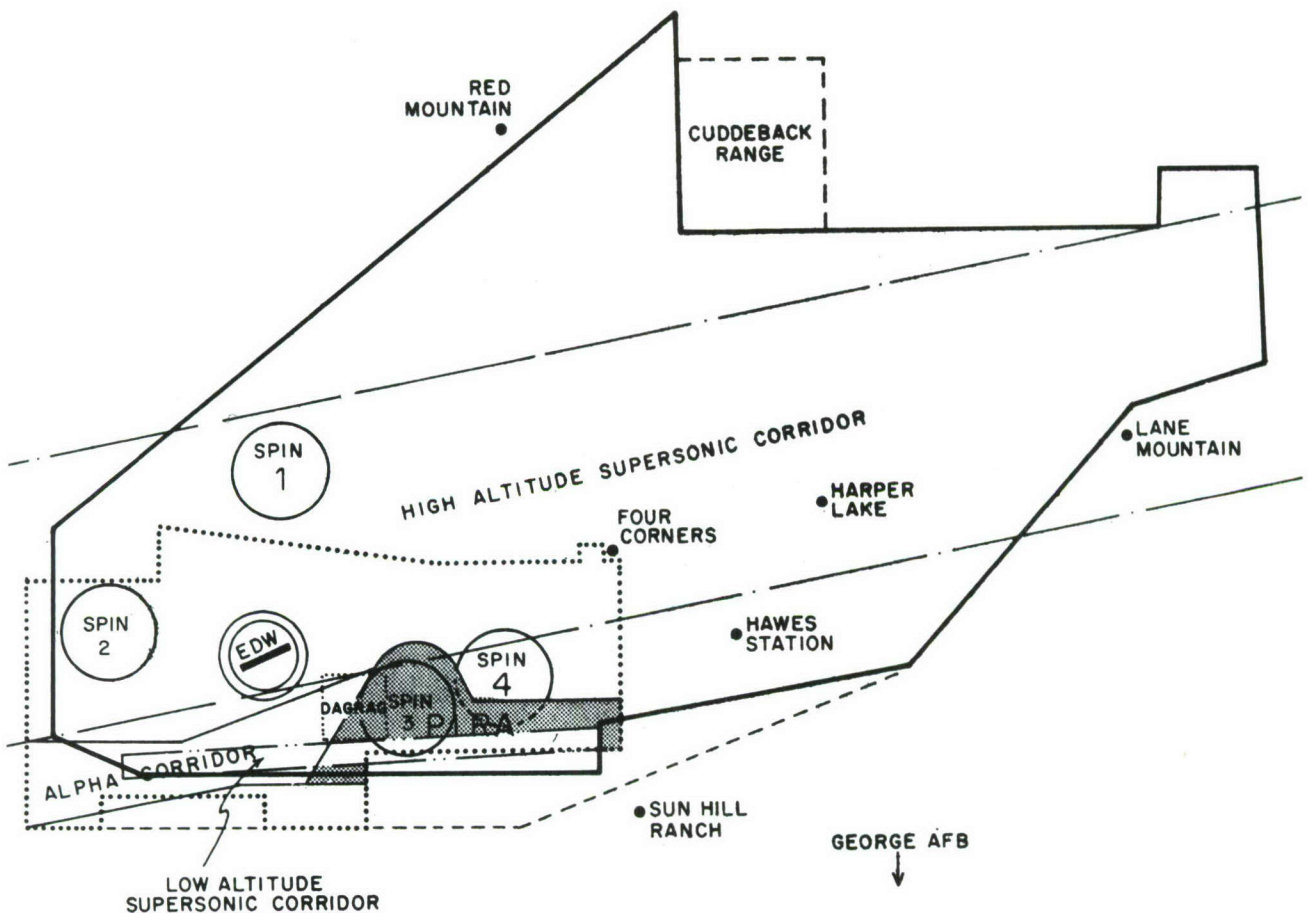


Figure 17 R-2515 Complex

SECTION E - TOWER FLYBY LINE

The tower flyby line is a subsonic airspeed calibration facility which runs parallel to the extended centerline of runway 04/22 approximately midway between the ramp and runway, starting at the northern edge of Rogers Dry Lake and terminating approximately at the west taxiway. Pattern alignment markers are located on the lakebed between the Flyby Tower and the eastern edge of Rogers Dry Lake. All flybys are flown under Edwards Tower control. Missions are conducted during daylight hours only.

The tower flyby pattern (figure 18) is about 4 NM wide and 8 NM long. Variable short patterns, commensurate with test requirements, may be flown in the shaded portion; however, no deviation can be made from the downwind altitude of 3500 MSL. The flyby pattern is east to west, right turns only, and at speeds of less than Mach 1 (true).

