

20001006122

EXEMPT COPY

1

Research Note

ANALYSES OF SELECTED LHX MISSION FUNCTIONS

**IMPLICATIONS FOR OPERATOR WORKLOAD AND SYSTEM
AUTOMATION GOALS**

AD-A232 330
JUL 20 1991
TIC
D

PREPARED FOR:
U.S. ARMY RESEARCH INSTITUTE
AVIATION RESEARCH AND DEVELOPMENT ACTIVITY
FORT RUCKER, ALABAMA

June 1984

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

PREPARED BY:



**ANACAPA SCIENCES, INC.
MILITARY PROGRAMS**

P. O. BOX 489
FT. RUCKER, ALABAMA 36362
(205) 598-6326

**Reproduced From
Best Available Copy**

91 3 18 029



232 330

DEFENSE LOGISTICS AGENCY
DEFENSE TECHNICAL INFORMATION CENTER
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6145

IN REPLY
REFER TO

DTIC-FDAB (202) 274-6847 (AV) 284-6847
AD B90-1131

12 Dec 90

SUBJECT: Request for Scientific and Technical Report

TO: Anacapa Sciences Inc
Attn: Lib - B Gates
PO Box 519
Santa Barbara, CA. 93102-0519

Please Expedite
SL5 3/15/91

1. We have been unable to locate the report referenced below in the Defense Technical Information Center Collection. In accordance with DoDD 3200.12 "DoD Scientific and Technical Information Program" the Defense Technical Information Center is requesting that two copies of the Technical Report cited below be sent to us.

Please return letter
with report

2. All copies of the report must be suitable for reproduction including a clearly marked distribution statement as described in DoDD 5230.24. (See reverse for categories of distribution statement.) A clearly marked loan copy suitable for reproduction is acceptable.

3. If for any reason you cannot furnish the report, please return the copy of this letter annotating your reason on the reverse side.

4. A franked mailing label for shipping the reports and a DTIC Form 50 to obtain the AD number after processing are enclosed.

FOR THE ADMINISTRATOR:

Sharon Serzan

SHARON SERZAN
Chief, Acquisition Section

- 2 Encl
1. Franked Label
2. DTIC Form 50

B90-1131

Anacapa Science Inc. - Santa Barbara, CA.

Analyses of Selected LEX Mission Functions: Implications
For Operator Work & System Automation.

Report Number: ASI-479-024-84B.

gw/90-346

20002

DTIC FL-88, Mar 88

* PLEASE CHECK THE APPROPRIATE BLOCK BELOW:

☒ 1 copies are being forwarded. Indicate whether Statement A, B, C, D, E, or F applies.

☒ DISTRIBUTION STATEMENT A:

UNCLASSIFIED//FOR OFFICIAL USE ONLY (U//FOUO) IS APPLIED TO THIS DOCUMENT. IT IS REFERRED TO AS "UNCLASSIFIED//FOR OFFICIAL USE ONLY" (U//FOUO).

THIS DOCUMENT IS UNCLASSIFIED//FOR OFFICIAL USE ONLY (U//FOUO) AND IS REFERRED TO AS "UNCLASSIFIED//FOR OFFICIAL USE ONLY" (U//FOUO).

THIS DOCUMENT IS UNCLASSIFIED//FOR OFFICIAL USE ONLY (U//FOUO) AND IS REFERRED TO AS "UNCLASSIFIED//FOR OFFICIAL USE ONLY" (U//FOUO).

THIS DOCUMENT IS UNCLASSIFIED//FOR OFFICIAL USE ONLY (U//FOUO) AND IS REFERRED TO AS "UNCLASSIFIED//FOR OFFICIAL USE ONLY" (U//FOUO).

THIS DOCUMENT IS UNCLASSIFIED//FOR OFFICIAL USE ONLY (U//FOUO) AND IS REFERRED TO AS "UNCLASSIFIED//FOR OFFICIAL USE ONLY" (U//FOUO).

☐ DISTRIBUTION STATEMENT B:

UNCLASSIFIED//FOR OFFICIAL USE ONLY (U//FOUO) IS APPLIED TO THIS DOCUMENT. IT IS REFERRED TO AS "UNCLASSIFIED//FOR OFFICIAL USE ONLY" (U//FOUO).

☐ DISTRIBUTION STATEMENT C:

UNCLASSIFIED//FOR OFFICIAL USE ONLY (U//FOUO) IS APPLIED TO THIS DOCUMENT. IT IS REFERRED TO AS "UNCLASSIFIED//FOR OFFICIAL USE ONLY" (U//FOUO).

☐ This document contains information forwarded to DOD on NIA date and the AD number is _____.

☐ In accordance with the instructions of DOD instructions, the document requested is not supplied because:

☐ It is TOP SECRET.

☐ It is exempted in accordance with DOD instructions pertaining to communications and electronic intelligence.

☐ It is a registered publication.

☐ It is a contract or grant proposal, or an order.

☐ It will be published at a later date. (Enter approximate date, if known.)

☐ Other. (Give Reason.)

CHARLES A. GAINER

Print or Type Name

Charles A. Gainer 1 MAR 91

Authorized Signature Date

(205) 255-4404

Telephone Number

Human Factors Research in
Aircrew Performance and Training
MDA903-81-C-0504
ASI479-024-84

ANALYSES OF SELECTED LHX MISSION FUNCTIONS
IMPLICATIONS FOR OPERATOR WORKLOAD AND
SYSTEM AUTOMATION GOALS

Prepared by:

Jack H. McCracken, Ph.D.
U.S. Army Research Institute

and

Theodore B. Aldrich
Anacapa Sciences, Inc.

June 1984

Accession For	
NTIS CRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Availability for Special
A-1	



UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle)		5. TYPE OF REPORT & PERIOD COVERED
ANALYSES OF SELECTED LHX MISSION FUNCTIONS: IMPLICATIONS FOR OPERATOR WORKLOAD AND SYSTEM AUTOMATION GOALS		7 July 83 - June 84
7. AUTHOR(s)		6. PERFORMING ORG. REPORT NUMBER
McCracken, J. H., & Aldrich, T. B.		ASI479-024-84
9. PERFORMING ORG. ORIGINATOR NAME AND ADDRESS		8. CONTRACT OR GRANT NUMBER(s)
Anacapa Sciences, Inc. P. O. Box 489 Fort Rucker, Alabama 36362		MDA903-81-C-0504
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
U.S. Army Research Institute Field Unit ATTN: PERI-IR Fort Rucker, Alabama 36362		63739A 2Q263739A793 ✓ 132C1
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE
U.S. Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue Alexandria, Virginia 22333		June 1984
16. DISTRIBUTION STATEMENT (of this Report)		13. NUMBER OF PAGES
Approved for public release; distribution is unlimited.		377
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		15. SECURITY CLASS. (of this report)
		Unclassified
18. SUPPLEMENTARY NOTES		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
Automated crew functions, Mission analysis, Task analysis, Cognitive workload, One vs two crewmember design, Visual workload, Function analysis, Pilot overload, Workload, Human engineering, Predicting workload, Man-machine interface, Psychomotor workload		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
Twenty-nine Light Helicopter Experimental (LHX) scout and attack mission segments were analyzed for excessive workload. Each of the mission segments was broken down into critical flight control, support, and mission functions, and positioned on a mission timeline. Functional analyses were performed by identifying the critical performance elements with their man-machine interface. Sensory, cognitive, and psychomotor workload and durations were estimated for each performance element.		

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

BLOCK 20. ABSTRACT - Continued

The analysis identified total workload for concurrent performance elements in four workload components: visual, auditory, cognitive, and psychomotor. An overload threshold was established so that overload conditions could be identified throughout the mission. Performance elements and subsystems associated with overload conditions were identified.

The analysis was conducted for three LHX configurations: (a) one crewmember, assuming existing crew station technology, (b) one crewmember, assuming a high degree of automated crew functions, and (c) two crewmembers, assuming existing crew station technology. Results included comparisons of overload conditions in the three LHX configurations.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

ACKNOWLEDGMENTS

Numerous individuals aided in the conduct of these analyses and the preparation of this report. Mr. Charles A. Gainer, Chief of the U.S. Army Research Institute's Field Unit at Fort Rucker provided guidance and supervision throughout the project. Mr. Richard Armstrong, Human Engineering Laboratory's Liaison Office at the Aviation Center, Fort Rucker, provided project coordination with the Tradeoff Analysis Group within the Directorate of Combat Developments. Mr. Harry Reed, Human Engineering Laboratory, Aberdeen Proving Ground, and Mr. Robert McMullen, Army Research Institute Field Unit, assisted in the analysis by identifying key performance elements in various LHX mission profiles. Subject matter experts CW3 Richard Hopkins, a highly experienced and current aeroscout pilot, and CW3 Frank White, an equally well qualified attack aviator, reviewed the analyses and contributed valuable insight into the scout and attack mission requirements.

The authors are also grateful to Ms. Remona Locklar, Army Research Institute, and Ms. Tina Pridgen and Ms. Nadine McCollim, Anacapa Sciences, Inc., for their extensive support in the formatting and typing of this report.

ANALYSES OF SELECTED LHX MISSION FUNCTIONS:
IMPLICATIONS FOR OPERATOR WORKLOAD AND
SYSTEM AUTOMATION GOALS

CONTENTS

	Page
SECTION ONE: INITIAL ANALYSES, SINGLE CREWMEMBER, NO AUTOMATION	1
BACKGROUND	1
TECHNICAL OBJECTIVES	1
Identification of Mission Phases and Segments	2
Identification of Functions Within Segments	3
Analyses of Functions	6
Summary of Concurrent and Sequential Workload Demands	11
SECTION TWO: ANALYSES REVISED FOR ONE CREWMEMBER, HIGH DEGREE OF AUTOMATION, AND TWO CREWMEMBERS, NO AUTOMATION	15
FIRST ITERATION: ONE CREWMEMBER, AUTOMATION	15
Flight Control Automation	15
Weapon Systems	16
Target Acquisition	16
Voice Interactive Data Processing	16
Navigation System	17
Fault Detection and Threat Warning	17
SECOND ITERATION: TWO CREWMEMBERS, NO AUTOMATION	20
REFERENCES	25
APPENDIX A: GLOSSARY OF TERMS	A-1
APPENDIX B: SEGMENT SUMMARIES	B-1
APPENDIX C: FUNCTION ANALYSIS WORKSHEETS (INITIAL ANALYSES--SINGLE CREWMEMBER)	C-1
APPENDIX D: SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS (INITIAL ANALYSES-- SINGLE CREWMEMBER)	D-1
APPENDIX E: FUNCTION ANALYSIS WORKSHEETS (REVISED TO REFLECT AUTOMATION OF SELECTED SUBSYSTEMS) ...	E-1

CONTENTS (Continued)

	Page
APPENDIX F: SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS (REVISED TO REFLECT AUTOMATION OF SELECTED SUBSYSTEMS)	F-1
APPENDIX G: FUNCTION ANALYSIS WORKSHEETS (REVISED TO REFLECT DISTRIBUTION OF FUNCTIONS TO TWO CREWMEMBERS)	G-1
APPENDIX H: SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS (REVISED TO REFLECT DISTRIBUTION OF FUNCTIONS TO TWO CREWMEMBERS)	H-1

LIST OF TABLES

Table

1	SCAT missions, mission phases, and segments	4
2	Segment summary worksheet	5
3	Function analysis	7
4	Workload components	8
5	Summary of concurrent and sequential workload demands--single crewmember	12
6	Summary of high workload demand incidents - flight regimes vs LHX subsystem areas - single pilot base case/single pilot with automation	18
7	Summary of high workload demand incidents - flight regimes vs LHX subsystem areas - single pilot base case/two pilots (no automation)	22

SECTION ONE: INITIAL ANALYSES, SINGLE CREWMEMBER,
NO AUTOMATION

BACKGROUND

As part of its force modernization effort in aviation, the Army is evaluating the concept of a multipurpose, lightweight helicopter, the LHX. One of the major design goals for the LHX is that it should be capable of performing its various missions with a single crewmember. This design goal is desirable for two reasons. First, it will greatly increase the number of flight hours that can be flown with a given aircraft-to-pilot ratio. Second, design for single crewmember operation will result in a lightweight LHX with a smaller target profile. The small profile is particularly desirable in the scout-attack version. Design for single crewmember operation of the LHX may require considerable effort and expense to automate many system operations and mission functions. The purpose of these analyses is to provide baseline human performance data for evaluating various automation options and for assessing the feasibility of operating the LHX with a single crewmember.

The Army Research Institute (ARI) Field Unit at Fort Rucker was tasked, as the lead element, to develop analyses of LHX Scout-Attack (SCAT) missions in a message from Commander, Aviation Research and Development Command (AVRADCOM), dated 072325Z July 1983. As stated in the tasking document, the purposes of the analyses were (a) to evaluate the feasibility of single pilot LHX mission performance, and (b) to help identify the equipment, operation, and mission functions where automation would be most beneficial. The analyses were envisioned as useful in defining LHX aircrew selection and training requirements.

TECHNICAL OBJECTIVES

In accordance with the tasking message, the initial analyses were designed to achieve the following technical objectives:

- provide an objective method for evaluating the feasibility of single pilot operation of the LHX during Scout-Attack missions, and
- provide analytical material for identifying equipment operation and mission functions where automation can reduce pilot workload and enhance mission performance.

Because of severe time limitations, the methodology adopted for the initial analysis was designed to provide

approximate, first-iteration results at the function level. In developing the methodology, certain procedural limitations were necessary. These limitations are listed below.

- Subsystems, and procedures for their operation, were viewed in non-specific, generic terms.
- The level of analysis was limited to identification of general performance elements within functions.
- Analyses addressed only primary aeroscout and attack mission functions under normal operating conditions. Degradation resulting from system failures, visual obscuration, or enemy countermeasures were not addressed.
- No validation was possible except for content review by subject matter experts.
- As a baseline case, the general level of subsystem and weapon technologies for the LHX were assumed to be comparable to those provided in the OH-58D and AH-64A.
- Time estimates, cognition requirements, and other parameters of mission functions were based upon the analysts' understanding of current Army doctrine and tactics.
- The LHX mission analyses prepared in this study will become a baseline for follow-on efforts comparing alternative combinations of man/equipment capabilities.
- These analyses will be subject to change and further refinement as equipment configuration becomes known.
- A standard vocabulary of verbs and objects was established and applied in these analyses. The vocabulary is provided in Appendix A.

Within the above limitations and assumptions, the analytical methodology was organized into the four tasks described in the following paragraphs.

Identification of Mission Phases and Segments

Phases are defined as the major units by which all missions can be characterized (e.g., enroute, reconnaissance, target servicing, etc.). Segments are analytically convenient groupings of related activities which take place within

a phase (e.g., the target servicing phase may include segments such as target acquisition, handoff, and/or direct engagement). The phases and segments for these analyses were developed through examination of 24 LHX (SCAT) profiles prepared by DCD at the U.S. Army Aviation Center (USAAVNC). Based on an examination of these profiles, the matrix shown in Table 1 was developed. The matrix shows the 12 major SCAT missions envisioned for the LHX. The "X"s were placed in the columns to signify the segments judged to be prominent within each mission. The cells with an X in parentheses were selected for analyses of functions.

Identification of Functions Within Segments

Once mission segments were identified, it was possible to analyze their execution in terms of essential or critical functions. Since explication of workload and operational effectiveness variables were guiding considerations in the analysis, it was necessary to identify those functions that must occur within a segment, and also to estimate when they occur in relation to one another. Excessive operator workload (and performance degradation) may result from either (a) inordinate time pressure among sequential functions, or (b) when two or more functions, each having high workload demands, must be performed concurrently. Worksheets were developed to depict both concurrent and sequential functions. It was reasoned that concurrent or overlapping performance is most likely to be required among functions belonging to different categories, as listed below.

- Flight Control - those functions which are directly involved in flying aircraft,
- Support - functions which support both flight control and mission functions, but are not directly involved in either; examples include checking systems and threat warning displays, navigation, radio management etc.
- Mission - functions directly involved in performing mission objectives; examples include target acquisition, engagement, etc.

Accordingly, segment summary sheets were developed which provide separate columns for categorizing each function. An example of a summary sheet showing functions involved in an air-to-air engagement is presented in Table 2.

Table 2

Segment Summary Worksheet

Phase Target Service, Air-to-AirSegment 25: Engagement Air-to-AirMethod From Masked Position

FLIGHT CONTROL	SUPPORT	MISSION
Hover Masked	Check A/C Systems	
Unmask Sensor		Track Target
Align Heading on Target Bearing		Estimate Range
		Prepare Weapon
Unmask Aircraft		Track Target
		Fire Weapon
Deploy to Cover		

Two rules were adhered to in preparation of segment summary sheets. First, functions were included in segments only if they were considered critical for accomplishing the specified mission activity or if they must be performed on a recurring basis, independent of mission activity (e.g., check aircraft systems). Second, to the extent possible, initiation times of functions were staggered to reflect logical sequencing and to avoid unnecessary overlapping of performance elements. In preparing these summary sheets, every reasonable effort was made to conform to accepted aeroscout and attack mission doctrine. ATMs, field manuals, and existing task analyses were used as references. Additionally, all summary sheets were revised to incorporate recommendations from aeroscout and attack subject matter experts (SMEs).

Summary sheets were initially prepared for all 31 segments in Table 1 shown with an X in parentheses. Subsequently, alternative performance methods were included for some segments, thus increasing the number to more than 40. Several segment summaries contained virtually identical performance procedures. Eliminating such duplicates reduced the number of summary sheets to 29. Summary sheets retained for further analyses are shown in Appendix B.

Analyses of Functions

The completed segment summaries were used to identify functions for further analyses. The 29 summaries contain 58 functions, including alternative methods. These 58 functions were analyzed in terms of their respective performance elements, workload, and time variables. A sample of a completed worksheet used in conducting the analyses is shown in Table 3.

Each performance element within a function was listed in a format containing a verb and an object. Listed performance elements were limited to those considered critical to successful performance of the function. For purposes of analysis, it was assumed that all listed performance elements are to be performed by a crewmember.

Each performance element was analyzed in terms of subsystem, workload demand, and duration. Subsystems associated with the performance elements were straightforward and evident. The subsystems listed are those primarily involved in each performance element and are intended to be generic. Workload is composed of three variables:

- sensory: complexity of visual or auditory stimuli requiring response,
- cognitive: level of thinking required, and
- psychomotor: the complexity of behavioral outputs required.

Workload in these analyses is not limited to overt behavior. A considerable portion of aviators' efforts, especially in combat missions, is occupied in sensory intake and processing. The variables listed above seem well suited to account for these subtle but important demands on pilots' resources.

The scales in Table 4 were used to quantify these variables for each performance element listed in the functions.

Table 3

Function Analysis

Total Time (Approximate) 20.5 seconds Function Detect Target (Ground) No. 16Method Free Search

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
147 Search	Target area	Sensor display scene AS	Visual survey (V-1)	Area clear? (C-6)	Control pressure (LOS) (P-4)	12.5	S + 13
75 Detect	Movement	Sensor display scene AS	Visual detection (V-2)	Signal (movement) (C-2)		2	13 - 15
24 Align	Sight	Sensor display/sight ADS	Visual alignment (V-4)	Target centered (C-2)	Control pressure (P-4)	5	15.5 - 20.5

Table 4

Workload Components

SCALE VALUE	DESCRIPTORS
	<u>VISUAL</u>
1	Monitor, Scan, Survey
2	Detect Movement, Change in Size, Brightness
3	Trace, Follow, Track
4	Align, Aim, Orient On
5	Discriminate Symbols, Numbers, Words
6	Discriminate Based on Multiple Aspects
7	Read, Decipher Text, Decode
	<u>AUDITORY</u>
1	Detect Occurrence of Sound, Tone, Etc.
2	Detect Change in Amplitude, Pulse Rate, Pitch
3	Comprehend Semantic Content of Message
4	Discriminate Sounds on the Basis of Signal Pattern Pitch, Pulse Rate, Amplitude
	<u>COGNITIVE</u>
1	Automatic (Stimulus-Response)
2	Sign/Signal Recognition
3	Alternative Selection
4	Encoding/Decoding, Recall
5	Formulation of Plans (Projecting Action Sequence, Etc.)
6	Evaluation (Consider Several Aspects in Reaching Judgment)
7	Estimation, Calculation, Conversion
	<u>PSYCHOMOTOR</u>
1	Discrete Actuation (Button, Toggle, Trigger)
2	Discrete Adjustive (Variable Dial, Etc.)
3	Speech Using Prescribed Format
4	Continuous Adjustive (Flight Controls, Sensor Control, Etc.)
5	Manipulative (Handling Objects, Maps, Etc.)
6	Symbolic Production (Writing)
7	Serial Discrete Manipulation (Keyboard Entries)

Scale values contained in Table 4 were applied to the function analyses after all performance elements had been identified and listed with verbal descriptors. The verbal description for each workload variable was matched with one of the categories contained in the coding charts. The number rank corresponding to the category was then assigned to the variable.

Inferences about workload demand requirements from the numbers presented in the function analyses should be in relation to the verbal anchors corresponding to the numbers in Table 4. To the extent that interpretations of numerical ratings are tied to the verbal anchors, there is a rational basis for judging the relative demands posed by performance elements. However, it should be remembered that these numbers, and the performance elements to which they are applied, represent only the best estimate of the analysis team. As such, they should be used as points of departure for further refinement or validation.

Another step in the function analyses was estimating time intervals for all performance elements. Performance element times cannot be precisely determined in advance of hardware/equipment design. Nevertheless, the time dimension was considered an essential component of the workload posed by each performance element. Therefore, the duration of each performance element was estimated and included in the analysis.

Each performance element was categorized as discrete or continuous. Discrete performance elements are characterized by actions having a definite, observable start and end point. Activation of switches, performance of procedural steps, and radio transmissions are examples of performance elements considered discrete. Continuous performance elements do not have observable start and end points. They cannot be reduced to procedures. Cyclic, collective, and pedal movements for controlling the helicopter, and tracking tasks associated with airborne sensors are examples of continuous performance elements.

The following helicopter task analyses were used as references:

- OH-58D MEP Description and Workload Analysis. Bell Helicopter Report No. 406-099-063 (Taylor, R. R., & Poole, R., 1983).
- Time Series Analysis for the AHIP. Applied Psychological Services, 1982.

- Time Series Analysis for the AH-64. Applied Psychological Services, 1982.
- Analysis of Control and Coordination During Helicopter Anti-Armor Operations. The Mitre Corporation Report No. MTR-82W00022 (Holt, C. R., & Kelbawi, F. S., 1982).

The analysts sought tasks in the reference material similar in content and mission context to the performance elements identified in these analyses. Task times published in the references were used in making the estimates of duration for the LHX performance elements.

Computation of the estimates for total function times are presented in the Comments column. The following decision rules were established for estimating total time.

- All performance element time estimates were rounded off to the half second.
- A transition time of .5 second was inserted before each performance element unless it is likely that an aviator would be in a performance mode not requiring transition to the next performance element.
- Time estimates for discrete performance elements were summed.
- Transition times were added to the sum.
- Time estimates for continuous functions judged to overlap other performance elements were not added to the sum. In these cases, the time estimates were adjusted to compensate for some degree of overlap.

Some functions require continuous performance elements having an indeterminate duration. Mission requirements are the determining factors prescribing their duration. Performance elements such as "monitor surroundings" and "survey approaches to AO" are examples. An arbitrary duration time was assigned to such performance elements for these initial analyses.

Readers are cautioned that the times in these analyses are only estimates and represent a consensus of the analysts involved in this work. The time estimates were judged to be reasonable by reviewers who are highly experienced and current in attack and scout missions, but they have not been validated. The analyses require refinement through several iterations as the conceptual and subsequent design and development phases of the LHX ensue. True validation for the

estimated times and other elements in the analyses must await further system definition.

The complete set of 58 Function Analysis Summaries are contained in Appendix C.

Summary of Concurrent and Sequential Workload Demands

The primary objective of these analyses has been to provide a data base for evaluating the single versus dual crewmember requirement and various automation options. As pointed out earlier, excessive demands on pilots' resources may be caused either by time pressure among sequential performance elements or by competing demands from performance elements which must be performed concurrently. Particular consideration should be given to the compounding of workload requirements which result when performance elements must be performed concurrently. Worksheets for tabulating the three major sources of demand were developed in order to identify concurrent demands placed on the operators' resources. A completed worksheet is presented in Table 5. A complete set of summary charts is found in Appendix D.

The worksheet consists of four main sections, three corresponding to the major function categories of (a) flight control, (b) support, and (c) mission, as discussed, and one section for summing workload demands across columns. Each category is further divided into a column for identifying the function and four small columns headed by the letters V (visual), A (auditory), C (cognitive), and P (psychomotor). Vertically, the chart is a cumulative timeline with 10-second increments.

Within the function column, each function is identified by a two-digit number. The identification number corresponds to the function identification numbers listed in the Table of Contents for Appendix D. For additional convenience, the listing of functions, including identification numbers, is also included in Appendix C.

The workload demand estimates in columns V, A, C, and P were derived from the function analyses contained in Appendix D. The numbers in each block represent the peak demand for the workload mode during the 10-second interval for that function. By summarizing workload demand for each 10-second interval, it is possible to develop a running account of these variables throughout each segment. Total demand placed on the operation for each modality (VACP) during each 10-second interval is estimated by summing across

corresponding entries to arrive at the totals in the right-hand columns.

Table 5

Summary of Concurrent and Sequential Workload Demands--Single Crewmember

Phase Target Service, Air-to-Air

Segment 24: Acquisition

Method Free Search

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		1	4	06	5		2							7		3	4
20	54	2		1	4											2		1	4
30		2		2	4	35	2	2	2							4	2	4	4
40		2		2	4						32	1		3	4	3		5	8
50		2		2	4							4		4	4	6		6	8
60		2		2	4						15	4		6	4	6		8	8
70		2		2	4							2		4		4		6	4
80		2		2	4	49	5	1	4	3						7	1	6	7
90		2		2	4						27	3		3	4	5		5	8
100		2		2	4							4		5	4	6		7	8
110		2		2	4	20	4		1	4						9		6	12
120		2		2	4		6		6	4						11		11	12
130		2		2	4				7							2		9	4
140																			
150																			
160																			
170																			
180																			

As mentioned in the preceding section, the numbers representing workload demand are best interpreted in relation to the verbal anchors shown in Table 4. It is not possible, given the generality of analyses presented here, to develop any hard and fast rules for specifying the level where an operator's capacity is exceeded. However, Level 7 was judged to be the upper boundary of human workload capacity in any single mode.

Prudent use of the workload demand summaries can be helpful, but must be considered tentative indications of where a single operator's workload capacity may be exceeded. They provide a point of departure for assessing probable workload with varying mixes and degrees of subsystem automation. Tentative identification of operator overloading, and judgments about the probable effects of automation options are the most appropriate applications of the results of these analyses.

SECTION TWO: ANALYSES REVISED FOR ONE CREWMEMBER,
HIGH DEGREE OF AUTOMATION, AND
TWO CREWMEMBERS, NO AUTOMATION

The base case, nonautomated, single crewmember analyses reported in Section One assumed equipment configuration roughly equivalent to the AHIP Scout or the AH-64A. The results of the basic analyses are presented in Appendix C, Function Analysis Worksheets, and Appendix D, Summaries of Concurrent and Sequential Workload Demands. Every one of the 29 segments summarized in Appendix D contains several instances of overloading operator capacity. Thus, the results from the initial analyses strongly indicate that single pilot operations in the LHX will require considerable automation of crew functions. An iteration of the basic analyses assuming a high degree of automation was selected as the next analytical requirement.

Costs of automation may be unacceptable. An alternative means of reducing single pilot workload is to design LHX with a dual crewmember configuration. In fact, the Army plans to conduct tradeoff studies to determine whether one or two crewmembers are required. An iteration of the basic analyses assuming two crewmembers was selected as another analytical requirement.

This section reports the results obtained from two iterations of the basic analyses described above. The first iteration revised the initial analyses by incorporating a high degree of system automation for a single crewmember. The second iteration revised the initial analyses by distributing the Section One crew functions and performance elements to two crewmembers.

FIRST ITERATION: ONE CREWMEMBER, AUTOMATION

Several assumptions about LHX subsystem automation were stated prior to conducting this iteration. They are listed below.

Flight Control Automation

- Hover hold with altitude, heading, and drift override (gradual) switches.
- Interface with Fire Control Computer (FCC). Heading control can be slaved to the target sight reticle while tracking. Pitch should not be under FCC control

since the interface may cause unacceptable aircraft control problems, especially in hover flight.

- Automatic cruise modes for low level and contour flight with an interface with the navigation and preloaded mission data system.

Weapon Systems

- Automatic weapon selection, fusing, laser code selection, verification of firing conditions, and weapon release to achieve maximum hit probabilities.
- Weapons launcher variable elevation control slaved to the FCC (Lock-on After Launch, Folding Fin Aerial Rockets) or to target sight reticle (Lock-on Before Launch, or infrared heat seeking munitions).

Target Acquisition

Stepwise semi-automatic target acquisition system with pilot-selected modes as follows.

- Automatic search/detection within a pattern selected by pilot. Pattern selection based on simple indications of quadrant(s) and range of interest for search. Automatic cueing of "targets" having predetermined characteristics.
- Automatic recognition/classification of targets. When activated, a device scans target features to classify and assign priorities to each target on the basis of predetermined aspects. Classification symbols and numbers are automatically presented on the pilot's sight display.
- Automatic target position determination. Targets are identified using cueing numbers and a single switch is activated to obtain position data. Each target selected is automatically lased in rapid succession and all position data are entered into the mission computer for storage, handoff, or direct engagement.

Voice Interactive Data Processing

Simple voice commands or data inputs are converted to digital form for processing or transmission. It is assumed that voice commands or dictation of data will supplant use of

the data entry keyboard to the maximum extent possible. Voice interactive data processing will be capable of feeding any of the mission computer functions (e.g., target handoff, fire control, navigation, data storage, target acquisition, etc.) selected by the pilot.

Navigation System

An automatic navigation system complete with automatic updating. A map display, depicting aircraft position, along with course and distance to any selected waypoint(s) will be continually updated to maintain aircraft position centered on the display. Other information that can be presented at pilot discretion will include all last known threat/target locations, wind direction and velocity, fuel remaining, maximum range and endurance airspeeds, and estimated time enroute to selected waypoints at selected airspeeds.

Fault Detection and Threat Warning

- System fault and threat signals are automatically diagnosed and verified, with invalid signals being disregarded.
- Appropriate countermeasures such as fault isolation, electronic countermeasures, jamming, etc., are initiated automatically for valid fault or threat signals.
- Appropriate visual and aural signals, along with indications of procedures initiated, are presented to the pilot.
- All threat signal source locations are automatically stored and can be called up as vectors on the navigation display at the pilot's discretion.

All function analyses (Appendix C) in the initial analyses were reviewed and revised as appropriate to allow for the automation assumptions listed above. The function analyses in Appendix E resulted from the review and revision. Revised function analyses are indicated by the word (Revised) entered on the method line. New tables summarizing operator workload demands were developed and are printed in Appendix F. These workload demand tables summarize the effect of automation in reducing operator overload. Table 6 further summarizes comparisons for various flight regimes and for various subsystem areas. The diagonal line in each cell separates the instances of excessive workload demand reported

Table 6

Summary of High Workload Demand Incidents - Flight Regimes Vs LHX Subsystem Areas - Single Pilot Base Case/Single Pilot With Automation

	FLIGHT CONTROLS	ENGINE & CAUTION DISPLAYS	SENSOR DISPLAYS	SENSOR CONTROLS	RADIO	NAVIGATION DISPLAYS & CONTROLS	OUTSIDE VISUAL, MAP, & MAP DISPLAY	THREAT DISPLAY	DEK	WEAPON PANEL & CONTROLS
MAINTAIN SEPARATION	V C P 2			2						
ESTABLISH DASH/ATTACK	V C P 2						3	1		2
CONTROL/ ADJUST HEADING	V C P 5		12	2						5
MANEUVER NOE	V C P 1	1	3	1	2	5		1		
MASK; REDUCE ALTITUDE; STABILIZE A/C	V C P 2						2		2	
UNMASK; INCREASE ALTITUDE; STABILIZE A/C	V C P 92		27	5	8		20		13	
HOVER MASKED A/C	V C P 51		11				14		45	
TOTAL	V C P 150	1	54	127	10	9	39	2	60	8

V = Visual; C = Cognitive; P = Psychomotor

in the basic analyses, Appendix D, from the instances of excessive workload demand reported in the first iteration of the analyses, Appendix F. The number of instances to the left and above the diagonal are for the single crewmember, no automation analyses, and the number of instances to the right and below the diagonal are for the single crewmember with extensive automation as assumed above.

The consequences of assuming automation to the extent described above are significant. Under these assumptions, the likely occurrence of excessive workload demands are reduced to brief periods in only three segments--Evade Radar Lock-on, Tactical Movement, and Team Coordination. Each of these instances of excessive workload demand occur during nap-of-the-earth (NOE) flight, when considerable attention is required for maneuvering the aircraft along an NOE course. In this flight regime, the pilot's visual and cognitive resources are excessively taxed by attending to the sensor in order to survey airspace and/or surrounding terrain. Two out of the three instances of overload result from this combination of functions. These overload situations can be avoided operationally by the tactical expediency of separating survey or overwatch functions from maneuver functions. Using teamwork, a pair of aircraft can maneuver along a course, alternating movement and overwatch functions in a bounding overwatch. This team maneuver technique will be more important in operations with LHX aircraft flown by single crewmembers than with two crewmember aircraft.

The other instance of excessive workload demand occurs when the pilot must respond to a threat warning signal (evade threat radar) during NOE maneuvering. The cognitive and visual workload components required to respond to a threat radar lock-on signal, combined with the demands required during NOE maneuvering, will be excessive for a few seconds until an evasive maneuver has been initiated. It is doubtful that overloading the operator, at least temporarily, can be avoided in this instance.

Single pilot LHX mission performance appears feasible if automation is provided to the extent described in the assumptions. However, there are several critical questions that need to be addressed.

- What system reliability can be attained in the automated systems?
- What mission performance can be expected in conditions degraded by threat countermeasures, weather, or battlefield obscuration?

- How cost-effective will the automated systems be in comparison to a dual configuration LHX with less automation?

These issues are beyond the scope of these analyses. They should be the subjects of continuing analytical and simulator work.

SECOND ITERATION: TWO CREWMEMBERS, NO AUTOMATION

As a second iteration, the baseline analyses were reviewed to reflect how workload would be reduced by distributing crew functions among two pilots. The first step was to assign flight control functions to one crewmember and support and mission functions to a second crewmember. Assumptions about system configurations underlying the original mission analyses were retained for this iteration. No automation options were included. Equipment and system configurations roughly equivalent to the current AHIP Scout or the AH-64A remained a basic assumption.

The function analyses (Appendix C) completed in the first iteration were reviewed and divided into three groups. Twelve function analyses involving flight control performance elements were assigned to one group. Forty function analyses involving support and mission functions were assigned to a second group. Thus, 52 of the function analyses were neatly divided into flight control functions and assigned to one crewmember and support and mission functions assigned to a second crewmember. The third group consisted of six function analyses judged to have performance elements likely to be performed by both crewmembers.

The 58 function analyses are shown in Appendix G. The 12 function analyses in the flight control group are annotated "Pilot" on the Method line. The 40 function analyses in the support and mission group are annotated "Copilot" on the Method line. The six function analyses judged to have performance elements likely to be performed by both crewmembers are annotated "Both" on the Method line. The performance elements in these six function analyses have been further annotated to include whether the performance element is likely to be performed by the pilot or a copilot or would routinely be performed by both.

The tables summarizing operator workload demand (Appendix D) were revised to depict the reduced workload demands as a result of distributing the crew functions are located in Appendix H. The summary table format was revised to depict the workload demand placed on each

crewmember by dividing the cells with diagonal lines. Numbers above and to the left of the diagonal line represent workload demands on the pilot and numbers to the right and below the diagonal line represent workload demands on the other crewmember. The timeline and basic organization of the summary table were retained to enable direct comparison between the one crewmember analyses and the two crewmember iteration.

Table 7 compares the results for single vs. dual crew for various flight regimes and for various subsystem areas. The diagonal line in each cell separates the instances of workload demand reported in the basic analyses, Appendix D, from the second iteration of the analyses reported in Appendix H. The number of instances to the left of the diagonal are for the single crewmember, no automation, and the number of instances to the right of the diagonal are for two crewmembers, no automation.

The most dramatic result from this iteration was the decrease in workload demand during flight control functions. One hundred and ninety-three instances of excessive workload demands were reduced to four. Reduced workload demands also occurred in the support and mission functions.

- Fifty-four instances of excessive workload demand during functions involving use of sensor displays were reduced to twenty-nine.
- One hundred and twenty-seven instances of excessive workload demand during functions involving use of sensor controls were reduced to ninety-four.
- Ten instances of excessive workload demand during functions involving use of radios were reduced to five.
- Thirty-nine instances of excessive workload demands involving comparison of the outside visual field with a map or map display were reduced to nine.
- Sixty instances of excessive workload demand involving use of a digital entry keyboard were reduced to three.

Excessive workload demands were eliminated completely from only seven of the 29 mission segments in the base-case analyses. The seven are:

- Transmit report;
- Engagement, Point Target (Remote Designation);
- Engagement, Soft Target (Cannon Fire, Hover);

Table 7

Summary of High Workload Demand Incidents - Flight Regimes Vs LHX Subsystem Areas -
Single Pilot Base Case/Two Pilots (No Automation)

	FLIGHT CONTROLS	ENGINE & CAUTION DISPLAYS	SENSOR DISPLAYS	SENSOR CONTROLS	RADIO	NAVIGATION DISPLAYS & CONTROLS	OUTSIDE VISUAL, MAP, & MAP DISPLAY	THREAT DISPLAY	DEK	WEAPON PANEL & CONTROLS
MAINTAIN SEPARATION	V C P 2			2						V C P
ESTABLISH DASH/ATTACK	V C P 2			2			2 1 3	1 1 1		V C P 2
CONTROL/ ADJUST HEADING	V C P 6 5 5	12 7 5 4	12 7 5 4	8 4 1 5 4	1 1 1 1	1 1 1 1				V C P 5 4 1 1 1
MANEUVER NOE	V C P 7	1 1 1 1	1 1 1 1	7 3 3 3	2 1 1 1	5 4 4 4		1 1 1		V C P
MASK; REDUCE ALTITUDE; STABILIZE A/C	V C P						2		2	V C P
UNMASK; INCREASE ALTITUDE; STABILIZE A/C	V C P 13 3 92	10 17 21	27 13 6	5 19 86	110 12 73	1 3 4	20 7 10 3 3	2 2 2 3 3	13 2 2 3 3	V C P 1 1 1
HOVER MASKED A/C	V C P 14 51	8 3	11 3	1 1		1 1	14 3 9 6 6		45 4 4	V C P
TOTAL	V C P 35 8 150	1 1 1 28 23 3	1 1 1 54 14 6	127 8 23 96	10 1 4 5	9 5 4 10	39 12 21 6 3	2 2 2 50	60 8 3	V C P 8 7 1 1

V = Visual; C = Cognitive; P = Psychomotor

- Engagement, Soft Target (FFAR Direct);
- Receive Handoff (Voice);
- Engagement, Air-to-Air (Running Fire, Cannon);
- Engagement, Air-to-Air (Running Fire, Missile).

