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Heliport Visual Approach Surface High Temperature and High Altitude Test Plan

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June 1988

DOT/FAA/CT-TN88/5

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16. Abstract

This Technical Note identifies procedures to be used during tests to be conducted at the Albuquerque International Airport (ABQ), Albuquerque, New Mexico. These tests are designed to evaluate the applicability of existing heliport approach and departure surface criteria under high temperature and high altitude conditions. A UH-1H aircraft will be used. This project is similar to the work documented in DOT/FAA/CT-TN87/54, "Analysis of Heliport Environmental Data: Indianapolis Downtown Heliport, Wall Street Heliport" (to be published).

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TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

EXECUTIVE SUMMARY

The Guidance and Airborne Systems Branch, ACT-140, has received a request from the Office of Airport Standards, AAS-100, to examine the current heliport approach/departure surfaces criteria under high temperature and high altitude conditions.

Several factors promoted this activity. The current criteria was based on experience tempered with engineering judgement. Industry has challenged this criteria as being too conservative. Visual meteorological conditions (VMC) approach/departure testing was conducted at the Federal Aviation Administration Technical Center from February through May 1987, using several aircraft. These tests were conducted near sea level with temperatures ranging from the low 30's to the mid-60's (degrees Fahrenheit). At higher altitudes and higher temperatures, the density altitude increases, resulting in deteriorated helicopter engine and rotor systems performance. It is, therefore, imperative that VMC approach/departure testing be performed under high density altitude to adequately examine the issue of reducing the lateral and vertical distances of the protected surfaces.

The primary objectives of this project are to provide flight data under high density altitude condition to verify the current approach/departure surface criteria and determine the airspace required for visual approaches/departures. Three different approach angles, 7.125°, 8°, and 10°, and three departure angles, 7.125°, 10°, and 12°, will be flown for both straight-in and curved path procedures. The project will consist of at least 360 approaches and departures using six subject pilots, each flying at least 30 procedures.

The approaches/departures will be tracked using an onboard airborne precision Global Positioning System (GPS) receiver. The airborne data acquisition system will record various aircraft performance data. The tracker data will be used to generate plots depicting both a profile view and a plane view of each procedure relative to the desired course. Pilot evaluations will be analyzed to determine work load, safety factors, and control issues. The observer logs will also be examined to determine other factors that may influence the course deviation such as weather and wind conditions.

1. INTRODUCTION.

1.1 PURPOSE.

The purposes of this test plan on Helicopter Visual Meteorlogical Conditions (VMC) Clearance project to be conducted at high temperature and high altitude conditions are as follows:

a. The identification of problems to be investigated.

b. The definition of the tasks required to resolve these problems.

c. The development of test procedures.

d. The description of the methodology for data collection, reduction, and analysis.

e. The specification of the required data.

1.2 BACKGROUND.

The focus of this test is on the issue of airspace requirements and obstruction protection requirements for visual approaches and departures at a heliport. The current Federal Aviation Administration (FAA) Heliport Design Advisory Circular (AC) 150/5390-2 states:

"The area of the primary surface coincides in size and shape with the designated take-off and landing area of a heliport. This surface is a horizontal plane at the elevation of the established heliport elevation.

