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JUL 78 W M KOMANSKI, R E PICTON

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NAVY TRAINING COMMAND NAVAL FLIGHT OFFICER TRAINING SITUATION ANALYSIS

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NAVTRAEQUIPCEN IH-302

NAVY TRAINING COMMAND NAVAL FLIGHT OFFICER TRAINING SITUATION ANALYSIS

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July 1978

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Tutorial Media	Affective Domain

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This report documents the results of the Training Situation Analysis conducted for the Navy Training Command Naval Flight Officer Training conducted at NAS Pensacola. The objective of the Training Situation Analysis was to determine and identify the training media requirements to support the Naval Flight Officer training in the 1980s. The procedures used in the conduct of the Training Situation Analysis are delineated in CNET SUPPORT INST. 1551.5A. The results of the Training Situation Analysis identified the individual and tutorial media

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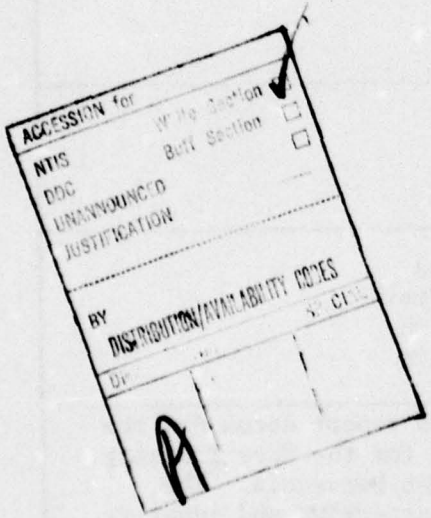
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which will provide optimum support for the Naval Flight Officer Training at NAS Pensacola. Recommendations included incorporating the media as an instructional delivery system within a Learning Center.



SUMMARY

This document reports the results of a ten month Training Situation Analysis (TSA) study on the Naval Training Command's (NAVTRACOM) Naval Flight Officer (NFO) Training Program conducted at NAS Pensacola. The project team consisted of a four-member team of Training/Education Specialists, with assistance from other disciplines as necessary. The objective of this TSA is to determine and identify the training media required to provide optimum support for NAVTRACOM NFO training during the 1980s.

A meeting was held at CNET SUPPORT Headquarters on 13 September 1977 which established the guidelines under which the TSA would be conducted. Representatives of CNET, CNET SUPPORT, CNATRA and NAVTRAEQUIPCEN were in attendance. The guidelines established were that current NAVTRACOM NFO training adequately met the requirements of the fleet, therefore, no survey of the Fleet Readiness Squadron was necessary. The Terminal Learning Objectives (TLOs) and Learning Objectives (LOs) identified within the current NFO curricula of the training conducted at NAS Pensacola would be the basis for the development of the Specific Behavioral Objectives (SBOs). Emphasis was to be placed on the NFO "pilot assist" role as one of his major responsibilities. Conduct of the TSA was in consonance with the established guidelines and the procedures set forth in CNET SUPPORT Instruction 1551.5A, Procedures for Conducting Training Situation Analysis.

The TSA was initiated by a survey of the NFO training and training facilities at NAS Pensacola, administered by Training Squadron Ten (VT-10) and Training Squadron (VT-86). VT-10 conducts the basic NFO and intermediate NFO training. VT-86 receives the student NFOs from VT-10 and provides advanced tactical navigation and advanced radar intercept operator training. Using the TLOs and LOs from the four courses as a basis, a task analysis was performed from which the SBOs emerged. The analytical sorting and merging procedures delineated in the CNET SUPPORT Instruction 1551.5A were utilized, terminating in the determination and identification of the Individual and Tutorial Media to support NAVTRACOM NFO training in the 1980s and beyond.

The individual media, identified and described in Appendix F, is a multimedia mix which will adequately support the academics and flight

support phases of training by assisting the student NFO in acquiring the necessary cognitive skills for progression through the training program. It is recommended that the instructional program and its supporting individual media be incorporated in a Learning Center, which will utilize the available instructional technology to provide optimum training. The Learning Center is to be computer supported. For those instructional situations requiring normal classroom training, to assist the instructor or to substitute for the instructor, it is recommended Mobile Video Centers described in Section II be utilized.

The Tutorial Media, identified in Appendix F and described in Appendix G, is based on the requirements of the SBOs and results of the micro-analytical empirical analysis. Four devices are recommended. These are: the Scan Trainer, Cockpit Procedures Trainer, Communications and Navigation Trainer (Device 1D23), and the Air-to-Air Intercept Trainer. Device 1D23 is a Cognizance Symbol "20" device, currently supporting NFO training and can continue to support the required training in the 1980s. The four devices correctly utilized within the NFO curricula will provide optimum training support.

The current aircraft, the T-2s, TA-4s, and T-39s used to support NFO flight training are scheduled to be phased out of Navy inventory in the mid-1980s. This situation requires a resolution as to how NFO flight training will be accomplished in the mid-1980s and beyond. Two possible solutions are proposed. The optimum is an aircraft developed to meet the NFO specific training requirements, i.e., capacity for more than one student, a pilot, and instructor NFO; operate economically; high performance capability for Air Combat Maneuvering (ACM), communications/navigation equipment for visual and instrument navigation, airborne radar with ground mapping and air intercept capability with repeater scopes at each student station. An alternative is the use of the T-34C aircraft, recently introduced in the Navy for basic pilot training and the proposed VTX aircraft scheduled to replace the T-2 and TA-4.

PREFACE

This report documents the results of the TSA for the Navy Training Command NFO training conducted at NAS Pensacola. The TSA was conducted by NAVTRAEQUIPCEN during the period of July 1977 through July 1978, under sponsorship of CNET SUPPORT. The principal NAVTRAEQUIPCEN investigators were:

Mr. W. M. Komanski, Training Specialist
Mr. R. E. Picton, Educational Specialist

Other NAVTRAEQUIPCEN personnel contributing and providing assistance, on a part time basis were:

Mr. R. W. Camp, Education Specialist
Mr. M. D. Sarkovitz, Education Specialist

The support and assistance of CDR B. Windsor, Chief of Naval Air Training (CNATRA) (Code N-22), throughout the TSA is gratefully acknowledged. We are also indebted to members of the staff of Training Wing Six, Training Squadron Ten and Training Squadron Eighty-Six for their assistance and cooperation. Appreciation is expressed for the counsel and support of Dr. C. Havens (CNET SUPPORT, Code 01A) and Mr. C. Harrison (CNET SUPPORT, Code 01A1) who has coordinated this project at the CNET SUPPORT Staff Level.

W. M. Komanski

W. M. KOMANSKI
Team Leader

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SECTION I

INTRODUCTION

BACKGROUND

This report describes the activities and methodologies utilized in the conduct of the Navy Training Command (NAVTRACOM) Naval Flight Officer (NFO) Training Situation Analysis (TSA). The NFO training program being considered within this report is the training conducted within Training Wing Six (TRAWING 6) NAS Pensacola by Training Squadrons Ten (VT-10) and Eighty-Six (VT-86).

The duties and responsibilities of the NFO are many and complex. The NFO is an indispensible crew member of naval flight operations, performing a variety of roles within a variety of naval aircraft. In addition to such tasks as navigation and communications, the NFO must operate and manage complex electronic equipment, be capable of a "pilot assist" role, be comfortable in and adapt to a high "G" environment and exercise considerable decision making skills in air combat maneuvering and weapon delivery in both electronic and visual modes. Furthermore, the NFO must be capable of coping with enemy Electronic Countermeasures (ECM) and using ECM against hostile air and ground elements. The foregoing NFO activities show the range of responsibilities and illustrate the complexity of the job; as such, training is more complex in order for the NFO to be an effective crewmember.

TRAINING SITUATION ANALYSIS OBJECTIVE

To determine the requirements for training media that will be required to support NAVTRACOM NFO training in the 1980s.

SCOPE OF THE TASK

The scope of the TSA was established at a meeting with representatives of CNET, CNATRA, CNET SUPPORT, NAVTRAEQUIPCEN, TRAWING 6, VT-10 and VT-86 as NAS Ellysin Field on 13 September 1977. It was determined by the CNET and CNET SUPPORT representatives that the TSA would be limited to the NFO training conducted by NAVTRACOM at NAS Pensacola, i.e., training conducted by VT-10 and VT-86. Due to the extensive studies already performed relative to

the NFO, the study data and current curricula, used in NFO training, would be the basis for the development of the Specific Behavioral Objectives (SBO) for the TSA. It was to be assumed that the NAVTRACOM NFO training adequately met the requirements of the fleet. The "pilot assist" role was to be considered as one of the major responsibilities of the NFO.

GUIDELINES UTILIZED IN THE CONDUCT OF THE TSA

The guidelines used in the conduct of the TSA are delineated below:

a. The TSA was conducted within the constraints identified in the scope of the task section of the report.

b. The conduct of the TSA is in consonance with the procedures set forth in CNET SUPPORT Instruction 1551.5A, Procedures for Conducting Training Situation Analysis. Five stages are listed in the instruction for conducting the TSA and are identified as follows:

Stage A - Sort of SBO's to Domain and Levels

Stage B - Sort of SBO's to Individual Media and Tutorial Media

Stage C - Sort to Academic, Flight Support and Flight (CNATRA categories)

Stage D - Merge to a Composite of Media and Categories

Stage E - Microanalytical Empirical Translations to related Specifications or Military Characteristics

Completion of the microanalyses cited in Stage E concludes the training situation analysis.

c. The SBO's were developed from the curricula and data utilized by VT-10 and VT-86.

d. All SBO's are considered equal and independent; there is no heirarchy of objectives.

e. All SBO's identified in the TSA reflect the final performance level to be achieved in TRACOM training.

f. Representatives of CNATRA were provided the opportunity to review the SBO's.

DESCRIPTION OF CURRENT TRACOM NFO TRAINING

The NFO training currently conducted at NAS Pensacola is depicted in Figure 1. Students for the program volunteer from several sources, which include; Naval Flight Officer Candidate Program, Naval Reserve Officer Training Program, Naval Academy and Officer Candidate Schools. Prospective NFO's begin their training at the Naval Aviation Schools Command in the Aviation Officer Candidate School (AOCS) where they receive training in such areas as Naval orientation, Naval history, leadership, seamanship, aviation physiology, basic aeronautics, engineering, swimming, physical fitness and survival. Previously commissioned officers receive their initial training in the Aviation Indoctrination School. At the completion of these Naval Aviation School Command programs, the Student Naval Flight Officer (SNFO) proceeds to VT-10, which is located at NAS Pensacola, and attends Basic NFO Training, Course Number 0-2D-0012. See Figure 2 for the training received in Basic NFO training.

Upon completion of Basic NFO training at VT-10, one pipeline of SNFO's is selected for advanced navigator training and is sent to Mather Air Force Base to attend the Joint Service Undergraduate Navigation Training, Course Number Q-2D-0028. The training conducted in this pipeline concentrates on long-range, over water, navigational skills required by patrol and fleet support aircraft. The remainder of the SNFOs remain at VT-10 and attend Intermediate NFO training, Course Number Q-2D-0027. See Figure 3 for the training received in Intermediate NFO Training. Upon completion of Intermediate NFO training, the SNFO receives training in one of the three remaining advanced pipelines. These pipelines are the Tactical Navigator (TN), Radar Intercept Operator (RIO), and Airborne Tactical Data System (ATDS) Operator. Each pipeline concentrates upon training for specific tasks which the NFO will perform in a fleet assignment.

The SNFO designated for either the TN or the RIO pipeline receives advanced training at VT-86, which is also located at NAS Pensacola, in Tactical Navigation Training, Course Number Q-2D-0024, and in Radar Intercept Operator Training, Course Number Q-2D-0025, respectively. See Figure 4 for the training received in Tactical Navigation Training and Figure 5 for Radar Intercept Operator Training. The remaining SNFOs, the ATDS operator, are sent to a Fleet Readiness Squadron (FRS) for the advanced training. Upon completion

of training provided in these advanced pipelines, the SNFO is designated a Naval Flight Officer and is assigned to a specific FRS where further training is received in a fleet aircraft.