Excessive workload demands remain in the other 22 mission segments. The crewmember performing support and mission functions is frequently overloaded while using sensor displays and controls in the hover masked and unmasked flight regimes.

Two limitations of this second iteration need to be stated. First, the separation of crew functions between the two crewmembers was maintained throughout the iteration. This is different from the real operational world where a second crewmember sometimes can provide assistance during peak workload demand periods. This iteration does not allow for flexibility provided when two crewmembers can share functions. Second, no automation is assumed. Automation of sensor functions would significantly reduce the considerable workload demands that remain after distributing mission functions between two crewmembers. This iteration leads to the conclusion that some automation will be required if the two crewmember LHX configuration is selected.

REFERENCES

Applied Psychological Services. (1982). Time series analysis for the AH-64, task 4 report. Wayne, PA: APS.

Applied Psychological Services. (1982). Time series analysis for the AHIP, task 4 report. Wayne, PA: APS.

Holt, C. R., & Kelbawi, F. S. (1982). Analysis of control and coordination during helicopter anti-armor operations (Report No. MTR-82-W00022). McLean, VA: The Mitre Corporation, C3I Division.

Taylor, R. R., & Poole, R. (1983). OH-58D MEP description and workload analysis (Report No. 406-099-063). Fort Worth, TX: Bell Helicopter Division Textron.

APPENDIX A
GLOSSARY OF TERMS

A P P E N D I X A

TABLE OF CONTENTS

	Page
I. VERB LIST AND DEFINITIONS.....	A-3
II. OBJECT LIST AND DEFINITIONS.....	A-8
III. ABBREVIATIONS AND ACRONYMS.....	A-21

I. VERB LIST AND DEFINITIONS

ACCELERATE	- Increase speed.
ACKNOWLEDGE	- Indicate that instructions have been received and understood.
ACQUIRE	- To gain completely; to capture.
ACTIVATE	- To make active; to put in active status.
ADDRESS	- To direct a report to the intended receiver.
ADJUST	- To change or correct so as to fit; conform; make suitable; make accurate.
ALIGN	- To bring into a straight line.
APPROACH	- To come closer or nearer. To fly a specified flight path bringing the aircraft nearer to a landing area, target area, rendezvous area, etc.
ARM	- To make ready the parts needed for operation.
ASSESS	- To estimate or determine the significance, importance, or value of; to evaluate.
BRIEF	- To supply with all the pertinent instructions or information.
CHANGE	- To substitute; to make different; to replace with or transfer to another of a similar kind.
CHECK	- Examine to determine if something is as it should be.
CLEAR	- To pass without contact; to visually check that path is free of obstacles; to open up or free up a display.
CLIMB	- Increase altitude.
COMMUNICATE (COMM)	- Transmit and receive information by radio or visual signals.
COMPLETE	- Bring to a conclusion; end; finish. To make whole, full, or perfect.
CONTROL	- To regulate in a prescribed manner or within safe or prescribed limits, especially in regards to movement.

COPY	- To transcribe an aural message to a written memo.
COORDINATE	- Adjust so as to have harmonious action.
CORRECT	- To make right; change from wrong to right; remove errors from. To make an adjustment so as to compensate for an error or a counteracting force.
DE-ARM	- To make safe.
DEPART	- To fly away from an area.
DEPLOY	- To fly a mission in accordance with a specified plan.
DESCEND	- Decrease altitude.
DESIGNATE	- To point out; mark out; indicate or specify.
DETECT	- To discover or find a target.
DETERMINE	- To reach a decision about something after thought and investigation; decide upon. To find out exactly; calculate precisely; ascertain. To decide or resolve.
DICTATE	- To speak aloud into a recorder.
DIRECT	- To manage the action of; guide; conduct, regulate. To order or command with authority. To turn or point toward an object or goal; aim; head. To tell a person the way to a place. To plan the actions and effects of. To supervise and instruct in the carrying out of a plan.
DISCONNECT	- To break or undo the connection of; separate; detach; unplug.
ENTER	- To put into; insert.
ESTABLISH	- To set up or make stable.
ESTIMATE	- To judge or determine generally but carefully; calculate approximately.
EVADE	- To escape from surveillance.
EVALUATE	- To judge or determine the quality of; to appraise.
FIRE	- To discharge a weapon

FOLLOW	- To direct ones course to approximate the course taken by a leading element or designated route.
FLY	- To traverse a course supported only by movement through the air, out of ground effect.
HANDOFF	- To transfer target information from a scout to an attack aircraft or one attack aircraft to another attack aircraft; to transfer an aircraft from one controlling agency to another.
HOLD	- To maintain a steady state or condition.
HOVER	- To maintain a position in the air near one place.
IDENTIFY	- Given a stimulus occurrence, the act of classifying it as belonging to a set of general or specific occurrences having key elements in common.
INCREASE	- To raise the amount of a variable state (i.e., size, amount, intensity, number).
JOIN UP	- To come into proximity with other elements of a team, such as aircraft in formation.
LIST	- To enter a series of words, names, or numbers, designating essential flight or mission information, into a catalog, directory, or roll.
LOCK-ON	- To track and automatically follow a target, as by radar or other sensor.
MAINTAIN	- To keep in a certain condition or position of flight.
MANEUVER	- To change the movement of a flying aircraft according to a specific pattern or series of movements.
MASK	- To fly to a position where the aircraft will be concealed from observation.
MONITOR	- To casually attend to a source (i.e., display) of possible sensory events or changes.
NOTE	- To pay close attention to.
OBSERVE	- To actively and purposely attend to or witness an event or series of events for the purpose of learning, data collection, etc.

OVERFLY	- To fly an aircraft over a specified area or position for reconnaissance or to update navigation systems.
PERFORM	- To do.
POSITION	- To place oneself or others in a location or posture.
PREPARE	- To set in order; to make ready.
PROVIDE	- To furnish or supply.
RECEIVE	- To acquire or get; to get knowledge or information about.
RECOGNIZE	- Upon being presented with a sensory event or object, to identify it by past experience or on the basis of descriptions.
RECORD	- To place data or stimulus events into a form for later access or recall.
REDUCE	- To lower or bring down
REGAIN	- To get back one's possession; to succeed in reaching again; to recover.
RELEASE	- To let go, loosen completely.
REPLAY	- To play again, usually for the sake of review.
RESPOND	- To answer, reply; to act in return.
REVIEW/EDIT	- To listen to a recorded report and revise for accuracy prior to transmission.
SEARCH	- To look over for the purpose of finding something.
SELECT	- To choose from among two or more options,
SEND	- To transmit, as by radio or other communications medium.
SLEW	- (Also slue.) To rotate around a pivotal point (e.g., slew the gun turret, etc.).
SLOW	- To reduce speed.
STABILIZE	- To stop all fluctuations from a desired dynamic condition, such as altitude, airspeed, heading, etc.

STORE	- To put or keep for later recall and use, as in a computer memory unit.
STOW	- To place something in an appropriate place and condition when not in use.
SURVEY	- To collect information of a predetermined type on the basis of first-hand observation and measurement, or by questioning a number of authoritative sources.
TRACK	- To observe or plot the path or trajectory of and record data from using a sensor, such as radar; to follow as with a sight.
TRANSLATE	- To convert information from one form into another (usually across languages). Prefer use of "convert" in referring to changing from one metric system to another.
TRANSMIT	- To send out communications through electromagnetic energy.
UPDATE	- To provide current information on a set of changing conditions.
UNMASK	- To fly to a position where the sensors or aircrew can observe a target, enemy position or to where the aircraft is no longer concealed from observation.
VERIFY	- To confirm a tentative conclusion by using a second opinion or by using a test to resolve any doubt.

II. OBJECT LIST AND DEFINITIONS

A TO A	- Air to air. The maneuvers and weapon firing (gunnery) employed when aircraft attempt to engage and destroy other aircraft in flight.
A TO G	- Air to ground. The maneuvers and weapon delivery operations employed when aircraft attempt to engage and destroy targets located on the ground. Definition limited to tactical operations.
ACCESS	- An unobstructed way or means of approaching or viewing a destination.
ACKNOWLEDGMENT	- A response indicating receipt and understanding of a communication.
ADF	- Automatic Directional Finding. A feature of low frequency radio equipment that indicates the direction to the transmitting radio source.
AIRCRAFT (A/C)	- Airplanes, helicopters, etc. Applies to all manned, powered vehicles designed to travel through the air.
AIRSPACE	- An area of space assigned for aircraft operations, with definite boundaries indicated by ground features or electronic means.
AIRSPEED (A/S)	- The speed of an aircraft relative to the air through which it moves.
ALERT	- A warning to be ready or watchful.
ALIGNMENT	- The arrangement of parts or components into a straight line.
ALTITUDE	- The height of an aircraft above the ground or above the standard.
AMMO	- Short for ammunition. Anything launched, dropped, fired, or exploded as a weapon.
ANGLE	- The difference between two planes that meet in a point, usually measured in degrees.
AO	- Area of operations.

APPROACHES	- Flight paths providing a means or route for reaching a destination, such as a target area or landing zone.
APU	- Auxiliary Power Unit. An electrical generating engine or motor (other than the aircraft's propulsion system) that is used to power essential aircraft equipment required for starting the primary engines and for other operations usually on the ground.
AREA	- A space on the earth's surface or in the air above the earth's surface designated for specific aircraft operations.
ARMAMENT	- All of the guns, weapons, and equipment serving offensive or defensive purposes on an aircraft.
ARTC	- Air Route Traffic Control. An agency that controls the flow and separation of aircraft traveling along specified routes.
ARTILLERY	- Guns of large caliber, too heavy to carry. Mounted guns (exclusive of machine guns) such as cannons and launchers. May be mobile, stationary, or mounted on ships; weapon carriers.
ATTACK	- Offensive acts and maneuvers associated with an assault against an enemy.
ATTITUDE	- The position of an aircraft in relation to a given line or plane, as the horizon.
AUTOTRACK	- A mode of sensor operation with the sensor automatically tracking movements of a target.
AVIONICS	- Electronically powered displays depicting information required by aviators in performance of aviator functions.
BASE	- The location from whence aircraft operations start and end. Location where the aircraft and aviators are assigned and located. The traffic pattern leg flown just before (and usually 90° from) the final approach leg.
BEARING	- The position or direction established by determining the number of degrees away from a known point, usually from the nose of the aircraft.

CHANNELS	- A band of frequencies selected to transmit or receive communications.
CHECKS	- The series of steps taken to examine or determine if something is as it should be.
CLEARANCE	- The authorization from a controlling agency to proceed in accordance with a planned flight. The distance between an aircraft and an obstacle during aircraft operations.
CODE(S)	- A set of signals or symbols used in sending messages, information processing, or transferring information from a sensor.
COLLECTIVE	- The flight control that provides the aviator with a means of adjusting the pitch angle of the main rotor blades simultaneously and also the speed of the engine.
CONSTRAINTS	- The restriction or confinement within prescribed limits or boundaries.
CONTENT	- Essential meaning or substance in a written or spoken message.
CONTROL	- A mechanism used to regulate and/or adjust aircraft systems or equipment.
COORDINATE	- Any value of a system of two or more magnitudes used to define a position or a point, usually on a map or on the earth. The value will identify the point of interest.
COURSE	- The movement from one point to another. A way, path, or route of movement. The direction taken, usually expressed in degrees measured from north.
COVER	- A hiding place or area where a helicopter will be hidden or concealed from an enemy.
CYCLIC	- The flight control that provides the aviator with the means of controlling the helicopter's movement about the pitch and roll axes.
DAMAGE	- Harm or injury to things (targets, aircraft, etc.).
DASH	- A sudden, swift movement of an aircraft to a destination.

DATA	- Things known or assumed; facts and figures from which conclusions can be inferred; information.
DESCENT	- A downward flight path.
DESIGNATOR	- A device or capability of a sensor to point out; to mark; to indicate or to specify.
DESTINATION	- The place toward which someone or something is going or sent.
DIMENSIONS	- Extent, size, shape of objects or targets.
DIRECTION	- The point or line along which a threat or target is moving or lies.
DISPENSER	- A container designed to give out or distribute its contents in predetermined portions.
DISPLAY(S)	- Arrangements of instruments, indicators, or electro-optical viewing surfaces on which information can be coded and presented to aviators.
DISTANCE	- The interval between two points, objects, lines, etc.
DOPPLER	- A self-contained navigation system providing worldwide navigation without ground-based aids by comparing the magnitude of change in the frequencies or wavelengths transmitted with those received.
DRIFT	- The deviation of an aircraft from its flight path or hover position because of wind.
ENGINE	- The power plant that propels the aircraft through the air.
EQUIPMENT	- Supplies, furnishings, apparatus onboard the aircraft or carried by a crew member.
EVASION	- The avoidance of a threat.
FAC	- Forward Air Controller. A member of the tactical air control party who, from a ground or airborne position, controls aircraft engaged in close air support of ground forces.

FAO	- Forward Air Observer. A member of the tactical air control party who, from a ground or airborne position, observes aircraft engaged in close air support of ground forces and reports on results of the engagement.
FCC	- Fire Control Computer. An automatic data processing device for calculating weapon parameters and for controlling weapon firing operations for maximum engagement effectiveness.
FIRE	- A discharge of firearms or artillery; shooting.
FIX	- The position of an aircraft determined from the bearing of two or more known points or radio signals.
FORMAT	- The general makeup, arrangement, or organization of a message.
FORMATION	- An arrangement or positioning of airplanes in flight.
FORMS	- Printed documents with blank spaces to be filled in to report on aircraft or mission status and results.
FOV	- Field of view. An area of observation as through a sensing device or from a visual position.
FREQUENCY	- The method of identifying (usually in Hertz or cycles per second) specific carrier waves used in radio communications and for radio navigation equipment.
FUEL	- Material burned by the engine to produce power for the aircraft.
GO-AROUND	- Maneuver flown after an abortive landing approach.
GROUND FORCES	- Generic term for all ground combatants, friendly or enemy.
GROUND SCOUT	- A soldier or other ground-based observer locating targets and providing instructions normally provided by aviators in scout aircraft.
G/S	- Groundspeed. Effective speed across the ground. Airspeed adjusted for the effect of wind.

GUN	- A weapon consisting of a metal tube from which a projectile is discharged by the force of an explosive.
HANDOFF	- An offensive maneuver in which target information is transferred from a scout to an attack aircraft or from one attack aircraft to another.
HEADING	- The direction an aircraft is moving, usually expressed as a compass reading.
HIT	- A blow from a weapon as it strikes its mark.
HLH	- Heavy Lift Helicopter. A large rotary-wing aircraft designed to pick up and transport heavy equipment.
HOMING SIGNAL	- A radio transmission that can be received by an aircraft or weapon and is used to guide the aircraft homeward or toward a goal and/or a weapon toward a target.
HOVER	- A maneuver in which the helicopter is flying suspended in the air near one place.
HOVER HOLD	- An automatic flight control feature, without pilot control instruments, for maintaining steady hover conditions.
HOVER TURN	- A repositioning of the nose of a helicopter from one direction to another while flying suspended in the air near one place.
IDENTIFICATION	- A mode switch on an IFF Penal. When selected, the IFF electronically transmits an identification code.
IFF	- Identification Friend or Foe. An electronic system for recognition of friendly aircraft.
ILS	- Instrument Landing System. A system of radio signals that transmits precise landing course and glide path information to be translated by aircraft instruments and interpreted by aviators, thus enabling recovery of aircraft during adverse weather conditions.
IMPACT	- The contact and resulting destruction when a weapon strikes a target.

INDICATORS	- Devices such as gauges, dials, registers, or printers that measure and visibly display information required by crew members.
INSTRUMENTS	- Devices for indicating or measuring condition, performance, position, direction of flight, and operation of aircraft subsystems.
ITEMS	- Particular things or units in an inventory or a list of things.
JOIN-UP	- A flight maneuver performed with the objective of entering and becoming a member of a formation of aircraft, or the completion of a planned rendezvous with another aircraft.
LANDMARK	- A prominent feature of the landscape serving to identify a particular locality or position of an aircraft or target.
LASER	- (Light Amplification by Stimulated Emission of Radiation). A device in which atoms, when stimulated by focused light waves amplify and concentrate the waves, then emit them in a narrow, intense beam. Used as a sensor to designate, aim, and direct a weapon or measure range.
LASER CUE	- A mode of operation enabling a sensor to receive target location from a laser.
LASER RANGEFINDER (LRF)	- A device that emits a focused beam of amplified light waves onto a distant object or target in order to measure range.
LIFT-OFF	- The upward movement of a helicopter as it leaves the ground.
LINE OF SIGHT (LOS)	- An imaginary straight line joining the center of the eye of an observer with the object viewed.
LOCATION	- An area marked off or designated for a specific purpose.
MANEUVER(S)	- Any change of movement by a flying aircraft.
MAP	- A printed representation of the earth's surface showing ground features, such as mountains, bodies of water, roads, cities, etc.

MAXIMUM POWER	- The maximum torque the engine is capable of developing based upon the pressure altitude, temperature, and calibration factors for the aircraft.
MEDEVAC	- Medical evacuation. A mission flown for the purposes of evacuating casualties from a battle area.
MESSAGE	- A communication passed or sent between aviators by speech, electro-optical, or other signal means.
MISSION	- A specific combat operation assigned to an aircraft and its crew.
MODE(S)	- A manner or way of operation, the methods of employment.
MOVEMENT	- A change of location of an aircraft, troops, tanks, etc., as part of an operation or maneuver.
NAP OF THE EARTH (NOE)	- The airspace close to the earth amidst trees, ridges, and other terrain or man-made features providing concealment for helicopters in flight.
OBSERVATION	- Reconnaissance to gain information about the terrain and enemy.
OVERWATCH	- Surveillance of terrain on which an enemy might be positioned in order to provide warning to friendly helicopters in the flight formation; a maneuver flown by helicopters in formation where surveillance is performed by one helicopter crew while the others move concealed by masking; the surveillance functions alternate between members of the formation as the movement proceeds.
PATH	- A route of flight movement to a destination.
PATTERN	- A prescribed route or movement for the flow of aircraft traffic; a grouping or distribution such as from a number of bullets, rockets, or missiles when they are fired at a mark.
PEDALS	- The controls in a helicopter operated by the feet with the primary purpose of counteracting torque, thus maintaining nose alignment and aircraft heading as desired, and for coordinating force vectors during turns.

PERCENTAGE	- The amount or number expressed in rate per hundred.
POINT	- A particularly or precisely specified location, place, or spot on a map, course, or in a target area.
POSITION	- The place where an aircraft, target, landing zone, or other operational thing is, especially in relation to others or to a system of navigation.
POWER	- The capacity of the aircraft propulsion system in terms of the rate at which it can produce energy for flight.
PREPOINT	- A sensor mode in which the sensor automatically slews to a preselected set of coordinates.
PRESSURE	- A force exerted against a control lever in order to execute flying maneuvers or stabilize flight.
PULL-OUT	- The act of maneuvering an aircraft from a steep descent into level or climbing flight.
PULL-UP	- The act of maneuvering an aircraft from a descent or level flight into a climb and higher altitude.
RADAR WARNING	- An alarm, auditory or visual, indicating that the aircraft is being tracked by radar.
RADIO	- An electronic set capable of transmitting and receiving messages carried by electromagnetic energy through space, within prescribed frequencies.
RANGE	- The maximum effective distance that an aircraft can operate without refueling; or that a weapon can effectively fire its projectile.
RATE OF DESCENT	- The amount of altitude being lost in a descent per unit of time, usually expressed in feet per minute.
RECEIVER	- An electronic device that converts incoming electromagnetic energy or electrical signals into audible or visual signals.
RECORD	- The report of events stored in a reading device.
RECORDER	- A device for recording mission data or messages.

REPORT	- An account of facts or the record of some observation or event.
RETICLE	- A network of fine lines, wires, etc. in the focus of a sensor or sight used to aid alignment or aiming.
RPM	- Revolutions per minute. Applies to the speed that a rotor is turning in helicopter operations.
RUN	- The approach to a target made by an attacking aircraft.
SAS	- Stabilizer Augmentation System (SAS). A system that provides short term damping of aircraft dynamics in the pitch, roll, and yaw axes, thus enhancing the stability and handling qualities of the helicopter.
SCAN	- A systematic search pattern from an electronic sensor.
SCOUT	- An aircraft sent out to observe, reconnoiter the strength, movements, etc. of the enemy and to direct attacking aircraft against enemy targets.
SEARCH	- An act of scrutiny, inquiry, or examination in an attempt to find something (i.e., a target), gain knowledge, establish facts, etc.
SECURITY	- A radio device or mode of operation that enables communication not likely to be intercepted by an enemy listener.
SENSOR	- Any of various optical or electronic devices designed to detect, measure, or record physical phenomena such as radiation, heat, pressure, etc., and to respond by transmitting information, initiating changes, or operating controls. Specifically, any such device used to search, detect, identify a target or ground reference, and which may respond by guiding or controlling the aircraft or weapons.
SEPARATION	- The airspace or distance between two aircraft flying in formation.
SHIFT	- A change in the observed frequency of a wave, as a light, sound, etc. caused by an increase or decrease in the distance between the source and the observer. With doppler, the change in frequency of the electromagnetic energy.

SIGHT	- A device used to aid the eyes in lining up a gun, or electro-optical sensor on a target or objective.
SIGHTING	- The act of seeing an object or target.
SIGNAL	- A sign or event fixed or understood as the occasion for prearranged combined action. A sign given by gesture, flashing light, etc. to convey a command, direction, warning, etc. An object or device, as a red flag, flashing light, etc. processing such a sign.
STATION	- A post, position, or location where an aircraft is assigned for duty or operations.
STATUS	- The state or condition as of a weapon or an aircraft system.
SURROUNDINGS	- The things, conditions that are present in a given place or within view of an observer.
SURVEILLANCE	- A watch kept over a target or battle area.
SWITCH	- A device used to activate, open, close, or divert an electric circuit associated with an aircraft system or control.
SYMBOL	- A written or printed mark, letter, abbreviation, or geometric form standing for an object, quality, or process.
SYSTEM	- A set or arrangement of components so related or connected as to form a unity or organic whole and used to perform an aircraft function.
TACAIR	- Tactical aircraft. Term used to designate friendly fighter aircraft providing close air support to ground and helicopter operations against an enemy.
TARGET(S)	- An objective, goal, tanks, force, etc. that is the object of a military attack.
T.D.	- Touchdown. The act of touching down or landing an aircraft; the moment at which a landing aircraft touches the landing surface.
TERMINAL AREA	- The region where aircraft flights end and where servicing facilities and resources are maintained.

TERRAIN	- Ground or earth, especially with regard to its natural or topographical features or fitness for some use.
THREAT	- The source of danger and potential destruction from an enemy force, such as artillery, tank, or aircraft.
THROTTLE	- The control that regulates the amount of fuel being metered to the engine(s).
T.O.	- Takeoff. The act of leaving the ground in an aircraft. The place from which an aircraft leaves the ground, the starting point for a flight.
TRACERS	- Bullets or shells that indicate their own courses in the air with trails of smoke or fire, so as to facilitate adjustment of the aim.
TRACK	- A course or line of flight, route, way; the projection of the flight path of an airplane on the surface of the earth.
TRAFFIC	- The movement of a number of aircraft along prescribed routes or flight paths, usually in landing or takeoff operations, but also in operations involving multiple aircraft.
TRANSMITTER	- The part of a radio or other electromagnetic device that generates waves, modulates their amplitude or frequency, and sends them by means of an antenna.
TRIGGER	- A small lever, switch, or part which when pulled or pressed activates the firing of a weapon.
TURN(S)	- A change in direction of flight. An aircraft maneuver resulting in a change of course or direction of flight.
UPDATE	- An action taken or a function performed to revise navigation data making it more accurate or concurrent with present aircraft status or position.

UTM

- Universal Transverse Mercator. A conventional system for indicating position on the earth's surface. The earth's surface is divided into grids which are 1000 meters square. A position is easily defined in UTM coordinates by a prefix (e.g., B5) which represents a 100,000 x 100,000 meter area followed by easting (3 digits) and northing (3 digits) coordinates which locate a spot within 10 meters.

WAYPOINT

- A preselected navigation checkpoint along a planned route of flight. Location of the checkpoints are stored in the doppler and are called up for navigation purposes during the flight.

WEAPON

- An instrument or device of any kind that can be used to fight or to attack an enemy target.

III. ABBREVIATIONS AND ACRONYMS

A	- Auditory
A/C	- Aircraft
Ack	- Acknowledge
Adj	- Adjust
Align	- Alignment
AO	- Area of Operations
C	- Cognitive
Comm	- Communication
DEK	- Data Entry Keyboard
Discrim	- Discrimination
FCC	- Fire Control Computer
FFAR	- Folding Fin Aerial Rockets
FOV	- Field of View
Ident	- Identification
Interp	- Interpretation
LHX	- Light Helicopter Experimental
LOAL	- Lock-On After Launch
LOBL	- Lock-On Before Launch
LOS	- Line of Sight
LRF	- Laser Rangefinder
Nav	- Navigation
NOE	- Nap of the Earth
Orient	- Orientation
P	- Psychomotor
PE	- Performance Element
PGM	- Precision Guided Missile
Recog	- Recognition
S-R	- Stimulus-Response
Sec(s)	- Second(s)
Symb	- Symbol, Symbolic
Tgt	- Target
V, Vis	- Visual

A P P E N D I X B

SEGMENT SUMMARIES

A P P E N D I X B

TABLE OF CONTENTS

	Page
RECONNAISSANCE PHASE	
Segment 1. Bomb Damage Assessment	B-3
Segment 2. Evade Radar Lock-On	B-4
Segment 3. Reconnaissance, General	B-5
Segment 4. Record Sightings	B-6
Segment 5. Tactical Movement	B-7
Segment 6. Transmit Report, Digital	B-8
TARGET SERVICE	
Segment 7. Acquisition , Auto Search.....	B-9
Segment 8. Acquisition, From Laser Cueing	B-10
Segment 9. Adjustments, Area Weapons, Digital	B-11
Segment 10. Adjustments, Area Weapons, Voice	B-12
Segment 11. Designate for PGM	B-13
Segment 12. Engagement, Air-to-Ground, Autonomous, LOAL	B-14
Segment 13. Engagement, Ground Target, Autonomous, LOBL	B-15
Segment 14. Engagement, Ground Target, Remote Designation	B-16
Segment 15. Engagement, Soft Targets, Cannon Fire, Hover	B-17
Segment 16. Engagement, Soft Targets, FFAR, Direct	B-18
Segment 17. Handoff, Ground Target, Digital	B-19
Segment 18. Handoff, Ground Target, Voice	B-20
Segment 19. Handoff Target, Laser Cueing	B-21
Segment 20. Holding Checks	B-22
Segment 21. Overwatch	B-23
Segment 22. Receive Handoff, Voice	B-24
Segment 23. Team Coordination	B-25
TARGET SERVICE, AIR-TO-AIR	
Segment 24. Acquisition , Free Search.....	B-26
Segment 25. Engagement Air-to-Air From Masked Position	B-27
Segment 26. Engagement Air-to-Air, Running Fire, Cannon	B-28
Segment 27. Engagement Air-to-Air, Running Fire, Missile	B-29
Segment 28. Handoff Aerial Threat, Voice	B-30
Segment 29. Receive Handoff, Voice	B-31

SEGMENT SUMMARY WORKSHEET

Phase Reconnaissance

Segment 1: Bomb Damage Assessment

Method

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE	Monitor Threat Warning Displays	
Establish Position (Observation)		
Hover Masked	Check A/C Systems	
Unmask Sensor		Survey Target Area
		Assess Damage
Hover Masked	Transmit Report (Digital)	

SEGMENT SUMMARY WORKSHEET

Phase Reconnaissance

Segment 2: Evade Radar Lock-On

Method

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE	Respond to Threat Warning Signal	
Deploy to Cover	Transmit Message	
Hover Masked		

SEGMENT SUMMARY WORKSHEET

Phase Reconnaissance

Segment 3: Reconnaissance, General

Method _____

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE	Monitor Threat Warning Displays	
Establish Position (Observation)	Check A/C Systems (Power Change)	
Unmask Sensors		Survey Target Area
Hover Masked		
	Record Target Data	
	Prepare Report	
	Transmit Report (Digital)	
Unmask Sensor		
	Update Doppler	
		Monitor Terrain, Aerial Approaches to Area of Operations
Maneuver NOE		

SEGMENT SUMMARY WORKSHEET

Phase Reconnaissance

Segment 4: Record Sightings

Method _____

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor	Update Doppler	
		Survey Target Area
		Acquire Position Data
Mask Aircraft	Record Target Data	
	Record Target Data	

SEGMENT SUMMARY WORKSHEET

Phase Reconnaissance

Segment 5: Tactical Movement

Method _____

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
	Check Course Required	
Unmask Sensor		Monitor Terrain, Aerial Approaches
	Transmit Message	
Maneuver NOE		Monitor Terrain, Aerial Approaches
Mask Aircraft		
Unmask Sensor		
	Monitor Threat Warning Display	
		Monitor Terrain, Aerial Approaches
	Transmit Message	

SEGMENT SUMMARY WORKSHEET

Phase Reconnaissance

Segment 6: Transmit Report

Method Digital

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	Prepare Report, Digital Message Device Transmit Report, Digital

SEGMENT SUMMARY WORKSHEET

Phase	Target	Service

Segment 7: Acquisition

Method Auto Search

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor		Receive Handoff (Laser Cueing)
	Transmit Message (Target Detected)	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 8: Acquisition

Method From Laser Cueing

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
	Receive Message	
Unmask Sensor		Survey Target Area
		Acquire Position Data (Marking Round Impact Point)
Mask Aircraft	Record Target Data	
	Transmit Report Digital	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 9: Adjustments, Area Weapons Method Digital

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
	Receive Message	
Unmask Sensor		Survey Target Area
		Estimate Adjustments
Mask Aircraft		
	Transmit Message (Adjustments)	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 10: Adjustments, Area Weapons Method Voice

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
	Receive Message	
Unmask Sensor		Survey Target Area
		Estimate Adjustments
Mask Aircraft		
	Transmit Message (Adjustments)	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 11: Designate for Precision Guided Missile Method

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	Track Target
	Receive Message (Fire Coordination)	
	Receive Message	Designate Target
Deploy to Cover		

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 12: Engagement, Air-to-Ground

Method Autonomous, Lock-On

After Launch

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	Track Target
		Acquire Position Data
		Prepare Weapon
Align Heading on Target Bearing		
Unmask Aircraft		
Designate Target (Continue Until Weapon Impact)		Fire Weapon
Deploy to Cover		

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 13: Engagement, Ground Target

Method Autonomous, Lock-On

Before Launch

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	Track Target
		Estimate Range
Align Heading on Target Bearing		Prepare Weapon, Laser
Unmask Aircraft		Designate Target (Continue Until Missile Impact)
		Fire Weapon
Deploy to Cover		

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 14: Engagement, Ground Target

Method Remote Designation

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Receive Message (Target Handoff)	
	Record Target Position Data	
	Check Course Required	
Maneuver NOE		
Hover Masked	Update Doppler	
	Check A/C Systems	
		Prepare Weapon
	Transmit Message (Attack Coordination)	
Unmask Aircraft		
		Fire Weapon
	Transmit Message (Brief, "Shot")	
Mask Aircraft		

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 15: Engagement, Soft Targets

Method Cannon Fire, Hover

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE		
Hover Masked	Check A/C Systems	
	Receive Message (Coordinate Attack)	
Maneuver NOE		
Establish Position Firing		Prepare Weapon(s)
Align Heading on Target Bearing		
Unmask A/C		Acquire Position Data
		Fire Cannon
Deploy to Cover		

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 16: Engagement, Soft Targets

Method FFAR, Direct

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
	Receive Message (Target Handoff Data)	
	Record Target Position Data	
	Check Bearing and Range	
Maneuver NOE		
Establish Position (Firing)		
Hover Masked	Transmit Message (Coordinate Attack)	
		Prepare Weapons
Align Heading on Target Bearing		
Unmask Aircraft		
		Estimate Range
		Fire Weapon
Deploy to Cover		

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 17: Handoff, Ground Target

Method Digital

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	Acquire Position Data
Mask Aircraft	Record Target Data	
	Transmit Report (Handoff Message)	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 18: Handoff, Ground Target

Method Voice

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	
	Maintain Track Target With Target	
		Acquire Data
Mask Aircraft		
		Acquire Position Data
Mask Aircraft		
	Transmit Message (Target Handoff)	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 19: Handoff Target

Method Laser Cueing

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	Track Target Handoff Target Using Laser Cueing

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 20: Holding Checks

Method

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Update Doppler Check A/C Systems Check Sensors Transmit Message (Coordinate With Team)	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 21: Overwatch

Method _____

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE		
Hover Masked	Update Doppler	
	Check A/C Systems	
Unmask Sensor		Maintain LOS With Target
		Monitor Terrain, Aerial Approaches
	Monitor Threat Warning Displays	
		Check Sighting
	Transmit Message (Threat Alert)	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 22: Receive Handoff

Method Voice

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems Receive Message (Handoff) Record Target Data Note Bearing and Range	

SEGMENT SUMMARY WORKSHEET

Phase Target Service

Segment 23: Team Coordination

Method

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE	Monitor Threat Warning Displays	
	Check A/C Systems	
	Transmit Message (Coordinate Establishment of Kill Zones)	
Establish Firing Position		Survey Target Area
Unmask Sensor		Establish Position (Firing)
		Monitor Terrain, Aerial Approaches

SEGMENT SUMMARY WORKSHEET

Phase Target Service, Air-to-Air

Segment 24: Acquisition

Method Free Search

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor	Monitor Threat Warning Displays	
		Monitor Terrain, Aerial Approaches
		Detect Aerial Threat
	Transmit Message (Alert Team)	
	Maintain Sensor LOS With Target	
		Estimate Range

SEGMENT SUMMARY WORKSHEET

Phase Target Service, Air-to-Air

Segment 25: Engagement Air-to-Air

Method From Masked Position

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor		Track Target
Align Heading on Target Bearing		Estimate Range
		Prepare Weapon
Unmask Aircraft		Track Target
		Fire Weapon
Deploy to Cover		

SEGMENT SUMMARY WORKSHEET

Phase Target Service, Air-to-Air

Segment 26: Engagement Air-to-Air

Method Running Fire, Cannon

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Establish Attack Run		Prepare Weapon
Maintain Separation (Close)		Fire Weapon (Cannon)
Deploy to Cover		

SEGMENT SUMMARY WORKSHEET

Phase Target Service, Air-to-Air

Segment 27: Engagement Air-to-Air

Method Running Fire, Missile

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Establish Attack Run		Prepare Weapon
Align Heading on Target Bearing		Fire Weapon (Missile)
Deploy to Cover	Check A/C Systems	

SEGMENT SUMMARY WORKSHEET

Phase Target Service, Air-to-Air

Segment 28: Handoff Aerial Threat

Method Voice

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor	Monitor Threat Warning Devices	
		Monitor Terrain, Aerial Approaches
		Detect Aerial Threat
	Transmit Message (Threat Alert)	
		Maintain Sensor LOS With Aerial Threat
	Transmit Message (Coordinate Target Selection)	

SEGMENT SUMMARY WORKSHEET

Phase Target Service, Air-to-Air

Segment 29: Receive Handoff

Method Voice

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor	Monitor Threat Warning Devices	Monitor Terrain, Aerial Approaches to AO
	Receive Message (Handoff Data)	Survey Target Area
		Detect Aerial Threat
	Transmit Message (Threat Sighted)	Maintain Sensor LOS With Aerial Threat

APPENDIX C
FUNCTION ANALYSIS WORKSHEETS
(INITIAL ANALYSES—SINGLE CREWMEMBER)

APPENDIX C

TABLE OF CONTENTS

FUNCTION NO.	FUNCTION	Page
01	Acquire Position Data, Automatic.....	C-4
02	Acquire Position Data, Shift From Known Point.....	C-5
03	Align Heading on Target Bearing.....	C-6
04	Assess Damage.....	C-7
05	Check Aircraft Systems (Holding).....	C-8
06	Check A/C Systems (Power Change).....	C-9
07	Check Course Required.....	C-10
08	Check Sensor Operation.....	C-11
09	Check Sights.....	C-12
10	Coordinate Mission.....	C-13
11	Coordinate Target Selection.....	C-14
12	Deploy to Cover.....	C-15
13	Designate Target.....	C-16
14	Detect Aerial Threat, Automatic Search, Cueing.....	C-17
15	Detect Aerial Threat, Unaided.....	C-18
16	Detect Target (Ground), Free Search.....	C-19
17	Detect Target, Prepoint, Auto Cueing.....	C-20
18	Establish Position (Firing or Observation.....	C-21
19	Estimate Range, Automatic.....	C-22
20	Estimate Range, Unaided Estimation.....	C-23
21	Evaluate Position.....	C-24
22	Fire Cannon.....	C-25
23	Fire Weapon.....	C-26
24	Handoff Target, Laser Cueing.....	C-27
25	Hover Masked.....	C-28
26	Identify Target.....	C-29
27	Maintain LOS With Target.....	C-30
28	Maintain Separation Between Aircraft.....	C-31
29	Maneuver NOE.....	C-32
30	Mask Aircraft, Lateral.....	C-33

FUNCTION NO.	FUNCTION	Page
31	Mask Aircraft, Vertical.....	C-34
32	Monitor Terrain, Aerial Approaches.....	C-35
33	Monitor Threat Warning Displays.....	C-36
34	Perform Evasive Maneuvers.....	C-37
35	Prepare Report, Digital Message Device.....	C-38
36	Prepare Weapon, Fire and Forget/Cannon.....	C-39
37	Prepare Weapon, Laser Cueing.....	C-40
38	Receive Handoff, Laser Cueing.....	C-41
39	Receive Message, Designation Coordination, Digital.....	C-42
40	Receive Message, Standard, Digital.....	C-43
41	Receive Message (Standard), Radio, Voice.....	C-44
42	Record Target Data.....	C-45
43	Respond to Threat Warning Signal.....	C-46
44	Stabilize Aircraft.....	C-47
45	Survey Target Area, Automatic Search.....	C-48
46	Survey Target Area, Manual Control, Visual Search.....	C-49
47	Survey Waypoint.....	C-50
48	Track Target.....	C-51
49	Transmit Message (Brief), Voice, Brief.....	C-52
50	Transmit Message (Standard), Voice.....	C-53
51	Transmit Report, Digital.....	C-54
52	Unmask Aircraft, Lateral.....	C-55
53	Unmask Aircraft, Vertical.....	C-56
54	Unmask Sensor.....	C-57
55	Update Doppler, Overfly Stored Waypoint.....	C-58
56	Update Doppler, Remote Landmark.....	C-59
57	Estate Adjustments, Automatic.....	C-60
58	Engagement, Air-to-Air, Establish Attack Run.....	C-61

FUNCTION ANALYSIS

No. 01

FUNCTION Acquire Position Data

METHOD Automatic

TOTAL TIME 8.5 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control/ sight ACS	Visual Align (V-4)	Sight adjustment needed (C-1)	Control pressure (P-4)	5	Start 5.5
04 Activate	Laser rangefinder	Laser rangefinder AL	Visual Alignment (V-4)	Laser on target? (C-2)	Switch activation (P-1)	1.5	6.0 - 7.5
122 Note	Coordinates (Sensor capture)	Sensor subsystem Coordinate display NDC	Visual symbolic (V-5)	Encoding (C-4)	---	.5	8.0 - 8.5

FUNCTION ANALYSIS

No. 02

TOTAL TIME 28 seconds
(APPROXIMATE)

FUNCTION Acquire Position Data

METHOD Shift From Known Point

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control/ sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressures (P-4)	5	S + 5.5
36 Select	Wide FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Point usable? (C-1)	Switch activation (P-1)	1.0	6.0 - 7.0
94 Identify	Landmark	Sensor scene, map NSM	Visual Discrimi- nation (V-6)	Correct Landmark (C-6)	Map Orienta- tion (P-5)	5	7.5 - 12.5
89 Estimate	Shift (to target)	Sensor scene, map NSM	Visual Discrimi- nation (V-6)	Correct Shift (C-7)	Map Orienta- tion (P-5)	15	13 - 28

FUNCTION ANALYSIS

FUNCTION Align Heading on Target Bearing No. 03

TOTAL TIME 34.5 seconds
(APPROXIMATE)

METHOD _____

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
13 Adjust	Heading	Flight Controls Sensor Display FAD	Alignment of bench- marks (V-4)	Heading adjustment needed (C-5)	Direction power adjustment (P-4)	30	S + 30.5
181 Stabilize	Aircraft	Flight controls, surrounding visual field FV	Relative movement in sur- rounding referents (V-2)	Control adjustments to stop drift, heading change (C-1)	Small adjust- ments in power, cyclic anticorque (P-4)	5	29.5 - 34.5

FUNCTION ANALYSIS

No. 04

FUNCTION Assess Damage

TOTAL TIME 62 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
87 Estimate	Percentage of target coverage	Sensor display scene AS	Visual search of terrain (V-6)	What percentage? (C-7)	LOS Control (P-4)	7	S - 14.5
79 Determine	Targets disabled	Sensor display scene AS	Visual inspection (V-6)	Destroyed, repairable, usable? (C-7)	LOS control (P-4)	7	S - 14.5
42 Record	Message	Message device CM	Visual symbolic (V-7)	Format content (C-4)	Keyboard entries (P-7)	45	15 + 60 Time for PE 1 and PE 2 total 14.5 seconds. The two PEs will be performed simultaneous during scan/survey of target area for 14.5 seconds.