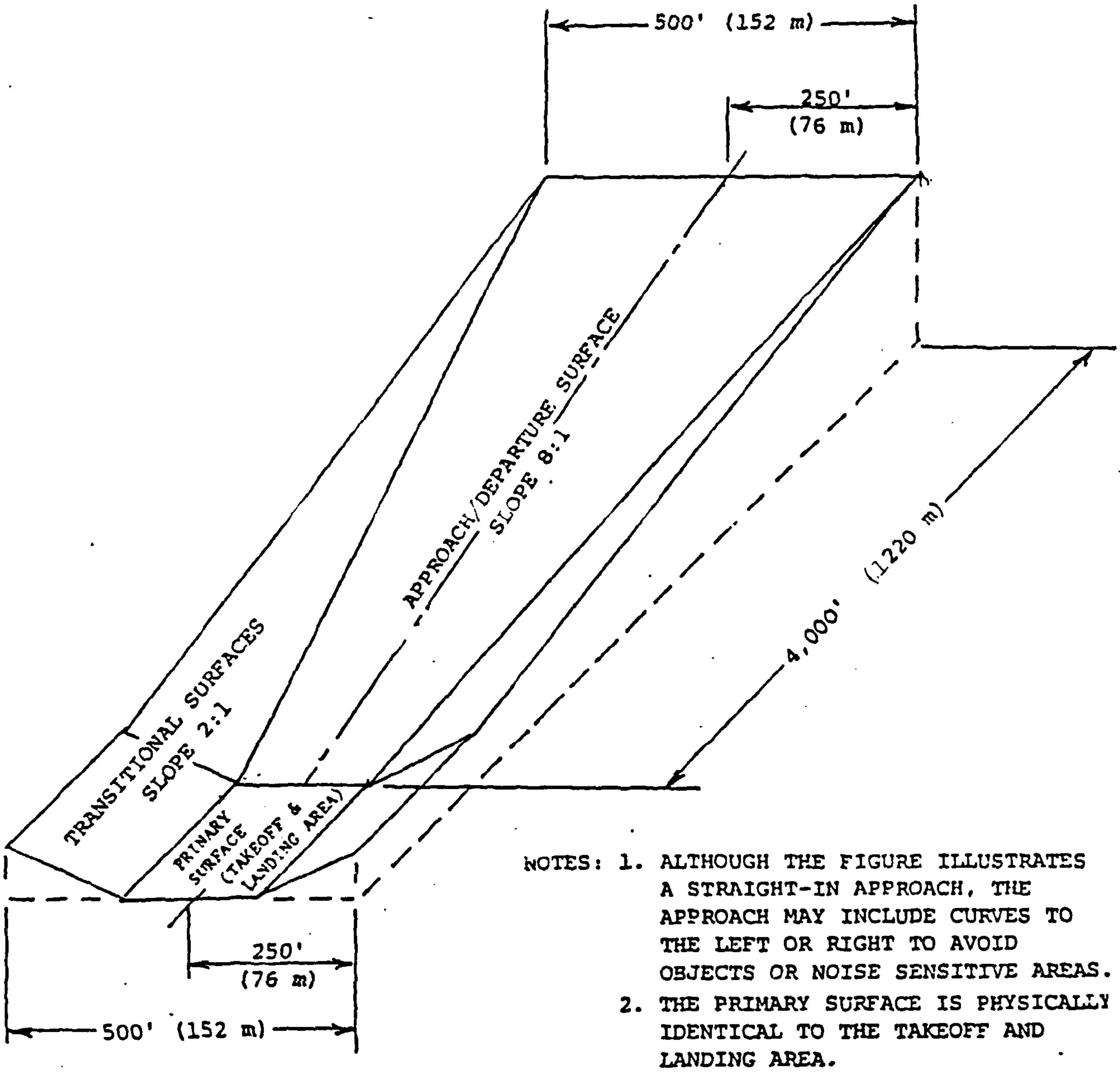
The approach surface begins at each end of the heliport primary surface with the same width as the primary surface, and extends outward and upward for a horizontal distance of 4000 feet where its width is 500 feet. The slope of the approach surface is 8 to 1 for civilian heliports.

And, the heliport transitional surfaces extend outward and upward from the lateral boundaries of the heliport primary surface and from the approach surfaces at a slope of 2 to 1 for a distance of 250 feet measured horizontally from the centerline of the primary and approach surfaces."

The airspace is pictorially depicted in figure 1.

The criteria for the approach surface has been challenged by industry as being too conservative.

Flight tests were conducted at the FAA Technical Center, Atlantic City International Airport, New Jersey. These tests were conducted under sea level conditions in the winter and spring 1987, as described in the "Heliport Visual Approach Surface Testing Plan," Report No. DOT/FAA/CT-TN86/61, February 1987. The data collected during the current test activity will examine pilot performance within this criteria, but at high temperature and high altitude conditions, to determine if the criteria can be supported under these conditions.



NOTES: 1. ALTHOUGH THE FIGURE ILLUSTRATES A STRAIGHT-IN APPROACH, THE APPROACH MAY INCLUDE CURVES TO THE LEFT OR RIGHT TO AVOID OBJECTS OR NOISE SENSITIVE AREAS.

2. THE PRIMARY SURFACE IS PHYSICALLY IDENTICAL TO THE TAKEOFF AND LANDING AREA.

FIGURE 1. APPROACH/DEPARTURE SURFACES

1.3 TEST LOCATION.

The flight test will be conducted at Kirtland Air Force Base (AFB) which is collocated within Albuquerque International Airport (ABQ), Albequerque, New Mexico. This site has an average density altitude of 8,500 feet, which is considered typical of hot/high flight. Visual approaches and departures will be conducted within a 2-nautical mile (nmi) radius of a designated helipad at Kirtland AFB. The aircraft tracking function will be performed by an onboard airborne precision Global Positioning System (GPS) receiver.

1.4 OBJECTIVES.

The objectives of this project are as follows:

a. To determine the airspace consumed during visual approaches and departures to a heliport under hot, high conditions.

b. To verify the requirements for the current Heliport Design Guide's visual approach and departure path surfaces or the determination of possible modifications to these surfaces under these conditions.

2. FACILITIES AND INSTRUMENTATION.

2.1 TEST AIRCRAFT.

2.1.1 Bell UH-1H. The UH-1H is a single turbine engine, single main rotor helicopter designed to carry up to 14 passengers and a pilot. It is capable of speeds up of 120 knots, has a maximum takeoff weight of 9,500 pounds, and the main rotor is 48 feet in diameter. The use of this aircraft has been obtained through an Interagency Agreement with the Department of the Army.

2.2 AIRCRAFT TRACKING.

2.2.1 Global Positioning System.

Precision tracking of the aircraft will be accomplished by an onboard GPS receiver. The receiver was manufactured by Collins Radio under the U.S. Air Force GPS User Equipment development contract. This receiver was provided by the GPS Joint Program Office to the U.S. Army Avionics Research and Development Activity (AVRADA), Fort Monmouth, New Jersey. AVRADA conducted a Flight Test Program at the FAA Technical Center in December 1986 and January 1987. The receiver was mounted in the UH-1H helicopter. The flight tests are described in the AVSCOM Test Report 8412, "Report of Investigative Testing of Global Positioning System Slant Range Accuracy."