SPECIFIC BEHAVIORAL OBJECTIVE NUMBERING SYSTEM

The whole number SBO indicates:

a. 1, 2 . . . nth, the final SNFO required performance and is achieved in Flight Training.

b. With one decimal place, 1.1, 1.2 . . . nth, though equal and independent, supports the whole number behavior, and is usually achieved in Flight Support Training.

c. With two decimal places, 1.1.1, 1.1.2 . . . nth, supports both the whole number and whole number with one decimal place SBO's, and is achieved in Academics Training.

A letter suffix is used, A, B . . . nth, in conjunction with the number system, wherever a number of behaviors, which are compatible, have the same conditions and standard are grouped for the sake of brevity.

REPORT ORGANIZATION

In addition to Section I, there are two other major sections in the report. Section II, Description, outlines the methodology and procedures used to accomplish the NAVTRACOM NFO TSA. Section III, Results, summarizes the recommendations resulting from the TSA. The appendices contain substantive material which support the TSA findings and recommendations.

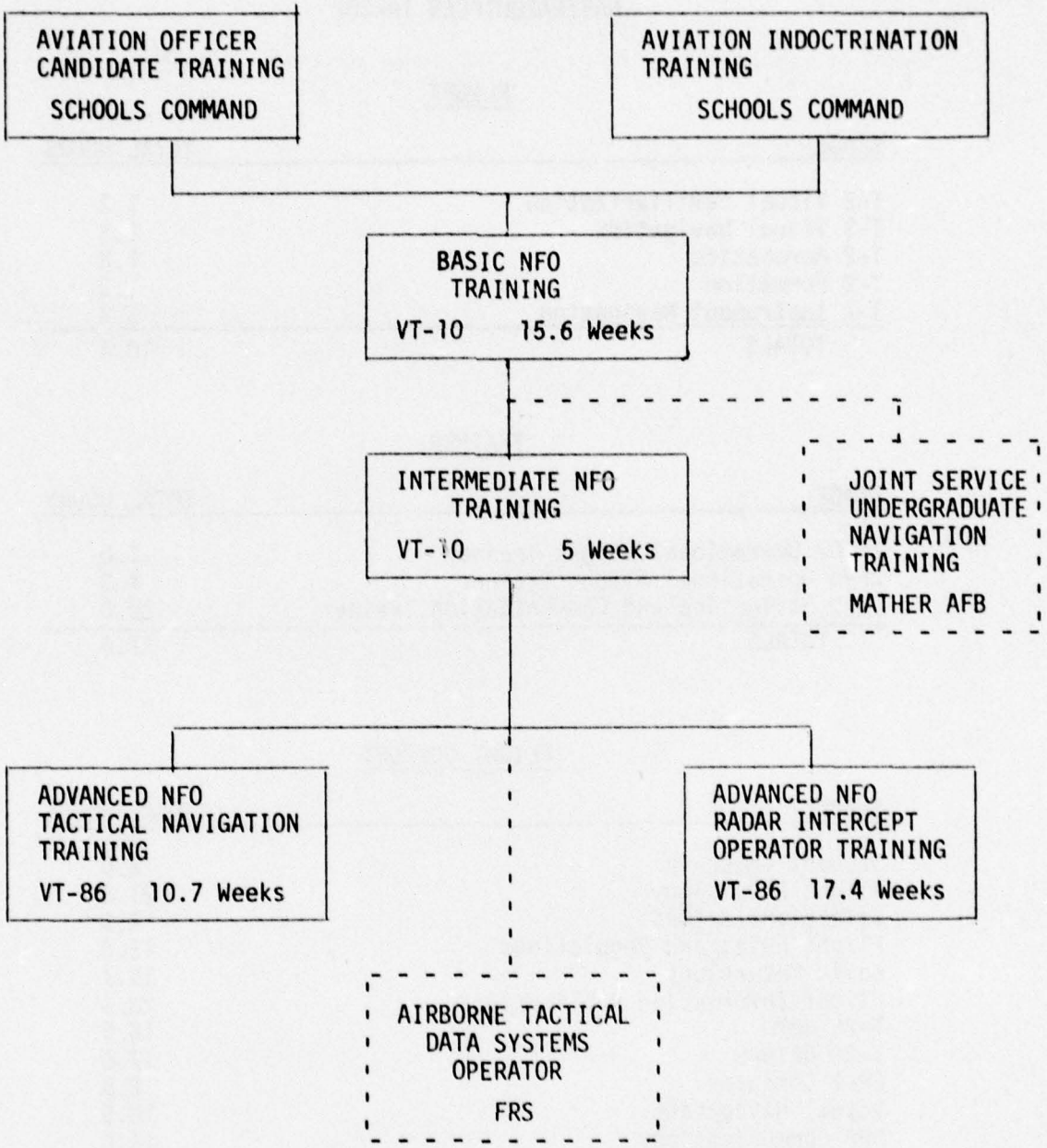


Figure 1. NAVTRACOM NFO Training at NAS Pensacola

FLIGHT

STAGE	TOTAL HOURS
T-2 Visual Familiarization	1.3
T-2 Visual Navigation	1.3
T-2 Aerobatics	1.3
T-2 Formation	1.3
T-2 Instrument Navigation	5.2
TOTALS	10.4

TRAINER

STAGE	TOTAL HOURS
2F101 Operational Flight Trainer	1.0
2F90 Operational Flight Trainer	4.0
1D23 Navigation and Communication Trainer	22.0
TOTALS	27.0

FLIGHT SUPPORT

SUBJECT	TOTAL HOURS
Student Check-in	8.0
Flight Physiology	21.0
Safety and NATOPS	4.5
Flight Rules and Regulations	13.0
Basic Meterology	14.1
Flight Information Publications	23.8
T-2C NAMO	16.0
T-2C NATOPS	17.5
CR-2 Computer	6.5
Visual Navigation	16.5
UHF Communications	14.0
Instrument Navigation	33.5
Advanced Meterology	16.6
Flight Preparation	20.0
Student Check-Out	3.0
TOTALS	228.0

Figure 2. Basic NFO Training Summary

FLIGHT

STAGE	TOTAL HOURS
T-2 Advanced Performance Maneuvers	1.3
T-2 Formation	2.6
T-2 Instrument Navigation	5.2
T-39 Instrument Navigation	4.4
T-39 Visual Navigation	6.6
TOTALS	20.1

FLIGHT SUPPORT

SUBJECT	TOTAL HOURS
Flight Preparation	16.5
Student Check-out	3.0
TOTALS	19.5

Figure 3. *Intermediate NFO Training Summary*

FLIGHT

STAGE	TOTAL HOURS
T-39 Low Level	6.0
T-39 Radar Navigation	6.0
	5.0
T-39 Radar Analysis	11.2
	2.5
T-39 Airways Navigation	2.7
TA-4 Familiarization	4.6
TA-4 Advanced Tactical Maneuvering	6.0
TOTALS	44.0

TRAINER

STAGE	TOTAL HOURS
1D23 Radar Systems	14.0
TOTALS	14.0

FLIGHT SUPPORT

SUBJECT	TOTAL HOURS
Welcome Aboard	4.0
NATOPS and Safety	32.0
Course Rules	1.0
Low Level Planning and Navigation	4.0
Radar Systems	11.5
Surface, Subsurface Surveillance Coordination	2.0
Airmanship Seminar	8.0
Mid-phase Review and Exam	2.0
Advanced Tactical Maneuvering	8.0
Final Phase Exam	2.5
Administrative Time	8.0
Critique and Graduation	8.0
TOTALS	91.0

Figure 4. Tactical Navigation Training Summary

FLIGHT

STAGE	TOTAL HOURS
T-39 Airways Navigation	9.5
T-39 Radar Intercept Training	36.8
TA-4 Familiarization	4.6
TA-4 Advanced Tactical Maneuvers	6.0
TOTALS	56.9

TRAINER

STAGE	TOTAL HOURS
15C4 Synthetic Intercept Training	38.0
15C4 Synthetic Trainer Demonstrations	6.0
TOTALS	44.0

FLIGHT SUPPORT

SUBJECT	TOTAL HOURS
Welcome Aboard	3.0
Intercept Procedures	54.0
Air Intercept Radar	11.0
Fighter Environment	10.0
NATOPS and Safety	32.0
RIO Mission Profile	2.0
Course Rules	1.0
Airmanship Seminar	4.0
Advanced Tactical Maneuvering	8.0
Mid Phase Review	2.0
Mid Phase Exam	2.0
Final Phase Review	2.0
Final Phase Exam	4.0
Critique and Graduation	8.0
TOTALS	143.0

Figure 5. Radar Intercept Operator Training Summary

SECTION II

DESCRIPTION

INVESTIGATION AND DATA COLLECTION

The guidelines limited the scope of TSA in that no investigation was to be conducted by the TSA team with fleet personnel to verify the adequacy of the NFO TRACOM training or to conduct any additional analyses of NFO training other than at NAS Pensacola. This limitation resulted in using the existing resources and materials available at TRAWING SIX (i.e., VT-10 and VT-86). Initially the investigative effort centered on interviews with VT-10 and VT-86 training personnel, collecting the curriculum and supporting training materials for each of the courses, and surveying the training in and the facilities for each of the courses.

Discussions were held with VT-10 training personnel relative to the current basic NFO training and intermediate NFO training, and the philosophy reflected in the training. It was emphasized by VT-10 training personnel that the present syllabus reflected valid learning requirements. The thrust of the NFO training was the "pilot assist" role of the NFO. The Terminal Learning Objectives (TLO) and the Enabling Learning Objectives (ELO) cited in the syllabi were the valid behavior requirements and would be the basis for the development of SBOs for the NFO TSA. A tour of the VT-10 training facilities was made and training in Device 1D23, Communication and Navigation Trainer, was observed. It was noted that two aircraft, the T-2 in the basic course and both T-2 and T-39 in the intermediate course, were used to accomplish the NFO flight training.

In the same manner, discussions were held with VT-86 training personnel relative to the training conducted in the Advanced NFO Tactical Navigation (TN) Training and the Advanced NFO Radar Intercept Operator (RIO) Training. Major emphasis in the TN course currently, is to provide the NFO the basic skills to safely navigate utilizing airborne radar, systems management, and adapting to tactical maneuvering in a high "G" environment. Major emphasis in the RIO course is to provide the NFO the basic skills in operation of a tactical weapon system (airborne radar) in performing air-to-air intercepts, systems management, and adapting to tactical maneuvering in a high "G" environment. A tour of the VT-86 training facilities was made.

The TN course utilizes Device 1D23 to provide training in the operation of navigational radar. TA-4 and T-39 aircraft are used for flight training. In the RIO course Device 15C4D, Radar Scope Interpretation Trainer, is utilized to provide training in simulated air-to-air intercepts and the TA-4 and T-19 aircraft are used for flight training. Between VT-10 and VT-86 three aircraft, the T-2, TA-4 and T-39, are used to achieve the required flight training. It was observed during the tour of both the VT-10 and the VT-86 training facilities that the primary method of academic instruction was the formal lecture by instructor in the classroom, with the primary training aid being the blackboard. The individual training concept with programmed text is used to some extent in VT-10, however, no central individualized learning center is evident.

Several comprehensive studies on NFO training have been conducted from the early 1970's to the present. These studies resulted from the recognition that the NFO training needed updating to produce a better NFO at less cost. The current revised curricula, which implemented the VT-10 and VT-86, are the outcome from these studies. The studies conducted by CNATRA[1], Naval Aerospace Medical Research Laboratory[2], and HUMRRO[3] were obtained and thoroughly examined as to the relevancy to the conduct of the NFO TSA.