FUNCTION ANALYSIS

FUNCTION Check Aircraft Systems (Holding)

No. 05

TOTAL TIME 108 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
48 Check	Fuel	Fuel system display DF	Visual symbolic mental calculations (V-5)	Quantity (mission time) (C-6)	----	10	8 - 10.5
50 Check	Engine status displays	Engine status displays DE	Visual symbolic (V-5)	Within safe limits (C-2)	----	10	11 - 21
47 Check	Aircraft equipment	Life support L	Visual inspection (V-6)	Available and operating (C-6)	----	30	21.5 - 51.5
49 Check	Caution/warning indicators	Malfunction detection equipment (warning) DM	Visual symbolic (V-5)	No indications jeopardizing mission continuation (C-2)	Switch operation (P-1)	10	52 - 62
52 Check	Cockpit items	Personal equipment P	Visual inspection (V-6)	Secure (C-6)	--	30	62.5 - 92.5
138 Perform	Checklist items	Checklist PC	Visual reading (V-7)	No conditions jeopardizing mission continuation (C-6)	--	15	93 - 108
							Each PE occurs in sequence.

FUNCTION ANALYSIS

FUNCTION Check Aircraft Systems (Power Change) No. 56

TOTAL TIME 11.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
14 Adjust	Power	Power control FP	----	Amount necessary (C-1)	----	.5	S + 1.0
51 Check	System Instruments	Engine and caution displays DEW	Visual symbolic (V-5)	In limits? Desire setting (C-2)	----	10	1.5 - 11.5

FUNCTION ANALYSIS

FUNCTION Check Bearing and Range

No. 07

TOTAL TIME 3.0 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
170 Select	Waypoint (desired)	Navigation control N	Visual symbolic (V-5)	Correct waypoint? (C-3)	Switch activation (P-2)	1	S - 1.5
46 Check	Course, distance to waypoint	Navigation display ND	Visual symbolic (V-5)	Adjustment to heading? (C-5)	----	1	2.0 - 3.0

FUNCTION ANALYSIS

TOTAL TIME 32.5 seconds		FUNCTION Check Sensor Operation	No. 08
(APPROXIMATE)		METHOD	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
168 Select	Sensor(s)	Sensor subsystem AC	Visual inspect (V-6)	Sensor operating (C-6)	Sensor switch (P-1)	1.5	S - 2.0
15 Adjust	Sensors	Sensor subsystem AC	Visual inspect (V-6)	Adjust- ments needed -brightness -contrast -gain -polarity -frequency -boresight (C-6)	Sensor controls fine adjust- ments required (P-2)	30	2.5 - 32.5

FUNCTION ANALYSIS

FUNCTION Check Sighting

METHOD

No. 09

TOTAL TIME 38 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
111 Monitor	Surroundings	Visual, unaided V	Visual detect movement (V-2)	Possible sighting? (C-2)	----	S + 20.5
192 Survey	Approaches to AO	Sensor display scene AS	Visual Detect Movement (V-2)	Possible sighting? (C-2)	Adjust sensor LOS (P-4)	S - 20.5
24 Align	Sight	Sensor display sight ADS	Visual align (V-4)	Any sighting (C-2)	Sensor LOS adjustment (P-4)	21 - 26
36 Select	Sensor FOV	Sensor controls FOV ACF	Visual monitor (V-6)	Target centered (C-1)	Discrete activation (P-1)	26 - 27.5
98 Identify	Threat	Sensor displays DTV	Movement, shape, heat signature (V-2)	Level of threat friend/foe (C-4)	--	28 - 38
PE 1 and 2 will be continuous throughout function but interrupt by PE 3, 4, and 5.						

FUNCTION ANALYSIS

No. 10

FUNCTION Coordinate Mission

TOTAL TIME 116.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
166 Select	Radio, security	Communication system CS	Vis symbol (V-5)	Correct radio? (C-3)	Switch activation (P-1)	S - 10.5
205 Transmit	Message (extended)	Communication system CT	Auditory, message content (A-3)	Encoding (C-4)	Switch activation (P-1)	11 - 56
113 Note	Acknowledgement	Communication system CR	Auditory content (A-3)	Verify content established (C-4)	----	56.5 - 61.5
69 Coordinate	Mission number	Communication system CC	Auditory, message content (A-3)	Message received? Authentication correct? Mission proc? (C-5)	Switch activation (P-1)	61.5 - 71.5 71.5 - 116.5
						10 seconds delay awaiting PE 4

FUNCTION ANALYSIS

TOTAL TIME 102.5 seconds		FUNCTION Coordinate Target Selection	No. 11
(APPROXIMATE)		METHOD	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
150 Select	Communication channels and security	Communication system CS	Visual symbolic (V-5)	Adequacy of setting -equipment operating- (C-3)	Selector switches, speech (P-1; P-3)	10	5 - 10.5
124 Note	Target data	Communication system CR	Auditory (A-3)	Authentic message required (C-6)	---	30	11 - 41
141 Record	Target data	Message device FCC CM	Visual symbolic (V-5)	Encoding (C-4)	Keyboard entries (P-3)	10	41.5 - 51.5
196 Transmit	Message (brief) Acknowledgement	Communication system CT	Auditory (V-3)	Encoding recall (C-4)	Switches, speech (P-1; P-3)	5	52 - 57
68 Coordinate	Attack with other attack	Communication system CC	Auditory (A-3)	Target assessment Firing schedule (C-5)	Transmitter switches (P-1)	45	57.5 - 102.5

FUNCTION ANALYSIS

No. 12

FUNCTION Deploy to Cover

TOTAL TIME 18.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
43 Check	Obstacle clearance	Outside visual field V	Visual inspection (V-1)	Adequate clearance (C-2)	----	5	S - 5.5
83 Establish	Dash	Flight control F	Visual, relative movement (V-2)	Control adjustment needed? (C-1)	Control pressure (P-4)	3	5.5 - 8.5
181 Stabilize	Aircraft	Flight controls, outside visual field FV	Visual, detect movement (V-2)	Control adjustment needed? (C-1)	Control pressure (P-4)	5	8.5 - 13.5
143 Reduce	Altitude	Flight controls, outside visual field FV	Visual, relative movement (V-2)	Control adjustment needed (C-1)	Control pressure (P-4)	5	

FUNCTION ANALYSIS

No. 13

FUNCTION Designate Target

TOTAL TIME 27 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control sight ACS	Vis align (V-4)	Adj needed (C-1)	Control Pressure (P-4)	5	S - 5.5
36 Select	Narrow FOV	Sensor control FOV ACF	Vis monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6 - 7.0
33 Arm	Laser designator	Laser controls ACL	Vis symb (V-5)	Laser ready? (C-2)	Discrete activation (P-1)	2.5	7.5 - 10
02 Activate	Laser designator	Laser designator ALD	Vis detection (V-2)	Target lased? (C-2)	Discrete activation (P-1)	10	10.5 - 20.5
125 Note	Weapon impact	Sensor display AD	Vis monitor (V-1)	Target hit? (C-2)	----	5	21 - 26
72 De-Arm	Laser	Laser cont ACL	Vis symb (V-5)	Laser safe? (C-2)	Discrete activation (P-1)	.5	26.5 - 17

FUNCTION ANALYSIS

TOTAL TIME 31.5 seconds (APPROXIMATE)		FUNCTION Detect Aerial Threat	No. 14
		METHOD Automatic Search, Cueing	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
190 Survey	Airspace	Sensor display AS	Visual monitor (V-1)	Cueing symbol? (C-2)	----	20	5 + 20.5
76 Detect	Cueing symbol	Sensor display AT	Visual symbolic (V-5)	Signal detection (C-2)	----	5	21 - 26
16 Align	Sight reticle	Sensor control sight ACS	Visual alignment (V-4)	Target centered? (C-1)	Control press. (P-4)	5	26.5 - 31.5

FUNCTION ANALYSIS

FUNCTION Detect Aerial Threat No. 15

TOTAL TIME 31 seconds (APPROXIMATE)

METHOD Unaided

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
191 Search	Airspace	Visual, unaided V	Visual survey (V-1)	Area clear? (C-6)	----	12.5	S + 13
74 Detect	Movement	Visual, unaided V	Visual detect (V-2)	Signal (maneuver) (C-2)	----	2	13 - 15
176 Direct	Sensor (to target)	Sensor controls a/c direction indicated AC	Visual align (V-4)	Approx bearing to sighting? (C-6)	Control pressure (P-4)	5	15.5 - 20.5
99 Identify	Threat	Visual, unaided V	Visual; movement shape (V-2)	Orientation of a/c. Type of a/c. (C-4)		5	21 - 26
98 Identify	Threat	Sensor threat display (visual) DT	Movement shape heat signature (V-2)	Level of threat Friend/foe (C-4)		10	21 - 31
97 Identify	Threat	Sensor threat display (aural) DT	Tone(s) continuous or intermittent (A-3)	Type of threat a/c. Level of threat (C-4)		10	21 - 31
							No transition time provided to first discrete PE (2).

FUNCTION ANALYSIS

TOTAL TIME 20.5 seconds (APPROXIMATE)		FUNCTION Detect Target (Ground)	No. 16
		METHOD Free Search	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
147 Search	Target area	Sensor display scene AS	Visual survey (V-1)	Area clear? (C-6)	Control pressure (LOS) (P-4)	12.5	S + 13
75 Detect	Movement	Sensor display scene AS	Visual detection (V-2)	Signal (movement) (C-2)		2	13 - 15
24 Align	Sight	Sensor display/ sight ADS	Visual alignment (V-4)	Target Centered (C-2)	Control pressure (P-4)	5	15.5 - 20.5

FUNCTION ANALYSIS

TOTAL TIME 13 seconds (APPROXIMATE)		FUNCTION	Detect Target	No. 17
		METHOD	Prepoint, Auto Cueing	

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
209 Verify	Target data in FCC	FCC display ID	Visual symbol (V-5)	Data complete? (C-6)	----	S - 1.0
165 Select	Sensor prepoint	Sensor controls AC	Visual symbol (V-5)	Prepoint option (C-3)	Switch activation (P-1)	1.5 - 2.5
76 Detect	Cueing symbol	Sensor display/target cue AT	Visual symbol (V-5)	Signal recognition (C-2)	----	3 - 8
24 Align	Sight	Sensor display (sight) ADS	Visual alignment (V-4)	Target centered? (C-2)	Control pressure (P-4)	5 8 - 13

FUNCTION ANALYSIS

FUNCTION Establish Position (Firing or Observation) No. 18

TOTAL TIME 21.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
103 Maintain	Obstacle clearance	Flight controls outside visual FV	Visual detect (V-2)	Verify Clearance (C-2) (P-4)	Flight control pressures (P-4)	21.5	S + 21.5
92 Follow	Course	Nav display Flight controls NDF	Visual symbol (V-5) (C-5)	Course adjustment needed?	Control pressures (P-4)	21.5	S + 21.5
55 Check	Position	Outside visual map VM	Visual symbol (V-5)	Decoding (C-4)		10	.5 - 10.5
43 Check	Obstacle clearance	Outside visual V clearance (V-1)	Visual inspect masking? (C-2)	Adequate space,		5	11 - 16
181 Stabilize	Aircraft	Flight controls Outside visual FV	Visual detect movement (V-2)	Adjustments needed? (C-1)	Control pressures (P-4)	5	16.5 - 21.5
							PE 1 and PE 2 continuous throughout function overlapping PE 3, 4, and 5.

FUNCTION ANALYSIS

TOTAL TIME 10 seconds		FUNCTION	Estimate Range	No. 19
(APPROXIMATE)		METHOD	Automatic	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	5	8 - 5.5
36 Select	FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6 - 7.0
04 Activate	Laser range finder (LRF)-	Sensor/LRF AL	Visual align signal (V-4)	Target lased? (C-2)	Discrete activation (P-1)	1.5	7.5 - 9
132 Note	Range	Sensor display/ range AR	Visual discrim (V-5)	In range? (C-6)	----	.5	9.5 - 10

FUNCTION ANALYSIS

TOTAL TIME 33 seconds (APPROXIMATE)		FUNCTION	Estimate Range	No. 20
		METHOD	Unaided Estimation	

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	5 S - 5.5
36 Selec.	FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0 6.0 - 7.0
135 Note	Tgt/ml dimensions	Sensor display AD (V-6)	Visual discrim dimension (C-6)	Evaluate target pressure (P-4)	Sight control	5 7.5 - 12.5
88 Estimate	Range	Sensor display AD	----	Estimation (C-7)	----	20 13 - 33

FUNCTION ANALYSIS

No. 21

FUNCTION Evaluate Position

METHOD

TOTAL TIME 46.5 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
193 Survey	Surroundings	Sensor display scene AS	Visual, movements, shapes (V-2)	Area safe? (C-6)	Sensor controls (P-4)	20	S + 20.5
177 Slew	Sensor	Sensor controls AC	Visual survey (V-1)	Where to point? (C-3)	Sensor controls (P-4)	5	21 - 26
39 Check	Visual access	Sensors, maps NSN	Visual inspection (V-6)	Adequate area FOV? (C-6)	Sensor controls (P-4)	20	26.5 - 46.5

FUNCTION ANALYSIS

No. 2)

FUNCTION Fire Cannon

TOTAL TIME 15 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
207 Verify	Adjusted sight alignment	Sensor display scene AS	Visual, symbolic (V-5)	Verify sight picture (C-2)	----	5 + 2.5
08 Activate	Gun trigger	Fire control system I	----	Trigger position. Recognize (C-2)	Switch activation (P-1)	2.5 - 3.0
136 Observe	Tracers, impact	Sensor display sight ADS	Visual trace (V-3)	On target (C-2)	----	3.5 - 8.5
11 Adjust	Alignment	Sensor display sight ADS	Visual align (V-4)	Adjustment needed (C-1)	Control pressures (P-4)	9 - 14
71 De-arm	Gun	Fire control system I	Visual, symbolic (V-5)	Gun secured (C-2)	Switch or switch sequence (P-1)	14.5 - 15

FUNCTION ANALYSIS

No. 23

FUNCTION Fire Weapon

TOTAL TIME 9 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
208 Verify	Firing constraints met	Fire control display ID	Visual discrimination (V-5)	System ready? (C-6)	Control pressures (P-4)	5	S + 5.5
146 Release	Weapon	Fire control system I	Visual Auditory (V-2, A-1)	Weapon shot? (C-2)	Switch activation (P-1)	2	6 - 8
73 De-arm	Weapon	Fire control system I	Visual symbolic (V-5)	Weapon system secured (C-2)	Switch activation (P-1)	.5 sec/switch	8.5 - 9

FUNCTION ANALYSIS

No. 24

FUNCTION Handoff Target, Laser Cueing

TOTAL TIME 38 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
196 Transmit	Message (brief) alert	Communication system (transmit) CT	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	5	S + 5.5
113 Note	Ack/ready	Communication system (receive) CR	Auditory. Interpret (A-3)	Decoding (C-4)	----	5	6 - 11
196 Transmit	Message (brief) Alert for sensor cue	Communication system (transmit) CT	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	5	11.5 - 16.5
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed (C-1)	Control pressure (C-4)	5	17 - 22
02 Activate	Laser designator	Laser designator ALD	Visual detect (V-2)	Signal recognition (C-2)	Switch activation (C-1)	10	22.5 - 32.5
113 Note	Ack/tgt detected	Communication system (receive) CR	Auditory interpret (A-3)	Decoding (C-4)	----	5	33 - 38

FUNCTION ANALYSIS

No. 25

FUNCTION Hover Masked

TOTAL TIME 170 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
63 Control	Altitude	Flight controls F	Detect vertical movement (V-2)	Power adjust- ment needed? (C-1)	Control pressures (P-4)	170	S + 170
64 Control	Drift	Flight controls F	Detect horizon- tal movement (V-2)	Cyclic adjustment needed? (C-1)	Control pressures (P-4)	170	S + 170
66 Control	Heading	Flight controls F	Detect rotation (V-2)	Antitorque adjustment needed? (C-1)	Control pressures (P-4)	170	S + 170
40 Check	Lateral clearance	Outside visual field V	Visual survey (V-1)	Verify clearance (C-2)	----	2.0	PE 4 repetitive during 170-second function time.

FUNCTION ANALYSIS

FUNCTION Identify Target

METHOD

TOTAL TIME 12.5 seconds
(APPROXIMATE)

No. 26

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle on target	Sensor control/ sight ACS	Visual alignment (V-4)	Sight adjustment needed? (C-1)	Control pressures (P-4)	5	S + 5.5
36 Select	Narrow FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Switch activation (P-1)	1.0	6 - 7.0
96 Identify	Target	Sensor display AD	Visual inspect (V-6)	Friend or foe? Type of target (C-6)	None ----	5	7.5 - 12.5

FUNCTION ANALYSIS

FUNCTION Maintain LOS With Target

No. 27

TOTAL TIME 45.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(s)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
36 Select	Wide FOV	Sensor controls, FOV AC	Visual monitor (V-1)	Adjustment needed? (C-1)	Switch activation (P-1)	1.0	S + 1.5
194 Track	Target	Sensor control AC	Visual align (V-4)	Match slew rate (C-3)	Control pressure (P-4)	45	S + 45.5
145 Regain	LOS	Sensor control AC	Visual aim (V-4)	Planning search (C-5)	Control pressure (P-4)	5	S + 5.5

FUNCTION ANALYSIS

FUNCTION Maintain Separation Between Aircraft No. 28

TOTAL TIME 40.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
110 Monitor	A/C movement	Visual sensor display VD	Visual, detect movement (V-2)	Verify relative position (C-2)	----	15	S + 15.5
105 Maintain	Separation	Flight controls; outside visual; sensor display FVD	Visual, detect relative movement (V-2)	Adjustments needed (C-1)	Control pressure (P-4)	40	S + 40.5
							Time estimate for PE 1 overlaps continuous PE 2. PE 2 time will vary with mission requirements.

FUNCTION ANALYSIS

No. 29

FUNCTION Maneuver NOE

TOTAL TIME 80 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
103 Maintain	Obstacle clearance	Outside visual Flight controls FV	Visual detect (V-2)	Verify clearance (C-2)	Control pressures (P-4)	80	S + 80
12 Adjust	Flight modes	Outside visual Flight controls FV	Visual detect movement (V-2)	Select appropriate flight modes (C-3)	Control pressures (P-4)	80	S + 80
56 Check	Position	Outside visual Navigation display VND	Visual symbol (V-5)	Decoding (C-4)	Control pressures (P-4)	10	S + 10
164 Select	Flight path	Outside visual Navigation display VND	Visual symbol (V-5)	Selection (C-3)	----	3	S + 3
92 Follow	Course	Navigation display, flight controls NDF	Visual symbol (V-5)	Anticipating directional adjustments (C-5)	Control pressures (P-4)	80	S + 80 - PE 1, 2, and 5 continuous during entire function, overlapping discrete PE 3 and 4.

FUNCTION ANALYSIS

FUNCTION Mask Aircraft, Lateral

METHOD

No. 30

TOTAL TIME 11.5 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
40 Check	Obstacle clearance (lateral)	Outside visual field V	Visual inspection (V-1)	Adequate clearance (C-2)	----	2	S + 2.5
84 Establish	Drift	Flight controls F	Visual, relative movement (V-2)	Control adjust needed (C-1)	Control pressures (P-4)	5	2.0 - 7
181 Stabilize	Aircraft	Flight controls Outside visual field FV	Visual detect movement (V-2)	Control adjustment needed? (C-1)	Control pressures (P-4)	5	6.5 - 11.5
All three PEs overlap. Subtract 1 second overlap between PE 1 and 2; and 1 second overlap between 2 and 3.							

FUNCTION ANALYSIS

No. 31

FUNCTION Mask Aircraft, Vertical

TOTAL TIME 14 seconds

(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
43 Check	Obstacle clearance (lateral and vertical)	Outside visual field V	Visual inspect clearance (V-1)	Verify descent path clear (C-2)	----	5	S + 5.5
143 Reduce	Altitude	Flight controls Outside visual field FV	Visual relative movement (V-2)	Control adjustment needed (C-1)	Control pressures (P-4)	5	5 - 10
181 Stabilize	Aircraft	Flight controls Outside visual field FV	Visual detect relative movement (V-2)	Control adjustment needed (C-1)	Control pressures (P-4)	5	9 - 14
All three PEs overlap in time. Subtract 1 second overlap between PE 1 and PE 2 and 1 second overlap between PE 2 and 3.							

FUNCTION ANALYSIS

No. 32

FUNCTION Monitor Terrain, Aerial Approaches

TOTAL TIME 30.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
177 Slew	Sensors	Sensor control AC	Visual survey (V-1)	Were to point (C-3)	Sensor control pressures (P-4)	5	S + 5.5
107 Monitor	Approaches	Sensor display scene AS	Visual survey (V-1)	Select slew rate (C-3)	Sensor control pressures (P-4)	30	5 + 30.5
24 Align	Sight	Sensor display (sight) ADS	Visual align (V-4)	Possible sighting? (C-2)	Sensor control pressures (P-4)	5	6 + 30.5
36 Select	Narrow FOV	Sensor control FOV ACF	Visual monitor (V-1)	Sighting centered (C-1)	Switch activation (P-1)	1.0	11.5 + 30.5
							Continuous PEs 1 and 2 overlap each other and PE 3 and 4. PE 3 and 4 will be repetitive during the function period whenever a possible sighting occurs.

FUNCTION ANALYSIS

No. 33

FUNCTION Monitor Threat Warning Displays

TOTAL TIME 5.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
112 Monitor	Threat displays	Threat displays DT	Auditory, visual, signal detection (V-2) (A-2)	Signal recognition (C-2)	----	5	S + 5.5

FUNCTION ANALYSIS

No. 34

FUNCTION Perform Evasive Maneuvers

TOTAL TIME 30 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
140 Perform	Hard turns	Flight controls F	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	30	S + 30
35 Change	Altitude sharply	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	15	S + 15
34 Change	Airspeed	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	4	S + 4

FUNCTION ANALYSIS

No. 35

FUNCTION Prepare Report

TOTAL TIME 121 seconds
(APPROXIMATE)

METHOD Digital Message Device

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
61 Clear	Display	Message device CM	Visual symbol (V-5)	Ready? (C-2)	Switch activation (P-1)	3	S + 3.5
54 Check	Transmission mode	Message device, CM	Visual symbol (V-5)	Right radio? Secure? (C-3)	Switch activation (P-1)	2	4 - 6
160 Select	Format	Message device CM	Visual symbol (V-5)	Proper format? (C-5)	Serial discrete (P-7)	2	6.5 - 8.5
82 Enter	Message	Message device CM	Visual symbol (V-5)	Encoding (C-4)	Serial discrete (P-7)	108.5	9 - 117.5
80 Enter	Address code(s)	Message device CM	Visual symbol (V-5)	Correct address code? (C-3)	Serial discrete (P-7)	3	118 - 121

FUNCTION ANALYSIS

FUNCTION Prepare Weapon, Fire and Forget/Cannon No. 36

TOTAL TIME 7 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
171 Select	Weapon	Fire control (panel) IP	Visual symbolic (V-5)	Selection (C-3)	Switch activation (P-1)	5	S + 5.5
57 Check	Weapon status	Fire control display ID	Visual symbolic (V-5)	Verify (C-2)	----	1	6 - 7

FUNCTION ANALYSIS

No. 37

FUNCTION Prepare Weapon, Laser-Guided

METHOD

TOTAL TIME 12.5 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SEGS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
171 Select	Weapon	Fire control panel IP	Visual symbolic (V-5)	Selection (C-3) (P-1)	Switch activation	5	S + 5.5
149 Select	Laser code	Fire control panel IP	Visual symbolic (V-5)	Enter code (C-4)	Control switches (P-1)	5	6 - 11
57 Check	Weapon status	Fire control display ID	Visual symbolic (P-5)	Verify (C-2)	----	1	11.5 - 12.5

FUNCTION ANALYSIS

No. 38

FUNCTION Receive Handoff

TOTAL TIME 38.5 seconds
(APPROXIMATE)

METHOD Laser Cueing

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
128 Note	Message alert	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	5	S + 5.5
196 Transmit	Message (brief) Ack/Ready	Communication systems CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	5	6 - 11
177 Slew	Sensor	Sensor control AC	Visual monitor (V-1)	Where to point (C-3)	Control pressures (P-4)	5	11.5 - 16.5
120 Note	Alert (lasing)	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	5	17 - 22
76 Detect	Cueing symbol	Sensor display AT	Visual symbol (V-5)	Signal recog (C-2)	----	5	22.5 - 27.5
16 Align	Sight reticle	Sensor control ACS	Visual align (V-4)	Automatic (C-1)	Control pressures (P-4)	5	28 - 33
196 Transmit	Ack message (target detected)	Communication system CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	5	33.5 - 38.5

FUNCTION ANALYSIS

FUNCTION Receive Message, Designation Coordination No. 39

TOTAL TIME 10.5 seconds
(APPROXIMATE)

METHOD Digital

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
129 Note	Message alert	Message device CM	Auditory detect Visual symbol (A-1) (V-5)	Signal recognition (C-2)	----	2	S + 2.5
173 Send	Message (Ack/Ready)	Message device CM	Visual symbol Auditory symbol (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	.5	3 - 3.5
134 Note	"Splash" signal	Message display? CD	Visual symbol Auditory signal (V-5) (A-1)	Signal recognition (C-2)	----	2	8.5 - 10.5

FUNCTION ANALYSIS

No. 40

FUNCTION Receive Message, Standard

TOTAL TIME 30 seconds
(APPROXIMATE)

METHOD Digital

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
129 Note	Message alert	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Signal recog (C-2)	----	2	S + 2.5
173 Send	Message (Ack/Ready)	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	.5	3 - 3.5
121 Note	Message content	Message display CM	Visual read (V-7)	Decoding (C-4)	----	25	4.0 - 29
173 Send	Message (Ack/Roger)	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	.5	29.5 - 30

FUNCTION ANALYSIS

No. 41

FUNCTION Receive Message (Standard)

TOTAL TIME 53 seconds
(APPROXIMATE)

METHOD Radio, Voice

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
128 Note	Message alert	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	5 + 5.5
196 Transmit	Message (brief) Ack/Ready	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	6 - 11.5
127 Note	Message	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)		12 - 37
70 Copy	Data	Personal Equipment Cockpit items P	Visual symbolic (V-5)	Encoding (C-4)	Symbolic production (P-6)	37.5 - 47.5
196 Transmit	Message (brief) Ack/Roger	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activator (P-1, P-3)	48 - 53

FUNCTION ANALYSIS

TOTAL TIME 40.5 seconds		FUNCTION	Record Target Data	No. 42
(APPROXIMATE)		METHOD		

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
61 Clear	Display	Message device CM	Visual symbolic (V-5)	Verify ready (C-2)	Switch activation (P-1)	3	S + 3.5
81 Enter	Target data	Target keyboard system (FCC) AK	Visual symbolic (V-5)	Encoding (C-4)	Data entry (P-7)	35	4 - 39
189 Store	Target data	Target keyboard system (FCC) AK	Visual symbolic (V-5)	Select storage option (C-3)	Switch activation (P-1)	1	39.5 - 40.5

FUNCTION ANALYSIS

No. 43

FUNCTION Respond to Threat Warning Signal

TOTAL TIME 7 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
133 Note	Acquisition/ lock-on signal	Threat warning display DT	Auditory interpret (A-4)	Decoding (C-4)	----	.5	S + 1.0
90 Estimate	Signal bearing/ distance	Threat warning display DTV	Visual align, (V-4)	Signal evaluation (C-6)	----	3	1.5 - 4.5
01 Activate	Chaff dispenser	Chaff dispenser switch SC	Visual symbol (V-5)	Select option (C-3)	Switch activation (P-1)	2	5 - 7

FUNCTION ANALYSIS

No. 44

FUNCTION Stabilize Aircraft

TOTAL TIME 5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
63 Control	Altitude	Flight controls F	Detect vertical movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	S + 5
64 Control	Drift	Flight controls F	Detect horizontal movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	S + 5
66 Control	Heading	Flight controls F	Detect yaw (V-2)	S-R (C-1)	Control pressures (P-4)	5	S + 5
43 Check	Obstacle clearance	Outside visual field V	Visual monitor (V-1)	Verify clear (C-2)	----	5	S + 5

FUNCTION ANALYSIS

No. 45

TOTAL TIME 25 seconds
(APPROXIMATE)

FUNCTION Survey Target Area

METHOD Automatic Search

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
148 Select	Auto search	Sensor controls AC	Visual symbol (V-5)	Selection (C-3)	Switch activation (P-1)	1.5	S + 2.0
169 Select	Search pattern, coverage area	Sensor controls AC	Visual symbol (V-5)	Encoding (C-4)	Keyboard entries (P-7)	1.5	2.5 - 3.0
108 Monitor	Display	Sensor display scene AS	Visual survey (V-5)	Signal recognition (C-2)	----	25	S + 25

FUNCTION ANALYSIS

No. 46

FUNCTION Survey Target Area

METHOD Manual Control, Visual Search

TOTAL TIME 25 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
177 Slew	Sensor	Sensor controls AC	Visual survey (V-1)	Select rate, Direction (C-3)	Control pressures (P-4)	5	S + 5.5
108 Monitor	Display	Sensor display scene AS	Visual survey (V-1)	Sign, recog- nition (C-2)		25	S + 25 PE 1 time overlaps with PE 2.

FUNCTION ANALYSIS

No. 47

FUNCTION Survey Waypoint

TOTAL TIME 30 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
32 Approach	Waypoint	Navigation display ND	Visual symbolic (V-5)	Further movement needed? (C-5)		30	S + 30
210 Verify	Position	Outside visual map VM	Visual symbolic Visual survey (V-5, V-1)	Evaluative (C-6)	Map orientation (P-5)	10	S + 10

FUNCTION ANALYSIS

No. 48

FUNCTION Track Target

TOTAL TIME 45 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control sight ACS	Visual align (V-4)	Target center (C-1)	Control pressures (P-4)	5	S + 5.5
194 Track	Target	Sensor controls AC	Visual align (V-4)	Slew rate (C-3)	Control pressure (P-4)	45	6 - 45

FUNCTION ANALYSIS

TOTAL TIME 16 seconds
 (APPROXIMATE)

FUNCTION Transmit Message (Brief) No. 49

METHOD Voice, Brief

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
150 Select	Comm. channel and security	Communication system (select) CS	Visual symbolic (V-5)	Correct channel? (C-3)	Switch activation speech (P-1, P-3)	10	S + 10.5
196 Transmit	Message (brief)	Communication system (transmit) CT	Auditory speech feedback (A-3)	Message content (C-4)	Switch activation speech (P-1, P-3)	5	11 - 16

FUNCTION ANALYSIS

No. 50

FUNCTION Transmit Message (Standard)

TOTAL TIME 37 seconds
(APPROXIMATE)

METHOD Voice

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
196 Transmit	Message (brief) alert	Communication systems (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	5 + 5.5
113 Note	Ack/ready	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	6 - 11
206 Transmit	Message (standard)	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	11.5 - 31.5
113 Note	Ack	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	32 - 37

FUNCTION ANALYSIS

TOTAL TIME 7 seconds (APPROXIMATE)		FUNCTION Transmit Report	No. 51
		METHOD Digital	

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
173 Send	Message (alert, Ident code)	Message device CM	Visual symbol (V-5) (A-1)	Message sent? (C-3)	Button (P-1)	S + 1.0
118 Note	Acknowledgement, Authentication code	Message display CM	Visual symbol Auditory signal (V-5) (A-1)	Authentic reply? (C-6)	----	1.5 - 3.5
173 Send	Message	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	4 - 4.5
118 Note	Acknowledgement, Authentication code	Message display CD	Visual symbol Auditory signal (V-5) (A-1)	Authentic reply? (C-6)	----	5 - 7

FUNCTION ANALYSIS

No. 57

FUNCTION Unmask Aircraft, Lateral

TOTAL TIME 21 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) - DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
40 Check	Lateral clearance	Outside visual field V	Visual inspect (V-1)	Adequate clearance? (C-2)	----	2	S + 2.5
84 Establish	Drift	Flight control F	Visual monitor, relative movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	3 - 8
181 Stabilize	Aircraft	Flight controls, Outside visual field FV	Visual, detect relative movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	8.5 - 13.5
59 Check	Weapon path clear	Outside visual field V	Visual orient (V-4)	Verify weapon path clear	----	7	14 - 21

FUNCTION ANALYSIS

FUNCTION Unmask Aircraft. Vertical

No. 53

TOTAL TIME 18 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE		
101 Increase	Altitude	Flight controls sensors visual field FVD	Visual, detect movement (V-2)	Verify LOS target clear (C-2)	10	S + 10.5
64 Control	Drift	Flight controls F	Detect horizon- tal move- ment (V-2)	S-R (C-1)	5	S + 18
66 Control	Heading	Flight controls F	Detect rotation (V-2)	S-R (C-1)	5	S + 18
59 Check	Weapon path clear	Visual field V	Visual orienta- tion (V-4)	Verify clear of obstacles (C-2)	7	11 - 18
181 Stabilize	Aircraft	Flight controls, Outside visual field FV	Visual detect movement (V-2)	S-R (C-1)	5	11 - 16 PE 2 and 3 occur simultaneously and continuously during total time.