The following AVSCOM report 8412 quotation describing ranging accuracy IS: "The Ensemble Average Error for the Forty Valid Test Approaches was 46 feet (14 meters). The largest mean error during an individual approach was 95 feet (29 meters)." The GPS specifications call for a standard positioning service horizontal position error similarly equal to 100 meters 2D root mean square (rms). Its precise positioning service vertical position error is less than 12 meters.

Currently, GPS is operating with six operating satellites that provide 2 to 4-hour intervals of four-satellite coverage over selected geographical areas. A 5° or better masking angle is the minimum angle of satellite elevation at which that satellite's signal is usable. Airborne data will be collected onboard the test vehicle. These data will focus on aircraft state and control position status.

2.3 AIRBORNE DATA COLLECTION EQUIPMENT.

2.3.1 Bell UH-1H.

The airborne data collection system on the UH-1H is a Motorola 6809 microprocessor-based package which is a combination of an off-the-shelf data package and FAA designed and built interface boards. The system is capable of recording the parameters listed in table 1 for storage on a Kennedy magnetic tape recorder.

3. PROBLEM/TASKS.

3.1 STATEMENT OF THE PROBLEM.

VMC approach/departure testing was carried out at the FAA Technical Center from February through May 1987, using an S-76, an UH-1H, and an OH-6 to determine the airspace consumed during visual approaches/departures to a heliport and verify the current Heliport Design Guide's visual approach/departure path requirements or determine possible modifications to these surfaces. The surface currently defined is depicted in figure 1. The surface criteria angle, 7.125°, along with 8°, and 10° approach angles were flown, while departure angles of 7.125°, 10°, and 12° were also flown. Over 1200 runs were completed, all near sea level with temperatures ranging from the low 30's to mid-60's.

It is given that a helicopter's engine and rotor systems' performance will deteriorate with increasing density altitude. Therefore, to adequately examine the issue of modifying the lateral and vertical distances of the protected surfaces given the performance problems at higher altitudes, it is necessary to carry out similar flight tests at airports/heliports with density altitudes in excess of 5000 feet. ABQ has been selected for its density altitude of 8500 feet during August.

3.2 TASKS.

The approach/departure protected surface extends outward to 4000 feet. However, pilots routinely initiate turning approaches inside the outer limits of the surface. As a result, both straight-in and curved path procedures will be examined.

3.2.1 Straight-In vs. Curved Path.

a. Approaches: Each straight-in approach will begin at least 6000 feet from the touchdown point (see figure 2). One out of every three approaches will be a curved path approach during which the pilot will maneuver through at least a 90° turn prior to arriving on the final approach segment (see figure 3). The profile will be designed so the turn to final is completed at least 200 feet AGL. The pilot will be asked to begin the free choice approach no earlier than 0.7 nmi from the intended touchdown point, from an altitude of at least 500 feet.

b. Departures: A departure obstacle, such as a tethered balloon, will be used to control the angle of the departure surface. One out of every three departures will be a curved path departure. During curved path departures the

TABLE 1. UH-1H AIRBORNE DATA COLLECTION PARAMETERS

Parameters	Units	Minimum Sample Rate/Second	Resolution Level
Time	Hours/minutes/seconds	-	0.001 sec
Indicated airspeed	Knots	2	0.0977 kt
Vertical velocity	Feet/minute	2	0.488 ft/min
Aircraft heading	Degrees	2	0.022 deg
Barometric altitude 29.92	Feet	2	1.95 ft
Radar altitude	Feet	2	1.732 ft
Transverse acceleration	g's	2	0.0012 g's
Longitundinal acceleration	g's	2	0.0012 g's
Vertical acceleration	g's	2	0.0049 g's
Time Code generator	Milliseconds	-	0.001 sec

Time Mark Data Block

Origin	RPU
Destination	(User)
Message Identifier	3
Word Count	59
Flags	None
Basic Rate	1 Hz

TABLE 1. UH-1H AIRBORNE DATA COLLECTION PARAMETERS (CONTINUED)

Data Item	No. of Parameters	Data Type	No. of Words	Units
GPS Time	1	DPFP	4	seconds
CUT Time	1	DPFP	4	seconds
ΔT from GPS Time	1	Integer	1	10 milliseconds
Time Mark Counter	1	Integer	1	N/A
Position (Lat, Long)	2	FP	4	radians
Position (x, y, z)	3	FP	6	meters
Altitude (m.s.l. & Absolute)	2	FP	4	meters
Velocity (E, N, Up)	3	FP	6	meters/seconds
Acceleration (E, N, Up)	3	FP	6	meters/sec/sec
Attitude (Pitch, Roll)	2	FP	4	radians
True Heading	1	FP	2	radians
Magnetic Variation	1	FP	2	radians
Measurement Channel Status	5	Binary	10	N/A
Standardized Figure of Merit	1	Binary	1	N/A
Expected Horizontal Error	1	Integer	1	meters
Expected Vertical Error	1	Integer	1	meters
Equip. Configuration	1	Binary	2	N/A