"PILOT ASSIST" ROLE OF THE NAVAL FLIGHT OFFICER

Throughout the discussions with CNET and CNATRA training personnel, it was emphasized that the "pilot assist" role of the NFO is a prime responsibility. To accomplish this NFO role, the Navy has completely revised the training given the NFO. The current curriculum reflects this philosophy. Emphasis in training is placed on airmanship, thus flight training has been increased. In order for the NFO to be an effective crewmember, capable of assisting the pilot in the successful completion of the aircraft flight

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[1] Report on the Study of Naval Flight Officers (NFO) Training in the Naval Air Training Command, CNATRA, NAS Pensacola, Fla, 14 May 1972.

[2] Naval Flight Officer Function Analysis, Final Report. Commonality of Operational Functions, NAMC Laboratory, NAMRL-1194, Pensacola, Fla, 2 November 1973.

[3] Revision of Naval Flight Officer Basic Training, prepared for CNET NAS Pensacola, Fla, FR-CD(P) 76-1, HUMRRO, Pensacola, Fla, April 1976.

mission, he must be able to adapt to, and be comfortable in all regimes of aircraft flight, especially in the high "G" environment. To accomplish this NFO capability, it is reasonable to assume that NFO knowledge and skills in many areas must parallel that of the pilot, and that NFO training must be similar to the pilot and the pilot's flight environment. In addition, the NFO within the flight environment must be able to practice the system management of the system of his particular speciality for which he is being trained. The importance of the NFO "pilot assist" role is addressed throughout the conduct of the TSA.

FUTURE ROLE OF THE NFO

Since the objective of this TSA is to determine the training media requirements to support the NAVTRACOM NFO training in the 1980's, consideration must be given to the role that the NFO will have in naval aviation in this time frame, i.e., the type of aircraft to be used for tactical missions and the type of mission to be accomplished. These factors were examined to determine whether there will be an impact relative to the NFO tasks, in future tactical environment. It appears that the role of the NFO will remain relatively unchanged; he will continue to fly in the same type of aircraft in the 1980 - 1990's, which are in the Navy inventory today, i.e., the F-4, F-14, S-3, A-6E, EA-6B, E-2B, E-2C and P-3. As far as can be determined, no new aircraft are contemplated for future procurement or are in the planning stage, which would affect the future role of the NFO. With the advent of the F-18 (a single place fighter aircraft, scheduled to become operational in the mid 1980's and will eventually replace the F-4 in the Navy inventory) the number of NFO crewman positions will decrease by the number of F-4s displaced. Initially this displacement will decrease the NFO training pipeline by some factor, but in the long term, should stabilize the training to support the remaining fleet requirements.

TASK ANALYSIS

Using the available information and data gathered from VT-10 and VT-86, primarily the curricula, supporting training materials, and the insight

gained from the investigation, the analysis was initiated to determine and identify the SBOs on which the TSA would be conducted. The Terminal Learning Objectives (TLOs) and supporting Learning Objectives (LOs) for each of the four courses, which are identified in each of the curriculum, were minutely examined as to the feasibility of being translated into SBOs. Appendix A provides a listing of the TLOs and LOs for each course. In essence, the SBO is a statement of a behavior goal, with the conditions under which the behavior will occur and to a set standard of performance. The SBO is a statement of the terminal behavior required at the completion of a training cycle; as such, SBOs are differentiated from learning/training objectives which are the instructional means to achieve the SBO. It may require multiple learning objectives to achieve one SBO.

Each TLO and LO was examined as to its character, domain and proficiency level. Through analysis, it was determined that there were too few TLOs to establish the aura of the NFO as a "pilot assist" and systems manager. In addition, many of the TLO and LO verbs were of low proficiency level, i.e., Recall -1, State -1, Identify -1, using Bloom's et al Taxonomy of Educational Objectives. In the SBO format, the verb is the key to the proficiency level. However, the TLOs and LOs provided a sound basis from which to extrapolate, identify and format the SBOs for the TSA. The approach used was to extract from the TLOs and LOs an NFO task listing; when apparent additional tasks were needed, they were empirically added to complete the task inventory. The guidelines used in developing the task inventory were to stress the "pilot assist" responsibilities, in which the NFO and pilot flight environment are identical and performance of inflight tasks are so interrelated that success of a mission is dependent on the effective performance of the tasks by both crewmen. Generally, the task inventory sequence follows the training pattern established in VT-10 and VT-86. The sequence includes: Aircraft, Ground Operations, Flight Familiarization, Visual Navigation, Instrument Navigation, ACM, Air-to-Air Intercepts and Radar Navigation.

Using the NFO job/tasks inventory as a foundation, the next event was to develop and prepare the SBOs. Through an iterative process, the performance SBOs (both psychomotor and cognitive) were written following the sequence established in the job/task inventory. The TLO and LOs, identified

in Appendix A, were the basis from which many of the SBOs were written, either as presently formulated or restructured to meet the SBO requirements. Next, the supporting cognitive and affective SBOs were prepared. As there is no heirarchy among SBOs, per CNETSUPPORTINST 1551.5A, each is equal and independent. The wordage within each SBO must reflect this principle. Additionally, the action verbs for each SBO were written to be in the format which is in accordance with Bloom's et al Taxonomy of Educational Objectives. Through a series of iterations, the SBOs were refined with conditions and standards added to reflect a valid set of SBOs. The performance SBOs were forwarded for review and comment to representatives of CNET, CNET SUPPORT, CNATRA, COMTRAWING SIX, VT-10 and VT-86. Comments received were incorporated into the SBOs. The SBOs are identified in Appendix B. It should be noted that the aircraft, as used in the SBOs, is the aircraft to which the NFO is assigned.

SORT OF SPECIFIC BEHAVIORAL OBJECTIVES TO DOMAIN AND LEVEL (STAGE A)

Implementation of the sort of SBOs to domain and level is the first stage of the TSA, identified as Stage A, per CNETSUPPORTINST 1551.5A. This is an analytical classification procedure for each SBO. Each SBO is examined as to its characteristics and type of behavior required as related to the action verb. By matching the characteristics, behavior requirements and action verbs with one of the matching verbs listed in Cognitive Domain and Level, Figure 6, Psychomotor Domain and Level, Figure 7, or Affective Domain and Level, Figure , the domain for each SBO is identified.

The proficiency level indicated for each SBO is the level to be achieved at the completion of the NFO TRACOM training. The assignment of the proficiency level requires a thorough analysis of terminal behavior requirements as stated in each of the course missions in the four instructional syllabi supporting TRACOM NFO training, the examination of criticality and/or difficulty of each behavior, and the extent to which reinforcement is required for each behavior to achieve the required proficiency level. Helpful in determining the relative complexity of each SBO is the description of eleven tasks and the learning guidelines associated with each

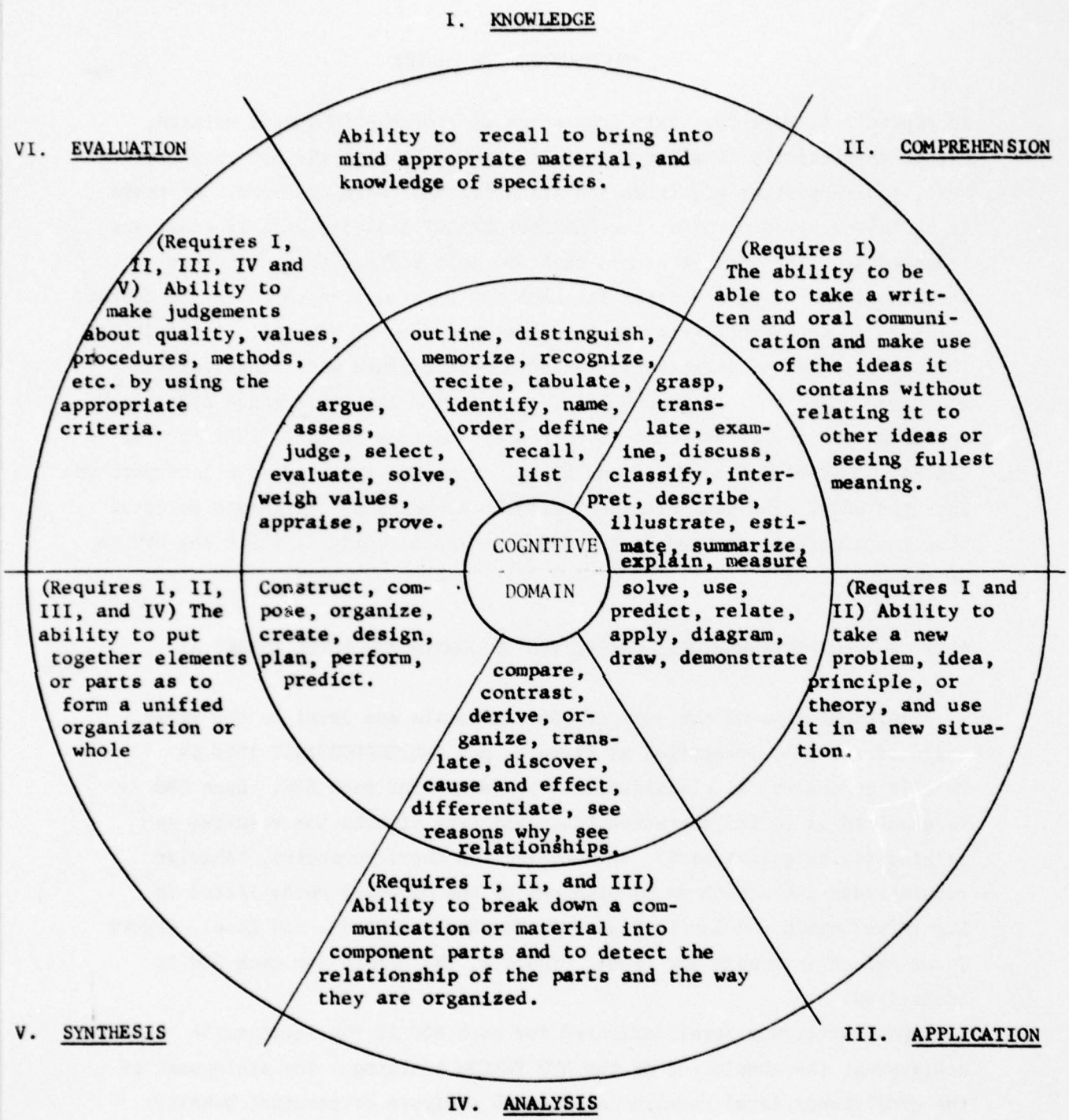


Figure 6. Cognitive Domain and Level.