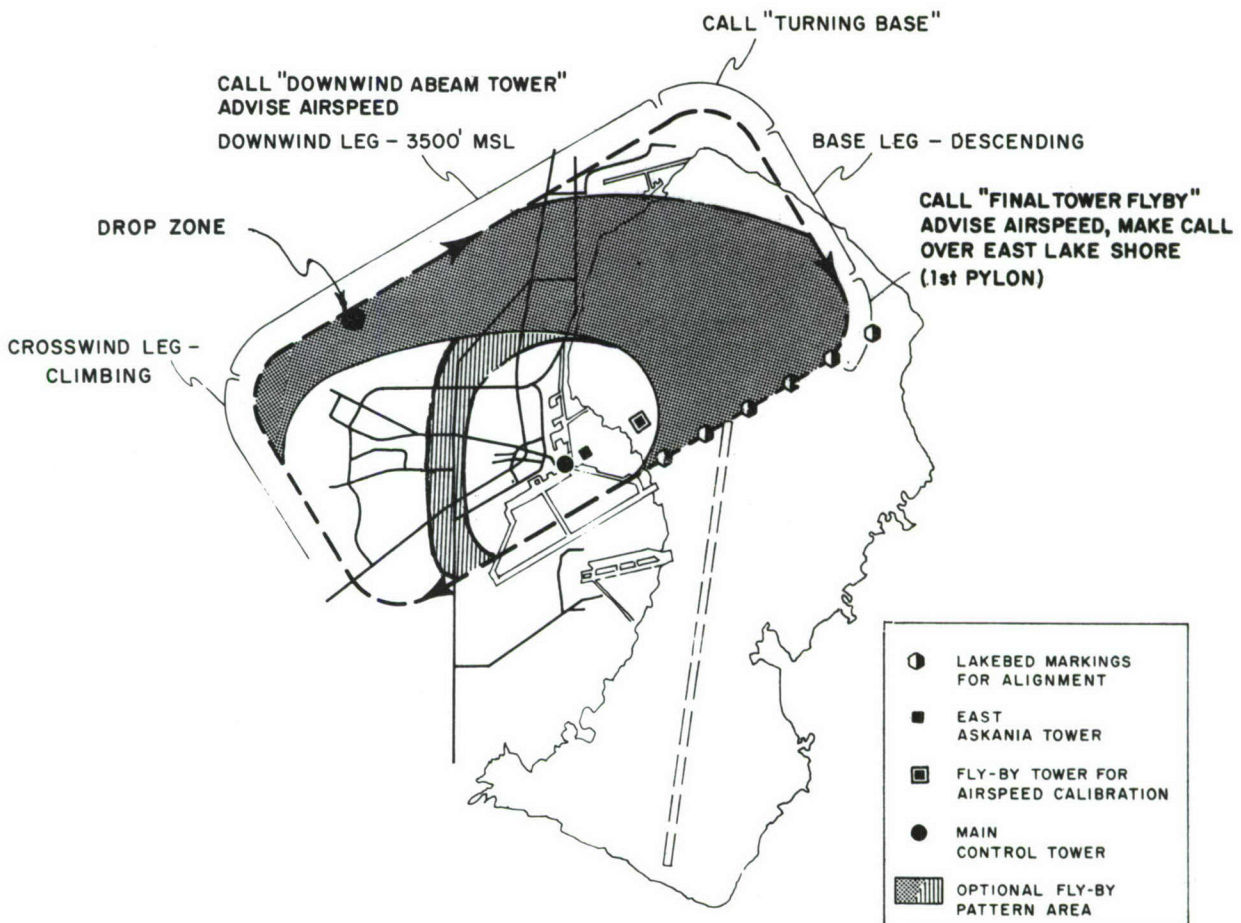


Figure 18 Tower Flyby Pattern

SECTION F - PHOTO AND INFRARED RESOLUTION RANGE (PRR) AND PHOTO AND INFRARED TACTICAL RANGE (PTR)

The PRR is located in the southeast portion of the Edwards AFB reservation. The PRR covers an area 2 NM wide and 21 NM long and consists of 18 bar type resolution targets, one tri-density target, five circle targets, one oblique target, and 14 check-cross patterns. Photo resolution patterns are constructed per MIL STD 150 (figure 19).

The PTR is located within Alpha Corridor and the PIRA. This range consists of a variety of targets at sited locations, principally along the PRR and the PB-7 Strip Range (figure 20).