TABLE 1. UH-1 AIRBORNE DATA COLLECTION PARAMETERS (CONTINUED)

Midcourse Receiver Ephemerides Data Block

Origin	RPU
Destination	MCR
Message Identifier	5
Word Count	54
Flags	None
Basic Rate	All available blocks once per sixth Time Mark

Data Item	Number	Data Type	No. of Words	Units
GPS Time	1	DPFP	4	seconds
Satellite Number	1	Integer	1	N/A
Satellite Health Word	1	Integer	1	N/A
C/N_o	1	Integer	1	decibel
Ephemeris Data (Subframes 1,2,3 without parity)	3 x 15	Binary	45	N/A
Ionospheric Correction	1	FP	2	meters

Legend:

DPFP - Double Precision Floating Point

FP - Floating Point

MCR - Midcourse Receiver

RPU - Receiver Processor Unit

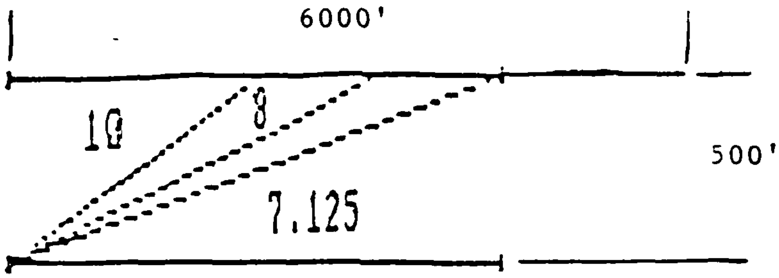


FIGURE 2. STRAIGHT-IN APPROACHES

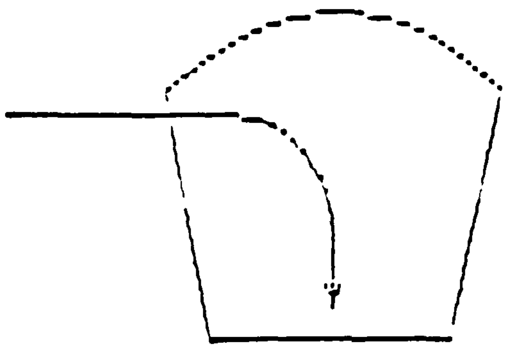


FIGURE 3. PLAN VIEW OF CURVED APPROACHES

turn will not commence until the airspeed indicator is as reliable as defined in the Aircraft Operator's Manual (AOM) (i.e., 25 knots indicated airspeed (KIAS) for the UH-1H). The departure point for free choice departures will be determined solely by the pilot.

4. TESTING AND DATA COLLECTION.

4.1 SUBJECT PILOT SELECTION.

UH-1H pilots will come from the FAA Technical Center as well as from the site test area. A diverse range of experience is desired so the conclusions will be based on average helicopter piloting skills.

4.2 DATA COLLECTION FLIGHTS.

Each subject pilot will fly at least 30 runs. Each run will be either an approach or departure. Three given approach angles, 7.125°, 8°, and 10°, and three given departure angles, 7.125°, 10°, and 12°, will be flown (see table 2). Pilot choice approach and departure angles will also be flown.

The 7.125° angles will set up an approach or departure that parallels the current approach/departure surface requirements. Runs at this angle will allow for measurement of pilot performance in reference to current standard. The position from which to begin each departure will yield an angle that will clear barriers that control the departure surface angle.

TABLE 2. FLIGHT PROFILES

Run	Maneuver	Angle
1	Departure	Pilot Choice
2	Curved Approach	Pilot Choice
3	Curved Departure	Pilot Choice
4	Approach	Pilot Choice
5	Departure	Pilot Choice
6	Approach	Pilot Choice
7	Departure	Pilot Choice
8	Approach	Pilot Choice
9	Curved Departure	Pilot Choice
10	Approach	Pilot Choice
11	Departure	Pilot Choice
12	Curved Approach	Pilot Choice
13	Departure	7°
14	Approach	8°
15	Departure	10°
16	Approach	10°
17	Departure	12°
18	Curved Approach	7°
19	Curved Departure	7°
20	Approach	10°
21	Departure	12°
22	Curved Approach	8°
23	Departure	10°
24	Approach	7°
25	Curved Departure	10°
26	Approach	8°
27	Departure	7°
28	Approach	7°
29	Curved Departure	12°
30	Curved Approach	10°

Before each test period, a call will be placed to the GPS monitor station at Falcom Air Force Station, CO, to verify the normal operation of the satellites used during testing. The GPS user equipment is validated each test period to ensure the equipment is functioning normally prior to the start of testing. GPS latitude/longitude coordinates will be checked at a surveyed point on the ABQ militarv ramp before departing to the helipad and following the test period prior to parking the aircraft.

The test will be flown only during the optimum GPS satellite window. At least four GPS satellites are in view that provide coverage for continuous, accurate, three-dimensional aircraft positioning. The GPS CDU is monitored constantly throughout each approach to ensure that the GPS Figure of Merit (FOM) is equivalent to one. If the FOM changed from one, it will be noted in the flight log. GPS user equipment computes the FOM as an estimate of system performance.