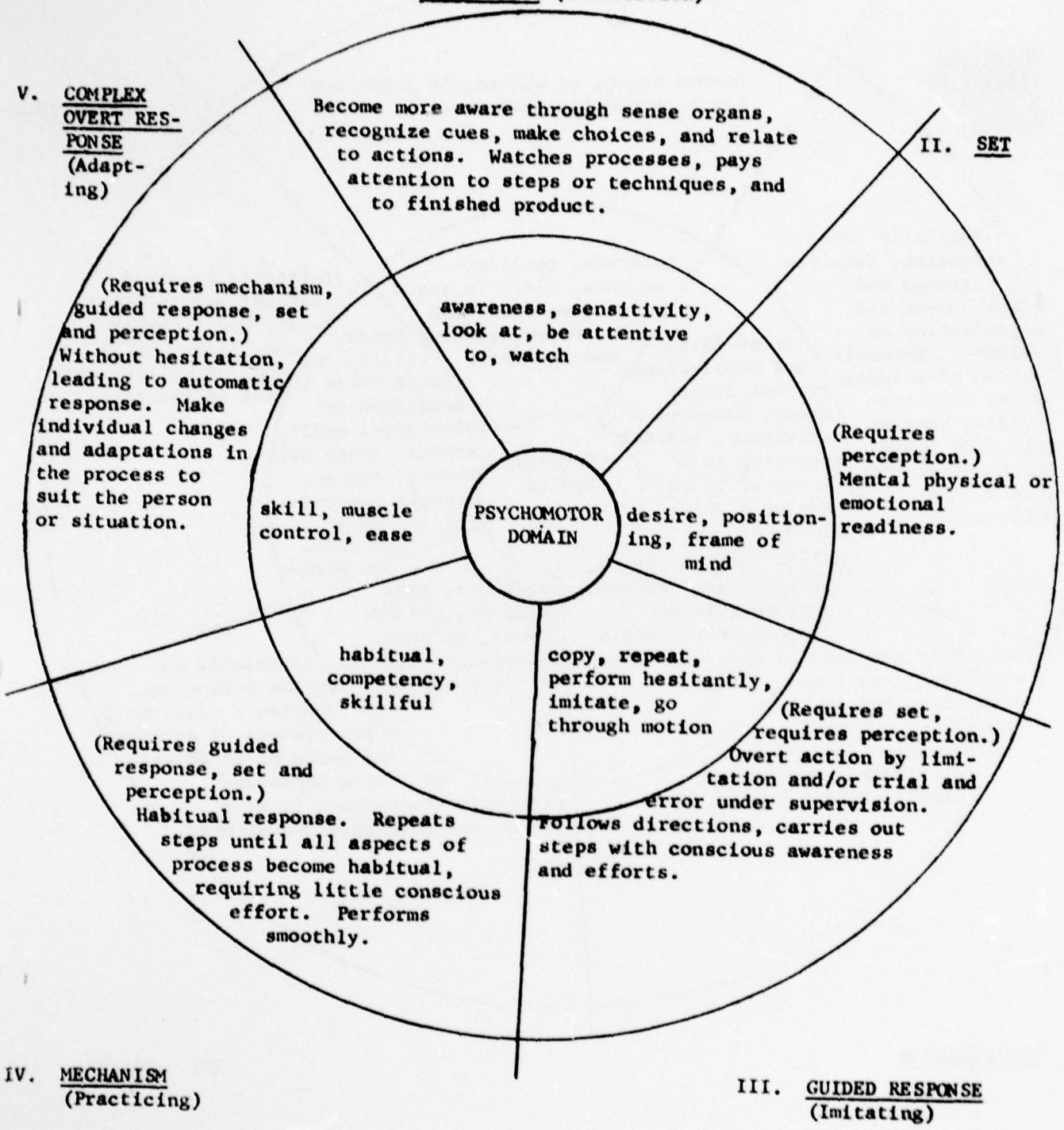


Figure 7. Psychomotor Domain and Level.

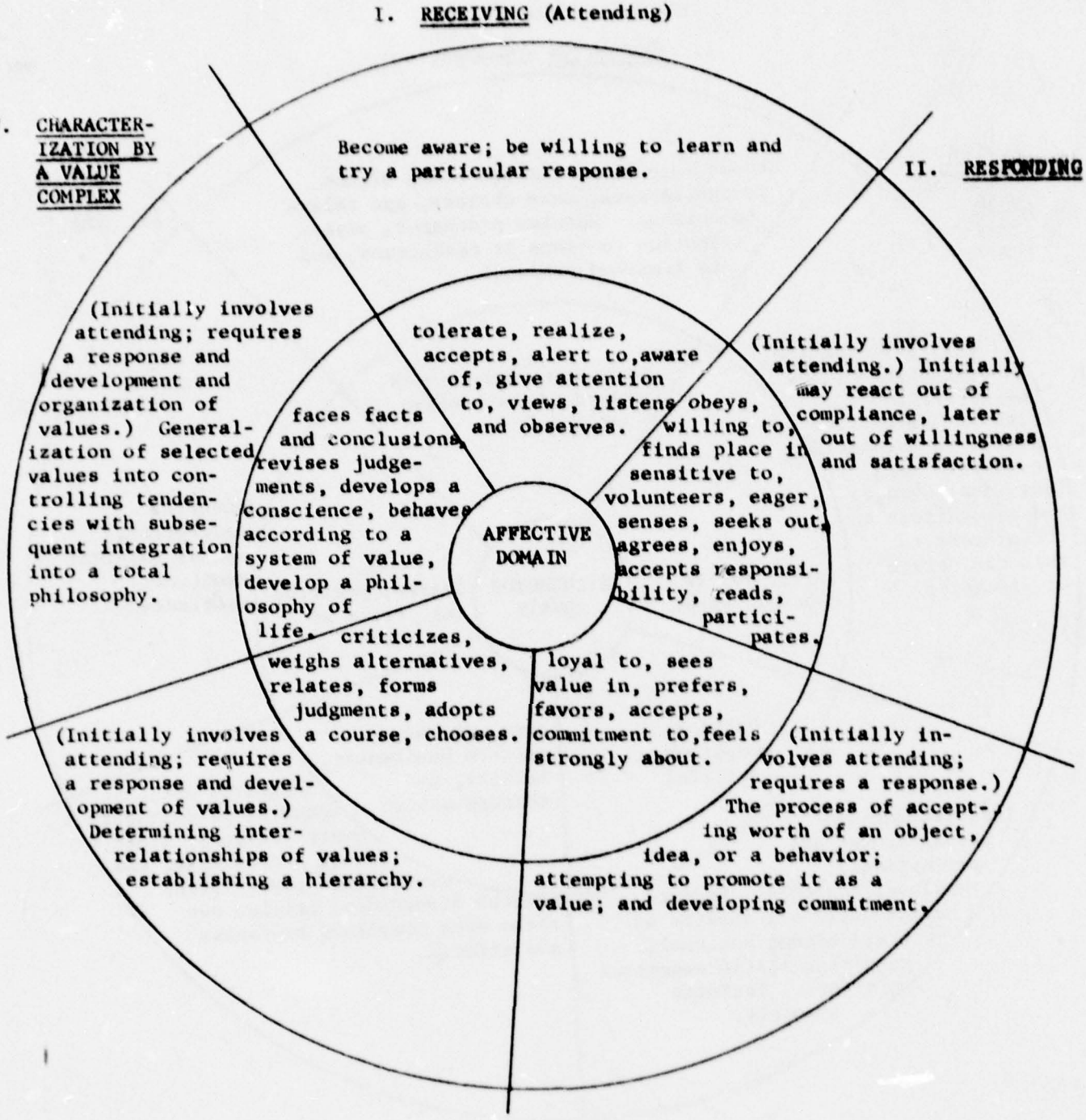


Figure 8. Affective Domain and Level.

contained in TAEG Report No. 23.[4] Consequently, with the domain of the SBO established in Stage A of the TSA, using the information above, the action verb as a guideline, and the experience of the analyst, the level of proficiency was determined in accordance with the levels designated for each domain in Figures 6, 7, and 8. A number of SBOs have an interim proficiency level indicated by a parenthesis, i.e., ( ) to indicate that this level is achieved in Flight Support Training and the final level is achieved in Flight Training. Appendix B documents the SBOs, Domain and Level.

SORT TO INDIVIDUAL MEDIA AND TUTORIAL MEDIA (STAGE B)

Stage B, the Sort to Individual Media and Tutorial Media, is the second stage of the TSA process as delineated in CNET SUPPORT Instruction 1551.5A. The analytical sorting procedures result in the assignment of each SBO to a class of media which will provide instructional support for the achievement of the SBO. Within the CNET SUPPORT Instruction, classes of individual media are identified as print, audiovisual (static), audiovisual (dynamic), and part-task trainer (static). Tutorial media classes are identified as part-task trainer (dynamic), whole-task simulator and flight (airplane). In performing the analytical sort to a class of media, the procedures contained in Training Effectiveness, Cost-Effectiveness, Prediction (TECEP) technique,[5] where applicable and in consonance with the TSA procedures of CNET SUPPORT Instruction 1551.5A, were used. Particularly useful are the listed generic characteristics of training media and the media pool which lists and defines a broad range of types of media which were used as a basis for the analytical sorting to a class within the Individual media and Tutorial media. Consideration was given to all the known characteristics of each SBO. For many SBO's, more than one medium is assigned. This is based on the judgement that multiple media are required to provide optimum training support to achieve the required SBO

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[4] Learning Guidelines and Algorithms for Types of Training Objectives, TAEG Report No. 23, Marh 1976.

[5] A Technique for Choosing Cost-Effective Instructional Delivery Systems, TAEG Report No. 16, April 1975.

proficiency level. For many SBO's the final proficiency level is achieved only in the tutorial medium identified as flight (airplane). Appendix C documents the sort to Individual and Tutorial media.

SORT TO ACADEMICS, FLIGHT SUPPORT AND FLIGHT (CNATRA TRAINING CATEGORIES) (STAGE C)

The third analytical sorting procedure of SBOs per CNET SUPPORT Instruction 1551.5A, and identified as Stage C, is to determine where in the CNATRA instructional/training environment the SBOs will be introduced, reinforced and achieved. Completion of Stage C assigns each SBO to one or more of the CNATRA training categories, i.e., Academics Training, Flight Support Training and/or Flight Training. In the VT-10 and VT-86 curricula both Academics and Flight Support Training are consolidated under the heading of Flight Support Training and Simulator Training.

The methodology used to sort the SBOs to Training Categories was to assign the performance SBOs to Flight Support and Flight. For many SBOs, it is only possible to achieve the required proficiency level in flight; i.e., the airplane. Concurrently with the assignment of the SBOs to training categories, the performance SBOs were placed in sequential order of accomplishment based on the building block approach, i.e., simple to complex, which forms the basis of an optimum training sequence.

The next procedure was to assign the remaining SBOs to support the performance SBOs. This correlation was a voluminous effort since the same supporting SBO often sustained many performance SBOs; however, it was worthwhile since it insured the contiguity of all the SBOs. Coincidentally with the SBO correlation, the supporting SBOs were assigned to a training category, i.e., Academics or Flight Support, based on their content, domain and proficiency levels. Appendix D documents the results of the sort to training categories. The numerical proficiency level is used to denote the proficiency achieved in that particular training category.

MERGE TO COMPOSITE OF MEDIA AND CATEGORIES (STAGE D)

Stage D, Merge to Composite of Media and Categories, as identified in the CNET SUPPORT Instruction 1551.5A, initiates the merging process of all

analytical data on hand leading to the identification of the media requirements. Stage D, primarily is the compilation of the information contained in the TSA Stages A, B, and C to one form for ease of use in performing the remaining stages of the TSA. Additionally, the form is used for this TSA to further classify the Individual Media and the Tutorial Media, supporting each SBO, to a specific type of medium versus the class of media determined in Stage B. The preliminary selection and identification of medium provides the basis for completing the last stage of the TSA, Stage E, Micro-Analytical Empirical Translations to Related Specifications or Military Characteristics. To accomplish this section, TECEP procedures, where applicable, were used. The selected medium for both the individual and tutorial media are identified either by an abbreviation or symbol, which is explained in the legend in the front section of Appendix D. Appendix D documents the Merge to Composite of Media and Categories (Stage D). Appendix E provides a definition for each medium type identified in the TSA.

MICROANALYTICAL EMPIRICAL TRANSLATIONS TO RELATE TO SPECIFICATIONS OR MILITARY CHARACTERISTICS (STAGE E)

The objective of the final stage of the analysis is to conclude the analytical merging process of the previously classified SBO's by establishing a positive relationship to, and a requirement for, a specific medium. This process provides for full accountability and complete visibility of the SBO's as they relate to the requirement for a medium, and to the specific capabilities required of that medium to provide training support in achieving the SBOs. Micro-analytical empirical translations are primarily a clustering process, whereby, through the grouping of compatible SBOs a requirement for a specific medium emerges, and the capabilities and characteristics of the medium are determined. The results are valid media requirements. Six classes of media identified in Stage B are the basis for the microanalytical empirical translations; the airplane is not considered as a medium in this exercise. A total of nine translations are identified within the CNET SUPPORT Instruction 1551.5A to complete the analysis. These are identified in Figure 9. The first six translations relate to the Individual Media and the last three relate to the Tutorial Media. Based on the results of the sorting classes in Stage B, all of the translations may not be required.