FUNCTION ANALYSIS

No. 54

FUNCTION Unmask Sensor

TOTAL TIME 21.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
101 Increase	Altitude	Flight controls FVD	Visual detect movement (V-2)	Verify LOS target clear (C-2)	Control pressures (P-4)	10	S + 10.5
53 Check	Sensor LOS	Sensor display, controls ADC	Visual survey (V-1)	Verify clear (C-2)	Control pressures (P-4)	5	11 - 16
181 Stabilize	Aircraft	Flight controls FV	Visual, detect movement (V-2)	Adjustments necessary (C-1)	Control pressures (P-4)	5	16.5 - 21.5

FUNCTION ANALYSIS

TOTAL TIME 19.5 seconds		FUNCTION Update Doppler	No. 55	
(APPROXIMATE)		METHOD	Overfly Stored Waypoint	

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
100 Identify	Waypoint	Outside visual, map VM	Visual discrimination (V-6)	Confirm location (C-6)	Orient map (P-5)	5	S + 5.5
163 Select	Update mode, preset waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall position number (C-4)	Discrete adjustment (P-2)	1.0	6.0 - 7.0
137 Overfly	Landmark	Flight controls outside visual field FV	Visual track (V-3)	Select heading (C-3)		5	7.5 - 12.5
09 Activate	Update switch	Navigation controls NC	Visual symbolic (V-5)	Verify over landmark (C-2)	Switch activation (P-1)	1	13 - 14
161 Select	Navigation mode, next waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall waypoint desired (C-4)	Discrete adjustment (P-2)	5	14.5 - 19.5

FUNCTION ANALYSIS

No. 56

FUNCTION Update Doppler
METHOD Remote Landmark

TOTAL TIME 22.5 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
94 Identify	Landmark	Sensor scene display NSM	Visual discrim (V-6)	Confirm land- mark (C-6)	Orient map (P-5)	5	S + 5.5
152 Select	Preset coordi- nates	Navigation controls NC	Visual symbolic (V-5)	Recall posi- tion number (C-4)	Discrete adjustment (P-2)	1	6 - 7.0
167 Select	Remote update doppler	Navigation controls NC	Visual symbolic (V-5)	Recall posi- tion number (C-4)	Switch activation (P-1)	1	7.5 - 9.0
24 Align	Sight on landmark	Sensor display/ sight ADS	Visual alignment (V-4)	Verify land- mark centered (C-2)	Control Pressures (P-4)	5	9.5 - 14.5
04 Activate	Laser range finder	Laser range finder AL	Visual Align (V-4)	Verify feature lased (C-2)	Switch activation (P-1)	1.5	15 - 16.5
09 Activate	Update (remote)	Navigation controls NC	Visual symbolic (V-5)	Verify update (C-2) (C-4)	Switch activation (P-1)	1	17.0 - 18.0
161 Select	Nav mode, next waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall way- point desired (C-4)	Discrete adjustment (P-2)	5	18.5 - 22.5

FUNCTION ANALYSIS

TOTAL TIME 22.5 seconds (APPROXIMATE)		FUNCTION Estimate Adjustments		No. 57	
		METHOD Automatic			

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
36 Select	Wide FOV	Sensor controls FOV ACF	Visual monitor (V-1)	Adjustment needed (C-1)	Switch activation (P-1)	S + 1.5
126 Note	Impact point	Sensor scene display AS	Visual detect (V-2)	Verify impact (C-3)	----	2 - 7
16 Align	Sight reticle on impact point	Sensor control sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	7.5 - 12.5
36 Select	Narrow FOV	Sensor control FOV ACF	Visual monitor (V-1)	Adjustment needed (C-1)	Switch activation (P-1)	13 - 14
16 Align	Sight reticle on impact point	Sensor control sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	14.5 - 19.5
04 Activate	Laser range finder	Laser range finder AL	Visual alignment (V-4)	Verify laser on spot (C-2)	Switch activation (P-1)	20 - 21.5
122 Note	Impact coordinates	Sensor display NDC	Visual symbolic (V-5)	Decoding (C-4)	----	22 - 22.5

FUNCTION ANALYSIS

FUNCTION Engagement, Air-to-Air

No. 58

TOTAL TIME 20 seconds
(APPROXIMATE)

METHOD Establish Attack Run

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
86 Establish	Attack run	Outside visual flight controls FV	Visual, direction (V-4)	Establish closure course (C-3)	Control pressures (P-4)	20	S + 20
91 Fly	Intercept headings	Outside visual flight controls FV	Visual, relative movement (V-4)	Stop relative movement (C-3)	Control pressures (P-4)	20	S + 20
106 Monitor	Airspeed	Flight instrument displays FD	Visual, symbolic (V-2)	Check maximum airspeed (C-3)	----	1	S + 1

A P P E N D I X D

SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS
(INITIAL ANALYSES—SINGLE CREWMEMBER)

A P P E N D I X D T A B L E O F C O N T E N T S

Page

R E C O N N A I S S A N C E P H A S E

Segment 1.	Bomb Damage Assessment	D-5
Segment 2.	Evade Radar Lock-On	D-6
Segment 3.	Reconnaissance, General	D-7
Segment 4.	Record Sightings	D-9
Segment 5.	Tactical Movement.....	D-10
Segment 6.	Transmit Report, Digital.....	D-11

T A R G E T S E R V I C E

Segment 7.	Acquisition , Auto Search.....	D-12
Segment 8.	Acquisition, From Laser Cueing	D-13
Segment 9.	Adjustments, Area Weapons, Digital	D-14
Segment 10.	Adjustments, Area Weapons, Voice	D-15
Segment 11.	Designate for PGM	D-16
Segment 12.	Engagement, Air-to-Ground, Autonomous, LOAL	D-17
Segment 13.	Engagement, Ground Target, Autonomous, LOBL	D-18
Segment 14.	Engagement, Ground Target, Remote Designation	D-19
Segment 15.	Engagement, Soft Targets, Cannon Fire, Hover	D-21
Segment 16.	Engagement, Soft Targets, FFAR, Direct	D-23
Segment 17.	Handoff, Ground Target, Digital	D-25
Segment 18.	Handoff, Ground Target, Voice	D-26
Segment 19.	Handoff Target, Laser Cueing	D-27
Segment 20.	Holding Checks	D-28
Segment 21.	Overwatch	D-29
Segment 22.	Receive Handoff, Voice	D-30
Segment 23.	Team Coordination	D-31

T A R G E T S E R V I C E , A I R - T O - A I R

Segment 24.	Acquisition , Free Search.....	D-32
Segment 25.	Engagement Air-to-Air From Masked Position	D-33
Segment 26.	Engagement Air-to-Air, Running Fire, Cannon	D-34
Segment 27.	Engagement Air-to-Air, Running Fire, Missile	D-35
Segment 28.	Handoff Aerial Threat, Voice	D-36
Segment 29.	Receive Handoff, Voice	D-37

FUNCTION NO.	FUNCTION
01	Acquire Position Data, Automatic
02	Acquire Position Data, Shift From Known Point
03	Align Heading on Target Bearing
04	Assess Damage
05	Check Aircraft Systems (Holding)
06	Check A/C Systems (Power Change)
07	Check Course Required
08	Check Sensor Operation
09	Check Sights
10	Coordinate Mission
11	Coordinate Target Selection
12	Deploy to Cover
13	Designate Target
14	Detect Aerial Threat, Automatic Search, Cueing
15	Detect Aerial Threat, Unaided
16	Detect Target (Ground), Free Search
17	Detect Target, Prepoint, Auto Cueing
18	Establish Position (Firing or Observation)
19	Estimate Range, Automatic
20	Estimate Range, Unaided Estimation
21	Evaluate Position
22	Fire Cannon
23	Fire Weapon
24	Handoff Target, Laser Cueing
25	Hover Masked
26	Identify Target
27	Maintain LOS With Target
28	Maintain Separation Between Aircraft
29	Maneuver NOE
30	Mask Aircraft, Lateral
31	Mask Aircraft, Vertical
32	Monitor Terrain, Aerial Approaches

FUNCTION NO.	FUNCTION
33	Monitor Threat Warning Displays
34	Perform Evasive Maneuvers
35	Prepare Report, Digital Message Device
36	Prepare Weapon, Fire and Forget/Cannon
37	Prepare Weapon, Laser Cueing
38	-Receive Handoff, Laser Cueing
39	Receive Message, Designation Coordination, Digital
40	Receive Message, Standard, Digital
41	Receive Message (Standard), Radio, Voice
42	Record Target Data
43	Respond to Threat Warning Signal
44	Stabilize Aircraft
45	Survey Target Area, Automatic Search
46	Survey Target Area, Manual Control, Visual Search
47	Survey Waypoint
48	Track Target
49	Transmit Message (Brief), Voice, Brief
50	Transmit Message (Standard), Voice
51	Transmit Report, Digital
52	Unmask Aircraft, Lateral
53	Unmask Aircraft, Vertical
54	Unmask Sensor
55	Update Doppler, Overfly Stored Waypoint
56	Update Doppler, Remote Landmark
57	Estimate Adjustments, Automatic
58	Engagement, Air-to-Air, Establish Attack Run

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase RECONNAISSANCE

Segment 1: BOMB DAMAGE ASSESSMENT

Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		2	4	33	2	2	2							4	2	4	4
20		5		4	4											5		4	4
30	18	1		3	4											1		3	4
40		5		5	4											5		5	4
50	25	2		1	4											2		1	4
60		2		1	4	06	5		2							7		3	4
70	54	2		1	4											2		1	4
80		2		2	4						46	5		3	4	7		5	8
90		2		2	4							5		3	4	7		5	8
100		2		2	4							5		3	4	7		5	8
110		2		2	4						04	6		7		8		9	
120		2		2	4							6		7		8		9	
130	25	2		1	4							7		4	7	9		5	11
140		2		1	4							7		4	7	9		5	11
150		2		1	4							7		4	7	9		5	11
160		2		1	4							7		4	7	9		5	11
170		2		1	4	51	5	1	6	1						7	1	7	5
180		2		1	4		5	1	6	1						7	1	7	5

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase RECONNAISSANCE

Segment 2: EVADE RADAR LOCK-ON

Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		3	4											2		3	4
20	34	5		5	4	43		4	4							5	4	9	4
30	12	2		5	4		5	4	6							7	4	11	4
40		2		6	4											2		6	4
50	25	2		1	4											2		1	4
60		2		2	4	49	5	1	4	3						7	1	6	7
70																			
80																			
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase RECONNAISSANCE

Segment 3: RECONNAISSANCE, GENERAL

Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		3	4											2		3	4
20		5		4	4	33	2	2	2							7	2	6	4
30		5		5	4											5		5	4
40	18	1		3	4											1		3	4
50		6		5	4											6		5	4
60		6		6	5											6		6	5
70		2		2	4	06	5		2							7		4	4
80	54	2		2	4											2		2	4
90		2		2	4	33		2	2							4	2	4	4
100		2		2	4						45	5		4	7	7		6	11
110		2		2	4							5		2		7		4	4
120		2		2	4							5		2		7		4	4
130	25	2		2	4											2		2	4
140		2		2	4	42	5		2	1						7		4	5
150		2		2	4		5		4	7						7		6	11
160		2		2	4		5		4	7						7		6	11
170		2		2	4		5		4	7						7		6	11
180		2		2	4		5		3	1						7		5	5

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase RECONNAISSANCE

Segment 3: RECONNAISSANCE, GENERAL (Cont.) Method

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
190		2		2	4		5		3	1					7	5 5
200		2		2	4		5		5	7					7	7 11
210		2		2	4		5		4	7					7	6 11
220		2		2	4		5		4	7					7	6 11
230		2		2	4		5		4	7					7	6 11
240		2		2	4		5		4	7					7	6 11
250		2		2	4		5		4	7					7	6 11
260		2		2	4		5		4	7					7	6 11
270		2		2	4		5		4	7					7	6 11
280		2		2	4	51	5	1	2	1	45				7	1 4 5
290		2		2	4		5	1	6	1					7	1 8 5
300	54	2		2	4										2	2 4
310		2		2	4	55	6		6	5					8	8 9
320		2		2	4		5		4	2					7	6 6
330		2		2	4						32	1		3	4	3 5 8
340		2		2	4							4		4	4	6 6 8
350	29	2		3	4										2	3 4
360		5		4	4										5	4 4

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase RECONNAISSANCE

Segment 4: RECORD SIGHTINGS

Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
10	25	2		2	4	06	5		2				7		4	4
20	54	2		2	4								2		2	4
30		2		1	4								2		1	4
40		2		2	4	56	6		6	5			8		8	9
50		2		2	4		5		4	2			7		6	6
60		2		2	4		5		4	4			7		6	8
70		2		2	4						45	5		4	7	11
80		2		2	4							5		2	7	11
90		2		2	4							5		2	7	11
100		2		2	4						01	4		1	4	8
110		2		2	4							5		4	1	5
120	31	1		2									1		2	
130		2		1	4	55							2		1	4
140	25	2		2	4								2		2	4
150		2		2	4	42	5		2	1			7		4	5
160		2		2	4		5		4	7			7		6	11
170	29	2		2	4		5		4	7			7		6	11
180		2		2	4		5		3	1			7		5	11

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS---SINGLE CREWMEMBER

Phase RECONNAISSANCE

Segment 5: TACTICAL MOVEMENT

Method _____

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		1	4	06	5		2							7		3	4
20		2		1	4	07	5		5	2						7		6	6
30	54	2		1	4											2		1	4
40		2		2	4						32	1		3	4	3		5	8
50		2		2	4							1		3	4	3		5	8
60		2		2	4							4		4	4	6		6	8
70		2		2	4	49	5	1	4	3						7	1	6	7
80	29	2		3	4											2		3	4
90		5		4	4						32	1		3	4	6		7	8
100		5		5	4							1		3	4	6		8	8
110		5		5	4							4		4	4	9		9	8
120	30	2		2	4											2		2	4
130	54	2		1	4	33	2	2	2							4	2	3	4
140		2		2	4						32	1		3	4	3		5	8
150		2		2	4							1		3	4	3		5	8
160		2		2	4							4		4	4	6		6	8
170		2		2	4	49	5	1	4	3						7	1	6	7
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase RECONNAISSANCE

Segment 6: TRANSMIT REPORT

Method DIGITAL

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
10	25	2		2	4	06	5		2				7		4	4
20		2		2	4	35	5		3	1			7		5	5
30		2		2	4		5		5	7			7		7	11
40		2		2	4		5		5	7			7		7	11
50		2		2	4		5		5	7			7		7	11
60		2		2	4		5		5	7			7		7	11
70		2		2	4		5		5	7			7		7	11
80		2		2	4		5		5	7			7		7	11
90		2		2	4		5		5	7			7		7	11
100		2		2	4		5		5	7			7		7	11
110		2		2	4		5		5	7			7		7	11
120		2		2	4		5		5	7			7		7	11
130		2		2	4		5		5	7			7		7	11
140		2		2	4		5		5	7			7		7	11
150		2		2	4	51	5	1	6	1			7	1	8	5
160		2		2	4		5	1	6	1			7	1	8	5
170																
180																

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE

Segment 7: ACQUISITION

Method AUTO SEARCH

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		3	4	49	5	1	4	3						7	1	7	7
20		5		4												5		4	
30		5		5	4											5		5	4
40	25	2		2	4	06	5		2							7		4	4
50		2		2	4											2		2	4
60	54	2		1	4											2		1	4
70		2		2	4	33	2	2	2							2	2	4	4
80		2		2	4	56	6		4	5						8		6	9
90		2		2	4		5		4	4						7		6	8
100		2		2	4		5		4	2						7		6	6
110		2		2	4						45	5		4	7	7		6	11
120		2		2	4							5		2		7		4	4
130		2		2	4							5		2		7		4	4
140		2		2	4						16	4		6	4	6		8	8
150		2		2	4						26	6		6	4	8		8	8
160		2		2	4						01	5		4	4	7		6	8
170	31	2		2	4											2		2	4
180		2		1	4											2		1	4

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE

Segment 8: ACQUISITION

Method FROM LASER CUEING

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
10	25	2		1	4	06	5		2					7		3 4
20		2		2	4									2		2 4
30		2		2	4						38		3	4	3	2 3 6 7
40	54	2		1	4							1		3	4	3 4 8
50		2		1	4								3	4		2 3 5 4
60		2		1	4							2		2		4 3 4
70		2		1	4							4		4		6 5 8
80		2		1	4	49	5		4	3						7 5 7
90																
100																
110																
120		2		2	4		6		6	4						
130		2		2	4				7							
140																
150																
160																
170																
180																

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 9: ADJUSTMENTS, AREA WEAPONS

Method DIGITAL

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		2	4	06	5		2							7		4	4
20		2		2	4											2		2	4
30		2		2	4	39	5	1	3	1						7	1	5	5
40	54	2		2	4											2		2	4
50		2		2	4						46	3		3	4	5		5	8
60		2		2	4							5		2	4	5		4	8
70		2		2	4						01	5		1	4	7		3	8
80	31	2		2	4											2		2	4
90	25	2		2	4	42	5		4	7						7		6	11
100		2		2	4		5		3	1						7		5	5
110		2		2	4	51	5	1	6	1						7	1	8	5
120		2		2	4		5	1	6	1						7	1	8	5
130		2		2	4											2		2	4
140		2		2	4											2		2	4
150		2		2	4											2		2	4
160		2		2	4											2		2	4
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE

Segment 10: ADJUSTMENTS, AREA WEAPONS

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
10	25	2		1	4	06	5		2				7		3	4
20		2		2	4								2		2	4
30		2		2	4	41		3	4	3			2	3	6	7
40		2		2	4			3	4	3			2	3	6	7
50	54	2		1	4						46	3		3	4	8
60		2		2	4							5		2	4	8
70		2		2	4						57	4		3	1	5
80		2		2	4							4		1	4	8
90		2		2	4							5		4	4	8
100	31	2		2	4								2		2	4
110		2		1	4								2		1	4
120						49	5		4	3			5		4	3
130																
140																
150																
160																
170																
180																

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 11: DESIGNATE FOR PGM

Method

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4											2		2	4
20		2		2	4	33	2	2	2							4	2	4	4
30		2		2	4						48	4		3	4	6		5	8
40		2		2	4	40	2	1	3	1						4	1	5	5
50		2		2	4		7		4							9		6	4
60		2		2	4		7		4							9		6	4
70		2		2	4		2	1	3	1						4	1	5	5
80		2		2	4	39	5	1	3	1						7	1	5	5
90		2		2	4		5	1	2							7	1	4	4
100		2		2	4						13	5		2	4	7		4	8
110		2		2	4							5		2	1	7		4	5
120		2		2	4							5		2	1	7		4	5
130	12	2		5	4											2		5	4
140		2		6	4											2		6	4
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE

Segment 12: ENGAGEMENT, AIR-TO-GROUND

Method AUTONOMOUS, LOAL

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4											2		2	4
20		2		2	4	33	2	2	2							4	2	4	4
30		2		2	4						48	4		3	4	6		5	8
40		2		2	4							4		3	4	6		5	8
50		2		2	4						01	5		4		7		6	4
60		2		2	4						37	5		4	1	7		6	5
70		2		2	4							5		2		7		4	4
80	03	4		5	4											4		5	4
90		2		1	4											2		1	4
100	53	1		2	4											1		2	4
110		2		1	4											2		1	4
120		2		2	4	13	5		2	4						7		4	8
130		2		2	4		5		2	1	23	5		6	4	12		10	9
140		2		2	4		5		2	1		5	1	2	1	12		6	6
150		2		2	4		5		2	1						7		4	5
160		2		2	2		5		2	1						7		4	5
170	12	2		5	4											2		5	4
180		2		6	4											2		6	4

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 13: ENGAGEMENT, GROUND TARGET

Method AUTONOMOUS, LOBL

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		1	4	33	2	2	2							4	2	3	4
20		2		1	4						48	4		3	4	6		4	8
30		2		2	4	19	4		2	4		4		3	4	10		7	12
40		2		2	4		5	1	6	1		4		3	4	11	1	11	9
50	03	4		5	4						37	5		4	1	9		9	5
60		4		5	4							5		4	1	9		9	5
70	53	2		2	4	13	4		1	4						6		3	8
80		2		2	4		5		2	1	57	4		3		11		7	5
90		4		2	4		5		2	1	23	5	1	6	4	14	1	10	9
100		4		2	4		5		2	1						9		4	5
110	12	2		5	4											2		5	4
120		2		6	4											2		6	4
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 14: ENGAGEMENT, GROUND TARGET

Method REMOTE DESIGNATION

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		2	4	41		3	4	3						2	3	6	7
20		2		2	4			3	4							2	3	6	4
30		2		2	4			3	4							2	3	6	4
40		2		2	4		3		4	6						5		6	10
50		2		2	4			3	4	3						2	3	6	7
60		2		2	4	42	5		2	1						7		4	5
70		2		2	4		5		4	7						7		6	11
80		2		2	4		5		4	7						7		6	11
90		2		2	4		5		4	7						7		6	11
100		2		2	4		5		4	7						7		6	11
110		2		2	4	07	5		5	2						7		7	6
120	29	5		5	4											5		5	4
130		5		5	4											5		5	4
140	25	2		2	4	55	6		6	5						8		8	9
150		2		2	4		5		4	2						7		6	6
160		2		2	4	06			1							2		3	4
170		2		2	4		5		2							7		4	4
180		2		2	4						37	5		4	1	7		6	5

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 14: ENGAGEMENT, GROUND TARGET (Cont.) Method REMOTE DESIGNATION

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
190		2		2	4							5		4	1	7		6	5
200		2		2	4	50		3	4	3						2	3	6	7
210		2		2	4			3	4	3						2	3	6	7
220		2		2	4			3	4	3						2	3	6	7
230		2		2	4			3	4	3						2	3	6	7
240	53 a-c	2		2	4											2		2	4
250	d	4		2	4											4		2	4
260		2		1	4											2		1	4
270		2		1	4						23	5	1	6	4	7	1	7	8
280		2		1	4	49		3	4	3						2	3	5	7
290	31	2		2	4											2		2	4
300		2		2	4											2		2	4
310																			
320																			
330																			
340																			
350																			
360																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 15: ENGAGEMENT, SOFT TARGETS

Method CANNON FIRE, HOVER

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	5		4	4											5		4	4
20	25	2		1	4											2		1	4
30		1		2		06	5		2							6		4	
40		2		1	4	41		3	4	3						2	3	5	7
50		2		1	4			3	4							2	3	5	4
60		2		1	4			3	4							2	3	5	4
70		2		1	4		5		4	6						7		5	10
80		2		1	4			3	4	3						2	3	5	7
90	29	5		4	4											5		4	4
100		5		4	4											5		4	4
110	18	6		5	4											6		5	4
120		6		6	4											6		6	4
130		2		1	4											2		1	4
140		2		1	4						36	5		3	1	7		4	5
150	03	4		5	4											4		5	4
160		2		1	4											2		1	4
170	53	2		2	4											2		2	4
180		4		2	4											4		2	4

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE

Segment 15: ENGAGEMENT, SOFT TARGETS (Cont.) Method CANNON FIRE, HOVER

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
190		2		1	4									2		1 4
200		2		1	4						01	5		4	4	7 5 8
210		2		1	4						22	3		2	1	5 3 5
220		2		1	4							5		2	4	7 3 8
230	12	2		5	4											2 5 4
240		2		6	4											2 6 4
250																
260																
270																
280																
290																
300																
310																
320																
330																
340																
350																
360																

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 16: ENGAGEMENT, SOFT TARGETS

Method FFAR, DIRECT

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
10	25	2		2	4	06	5		2				7		4	4
20		2		2	4	41		3	4	3			2	3	6	7
30		2		2	4			3	4				2	3	6	4
40		2		2	4		5		4	6			7		6	10
50		2		2	4			3	4	3			2	3	6	7
60		2		2	4	42	5		4	7			7		6	11
70		2		2	4		5		4	7			7		6	11
80		2		2	4		5		4	7			7		6	11
90		2		2	4		5		3	1			7		5	5
100		2		2	4	07	5		5	2			7		7	6
110	29	2		3	4								2		3	4
120		5		4									5		4	
130		5		5	4								5		5	4
140	18	6		6	5								6		6	5
150		6		6	4								6		6	4
160	25	2		2	4								2		2	4
170		2		2	4	50		3	4	3			2	3	6	7
180		2		2	4			3	4	3			2	3	6	7

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 16: ENGAGEMENT, SOFT TARGETS (Cont.)

Method FFAR, DIRECT

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
190		2		2	4	(Cont) 50		3	4							2	3	6	4
200		2		2	4						36	5		3	1	7		5	5
210	03	4		5	4											4		5	4
220		4		5	4											4		5	4
230	53	2		2	4											2		2	4
240		2		2	4											2		2	4
250		4		2	4											4		2	4
260		4		2	4						19	5		6	4	9		8	8
270		4		2	4						23	5		2	1	9		4	5
280	12	2		5	4											2		5	4
290		2		6	4											2		6	4
300																			
310																			
320																			
330																			
340																			
350																			
360																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 17: HANDOFF, GROUND TARGETS

Method DIGITAL

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4	33	2	2	2							4	2	4	4
20		2		2	4						01	5		4	4	7		6	8
30	31	2		2	4	42	5		4	7						7		6	11
40		2		2	4		5		4	7						7		6	11
50		2		2	4		5		4	7						7		6	11
60		2		2	4		5		4	7						7		6	11
70		2		2	4		5		4	7						7		6	11
80		2		2	4	51	5	1	6	1						7	1	8	5
90		2		2	4		5	1	6							7	1	8	4
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE

Segment 18: HANDOFF, GROUND TARGET

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4	33	2	2	2							4	2	4	4
20		2		1	4						27	3		3	4	5		4	8
30		2		2	4							4		5	4	6		7	8
40		2		2	4						48	4		3	4	6		5	8
50		2		2	4						01	5		4	4	7		6	8
60	31	1		2												1		2	
70		2		1	4											2		1	4
80		2		2	4	50		3	4	3						2	3	6	7
90		2		2	4			3	4	3						2	3	6	7
100		2		2	4			3	4							2	3	6	4
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE

Segment 19: HANDOFF TARGET

Method LASER CUEING

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4											2		2	4
20		2		2	4	33	2	2	2							4	2	4	4
30		2		2	4						48	4		3	4	6		5	8
40		2		2	4							4		3	4	6		5	8
50		2		2	4						24		3	4	3	2	3	6	7
60		2		2	4							4	3	4	4	6	3	6	8
70		2		2	4							2		2	1	4		4	5
80		2		2	4								3	4		2	3	6	4
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 20: HOLDING CHECKS

Method

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		2	4											2		2	4
20		2		2	4	55	6		6	5						8		8	9
30		2		2	4		5		4	2						7		6	6
40		2		2	4	05	5		6							7		8	4
50		2		2	4		5		2							7		4	4
60		2		2	4		6		6							8		8	4
70		2		2	4		5		2	1						7		4	5
80		2		2	4		6		6							8		8	4
90		2		2	4		7		6							9		8	4
100		2		2	4	08	6		6	1						8		8	5
110		2		2	4		6		6	2						8		8	6
120		2		2	4		6		6	2						8		8	6
130		2		2	4		6		6	2						8		8	6
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 21: OVERWATCH

Method

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	5		4	4											5		4	4
20		5		4	4											5		4	4
30	25	2		1	4	55	6		6	5						8		7	9
40		2		1	4		5		4							7		5	4
50		2		1	4	06	5		2							7		3	4
60	54	2		1	4	33	2	2	2							4	2	3	4
70		2		1	4						27	3		3	4	2		4	8
80		2		1	4							4		5	4	6		6	8
90		2		1	4						32	4		4	4	6		5	8
100		2		1	4						09	2		2	4	4		3	8
110		2		1	4							6		6	2	8		7	6
120		2		1	4											2		1	4
130	31	1		2		49	5		4	3						6		6	3
140		2		1	4											2		1	4
150	25	2		2	4											2		2	4
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE

Segment 22: RECEIVE HANDOFF

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		1	4	06	5		2							7		3	4
20		2		1	4	41		3	4	3						2	3	5	7
30		2		1	4			3	4							2	3	5	4
40		2		1	4			3	4							2	3	5	4
50		2		1	4		5	3	4	6						7	3	5	10
60		2		1	4			3	4	3						2	3	5	7
70		2		1	4	42	5		4	7						7		5	11
80		2		1	4		5		4	7						7		5	11
90		2		1	4		5		4	7						7		5	11
100		2		1	4		5		4	7						7		5	11
110		2		1	4	07	5		5	2						7		6	6
120																			
130																			
140																			
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE

Segment 23: TEAM COORDINATION

Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		3	4	33	2	2	2							4	2	5	4
20		5		3	4											5		3	4
30		5		3	4	06	5		2		46	5		3	4	10		5	4
40		5		3	4							5		3	4	10		6	8
50		5		3	4							5		3	4	10		6	8
60		5		3	4	50		3	4	3						10	3	10	11
70		5		3	4			3	4	3						5	3	7	7
80		5		3	4			3	4							5	3	7	4
90	18	6		5	4											6		5	4
100		6		6	5											6		6	5
110		2		1	4											2		1	4
120	54	2		1	4											2		1	4
130		2		2	4						32	1		3	4	3		5	8
140		2		2	4							4		4	4	6		6	8
150		2		2	4							4		3	4	6		5	8
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE, AIR-TO-AIR

Segment 24: ACQUISITION

Method FREE SEARCH

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		1	4	06	5		2							7		3	4
20	54	2		1	4											2		1	4
30		2		2	4	35	2	2	2							4	2	4	4
40		2		2	4						32	1		3	4	3		5	8
50		2		2	4							4		4	4	6		6	8
60		2		2	4						15	4		6	4	6		8	8
70		2		2	4							2		4		4		6	4
80		2		2	4	49	5	1	4	3						7	1	6	7
90		2		2	4						27	3		3	4	5		5	8
100		2		2	4							4		5	4	6		7	8
110		2		2	4	20	4		1	4						9		6	12
120		2		2	4		6		6	4						11		11	12
130		2		2	4				7							2		9	4
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE, AIR-TO-AIR

Segment 25: ENGAGEMENT AIR-TO-AIR

Method FROM MASKED POSITION

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
10	25	2		2	4	06	5		2					7		4
20		2		2	4		5		2					7		4
30	54	2		1	4									2		1
40		2		1	4						48	4		3	4	6
50	03	4		5	4							4		3	4	8
60		2		1	4							4		3	4	6
70		2		1	4	20	6		6	4					8	7
80		2		1	4		6		6	4					8	7
90		2		1	4				7						2	8
100		2		1	4				7						2	8
110		2		1	4						36	5		3	1	7
120	53	2		2	4										2	2
130		4		2	4										4	2
140		2		1	4						48	4		3	4	6
150		2		1	4							4		3	4	6
160		2		1	4						23	5	1	6	4	7
170	12	2		5	4										2	5
180		2		6	4										2	6

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE, AIR-TO-AIR

Segment 26: ENGAGEMENT AIR-TO-AIR

Method RUNNING FIRE, CANNON

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	58	4		3	4											4		3	4
20		4		3	4						36	5		3	1	9		6	5
30	28	2		2	4											2		2	4
40		2		2	4											2		2	4
50		2		2	4						22	5		2	4	7		4	8
60		2		2	4							5		2	4	7		4	8
70	12	2		5	4											2		5	4
80		2		6	4											2		6	4
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER**

Phase TARGET SERVICE, AIR-TO-AIR

Segment 27: ENGAGEMENT, AIR-TO-AIR

Method RUNNING FIRE, MISSILE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	58	4		3	4											4		3	4
20		4		3	4						36	5		3	1	9		6	5
30	03	4		5	4											4		5	4
40		4		5	4											4		5	4
50		4		5	4						23	5	1	6	4	9		11	8
60	12	2		5	4											2		5	4
70		2		5	4											2		5	4
80		2		5	4	06	5		2							7		7	4
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE, AIR-TO-AIR

Segment 28: HANDOFF AERIAL THREAT

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		2	4	06	5		2							7		4	4
20	54	2		2	4											2		2	4
30		2		2	4	33	2	2	2							4	2	4	4
40		2		2	4						32	1		3	4	3		5	8
50		2		2	4							4		4	4	6		6	8
60		2		2	4						15	4		6	4	6		8	8
70		2		2	4							2		4		4		6	4
80		2		2	4	49	5	1	3	1	27	3		3	4	10	1	8	9
90		2		2	4	50		3	4	3		4		5	4	6	3	11	11
100		2		2	4			3	4	3						2	3	6	7
110		2		2	4			3	4	3						2	3	6	7
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--SINGLE CREWMEMBER

Phase TARGET SERVICE, AIR-TO-AIR

Segment 29: RECEIVE HANDOFF

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	2		2	4	06	5		2							7		4	4
20		2		2	4											2		2	4
30	54	2		1	4	33	2	2	2							4	2	3	4
40		2		2	4						32	1		3	4	3		5	8
50		2		2	4							4		4	4	6		6	8
60		2		2	4	41		3	4	3						2	3	6	7
70		2		2	4		5	3	4	6						7	3	6	10
80		2		2	4		5	3	4	6						7	3	6	10
90		2		2	4			3	4	3						2	3	6	7
100		2		2	4						46	3		3	4	5		5	8
110		2		2	4							5		2	4	7		4	8
120		2		2	4						15	4		6	4	6		8	8
130		2		2	4							2		4		4		6	4
140		2		2	4							2	3	4		4	3	6	4
150		2		2	4	49	5	1	4	3	27	4		5	4	6	1	7	8
160																			
170																			
180																			

A P P E N D I X E

FUNCTION ANALYSIS WORKSHEETS

(REVISED TO REFLECT AUTOMATION OF SELECTED SUBSYSTEMS)

APPENDIX E TABLE OF CONTENTS

FUNCTION NO.	FUNCTION	Page
01	Acquire Position Data, Automatic.....	E-4
02	Acquire Position Data, Shift From Known Point.....	E-5
03	Align Heading on Target Bearing.....	E-6
04	Assess Damage.....	E-7
05	Check Aircraft Systems (Holding).....	E-8
06	Check A/C Systems (Power Change).....	E-9
07	Check Course Required.....	E-10
08	Check Sensor Operation.....	E-11
09	Check Sights.....	E-12
10	Coordinate Mission.....	E-13
11	Coordinate Target Selection.....	E-14
12	Deploy to Cover.....	E-15
13	Designate Target.....	E-16
14	Detect Aerial Threat, Automatic Search, Cueing.....	E-17
15	Detect Aerial Threat, Unaided.....	E-18
16	Detect Target (Ground), Free Search.....	E-19
17	Detect Target, Prepoint, Auto Cueing.....	E-20
18	Establish Position (Firing or Observation.....	E-21
19	Estimate Range, Automatic.....	E-22
20	Estimate Range, Unaided Estimation.....	E-23
21	Evaluate Position.....	E-24
22	Fire Cannon.....	E-25
23	Fire Weapon.....	E-26
24	Handoff Target, Laser Cueing.....	E-27
25	Hover Masked.....	E-28
26	Identify Target.....	E-29
27	Maintain LOS With Target.....	E-30
28	Maintain Separation Between Aircraft.....	E-31
29	Maneuver NOE.....	E-32
30	Mask Aircraft, Lateral.....	E-33

FUNCTION NO.	FUNCTION	Page
31	Mask Aircraft, Vertical.....	E-34
32	Monitor Terrain, Aerial Approaches.....	E-35
33	Monitor Threat Warning Displays.....	E-36
34	Perform Evasive Maneuvers.....	E-37
35	Prepare Report, Digital Message Device.....	E-38
36	Prepare Weapon, Fire and Forget/Cannon.....	E-39
37	Prepare Weapon, Laser Cueing.....	E-40
38	Receive Handoff, Laser Cueing.....	E-41
39	Receive Message, Designation Coordination, Digital.....	E-42
40	Receive Message, Standard, Digital.....	E-43
41	Receive Message (Standard), Radio, Voice.....	E-44
42	Record Target Data.....	E-45
43	Respond to Threat Warning Signal.....	E-46
44	Stabilize Aircraft.....	E-47
45	Survey Target Area, Automatic Search.....	E-48
46	Survey Target Area, Manual Control, Visual Search.....	E-49
47	Survey Waypoint.....	E-50
48	Track Target.....	E-51
49	Transmit Message (Brief), Voice, Brief.....	E-52
50	Transmit Message (Standard), Voice.....	E-53
51	Transmit Report, Digital.....	E-54
52	Unmask Aircraft, Lateral.....	E-55
53	Unmask Aircraft, Vertical.....	E-56
54	Unmask Sensor.....	E-57
55	Update Doppler, Overfly Stored Waypoint.....	E-58
56	Update Doppler, Remote Landmark.....	E-59
57	Estimate Adjustments, Automatic.....	E-60
58	Engagement, Air-to-Air, Establish Attack Run.....	E-61

FUNCTION ANALYSIS

TOTAL TIME (APPROXIMATE)		FUNCTION	Acquire Position Data		No. 01
		METHOD	Automatic		(Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Target location mode	Target acquisition	V-5	C-3	P-1	.5- 1.0	
List	Target(s)	Target acquisition	A-3	C-3	P-3	1.0*	
Note	Coordinates (Sensor capture)	Sensor FCC display	V-5	C-4	---	.5	
							*Per target

FUNCTION ANALYSIS

No. 02

FUNCTION Acquire Position Data

TOTAL TIME 12.4-32.9 seconds
(APPROXIMATE)

METHOD Shift From Known Point

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Align	Sight reticle	Sensor control	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	5	Precedes PE 2 Each discrete PE occurs in sequence. Total time: 12.9-32.9 Estimated by adding: .5 transition to PE 1 2-5 for PE .5 transition to PE 2 .9 for PE 2 .5 transition to PE 3 .5-5 for PE 3 .5 transition to PE 4 7-20 for PE 4 12.4-32.9 seconds
Select	Wide FOV	Sensor	Visual alignment (V-1)	FOV adequate? (C-1)	Switch activation (P-1)		
Identify	Landmark	Sensor, map	Visual Discrimination (V-6)	Correct Landmark (C-6)	Map Orientation (P-5)		
Estimate	Shift (to target)	Sensor, map	Visual discrimination (V-6)	Correct shift (C-7)	Map orientation (P-5)		

FUNCTION ANALYSIS

TOTAL TIME (APPROXIMATE)		FUNCTION	Align Heading on Target Bearing	No. 03
		METHOD	Automatic	(Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Fire mode	FCC	A-3	C-4	P-3	.5- 1.0	
List	Target(s)	FCC	A-3	C-3	P-3	1.0*	
Note	Weapon ready	Weapon system	V-2	C-2	---	1.0- 30.0**	
*Per target **Alignment on target is automatic and is part of ready indication.							