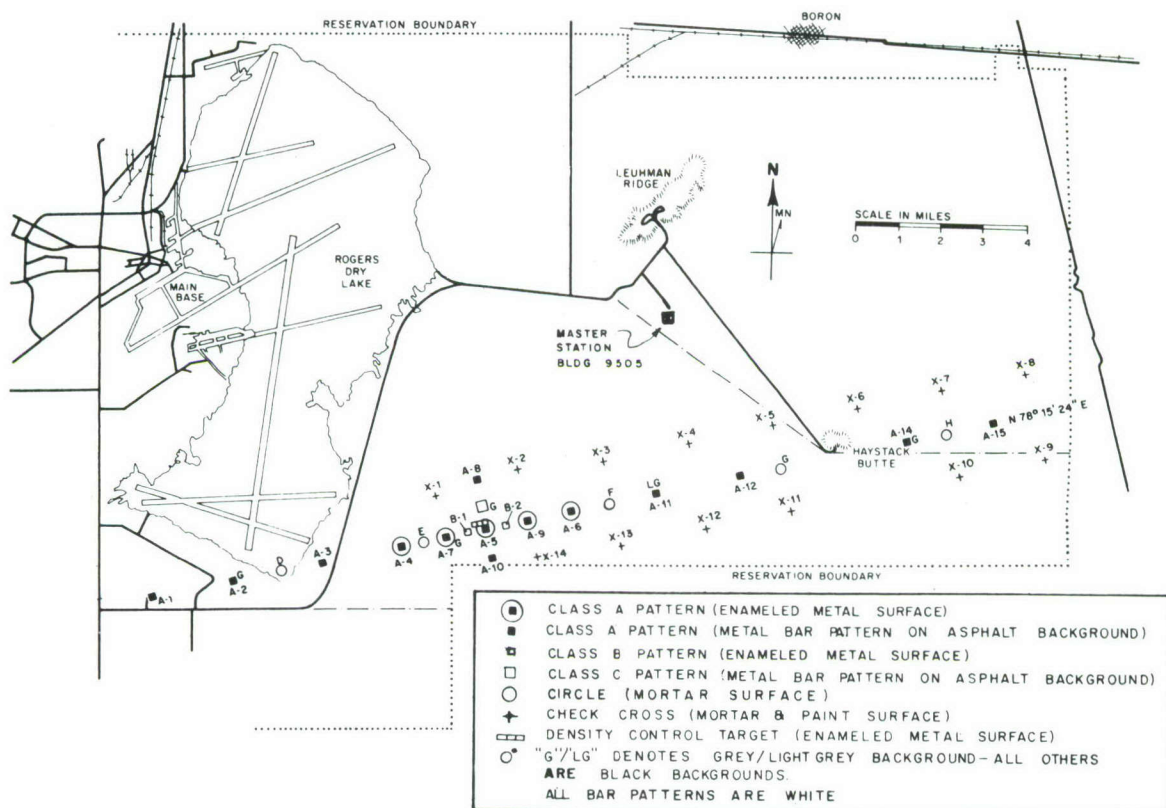


Figure 19 AFFTC Photo Resolution Range

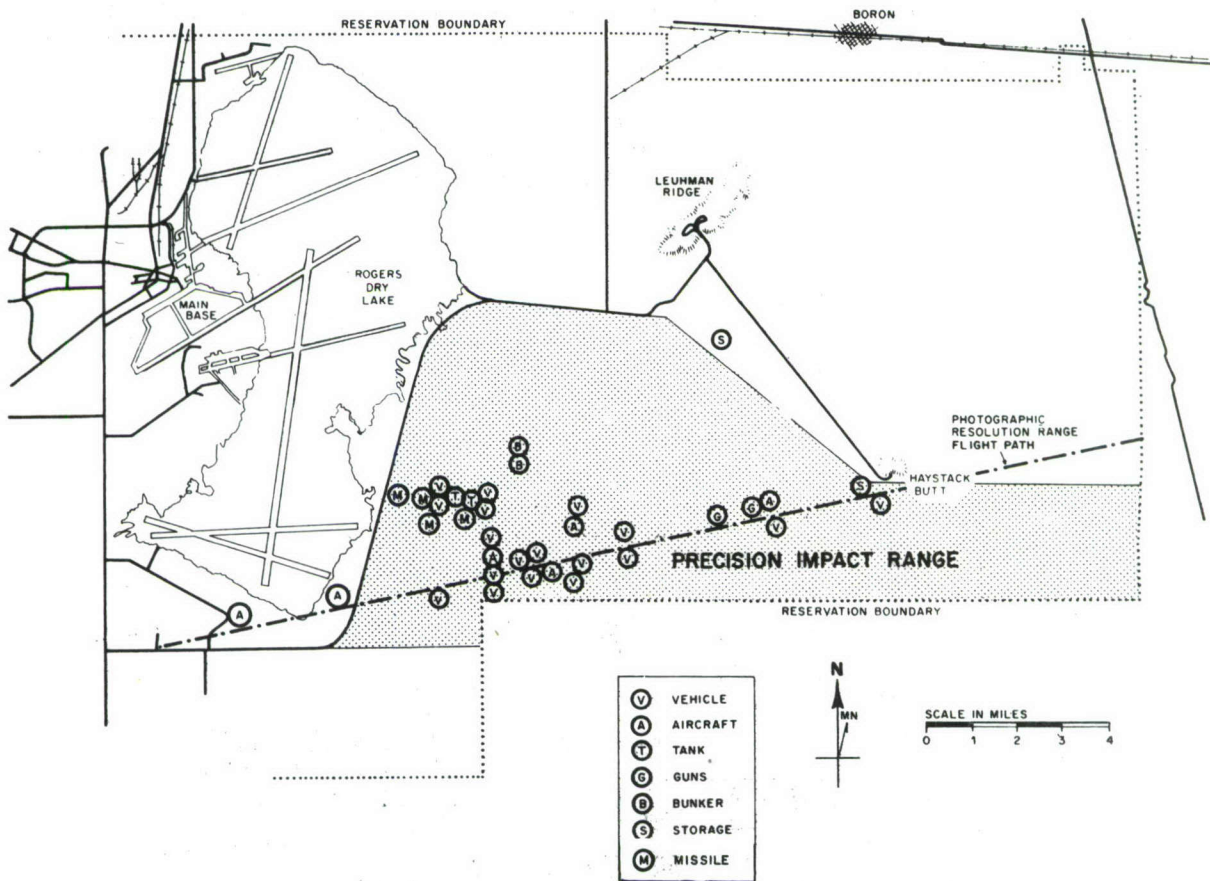


Figure 20 Photo and IR Tactical Range

SECTION G - TAKEOFF AND LANDING FACILITY (TO/L) AND LOW ALTITUDE GROUND SPEED CALIBRATION COURSES

The TO/L towers are located approximately 1 mile north of runway 04-22 and 1 mile in from each end of the runway. The TO/L facility is used to provide uninterrupted photographic time, space positioning data on test aircraft takeoff and landing characteristics (figure 21).

Two low altitude ground speed calibration courses are located on Edwards AFB. One course is on the south base ramp (figure 22); the other is on Rogers Dry Lake, parallel to and east of runway 17-35 (figure 21).

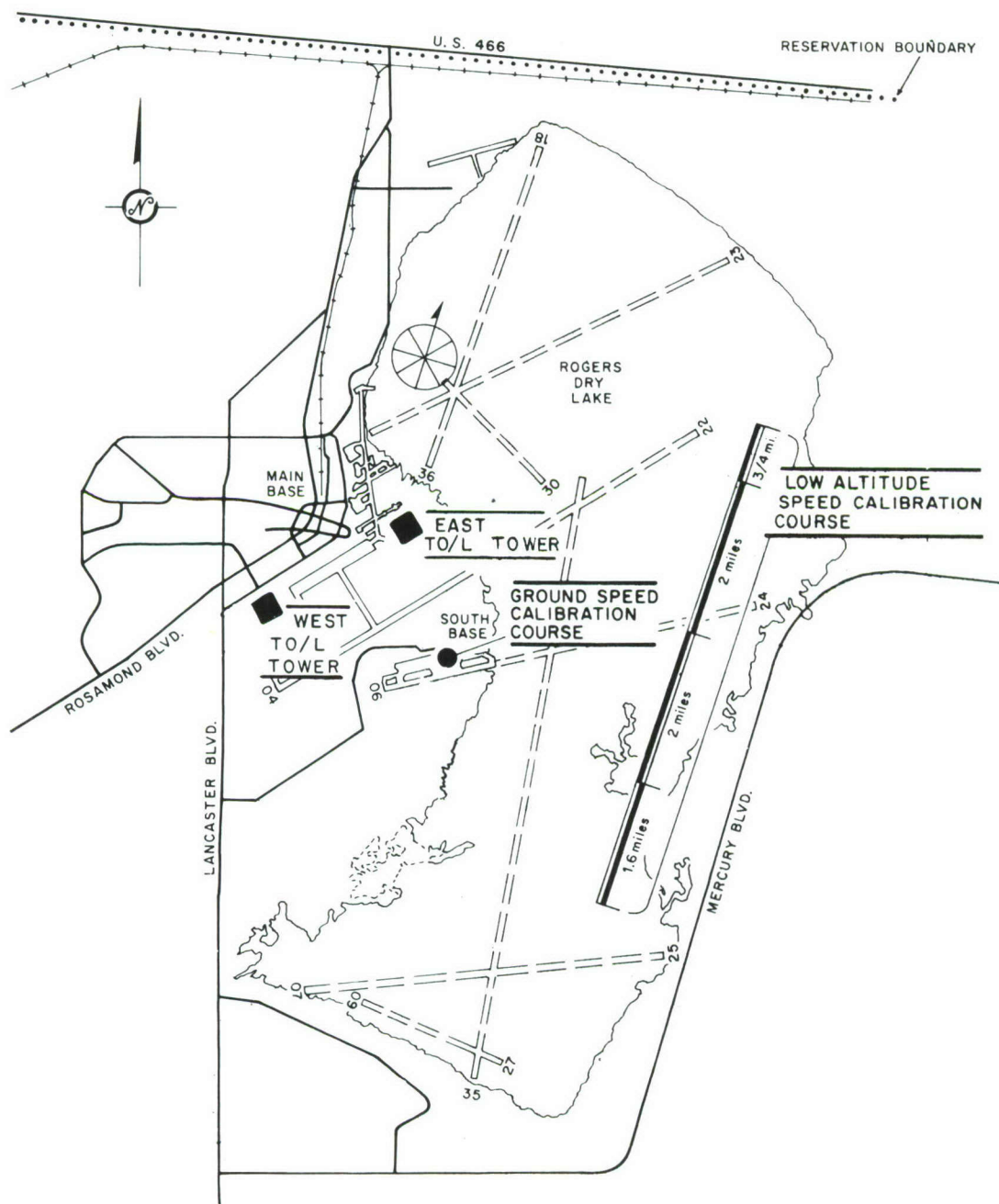
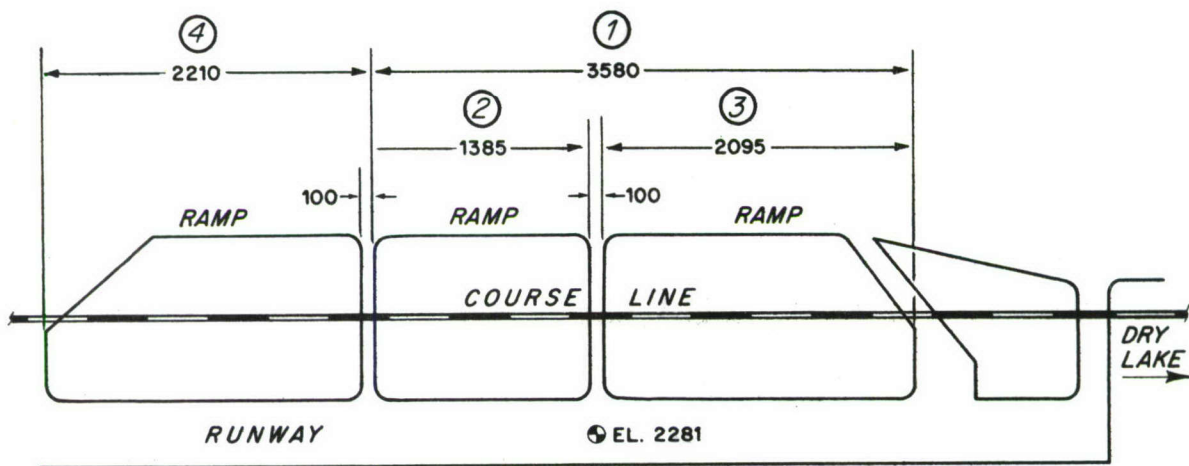