Each flight period will require a determination of helipad coordinate system origin in the GPS data prior to and just after the flight period. This will be accomplished by placing the ship's GPS antenna as close as possible to the helipad origin. These data will be recorded on the airborne magnetic data tape. At these times, the x,y,z parameter offset distances will be measured between the helicopter GPS antenna and the helipad origin. These data will be recorded on the flight log.

Each approach/departure angle will be flown three times during a flight. Each pilot will also be allowed to fly six approaches and departures of choice to determine his preference. All six of the free choice procedures will occur prior to the assigned angles. An entire flight should be completed in a 2-hour time period. Ideally, each pilot will conduct two flights in 1 day (see table 3).

TABLE 3. FLIGHT PERIOD SCHEDULE

30 minutes	Pre-flight briefing
2 hours	First flight - 30 runs, either an approach or departure
1 hour	Refuel/lunch
2 hours	Second flight - 30 runs, either an approach or departure
30 minutes	Post-flight debriefing

The pilot will be given very high frequency omnidirectional radio range (VOR)/distance measuring equipment (DME) navigational guidance together with barometric altitude to position the aircraft to the predetermined and calculated approach starting point for fixed angle approaches. From that point the visual segment will be unguided. Each approach will begin from an altitude of at least 500 feet above ground level.

The aircraft will be flown as close as possible to maximum gross weight, between 8,000 to 9,000 pounds.

4.3 DATA RECORDING AND COLLECTION.

Data will be collected to determine the precision with which pilots are able to control the position and flightpath of the helicopter relative to a criterion surface during the visual approach or departure. This requires:

a. An accurate determination of the helicopter position relative to the landing site.

b. Measurement of pilot performance.

c. Knowledge of the intended flightpath during the approach/departure.

Additional data will be taken to establish objective measures of pilot workload, control margin, and perceived safety for each procedure. These measures and aircraft position will be determined from the following sources:

a. Airborne data collection systems.

b. Pre-flight pilot rating/questionnaire (see appendix, page A-2).

c. Flight pilot ratings/questionnaires (see appendix, page A-3).

d. Observer log/comments (see appendix, page A-1).

4.3.1 Preflight Briefing.

During the preflight briefing the subject pilot will be presented with an overview of the objectives of the flight test, an outline of the runs to be flown, and the in-flight questionnaire will be explained. Each pilot will be briefed on the rating system criteria. The rating system is depicted in figure 4. Free choice approach/departure limitations and duties of each crew member will also be explained.

4.3.2 Tracking.

Tracking of the aircraft flightpath will be from beyond the approach initiation point through touchdown and from departure to at least 500 feet AGL.

4.3.3 In-Flight Pilot Rating.

Using a modified Cooper-Harper rating scale the pilot will be asked to rate each approach and each departure concerning procedures, workload, and safety margin. Immediately following the maneuver, the pilot responses will be recorded in a written log by the flight observer or technician.

4.3.4 Post-Flight Questionnaire.

At the conclusion of each flight the subject pilot will complete a questionnaire (see appendix, page A-3). This questionnaire will ask for pilot opinion about issues such as suitability of the approach/departures, difficulty in maintaining control, personal preference, and workload. Pilot background information will also be collected such as number of flight hours and aircraft experience. This information will be correlated with performance.

4.3.5 Observer Responsibilities.

The flight observer, usually the project technician, will be responsible for filling in the observer log during each flight. Start and stop times of each approach/departure, pilot name, and date of each flight will be recorded. Pilot comments, notes about equipment problems, and local weather and wind conditions will also be recorded.

4.3.6 Flight Systems Data.

The following airborne parameters will be recorded on the UH-1H and, as necessary, they will be reduced in the analysis:

a. Airspeed.

b. Vertical velocity.

c. Barometric altitude.

ACCEPTABILITY OF SAFETY MARGINS, TASK PERFORMANCE, AND PILOT WORKLOAD	GENERAL CHARACTERISTICS	SAFETY MARGINS	DEMANDS ON THE PILOT	PILOT RATING
Acceptable for routine operations ? — YES	Excellent Highly Desirable	Clearly adequate	Pilot compensation not a factor for desired performance	1
	Good Negligible Deficiencies	Clearly adequate	Pilot compensation not a factor for desired performance	2
	Fair — Some Mildly Unpleasant Deficiencies	Clearly adequate	Minimal pilot compensation required for desired performance	3
NO → Acceptable for rare occasions, e.g. FCS *failure or severe* atmospheric conditions? — YES	Minor but annoying deficiencies	Clearly adequate	Desired performance requires moderate pilot compensation	4
	Moderately objectionable *deficiencies*	Adequate	Adequate performance requires considerable pilot compension	5
	Very objectionable but tolerable deficiencies	Marginal	Adequate performance requires extensive pilot compension	6
NO → Controllable ? — YES	Major deficiencies	Inadequate	Adequate performance not attainable with maximum tolerable pilot compensation Controllability not in question	7
	Major deficiencies	Inadequate	Considerable pilot compensation is required for control	8
	Major deficiencies	Inadequate	Intense pilot compensation is required to retain control	9
NO → Pilot Decisions	Major deficiencies	None	Control will be lost during some portion of required operation	10

FIGURE 4. COOPER-HARPER RATING SCALE

d. Radar altimeter.

e. Azimuth.

f. Elevation.

g. DME.

h. Aircraft heading.

i. Cyclic position.

j. Collective position.

k. Roll.

l. Pitch.

m. GPS Time Mark Block (refer to table 1 for parameter listing).

n. GPS Midcourse Receiver Ephemerides Data Block (refer to table 1 for parameter listing).