FUNCTION ANALYSIS

TOTAL TIME (APPROXIMATE)		FUNCTION Assess Damage		No. 04
		METHOD Voice Data Recording		(Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Estimate	Percentage of target coverage	Sensor display	Visual search of terrain (V-6)	What percentage? (C-7)	LOS Control (P-4)	7	Time for PE 1 and PE 2 total 12-16 seconds. The two PEs will be performed simultaneously during scan/survey of target area for 12-16 seconds.
Determine	Targets disabled		Visual inspection (V-6)	Destroyed, repairable, usable? (C-7)	LOS control (P-4)	7	Total time = 43-62 secs. Estimated by adding: .5 transition time to PE 1; 12-16 seconds for PE 1 and 2 transition time to PE 3; 30-45 seconds for PE 3 43-62 seconds
Record	Message	Mission data device	A-3	C-4	P-3	30	

FUNCTION ANALYSIS

TOTAL TIME 41-158 seconds (APPROXIMATE)		FUNCTION Check Aircraft Systems (Holding)		No. 05	
		METHOD		(Revised)	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Check	Fuel	Fuel system	Visual symbolic mental calculations (V-5)	Quantity (mission time) (C-6)	----	10	Each PE occurs in sequence. Total time = 41-158 seconds.
Check	Engine instruments	Propulsion system	Visual symbolic (V-5)	Within safe limits (C-2)	----	10	.5 transition to PE 1 3-15 for PE 1 .5 transition to PE 2 6-15 for PE 2
Check	Aircraft equipment	Life support	Visual inspection (V-6)	Available and operating (C-6)	----	30	.5 transition to PE 3 -45 for PE 3 .5 transition to PE 4 3-15 for PE 4
Check	Caution/warning indicators	Malfunction detection display	Visual symbolic (V-1)	No indications jeopardizing mission continuation (C-2)	----	3	.5 transition to PE 5 9-45 for PE 5 .5 transition to PE 6 8-20 for PE 6 41-158 seconds
Check	Cockpit items	----	Visual inspection (V-6)	Secure (C-6)	----	30	
Perform	Checklist items	Checklist	Visual reading (V-7)	No conditions jeopardizing mission continuation (C-6)	----	15	

FUNCTION ANALYSIS

FUNCTION Check Aircraft Systems (Power Change) No. 06

METHOD (Revised)

TOTAL TIME
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Check	Caution	Display FP	V-1	C-2 necessary (C-1)	----	3	
51 Check	System instruments	Engine and caution displays DEW	Visual symbolic (V-5)	In limits? Desire setting (C-2)	----	10	

THIS
PAGE
IS
MISSING
IN
ORIGINAL
DOCUMENT

E-10

FUNCTION ANALYSIS

TOTAL TIME 5.1-52.3 seconds (APPROXIMATE)		FUNCTION Check Sensor Operation	No. 08
		METHOD	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Sensor(s)	Sensor subsystem	Visual inspect (V-6)	Sensor operating? (C-6)	Sensor switch (P-1)	1.5	Each PE occurs in sequence.
Adjust	Sensors	Sensor subsystem	Visual inspect (V-6)	Adjustments needed -brightness -contrast -gain -polarity -frequency -boresight (C-6)	Sensor controls fine adjustments required (P-2)	30	Total time = 5.1-52.3 seconds. Estimated by adding: .5 transition to PE 1 1.1-1.3 for PE 1 .5 transition to PE 2 3-50 for PE 2 (May include: 2.2 secs focus 1.8 secs polarity change 34-45 secs boresight)

FUNCTION ANALYSIS

No. 09

FUNCTION Check Sighting

(Revised)

TOTAL TIME Not applicable
(APPROXIMATE)

METHOD Automatic

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Note	Cueing symbol	Sight display	V-5	C-2	----	1.0	
Select	Ident mode	Acquisition system	A-3	C-4	P-3	1.0	
Note	Ident symbol	Sight display	V-5	C-2	----	1.0	

FUNCTION ANALYSIS

No. 10

FUNCTION Coordinate Mission

TOTAL TIME 101.9-137.1 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Radio, security	Radio, security device	Vis symbol (V-5)	Correct radio? (C-3)	Switch activation (P-1)	10	Each PE Occurs in sequence.
Transmit	Message	Radio	Auditory, message content (A-3)	Encoding (C-4)	Switch activation (P-1)	45	Total time = 101.9-137.1 seconds.
Note	Acknowledgement	Radio	Auditory content (A-3)	Verify content established (C-4)	----	5	Estimated by adding: .5 transition to PE 1 5.4-10.6 for PE 1 .5 transition to PE 2 45-55 for PE 2 .5 transition to PE 3 2-5 for PE 3 3-10 secs delay awaiting PE 4 45-55 for PE 4
Coordinate	Mission number	Radio	Auditory, message content (A-3)	Message received? Authentication correct? Mission proc? (C-5)	Switch activation (P-1)	45	

FUNCTION ANALYSIS

TOTAL TIME 76.9-114.1 seconds
 (APPROXIMATE)
 FUNCTION Coordinate Target Selection
 METHOD
 No. 11

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Communication channels and security	Communication system	Visual symbolic (V-5)	Adequacy of setting -equipment operating (C-3)	Selector switches (P-1)	10	Each PE Occurs in sequence. Total time = 76.9-114.1 seconds.
Note	Target data	Communication system	Auditory (A-3)	Authentic message received (C-6)	----	30	Estimated by adding: .5 transition to PE 1 5.4-10.6 for PE 1 .5 transition to PE 2 15-30 for PE 2 .5 transition to PE 3 7-11 for PE 3 .5 transition to PE 4 2-5 for PE 4 .5 transition to PE 5 45-55 for PE 5 76.9-114.1 seconds
Record	Target data	DEK FCC	Visual symbolic (V-5)	Encoding (C-4)	Keyboard entries (P-7)	10	
Transmit	Message (brief) Acknowledgement	Communication system	Auditory (V-3)	Encoding recall (C-4)	Switches, (P-1)	5	
Coordinate	Attack with other attack	Communication system	Auditory (A-3)	Target assignment Firing schedule (C-5)	Transmitter switches (P-1)	45	

FUNCTION ANALYSIS

No. 12

FUNCTION Deploy to Cover

(Revised)

TOTAL TIME 5.1-19.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Check	Obstacle clearance	Outside visual field	Visual inspection (V-1)	Adequate clearance (C-2)	----	5	PE 1 occurs prior to start of PE 2, 3, and 4.
Establish	Dash	Flight control	Visual, relative movement (V-2)	Control adjustment needed? (C-1)	Control Pressure (P-4)	3	PE 2, 3, and 4 treated as sequential for total time estimate. Total time = 5.1-19.5 seconds.
Stabilize (establish hover)	Aircraft	Outside visual field	Visual, detect movement (V-2)	Control adjustment needed? (C-1)	Switch (P-1)	2-5	Estimated by adding: .5 transition to PE 1 .5-5 for PE 1 .1-4 for PE 2 2-5 for PE 3 2-5 for PE 4 (No transition time assumed between PE 2, 3, and 4)
Reduce	Altitude	Outside visual field	Visual, relative movement (V-2)	Clear? C-6)	Control pressure (P-4)	5	

FUNCTION ANALYSIS

No. 13

FUNCTION Designate Target

(Revised)

TOTAL TIME 24.2-32 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
Align	Sight	Sensor control (voice)	Aud-3	C-3 (C-1)	P-3	2-5	Precedes PE 2. All PEs are sequential. Transi- tion time of .5 seconds estimated before start of each PE.
Select	Narrow FOV	Sensor controls	Aud-3	Target centered? (C-1)	P-3	1.0	Total time = 21.2-32 seconds.
Arm	Laser designator	Laser controls	Vis symb (V-5)	Laser ready? (C-2)	Discrete activation (P-1)	2.5	Estimated by adding: .5 transition to PE 1 2-5 for PE 1
Activate	Laser designator	Laser controls	Vis symb (V-5)	Target lased? (C-2)	Discrete activation (P-1)	10	.5 transition to PE 2 .9 for PE 2
Note	Weapon impact	Sensor display	Vis monitor (V-1)	Target hit? (C-2)	----	5	.5 transition to PE 3 2.5 for PE 3
De-Arm	Laser	Laser cont	Vis symb (V-5)	Laser safe? (C-2)	Discrete activation (P-1)	.5	.5 transition to PE 4 6-10 for PE 4
							.5 transition to PE 5 2-5 for PE 5 .5 transition to PE 6 2-5 for PE 6 (Assumes single switch. Aud .7-1.0 for each additional switch) .5 transition to PE 7

FUNCTION ANALYSIS

TOTAL TIME 7-11 seconds (APPROXIMATE) FUNCTION Detect Aerial Threat No. 14
 METHOD Automatic Search, Cueing (Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Survey	Airspace	Sensor display	Visual monitor (V-1)	Cueing symbol? (C-2)	----	20	PE 1 time variable for period preceding PE 2
Detect	Cueing symbol	Sensor display	Visual symbolic (V-5)	Target cue? (C-3)	----	5	Total time = 7-13 secs.
Align	Sight reticle	Sensor controls (voice)	A-3	Target centered? (C-1)	P-3	2-5	Estimated by adding: .5 transition to PE 2 4-6 for PE 2 .5 transition to PE 3 2-5 for PE 3

FUNCTION ANALYSIS

TOTAL TIME 5.8-28.5 seconds (APPROXIMATE)		FUNCTION Detect Aerial Threat		No. 15	
		METHOD		Unaided	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Survey	Airspace	Unaided	Visual survey (V-1)	Area clear? (C-6)	----	12.5	Survey airspace time variable for period preceding A/C detection. No transition time provided to first discrete PE (2).
Detect	Movement	Unaided	Visual detect (V-2)	Signal (maneuver) (C-2)	----	2	Total time = 5.8-28.5 seconds.
Direct	Sensor (to target)	Sensor controls A/C direction indicated	Visual align (V-4)	Approx bearing to sighting? (C-6)	Control pressure (P-4)	5	Estimated by adding: .3-3 for PE 2 .5 transition to PE 3 2-5 for PE 3 3-20 for PE 4
Identify	Threat	Visual, unaided	Visual; Movement shape (V-2)	Orientation of A/C. Type of A/C. (C-4)		5	No transition time from PE 3 to PE 4 (PE 4 time will vary depending on method of identification)
Identify	Threat	Sensor display (visual)	Movement shape heat signature (V-2)	Level of threat Friend/foe (C-4)		10	
Identify	Threat	Sensor display (aural)	Tone(s) continuous or intermittent (A-3)	Type of threat A/C. Level of threat (C-4)		10	

FUNCTION ANALYSIS

No. 16

FUNCTION Detect Target (Ground)

(Revised)

METHOD Automatic

TOTAL TIME
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Search mode	Sensors	V-5	C-3	P-1	.5- 1.0	
Establish	Search pattern (zone)	Voice command system	A-3	C-4	P-3	3.0- 6.0	
Monitor	Display	Sensor display	V-1	C-2	----	v. cont.	
Note	Cueing symbols	sensor display	V-5	C-2	----	.5- 1.0	

FUNCTION ANALYSIS

No. 17

FUNCTION Detect Target

TOTAL TIME 9-14.8 seconds
(APPROXIMATE)

METHOD Prepoint, Auto Cueing
(Revised)

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
Verify	Target data in FCC	FCC display	Visual symbol (V-5)	Data complete? (C-6)	----	.5	Each PE occurs in sequence.
Select	Sensor prepoint	Sensor voice contr.	Visual symbol (V-5)	Prepoint option (C-3)	P-3	1.1-1.3	Total time = 9-14.8 seconds.
Detect	Cueing symbol	Sensor display	Visual symbol (V-5)	Signal recognition (C-2)	----	5	Estimated by adding: .5 transition to PE 1 .3-.5 for PE 1 .5 transition to PE 2 1.1-1.3 for PE 2 .5 transition to PE 3 4-6 for PE 3 .5 transition to PE 4 2-5 for PE 4 9-14.8 seconds
24 Align	Sight	Sensor display (sight) ADS	Visual alignment (V-4)	Target centered? (C-2)	Control pressure (P-4)	5	

FUNCTION ANALYSIS

FUNCTION Establish Position (Firing or Observation) No. 18

TOTAL TIME 9.5-22.2 seconds
(APPROXIMATE)

(Revised)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Maintain	Obstacle clearance	Flight controls	Visual scan (V-2)	Choose direction (C-2)	Flight control pressures (P-4)	21.5	PE 1 and PE 2 continuous throughout function, overlapping PE 3, 4, and 5. Time estimates coincide with total time estimate.
Follow	Course	Nav display Flight controls	Visual discrim (V-5)	Course adjustment needed? (C-5)	Control pressures (P-4)	21.5	Total time = 9.5-22.5 seconds.
Check	Position	Outside visual map	Visual discrim (V-5)	Decoding (C-4)		10	Estimated by adding: .5 transition to PE 3 7-11 for PE 3 .5 transition to PE 4 .5-5 for PE 4 .5 transition to PE 5 5-5 for PE 5 9.5-22.5 seconds
Check	Obstacle clearance	Outside visual	Visual detect movement (V-1)	Adequate space, masking? (C-2)		.5-	
Stabilize (Select hover)	Aircraft	Flight controls Outside visual	Visual detect movement (V-2)	Adjustments needed? (C-1)	Switch (P-1)		

FUNCTION ANALYSIS

No. 19

TOTAL TIME 5.7-10 seconds
(APPROXIMATE)

FUNCTION Estimate Range

(Revised)

METHOD Automatic

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Range mode	Sensor control	V-5	C-3	P-1	.5- 1.0	
List	Target(s)	Sensor voice control	A-3	C-3	P-3	2.0*	
Activate	Laser range finder	Sensor control	V-5	C-1	P-1	.5- 1.0	
Note	Range(s)	FCC display, map display	V-5	C-4	----	2.0*	
*Perf targeted **Add 4 seconds per target							

FUNCTION ANALYSIS

TOTAL TIME 17.9-37.9 seconds (APPROXIMATE)		FUNCTION Estimate Range	No. 20
		METHOD Unaided Estimation	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Align	Sight reticle	Sensor controls	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	5	Each PE occurs in sequence. Total time = 17.9-37.9 seconds.
Change	FOV	Sensor controls	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	Estimated by adding: .5 transition to PE 1 2-5 for PE 1
Note	Tgt/mil dimensions	Sensor display	Visual discrim (V-6)	Evaluate target dimension (C-6)	Sight control pressure (P-4)	5	.5 transition to PE 2 .9 for PE 2 .5 transition to PE 3 3-10 for PE 3
Estimate	Range	----	----	Estimation (C-7)	----	20	.5 transition to PE 4 10-20 for PE 4 17.9-37.9 seconds

FUNCTION ANALYSIS

No. 21

FUNCTION Evaluate Position

TOTAL TIME 16-28 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Survey	Surroundings	Sensors	Visual, movements, shapes (V-2)	Area safe? (C-6)	Sensor controls (P-4)	20	PE 1 continuous for a variable period prior to PE 2.
Slew	Sensor	Sensor controls	Visual scene (V-2)	Clear LOS (C-6)	Sensor controls (P-4)	5	Total time = 16-28 seconds.
Check	Visual access	Sensors, maps	Visual inspection (V-6)	Adequate area FOV? (C-6)	Sensor controls (P-4)	20	Estimated by adding: .5 transition to PE 2 13-22 for PE 2 .5 transition to PE 3 2-5 for PE 3 16-28 seconds

FUNCTION ANALYSIS

No. 22

FUNCTION Fire Cannon

(Revised)

TOTAL TIME 8.2-14.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Align	Adjusted sight alignment	Sensor	Visual, symbolic (V-2)	Verify sight picture (C-2)	----	2	Decision to fire precedes this function.
Activate	Gun trigger	Weapon system	----	Trigger position, recognize (C-2)	Switch activation (P-1)	.5	PE 1 and PE 2 occur simultaneously, times overlap.
Observe	Tracers, impact	Sensor sight	Visual trace (V-3)	On target (C-2)	----	5	Total time = 8.2-14.5 seconds. Assumes single switch in PE 5.
Adjust	Alignment	Sensor sight	Visual align (V-4)	Adjustment needed (C-3)	P-1	2-3.5	Estimated by adding: .5 transition to PE 1 2-3.5 for PE 1 and 2 .5 transition to PE 3 2-5 for PE 3 .5 transition to PE 4 2-3.5 for PE 4 .5 transition to PE 5 2-5 for each switch in PE 5
De-arm	Gun	Weapon system	Visual, symbolic (V-2)	Gun secured (C-2)	Switch or switch sequence (P-1)	.5	8.2-14.5 seconds

FUNCTION ANALYSIS

TOTAL TIME (APPROXIMATE)		FUNCTION	Fire Weapon	No. 23
		METHOD	Automatic	(Revised)

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
Select	FCC	Voice command/ data control panel	V-5	C-3	P-1	.5- 1.0
Select	Weapon type(s)	FCC (voice control)	A-3	C-4	P-3	1.0- vari- able
Select	Control mode Weapon	FCC (voice control)	A-3	C-3	P-3	1.0
List	Target(s)	FCC (voice control)	A-3	C-3	P-3	1.0**
Release	Weapon(s)	Armament trigger switch	----	C-1	P-1	3.0*
						*Per weapon type **Per target ***Add 3.0 seconds per target

FUNCTION ANALYSIS

FUNCTION Handoff Target, Laser Cueing No. 24

TOTAL TIME 19-38 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
Transmit	Message alert	Radio	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	5	Each PE occurs in sequence. Total time = 19-38 seconds.
Note	Ack/ready	Radio	Auditory. Interpret (A-3)	Decoding (C-4)	----	5	Estimated by adding: .5 transition to PE 1 2-5 for PE 1
Transmit	Message (brief) Alert for sensor cue	Radio	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	5	.5 transition to PE 2 2-5 for PE 2 .5 transition to PE 3 2-5 for PE 3
Align	Sight	Sensor subsystem	Visual align (V-4)	Adjustment needed (C-1)	Control pressure (C-4)	5	.5 transition to PE 4 2-5 for PE 4 .5 transition to PE 5 6-10 for PE 5
Activate	Laser designator	Sensor subsystem	Visual detect (V-2)	Signal recognition (C-2)	Switch activation (C-1)	10	.5 transition to PE 6 2-5 for PE 6 19-38 seconds
Note	Ack/tgt detected	Radio	Auditory interpret (A-3)	Decoding (C-4)	----	5	

FUNCTION ANALYSIS

TOTAL TIME Not applicable (APPROXIMATE)

FUNCTION Hover Masked

METHOD Automatic

No. 25 (Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Establish	Position desired	Outside visual field flight controls	V-1	C-2	P-4	5.0 10.0	
Select	Hover hold	Flight controls	----	C-1	P-1	.5 1.0	

FUNCTION ANALYSIS

No. 26

FUNCTION Identify Target

(Revised)

METHOD Automatic

TOTAL TIME
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Ident mode	Sensor control	V-5	C-3	P-1	.5- 1.0	
List	Target(s)	Sensor control (voice)	V-5 A-3	C-3	P-3	1.0*	
Activate	Ident scan	Sensor control	V-5	C-3	P-2	1.0	
						*Per target	

FUNCTION ANALYSIS

TOTAL TIME Not applicable (APPROXIMATE)		FUNCTION Maintain LOS With Target	No. 27
		METHOD Automatic	(Revised)

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
Select	Wide FOV	Sensor	Visual monitor (V-1)	Adjustment needed? (C-1)	Switch activation (P-1)	PE-2 continuous during this function. Time estimate for PE 2 coincides with estimate for total function.
Align	Sight	Sensor control	V-4	C-1	P-4	
Select	Auto track	Sensor contr.	----	C-1 (C-3)	P-1	
145 Regain	LOS	Sensor control AC	Visual aim (V-4)	Planning search (C-5)	Control pressure (P-4)	
					5	

FUNCTION ANALYSIS

FUNCTION Maintain Separation Between Aircraft No. 28

TOTAL TIME Not applicable
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Monitor	A/C movement	Outside visual; sensor subsystem	Visual, detect movement (V-2)	Verify relative position (C-2)	----	15	Time estimate for PE 1 overlaps continuous PE 2.
Maintain	Separation	Flight controls; outside visual; sensor subsystem	Visual, detect relative movement (V-2)	Adjustments needed (C-1)	Control pressure (P-4)	40	PE 2 time will vary with mission requirements. Total time not estimated.

FUNCTION ANALYSIS

No. 29

FUNCTION Maneuver NOE

TOTAL TIME Not applicable
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Maintain	Obstacle clearance	Outside visual flight controls	Visual detect (V-2)	Verify clearance (C-2)	Control pressures (P-4)	80	Total function time will vary depending on mission requirements. PE 1, 3, and 6
Adjust	Flight modes	Outside visual	Visual detect movement (V-2)	Select appropriate flight modes (C-3)	Control pressures (P-4)	80	continuous during entire function. Overlapping discrete PE 2, 4, and 5.
Check	Position	Outside visual navigation display	Visual symbol (V-5)	Decoding (C-4)	----	10	PE 2, 4, and 5 are repeated throughout function
Select	Flight path	Outside visual navigation display	Visual symbol (V-5)	Selection (C-3)	----	3	Total function time not estimated.
Follow	Course	Outside visual navigation display	Visual symbol (V-5)	Anticipating directional adjustments (C-5)	Control pressures (P-4)	80	

FUNCTION ANALYSIS

No. 30

FUNCTION Mask Aircraft, Lateral

(Revised)

METHOD Automatic

TOTAL TIME
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Check	Obstacle clearance (lateral)	Outside visual field	Visual inspection (V-1)	Adequate clearance (C-2)	----	2	
Establish	Drift	Flight controls	Visual, relative movement (V-2)	Control adjust needed (C-1)	Control pressures (P-4)	2-5	
Select	Hover hold	Flight controls	----	C-1	P-1	.5 1.0	

FUNCTION ANALYSIS

TOTAL TIME (APPROXIMATE)		FUNCTION Mask Aircraft, Vertical		No. 31
		METHOD Automatic		(Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Check	Obstacle clearance (lateral and vertical)	Outside visual field	Visual inspect clearance (V-1)	Verify descent path clear (C-2)	----	5	
Reduce	Altitude	Flight controls	Visual relative movement (V-2)	Control adjustment needed (C-1)	Control pressures (P-4)	5	
Select	Hover hold	Flight controls	----	C-1	P-1	.5 1.0	

FUNCTION ANALYSIS

FUNCTION Monitor Terrain, Aerial Approaches No. 32

METHOD Automatic (Revised)

TOTAL TIME
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Sensor control	Voice command/ data control panel	V-5	C-3	P-1	.5- 1.0	
Select	Search mode, zone	Sensor control (voice)	A-3	C-4	P-3	10- 15.0	
Monitor	Sensor display	Sensor display	V-1	C-2	----	Cont vari- able	

FUNCTION ANALYSIS

No. 33

FUNCTION Monitor Threat Warning Displays

TOTAL TIME 3.5-5.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Monitor	Threat displays	Threat displays	Auditory, visual, signal detection (V-2) (A-2)	Signal recognition (C-2)	----	5	Total time = 3.5-5.5 seconds. Estimated by adding: .5 transition to PE 1

FUNCTION ANALYSIS

FUNCTION Perform Evasive Maneuvers No. 34

METHOD

TOTAL TIME Not applicable
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Perform	Hard turns	Flight controls	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	30	All PEs overlap in an evasive maneuver scenario. Total time of function depends on mission requirements. PE 1, 2, and 3 will be repeated as required for duration of functions. Time estimates for each PE are for a single iteration and range from time estimated to initiate PE to an estimate of time PE will continue. No total time estimate.
Change	Altitude sharply	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	15	
Change	Airspeed	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	4	

FUNCTION ANALYSIS

No. 35

TOTAL TIME
(APPROXIMATE)

FUNCTION Prepare Report

(Revised)

METHOD Voice Interactive Data Processing

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Mission data recorder	Voice command/data control panel	V-5	C-3	P-1	.5- 1.0	
Select	Format	Mission data display cont	A-3	C-4	P-3	.5- 1.0	
Dictate	Report contents	Mission data recorder	A-3	C-4	P-3	Var- able	
Select	Review/playback	Mission data recorder	V-5	C-3	P-1	.5- 1.0	
Review/Edit	Report	Mission data recorder	A-3 V-5	C-6	----	Var- able	
Address	Report	Mission data recorder	A-3	C-4	P-3	3.0- 4.0	

FUNCTION ANALYSIS

FUNCTION Prepare Weapon, Fire and Forget/Cannon No. 36

METHOD (Revised)

TOTAL TIME 4.5-8 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Weapon	Weapon arming panel	Visual symbolic (V-2)	Selection (C-3)	Switch activation (P-1)	5	Each PE occurs in sequence. Total time = 4.5-8 seconds.
Check	Weapon status	Weapon control display	Visual symbolic (V-2)	Verify (C-2)	----	1	Estimated by adding: .5 transition to PE 1 3-6 for PE 1 .5 transition to PE 2 .5-1 for PE 2 4.5-8 seconds

FUNCTION ANALYSIS

No. 37

FUNCTION Prepare Weapon, Laser-Guided

TOTAL TIME 8-14.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Weapon	Weapon arming panel	Visual symbolic (V-5)	Selection (C-3)	Switch activation (P-1)	5	Each PE occurs in sequence. Total time = 8-14.5 seconds.
Select	Laser code	Weapon arming panel	Visual symbolic (V-5)	Enter code (C-4)	Control switches (P-1)	5	Estimated by adding: .5 transition to PE 1 3-6 for PE 1
Check	Weapon status	Display	Visual symbolic (P-5)	Verify (C-2)	----	1	.5 transition to PE 2 3-6 for PE 2 .5 transition to PE 3 5-1 for PE 3 8-14.5 seconds

FUNCTION ANALYSIS

FUNCTION Receive Handoff

METHOD Laser Cueing, Automatic

19.5-39.5 seconds

(APPROXIMATE)

(Revised)

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
Note	Message alert	Radio	Auditory interp (A-3)	Decoding (C-4)	----	Each PE occurs in sequence. Total time = 19.5-39.5 seconds.
Transmit	Ack/ready	Radio	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	Estimated by adding: .5 transition to PE 1 2-5 for PE 1 .5 transition to PE 2 2-5 for PE 2 .5 transition to PE 3 2-5 for PE 3 .5 transition to PE 4 2-5 for PE 4 .5 transition to PE 5 4-6 for PE 5 .5 transition to PE 6 2-5 for PE 6 .5 transition to PE 7 2-5 for PE 7 19.5-39.5 seconds
Select	Laser cue	Sensor contr	V-2	C-3	P-1	1.0- 5.0
Note	Alert (lasing)	Radio	Auditory interp (A-3)	Decoding (C-4)	----	2-5
Detect	Cueing symbol	Sensor	Visual detect (V-2)	Signal recog (C-2)	----	5
Transmit	Ack (target detected)	Radio	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	5

FUNCTION ANALYSIS

FUNCTION Receive Message, Designation Coordination No. 39

TOTAL TIME 10-21 seconds
(APPROXIMATE)

METHOD Digital

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Note	Message alert	Message device	Auditory detect Visual symbol (A-1) (V-5)	Signal recognition (C-2)	----	2	Each PE occurs in sequence with a 3-5 second delay between PE 2 and 3. Total time = 10-21 seconds.
Send	Message (ack/ready)	Message device	Visual symbol auditory symbol (V-5) (A-1)	Response select. (C-3)	Switch activation (P-1)	.5	Estimated by adding: .5 transition to PE 1 2-5 for PE 1 .5 transition to PE 2 2-5 for PE 2 3-5 for delay-message transition time prior to PE 3 2-5 for PE 3 10-21 seconds
Note	"Splash" signal	Message device	Visual symbol auditory signal (V-5) (A-1)	Signal recognition (C-2)	----	2	

FUNCTION ANALYSIS

TOTAL TIME 23-47 seconds (APPROXIMATE)		FUNCTION Receive Message, Standard		No. 40	
		METHOD Digital		(Revised)	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Note	Message alert	Message display	Visual symbol auditory signal (V-2) (A-1)	Signal recog (C-2)	----	2	Each PE occurs in sequence. Total time = 23-47 seconds.
Send	Message (ack/ready)	Message device controls	Visual symbol auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	.5	Estimated by adding: .5 transition to PE 1 2-5 for PE 1 .5 transition to PE 2 2-5 for PE 2 .5 transition to PE 3 15-30 for PE 3 .5 transition to PE 4 2-4 for PE 4 23-47 seconds
Note	Message content	Message display voice playback	A-3	Decoding (C-4)	Switch activation (P-1)	25	
Send	Message (ack/roger)	Message device controls	Visual symbol auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	.5	

FUNCTION ANALYSIS

FUNCTION Receive Message (Standard) No. 41
 METHOD Radio, Voice, Automatic (Revised)
 TOTAL TIME 30.5-58.5 seconds
 (APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Note	Message alert	Communication system	Auditory interp (A-3)	Decoding (C-4)	----	5	
Select	Record, radio	Voice command/data control panel	V-2	C-3	P-1	.5-2.0	
Transmit	Message (brief) ack./ready	Communication system	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	5	
Note	Message	Communication system	Auditory interp (A-3)	Decoding (C-4)		25	
Transmit	Message (brief) ack./roger	Communication system	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activator (P-1, P-3)	5	

FUNCTION ANALYSIS

No. 42

(Revised)

TOTAL TIME
(APPROXIMATE)

FUNCTION Record Target Data

METHOD Automatic

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Target location mode	Sensor contr	V-5	C-3	P-1	5.0	
List	Target(s)	Sensor control (voice)	A-3	C-3	P-3	5.0- vari- able*	
Activate	Laser range finder	Sensor control	V-5	C-1	P-1	.5- 1.0	
Note	Data	Mission data display	V-5	C-4	----	5.0- vari- able*	
Activate	Recorder	Mission data control	V-5	C-3	P-1	.5- 1.0	
						*2.0 per target	

FUNCTION ANALYSIS

TOTAL TIME : Not applicable
 (APPROXIMATE)

FUNCTION Respond to Threat Warning Signal No. 43
 METHOD Automatic (Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Note	Alert	Display	V-2 A-3	C-2	----	.5- 1.0	
Note	Direction of threat	Display	A-3	C-4	----	.5- 1.0	

FUNCTION ANALYSIS

No. 44

FUNCTION Stabilize Aircraft

TOTAL TIME Not applicable
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Control	Altitude	Flight controls	Detect vertical movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	Time for PE 1, 2, and 3 will be variable depending upon mission.
Control	Drift	Flight controls	Detect horizontal movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	No total time estimate for function.
Control	Heading	Flight controls	Detect yaw (V-2)	S-R (C-1)	Control pressures (P-4)	5	
Check	Obstacle clearance	Outside visual field	Visual monitor (V-1)	Verify clear (C-2)	----	5	

FUNCTION ANALYSIS

No. 45

TOTAL TIME Not applicable
(APPROXIMATE)

FUNCTION Survey Target Area

METHOD Automatic Search

(Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Auto search	Sensor system	Visual symbol (V-5)	Selection (C-3)	Switch activation (P-1)	1.5	PE 1 and 2 occur in sequence prio to PE 3.
Select	Search pattern, coverage area	Sensor system	Visual symbol (V-5)	Encoding (C-4)	Keyboard entries (P-7)	1.5	Total time of function varies with mission requirements for search.
Monitor	Display	Sensor display	Visual survey (V-5)	Signal recognition (C-2)	----	25	Time for PE 1 plus PE 2 estimated by adding: .5 transition to PE 1 1.7 for PE 1 .5 transition to PE 2 1.5 for PE 2 4.2 seconds

FUNCTION ANALYSIS

No. 46

FUNCTION Survey Target Ar-a

TOTAL TIME Not applicable
(APPROXIMATE)

METHOD Manual Control, Visual Search

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Slew	Sensor	Sensor controls	Visual track (V-3)	Select rate, directions (C-3)	Control pressures (P-4)	5	PE 1 time overlaps with PE 2.
Monitor	Display	Sensor display	Visual survey (V-5)	Sign, recognition (C-2)	Control pressures (P-4)	25	PE 2 time variable depending upon mission requirements. No estimate of total time.

FUNCTION ANALYSIS

No. 47

FUNCTION Survey Waypoint

TOTAL TIME Not applicable
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Approach	Waypoint	Navigation	Visual symbolic (V-5)	Further move- ment needed? (C-5)		30	PE 1 continuous. Time varies with mission requirements.
Verify	Position	Map, outside visual	Visual symbolic visual survey (V-5, V-1)	Evaluative (C-6)	Map orienta- tion (P-5)	10	No total time estimate for function.

FUNCTION ANALYSIS

No. 48

FUNCTION Track Target

METHOD

TOTAL TIME Not applicable
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Align	Sight reticle	Sensor sight	Visual align (V-4)	Slew rate (C-1)	Control pressures (P-4)	5	PE 2 is continuous throughout function. Function duration will vary with mission requirements.
Track	Target	Sensor controls	Visual align (V-4)	Slew rate (C-3)	Control pressure (P-4)	45	No time estimate for total function.

FUNCTION ANALYSIS

TOTAL TIME 5-10 seconds (APPROXIMATE)		FUNCTION Transmit Message (Brief)	No. 49
		METHOD Voice, Brief	

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
Select	Comm. channel	Radio	Visual symbolic (V-5)	Correct channel? (C-3)	Switch activation (P-1)	Each PE occurs in sequence.
Transmit	Message	Radio	Auditory feedback (A-1)	Message content (C-4)	Speech (P-3)	Total time = 5-10 seconds. Estimated by adding: .5 transition to P 1 2-4 for PE 1 .5 transition to PE 2 2-5 for PE 2 5-10 seconds

FUNCTION ANALYSIS

TOTAL TIME 23-37 seconds (APPROXIMATE)		FUNCTION Transmit Message (Standard)	No. 50
		METHOD Voice	(Revised)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Select	Comm channel	Communication system	V-5	C-3	P-1		
Transmit	Message alert	Communication system	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	5	Each PE occurs in sequence. Total time = 23-37 seconds.
Note	Ack/ready	Communication system	Auditory interp (A-3)	Decoding (C-4)	----	5	Estimated by adding: .5 transition to PE 1 2-5 for PE 1 .5 transition to PE 2 2-5 for PE 2
Transmit	Message	Communication system	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	20	.5 transition to PE 3 15-20 for PE 3 .5 transition to PE 4 2-5 for PE 4
Note	Ack	Communication system	Auditory interp (A-3)	Decoding (C-4)	----	5	23-37 seconds

FUNCTION ANALYSIS

No. 51

FUNCTION Transmit Report

METHOD Digital

TOTAL TIME 8.7-17.7 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Send	Message alert, ident code	Message device	Visual symbol (V-5) (A-1)	Message sent? (C-3)	Button (P-1)	.5	Each PE occurs in sequence. Total time = 8.7-17.7 seconds.
Note	Acknowledgement, authentication code	Message display	Visual symbol auditory signal (V-5) (A-1)	Authentic reply? (C-6)	----	2	Estimated by adding: .5 transition to PE 1 2-5 for PE 1 .5 transition to PE 2 2-5 for PE 2 .5 transition to PE 3 .7 for PE 3 .5 transition to PE 4 2-5 for PE 4 8.7-17.7 seconds
Send	Message	Message device	Visual symbol auditory signal (V-5) (A-1)	Message sent (C-2)	Switch activation (P-1)	.5	
Note	Acknowledgement, authentication code	Message display	Visual symbol auditory signal (V-5) (A-1)	Authentic reply? (C-6)	----	2	

FUNCTION ANALYSIS

No. 52

FUNCTION Unmask Aircraft. Lateral

METHOD Automatic

TOTAL TIME
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Check	Lateral clearance	Outside visual field	Visual inspect (V-1)	Adequate clearance? (C-2)	----	2	
Establish	Drift	Outside visual field	Visual monitor, relative movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	
Select	Hover hold	Flight controls	----	C-1	P-1	.5 1.0 7	
Check	Weapon path clear	Outside visual field	Visual orient (V-4)	Verify weapon path clear (C-2)	----		

FUNCTION ANALYSIS

TOTAL TIME Not applicable (APPROXIMATE)		FUNCTION Unmask Aircraft, Vertical	No. 53
		METHOD Automatic	(Revised)

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
Increase	Altitude	Flight controls sensors visual field	Visual, check visual field (V-2)	Verify LOS target clear (C-2)	Flight control pressures (P-4)	10
Check	Weapon path clear	Surrounding visual field	Visual orienta- tion (V-4)	Verify clear of obstacles (C-2)		7
Select	Hover hold	Flight cont	----	C-1	P-1	1.0

FUNCTION ANALYSIS

No. 54

FUNCTION Unmask Sensor

(Revised)

TOTAL TIME
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Increase	Altitude	Flight controls	Visual detect movement (V-2)	Adjustments necessary (C-2)	Control pressures (P-4)	10	
Check	Sensor LOS	Sensor display, controls	Visual survey (V-1)	Verify clear (C-2)	Control pressures (P-4)	5	
Select	Hover hold	Flight controls	----	C-1	P-1	.5 1.0	

FUNCTION ANALYSIS

No. 55

FUNCTION Update Doppler

TOTAL TIME 12.8-26.2 seconds
(APPROXIMATE)

METHOD Remote Landmark

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
Identify	Waypoint	Outside visual, map	Visual discrimination (V-6)	Confirm location (C-6)	Orient map (P-5)	Each PE occurs in sequence. PE 3 time varies with maneuver time required to fly over landmark. Total time = 8.4-17.8 seconds plus maneuver time for PE 3.
Select	Update mode, preset waypoint	Doppler controls	Visual symbolic (V-5)	Recall position number (C-4)	Discrete adjustment (P-2)	Estimated by adding: .5 transition to PE 1 .5-5 for PE 1 .5 transition to PE 2 .7-.9 for PE 2 .5 transition to PE 3 .5 transition to PE 4 .7-1.4 for PE 4 .5 transition to PE 5 4-7 for PE 5 8.4-17.8 seconds
Overfly	Landmark	Flight controls outside visual field	Visual track (V-3)	Select heading (C-3)		
Activate	Update switch	Doppler controls	Visual symbolic (V-5)	Verify over landmark (C-2)	Switch activation (P-1)	
Select	Navigation mode, next waypoint	Doppler controls	Visual symbolic (V-5)	Recall waypoint desired (C-4)	Discrete adjustment (P-2)	

FUNCTION ANALYSIS

No. 56

FUNCTION Update Doppler

METHOD Remote Landmark

TOTAL TIME 23 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
Identify	Landmark	Outside visual field, sensor, map	Visual discrim (V-6)	Confirm landmark (C-6)	Orient map (P-5)	5	Each PE occurs in sequence. Total time = 12.8-26.2 seconds.
Select	Preset coordinates	Doppler controls	Visual symbolic (V-5)	Recall position number (C-4)	Discrete adjustment (P-2)	1.0	Estimated by adding: .5 transition to PE 1 .5-5 for PE 1 .5 transition to PE 2 .9-1.4 for PE 2 .5 transition to PE 3 .7-1.4 for PE 3 .5 transition to PE 4 2-5 for PE 4 .5 transition to PE 5 .5-1.5 for PE 5 .5 transition to PE 6 .7-1.4 for PE 6 .5 transition to PE 7 4-7 for PE 7 12.8-26.2 seconds
Select	Remote update doppler	Doppler controls	Visual symbolic (V-5)	Recall position number (C-4)	Switch activation (P-1)	1.0	
Align	Sight on landmark	Sensor system	Visual alignment (V-4)	Verify landmark centered (C-2)	Control Pressures (P-4)	2	
Activate	Range finder	Laser range finder	Visual Align (V-4)	Verify feature lased (C-2)	Switch activation (P-1)	1.0	
Activate	Update (remote)	Doppler nav controls	Visual symbolic (V-5)	Verify update (C-2) (C-4)	Switch activation (P-1)	1.0	
Select	Nav mode, next waypoint	Doppler nav controls	Visual symbolic (V-5)	Recall waypoint desired (C-4)	Discrete adjustment (P-2)	5	

FUNCTION ANALYSIS

No. 57

FUNCTION Estimate Adjustments

TOTAL TIME 12.1-22.3 seconds
(APPROXIMATE)

METHOD Automatic

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
Select	Wide FOV	Sensor	Visual alignment (V-4)	Adjustment needed (C-1)	Switch activation (P-1)	Each PE occurs in sequence.
Note	Impact point	Sensor	Visual detect (V-2)	Verify impact (C-3)	----	Total time = 12.1-22.3 seconds.
Align	Sight on impact point	Sensor	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	Estimated by adding: .5 transition to PE 1 .9 for PE 1 .5 transition to PE 2 2-5 for PE 2 .5 transition to PE 3 2-5 for PE 3 .5 transition to PE 4 .9 for PE 4 .5 transition to PE 5 2-5 for PE 5 .5 transition to PE 6 .5-1.5 for PE 6 .5 transition to PE 7 3-5 for PE 7 12.1-22.3 seconds
Select	Narrow FOV	Sensor	Visual alignment (V-4)	Adjustment needed (C-1)	Switch activation (P-1)	5
Align	Sight on impact point	Sensor	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	1.0
Activate	Laser range finder	Laser range finder	Visual alignment (V-4)	Verify laser on spot (C-3)	Switch activation (P-1)	1.5
Note	Impact coordinates	Sensor display	Visual symbolic (V-5)	Decoding (C-4)	----	.5

FUNCTION ANALYSIS

TOTAL TIME Not applicable (APPROXIMATE)		FUNCTION Engagement, Air-to-Air		No. 58			
		METHOD Establish Attack Run					
PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
Establish	Attack run	Outside visual flight controls	Visual, direction (V-4)	Establish closure course (C-3)	Control pressures (P-4)	20	PE 1 time varies with amount of heading and power change required.
Fly	Intercept headings	Outside visual flight controls	Visual, relative movement (V-4)	Stop relative movement (C-3)	Control pressures (P-4)	20	PE 2 time varies with distance to be flown and evasive counter-attack maneuvers flown by the enemy aircraft.
Monitor	Airspeed	Flight instruments	Visual, symbolic (V-2)	Check maximum airspeed (C-3)	----	1	PE 1, 2, and 3 times may overlap. No total time is estimated, but minimum time estimated by adding: .5 transition to PE 1 6-30 minimum time for PE 1 .5 transition to PE 3 .5-1 minimum for PE 3 7.5 seconds

A P P E N D I X F

SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS

(REVISED TO REFLECT AUTOMATION OF SELECTED SUBSYSTEMS)