Figure 21 TO/L Facilities and Low Altitude Ground Speed Calibration Courses



NOTE—
ALL DIMENSIONS ARE IN "FEET".
COURSE NUMBERS ARE CIRCLED.

Figure 22 South Base Ground Speed Calibration Courses

SECTION H - ROCKET TEST HAZARD CONTROL AREA (RTHCA) AND PB-6 TARGET AREA

The RTHCA is located in the northeast section of the Edwards reservation (figure 23). This area is used in conjunction with PIRA. NOTE: Airspace 2 NM either side of the instrument landing system (ILS) centerline is excluded.

The PB-6 Target area is located in the northeast corner of the RTHCA. This area is used for gun camera resolution and as a drop area (figure 23).

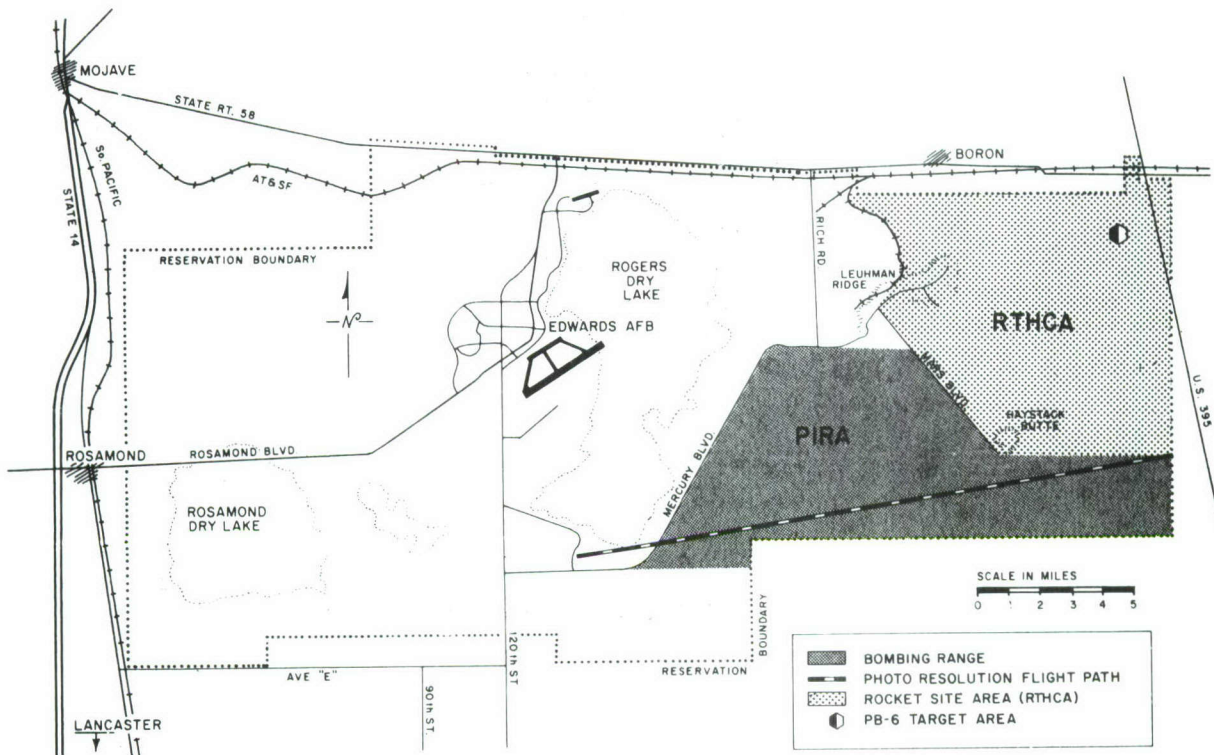


Figure 23 RTHCA and PB-6 Target Area

SECTION I - RADAR FIDELITY AND GEOMETRIC RANGE (RADFAG)

The RADFAG is located on Buckhorn Lake approximately 6 NM southwest of the main base runway (figure 10). The range consists of six square arrays consisting of 96 reflector positions and six L-shaped arrays consisting of nine reflector positions. A wide assortment of corner reflectors and Luneberg lens are available which can be installed to simulate a tactical situation or satisfy a wide variety of forward and/or sidelooking airborne radar flight test requirements. Cross-sectional areas of available reflectors vary from 1 to 1,045 square meters. All cross-sectional targets are designed for use against X-band frequency radars (figure 24). In addition, a smaller passive radar range is located on Rogers Dry Lake.