5. DATA REDUCTION AND ANALYSIS.

5.1 DATA TAPES.

One magnetic tape will contain the airborne data system data and the tracker system data. These data will be converted to engineering units. All data shall be examined and validated before final processing to assure the correct parameters were recorded and that the data are valid. The output will be at a rate of one sample per second.

5.2 DATA PROCESSING.

Data shall be translated using a rectangular coordinate reference system which will be established with the origin at the center of the heliport. The helipad X and Y axes will run through the centerline with the X-axis positive on the approach side and negative beyond the origin. The Y-axis will be perpendicular to the X-axis within the heliport plane, positive to the right of the X-axis and negative to the left. The Z-axis is perpendicular to the X-Y plane at the ground point of intercept (GPI), positive above and negative below the heliport plane (figure 5).

The position of the aircraft in space as determined by the airborne tracking system will be translated and rotated with respect to this rectangular coordinate system to within 100 feet in slant range accuracy. This processing will be performed on the VAX 11/750 minicomputer.

5.3 GRAPHICAL PRESENTATION.

5.3.1 Plots.

The following individual and composite plots will be generated on a Calcomp 1051 drum plotter using Calcomp 907 software for the VAX 11/750:

a. Plan view of each approach/departure with intended path and criterion surface shown.

b. Profile view of each approach/departure with intended path and criterion surface shown.

c. Composite plots: vertical and crosstrack by range for each profile, with intended path and criterion surface shown.

d. Probability contours, mean, ±6 standard deviations by range for each profile: about the vertical track deviation and the crosstrack deviaton.

e. Vertical and lateral aircraft position for each approach/departure broken down into 100-feet segments.

5.3.2 Data Partitioning.

Each approach/departure will be partitioned into 100-feet intervals by distance from the center of the helipad. Given the approach/departure initiation points, linear interpolation will be used to calculate the 100-foot intervals. This partitioning will begin at the center of the helipad and continue out to the approach initiation point on approaches. It will begin at the departure point and continue up to 500 feet AGL on departures.

5.4 STATISTICAL ANALYSIS.

Statistical analysis will be performed during standard statistical formulas. The parameters to be computed are number of data points, arithmetic mean, unbiased estimate of standard deviation, skewness, and kurtosis.

5.4.1 Obstacle Clearance Analysis.

This analysis will be used to verify the current heliport design guide approach/departure surface criteria or to support modifications to the criteria. Standard statistics at each of the partitions specified in section 5.3.2 for each approach/departure type will be computed for:

a. Vertical deviation (deviation from the intended vertical path).

b. Crosstrack deviation (deviation from the intended horizontal path).

c. Vertical position (pilot's actual vertical path).

d. Crosstrack position (pilot's actual crosstrack path).

e. Variability in approach initiation point, angle-wise, and distance for free approaches.

5.5 REPORTS.

The data will be analyzed and a final Technical Note report will be written by Technical Center personnel. This report will address the test objectives and contain pilot evaluations of each approach/departure type as well as any computed statistical data from the test flights.