NUMBER OF TRANSLATIONS REQUIRED (CUMULATIVE)	MEDIUM	CATEGORY
1	Print	Academics
2	Print	Flight Support
3	A-V Static	Academics
4	A-V Static	Flight Support
5	A-V Dynamic	Academics
6	A-V Dynamic	Flight Support
7	P-T Trainer (Static)	Academics
8	P-T Trainer (Dynamic)	Flight Support
9	Whole-Task Simulator	Flight Support

Figure 9. Media Microanalytical Translations

MEDIUM: Print CATEGORY: Academics

The print medium identified as programmed text is intended to support self-paced individualized instruction for academics training. The SBO's identified for this medium in Stage D were clustered into compatible subject areas under typical academic training titles such as aerodynamics, engineering, etc., from which the curriculum developer will evolve training modules. The suggested titles and applicable SBO's are identified in Appendix F.

MEDIUM: Print CATEGORY: Flight Support

Basically, the same procedures used to determine the print medium for academics were used to identify the print medium to support flight support training. The SBO's identified in Stage D to be accomplished in flight support training were extracted and clustered to compatible subject areas. Primarily, these SBOs are to provide the necessary background to prepare the NFO for the "pilot assist" and systems manager role. Consequently, the information for this medium is the NATOPS. This can be used directly or information from the various NATOPS may be consolidated in the Flight Training Instructions (FTI's) document. Sense pamphlets have been identified

to support those affective SBO's which relate to the development of the NFO's awareness, attitudes and motivation in job performance. Appendix A documents the results of the translations.

MEDIUM: Audiovisual (Static) CATEGORY: Academics

The microanalytical empirical translation of SBO's to the audiovisual (static) medium for Academics Training resulted in the requirement for a number of graphic aids to augment the programmed text. Appendix F documents and provides a description of each graphic aid.

MEDIUM: Audiovisual (Static) CATEGORY: Flight Support

The microanalytical empirical translation of SBO's to the audiovisual (static) medium for Flight Support Training identified a photo mockup, graphic aids and a number of sound/slide programs. These are described in Appendix F.

MEDIUM: Audiovisual (Dynamic) CATEGORY: Academics

The microanalytical empirical translations of SBO's to the audiovisual (dynamic) medium to support the academics training, identified the requirement for two motion pictures, described and documented in Appendix F.

MEDIUM: Audiovisual (Dynamic) CATEGORY: Flight Support

The microanalytical empirical translations of SBO's to the audiovisual (dynamic) medium to support Flight Support Training identified the requirement for seven motion pictures and a night vision dynamic demonstrator as described and documented in Appendix F.

MEDIUM: Part-Task Trainer (Static) CATEGORY: Academics

The microanalytical empirical translations of SBO's to a part-task trainer (static) in support of academics training resulted in the identification of a typical ejection seat mockup. Appendix F describes and documents the device.

MEDIUM: Part-Task Trainer (Dynamic) CATEGORY: Flight Support

The microanalytical empirical translations of the SBO's established a requirement for a number of part-task (dynamic) trainers and are identified as:

a. Scan Trainer

b. Cockpit Procedures (CPT)

c. Communication-Navigation-Radar Trainer (Device 1D23)

d. Air-to-Air Intercept Trainer (AIT)

SCAN TRAINER. The objective of the Scan Trainer is to train the SNFO in the effective use of the eyes throughout the flight mission in order to function as a capable crewman in the performance of the NFO and pilot assist tasks. The trainer will provide training in developing the correct scan patterns for inside the cockpit, outside the cockpit, and time-sharing scan. The requirement for a Scan Trainer was initially identified for pilot training in the CNATRA Basic Flight Training Phase and is documented in NAVTRAEQUIPCEN Technical Report: NAVTRAEQUIPCEN IH-238, Training Situation Analysis Study for the T-34C Expanded Primary Flight Training Phase. More recently, the same requirement was identified for advanced pilot training and is documented in NAVTRAEQUIPCEN Technical Report: NAVTRAEQUIPCEN IH-286, Navy Undergraduate Pilot Training Jet Pipeline Training Situation Analysis. The same scan requirements identified for the pilot exists for the NFO. There are specifically eight SBO's relating to NFO scan behavior which are documented in Appendix F. However, it is recognized that these SBO's are only a representation and that the scanning task is a part of and inseparable from most of the NFO behavior.

The Scan Trainer has the capability of providing training in eye accommodation exercises, speed reading of cockpit instrument display and eye exercises to improve peripheral vision. Time-sharing scan training is provided to require the SNFO to speed read the aircraft instruments, make control movements to maintain the desired flight attitude, and at the

same time detect intruders (targets) which enter his field of vision. The Functional Description of the proposed device is documented in Appendix G.

COCKPIT PROCEDURES TRAINER (CPT). The microanalytical empirical translation of SBO's from Stage D and subsequent clustering of the applicable SBO's established a requirement for a part-task dynamic trainer to support the SNFO training in aircraft cockpit familiarization necessary to the acquisition of procedural skills, in aircraft systems operation, recognition of aircraft systems malfunction and the implementation of normal and emergency procedures. The NFO in his role of systems manager and as a "pilot assist" must have knowledge of aircraft systems operation, procedures for system operation and the location of the aircraft system switches, indicators and controls in order to perform effectively as a crewmember and advisor to the pilot.

The Cockpit Procedures Trainer will have the capability to provide training in the acquisition of the NFO behaviors related to the aircraft cockpit orientation and familiarization, use of checklists in aircraft system operation and checkout and the performance of normal and emergency procedures. Configuration of the cockpit will reflect the aircraft the NFO will use in flight training. Appendix F documents the microanalytical translations and Appendix G provides the Functional Description for the device.

COMMUNICATIONS AND NAVIGATION TRAINER. The microanalytical empirical translations of SBO's, as identified in Stage D and the subsequent clustering of SBO's establish the requirement for a part-task dynamic trainer which will provide training and develop the NFO skills as related to operation and management of navigational aids. Prior to developing a functional description for a communication and navigation trainer, a comparison was made of the requirements of the SBO's documented in Appendix E and the training capabilities of the onboard Cognizance Symbol "20" Device 1D23, Communications and Navigation Trainer. The results of the comparison indicate that the Cog "20" Device 1D23 adequately supports the training requirements in the use and operation of communication and navigation equipment and will

continue to adequately support NFO training in the 1980s.

Device 1D23, as presently configured, has the capability to provide training in communication, instrument navigation, airways navigation and radar navigation. Because of the number and criticality of the communication tasks assigned to the NFO, which the NFO must perform simultaneously with other flight tasks, Device 1D23 can serve as an excellent training tool in accomplishing the required NFO communication skills. The device has the capability to provide individual student communications, training for one or more students at the same time. In the training sequence, this training should be accomplished prior to any flight training, so that the SNFO will be familiar with the requirements of, and be able to initiate the required communications in the aircraft environment. Device 1D23 also has the capability to provide all facets of instrument navigation, airways navigation and navigation using radar via programmed lessons including the recording of the SNFO progress and performance. The hard copy printout of the SNFO performance for a specific simulated flight mission should be used for student debriefing, evaluation and retention as part of the student's record.

AIR-TO-AIR INTERCEPT TRAINER. The microanalytical empirical translations from Stage D and the subsequent clustering of the applicable SBOs established a requirement for a part-task trainer to support training for those SNFOs designated to become Radar Intercept Operators (RIO). The trainer will provide training in the acquisition of the basic skills required for the operation of the associated fire control system. The prime responsibility of the RIO is to operate and manage the air-to-air radar system to conduct air-to-air intercepts by maneuvering the aircraft to the envelope of the selected weapon and release of the weapon to eliminate the designated target.

The Air-to-Air Intercept Trainer will have the capability to provide training in the acquisition of NFO-RIO skills for setting up normal operation of the air-to-air radar, calibration of the radar for optimum performance, search and acquisition of maneuverable targets, target lockon, communications with pilot and missile release. Training intercept problems can be unprogrammed with complete control by the instructor or programmed with

will allow self-paced instruction with monitoring by the instructor. Student performance will be continuously monitored, evaluated and recorded by the device.

Device 15C4D, Radar Scope Interpretation Trainer, is currently utilized to support the RIO training at VT-86. The device is approximately twelve years old, is obsolescent and allows only one student at a time to actively participate in intercept training with additional students monitoring the on-going training. Each monitoring student then takes his turn at actively participating in radar intercept training.

The proposed trainer will provide more efficient intercept training by allowing each student to actively participate in radar intercept training, whenever he utilizes the device. With more efficient utilization of the trainer, less training hours may be required to achieve the required objectives. In addition, the device will reflect the latest technology and radar capabilities. Appendix F documents the microanalytical translations for the trainer and Appendix G provides a Functional Description of the device.

MEDIUM: Whole-Task Simulator CATEGORY: Flight Support

The microanalytical empirical translations resulted in no identification of a requirement for a whole task simulator.

INSTRUCTIONAL DELIVERY SYSTEMS

Learning Centers

As stated in Section I of this report, the objective of this TSA is to determine the requirements for training media to support NFO training in the 1980s. A logical consideration is the method of delivery of the instruction and its supporting training media in this time frame. The major portion of the NFO academics/flight support training lends itself to, and can be accomplished using the individualized instruction concept and incorporated in a Learning Center. Physically, the Learning Center is a facility with appropriately equipped carrels, training aids, training materials and equipment to support individualized instruction. This center is self-paced and utilizes a systems approach to training. Educationally, the Learning Center is a training/instructional system which must be

carefully developed and structured so that the learning environment is conducive to the student achieving the stated objectives. Such a system would eliminate redundancies and extraneous material.

For the 1980s and beyond, the Learning Center should take advantage of, and reflect the combined computer and electronic technology of the period. The Learning Center will incorporate the computer supported system which will have the capability to manage and administer the entire training program. Each carrel within the Learning Center will have the capability to present the Individual Media identified in the TSA by means of a video display system. The video display will be able to present text combined with graphics, video tapes and movies in color and with audio. By means of an electronic keyboard the student will be able to select the lesson to be accomplished, call up additional training aids such as video tapes etc., repeat portions of the lesson, take examinations/tests, receive the results of the tests, and by means of an audio system request assistance from the monitoring instructor. Figure 10 illustrates a typical video carrel and Figure 11 provides a representative grouping of carrels within a Learning Center. The computer supported system will have the capability to provide the instructor and/or training manager with: monitoring of student's progress, alerting the instructor of students in need of help, recording of examinations/tests, evaluating of examinations/tests for validity, scheduling the student through the instructional program, and providing a hard copy printout of the student's academic record.

The foregoing presents a training system design for the 1980s. During the interim, planning should be implemented for the immediate development of a Learning Center for the present on-going NFO training program at VT-10 and VT-86. Initially the Learning Center could be relatively unsophisticated, adapting and using existing training and assets, i.e., sound-slide, cassette recorder, etc., with the goal of upgrading the center to a complete computer supported and managed system. Carrels can be procured with the flexibility, via cutouts, to house different types of instructional delivery equipment. The General Service Administration (GSA) federal supply schedule identifies a variety of carrels to meet each training need.