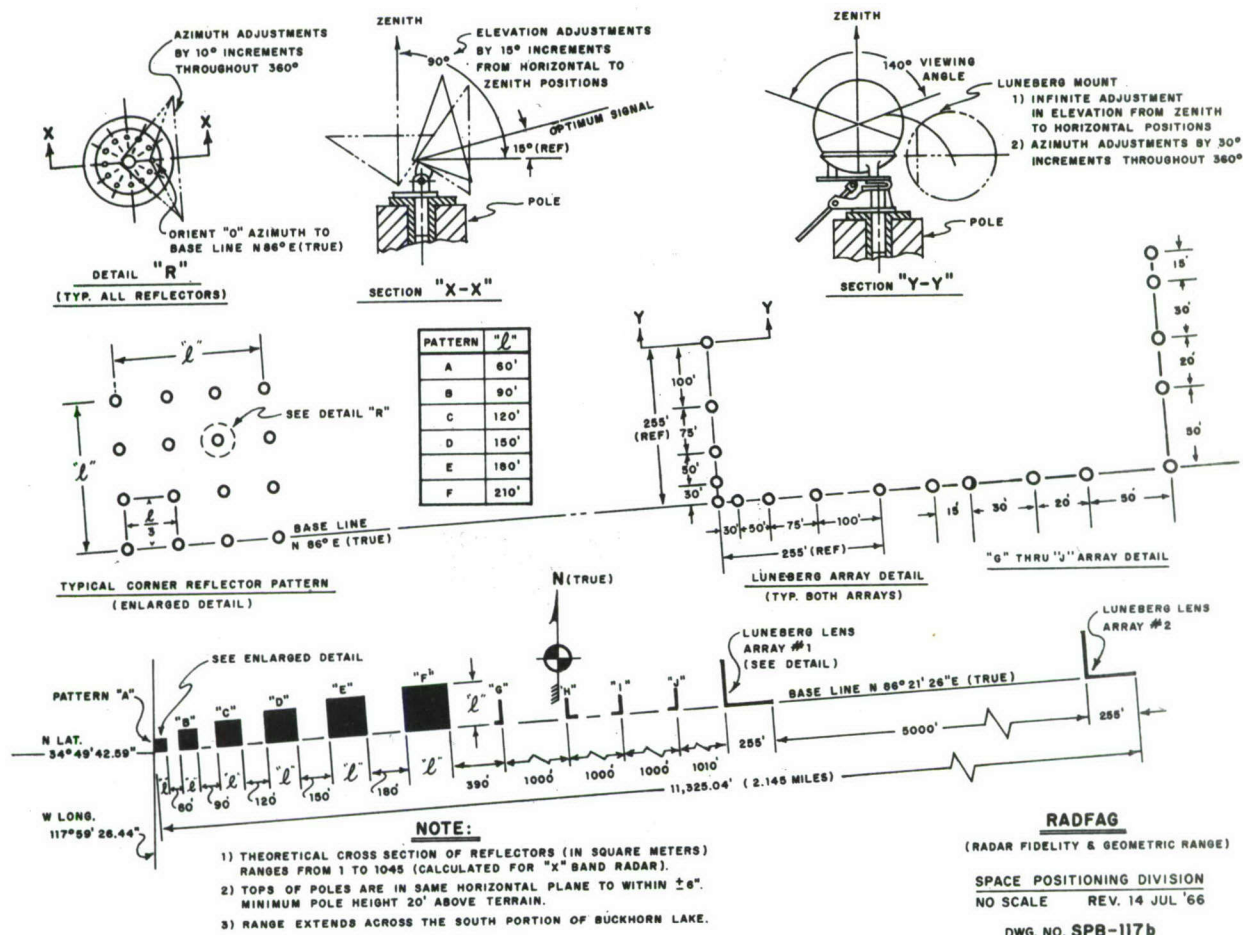


Figure 24 Radar Fidelity and Geometric Range (RADFAG)

SECTION J - HIGH ELEVATION TEST COMPLEX

Flight testing at high elevations is accomplished at the AFFTC high elevation test complex near Bishop, California, approximately 150 NM north of Edwards AFB. Test sites are available at Bishop (4,118 ft elev), Long Valley (7,130 ft elev), and Coyote Flats (10,000 ft elev). A 3,000-foot oil-surfaced runway with 1,000-foot overruns is located at Coyote Flats. Operation at this and other remote sites is supported through deployment of portable test and support equipment on an as-required basis (figure 25).