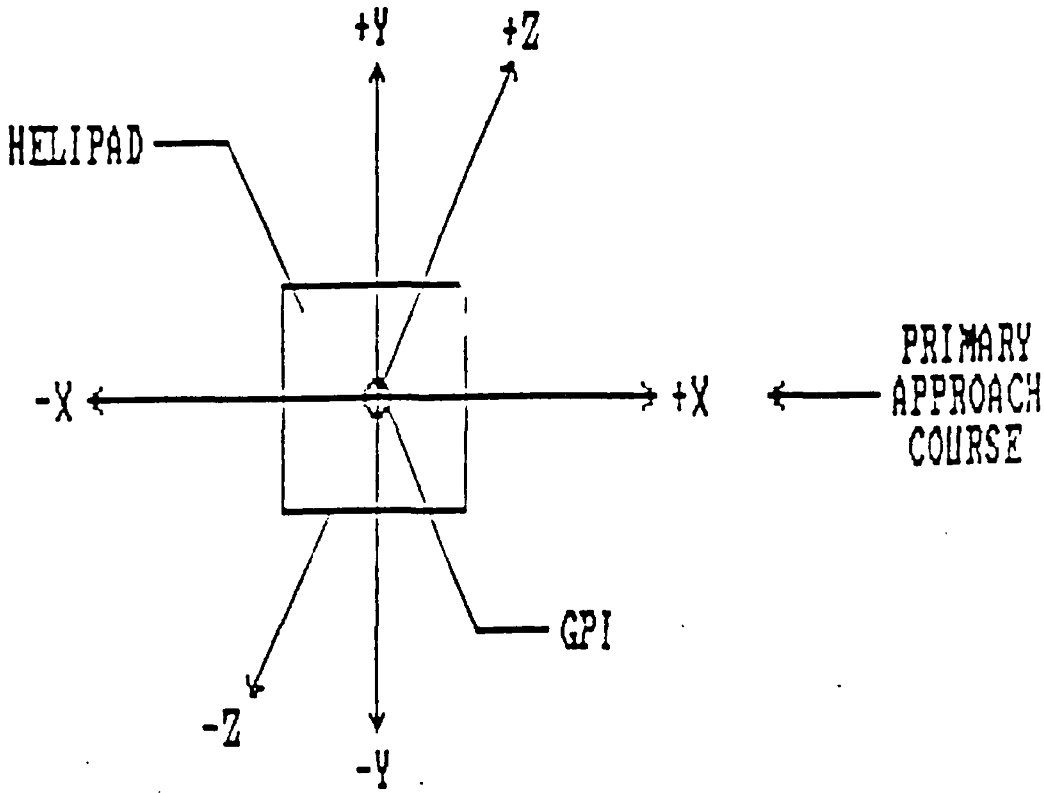


FIGURE 5. RECTANGULAR COORDINATE REFERENCE SYSTEM

6. SCHEDULE.

The projected amount of time each phase of this project will need for completion is described in figure 6. The following factors may have an impact on this schedule:

a. Availability of the on-board the aircraft tracker.

b. Availability of four-satellite coverage.

c. Weather.

d. Aircraft availability.

e. Subject pilot availability.

f. Accessibility of the computer facility for data reduction.