APPENDIX F TABLE OF CONTENTS

Page

RECONNAISSANCE PHASE

Segment 1.	Bomb Damage Assessment	F-5
Segment 2.	Evade Radar Lock-On	F-6
Segment 3.	Reconnaissance, General	F-7
Segment 4.	Record Sightings	F-9
Segment 5.	Tactical Movement.....	F-10
Segment 6.	Transmit Report, Digital.....	F-11

TARGET SERVICE

Segment 7.	Acquisition , Auto Search.....	F-12
Segment 8.	Acquisition, From Laser Cueing	F-13
Segment 9.	Adjustments, Area Weapons, Digital	F-14
Segment 10.	Adjustments, Area Weapons, Voice	F-15
Segment 11.	Designate for PGM	F-16
Segment 12.	Engagement, Air-to-Ground, Autonomous, LOAL	F-17
Segment 13.	Engagement, Ground Target, Autonomous, LOBL	F-18
Segment 14.	Engagement, Ground Target, Remote Designation	F-19
Segment 15.	Engagement, Soft Targets, Cannon Fire, Hover	F-21
Segment 16.	Engagement, Soft Targets, FFAR, Direct	F-23
Segment 17.	Handoff, Ground Target, Digital	F-25
Segment 18.	Handoff, Ground Target, Voice	F-26
Segment 19.	Handoff Target, Laser Cueing	F-27
Segment 20.	Holding Checks	F-28
Segment 21.	Overwatch	F-29
Segment 22.	Receive Handoff, Voice	F-30
Segment 23.	Team Coordination	F-31

TARGET SERVICE, AIR-TO-AIR

Segment 24.	Acquisition , Free Search.....	F-32
Segment 25.	Engagement Air-to-Air From Masked Position	F-33
Segment 26.	Engagement Air-to-Air, Running Fire, Cannon	F-34
Segment 27.	Engagement Air-to-Air, Running Fire, Missile	F-35
Segment 28.	Handoff Aerial Threat, Voice	F-36
Segment 29.	Receive Handoff, Voice	F-37

FUNCTION NO.	FUNCTION
01	Acquire Position Data, Automatic
02	Acquire Position Data, Shift From Known Point
03	Align Heading on Target Bearing
04	Assess Damage
05	Check Aircraft Systems (Holding)
06	Check A/C Systems (Power Change)
07	Check Course Required
08	Check Sensor Operation
09	Check Sights
10	Coordinate Mission
11	Coordinate Target Selection
12	Deploy to Cover
13	Designate Target
14	Detect Aerial Threat, Automatic Search, Cueing
15	Detect Aerial Threat, Unaided
16	Detect Target (Ground), Free Search
17	Detect Target, Prepoint, Auto Cueing
18	Establish Position (Firing or Observation
19	Estimate Range, Automatic
20	Estimate Range, Unaided Estimation
21	Evaluate Position
22	Fire Cannon
23	Fire Weapon
24	Handoff Target, Laser Cueing
25	Hover Masked
26	Identify Target
27	Maintain LOS With Target
28	Maintain Separation Between Aircraft
29	Maneuver NOE
30	Mask Aircraft, Lateral
31	Mask Aircraft, Vertical
32	Monitor Terrain, Aerial Approaches

FUNCTION NO.	FUNCTION
33	Monitor Threat Warning Displays
34	Perform Evasive Maneuvers
35	Prepare Report, Digital Message Device
36	Prepare Weapon, Fire and Forget/Cannon
37	Prepare Weapon, Laser Cueing
38	Receive Handoff, Laser Cueing
39	Receive Message, Designation Coordination, Digital
40	Receive Message, Standard, Digital
41	Receive Message (Standard), Radio, Voice
42	Record Target Data
43	Respond to Threat Warning Signal
44	Stabilize Aircraft
45	Survey Target Area, Automatic Search
46	Survey Target Area, Manual Control, Visual Search
47	Survey Waypoint
48	Track Target
49	Transmit Message (Brief), Voice, Brief
50	Transmit Message (Standard), Voice
51	Transmit Report, Digital
52	Unmask Aircraft, Lateral
53	Unmask Aircraft, Vertical
54	Unmask Sensor
55	Update Doppler, Overfly Stored Waypoint
56	Update Doppler, Remote Landmark
57	Estimate Adjustments, Automatic
58	Engagement, Air-to-Air, Establish Attack Run

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase RECONNAISSANCE

Segment 1: BOMB DAMAGE ASSESSMENT

Method

CUM. SECS.	FLIGHT				SUPPORT					MISSION				TOTAL CONCURRENT					
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		2	4	33	2	2	2							4	2	4	4
20		5		4	4											5		4	4
30	18	1		3	4											1		3	4
40		6		6	5											6		6	5
50	25	1		2	4											1		2	4
60						06	1		2							1		2	
70	54	2		2	4											2		2	4
80						46	5		4	3						5		4	3
90											04	6		7	4	6		7	4
100												6		7	4	6		7	4
110	25	1		2	4											1		2	4
120													3	4	3		3	4	3
130													3	4	3		3	4	3
140													3	4	3		3	4	3
150						51	5	1	6	1						5	1	6	1
160							5	1	6	1						5	1	6	1
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS**

Phase RECONNAISSANCE

Segment 2: EVADE RADAR LOCK-ON Method

CUM. SECS.	FLIGHT				SUPPORT					MISSION					TOTAL CONCURRENT				
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		3	4											2		3	4
20		5		5	4	43	2	3	4							7	3	9	4
30	12	2		5	4											2		5	4
40		2		6	4											2		6	4
50	25	1		2	4											1		2	4
60						49	5	1	4	3						5	1	4	3
70																			
80																			
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase RECONNAISSANCE

Segment 3: RECONNAISSANCE, GENERAL

Method

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		3	4	33	2	2	2							4	2	5	4
20		5		4	4											5		4	4
30		5		5	4											5		5	4
40	18	1		3	4											1		3	4
50		6		5	4											6		5	4
60		6		6	5											6		6	5
70				1	1													1	1
80	54	2		2	4											2		2	4
90				1	1													1	1
100											45	5		4	3	5		4	3
110												1		2		1		2	
120												1		2		1		2	
130	25	1		2	4											1		2	4
140						42	5	3	3	3						5	3	3	3
150							5		1	1						5		1	1
160							5		4							5		4	
170							5		3	1						5		3	1
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS**

Phase RECONNAISSANCE

Segment 3: RECONNAISSANCE, GENERAL (Cont.) Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
190						35	5	3	4	3						5	3	4	3
200								3	4	3							3	4	3
210								3	4	3							3	4	3
220								3	4	3							3	4	3
230								3	4	3							3	4	3
240							5	3	6							5	3	6	
250							5	3	6							5	3	6	
260							5	3	6							5	3	6	
270								3	4	3							3	4	3
280						51	5	1	2	1						5	1	2	1
290							5	1	2	1						5	1	2	1
300	54	2		2	4											2		2	4
310																			
320																			
330											32	5	3	4	3	5	3	4	3
340												1		2		1		2	
350	29	2		3	4											2		3	4
360																5		4	4

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase RECONNAISSANCE

Segment 4: RECORD SIGHTINGS

Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	4
20	54	2		2	4											2		2	4
30																			
40																			
50																			
60																			
70											45	5		4	3	5		4	3
80												1		2		1		2	
90												1		2		1		2	
100											01	5	3	3	3	5	3	3	3
110																			
120	31	2		2	4											2		2	4
130				1	1													1	1
140	25	1		2	4											1		2	4
150											42	5	3	3	3	5	3	3	3
160												5		1	1	5		1	1
170												5		4		5		4	
180												5		3	1	5		3	1

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS---AUTOMATION OF SELECTED SUBSYSTEMS**

Phase RECONNAISSANCE

Segment 5: TACTICAL MOVEMENT

Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	4
20						07	5		5	2						5		5	2
30	54	2		2	4											2		2	4
40											32	5	3	4	3	5	4	4	3
50												1		2		1		2	
60												1		2		1		2	
70						49	5	1	4	3						5	1	4	3
80	29	2		3	4											2		3	4
90		5		4	4						32	5	3	4	3	10	3	8	4
100		5		5	4							1		2		6		7	4
110		5		5	4							1		2		6		7	4
120	30	2		2	4											2		2	4
130	54	2		2	4	33	2	2	2							4	2	4	4
140											32	5	3	4	3	5	3	4	3
150												1		2		1		2	
160												1		2		1		2	
170						49	5	1	4	3						5	1	4	3
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase RECONNAISSANCE

Segment 6: TRANSMIT REPORT

Method DIGITAL

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4		1		2							1		4	4
20											35	5	3	4	3	5	3	4	3
30													3	4	3		3	4	3
40													3	4	3		3	4	3
50													3	4	3		3	4	3
60													3	4	3		3	4	3
70													3	4	3		3	4	3
80												5	3	6		5	3	6	
90												5	3	6		5	3	6	
100												5	3	6		5	3	6	
110													3	4	3		3	4	3
120																			
130																			
140																			
150											51	5	1	6	1	5	1	6	1
160												5	1	6		5	1	6	
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS---AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 7: ACQUISITION

Method AUTO SEARCH

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		3	4	49	5	1	4	3						7	1	7	7
20		5		4												5		4	
30		5		5	4											5		5	4
40	25	1		2	4		1		2							2		4	4
50																			
60	54	2		2	4											2		2	4
70						33	2	2	2							2	2	2	
80																			
90																			
100																			
110											16	5		4	3	5		4	3
120												1		2		1		2	
130												1		2		1		2	
140												5		2		5		2	
150											26	5	3	3	3	5	3	3	3
160											01	5	3	3	3	5	3	3	3
170	31	2		2	4											2		2	4
180				1	1													1	1

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 8: ACQUISITION

Method FROM LASER CUEING

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	
20																			
30											38		3	4	3		3	4	3
40	54	2		2	4							2		3	1	4		2	4
50													3	4			3	4	
60												2	3	4	3	2	3	4	3
70																			
80						49	5		4	3						5		4	3
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS**

Phase TARGET SERVICE

Segment 9: ADJUSTMENTS, AREA WEAPONS

Method DIGITAL

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							1		4	4
20																			
30						39	5	1	3	1						5	1	3	1
40	54	2		2	4											2		2	4
50											46	5		4	3	5		4	3
60												1		2		1		2	
70											01	5	3	3	3	5	3	3	3
80	31	2		2	4											2		2	4
90				1	1	42	5	3	3	3						5	3	4	4
100							5		4	1						5		4	1
110						51	5	1	6	1						5	1	6	1
120							5	1	6	1						5	1	6	1
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SFELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 10: ADJUSTMENTS, AREA WEAPONS

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	4
20																			
30						41		3	4	3							3	4	3
40								3	4	3							3	4	3
50	54	2		2	4						46	5		4	3	7		6	7
60												1		2		1		2	
70											57	4		3	1	4		3	1
80												4		1	4	4		1	4
90												5		4	4	5		4	4
100	31	2		2	4											2		2	4
110				1	1													1	1
120						49	5	1	4	3						5	1	4	3
130																			
140																			
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS**

Phase TARGET SERVICE

Segment 11: DESIGNATE FOR PGM

Method

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4											2		2	4
20						33	2	2	2							2	2	2	
30											48	4		3	4	4		3	4
40						40	2	1	3	1						2	1	3	1
50								3	4	1							3	4	1
60								3	4								3	4	
70							2	1	3	1						2	1	3	1
80						39	5	1	3	1						5	1	3	1
90							5	1	2							5	1	2	
100											13	5	3	3	3	5	3	3	3
110												5		2	1	5		2	1
120												5		2	1	5		2	1
130	12	2		5	4											2		5	4
140		2		6	4											2		6	4
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 12: ENGAGEMENT, AIR-TO-GROUND

Method AUTONOMOUS, LOAL

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4											2		2	4
20						33	2	2	2							2	2	2	
30											27a	4		1	4	4		1	4
40														1	1			1	1
50											01	5	3	3	3	5	3	3	3
60	53	4		2	4											4		2	4
70											23	5	3	4	3	5	3	4	3
80													1	1			1	1	
90																			
100																			
110	12	2		5	4											2		5	4
120		2		6	4											2		6	4
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS---AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 13: ENGAGEMENT, GROUND TARGET

Method AUTONOMOUS, LOBL

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT			
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	
10	54	2		2	4	33	2	2	2					4	2	4
20											27	4		1	4	
30											01	5	3	3	3	
40	53	4		2	4									4		2
50				1	1										1	1
60											23	5	3	4	3	
70													1	1		
80																
90	12	2		5	4									2		5
100		2		6	4									2		6
110																
120																
130																
140																
150																
160																
170																
180																

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 14: ENGAGEMENT, GROUND TARGET

Method REMOTE DESIGNATION

CUM. SECS.	FLIGHT				SUPPORT					MISSION					TOTAL CONCURRENT				
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	41	2	3	4	3						3	3	6	7
20								3	4								3	4	
30								3	4								3	4	
40								3	4								3	4	
50								3	4	3							3	4	3
60						42	5	3	3	3						5	3	3	3
70							5		1	1						5		1	1
80							5		4							5		4	
90							5		3							5		3	
100																			
110						07	5		5	2						5		5	2
120	29	5		5	4											5		5	4
130		5		5	4											5		5	4
140	25	1		2	4											1		2	4
150																			
160																			
170																			
180											23	5	3	4	3	5	3	4	3

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 14: ENGAGEMENT, GROUND TARGET (Cont.) Method REMOTE DESIGNATION

CUM. SECS.	FLIGHT				SUPPORT					MISSION					TOTAL CONCURRENT				
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
190																			
200						50	5	1	4	3						5	1	4	3
210								3	4	3							3	4	3
220								1	4	3							1	4	3
230								3	4	3							3	4	3
240	53	4		2	4											4		2	4
250				1	1													1	1
260											23e		3	3	3		3	3	3
270						49	5	1	4							5	1	4	
280	31	2		2	4											2		2	4
290				1	1													1	1
300																			
310																			
320																			
330																			
340																			
350																			
360																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 15: ENGAGEMENT, SOFT TARGETS

Method CANNON FIRE, HOVER

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	5		4	4											5		4	4
20	25	1		2	4											1		2	4
30						06	1		2							1		2	
40						41	2	3	4	3						2	3	4	3
50								3	4								3	4	
60								3	4								3	4	
70								3	4								3	4	
80								3	4	3							3	4	3
90	29	5		4	4											5		4	4
100		5		4	4											5		4	4
110	18	6		5	4											6		5	4
120		6		6	4											6		6	4
130																			
140											36	2		3	1	2		3	1
150																			
160																			
170	53	4		2	4											4		2	4
180				1	1													1	1

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS**

Phase TARGET SERVICE

Segment 15: ENGAGEMENT, SOFT TARGETS (Cont.) Method CANNON FIRE, HOVER

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
190																			
200											01	5	3	3	3	5	3	3	3
210											22	3		2	1	3		2	1
220												2		2	1	2		2	1
230	12	2		5	4											2		5	4
240		2		6	4											2		6	4
250																			
260																			
270																			
280																			
290																			
300																			
310																			
320																			
330																			
340																			
350																			
360																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 16: ENGAGEMENT, SOFT TARGETS

Method FFAR, DIRECT

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	4
20						41	2	3	4	3						2	3	4	3
30								3	4								3	4	
40								3	4								3	4	
50								3	4	3							3	4	3
60						42	5	3	3	3						5	3	3	3
70							5		1	1						5		1	1
80							5		4							5		4	
90							5		3							5		3	
100						07	5		5	2						5		5	2
110	29	2		3	4											2		3	4
120		5		4												5		4	
130		5		5	4											5		5	4
140	18	6		6	5											6		6	5
150		6		6	4											6		6	4
160	25	1		2	4											1		2	4
170						50	5	1	4	3						5	1	4	3
180								3	4	3							3	4	3

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS**

Phase TARGET SERVICE

Segment 16: ENGAGEMENT, SOFT TARGETS (Cont.)

Method FFAR, DIRECT

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
190						(Cont) 50		1	4	3							1	4	3
200								3	4	3							3	4	3
210											36	2		3	1	2		3	1
220																			
230	53	4		2	4											4		2	4
240				1	1													1	1
250																			
260											19	5		6	4	5		6	4
270											23	5		2	1	5		2	1
280	12	2		5	4											2		5	4
290		2		6	4											2		6	4
300																			
310																			
320																			
330																			
340																			
350																			
360																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 17: HANDOFF, GROUND TARGETS

Method DIGITAL

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4	33	2	2	2							4	2	4	4
20											01	5	3	3	3	5	3	3	3
30	31	2		2	4	42	5	3	3	3						7	3	5	7
40				1	1		5		1	1						5		2	2
50							5		4							5		4	
60							5		3	1						5		3	1
70																			
80						51	5	1	6	1						5	1	6	1
90							5	1	6							5	1	6	
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 18: HANDOFF, GROUND TARGET

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4	33	2	2	2							4	2	4	4
20						27	4		1	4						4		1	4
30									1	1								1	1
40											48	4		3	4	4		3	4
50											01	5	3	3	3	5	3	3	3
60	31	2		2	4											2		2	4
70				1	1													1	1
80						50	5	1	4	3						5	1	4	3
90								3	4	3							3	4	3
100								1	4	3							1	4	3
110								3	4	3							3	4	3
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 19: HANDOFF TARGET

Method LASER CUEING

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	54	2		2	4											2		2	4
20						33	2	2	2							2	2	2	
30											48	4		3	4	4		3	4
40												4		3	4	4		3	4
50											24		3	4	3		3	4	3
60												4	3	4	4	4	3	4	4
70												2		2	1	2		2	1
80													3	4			3	4	
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS**

Phase TARGET SERVICE

Segment 20: HOLDING CHECKS

Method _____

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4											1		2	4
20																			
30																			
40						05	5		6							5		6	
50							5		2							5		2	
60							6		6							6		6	
70							5		2	1						5		2	1
80							6		6							6		6	
90							7		6							7		6	
100						08	6		6	1						6		6	1
110							6		6	2						6		6	2
120							6		6	2						6		6	2
130							6		6	2						6		6	2
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 21: OVERWATCH

Method

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	5		4	4											5		4	4
20		5		4	4											5		4	4
30	25	1		2	4											1		2	4
40																			
50						06	1		2							1		2	
60	54	2		2	4	33	2	2	2							4	2	4	4
70											27	4		1	4	4		1	4
80														1	1			1	1
90											32	5	3	4	3	5	3	4	3
100											09	5	3	4	3	5	3	4	3
110												5		2		5		2	
120						49	5	1	4	3						5	1	4	3
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 22: RECEIVE HANDOFF

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT					MISSION					TOTAL CONCURRENT				
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							1		4	4
20						41	2	3	4	3						2	3	4	3
30								3	4								3	4	
40								3	4								3	4	
50								3	4								3	4	
60								3	4	3							3	4	3
70						42	5	3	3	3						5	3	3	3
80							5		1	1						5		1	1
90							5		4							5		4	
100							5		3	1						5		3	1
110						07	5		5	2						5		5	2
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE

Segment 23: TEAM COORDINATION

Method

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	29	2		3	4	33	2	2	2							4	2	5	4
20		5		3	4											5		3	4
30		5		3	4	06	1		2							6		5	4
40		5		3	4						46	5		4	3	10		7	7
50		5		3	4							1		2		6		5	4
60		5		3	4	50	5	1	4	3		1		2		11	1	9	7
70		5		3	4			3	4	3						5	3	7	7
80		5		3	4			1	4	3						5	1	7	7
90	18	6		5	4			3	4	3						6	3	9	7
100		6		6	5											6		6	5
110																			
120	54	2		2	4											2		2	4
130											32	5	3	4	3	5	3	4	3
140												1		2		1		2	
150												1		2		1		2	
160																			
170																			
180																			

**SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS**

Phase TARGET SERVICE, AIR-TO-AIR

Segment 24: ACQUISITION

Method FREE SEARCH

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	4
20	54	2		2	4											2		2	4
30						33	2	2	2							2	2	2	
40											16	5	3	4	3	5	3	4	3
50												1		2		2		2	
60												5		2		5		2	
70											26	5	3	3	3	5	3	3	3
80						49	5	1	4	3						5	1	4	3
90						27	4		1	4						4		1	4
100									1	1								1	1
110											19	5	3	3	3	5	3	3	3
120												5		4		5		4	
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE, AIR-TO-AIR

Segment 25: ENGAGEMENT AIR-TO-AIR

Method FROM MASKED POSITION

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	4
20																			
30	54	2		2	4											2		2	4
40											48	4		3	4	4		3	4
50												4		3	4	4		3	4
60												4		3	4	4		3	4
70											19	5	3	3	3	5	3	3	3
80												5		4		5		4	
90																			
100																			
110											36	2		3	1	2		3	1
120	53	4		2	4											4		2	4
130				1	1													1	1
140											23a	5	3	4	3	5	3	4	3
150														1	1			1	1
160																			
170	12	2		5	4											2		5	4
180		2		6	4											2		6	4

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE, AIR-TO-AIR

Segment 26: ENGAGEMENT AIR-TO-AIR

Method RUNNING FIRE, CANNON

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	58	4		3	4											4		3	4
20		4		3	4						36	2		3	1	6		6	5
30	28	2		2	4											2		2	4
40		2		2	4											2		2	4
50		2		2	4						22	2		2	1	4		4	5
60		2		2	4							2		2	1	2		4	5
70	12	2		5	4											2		5	4
80		2		6	4											2		6	4
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE, AIR-TO-AIR

Segment 27: ENGAGEMENT, AIR-TO-AIR

Method RUNNING FIRE, MISSILE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	58	4		3	4											4		3	4
20		4		3	4						36	2		3	1	6		6	5
30																			
40																			
50											23	5	3	4	3	5	3	4	3
60	12	2		5	4									1	1	2		6	5
70		2		5	4											2		5	4
80				1	1	06	1		2							1		3	1
90																			
100																			
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE, AIR-TO-AIR

Segment 28: HANDOFF AERIAL THREAT

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	4
20	54	2		2	4											2		2	4
30						33	2	2	2							2	2	2	
40											16	5	3	4	3	5	3	4	3
50												1		2		1		2	
60												5		2	4	5		2	4
70											26	5	3	3	3	5	3	3	3
80						49	5	1	3	1	27	4		1	4	9	1	4	5
90						50	5	1	4	3				1	1	5	1	5	4
100								3	4	3							3	4	3
110								1	4	3							1	4	3
120								3	4	3							3	4	3
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL
WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

Phase TARGET SERVICE, AIR-TO-AIR

Segment 29: RECEIVE LANDOFF

Method VOICE

CUM. SECS.	FLIGHT				SUPPORT				MISSION				TOTAL CONCURRENT						
	Function	V	A	C	P	Function	V	A	C	P	Function	V	A	C	P	V	A	C	P
10	25	1		2	4	06	1		2							2		4	4
20																			
30	54	2		2	4	33	2	2	2							4	2	4	4
40											32	5	3	4	3	5	2	4	3
50												1		2		1		2	
60						41	2	3	4	3						2	3	4	3
70								3	4								3	4	
80								3	4								3	4	
90								3	4	3							3	4	3
100											16	5	3	4	3	5	3	4	3
110												1		2		1		2	
120												5		2	4	5		2	4
130											26	5	3	3	3	5	3	3	3
140						49	5	1	4	3						5	1	4	3
150											27	4		1	4	4		1	4
160														1	1			1	1
170																			
180																			

A P P E N D I X G

FUNCTION ANALYSIS WORKSHEETS

(REVISED TO REFLECT DISTRIBUTION OF FUNCTIONS TO TWO CREWMEMBERS)

APPENDIX G

TABLE OF CONTENTS

FUNCTION NO.	FUNCTION	Page
01	Acquire Position Data, Automatic.....	G-4
02	Acquire Position Data, Shift From Known Point.....	G-5
03	Align Heading on Target Bearing.....	G-6
04	Assess Damage.....	G-7
05	Check Aircraft Systems (Holding).....	G-8
06	Check A/C Systems (Power Change).....	G-9
07	Check Course Required.....	G-10
08	Check Sensor Operation.....	G-11
09	Check Sights.....	G-12
10	Coordinate Mission.....	C-13
11	Coordinate Target Selection.....	G-14
12	Deploy to Cover.....	G-15
13	Designate Target.....	G-16
14	Detect Aerial Threat, Automatic Search, Cueing.....	G-17
15	Detect Aerial Threat, Unaided.....	G-18
16	Detect Target (Ground), Free Search.....	G-19
17	Detect Target, Prepoint, Auto Cueing.....	G-20
18	Establish Position (Firing or Observation.....	G-21
19	Estimate Range, Automatic.....	G-22
20	Estimate Range, Unaided Estimation.....	C-23
21	Evaluate Position.....	G-24
22	Fire Cannon.....	C-25
23	Fire Weapon.....	G-26
24	Handoff Target, Laser Cueing.....	G-27
25	Hover Masked.....	G-28
26	Identify Target.....	G-29
27	Maintain LOS With Target.....	G-30
28	Maintain Separation Between Aircraft.....	G-31
29	Maneuver NOE.....	G-32
30	Mask Aircraft, Lateral.....	G-33

FUNCTION NO.	FUNCTION	Page
31	Mask Aircraft, Vertical.....	G-34
32	Monitor Terrain, Aerial Approaches.....	G-35
33	Monitor Threat Warning Displays.....	G-36
34	Perform Evasive Maneuvers.....	G-37
35	Prepare Report, Digital Message Device.....	G-38
36	Prepare Weapon, Fire and Forget/Cannon.....	G-39
37	Prepare Weapon, Laser Cueing.....	G-40
38	Receive Handoff, Laser Cueing.....	G-41
39	Receive Message, Designation Coordination, Digital.....	G-42
40	Receive Message, Standard, Digital.....	G-43
41	Receive Message (Standard), Radio, Voice.....	G-44
42	Record Target Data.....	G-45
43	Respond to Threat Warning Signal.....	G-46
44	Stabilize Aircraft.....	G-47
45	Survey Target Area, Automatic Search.....	G-48
46	Survey Target Area, Manual Control, Visual Search.....	G-49
47	Survey Waypoint.....	G-50
48	Track Target.....	G-51
49	Transmit Message (Brief), Voice, Brief.....	G-52
50	Transmit Message (Standard), Voice.....	G-53
51	Transmit Report, Digital.....	G-54
52	Unmask Aircraft, Lateral.....	G-55
53	Unmask Aircraft, Vertical.....	G-56
54	Unmask Sensor.....	G-57
55	Update Doppler, Overfly Stored Waypoint.....	G-58
56	Update Doppler, Remote Landmark.....	G-59
57	Estimate Adjustments, Automatic.....	G-60
58	Engagement, Air-to-Air, Establish Attack Run.....	G-61

FUNCTION ANALYSIS

TOTAL TIME 8.5 seconds (APPROXIMATE)		FUNCTION	Acquire Position Data	No. 01
		METHOD	Automatic	Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
16 Align	Sight reticle	Sensor control/ sight ACS	Visual Align (V-4)	Sight adjustment needed (C-1)	Control pressure (P-4)	Start 5.5
04 Activate	Laser rangefinder	Laser rangefinder AI	Visual Alignment (V-4)	Laser on target? (C-2)	Switch activation (P-1)	6.0 - 7.5
122 Note	Coordinates (Sensor capture)	Sensor subsystem Coordinate display NDC	Visual symbolic (V-5)	Encoding (C-4)	---	8.0 - 8.5

FUNCTION ANALYSIS

TOTAL TIME 28 seconds		FUNCTION	Acquire Position Data	No. 02
(APPROXIMATE)		METHOD	Shift From Known Point	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control/ sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressures (P-4)	5	S + 5.5
36 Select	Wide FOV	Sensor controls, FOV ACP	Visual monitor (V-1)	Point usable? (C-1)	Switch activation (P-1)	.0	6.0 - 7.0
94 Identify	Landmark	Sensor scene, map NSM	Visual Discrimi- nation (V-6)	Correct Landmark (C-6)	Map Orienta- tion (P-5)	5	7.5 - 12.5
89 Estimate	Shift (to target)	Sensor scene, map NSM	Visual Discrimi- nation (V-6)	Correct Shift (C-7)	Map Orienta- tion (P-5)	15	13 - 28

FUNCTION ANALYSIS

FUNCTION Align Heading on Target Bearing No. 03

Pilot

TOTAL TIME 34.5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
13 Adjust	Heading	Flight Controls Sensor Display FAD	Alignment of bench- marks (V-4)	Heading adjustment needed (C-5)	Direction power adjustment (P-4)	30	S + 30.5
181 Stabilize	Aircraft	Flight controls, surrounding visual field FV	Relative movement in sur- rounding referents (V-2)	Control adjustments to stop drift, heading change (C-1)	Small adjust- ments in power, cyclic antitorque (P-4)	5	20.5 - 34.5

FUNCTION ANALYSIS

No. 04

FUNCTION Assess Damage

TOTAL TIME 62 seconds
(APPROXIMATE)

Copilot

METHOD

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
87 Estimate	Percentage of target coverage	Sensor display scene AS	Visual search of terrain (V-6)	What percentage? (C-7)	LOS Control (P-4)	7	S - 14.5
79 Determine	Targets disabled	Sensor display scene AS	Visual inspection (V-6)	Destroyed, repairable, usable? (C-7)	LOS control (P-4)	7	S - 14.5
142 Record	Message	Message device CM	Visual symbolic (V-7)	Format content (C-4)	Keyboard entries (P-7)	45	15 + 60 Time for PE 1 and PE 2 total 14.5 seconds. The two PEs will be performed simultaneously during scan/survey of target area for 14.5 seconds.

FUNCTION ANALYSIS

No. 05

FUNCTION Check Aircraft Systems (Holding)

TOTAL TIME 108 seconds
(APPROXIMATE)

Both

METHOD

PERFORMANCE ELEMENTS			SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT			SENSORY	COGNITIVE	PSYCHOMOTOR		
COPILOT	48 Check	Fuel	Fuel system display DF	Visual symbolic mental calculations (V-5)	Quantity (mission time) (C-6)	----	10	S - 10.5
COPILOT	50 Check	Engine status displays	Engine status displays DE	Visual symbolic (V-5)	Within safe limits (C-2)	----	10	11 - 21
BOTH	47 Check	Aircraft equipment	Life support L	Visual inspection (V-6)	Available and operating (C-6)	----	30	21.5 - 51.5
COPILOT	49 Check	Caution/warning indicators	Malfunction detection equipment (warning) DM	Visual symbolic (V-5)	No indications jeopardizing mission continuation (C-2)	Switch operation (P-1)	10	52 - 62
BOTH	52 Check	Cockpit items	Personal equipment P	Visual inspection (V-6)	Secure (C-6)	--	30	62.5 - 92.5
BOTH	138 Perform	Checklist items	Checklist PC	Visual reading (V-7)	No conditions jeopardizing mission continuation (C-6)	--	15	93 - 108
								Each PE occurs in sequence.

FUNCTION ANALYSIS

FUNCTION Check Aircraft Systems (Power Change) No. 06

METHOD Pilot

TOTAL TIME 11.5 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
14 Adjust	Power	Power control FP	----	Amount necessary (C-1)	----	.5	S + 1.0
51 Check	System instruments	Engine and caution displays DEW	Visual symbolic (V-5)	In limits? Desire setting (C-2)	----	10	1.5 - 11.5

FUNCTION ANALYSIS

TOTAL TIME 3.0 seconds		FUNCTION Check Bearing and Range	No. 07
(APPROXIMATE)		METHOD	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	REMARKS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
170 Select	Waypoint (desired)	Navigation control N	Visual symbolic (V-5)	Correct waypoint? (C-3)	Switch activation (P-2)	1	S - 1.5
46 Check	Course, distance to waypoint	Navigation display ND	Visual symbolic (V-5)	Adjustment to heading? (C-5)	----	1	2.0 - 3.0

FUNCTION ANALYSIS

TOTAL TIME 32.5 seconds (APPROXIMATE)		FUNCTION Check Sensor Operation	No. 08
		METHOD	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
168 Select	Sensor(s)	Sensor subsystem AC	Visual inspect (V-6)	Sensor operating (C-6)	Sensor switch (P-1)	1.5	S - 2.0
15 Adjust	Sensors	Sensor subsystem AC	Visual inspect (V-6)	Adjustments needed -brightness -contrast -gain -polarity -frequency -boresight (C-6)	Sensor controls fine adjust-ments required (P-2)	30	2.5 - 32.5

FUNCTION ANALYSIS

TOTAL TIME 38 seconds (APPROXIMATE)		FUNCTION	Check Sighting	No. 09
		METHOD		Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	CONTENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
111 Monitor	Surroundings	Visual, unaided V	Visual detect movement (V-2)	Possible sighting? (C-2)	----	S + 20.5
192 Survey	Approaches to 40	Sensor display scene AS	Visual Detect Movement (V-2)	Possible sighting? (C-2)	Adjust sensor LOS (P-4)	S - 20.5
24 Align	Sight	Sensor display sight ADS	Visual align (V-4)	Any sighting (C-2)	Sensor LOS adjustment (P-4)	21 - 26
36 Select	Sensor FOV	Sensor controls FOV ACF	Visual monitor (V-6)	Target centered (C-1)	Discrete activation (P-1)	26 - 27.5
98 Identify	Threat	Sensor displays DTV	Movement, shape, heat signature (V-2)	Level of threat friend/foe (C-4)	--	28 - 38
						PE 1 and 2 will be continuous throughout function but interrupted by PE 3, 4, and 5.

FUNCTION ANALYSIS

TOTAL TIME 116.5 seconds (APPROXIMATE)		FUNCTION Coordinate Mission	No. 10
		METHOD	Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
166 Select	Radio, security	Communication system CS	Vis. symbol (V-5)	Correct radio? (C-3)	Switch activation (P-1)	10	S - 10.5
205 Transmit	Message (extended)	Communication system CT	Auditory, message content (A-3)	Encoding (C-4)	Switch activation (P-1)	45	11 - 56
113 Note	Acknowledgement	Communication system CR	Auditory content (A-3)	Verify content established (C-4)	----	5	56.5 - 61.5
69 Coordinate	Mission number	Communication system CC	Auditory, message content (A-3)	Message received? Authentication correct? Mission proc? (C-5)	Switch activation (P-1)	45	61.5 - 71.5 71.5 - 116.5
							10 seconds delay awaiting PE 4

FUNCTION ANALYSIS

TOTAL TIME 102.5 seconds (APPROXIMATE)		FUNCTION	Coordinate Target Selection	No. 11
		METHOD		Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
150 Select	Communication channels and security	Communication system CS	Visual symbolic (V-5)	Adequacy of setting -equipment operating (C-3)	Selector switches, speech (P-1; P-3)	10	S - 10.5
124 Note	Target data	Communication system CR	Auditory (A-3)	Authentic message required (C-6)	----	30	11 - 41
141 Record	Target data	Message device FCC CM	Visual symbolic (V-5)	Encoding (C-4)	Keyboard entries (P-7)	10	41.5 - 51.5
196 Transmit	Message (brief) Acknowledgement	Communication system CT	Auditory (V-3)	Encoding recall (C-4)	Switches, speech (P-1; P-3)	5	52 - 57
68 Coordinate	Attack with other attack	Communication system CC	Auditory (A-3)	Target assessment Firing schedule (C-5)	Transmitter switches (P-1)	45	57.5 - 102.5

FUNCTION ANALYSIS

TOTAL TIME 18.5 seconds (APPROXIMATE)		FUNCTION	Deploy to Cover	No. 12
		METHOD		Pilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
43 Check	Obstacle clearance	Outside visual field V	Visual inspection (V-1)	Adequate clearance (C-2)	----	5	S - 5.5
83 Establish	Dash	Flight control F	Visual, relative movement (V-2)	Control adjustment needed? (C-1)	Control pressure (P-4)	3	5.5 - 8.5
181 Stabilize	Aircraft	Flight controls, outside visual field FV	Visual, detect movement (V-2)	Control adjustment needed? (C-1)	Control pressure (P-4)	5	8.5 - 13.5
143 Reduce	Altitude	Flight controls, outside visual field FV	Visual, relative movement (V-2)	Control adjustment needed (C-1)	Control pressure (P-4)	5	

FUNCTION ANALYSIS

TOTAL TIME 27 seconds (APPROXIMATE)		FUNCTION	Designate Target	No. 13
		METHOD		Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control sight ACS	Vis align (V-4)	Adj needed (C-1)	Control Pressure (P-4)	5	S - 5.5
36 Select	Narrow FOV	Sensor control FOV ACF	Vis monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6 - 7.0
33 Arm	Laser designator	Laser controls ACL	Vis symb (V-5)	Laser ready? (C-2)	Discrete activation (P-1)	2.5	7.5 - 10
02 Activate	Laser designator	Laser designator ALD	Vis detection (V-2)	Target lased? (C-2)	Discrete activation (P-1)	10	10.5 - 20.5
125 Note	Weapon impact	Sensor display AD	Vis monitor (V-1)	Target hit? (C-2)	----	5	21 - 26
72 De-Arm	Laser	Laser cont ACL	Vis symb (V-5)	Laser safe? (C-2)	Discrete activation (P-1)	.5	26.5 - 17

FUNCTION ANALYSIS

TOTAL TIME 31.5 seconds (APPROXIMATE)		FUNCTION Detect Aerial Threat	No. 14
		METHOD Automatic Search, Cueing	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
190 Survey	Airspace	Sensor display AS	Visual monitor (V-1)	Cueing symbol? (C-2)	----	20	S + 20.5
76 Detect	Cueing symbol	Sensor display AT	Visual symbolic (V-5)	Signal detection (C-2)	----	5	21 - 26
16 Align	Sight reticle	Sensor control sight ACS	Visual alignment (V-4)	Target centered? (C-1)	Control press. (P-4)	5	26.5 - 31.5

FUNCTION ANALYSIS

TOTAL TIME 31 seconds (APPROXIMATE)			FUNCTION Detect Aerial Threat		No. 15	
			METHOD Unaided		Coptilot	
PERFORMANCE ELEMENTS			WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
191 Search	Airspace	Visual, unaided V	Visual survey (V-1)	Area clear? (C-6)	----	12.5
74 Detect	Movement	Visual, unaided V	Visual detect (V-2)	Signal (maneuver) (C-2)	----	2
176 Direct	Sensor (to target)	Sensor controls a/c direction indicated AC	Visual align (V-4)	Approx bearing to sighting? (C-6)	Control pressure (P-4)	5
99 Identify	Threat	Visual, unaided V	Visual; movement shape (V-2)	Orientation of a/c. Type of a/c. (C-4)		5
98 Identify	Threat	Sensor threat display (visual) DTV	Movement shape heat signature (V-2)	Level of threat Friend/ foe (C-4)		10
97 Identify	Threat	Sensor threat display (aural) DT	Tone(s) contin- uous or intermit- tent (A-3)	Type of threat a/c. Level of threat (C-4)		10
						No transition time provided to first discrete PE (2).