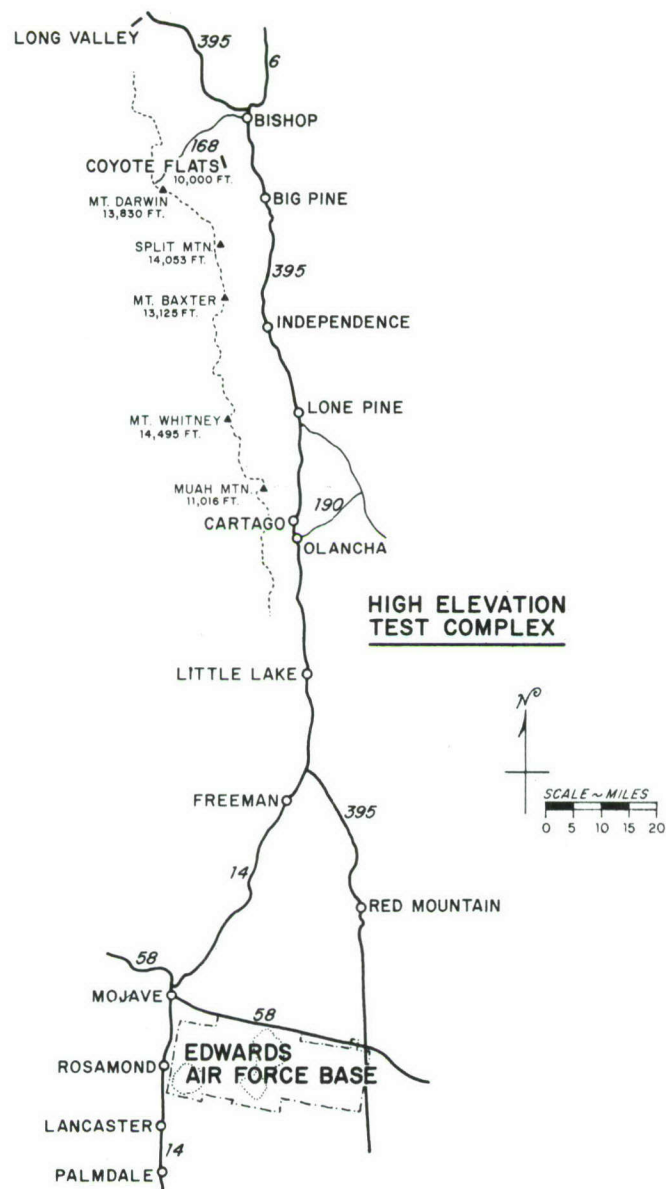


Figure 25 High Elevation Test Complex

SECTION K - HANGARS AND OTHER SPECIAL STRUCTURES

AFFTC possesses a total of 19 aircraft hangar complexes, three of which consist of two bays. These hangar complexes include office space for engineering and administrative personnel, shop and laboratory space, and storage space. Thirteen hangars are located on the main base, four at north base, and two at the south base.

All 13 hangars located at the main base are adjacent to the main taxiways connected to the 300-foot wide by 15,000-foot long instrumented main runway and Rogers Dry Lake. These hangars provide the basic hangar capability required in support of the AFFTC mission.

Included in these 13 hangars is the main AFFTC maintenance hangar complex, building 1600. This facility consists of one hangar (300 ft x 600 ft clear), 180,000 SF; 23,916 SF of administrative space; 204,000 SF of shop space; and 14,900 SF of avionics shop space (air-conditioned). This hangar has an adjoining concrete apron for parking of aircraft and access to taxiways leading to the 15,000-foot runway, Rogers Dry Lake, or to other hangars at Edwards AFB. The Field Maintenance Squadron uses this building to house the shops required for field level aircraft repair, experimental fabrication, and major modification of all aircraft, subsystems, rocket engines, components, etc., assigned to Edwards AFB. The Avionics Maintenance Squadron uses this building for field level repair of all avionics installed in the aircraft assigned to Edwards AFB. Support from this facility is available to all center test programs on the basis of precedence, priority, and availability of resources essential for the required workload.

The four hangars at north base are all located adjacent to taxiways which connect directly to both Rogers Dry Lake and a 150-foot wide by 6,000-foot long asphalt runway. Parking apron for small aircraft is available. This total complex is a relatively self-contained air base with administrative and laboratory facilities, and is located on AFFTC property 6 air miles north of the main base runway.

The two small hangars at south base are adjacent to a parking apron and have access to a 200-foot wide by 4,500-foot long light (12,500 lbs and under) aircraft runway. Access to the 15,000-foot main runway and the main base facilities for small aircraft is available. Access to the dry lake is also available. Some administration, shop, and storage space is available.

Table IV presents a complete list of hangars and other special structures used in direct support of the AFFTC mission, excluding NASA-DFRC and AFRPL structures.

Table IV
HANGARS AND OTHER SPECIAL STRUCTURES

<u>Bldg No.</u>	<u>Hangar Bays</u>	<u>SF</u>
181	1	21,970
182	1	29,338
1207	1	84,593
1210	1	82,346
1414	1	81,646
1600 (includes shops, lab areas)	1	419,619
1623	1	124,926
1630	2	71,920
1635	2	71,920
181Q	1	61,830
1820	2	135,712
1864	1	66,338
1870	1	43,855
1874	1	43,855
1881	1	48,684
4305	1	30,778
4401	1	13,210
4402	1	15,530
4505	1	84,328
Total Hangar Area		1,532,398

Fuel System Maintenance Dock Aircraft Wash Rack Four Point Aircraft Refueling System		
--	--	--

<u>Main Base (excluding RPL):</u>	<u>Bldg No.</u>	<u>SF</u>
PMEL:	1450	12,520
Munitions/Missiles Shops	360	6,853
	1015	1,995
		8,848
Ammo Bunkers (main base, excluding RPL)	648,649,650,651 652,653,654,655 656,657,658,659 660,661,662,663 664 at South Base	17 each
	1016 at Main Base	12 each
Weight & Balance Facility	1830	135,804
Range Mission Control Center	3940	36,844
<u>Environmental Chamber:</u>		
Space Suit Maintenance	3,920	17,081
<u>Major Main Base:</u>		
Base Warehouse for Supply	3735	89,913
	3736	121,003
		383,464

EXPLANATIONS OF ABBREVIATIONS AND TERMS

ABBREVIATIONS

<u>Item</u>	<u>Explanation</u>
AFFTC	Air Force Flight Test Center
AFLC	Air Force Logistics Command
AFM	Air Force Manual
AFPE	Air Force Preliminary Evaluation
AFR	Air Force Regulation
AFRPL	Air Force Rocket Propulsion Laboratory
AFSC	Air Force Systems Command
ARPA	Advanced Research Projects Agency
DAGRAG	dual air-to-ground gunnery and bombing range
DOD	Department of Defense
DT&E	development test and evaluation
EFTR	Edwards Flight Test Range
ESP	engineering services project
FTMCC	Flight Test Mission Control Center
HF	high frequency
IFR	instrument flight rules
ILS	instrument landing system
IOT&E	initial operational test and evaluation
IR	infrared
IRIG	Inter-Range Instrumentation Group
JON	Job Order Number
MARS	Mid-Air Retrieval System
NASA-DFRC	National Aeronautics and Space Administration Dryden Flight Research Center
NM	nautical mile
OD	operations directive
OR	operations requirement