Based on the current curriculum of the training conducted by VT-10 and VT-86, an estimate was made of the number of instructional hours in each

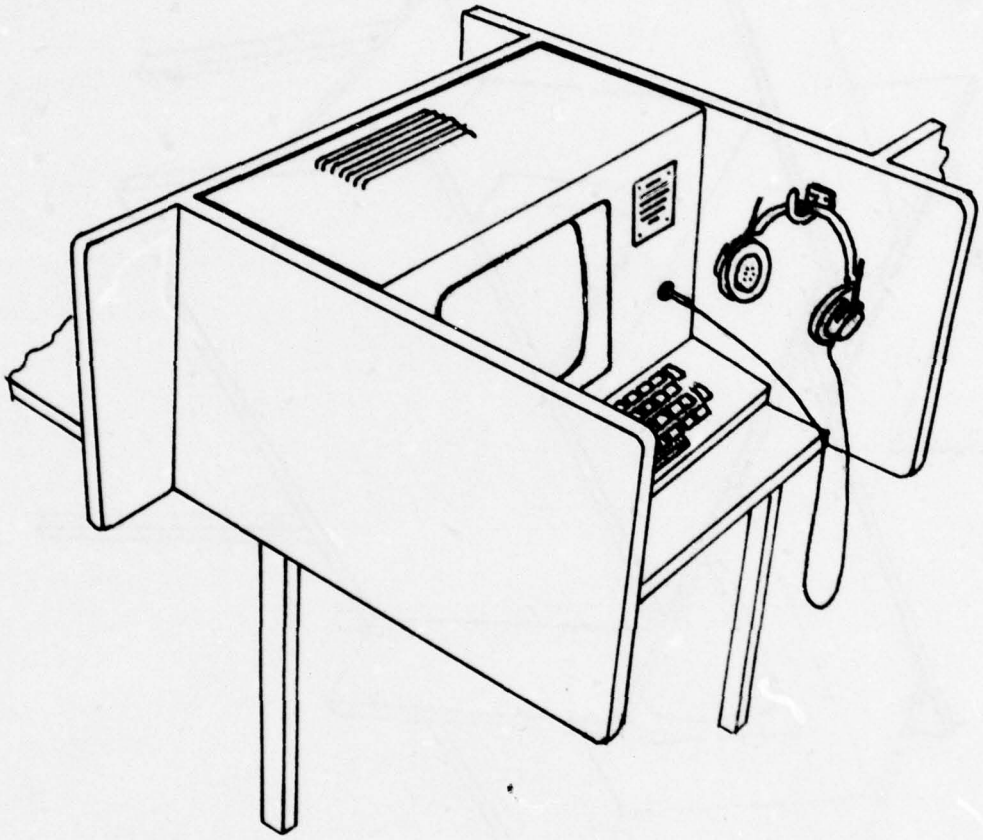


Figure 10. Typical Learning Center Video Carrel

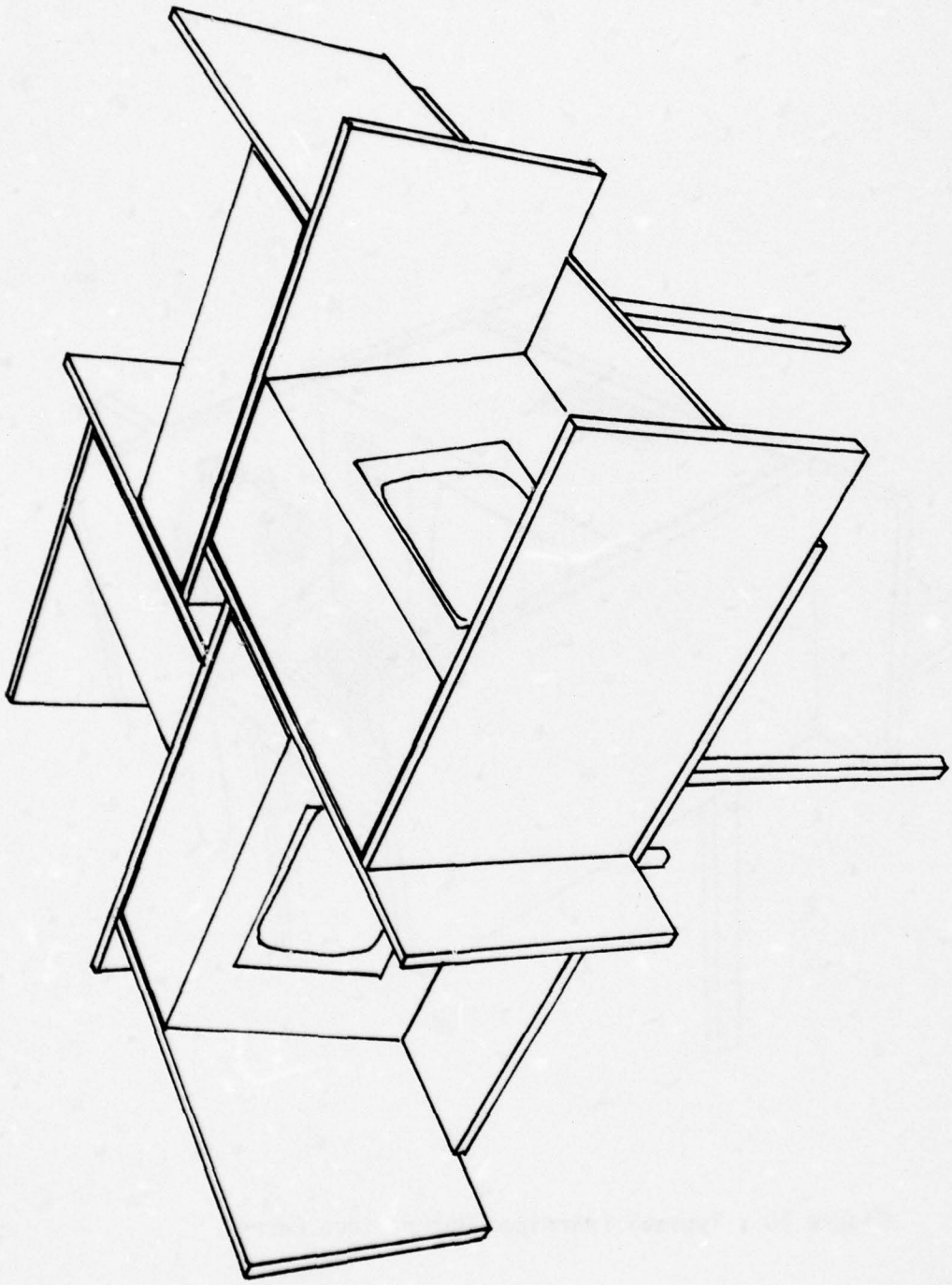


Figure 11. Typical Carrel Grouping

course which could be converted to individualized instruction and incorporated in a Learning Center, with the objective of determining the number of carrels which would be required. The estimates, indicated in Figure 12, identify the requirements of the Learning Center carrels for each course, for total training by VT-10 and VT-86, and due to the proximity of the VT-10 and VT-86, one Learning Center is considered for all TRACOM NFO training at NAS Pensacola. Alternatives relative to the hours of Learning Center use per days, i.e., 8, 12, 16 are provided. The formula used for determining the number of trainee stations (carrels) is:

$$\frac{\text{No. of Trainees Per Year} \times \text{No. of Hrs. Req. Per Trainee}}{\text{Training Hours Per Day} \times \text{Training Days Per Year (240)}} = \text{Basic No. of Carrels/Trainers}$$

$$\text{Basic No. of Trainee Stations} + \text{10\% Trainee Stations for Trainee Fluctuation} + \text{10\% Basic Trainee Stations for Trainee Changing} = \text{Trainee Stations Required}$$

TRAINEE	NO. OF TRAINEES PER YEAR	TRAINING HOURS	NUMBER OF CARRELS LEARNING CENTER HOURS PER DAY *(8)	*(12)	*(16)
VT-10 Basic	600	180	62	46	33
VT-10 Intermediate	400	None. Any carrel requirement to be absorbed into Basic.			
VT-86 TN	200	60	7	5	4
VT-86 RIO	200	94	12	9	6
VT-86 TN & RIO	400	154	39	26	20
VT-10 & VT-86	600	334	125	84	63

*Hours of Use Per Day

Figure 12. Learning Center Carrel Requirements

It should be noted that the estimate in Figure 12 used a student input of 600 per year into Basic, 400 into Intermediate, 200 each for TN and RIO courses. These figures are an approximation of the NFO known PTR requirements for the next five years and include a ten percent attrition rate. Any change in numbers of trainees, per year, and/or instructional hours scheduled for the Learning Center will require a re-computation of the number of carrels within the particular Learning Center.

Mobile Video Center

During the investigation phase of TSA, VT-10 and VT-86 training personnel commented that some of the NFO instruction does not adapt to individualized instruction and the instructor lecture method must be used. Compounding this situation was the nonavailability of instructors to conduct this type of training session. It is proposed that a Mobile Video Center, consisting of a 25-inch Video Monitor/Receiver, Video Player, Remote Control and a cabinet mounted on wheels to house the above equipment, plus storage space for video cassettes, see Figure 13, be utilized in those learning situations requiring the instructor lecture method.

The video center has the capability to increase the effectiveness of the instruction by supplementing the instructor, emphasizing key points, procedures, or systems operation via a video presentation versus using the blackboard; and motivating the student by making the instruction more diversified. Entire lessons can be taped and presented to a group of students, without instructors being present. In an individualized instruction situation, a student could use the mobile video center for a lesson he missed or to review a lesson. Due to the video center's mobility, it can be used wherever needed by moving it from classroom to classroom. The production of lessons can be accomplished locally and economically by means of a mobile production center consisting of a camera, video recorder and monitor housed on a mobile stand. Both the Mobile Video Center and the Video Production Center are relatively inexpensive items and can be procured through the GSA procurement schedule.

TUTORIAL MEDIA (SIMULATION MEDIA) REQUIREMENTS

The same formula and statistics used to determine the number of

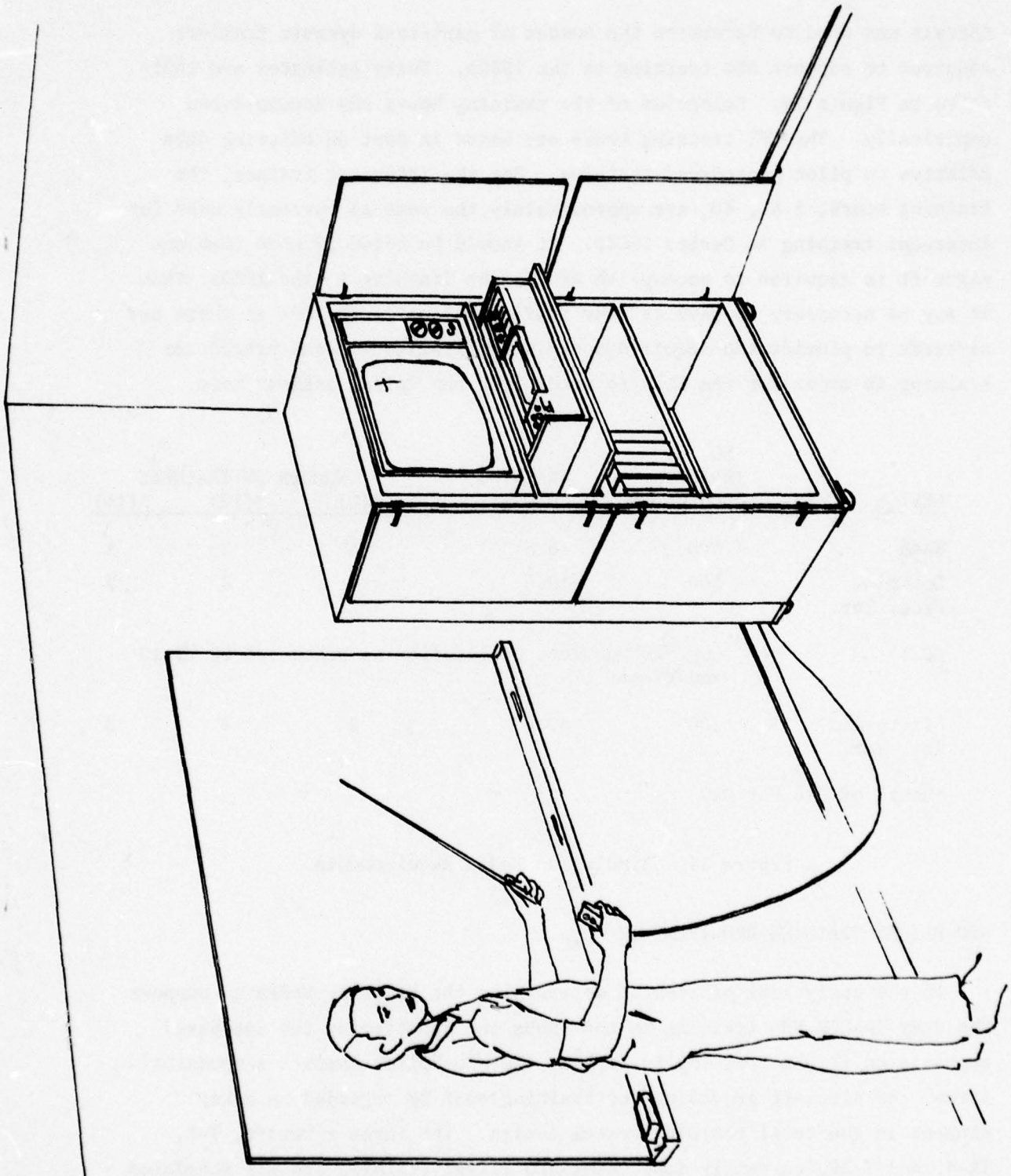


Figure 13. Mobile Video Center

carrels was used to determine the number of part-task dynamic trainers required to support NFO training in the 1980s. These estimates are indicated in Figure 14. Selection of the training hours was accomplished empirically. The CPT training hours are based in part on existing data relative to pilot procedures training. For the intercept trainer, the training hours, i.e., 40, are approximately the same as currently used for intercept training in Device 15C4D. It should be noted if more than one aircraft is required to accomplish NFO Flight Training in the 1980s, then it may be necessary to have as many configurations of the CPT as there are aircraft to provide the required cockpit familiarization and procedures training in order for the SNFO to accomplish the "pilot assist" role.