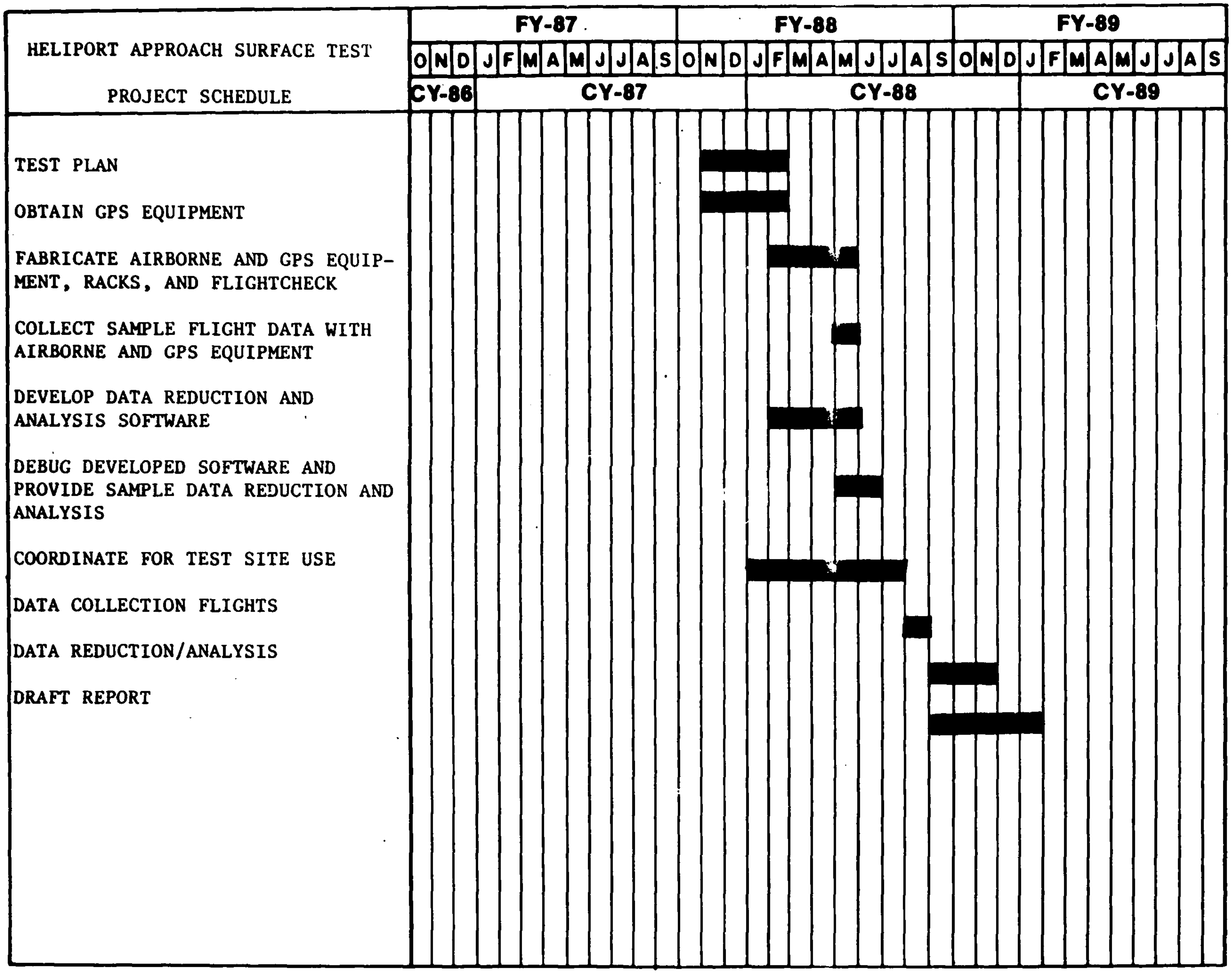


FIGURE 6. PROJECT SCHEDULE FOR HELIPORT APPROACH SURFACE TEST

APPENDIX

FLIGHT INFORMATION

VMC APPROACHES AND DEPARTURES

Flt #: .VMC **Date:** **Aircraft:** **GPS Tracker Used:**

Subject Pilot: **Safety Pilot:** **Crew:**

Data Period GPS Antenna Ground Position Cal. Offset
Initial: X = ;Y = ;Z =
Final : X = ;Y = ;Z =

[1] Liftoff	[2] Start curve	[3] End curve	Sync clock to Radio and Tracker
[4] Touchdown	[5] 500' Rad Alt	[6] Start Descent	Depart Hdg. - 180 Deg

RUN #	WINDS	EVENTS	RATE	REMARKS

How do you rate the approach/departure?

FIGURE A-1. FLIGHT LOG

HELICOPTER VISUAL METEOROLOGICAL CONDITIONS (VMC)
SURFACE TEST QUESTIONNAIRE

AIRCRAFT TYPE: ______________

OPERATIONAL PILOT QUALIFICATIONS

NAME: ____

AFFILIATION: ____

ADDRESS: ____

CITY: ____________________________ STATE: __________ ZIP: __________

PHONE (optional) ____________________________________

FAA HELICOPTER RATINGS: (Private, Comm, ATP, Helicopter Inst)

____

____

____

____

TOTAL FLIGHT HOURS: _________________________________

TOTAL HELICOPTER HOURS: _____________________________

TOTAL TIME IN TYPE: _________________________________

TOTAL HELICOPTER HOURS LAST 6 MONTHS: _______________

TIME IN TYPE LAST 8 MONTHS: __________________________

PERIOD OF FAA FLIGHT TEST: (week of) _________________

FIGURE A-2. PRE-FLIGHT QUESIONNAIRE

QUESTIONS

1\. a. The 7° approach angle was:

______ Acceptable ______ Unacceptable

If unacceptable why? ____

____

____

____

____

CONTINUE ON BACK

b. With a 7° approach angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 7° approach angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 7° approach angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

2\. a. The 8° approach angle was:

______ Acceptable ______ Unacceptable

If unacceptable why? ____

____

____

____

____

CONTINUE ON BACK

b. With a 8° approach angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 8° approach angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 8° approach angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

FIGURE A-3. FLIGHT QUESTIONNAIRE (SHEET 1 OF 4)

3. a. The 10° approach angle was:

_____ Acceptable _____ Unacceptable

If unacceptable why?____

____

____

____

____

CONTINUE ON BACK

b. With a 10° approach angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 10° approach angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 10° approach angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

4. a. The 7° departure angle was:

_____ Acceptable _____ Unacceptable

If unacceptable why?____

____

____

____

____

CONTINUE ON BACK

b. With a 7° departure angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 7° departure angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 7° departure angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

FIGURE A-3. FLIGHT QUESTIONNAIRE (SHEET 2 OF 4)

5. a. The 10° departure angle was:

_____ Acceptable _____ Unacceptable

If unacceptable why? ____________________

____

____

____

____

CONTINUE ON BACK

b. With a 10° departure angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 10° departure angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 10° departure angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

6. a. The 12° departure angle was:

_____ Acceptable _____ Unacceptable

If unacceptable why? ____________________

____

____

____

____

CONTINUE ON BACK

b. With a 12° departure angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 12° departure angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 12° departure angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

FIGURE A-3. FLIGHT QUESTIONNAIRE (SHEET 3 OF 4)

7. What percentage of your routine operations are conducted into and out of heliports or helistops? ______________________________

8. Do you feel the turning approach/departure maneuver should have an appropriate surface published in a design guide?

_____ YES _____ NO

WHY? ______________________________

____

____

____

____

CONTINUE ON BACK

9. Do you feel heliports should be delineated by capability?

_____ YES _____ NO

If yes should it classed by:

Heliport size	_____ YES	_____ NO
Rotor Configuration (single vs dual)	_____ YES	_____ NO
Aircraft Max Gross Weight	_____ YES	_____ NO

Other ______________________________

____

CONTINUE ON BACK

10. What improvements would you like to see added to a heliport to increase safety while performing approaches/departures (i.e. visual approach slope indicator)?

____

____

____

____

____

____

CONTINUE ON BACK

11. Should the approach surface ratio be published for the primary approach into a facility ?

_____ YES _____ NO

If yes how would you like it to be indicated? ______________________________

____

FIGURE A-3. FLIGHT QUESTIONNAIRE (SHEET 4 OF 4)