<u>Item</u>	<u>Explanation</u>
OT&E	operational test and evaluation
PD	project directive
PI	program introduction document
PIRA	precision impact range area
PMR	Pacific Missile Range
PO	project order
PRD	program requirements document
PRR	photo and infrared resolution range
PSP	program support plan
PSTE	personnel subsystems test and evaluation
RADFAG	radar fidelity and geometric range
RAPCON	radar approach control
RCC	Range Commanders' Council
RFP	request for proposal
RPV	remotely piloted vehicles
RTHCA	rocket test hazard control area
SAMTEC	Space and Missile Test Center
SC	statement of capability
SF	square feet
SPO	system project office
SPORT	space positioning radar
TDP	technical development plan
TFAP	Technical Facilities Acquisition Program
TO/L	takeoff and landing facility
TPS	Test Pilot School
TSR	test support request
UDS	Universal Documentation System
UHF	ultra high frequency
VFR	visual flight rules

<u>Item</u>	<u>Explanation</u>
VHF	very high frequency
VORTAC	VHF Omni-Range Tactical Air Navigation

TERMS

AIR FORCE FLIGHT TEST CENTER (AFFTC). As an operational component of the Air Force Systems Command, AFFTC is responsible for the testing and test support of manned/unmanned aerospace vehicles and associated weapons systems.

ACTIVE TEST AREA. A test area which is being used for a scheduled test, mission, or other authorized activity, cleanup, ouffer zone, etc. The test area will be declared ACTIVE (HOT) if a schedule test, mission, or other activity which by reason of the hazards involved, precludes any other simultaneous operations within the designated test area. The test area will be declared ACTIVE (COLD) if a scheduled test, mission, or other activity is determined to be nonhazardous to the extent that work party activity or other simultaneous and joint nonfiring operations can be safely conducted within the same area.

AIRSPACE SURVEILLANCE. Close continuous radar observation of the airspace associated with a specific mission or test in order to detect intruding nonmission aircraft. This service is performed by Edwards RAPCON(FAA).

ADD-ON MISSION. All missions received by the Center Scheduling Section subsequent to publication of the Weekly Aircraft and Air/Ground Support Requirements Schedule (AFFTC Form 16). Such missions will be considered on a "first come-first served" basis and scheduled on a strictly non-interference basis with mission activity already scheduled. Exception to this rule may be made by the Commander, 6510 Test Wing.

COLD MISSION. A scheduled test, mission, or other activity determined to be nonhazardous to the extent that work party activities or other simultaneous and joint nonfiring operations can be safely conducted within the same test area.

COMPLETED MISSION/SORTIE. Once a mission or sortie is activated, it will be considered complete at the end of the schedule period unless the Center Scheduling Section is advised by competent authority that the mission/sortie has been aborted (ground or air) or cancelled.

ESTIMATED TIME IN-COMMISSION (ETIC). This is an estimated time when an aircraft or other equipment will be operationally ready. ETIC does not include preflight, prestart, basic postflight, or loadtime requirements as applicable for any specific mission.

H PLUS (TIME). Estimated time for maintenance to get aircraft in commission after replacement part arrives.

HIGHER PRIORITY. This term will be used to indicate that the support requested for a specific mission has been assigned to another mission with a higher precedence.

HOLD TIME. A delay in mission progression due to a number of causes, including mission conflict, aircraft maintenance, ground instrumentation and weather delays. Based on mission activity existing at that time, a "hold time" will extend as long as the Center Scheduling Section determines

that support can be retained. Maximum established ground/crew day will not be exceeded without supervisory coordination and approval.

HOT MISSION. A scheduled test, mission, or other activity, which by reason of hazards involved, precludes any other simultaneous operation within the same test area. Examples are:

- a. High and low altitude supersonic flights.
- b. LASER missions when LASER is activated.
- c. Missions dispensing armament, personnel, bundles, or any other items while in flight.
- d. Missile launch activity.
- e. Aircraft with tow extended.
- f. Special purpose aircraft operations.
- g. Any mission deemed hazardous to other mission activity.

INACTIVE TEST AREA. A test area which is not being used for a scheduled test, mission, or other authorized activity.

MAINTENANCE ALERT (MX ALERT). Aircraft out-of-commission for maintenance but may be in-commission prior to mission time.

MISSION. This term applies to all test and specified training activities which are scheduled by the Center Scheduling Section. It includes ground and airborne activity.

MISSION ABORTED. A mission which utilized part of its scheduled range time or support, but which terminates before its objective is accomplished. Range time charged to the project will include range time utilized and range setup time. Ground or air aborts will be charged with setup time when applicable.

MISSION CANCELLED. A mission which has been scheduled, but is revoked by competent authority.

ORDNANCE OR MUNITIONS. Any munition, device, or agent which can be intentionally launched, fired, released, expended, or activated. This includes: ammunitions of all types, rockets, probes, missiles, bombs, flares, targets (including drones), tow cable, CB agents, droppable tanks, shapes, chaff, spheres and any other live or inert item which can be expended. Also includes LASER when related to test and training projects.

NORS. Not operationally ready-supply.

PIGGYBACK MISSION. Two missions conducted simultaneously within the same test area/range or support agency/facility/aircraft supporting two different, yet compatible missions simultaneously or consecutively.

POSITIVE CONTROL. The pilot under positive control of a facility is assured separation from other aircraft also under positive control. Edwards RAPCON facility is the only agency capable of providing positive control within the Edwards Test Complex.

POST MISSION TEST. A post mission requirement for checkout, recheck of test items data readout, aircraft systems, etc., in direct association with the mission accomplished. Post mission test requirements will be identified and requested on AFFTC Form 16.

PRESTART REQUIREMENTS. A pre-mission requirement for special checkout of test items, aircraft systems, etc., in direct association with the mission to be accomplished. Prestart requirements will be identified and requested on AFFTC Form 16.

PRIORITY. AFFTC order of precedence based on urgency, importance, or merit (AFFTC Program Summary and AFFTC Form 16), AFFTC priorities are initially assigned by the Programs & Requirements Branch per AFFTCR 27-3.

RADAR ADVISORY. Close continuous radar observation of aircraft and airspace associated with a specific mission or test for the purpose of advising mission pilots of observed aircraft operating in their immediate vicinity. Radar advisory service will be provided by Edwards RAPCON to pilots operating in R-2508 airspace, and by Edwards RAPCON and Space Positioning Radar (SPORT) when operating within R-2515 and/or over designated test areas/ranges. "Bogey Information" will be provided to test mission pilots by Edwards RAPCON.