DEVICE	NO. OF TRAINEES PER YEAR	TRAINING HOURS	NUMBER OF TRAINERS *(8)	*(12)	*(16)
Scan	600	6.5	3	2	1
Cockpit Proc. Tnr.	600	10.0	4	3	2
ID23	Cog "20" device, utilization as scheduled by VT-10 and VT-86				
Air-to-Air Int. Tnr.	200	40.0	5	4	3

*Hours of Use Per Day

Figure 14. Simulation Media Requirements

NFO FLIGHT TRAINING REQUIREMENTS

In the analytical process of determining the training media to support the Navy TRACOM NFO training in the 1980s and considering the increased emphasis on flight training to support the NFO "pilot assist" responsibilities, the aircraft providing the training must be regarded as a key element in the total training system design. The three aircraft, T-2, TA-4, and T-39, currently supporting NFO flight training are all scheduled to be phased out of Navy inventory in the mid-1980s. Planning has been implemented to replace the T-2 and TA-4 with the VTX aircraft, which will

be used for pilot training. No known plans exist for the replacement for the T-39.

The timing of the replacement of the T-2, TA-4 and T-39 presents an opportunity to plan for the development of a trainer aircraft to specifically meet the flight training needs of the NFO. The aircraft designed for NFO training should be capable of training more than one SNFO at a time, have relatively high performance and be economical to operate. One of the major deficiencies of the contemporary aircraft is the high operating cost. Training capabilities of the proposed aircraft are to include: management of the communications-navigation systems, visual navigation, instrument navigation, air combat maneuvering, tactical radar navigation and radar air-to-air intercept capability.

TRAINING SEQUENCE

To insure an effective and efficient training program, a logical training sequence is necessary which will allow the SNFO to acquire the prerequisite knowledge and skills, on the basis of complexity (building block approach), in order to achieve the required terminal behavior. Scheduling the use of the media within an instructional program is extremely important. The training effectiveness of media, particularly simulation media, can be diminished, or even negative training may occur by improper sequencing. The SBOs in the order of listing in Appendix B, provide the basis for the development of a logical sequence for the use of the media.

SECTION III
RESULTS

FINDINGS

It is recognized that the NFO cockpit/station in certain fleet aircraft do not have all the instrumentation or controls of the pilot cockpit/station, thus the NFO cannot observe all aircraft systems operation. However, when a flight situation occurs requiring the NFO assistance, in the "pilot assist" role, the NFO must react and respond correctly to the pilot's request. In order to do so, the NFO must be knowledgeable and skilled in the aircraft system operation, malfunction symptoms, procedures, and alternative procedures. This knowledge and skill can be achieved only in a training situation in which the SNFO acquires the required knowledge and skills through procedural training identical to that of the pilot. Based on this rationale and the requirements of the SBOs, the recommended CPT will provide the training in normal and emergency procedures, system operation, and malfunction analysis. In the current training program, Devices 2F90 and 2F101 have the capability to provide the same type of training.

CONCLUSIONS

The results of this TSA present the Navy the opportunity to perform the planning and timely acquisition of the NFO instructional system. By utilizing the individualized instruction concept with the support of Individual and Tutorial media in the Learning Center, optimum training will be provided for the Navy NFO training program at NAS Pensacola in the 1980s and beyond. To realize the full potential of the training effectiveness of selected media, the media must be scheduled and utilized at the correct intervals. within the curriculum, which is based on an optimum training sequence. This, in turn, will lead the SNFO to mastery of all of the required behavioral objectives (i.e., psychomotor, cognitive and affective).

An objective evaluation program will determine whether or not the SNFO has achieved the behavioral objectives to the required proficiency level in the psychomotor and cognitive domains. However, equally important to a total training system is the recognition and the incorporation of those

characteristics which affect and promote the affective domain, i.e., emotion, awareness, attitude, pride and professionalism. These factors, though intangible, will influence the performance of the NFO skills in psychomotor and cognitive domains. Objective evaluation of affective behavior is difficult, however, observable indicators of affective behavior can be translated to the achievement of the behavior. This TSA has addressed the NFO affective behavioral objectives which are identified in Appendix B.

RECOMMENDATIONS

Individual Media

The individual media, as identified in Appendix F, resulting from the microanalytical translations, will adequately support the Academic/Flight Support Training Phases in the acquisition of the required cognitive skills for progression through the SNFO curriculum(s) at NAS Pensacola during the 1980s. These cognitive skills will prepare the SNFO with the proper background for progression through the Flight Support and Flight Training Phases of the TRACOM courses. The recommended media supports the student centered, individualized and self-paced instruction; such as, it should be incorporated into a learning environment which supports this concept. It is recommended that the NFO instruction program with its supporting media be included in a Learning Center, which is computer supported with the capability for the complete instruction and management of the training program. When properly structured, the individualized instructional program, within the Learning Center, will allow the student to train to proficiency. Individualized instruction is student centered, thus the progress and performance within the training program is primarily his responsibility. Within this type of learning environment, it is anticipated that the SNFO will be intrinsically motivated to learn the required cognitive skills to progress successfully through the training program. The result is more effective training.

For those areas of instruction designated by the training manager requiring formal classroom training, it is recommended that Mobile Video Centers, described in Section II, be utilized. These Mobile Video Centers may be used in three different learning situations. First, to present

an entire lesson via video tape due to the unavailability of the instructor; next, to supplement the instructor as an integral part of the lesson; and last, to individually provide the means of viewing a make-up lesson missed and/or reviewing a lesson for a second time. Coincidental to the acquisition of a Mobile Video Center, a Mobile Production Center is required to provide the means of producing the lesson, and/or parts of the lesson, via video tape. The use of video tape provides extraordinary flexibility in developing entire lessons and/or supporting training material for either formal classroom use or Learning Center instructional use.

Tutorial Media

It is recommended that the four devices, as determined by the micro-analytical translation in Appendix F, described in Appendix G and listed below, be utilized in Flight Support Training to achieve the stated behavioral objectives and proficiency level.

Scan
Cockpit Procedures Trainer (CPT)
Communications and Navigation Trainer (Device 1D23)
Air Intercept Trainer

Using the current curriculum as a guide, the Scan Trainer, CPT (configured to the aircraft used in VT-10 for flight training), and Device 1D23, would support Basic NFO training; Device 1D23 and the CPT (configured to the aircraft used ib VT-86 TN flight training) would support Advanced Tactical Navigation Training; and CPT and Air Intercept Trainer will support Advanced Radar Intercept Operator Training.

The results of the TSA indicate that this complex of devices, correctly utilized within the training situation, will significantly contribute to the achievement of the required behavioral objectives. To insure the training effectiveness of the selected media, it must be logically sequenced for use in the training program for optimum utilization to achieve the required NFO behavior. The devices identified to support NFO training will provide the opportunity for the SNFO to practice flight procedures, system management, and procedures in a safe environment. These practices will

prepare the SNFO for progression through the training program.

Aircraft Flight Training Requirements

The current aircraft, the T-2, TA-4, and T-39, utilized to support NFO flight training at NAS Pensacola in the practical airmanship and "pilot assist" responsibilities, are scheduled to be phased out of Navy inventory in the mid 1980s. In view of this situation, planning is required to resolve how NFO flight training will be accomplished in the mid 1980s and beyond. The optimum is an aircraft developed to meet the NFO specific training requirements. It should have the capacity for more than one SNFO, instructor NFO, and pilot, operate economically, have high performance capability for ACM, communications-navigation equipment for visual and instrument navigation, airborne radar for both ground mapping and air intercept operation, with repeater scopes for each student station. One aircraft, performing the function of the three aircraft currently being utilized, would improve training and be more effective by lessening the training time required for the SNFO to become familiar with and adjust to three different aircraft. In addition, it may require less flight training to achieve the required behavioral objectives.

A possible alternative, if one aircraft concept is not attainable, is the use of the combination of the T-34C airplane, which recently has been introduced into the pilot Basic Flight Training Phase, and the proposed VTX aircraft, scheduled to replace the T-2 and TA-4. The T-34C could be used effectively to teach familiarization, visual and instrument navigation and visual ACM. Basic radar operation could be taught by the addition of a lightweight radar with weather and ground mapping modes. The VTX aircraft, with the addition of an airborne radar with ground mapping and air-to-air intercept modes, would be effective in teaching tactical navigation, radar navigation, radar air-to-air intercepts, and systems management. Cost of training the NFO could possibly be reduced using this combination of aircraft.

REFERENCES

Advanced Naval Flight Officer Radar Intercept Operator Training Curriculum, CNATRA INST. 1542.42, 30 June 1977.

Advanced Naval Flight Officer Tactical Navigation Training Curriculum, CNATRA INST. 1542.29C, 30 June 1977.

A Technique for Choosing Cost Effective Instructional Delivery Systems, TAEG Report No. 16, Training and Analysis Group, Orlando, Fla, April 1975.

Basic Naval Flight Officer Training Curriculum, CNATRA INST. 1542.54, 6 April 1977.

Bloom, Benjamin S., Taxonomy of Educational Objectives, David McKay Company, Inc., New York, 1956.

Glossary of Navy Education and Training Terminology, CNET INST. 1551.12, September 1976.

Harrison, C. E. and Esperson, R. J., Study: VT-10 Educational Self Audit, June 1974.

Intermediate Naval Flight Officer Training Curriculum, CNATRA INST. 1542.49, 6 June 1977.

Komanski, W. M., Picton, R. E., Advanced Helicopter Flight Training Phase Training Situation Analysis, Technical Report NAVTRAEQUIPCEN IH-260, December 1975.

Komanski, W. M., Picton, R. E., Navy Undergraduate Pilot Training Jet Pipeline Training Situation Analysis, Technical Report NAVTRAEQUIPCEN IH-286, September 1977.

Komanski, W. M., Picton, R. E., Camp, R. W., Training Situation Analysis Study for the T-34C Expanded Primary Flight Training Phase, Technical Report NAVTRAEQUIPCEN IH-238, November 1974.

Krathwohl, D. R., Taxonomy of Educational Objectives, Affective Domain, 1965.

Learning Guidelines and Algorithms for Types of Training Objectives, TAEG Report No. 23, Training and Analysis Group, Orlando, Fla, 32813, March 1976.

Naval Flight Officer Function Analysis, Final Report Commonality of Operational Functions, NAMRL-1194, 2 November 1973.

Report on the Study of Naval Flight Officer Training in the Naval Air Training Command, CNATRA, 15 May 1972.