FUNCTION ANALYSIS

TOTAL TIME 20.5 seconds
 (APPROXIMATE)

FUNCTION - Detect Target (Ground)

METHOD - Free Search

No. 16
 Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SF:30RY	COGNITIVE	PSYCHOMOTOR	
147 Search	Target area	Sensor display scene AS	Visual survey (V-1)	Area clear? (C-6)	Control pressure (LOS) (P-4)	S + 13
75 Detect	Movement	Sensor display scene AS	Visual detection (V-2)	Signal (movement) (C-2)		13 - 15
24 Align	Sight	Sensor display/ sight ADS	Visual alignment (V-4)	Target Centered (C-2)	Control pressure (P-4)	15.5 - 20.5

FUNCTION ANALYSIS

TOTAL TIME 13 seconds (APPROXIMATE)		FUNCTION Detect Target		No. 17
		METHOD Prepoint, Auto Cueing		Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
209 Verify	Target data in FCC	FCC display ID	Visual symbol (V-5)	Data complete? (C-6)	----	.5	S - 1.0
165 Select	Sensor prepoint	Sensor controls AC	Visual symbol (V-5)	Prepoint option (C-3)	Switch activation (P-1)	1.0	1.5 - 2.5
76 Detect	Cueing symbol	Sensor display/target cue AT	Visual symbol (V-5)	Signal recognition (C-2)	----	5	3 - 8
24 Align	Sight	Sensor display (sight) ADS	Visual alignment (V-4)	Target centered? (C-2)	Control pressure (P-4)	5	8 - 13

FUNCTION ANALYSIS

FUNCTION Establish Position (Firing or Observation) No. 18

METHOD Both

TOTAL TIME 21.5 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
PILOT	103 Maintain Obstacle clearance	Flight controls outside visual FV	Visual detect (V-2)	Verify Clearance (C-2) (P-4)	Flight control pressures	21.5	S + 21.5
PILOT	92 Follow Course	Nav display Flight controls NDF	Visual symbol (V-5) (C-5)	Course adjustment needed?	Control pressures (P-4)	21.5	S + 21.5
COPLOT	55 Check Position	Outside visual map VM	Visual symbol (V-5)	Decoding (C-4)		10	.5 - 10.5
COPLOT	43 Check Obstacle clearance	Outside visual V clearance (V-1)	Visual inspect masking? (C-2)	Adequate space,		5	11 - 16
PILOT	181 Stabilize Aircraft	Flight controls Outside visual FV	Visual detect movement (V-2)	Adjustments needed? (C-1)	Control - pressures (P-4)	5	16.5 - 21.5
							PE 1 and PE 2 continuous throughout function overlapping PE 3, 4, and 5.

FUNCTION ANALYSIS

TOTAL TIME 10 seconds		FUNCTION Estimate Range	No. 19
(APPROXIMATE)		METHOD Automatic	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	5	S - 5.5
36 Select	FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6 - 7.0
04 Activate	Laser range finder (LRF)	Sensor/LRF AL	Visual align signal (V-4)	Target lased? (C-2)	Discrete activation (P-1)	1.5	7.5 - 9
132 Note	Range	Sensor display/ range AR	Visual discrim (V-5)	In range? (C-6)	----	.5	9.5 - 10

FUNCTION ANALYSIS

TOTAL TIME 33 seconds (APPROXIMATE)		FUNCTION Estimate Range		No. 20	
		METHOD Unaided Estimation		Copilot	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	5	S - 5.5
36 Select	FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6.0 - 7.0
135 Note	Tgt/mil dimensions	Sensor display AD (V-6)	Visual discrim dimension (C-6)	Evaluate target pressure (P-4)	Sight control	5	7.5 - 12.5
88 Estimate	Range	Sensor display AD	----	Estimation (C-7)	----	20	13 - 33

FUNCTION ANALYSIS

TOTAL TIME 46.5 seconds		FUNCTION Evaluate Position	No. 21
(APPROXIMATE)		METHOD	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
193 Survey	Surroundings	Sensor display scene AS	Visual, movements, shapes (V-2)	Area safe? (C-6)	Sensor controls (P-4)	20	S + 20.5
177 Slew	Sensor	Sensor controls AC	Visual survey (V-1)	Where to point? (C-3)	Sensor controls (P-4)	5	21 - 26
39 Check	Visual access	Sensors, maps NSM	Visual inspection (V-6)	Adequate area FOV? (C-6)	Sensor controls (P-4)	20	26.5 - 46.5

FUNCTION ANALYSIS

TOTAL TIME 15 seconds (APPROXIMATE)		FUNCTION Fire Cannon	No. 22
		METHOD	Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
207 Verify	Adjusted sight alignment	Sensor display scene AS	Visual, symbolic (V-5)	Verify sight picture (C-2)	----	S + 2.5
08 Activate	Gun trigger	Fire control system 1	----	Trigger position. Recognize (C-2)	Switch activation (P-1)	2.5 - 3.0
136 Observe	Tracers, Impact	Sensor display sight ADS	Visual trace (V-3)	On target (C-2)	----	3.5 - 8.5
11 Adjust	Alignment	Sensor display sight ADS	Visual align (V-4)	Adjustment needed (C-1)	Control pressures (P-4)	9 - 14
71 De-arm	Gun	Fire control system I	Visual, symbolic (V-5)	Gun secured (C-2)	Switch or switch sequence (P-1)	14.5 - 15

FUNCTION ANALYSIS

TOTAL TIME 9 seconds		FUNCTION	Fire Weapon	No. 23
(APPROXIMATE)		METHOD		Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS				DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR		
203 Verify	Firing con- straints met	Fire control display ID	Visual discrimi- nation (V-5)	System ready? (C-6)	Control pressures (P-4)	5	S + 5.5
146 Release	Weapon	Fire control system I	Visual Auditory (V-2, A-1)	Weapon shot? (C-2)	Switch activation (P-1)	2	6 - 8
73 De-arm	Weapon	Fire control system I	Visual symbolic (V-5)	Weapon sys- tem secured (C-2)	Switch activation (P-1)	.5 sec/ switch	8.5 - 9

FUNCTION ANALYSIS

FUNCTION Handoff Target, Laser Cueing

No. 24

METHOD Copilot

TOTAL TIME 38 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
196 Transmit	Message (brief) alert	Communication system (transmit) CT	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	5	S + 5.5
113 Note	Ack/ready	Communication system (receive) CR	Auditory. Interpret (A-3)	Decoding (C-4)	----	5	6 - 11
196 Transmit	Message (brief) Alert for sensor cue	Communication system (transmit) CT	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	5	11.5 - 16.5
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed (C-1)	Control pressure (C-4)	5	17 - 22
02 Activate	Laser designator	Laser designator ALD	Visual detect (V-2)	Signal recognition (C-2)	Switch activation (C-1)	10	22.5 - 32.5
113 Note	Ack/rgt detected	Communication system (receive) CR	Auditory interpret (A-3)	Decoding (C-4)	----	5	33 - 58

FUNCTION ANALYSIS

TOTAL TIME 170 seconds (APPROXIMATE)		FUNCTION	Hover Masked	No. 25
		METHOD		Pilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
63 Control	Altitude	Flight controls F	Detect vertical movement (V-2)	Power adjust- ment needed? (C-1)	Control pressures (P-4)	S + 170
64 Control	Drift	Flight controls F	Detect horizon- tal movement (V-2)	Cyclic adjustment needed? (C-1)	Control pressures (P-4)	S + 170
66 Control	Heading	Flight controls F	Detect rotation (V-2)	Antitorque adjustment needed? (C-1)	Control pressures (P-4)	S + 170
40 Check	Lateral clearance	Outside visual field V	Visual survey (V-1)	Verify clearance (C-2)	----	2.0 PE 4 repetitive during 170-second function time.

FUNCTION ANALYSIS

TOTAL TIME 12.5 seconds		FUNCTION Identify Target	No. 26
(APPROXIMATE)		METHOD	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle on target	Sensor control/sight ACS	Visual alignment (V-4)	Sight adjustment needed? (C-1)	Control pressures (P-4)	5	S + 5.5
36 Select	Narrow FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Switch activation (P-1)	1.0	6 - 7.0
96 Identify	Target	Sensor display AD	Visual inspect (V-6)	Friend or foe? Type of target (C-6)	None ----	5	7.5 - 12.5

FUNCTION ANALYSIS

TOTAL TIME 45.5 seconds
 (APPROXIMATE)

FUNCTION Maintain LOS With Target

METHOD

No. 27

Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
36 Select	Wide FOV	Sensor controls, FOV -ACF	Visual monitor (V-1)	Adjustment needed? (C-1)	Switch activation (P-1)	1.0	S + 1.5
194 Track	Target	Sensor control AC	Visual align (V-4)	Match slew rate (C-3)	Control pressure (P-4)	45	S + 45.5
145 Regain	LOS	Sensor control AC	Visual aim (V-4)	Planning search (C-5)	Control pressure (P-4)	5	S + 5.5

FUNCTION ANALYSIS

TOTAL TIME 40.5 seconds (APPROXIMATE)		FUNCTION	Maintain Separation Between Aircraft	No. 28
		METHOD	Pilot	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
110 Monitor	A/C movement	Visual sensor display VD	Visual, detect movement (V-2)	Verify relative position (C-2)	----	15	S + 15.5
105 Maintain	Separation	Flight controls; outside visual; sensor display FVD	Visual, detect relative movement (V-2)	Adjustments needed (C-1)	Control pressure (P-4)	40	S + 40.5
Time estimate for PE 1 overlaps continuous PE 2. PE 2 time will vary with mission requirements.							

FUNCTION ANALYSIS

TOTAL TIME 80 seconds (APPROXIMATE)		FUNCTION Maneuver NOE	No. 29
		METHOD	Both

	PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
	VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
PILOT	103 Maintain	Obstacle clearance	Outside visual Flight controls FV	Visual detect (V-2)	Verify clearance (C-2)	Control pressures (P-4)	80	S + 80
PILOT	12 Adjust	Flight modes	Outside visual Flight controls FV	Visual detect movement (V-2)	Select appropriate flight modes (C-3)	Control pressures (P-4)	80	S + 80
COPLOT	56 Check	Position	Outside visual Navigation display VND	Visual symbol (V-5)	Decoding (C-4)	Control pressures (P-4)	10	S + 10
COPLOT	164 Select	Flight path	Outside visual Navigation display VND	Visual symbol (V-5)	Selection (C-3)	----	3	S + 3
PILOT	92 Follow	Course	Navigation display, flight controls NDF	Visual symbol (V-5)	Anticipating directional adjustments (C-5)	Control pressures (P-4)	80	S + 80
								PE 1, 2, and 5 continuous during entire function, overlapping discrete PE 3 and 4.

FUNCTION ANALYSIS

TOTAL TIME 11.5 seconds (APPROXIMATE)		FUNCTION Mask Aircraft, Lateral	No. 30
		METHOD	Pilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
40 Check	Obstacle clearance (lateral)	Outside visual field V	Visual inspection (V-1)	Adequate clearance (C-2)	----	2	S + 2.5
84 Establish	Drift	Flight controls F	Visual, relative movement (V-2)	Control adjust needed (C-1)	Control pressures (P-4)	5	2.0 - 7
181 Stabilize	Aircraft	Flight controls Outside visual field FV	Visual detect movement (V-2)	Control adjustment needed? (C-1)	Control pressures (P-4)	5	6.5 - 11.5
							All three PEs overlap. Subtract 1 second overlap between PE 1 and 2; and 1 second overlap between 2 and 3.

FUNCTION ANALYSIS

TOTAL TIME 14 seconds (APPROXIMATE)		FUNCTION Mask Aircraft, Vertical	No. 31
		METHOD	Pilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
43 Check	Obstacle clearance (lateral and vertical)	Outside visual field V	Visual inspect clearance (V-1)	Verify descent path clear (C-2)	----	S + 5.5
143 Reduce	Altitude	Flight controls Outside visual field FV	Visual relative movement (V-2)	Control adjustment needed (C-1)	Control pressures (P-4)	5 - 10
181 Stabilize	Aircraft	Flight controls Outside visual field FV	Visual detect relative movement (V-2)	Control adjustment needed (C-1)	Control pressures (P-4)	9 - 14
All three PEs overlap in time. Subtract 1 second overlap between PE 1 and PE 2 and 1 second overlap between PE 2 and 3.						

FUNCTION ANALYSIS

TOTAL TIME 30.5 seconds (APPROXIMATE)		FUNCTION Monitor Terrain, Aerial Approaches	No. 32
		METHOD	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
177 Slew	Sensors	Sensor control AC	Visual survey (V-1)	Were to point (C-3)	Sensor control pressures (P-4)	5	S + 5.5
107 Monitor	Approaches	Sensor display scene AS	Visual survey (V-1)	Select slew rate (C-3)	Sensor control pressures (P-4)	30	5 + 30.5
24 Align	Sight	Sensor display (sight) ADS	Visual align (V-4)	Possible sighting? (C-2)	Sensor control pressures (P-4)	5	6 + 30.5
36 Select	Narrow FOV	Sensor control FOV ACF	Visual monitor (V-1)	Sighting centered (C-1)	Switch activation (P-1)	1.0	11.5 + 30.5
							Continuous PEs 1 and 2 overlap each other and PE 3 and 4. PE 3 and 4 will be repetitive during the function period whenever a possible sighting occurs.

FUNCTION ANALYSIS

FUNCTION Monitor Threat Warning Displays No. 33

TOTAL TIME 5.5 seconds
(APPROXIMATE)

METHOD Both

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
BOTH	112 Monitor	Threat displays	Auditory, visual, signal detection (V-2) (A-2)	Signal recognition (C-2)	----	5	S + 5.5

FUNCTION ANALYSIS

TOTAL TIME 30 seconds (APPROXIMATE)		FUNCTION	Perform Evasive Maneuvers	No. 34
		METHOD		Pilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
140 Perform	Hard turns	Flight controls F	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	30	S + 30
35 Change	Altitude sharply	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	15	S + 15
34 Change	Airspeed	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	4	S + 4

FUNCTION ANALYSIS

TOTAL TIME 121 seconds (APPROXIMATE)		FUNCTION Prepare Report	No. 35
		METHOD Digital Message Device	Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
61 Clear	Display	Message device CM	Visual symbol (V-5)	Ready? (C-2)	Switch activation (P-1)	3 S + 3.5
54 Check	Transmission mode	Message device, CM	Visual symbol (V-5)	Right radio? Secure? (C-3)	Switch activation (P-1)	2 4 - 6
160 Select	Format	Message device CM	Visual symbol (V-5)	Proper format? (C-5)	Serial discrete (P-7)	2 6.5 - 8.5
82 Enter	Message	Message device CM	Visual symbol (V-5)	Encoding (C-4)	Serial discrete (P-7)	108.5 9 - 117.5
80 Enter	Address code(s)	Message device CM	Visual symbol (V-5)	Correct address code? (C-3)	Serial discrete (P-7)	3 118 - 121

FUNCTION ANALYSIS

FUNCTION Prepare Weapon, Fire and Forget/Cannon No. 36

TOTAL TIME 7 seconds (APPROXIMATE) METHOD Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
171 Select	Weapon	Fire control (panel) IP	Visual symbolic (V-5)	Selection (C-3)	Switch activation (P-1)	5	S + 5.5
57 Check	Weapon status	Fire control display ID	Visual symbolic (V-5)	Verify (C-2)	----	1	6 - 7

FUNCTION ANALYSIS

TOTAL TIME 12.5 seconds
 (APPROXIMATE)
 FUNCTION Prepare Weapon, Laser-Guided
 METHOD
 No. 37
 Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
171 Select	Weapon	Fire control panel IP	Visual symbolic (V-5)	Selection (C-3)	Switch activation	5	S + 5.5
149 Select	Laser code	Fire control panel IP	Visual symbolic (V-5)	(P-1) Enter code (C-4)	Control switches (P-1)	5	6 - 11
57 Check	Weapon status	Fire control display ID	Visual symbolic (P-5)	Verify (C-2)	----	1	11.5 - 12.5

FUNCTION ANALYSIS

TOTAL TIME 38.5 seconds		FUNCTION Receive Handoff	No. 38
(APPROXIMATE)		METHOD Laser Cueing	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD - COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
128 Note	Message alert	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	5	S + 5.5
196 Transmit	Message (brief) Ack/Ready	Communication systems CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	5	6 - 11
177 Slew	Sensor	Sensor control AC	Visual monitor (V-1)	Where to point (C-3)	Control pressures (P-4)	5	11.5 - 16.5
120 Note	Alert (lasing)	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	5	17 - 22
76 Detect	Cueing symbol	Sensor display AT	Visual symbol (V-5)	Signal recog (C-2)	----	5	22.5 - 27.5
16 Align	Sight reticle	Sensor control ACS	Visual align (V-4)	Automatic (C-1)	Control pressures (P-4)	5	28 - 33
196 Transmit	Ack message (target detected)	Communication system CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	5	33.5 - 38.5

FUNCTION ANALYSIS

TOTAL TIME 10.5 seconds		FUNCTION	Receive Message, Designation Coordination	No. 39
(APPROXIMATE)		METHOD	Digital	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
129 Note	Message alert	Message device CM	Auditory detect Visual symbol (A-1) (V-5)	Signal recognition (C-2)	----	2	S + 2.5
173 Send	Message (Ack/Ready)	Message device CM	Visual symbol Auditory symbol (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	.5	3 - 3.5
134 Note	"Splash" signal	Message display? CD	Visual symbol Auditory signal (V-5) (A-1)	Signal recognition (C-2)	----	2	8.5 - 10.5

FUNCTION ANALYSIS

TOTAL TIME - 30 seconds (APPROXIMATE)		FUNCTION	Receive Message, Standard	No. 40
		METHOD	Digital	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
129 Note	Message alert	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Signal recog (C-2)	----	2	S + 2.5
173 Send	Message (Ack/Ready)	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	.5	3 - 3.5
121 Note	Message content	Message display CM	Visual read (V-7)	Decoding (C-4)	----	25	4.0 - 29
173 Send	Message (Ack/Roger)	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	.5	29.5 - 30

FUNCTION ANALYSIS

TOTAL TIME 53 seconds (APPROXIMATE)		FUNCTION	Receive Message (Standard)	No. 41
		METHOD	Radio, Voice	Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
128 Note	Message alert	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	S + 5.5
196 Transmit	Message (brief) Ack/Ready	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	6 - 11.5
127 Note	Message	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)		12 - 37
70 Copy	Data	Personal Equipment Cockpit items P	Visual symbolic (V-5)	Encoding (C-4)	Symbolic production (P-6)	37.5 - 47.5
196 Transmit	Message (brief) Ack/Roger	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activator (P-1, P-3)	48 - 53

FUNCTION ANALYSIS

TOTAL TIME 40.5 seconds		FUNCTION	Record Target Data	No. 42
(APPROXIMATE)		METHOD		Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
61 Clear	Display	Message device CN	Visual symbolic (V-5)	Verify ready (C-2)	Switch activation (P-1)	3 S + 3.5
81 Enter	Target data	Target keyboard system (FCC) AK	Visual symbolic (V-5)	Encoding (C-4)	Data entry (P-7)	35 4 - 39
189 Store	Target data	Target keyboard system (FCC) AK	Visual symbolic (V-5)	Select storage option (C-3)	Switch activation (P-1)	1 39.5 - 40.5

FUNCTION ANALYSIS

FUNCTION Respond to Threat Warning Signal

No. 43

TOTAL TIME 7 seconds
(APPROXIMATE)

Both

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
BOTH 133 Note	Acquisition/ lock-on signal	Threat warning display DT	Auditory interpret (A-4)	Decoding (C-4)	----	.5	S + 1.0
COPILLOT 90 Estimate	Signal bearing/ distance	Threat warning display DTV	Visual align, (V-4)	Signal evaluation (C-6)	----	3	1.5 - 4.5
COPILLOT 01 Activate	Chaff dispenser	Chaff dispenser switch SC	Visual symbol (V-5)	Select option (C-3)	Switch activation (P-1)	2	5 - 7

FUNCTION ANALYSIS

No. 44

FUNCTION Stabilize Aircraft

Pilot

TOTAL TIME 5 seconds
(APPROXIMATE)

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
63 Control	Altitude	Flight controls F	Detect vertical movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	S + 5
64 Control	Drift	Flight controls F	Detect horizontal movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	S + 5
66 Control	Heading	Flight controls F	Detect yaw (V-2)	S-R (C-1)	Control pressures (P-4)	5	S + 5
43 Check	Obstacle clearance	Outside visual field V	Visual monitor (V-1)	Verify clear (C-2)	----	5	S + 5

FUNCTION ANALYSIS

TOTAL TIME 25 seconds (APPROXIMATE)		FUNCTION	Survey Target Area	No. 45
		METHOD	Automatic Search	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
148 Select	Auto search	Sensor controls AC	Visual symbol (V-5)	Selection (C-3)	Switch activation (P-1)	1.5	S + 2.0
169 Select	Search pattern, coverage area	Sensor controls AC	Visual symbol (V-5)	Encoding (C-4)	Keyboard entries (P-7)	1.5	2.5 - 3.0
108 Monitor	Display	Sensor display scene AS	Visual survey (V-5)	Signal recognition (C-2)	----	25	S + 25

FUNCTION ANALYSIS

No. 46

FUNCTION Survey Target Area

Copilot

METHOD Manual Control, Visual Search

TOTAL TIME 25 seconds
(APPROXIMATE)

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
177 Slew	Sensor	Sensor controls AC	Visual survey (V-1)	Select rate, Direction (C-3)	Control pressures (P-4)	5	S + 5.5
108 Monitor	Display	Sensor display scene AS	Visual survey (V-1)	Sign, recog- nition (C-2)		25	S + 25 PE 1 time overlaps with PE 2.

FUNCTION ANALYSIS

TOTAL TIME 30 seconds
 (APPROXIMATE)

FUNCTION Survey Waypoint
 METHOD

No. 47
 Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
32 Approach	Waypoint	Navigation display ND	Visual symbolic (V-5)	Further movement needed? (C-5)		30	S + 30
210 Verify	Position	Outside visual map VM	Visual symbolic Visual survey (V-5, V-1)	Evaluative (C-6)	Map orientation (P-5)	10	S + 10

FUNCTION ANALYSIS

TOTAL TIME 45 seconds (APPROXIMATE)		FUNCTION Track Target	No. 48
		METHOD	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
16 Align	Sight reticle	Sensor control sight ACS	Visual align (V-4)	Target center (C-1)	Control pressures (P-4)	5	S + 5.5
194 Track	Target	Sensor controls AC	Visual align (V-4)	Slew rate (C-3)	Control pressure (P-4)	45	6 - 45

FUNCTION ANALYSIS

TOTAL TIME 16 seconds		FUNCTION Transmit Message (Brief)	No. 49
(APPROXIMATE)		METHOD Voice, Brief	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
150 Select	Comm. channel and security	Communication system (select) CS	Visual symbolic (V-5)	Correct channel? (C-3)	Switch activation speech (P-1, P-3)	10	S + 10.5
196 Transmit	Message (brief)	Communication system (transmit) CT	Auditory speech feedback (A-3)	Message content (C-4)	Switch activation speech (P-1, P-3)	5	11 - 16

FUNCTION ANALYSIS

TOTAL TIME 37 seconds		FUNCTION Transmit Message (Standard)	No. 50
(APPROXIMATE)		METHOD Voice	Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
196 Transmit	Message (brief) alert	Communication systems (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	5 + 5.5
113 Note	Ack/ready	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	6 - 11
206 Transmit	Message (standard)	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	11.5 - 31.5
113 Note	Ack	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	----	32 - 37

FUNCTION ANALYSIS

TOTAL TIME 7 seconds (APPROXIMATE)		FUNCTION Transmit Report	No. 51
		METHOD Digital	Copilot

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
173 Send	Message (alert, Ident code)	Message device CM	Visual symbol (V-5) (A-1)	Message sent? (C-3)	Button (P-1)	.5	S + 1.0
118 Note	Acknowledgement, Authentication code	Message display CM	Visual symbol (V-5) (A-1) Auditory signal (A-1)	Authentic reply? (C-6)	----	2	1.5 - 3.5
173 Send	Message	Message device CM	Visual symbol (V-5) (A-1) Auditory signal (A-1)	Response select (C-3)	Switch activation (P-1)	.5	4 - 4.5
118 Note	Acknowledgement, Authentication code	Message display CD	Visual symbol (V-5) (A-1) Auditory signal (A-1)	Authentic reply? (C-6)	----	2	5 - 7

FUNCTION ANALYSIS

No. 52

FUNCTION Unmask Aircraft. Lateral

TOTAL TIME 21 seconds
(APPROXIMATE)

Pilot

METHOD

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
40 Check	Lateral clearance	Outside visual field V	Visual inspect (V-1)	Adequate clearance? (C-2)	----	2	S + 2.5
84 Establish	Drift	Flight control F	Visual monitor, relative movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	3 - 8
181 Stabilize	Aircraft	Flight controls, Outside visual field FV	Visual, detect relative movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	2.5 - 13.5
59 Check	Weapon path clear	Outside visual field V	Visual orient (V-4)	Verify weapon path clear	----	7	14 - 21

FUNCTION ANALYSIS

TOTAL TIME 18 seconds (APPROXIMATE)		FUNCTION Unmask Aircraft, Vertical	No. 53
		METHOD	Pilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
101 Increase	Altitude	Flight controls sensors visual field FVD	Visual, detect movement (V-2)	Verify LOS target clear (C-2)	Flight control pressures (P-4)	S + 10.5
64 Control	Drift	Flight controls F	Detect horizon- tal move- ment (V-2)	S-R (C-1)	Control pressures (P-4)	S + 18
66 Control	Heading	Flight controls F	Detect rotation (V-2)	S-R (C-1)	Control pressures (P-4)	S + 18
59 Check	Weapon path clear	Visual field V	Visual orienta- tion (V-4)	Verify clear of obstacles (C-2)		11 - 18
181 Stabilize	Aircraft	Flight controls, Outside visual field FV	Visual detect movement (V-2)	S-R (C-1)	Control pressures (P-4)	11 - 16
						PE 2 and 3 occur simultaneously and continuously during total time.

FUNCTION ANALYSIS

TOTAL TIME 21.5 seconds (APPROXIMATE)		FUNCTION Unmask Sensor	No. 54
		METHOD	Both

	PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
	VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
PILOT	101 Increase	Altitude	Flight controls FVD	Visual detect movement (V-2)	Verify LOS target-clear (C-2)	Control pressures (P-4)	10	S + 10.5
COPLOT	53 Check	Sensor LOS	Sensor display, controls ADC	Visual survey (V-1)	Verify clear (C-2)	Control pressures (P-4)	5	11 - 16
PILOT	181 Stabilize	Aircraft	Flight controls FV	Visual, detect movement (V-2)	Adjustments necessary (C-1)	Control pressures (P-4)	5	16.5 - 21.5

FUNCTION ANALYSIS

TOTAL TIME 19.5 seconds		FUNCTION Update Doppler	No. 55
(APPROXIMATE)		METHOD Overfly Stored Waypoint	Copilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
100 Identify	Waypoint	Outside visual, map VM	Visual discrimination (V-6)	Confirm location (C-6)	Orient map (P-5)	S + 5.5
163 Select	Update mode, preset waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall position number (C-4)	Discrete adjustment (P-2)	6.0 - 7.0
137 Overfly	Landmark	Flight controls outside visual field FV	Visual track (V-3)	Select heading (C-3)		7.5 - 12.5
09 Activate	Update switch	Navigation controls NC	Visual symbolic (V-5)	Verify over landmark (C-2)	Switch activation (P-1)	13 - 14
161 Select	Navigation mode, next waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall waypoint desired (C-4)	Discrete adjustment (P-2)	14.5 - 19.5

FUNCTION ANALYSIS

TOTAL TIME 22.5 seconds (APPROXIMATE)		FUNCTION Update Doppler		No. 56	
		METHOD Remote Landmark		Copilot	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
94 Identify	Landmark	Sensor scene display NSM	Visual discrim (V-6)	Confirm land- mark (C-6)	Orient map (P-5)	5	S + 5.5
152 Select	Preset coordi- nates	Navigation controls NC	Visual symbolic (V-5)	Recall posi- tion number (C-4)	Discrete adjustment (P-2)	1	6 - 7.0
167 Select	Remote update doppler	Navigation controls NC	Visual symbolic (V-5)	Recall posi- tion number (C-4)	Switch activation (P-1)	1	7.5 - 9.0
24 Align	Sight on landmark	Sensor display/ sight ADS	Visual alignment (V-4)	Verify land- mark centered (C-2)	Control Pressures (P-4)	5	9.5 - 14.5
04 Activate	Laser range finder	Laser range finder AL	Visual Align (V-4)	Verify feature lased (C-2)	Switch activation (P-1)	1.5	15 - 16.5
09 Activate	Update (remote)	Navigation controls NC	Visual symbolic (V-5)	Verify update (C-2) (C-4)	Switch activation (P-1)	1	17.0 - 18.0
161 Select	Nav mode, next waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall way- point desired (C-4)	Discrete adjustment (P-2)	5	18.5 - 22.5

FUNCTION ANALYSIS

TOTAL TIME 22.5 seconds (APPROXIMATE)		FUNCTION Estimate Adjustments		No. 57	
		METHOD Automatic		Copilot	

PERFORMANCE ELEMENTS		SUBSYSTEM(S)	WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT		SENSORY	COGNITIVE	PSYCHOMOTOR		
36 Select	Wide FOV	Sensor controls FOV ACF	Visual monitor (V-1)	Adjustment needed (C-1)	Switch activation (P-1)	1.0	S + 1.5
126 Note	Impact point	Sensor scene display AS	Visual detect (V-2)	Verify impact (C-3)	----	5	2 - 7
16 Align	Sight reticle on Impact point	Sensor control sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	5	7.5 - 12.5
36 Select	Narrow FOV	Sensor control FOV ACF	Visual monitor (V-1)	Adjustment needed (C-1)	Switch activation (P-1)	1.0	13 - 14
16 Align	Sight reticle on Impact point	Sensor control sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	5	14.5 - 19.5
04 Activate	Laser range finder	Laser range finder AL	Visual alignment (V-4)	Verify laser on spot (C-2)	Switch activation (P-1)	1.5	20 - 21.5
122 Note	Impact coordinates	Sensor display NDC	Visual symbolic (V-5)	Decoding (C-4)	----	.5	22 - 22.5

FUNCTION ANALYSIS

TOTAL TIME 20 seconds (APPROXIMATE)		FUNCTION	Engagement, Air-to-Air	No. 58
		METHOD	Establish Attack Run	Pilot

PERFORMANCE ELEMENTS		WORKLOAD COMPONENTS			DURATION (SECS) DISCRETE/ CONTINUOUS	COMMENTS
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	
86 Establish	Attack run	Outside visual flight controls FV	Visual, direction (V-4)	Establish closure course (C-3)	Control pressures (P-4)	S + 20
91 Fly	Intercept headings	Outside visual flight controls FV	Visual, relative movement (V-4)	Stop relative movement (C-3)	Control pressures (P-4)	S + 20
106 Monitor	Airspeed	Flight instrument displays FD	Visual, symbolic (V-2)	Check maximum airspeed (C-3)	----	S + 1

A P P E N D I X H

SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS
(REVISED TO REFLECT DISTRIBUTION OF FUNCTIONS TO TWO CREWMEMBERS)

A P P E N D I X H

TABLE OF CONTENTS

Page

RECONNAISSANCE PHASE

Segment 1.	Bomb Damage Assessment	H-5
Segment 2.	Evade Radar Lock-On	H-6
Segment 3.	Reconnaissance, General	H-7
Segment 4.	Record Sightings	H-9
Segment 5.	Tactical Movement.....	H-10
Segment 6.	Transmit Report, Digital.....	H-11

TARGET SERVICE

Segment 7.	Acquisition , Auto Search.....	H-12
Segment 8.	Acquisition, From Laser Cueing	H-13
Segment 9.	Adjustments, Area Weapons, Digital	H-14
Segment 10.	Adjustments, Area Weapons, Voice	H-15
Segment 11.	Designate for PGM	H-16
Segment 12.	Engagement, Air-to-Ground, Autonomous, LOAL	H-17
Segment 13.	Engagement, Ground Target, Autonomous, LOBL	H-18
Segment 14.	Engagement, Ground Target, Remote Designation	H-19
Segment 15.	Engagement, Soft Targets, Cannon Fire, Hover	H-21
Segment 16.	Engagement, Soft Targets, FFAR, Direct	H-23
Segment 17.	Handoff, Ground Target, Digital	H-25
Segment 18.	Handoff, Ground Target, Voice	H-26
Segment 19.	Handoff Target, Laser Cueing	H-27
Segment 20.	Holding Checks	H-28
Segment 21.	Overwatch	H-29
Segment 22.	Receive Handoff, Voice	H-30
Segment 23.	Team Coordination	H-31

TARGET SERVICE, AIR-TO-AIR

Segment 24.	Acquisition , Free Search.....	H-32
Segment 25.	Engagement Air-to-Air From Masked Position	H-33
Segment 26.	Engagement Air-to-Air, Running Fire, Cannon	H-34
Segment 27.	Engagement Air-to-Air, Running Fire, Missile	H-35
Segment 28.	Handoff Aerial Threat, Voice	H-36
Segment 29.	Receive Handoff, Voice	H-37

FUNCTION NO.	FUNCTION
01	Acquire Position Data, Automatic
02	Acquire Position Data, Shift From Known Point
03	Align Heading on Target Bearing
04	Assess Damage
05	Check Aircraft Systems (Holding)
06	Check A/C Systems (Power Change)
07	Check Course Required
08	Check Sensor Operation
09	Check Sights
10	Coordinate Mission
11	Coordinate Target Selection
12	Deploy to Cover
13	Designate Target
14	Detect Aerial Threat, Automatic Search, Cueing
15	Detect Aerial Threat, Unaided
16	Detect Target (Ground), Free Search
17	Detect Target, Prepoint, Auto Cueing
18	Establish Position (Firing or Observation
19	Estimate Range, Automatic
20	Estimate Range, Unaided Estimation
21	Evaluate Position
22	Fire Cannon
23	Fire Weapon
24	Handoff Target, Laser Cueing
25	Hover Masked
26	Identify Target
27	Maintain LOS With Target
28	Maintain Separation Between Aircraft
29	Maneuver NOE
30	Mask Aircraft, Lateral
31	Mask Aircraft, Vertical
32	Monitor Terrain, Aerial Approaches

FUNCTION NO.	FUNCTION
33	Monitor Threat Warning Displays
34	Perform Evasive Maneuvers
35	Prepare Report, Digital Message Device
36	Prepare Weapon, Fire and Forget/Cannon
37	Prepare Weapon, Laser Cueing
38	Receive Handoff, Laser Cueing
39	Receive Message, Designation Coordination, Digital
40	Receive Message, Standard, Digital
41	Receive Message (Standard), Radio, Voice
42	Record Target Data
43	Respond to Threat Warning Signal
44	Stabilize Aircraft
45	Survey Target Area, Automatic Search
46	Survey Target Area, Manual Control, Visual Search
47	Survey Waypoint
48	Track Target
49	Transmit Message (Brief), Voice, Brief
50	Transmit Message (Standard), Voice
51	Transmit Report, Digital
52	Unmask Aircraft, Lateral
53	Unmask Aircraft, Vertical
54	Unmask Sensor
55	Update Doppler, Overfly Stored Waypoint
56	Update Doppler, Remote Landmark
57	Estimate Adjustments, Automatic
58	Engagement, Air-to-Air, Establish Attack Run

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE RECONNAISSANCE

SEGMENT 1: BOMB DAMAGE ASSESSMENT

METHOD

CUM. SECS.	FLIGHT						SUPPORT						MISSION						TOTAL CONCURRENT					
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P					
10	29	2/0		2/0	4/0	33	2/2	2/2	2/2							4/2	2/2	4/2						
20		0/5		0/4	4/0											0/5		0/4	4/0					
30	18	1/0		3/0	4/4											1/0		3/0	4/4					
40		0/6		0/6	0/5											0/6		0/6	0/5					
50	25	2/0		1/0	4/0											2/0		1/0	4/0					
60		2/0		1/0	4/0	06	5/0		2/0							7/0		3/0	4/0					
70	54	2/0		1/0	4/4											2/0		1/0	4/4					
80		2/0		0/2	4/4	46	0/5		0/3	0/4						2/5		0/5	4/8					
90		2/0		0/2	4/4		0/5		0/3	0/4	04	0/6		0/7		2/11		0/12	4/8					
100	25	2/0		1/0	4/0							0/7		0/4	0/7	2/7		1/4	4/7					
110		2/0		1/0	4/0							0/7		0/4	0/7	2/7		1/4	4/7					
120		2/0		1/0	4/0							0/7		0/4	0/7	2/7		1/4	4/7					
130		2/0		1/0	4/0	51	0/5	0/1	0/6	0/1		0/7		0/4	0/7	2/7		0/5	4/7					
140							0/5	0/1	0/6	0/1		0/7		0/4	0/7	2/7		0/5	4/7					
150																0/5	0/1	0/6	0/1					
160																0/5	0/1	0/6	0/1					
170																								
180																								

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE RECONNAISSANCE

SEGMENT 2: EVADE RADAR LOCK-ON

METHOD

CUM. SECS.	FLIGHT						SUPPORT						MISSION						TOTAL CONCURRENT					
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P				
10	29	2/0		3/0	4/0												2/0			3/0	4/0			
20		0/5		0/5	4/0	43		4/4	4/4								0/5	4/4	4/9	4/0				
30	12	2/0		5/0	4/0		0/5	4/4	0/6								2/5	4/4	5/6	4/0				
40		2/0		6/0	4/0												2/0	6/0	4/0					
50	25	2/0		1/0	4/0												2/0		1/0	4/0				
60		2/0		2/0	4/0	49	0/5	0/1	0/4	0/3							2/5	0/1	2/4	0/3				
70																								
80																								
90																								
100																								
110																								
120																								
130																								
140																								
150																								
160																								
170																								
180																								

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE RECONNAISSANCE

SEGMENT 3: RECONNAISSANCE, GENERAL

METHOD

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	29	2/0		3/3	4/0												2/0	3/3	4/0	
20		0/5		0/4	4/0	33	2/2	2/2	2/2								2/7	2/2	2/6	4/0
30		0/5		5/0	4/0		0/5	4/4	0/6								0/5		5/0	4/0
40	18	1/0		3/0	4/0												1/0		3/0	4/0
50		0/6		0/5	4/0												0/6		0/5	4/0
60		0/6		0/6	5/0												0/6		0/6	5/0
70		2/0		2/0	4/0	06	5/0		2/0								7/0		4/0	4/0
80	54	2/0		0/2	4/4												2/0		0/2	4/4
90		2/0		0/2	4/4	33		2/2	2/2								2/0	2/2	2/4	4/4
100		2/0		0/2	4/4						45	0/5		0/4	0/7		2/5		0/6	4/11
110		2/0		0/2	4/4									0/2			2/5		0/4	4/4
120		2/0		0/2	4/4									0/2			2/5		0/4	4/4
130	25	2/0		2/0	4/0												2/0		2/0	4/0
140		2/0		2/0	4/0	42	0/5		0/2	0/1							2/5		2/2	4/1
150		2/0		2/0	4/0		0/5		0/4	0/7							2/5		2/4	4/7
160		2/0		2/0	4/0		0/5		0/4	0/7							2/5		2/4	4/7
170		2/0		2/0	4/0		0/5		0/4	0/7							2/5		2/4	4/7
180		2/0		2/0	4/0		0/5		0/3	0/1							2/5		2/3	4/1

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE RECONNAISSANCE

SEGMENT 3: RECONNAISSANCE, GENERAL (Cont.)