RADAR VECTORING. Vectoring mission aircraft over an assigned profile for the purpose of data collection. This service is provided by Space Positioning Radar (SPORT). Vectoring does not attempt to provide advisories concerning hazards to flight.

SCHEDULED CONFIRMATION. Accomplished by Center Scheduling Section daily at 1300 hours. Next day missions are reviewed and confirmed with Aircraft Maintenance, Test Operations, support agencies and appropriate contractor agencies. Schedules for Saturday and Sunday are reviewed and confirmed on Friday; holiday schedules are reviewed and confirmed on the last workday prior to the scheduled activity.

SCHEDULED MISSION. Any mission that appears as a numbered mission on AFFTC Form 16. This includes daily numbered add-on missions.

SORTIE. An operational flight by one aircraft (AFM 11-1, Sortie (Air)). This term also applies to an operational flight by one high altitude, probe, drone, or missile.

TEST AREA SURVEILLANCE. Close continuous visual or radar observation of the surface area and airspace associated with a specific mission or test in order to detect intruding non-mission traffic and take necessary action when the situation warrants.

TEST COMPLEX. The AFFTC/Edwards Test Complex is divided into two sections: the R-2508 California Restricted Area Complex (figure 16) and the Edwards

Test Complex (figure 17).

a. R-2508 Complex Airspace: (Air traffic control services provided by Edwards RAPCON).

<u>Restricted area</u>	<u>Altitude</u>	<u>Controlling Agency</u>
R-2502	Surface to unlimited	Ft MacArthur (Ft Irwin)
R-2502	Surface to unlimited	NWC, China Lake
R-2606	Surface to 6,000 feet	NWC, China Lake
R-2508	20,000 feet to unlimited	NWC, China Lake
R-2509	Surface to unlimited	George AFB (TAC)
R-2515	Surface to unlimited	AFFTC, Edwards AFB
R-2524	Surface to unlimited	NWC, China Lake

b. Edwards Test Complex:

Precision Impact Range Area (PIRA) - Surface to unlimited (specified altitude required)

Dual Air-to-Ground Gunnery Range (DAGRAG) - Surface to 14,000 feet MSL.

Alpha Corridor - Surface to unlimited (specified altitudes required).

Spin Areas #1, #2, #3 and #4 - 5 NM diameter; 10,000 feet MSL to unlimited.

Low Altitude Supersonic Corridors - 4 NM wide, surface to 10,000 feet MSL.

Medium Altitude Supersonic Corridor - 46 NM long, 7 NM wide; 10,000 feet to 30,000 feet MSL.

High Altitude Supersonic Corridor - 224 NM long, 15 NM wide; 30,000 feet MSL to unlimited.

Airspeed Calibration Course.

Ground Calibration Courses.

Photo optics and telemetry, and radar support facilities.

Super dry lakebed recovery areas within or immediately adjacent to the complex.

TEST RANGE CLEARANCE. A specific one-time approval of a request for an aircraft, individual, or a work party, to enter a test area for a specified period of time.

REFERENCES

1. Safety Planning for AFFTC Tests, AFFTC Regulation 127-3, 1 October 1976.
2. Universal Documentation System, Document 501-70, Volumes I and II, Documentation Group, Range Commanders' Council.
3. Protection of USAF Resources, AFR 125-37, Hq USAF, 21 December 1973.
4. Use of AF Installations by Other than US DOD Aircraft, AFR 55-20, Hq USAF, 18 February 1974, as supplemented.
5. Laser Health Hazards Control, AFR 161-24, Hq UAF, 3 August 1970.
6. Test and Evaluation, AFR 80-14, Hq USAF, 19 July 1976.
7. Engineering Services, AFSC Regulation 27-5, Hq AFSC, 12 August 1975.
8. Host-Tenant Support Responsibilities of USAF Organizations, AFR 11-4, Hq USAF, 19 June 1974.
9. Manpower Policies and Procedures, AFM 26-1, 8 May 1973.
10. Financial Administration of Interservice and Interdepartmental Support Agreement, AFR 172-3, Hq USAF, 27 December 1974.
11. Engineering and Technical Services Management and Control, AFM 66-18, Hq USAF, 26 February 1973.
12. USAF Supply Manual (Seven volumes), AFM 67-1, Hq USAF.
13. Advanced Research Project Agency Projects, AFSC Regulation 170-5, 7 May 1971.
14. Advance Procurement Data Support for Purchase Requests (PRs) and Military Interdepartmental Purchase Request (MIPRs), AFSC Regulation 67-12, Hq AFSC, 5 September 1975.
15. Support of Nongovernment Test and Evaluation, AFR 80-19, Hq USAF, 12 December 1967.
16. Scheduling Procedures for Aircraft and Air/Ground Support, AFFTC Regulation 55-15, 21 December 1976.
17. Assignment and Control of Radio Frequencies, AFFTC Regulation 100-5, 16 April 1975.
18. Use of Telemetry at AFFTC, AFFTC Regulation 100-6, 10 October 1974.
19. Frequency Management and Electromagnetic Compatibility, AFM 100-31, Hq USAF, 1 October 1974.

20. Telemetry Standards, IRIG Document 106-71, Range Commanders' Council, White Sands Missile Range. (Companion to IRIG 118-71, reference 22.)
21. Test Methods for Telemetry Systems and Subsystems, IRIG Document 118-71, Range Commanders' Council, White Sands Missile Range, March 1971. (Companion to IRIG 106-71, reference 21.)
22. Weapons Ranges, AFM 50-46, Hq USAF, 30 June 1972.

BIBLIOGRAPHY

Air Force Flight Test Center, AFSC Regulation 23-4, 30 June 1975.

Funding Support and Use of R&D Activities, AFSC Regulation 172-2, Hq AFSC, 15 June 1977

Safety Planning for AFFTC Tests, AFFTC Regulation 127-3, 10 October 1976.

• Reimbursement Policy, AFFTC Regulation 172-3, 11 December 1974.

Precision Impact Range Area (PIRA), AFFTC Regulation 55-17, 11 April 1977.

• Air Force Industrial Fund, AFR 170-10, Hq USAF, 18 May 1972.

Aircrew Operation Manual, AFFTCM 55-2, 1 September 1977.

Defense Advanced Research, AFSCR 170-5, 16 October 1974.