METHOD

CUM. SECS.	FLIGHT						SUPPORT						MISSION						TOTAL CONCURRENT			
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	A	C	P
190		2/0		2/0	4/0	35	0/5		0/3	0/1						2/5		2/3	4/1			
200		2/0		2/0	4/0		0/5		0/5	0/7						2/5		2/5	4/7			
210		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7			
220		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7			
230		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7			
240		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7			
250		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7			
260		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7			
270		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7			
280		2/0		2/0	4/0	51	0/5	0/1	0/2	0/1						2/5	0/1	2/2	4/1			
290		2/0		2/0	4/0		0/5	0/1	0/6	0/1						2/5	0/1	2/6	4/1			
300	54	2/0		2/0	4/4											2/0		0/2	4/4			
310		2/0		0/2	4/4	55	0/6		0/6	0/5						2/6		0/8	4/9			
320		2/0		0/2	4/4		0/5		0/4	0/2						2/5		0/6	4/6			
330		2/0		0/2	4/4							0/1		0/3	0/4	2/1		0/5	4/8			
340		2/0		0/2	4/4							0/4		0/4	0/4	2/4		0/6	4/8			
350	29	2/0		3/3	4/0											2/0		3/3	4/0			
360		5/0		5/0	4/0											5/0		5/0	4/0			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS---TWO CREWMEMBERS

PHASE RECONNAISSANCE

SEGMENT 4: RECORD SIGHTINGS

METHOD

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		2/0	4/0	06	5/0		2/0							7/0		4/0	4/0	
20	54	2/0		0/2	4/4											2/0		0/2	4/4	
30		2/0		1/0	4/4											2/0		1/0	4/4	
40		2/0		0/2	4/4	56	0/6		0/6	0/5						2/6		0/8	4/9	
50		2/0		0/2	4/4		0/5		0/4	0/2						2/5		0/6	4/6	
60		2/0		0/2	4/4		0/5		0/4	0/4						2/5		0/6	4/8	
70		2/0		0/2	4/4						45	0/5		0/4	0/7	2/5		0/6	4/11	
80		2/0		0/2	4/4							0/5		0/2		2/5		0/4	4/4	
90		2/0		0/2	4/4							0/5		0/2		2/5		0/4	4/4	
100		2/0		0/2	4/4						01	0/4		0/1	0/4	2/4		0/3	4/8	
110		2/0		0/2	4/4							0/5		0/4	0/1	2/5		0/6	4/5	
120	31	1/0		2/0												1/0		2/0		
130		2/0		1/0	4/0											2/0		1/0	4/0	
140	25	2/0		2/0	4/0											2/0		2/0	4/0	
150		2/0		2/0	4/0	42	0/5		0/4	0/7						2/5		2/2	4/1	
160		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7	
170		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7	
180		2/0		2/0	4/0		0/5		0/3	0/1						2/5		2/3	4/1	

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE RECONNAISSANCE

SEGMENT 5: TACTICAL MOVEMENT

METHOD

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		1/0	4/0	06	5/0		2/0							7/0		3/0	4/0	
20		2/0		1/0	4/0	07	0/5		0/5	0/2						2/5		1/5	4/2	
30	54	2/0		1/0	4/4											2/0		1/0	4/4	
40		2/0		0/2	4/4						32	0/1		0/3	0/4	2/1		0/5	4/8	
50		2/0		0/2	4/4							0/1		0/3	0/4	2/1		0/5	4/8	
60		2/0		0/2	4/4							0/4		0/4	0/4	2/4		0/6	4/8	
70		2/0		0/2	4/4	49	0/5	0/1	0/4	0/3						2/5	0/1	0/6	4/7	
80	29	2/0		3/3	4/4											2/0		3/3	4/0	
90		0/5		0/4	4/0						32	0/1		0/3	0/4	0/6		0/7	4/4	
100		0/5		0/5	4/0							0/1		0/3	0/4	0/6		0/8	4/4	
110		0/5		0/5	4/0							0/4		0/4	0/4	0/9		0/9	4/4	
120	30	2/0		2/0	4/0											2/0		2/0	4/0	
130	54	2/0		1/0	4/4	33	2/2	2/2	2/2							4/2	2/2	3/2	4/4	
140		2/0		0/2	4/4						32	0/1		0/3	0/4	2/1		0/5	4/8	
150		2/0		0/2	4/4							0/1		0/3	0/4	2/1		0/5	4/8	
160		2/0		0/2	4/4							0/4		0/4	0/4	2/4		0/6	4/8	
170		2/0		0/2	4/4											2/5	0/1	0/6	4/7	
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE RECONNAISSANCE

SEGMENT 6: TRANSMIT REPORT

METHOD DIGITAL

TOTAL
CONCURRENT

MISSION

SUPPORT

FLIGHT

CUM. SECS.	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P
10	25	2/0		2/0	4/0	06	5/0		2/0							7/0			4/0
20		2/0		2/0	4/0						35	0/5		0/3	0/1	2/5		2/3	4/1
30		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
40		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
50		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
60		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
70		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
80		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
90		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
100		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
110		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
120		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
130		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
140		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
150		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
160		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
170		2/0		2/0	4/0							0/5		0/5	0/7	2/5		2/5	4/7
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 7: ACQUISITION METHOD AUTO SEARCH

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	29	2/0		3/3	4/C	49	0/5	0/1	0/4	0/3						2/5	0/1	3/7	4/3	
20		5/0		0/4	4/0											5/0		0/4	4/0	
30		5/0		0/5	4/0											5/0		0/5	4/0	
40	25	2/0		2/0	4/0	06	5/0		2/0							7/0		4/0	4/0	
50		2/0		2/0	4/0											2/0		2/0	4/0	
60	54	2/0		1/0	4/4											2/0		1/0	4/4	
70		2/0		0/2	4/4	33	2/2	2/2	2/2							4/2	2/2	2/4	4/4	
80		2/0		0/2	4/4	56	0/6		0/4	0/5						2/6		0/6	4/9	
90		2/0		0/2	4/4		0/5		0/4	0/4						2/5		0/6	4/8	
100		2/0		0/2	4/4		0/5		0/4	0/2						2/5		0/6	4/6	
110		2/0		0/2	4/4						45	0/5		0/4	0/7	2/5		0/6	4/11	
120		2/0		0/2	4/4							0/5		0/2		2/5		0/4	4/4	
130		2/0		0/2	4/4							0/5		0/2		2/5		0/4	4/4	
140		2/0		0/2	4/4						16	0/4		0/6	0/4	2/4		0/8	4/8	
150		2/0		0/2	4/4						26	0/6		0/6	0/4	2/6		0/8	4/8	
160		2/0		0/2	4/4						01	0/5		0/4	0/4	2/5		0/6	4/8	
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 8: ACQUISITION

METHOD FROM LASER CUEING

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		1/0	4/0	06	5/0		2/0							7/0		3/0	4/0	
20		2/0		2/0	4/0											2/0		2/0	4/0	
30		2/0		2/0	4/0						38		0/3	0/4	0/3	2/0	0/3	2/4	4/3	
40	54	2/0		1/0	4/4							0/1		0/3	0/4	2/1		2/3	4/8	
50		2/0		1/0	4/4								0/3	0/4		2/0	0/3	1/4	4/4	
60		2/0		1/0	4/4							0/2		0/2		2/2		1/2	4/4	
70		2/0		1/0	4/4							0/4		0/4	0/4	2/4		1/4	4/8	
80		2/0		1/0	4/4	49	0/5		0/4	0/3						2/5		1/4	4/7	
90																				
100																				
110																				
120																				
130																				
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS---TWO CREWMEMBERS

PHASE TARGET SERVICE METHOD DIGITAL

SEGMENT 9: ADJUSTMENTS, AREA WEAPONS

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		2/0	4/0	06	5/0			2/0						7/0		4/0	4/0	
20		2/0		2/0	4/0											2/0		2/0	4/0	
30		2/0		2/0	4/0	39	0/5	0/1	0/3	0/1						2/5	0/1	2/3	4/1	
40	54	2/0		0/2	4/4											2/0		0/2	4/4	
50		2/0		0/2	4/4						46	0/3		0/3	0/4	2/3		0/5	4/8	
60		2/0		0/2	4/4							0/5		0/2	0/4	2/5		0/4	4/8	
70		2/0		0/2	4/4						01	0/5		0/1	0/4	2/5		0/3	4/8	
80	31	2/0		2/0	4/0											2/0		2/0	4/0	
90		2/0		2/0	4/0	42	0/5		0/4	0/7						2/5		2/4	4/7	
100		2/0		2/0	4/0		0/5		0/3	0/1						2/5		2/3	4/1	
110		2/0		2/0	4/0	51	0/5	0/1	0/6	0/1						2/5	0/1	2/6	4/1	
120		2/0		2/0	4/0		0/5	0/1	0/6	0/1						2/5	0/1	2/6	4/1	
130																				
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS---TWO CREWMEMBERS

PHASE

TARGET SERVICE

SEGMENT 10: ADJUSTMENTS, AREA WEAPONS

METHOD VOICE

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P
10	25	2/0		1/0	4/0	06	5/0		2/0							7/0		3/0	4/0
20		2/0		2/0	4/0											2/0		2/0	4/0
30		2/0		2/0	4/0	41		0/3	0/4	0/3						2/0	0/3	2/4	4/3
40		2/0		2/0	4/0			0/3	0/4	0/3						2/0	0/3	2/4	4/3
50	54	2/0		1/0	4/4						46	0/3		0/3	0/4	2/3		1/3	4/8
60		2/0		0/2	4/4							0/5		0/2	0/4	2/5		0/4	4/8
70		2/0		0/2	4/4						57	0/4		0/3	0/1	2/4		0/5	4/5
80		2/0		0/2	4/4							0/4		0/1	0/4	2/4		0/3	4/8
90		2/0		0/2	4/4							0/5		0/4	0/4	2/5		0/6	4/8
100	31	2/0		2/0	4/0											2/0		2/0	4/0
110		2/0		1/0	4/0											2/0		1/0	4/0
120						49	0/5		0/4	0/3						0/5		0/4	0/3
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 11: DESIGNATE FOR PGM

METHOD

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	54	2/0		0/2	4/4											2/0		0/2	4/4	
20		2/0		0/2	4/4	33	2/2	2/2	2/2							4/2	2/2	2/4	4/4	
30		2/0		0/2	4/4						48	0/4		0/3	0/4	2/4		0/5	4/8	
40		2/0		0/2	4/4	40	0/2	0/1	0/3	0/1						2/2	0/1	0/5	4/5	
50		2/0		0/2	4/4		0/7		0/4							2/7		0/6	4/4	
60		2/0		0/2	4/4		0/7		0/4							2/7		0/6	4/4	
70		2/0		0/2	4/4		0/2	0/1	0/3	0/1						2/2	0/1	0/5	4/5	
80		2/0		0/2	4/4	39	0/5	0/1	0/3	0/1						2/5	0/1	0/5	4/5	
90		2/0		0/2	4/4		0/5	0/1	0/2							2/5	0/1	0/4	4/4	
100		2/0		0/2	4/4						13	0/5		0/2	0/4	2/5		0/4	4/8	
110		2/0		0/2	4/4							0/5		0/2	0/1	2/5		0/4	4/5	
120		2/0		0/2	4/4							0/5		0/2	0/1	2/5		0/4	4/5	
130	12	2/0		5/0	4/0											2/0		5/0	4/0	
140		2/0		6/0	4/0											2/0		6/0	4/0	
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 12: ENGAGEMENT, AIR-TO-GROUND

METHOD AUTONOMOUS, LOAL

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	54	2/0		0/2	4/4											2/0			0/2	4/4
20		2/0		0/2	4/4	33	2/2	2/2	2/2							4/2	2/2	2/4	4/4	
30		2/0		0/2	4/4						48	0/4			0/3	2/4		0/5	4/8	
40		2/0		0/2	4/4							0/4		0/3	0/4	2/4		0/5	4/8	
50		2/0		0/2	4/4						01	0/5		0/4		2/5		0/6	4/4	
60		2/0		0/2	4/4						37	0/5		0/4	0/1	2/5		0/6	4/5	
70		2/0		0/2	4/4							0/5		0/2		2/5		0/4	4/4	
80	03	4/0		5/0	4/0											4/0		5/0	4/0	
90		2/0		1/0	4/0											2/0		1/0	4/0	
100	53	1/0		2/0	4/0											1/0		2/0	4/0	
110		2/0		1/0	4/0											2/0		1/0	4/0	
120		2/0		2/0	4/0	13	0/5		0/2	0/4						2/5		2/2	4/4	
130		2/0		2/0	4/0		0/5		0/2	0/1	23	0/5		0/6	0/4	2/10		2/8	4/5	
140		2/0		2/0	4/0		0/5		0/2	0/1		0/5	0/1	0/2	0/1	2/10	0/1	2/4	4/2	
150		2/0		2/0	4/0		0/5		0/2	0/1						2/5		2/2	4/1	
160		2/0		2/0	4/0		0/5		0/2	0/1						2/5		2/2	4/1	
170	12	2/0		5/0	4/0											2/0		5/0	4/0	
180		2/0		6/0	4/0											2/0		6/0	4/0	

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

METHOD AUTONOMOUS, LOBL

SEGMENT 13: ENGAGEMENT, GROUND TARGET

TOTAL
CONCURRENT

MISSION

SUPPORT

FLIGHT

CUM. SECS.	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P
10	54	2/0		1/0	4/4	33	2/2	2/2	2/2			2/2				4/0	2/2	3/2	4/4
20		2/0		1/0	4/4						48	0/4		0/3	0/4	2/4		1/3	4/8
30		2/0		0/2	4/4						19	0/4		0/2	0/4	2/4		0/4	4/8
40		2/0		0/2	4/4							0/5	0/1	0/6	0/1	2/5	0/1	0/8	4/5
50	03	4/0		5/0	4/0						37	0/5		0/4	0/1	4/5		5/4	4/1
60		4/0		5/0	4/0							0/5		0/4	0/1	4/5		5/4	4/1
70	53	2/0		2/0	4/0	13	0/4		0/1	0/4						2/4		2/1	4/4
80		2/0		2/0	4/0		0/5		0/2	0/1	57	0/4		0/3		2/9		2/5	4/1
90		4/0		2/0	4/0		0/5		0/2	0/1	23	0/5	0/2	0/6	0/4	4/10	0/1	2/8	4/5
100		4/0		2/0	4/0		0/5		0/2	0/1						4/5		2/2	4/1
110	12	2/0		5/0	4/0											2/0		5/0	4/0
120		2/0		6/0	4/0											2/5		6/2	4/4
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE		TARGET SERVICE										METHOD										REMOTE DESIGNATION			
SEGMENT 14: ENGAGEMENT, GROUND TARGET																									
CUM. SECS.	FUNCTION	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT								
		V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P						
10	25	2/0		2/0	4/0	41		0/3	0/4	0/3						2/0	0/3	2/4	4/3						
20		2/0		2/0	4/0			0/3	0/4							2/0	0/3	2/4	4/0						
30		2/0		2/0	4/0			0/3	0/4							2/0	0/3	2/4	4/0						
40		2/0		2/0	4/0		0/3		0/4	0/6						2/3		2/4	4/6						
50		2/0		2/0	4/0			0/3	0/4	0/3						2/0	0/3	2/4	4/3						
60		2/0		2/0	4/0		0/5		0/2	0/1						2/5		2/2	4/1						
70		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7						
80		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7						
90		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7						
100		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7						
110		2/0		2/0	4/0	07	0/5		0/5	0/2						2/5		2/5	4/2						
120	29	5/5		5/0	4/0											5/5		5/0	4/0						
130		5/5		5/0	4/0											5/5		5/0	4/0						
140	25	2/0		2/0	4/0	55	0/6		0/6	0/5						2/6		2/6	4/5						
150		2/0		2/0	4/0		0/5		0/4	0/2						2/5		2/4	4/2						
160		2/0		2/0	4/0	06			1/0							2/0		3/0	4/0						
170		2/0		2/0	4/0		5/0	2/0								7/0		4/0	4/0						
180		2/0		2/0	4/0						37	0/5		0/4	0/1	2/5		2/4	4/1						

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE SEGMENT 14: ENGAGEMENT, GROUND TARGET (Cont.) METHOD REMOTE DESIGNATION

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
190		2/0		2/0	4/0							0/5		0/4	0/1	2/5		2/4	4/1	
200		2/0		2/0	4/0	50		0/3	0/4	0/3						2/0	0/3	2/4	4/3	
210		2/0		2/0	4/0			0/3	0/4	0/3						2/0	0/3	2/4	4/3	
220		2/0		2/0	4/0			0/3	0/4	0/3						2/0	0/3	2/4	4/3	
230		2/0		2/0	4/0			0/3	0/4	0/3						2/0	0/3	2/4	4/3	
240	53	2/0		2/0	4/0											2/0		2/0	4/0	
250		4/0		2/0	4/0											4/0		2/0	4/0	
260		2/0		1/0	4/0											2/0		1/0	4/0	
270		2/0		1/0	4/0						23	0/5	0/1	0/6	0/4	2/5	0/1	1/6	4/4	
280		2/0		1/0	4/0	49		0/5	0/4	0/3						2/0	0/5	1/4	4/3	
290	31	2/0		2/0	4/0											2/0		2/0	4/0	
300		2/0		2/0	4/0											2/0		2/0	4/0	
310																				
320																				
330																				
340																				
350																				
360																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE
 SEGMENT 15: ENGAGEMENT, SOFT TARGETS METHOD CANNON FIRE, HOVER

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	29	5/5		0/4	4/0											5/5		0/4	4/0	
20	25	2/0		1/0	4/0											2/0		1/0	4/0	
30		1/0		2/0		06	5/0		2/0	4/0						6/0		4/0	4/0	
40		2/0		1/0	4/0	41		0/3	0/4	0/3						2/0	0/3	1/4	4/3	
50		2/0		1/0	4/0			0/3	0/4							2/0	0/3	1/4	4/0	
60		2/0		1/0	4/0			0/3	0/4							2/0	0/3	1/4	4/0	
70		2/0		1/0	4/0		0/5		0/4	0/6						2/5		1/4	4/6	
80		2/0		1/0	4/0			0/3	0/4	0/3						2/0	0/3	1/4	4/3	
90	29	5/5		0/4	4/0											5/5		0/4	4/0	
100		5/5		0/4	4/0											5/5		0/4	4/0	
110	18	0/6		0/5	4/0											0/6		0/5	4/0	
120		0/6		0/6	4/0											0/6		0/6	4/0	
130		2/2		1/0	4/0											2/2		1/0	4/0	
140		2/2		1/0	4/0						36	0/5	0/3	0/1		2/2		1/3	4/1	
150	03	4/0		5/0	4/0											4/0		5/0	4/0	
160		2/0		1/0	4/0											2/0		1/0	4/0	
170	53	2/0		2/0	4/0											2/0		2/0	4/0	
180		4/0		2/0	4/0											4/0		2/0	4/0	

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 15: ENGAGEMENT, SOFT TARGETS (Cont.)

METHOD CANNON FIRE, HOVER

CUM. SECS.	FLIGHT										SUPPORT										MISSION										TOTAL CONCURRENT			
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P										
190	53	2/0		1/0	4/0																2/0		1/0	4/0										
200		2/0		1/0	4/0												01	0/5		0/4	0/4	2/5		1/4	4/4									
210		2/0		1/0	4/0												22	0/3		0/2	0/1	2/3		1/2	4/1									
220		2/0		1/0	4/0													0/5		0/2	0/4	2/5		1/2	4/4									
230	12	2/0		5/0	4/0																2/0		5/0	4/0										
240		2/0		6/0	4/0																2/0		6/0	4/0										
250																																		
260																																		
270																																		
280																																		
290																																		
300																																		
310																																		
320																																		
330																																		
340																																		
350																																		
360																																		

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 16: ENGAGEMENT, SOFT TARGETS

METHOD FFAR, DIRECT

CUM. SECS.	FLIGHT										SUPPORT					MISSION					TOTAL CONCURRENT		
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	A	C	P
10	25	2/0		2/0	4/0	06	5/0		2/0			5/0		2/0			7/0					4/0	4/0
20		2/0		2/0	4/0	41		0/3	0/4	0/3			0/3	0/4	0/3		2/0	0/3	2/4	4/3		2/4	4/3
30		2/0		2/0	4/0			0/3	0/4				0/3	0/4			2/0	0/3	2/4	4/0		2/4	4/0
40		2/0		2/0	4/0		0/5		0/4	0/6				0/4	0/6		2/5		2/4	4/6		2/4	4/6
50		2/0		2/0	4/0			0/3	0/4	0/3			0/3	0/4	0/3		2/0	0/3	2/4	4/3		2/4	4/3
60		2/0		2/0	4/0	42	0/5		0/4	0/7				0/4	0/7		2/5		2/4	4/7		2/4	4/7
70		2/0		2/0	4/0		0/5		0/4	0/7				0/4	0/7		2/5		2/4	4/7		2/4	4/7
80		2/0		2/0	4/0		0/5		0/4	0/7				0/4	0/7		2/5		2/4	4/7		2/4	4/7
90		2/0		2/0	4/0		0/5		0/3	0/1				0/3	0/1		2/5		2/3	4/1		2/3	4/1
100		2/0		2/0	4/0	07	0/5		0/5	0/2				0/5	0/2		2/5		2/5	4/2		2/5	4/2
110	29	2/0		3/3	4/0												2/0		3/3	4/0		3/3	4/0
120		5/5		0/4													5/5		0/4			0/4	
130		5/5		5/0	4/0												5/5		5/0	4/0		5/0	4/0
140	18	0/6		0/6	0/5												0/6		0/6	0/5		0/6	0/5
150		0/6		0/6	4/0												0/6		0/6	4/0		0/6	4/0
160	25	2/0		2/0	4/0												2/0		2/0	4/0		2/0	4/0
170		2/0		2/0	4/0	50		0/3	0/4	0/3			0/3	0/4	0/3		2/0	0/3	2/4	4/3		2/4	4/3
180		2/0		2/0	4/0			0/3	0/4	0/3			0/3	0/4	0/3		2/0	0/3	2/4	4/3		2/4	4/3

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 16: ENGAGEMENT, SOFT TARGETS (Cont.)

METHOD FFAR, DIRECT

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
190		2/0		2/0	4/0	50		0/3	0/4							2/0	0/3	2/4	4/0	
200		2/0		2/0	4/0						36	0/5		0/3	0/1	2/5		2/3	4/1	
210		4/0		5/0	4/0											4/0		5/0	4/0	
220		4/0		5/0	4/0											4/0		5/0	4/0	
230	53	2/0		2/0	4/0											2/0		2/0	4/0	
240		2/0		2/0	4/0											2/0		2/0	4/0	
250		4/0		2/0	4/0											4/0		2/0	4/0	
260		4/0		2/0	4/0											4/0		2/0	4/0	
270		4/0		2/0	4/0											4/0		2/0	4/0	
280	12	2/0		5/0	4/0											2/0		5/0	4/0	
290		2/0		6/0	4/0											2/0		6/0	4/0	
300																				
310																				
320																				
330																				
340																				
350																				
360																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 17: HANDOFF, GROUND TARGET

METHOD DIGITAL

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	54	2/0		0/2	4/4	33	2/2	2/2	2/2							4/2	2/2	2/4	4/4	
20		2/0		0/2	4/4						01	0/5		0/4	0/4	2/5		0/6	4/8	
30	31	2/0		2/0	4/0	42	0/5		0/4	0/7						2/5		2/4	4/7	
40		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7	
50		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7	
60		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7	
70		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7	
80		2/0		2/0	4/0	51	0/5	0/1	0/6	0/1						2/5	0/1	2/6	4/1	
90		2/0		2/0	4/0		0/5	0/1	0/6							2/5	0/1	2/6	4/0	
100																				
110																				
120																				
130																				
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 18: HANDOFF, GROUND TARGET

METHOD VOICE

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P
10	54	2/0		0/2	4/4	33	2/2	2/2	2/2					2/2		4/2	2/2	2/4	4/4
20		2/0		1/0	4/4	27	0/3		0/3	0/4				0/3	0/4	2/3		1/3	4/8
30		2/0		0/2	4/4		0/4		0/5	0/4				0/5	0/4	2/4		0/7	4/8
40		2/0		0/2	4/4						48	0/4		0/3	0/4	2/4		0/5	4/8
50		2/0		0/2	4/4						01	0/5		0/4	0/4	2/5		0/6	4/8
60	31	1/0		2/0												1/0		2/0	
70		2/0		1/0	4/0											2/0		1/0	4/0
80		2/0		2/0	4/0	50		0/3	0/4	0/3						2/0	0/3	2/4	4/3
90		2/0		2/0	4/0			0/3	0/4	0/3						2/0	0/3	2/4	4/3
100		2/0		2/0	4/0			0/3	0/4							2/0	0/3	2/4	4/0
110																			
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 19: TARGET HANDOFF

METHOD LASER CUEING

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	54	2/0		0/2	4/4											2/0		0/2	4/4	
20		2/0		0/2	4/4	33	2/2	2/2	2/2							4/2	2/2	2/2	4/4	
30		2/0		0/2	4/4						48	0/4		0/3	0/4	2/4		0/5	4/8	
40		2/0		0/2	4/4							0/4		0/3	0/4	2/4		0/5	4/8	
50		2/0		0/2	4/4						24		0/3	0/4	0/3	2/0	0/3	0/6	4/7	
60		2/0		0/2	4/4							0/4	0/3	0/4	0/4	2/4	0/3	0/6	4/8	
70		2/0		0/2	4/4							0/2		0/2	0/1	2/2		0/4	4/5	
80		2/0		0/2	4/4								0/3	0/4		2/0	0/3	0/6	4/4	
90																				
100																				
110																				
120																				
130																				
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 20: HOLDING CHECKS

METHOD

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		2/0	4/0												2/0		2/0	4/0
20		2/0		2/0	4/0	55	0/6		0/6	0/5							2/6		2/6	4/5
30		2/0		2/0	4/0		0/5		0/4	0/2							2/5		2/4	4/2
40		2/0		2/0	4/0	05	0/5		0/6								2/5		2/6	4/0
50		2/0		2/0	4/0		0/5		0/2								2/5		2/2	4/0
60		2/0		2/0	4/0		6/6		0/6								8/6		2/6	4/0
70		2/0		2/0	4/0		0/5		0/2	0/1							2/5		2/2	4/1
80		2/0		2/0	4/0		6/6		0/6								8/6		2/6	4/0
90		2/0		2/0	4/0		6/6		0/6								8/6		2/6	4/0
100		2/0		2/0	4/0	08	0/6		0/6	0/1							2/6		2/6	4/1
110		2/0		2/0	4/0		0/6		0/6	0/2							2/6		2/6	4/2
120		2/0		2/0	4/0		0/6		0/6	0/2							2/6		2/6	4/2
130		2/0		2/0	4/0		0/6		0/6	0/2							2/6		2/6	4/2
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE

TARGET SERVICE

SEGMENT 21: OVERWATCH

METHOD

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	29	5/5		0/4	4/0												5/5		0/4	4/0
20		5/5		0/4	4/0												5/5		0/4	4/0
30	25	2/0		1/0	4/0	55	0/6		0/6	0/5							2/6		1/6	4/5
40		2/0		1/0	4/0		0/5		0/4								2/5		1/4	4/0
50		2/0		1/0	4/0	06	5/0		2/0								7/0		3/0	4/0
60	54	2/0		1/0	4/4	33	2/2	2/2	2/2								4/2	2/2	3/2	4/4
70		2/0		1/0	4/4						27	0/3		0/3	0/4		2/3		1/3	4/8
80		2/0		1/0	4/4							0/4		0/5	0/4		2/4		1/5	4/8
90		2/0		1/0	4/4						32	0/4		0/4	0/4		2/4		1/4	4/8
100		2/0		1/0	4/4						09	0/2		0/2	0/4		2/2		1/2	4/8
110		2/0		1/0	4/4							0/6		0/6	0/2		2/6		1/6	4/6
120		2/0		1/0	4/4	49	0/5		0/4	0/3						2/1		1/4	4/7	
130																				
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE

SEGMENT 22: RECEIVE HANDOFF METHOD VOICE

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT			
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P
10	25	2/0		1/0	4/0	06	5/0			2/0						7/0		3/0	4/0
20		2/0		1/0	4/0	41		0/3	0/4	0/3						2/0	0/3	1/4	4/3
30		2/0		1/0	4/0			0/3	0/4							2/0	0/3	1/4	4/0
40		2/0		1/0	4/0			0/3	0/4							2/0	0/3	1/4	4/0
50		2/0		1/0	4/0		0/5	0/3	0/4	0/6						2/5	0/3	1/4	4/6
60		2/0		1/0	4/0			0/3	0/4	0/3						2/0	0/3	1/4	4/3
70		2/0		1/0	4/0	42	0/5		0/4	0/7						2/5		1/4	4/7
80		2/0		1/0	4/0		0/5		0/4	0/7						2/5		1/4	4/7
90		2/0		1/0	4/0		0/5		0/4	0/7						2/5		1/4	4/7
100		2/0		1/0	4/0		0/5		0/4	0/7						2/5		1/4	4/7
110		2/0		1/0	4/0	07	0/5		0/5	0/2						2/5		1/5	4/2
120																			
130																			
140																			
150																			
160																			
170																			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE: TARGET SERVICE METHOD

SEGMENT 23: TEAM COORDINATION

CUM. SECS.	FLIGHT						SUPPORT						MISSION						TOTAL CONCURRENT			
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P			
10	29	2/0		3/3	4/0	33	2/2	2/2	2/2							4/2	2/2	5/5	4/0			
20		5/5		3/3	4/0											5/5		3/3	4/0			
30		5/5		3/3	4/0	06	5/0		2/0							10/5		5/3	4/0			
40		5/5		3/3	4/0						46	0/5		0/3	0/4	5/10		3/6	4/4			
50		5/5		3/3	4/0							0/5		0/3	0/4	5/10		3/6	4/4			
60		5/5		3/3	4/0	50		0/3	0/4	0/3		0/5		0/3	0/4	5/10	0/3	3/10	4/7			
70		5/5		3/3	4/0			0/3	0/4	0/3						5/5	0/3	3/7	4/3			
80		5/5		3/3	4/0			0/3	0/4							5/5	0/3	3/7	4/0			
90	18	0/6		0/5	4/0											0/6		0/5	4/0			
100		0/6		0/6	0/5											0/6		0/6	0/5			
110		2/2		1/0	4/0											2/2		1/0	4/0			
120	54	2/0		1/0	4/4											2/0		1/0	4/4			
130		2/0		0/2	4/4						32	0/1		0/3	0/4	2/1		0/5	4/8			
140		2/0		0/2	4/4							0/4		0/4	0/4	2/4		0/6	4/8			
150		2/0		0/2	4/4							0/4		0/3	0/4	2/4		0/5	4/8			
160																						
170																						
180																						

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE, AIR-TO-AIR

SEGMENT 24: ACQUISITION

METHOD FREE SEARCH

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		1/0	4/0	06	5/0			2/0						7/0		3/0	4/0	
20	54	2/0		1/0	4/4											2/0		1/0	4/4	
30		2/0		0/2	4/4	33	2/2	2/2	2/2							4/2	2/2	2/4	4/4	
40		2/0		0/2	4/4						32	0/1		0/3	0/4	2/1		0/5	4/8	
50		2/0		0/2	4/4							0/4		0/4	0/4	2/4		0/6	4/8	
60		2/0		0/2	4/4						15	0/4		0/6	0/4	2/4		0/8	4/8	
70		2/0		0/2	4/4							0/2		0/4		2/2		0/6	4/4	
80		2/0		0/2	4/4	49	0/5	0/1	0/4	0/3						2/5	0/1	0/6	4/7	
90		2/0		0/2	4/4		0/3		0/3	0/4						2/3		0/5	4/8	
100		2/0		0/2	4/4		0/4		0/5	0/4						2/4		0/7	4/8	
110		2/0		0/2	4/4		0/3		0/3	0/4	20	0/4		0/1	0/4	2/7		0/6	4/12	
120		2/0		0/2	4/4		0/3		0/3	0/4		0/6		0/6	0/4	2/9		0/11	4/12	
130		2/0		0/2	4/4		0/3		0/3	0/4				0/7		2/3		0/12	4/8	
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE, AIR-TO-AIR METHOD FROM MASKED POSITION

SEGMENT 25: ENGAGEMENT, AIR-TO-AIR

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		2/0	4/0	06	5/0		2/0							7/0		4/0	4/0	
20		2/0		2/0	4/0		5/0		2/0							7/0		4/0	4/0	
30	54	2/0		1/0	4/4											2/0		1/0	4/4	
40		2/0		1/0	4/4						48	0/4		0/3	0/4	2/4		1/3	4/8	
50	03	4/0		5/0	4/0							0/4		0/3	0/4	4/4		5/3	4/4	
60		2/0		1/0	4/0							0/4		0/3	0/4	2/4		1/3	4/4	
70		2/0		1/0	4/0							0/6		0/6	0/4	2/6		1/6	4/4	
80		2/0		1/0	4/0							0/6		0/6	0/4	2/6		1/6	4/4	
90		2/0		1/0	4/0									0/7		2/0		1/7	4/0	
100		2/0		1/0	4/0									0/7		2/0		1/7	4/0	
110		2/0		1/0	4/0						36	0/5		0/3	0/1	2/5		1/3	4/1	
120	53	2/0		2/0	4/0											2/0		2/0	4/0	
130		4/0		2/0	4/0											4/0		2/0	4/0	
140		2/0		1/0	4/0											2/0		1/0	4/0	
150		2/0		1/0	4/0											2/0		1/0	4/0	
160		2/0		1/0	4/0						23	0/5	0/1	0/6	0/4	2/5	0/1	1/6	4/4	
170	12	2/0		5/0	4/0											2/0		5/0	4/0	
180		2/0		6/0	4/0											2/0		6/0	4/0	

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE, AIR-TO-AIR METHOD RUNNING FIRE, CANNON
 SEGMENT 26: ENGAGEMENT, AIR-TO-AIR

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	58	4/0		3/0	4/0											4/0		3/0	4/0	
20		4/0		3/0	4/0											4/5		3/3	4/1	
30	28	2/0		2/0	4/0						36	0/5		0/3	0/1	2/0		2/0	4/0	
40		2/0		2/0	4/0											2/0		2/0	4/0	
50		2/0		2/0	4/0											2/5		2/2	4/4	
60		2/0		2/0	4/0						22	0/5		0/2	0/4	2/5		2/2	4/4	
70	12	2/0		5/0	4/0							0/5		0/2	0/4	2/0		5/0	4/0	
80		2/0		6/0	4/0											2/0		6/0	4/0	
90																				
100																				
110																				
120																				
130																				
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE, AIR-TO-AIR METHOD RUNNING FIRE, MISSILE

SEGMENT 27: ENGAGEMENT, AIR-TO-AIR

CUM. SECS.	FLIGHT						SUPPORT				MISSION				TOTAL CONCURRENT			
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	A	C	P
10	58	4/0		3/0	4/0							4/0					3/0	4/0
20		4/0		3/0	4/0						36	0/5		0/3	0/1		3/3	4/1
30	03	4/0		5/0	4/0												5/0	4/0
40		4/0		5/0	4/0												5/0	4/0
50		4/0		5/0	4/0						23	0/5	0/1	0/6	0/4	0/1	5/6	4/4
60	12	2/0		5/0	4/0												5/0	4/0
70		2/0		5/0	4/0												5/0	4/0
80		2/0		5/0	4/0	06	5/0		2/0								7/0	4/0
90																		
100																		
110																		
120																		
130																		
140																		
150																		
160																		
170																		
180																		

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE, AIR-TO-AIR METHOD VOICE

SEGMENT 28: HANDOFF AERIAL THREAT

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		2/0	4/0	.06	5/0		2/0							7/0		4/0	4/0	
20	54	2/0		0/2	4/4											2/0		0/2	4/4	
30		2/0		0/2	4/4	33	2/2	2/2	2/2							4/2	2/2	2/4	4/4	
40		2/0		0/2	4/4						32	0/1		0/3	0/4	2/1		0/5	4/8	
50		2/0		0/2	4/4							0/4		0/4	0/4	2/4		0/6	4/8	
60		2/0		0/2	4/4						15	0/4		0/6	0/4	2/4		0/8	4/8	
70		2/0		0/2	4/4							0/2		0/4		2/0		0/6	4/4	
80		2/0		0/2	4/4	49	0/5	0/1	0/3	0/1	27	0/3		0/3	0/4	2/3		0/5	4/9	
90		2/0		0/2	4/4	50		0/3	0/4	0/3		0/4		0/5	0/4	2/4	0/3	0/6	4/7	
100		2/0		0/2	4/4			0/3	0/4	0/3						2/0	0/3	0/6	4/7	
110		2/0		0/2	4/4			0/3	0/4	0/3						2/0	0/3	0/6	4/7	
120																				
130																				
140																				
150																				
160																				
170																				
180																				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

PHASE TARGET SERVICE, AIR-TO-AIR

SEGMENT 29: RECEIVE HANDOFF

METHOD VOICE

CUM. SECS.	FLIGHT					SUPPORT					MISSION					TOTAL CONCURRENT				
	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	FUNCTION	V	A	C	P	V	A	C	P	
10	25	2/0		2/0	4/0	06	5/0			2/0						7/0		4/0	4/0	
20		2/0		2/0	4/0											2/0		2/0	4/0	
30	54	2/0		1/0	4/4	33	2/2	2/2	2/2							4/2	2/2	3/2	4/4	
40		2/0		0/2	4/4						32	0/1		0/3	0/4	2/1		0/5	4/8	
50		2/0		0/2	4/4											2/4		0/6	4/8	
60		2/0		0/2	4/4	41	0/3	0/4	0/3							2/0	0/3	0/6	4/7	
70		2/0		0/2	4/4		0/5	0/3	0/4	0/6						2/5	0/3	0/6	4/10	
80		2/0		0/2	4/4		0/5	0/3	0/4	0/6						2/5	0/3	0/6	4/10	
90		2/0		0/2	4/4				0/3	0/4	0/3					2/0		0/6	4/7	
100		2/0		0/2	4/4						46	0/3		0/3	0/4	2/3		0/5	4/8	
110		2/0		0/2	4/4							0/5		0/2	0/4	2/5		0/4	4/8	
120		2/0		0/2	4/4						15	0/4		0/6	0/4	2/4		0/8	4/8	
130		2/0		0/2	4/4							0/2		0/4		2/2		0/6	4/4	
140		2/0		0/2	4/4							0/2	0/3	0/4		2/2	0/3	0/6	4/4	
150		2/0		0/2	4/4	49	0/5	0/1	0/4	0/3	27	0/4		0/5	0/4	2/9	0/1	0/11	4/11	
160																				
170																				
180																				

**END
FILMED**

DATE:

4-91

DTIC