Revision of Naval Flight Officer Basic Training, Human Resources Research Organization. FR-CD(P) 76-1, April 1976.

Simpson, Elizabeth, The Classification of Objectives, Psychomotor Domain, Research Project No. GE5-85-104, University of Illinois, 1966.

APPENDIX A

NAVTRACOM NFO

TERMINAL LEARNING OBJECTIVES (TLO's)

AND

LEARNING OBJECTIVES (LO's)

BASIC NFO TRAINING
TERMINAL LEARNING OBJECTIVES (TLO's)
AND
LEARNING OBJECTIVES (LO's)

A - Recall the scope of the NATOPS Program as defined by OPNAVINST 3710.7 (Series) and the aircraft NATOPS Flight Manual; standards are prescribed in learning objectives A.1 through A.3.

- A.1 Recall the scope of the NATOPS Program on a written exam to the accuracy of 80%.
- A.2 Recall the sections of the NATOPS Flight Manual on a written exam to the accuracy of 80%.
- A.3 Recall the sections of the NATOPS Pocket Checklist on a written exam to the accuracy of 80%.

B - Recall the organization and scope of Flight Information Publications (FLIP); standards are prescribed in learning objectives B.1 through B.10.

- B.1 Recall the organization and scope of the General Planning Publication (FLIP) on a written exam to the accuracy of 80%.
- B.2 Recall the organization and scope of FLIP Area Planning 1, 1A, 1B on a written exam to the accuracy of 80%.
- B.3 Recall the organization and scope of high altitude en route charts on a written exam to the accuracy of 80%.
- B.4 Recall the organization and scope of the area chart on a written exam to the accuracy of 80%.
- B.5 Recall the organization and scope of the IFR Supplement on a written exam to the accuracy of 80%.
- B.6 Recall the organization and scope of a High Altitude Instrument Procedures on a written exam to the accuracy of 80%.
- B.7 Recall the organization and scope of a Standard Instrument Departure (SID) on a written exam to the accuracy of 80%.
- B.8 Recall the organization and scope of the low altitude en route charts on a written exam to the accuracy of 80%.
- B.9 Recall the organization and scope of Low Altitude Instrument Procedures on a written exam to the accuracy of 80%.
- B.10 Describe the procedures for an en route descent and a radar approach on a written exam to the accuracy of 80%.

C - Recall the scope of Flight Rules and Regulations as defined by OPNAVINST 3710.7 (Series), Federal Aviation Regulations (FAR), Part 91, and the Airman's Information Manual, Part 1; standards are prescribed in learning objectives C.1 through C.3.

C.1 Recall the organization and contents of OPNAVINST 3710.7 (Series) on a written exam to the accuracy of 80%.
C.2 Recall the organization and contents of Federal Aviation Regulations (FAR) Part 91, Subparts A and B on a written exam to the accuracy of 80%.
C.3 Recall the organization and contents of the Airman's Information Manual, Part 1, on a written exam to the accuracy of 80%.

D - State the organization, publications and informative materials which define the Aviation Safety Program; standards are prescribed in learning objectives D.1 and D.2.

D.1 Recall the organization of the Naval Aviation Safety Program as defined in OPNAVINST 3750.6 (Series) on a written exam to the accuracy of 80%.
D.2 Recall associated Naval Aviation Safety Publications on a written exam to the accuracy of 80%.

E - Construct and organize preflight planning data using recommended procedures and FLIP; standards are prescribed in learning objectives E.1 through E.7.

E.1 Prepare a local area chart in the classroom, with the aid of the instructor, using a visual reference chart, without error.
E.2 Demonstrate the ability to use all functions of a CR-2 computer in a classroom on a written exam to the accuracy of 80%.
E.3 Prepare a low-level chart in the classroom, with the aid of an instructor, using a chart, divider, plotter, CR-2 computer, black-felt pen, FLIP AP-1B and local directives to the accuracy of: Fuel: 150 lbs.; Time: 12 seconds; Course: 2°; Plotting: without error.
E.4 Construct a JET LOG using FLIP; destination and alternate data in accordance with OPNAVINST 3710.7 (Series); Fuel: +200 lbs.; service data in accordance with NATOPS Flight Manual requirements.
E.5 Complete a DD-175 using FLIP, a JET LOG, NOTAM Information and DD-175-1, with instructor assistance without error.
E.6 Recognize and interpret significant meteorological conditions on a written exam to the accuracy of 80%.
E.7 Recognize and interpret significant meteorological conditions on a DD-175-1; given a DD-175-1, with instructor assistance, without error.

F - Determine the aircraft status and complete flight records and reports in accordance with OPNAVINST 3710.7 (Series) and OPNAVINST 4790.2 (Series), with the assistance of the flight instructor; standards are prescribed in learning objectives F.1 and F.2.

F.1 Ensure aircraft readiness for flight, with instructor assistance given and aircraft maintenance record during preflight, without error.
F.2 Complete VIDS/MAF's as necessary, with instructor assistance during the preflight and post flight, without error.

G - Recall specified procedures in accordance with the aircraft NATOPS; standards are prescribed in learning objectives G.1 through G.6.

G.1 Recall T-2C aircraft operating limitations, normal operating procedures and flight characteristics, emergency procedures, aircraft servicing, all-weather operations, performance data, and NATOPS Pocket Checklist utilization to the accuracy of 80% on an open and closed book exam.

G.2 Recall specified T-2C aircraft operating limitations during the flight evolution when asked by the pilot, without error.

G.3 Recall T-2C "immediate action" emergency procedures during preflight and post flight, without error.

G.4 Execute a T-2C aircraft inspection during preflight and post flight in accordance with NATOPS.

G.5 Perform all applicable T-2C aircraft checklists during the flight evolution in one or two plane formation in accordance with NATOPS with no items omitted.

G.6 Describe specified acrobatic maneuvers on a written exam to the accuracy of 80%.

H - Maintain the aircraft position using aids to navigation; standards are prescribed in learning objectives H.1 through H.13.

H.1 Recall the theory of operation of radio aids/to navigation on a written exam to the accuracy of 80%.

H.2 Apply standard time and course corrections on a low-level flight, given distance off course and seconds off time, without error.

H.3 Identify the aircraft position during visual meteorological conditions (low-level excluded), meteorological conditions (low-level excluded), using visual reference and Tactical Pilotage Chart within 5 nautical miles.

H.4 Identify aircraft position relative to a TACAN station, given an operable TACAN and FLIP, without error.

H.5 Recite 2-minute prior and mark-on-top procedures in the prescribed format, at each turn point, during instrument flight, without error.

H.6 Intercept, maintain and exit an arc during departure, en route, and approach phases within 2 nautical miles and 5 radials.

H.7 Maintain a course during the departure, en route and approach phases within 5°.

H.8 Execute a TACAN point-to-point during the departure, en route and approach phases within 4 nautical miles.

H.9 State appropriate altitudes during IFR flight as depicted in appropriate publications or as assigned by Air Traffic Control Facilities.

H.10 State the appropriate altitudes during VFR flight in accordance with FLIP, OPNAV and local directives.

H.11 Execute holding entry and pattern procedures during the en route or approach phases, entering at holding airspeed in accordance with Federal Aviation Regulations.

H.12 Describe the appropriate VFR entry and traffic pattern procedures during a VFR arrival, in accordance with FLIP and local directives.

H.13 Determine the aircraft glideslope position, on VFR final approach, using the Fresnel Lens System, with instructor assistance, without error.

I - Evaluate fuel and time estimates, and meteorological conditions in flight; standards are prescribed in learning objectives I.1 through I.3.

I.1 Update fuel and time estimate during instrument flight at each turn point or when ground speed varies one nautical mile per minute from previous measurement, using a JET LOG and CR-2 computer, to the accuracy of fuel: 50 lbs.; time: 1.5 minutes.

I.2 Evaluate updated computations to determine mission completion feasibility during instrument flight, at each turn point or when ground speed varies 1 nautical mile per minute from previous measurement, given a JET LOG, OPNAVINST 3710.7 (Series) fuel requirement, and instructor assistance without error.

I.3 Evaluate observed and forecast meteorological conditions to avoid hazards to flight and arrive at destination or alternate above OPNAV weather minimums given terminal forecast inflight with instructor assistance, without error.

J - Operate and assess the reliability of aircraft systems during the flight evolution, reporting malfunctions to the instructor; standards are prescribed in learning objectives J.1 through J.9.

J.1 Operate the ICS during the flight evolution in accordance with T-2C aircraft NATOPS.

J.2 Operate and assess the reliability of navigation aids during the flight evolution in accordance with T-2C aircraft NATOPS.

J.3 Operate and assess the reliability of UHF radio during the flight evolution in accordance with T-2C aircraft NATOPS.

J.4 Operate and assess the aircraft environmental system during the flight evolution in accordance with the T-2C aircraft NATOPS.

J.5 Operate and assess the reliability of the aircraft fuel transfer system during the flight evolution in one or two plane formation in accordance with T-2C aircraft NATOPS.

J.6 Assess the reliability of the electrical and hydraulic systems during the flight evolution in accordance with T-2C aircraft NATOPS.

J.7 Assess aircraft engine performance during the flight evolution in accordance with T-2C aircraft NATOPS.

J.8 Operate and assess the reliability of the aircraft flight instruments during the flight evolution given barometric pressure in accordance with T-2C aircraft NATOPS, local directives and FLIP.

J.9 Determine degraded aircraft mission capability in the 1D23, given communication and navigation malfunctions to the accuracy of 80%.

K - Transmit and receive identification, position, altitude, and intention in compliance with FAR and local directives as well as tactical doctrines; standards are prescribed in learning objectives K.1 through K.3.

K.1 Communicate with the following agencies: Clearance Delivery, Ground Control, Tower, Departure Control, Center, FSS, Metro, Approach Control, Squadron Base Radio during the flight evolution given appropriate publications and a UHF radio so that 60% of the transmissions need not be repeated.

K.2 Communicate with a wingman during two-plane formation flight via UHF or hand signals so that 75% of transmissions need not be repeated or hand signals repeated only once.

K.3 Communicate with the pilot during the flight evolution using the specified format without error.

L - Describe formation maneuvers in a two-plane flight; standards are prescribed in learning objectives L.1 through L.3.

L.1 Recall standard formations and maneuvers during debrief, given training aids, without error.

L.2 Recall tactical maneuvers during debrief, given training aids, without error.

L.3 Discuss the tactical lookout doctrine during debrief, given training aids without error.

INTERMEDIATE NFO TRAINING
TERMINAL LEARNING OBJECTIVES (TLO's)
AND
LEARNING OBJECTIVES (LO's)

A - Plan a flight, using recommended procedures and FLIP; standards are prescribed in learning objectives A.1 and A.2.

A.1 Prepare a low-level chart using a chart, divider, plotter, CR-2 computer, black felt-tip pen, FLIP AP-1B and local directives to the accuracy of: Fuel: 150 lbs.; Time: 15 seconds; Course: 3°; Plotting: without error.

A.2 Complete a DD-175 using FLIP, a JET LOG, NOTAM information and a DD-175-1, with no more than two errors.

B - Determine aircraft status and complete flight records and reports in accordance with OPNAVINST 3710.7 (Series) and OPNAVINST 4790.2 (Series); standards are prescribed in learning objectives B.1 through B.3.

B.1 Ensure aircraft readiness for flight given an aircraft maintenance record during preflight, without error.
B.2 Complete VIDS/MAF's as necessary during the preflight and post flight, without error.
B.3 Complete parts C and D of a naval aircraft flight record (yellow sheet) during preflight and post flight, without error.

C - Recall specified procedures in accordance with aircraft NATOPS; standards are prescribed in learning objectives C.1 and C.2.

C.1 Perform all applicable T-39D aircraft checklists during the flight evolution in accordance with NATOPS, with no items omitted.
C.2 Describe T-39D aircraft emergency egress procedures, during preflight, in accordance with T-39D NATOPS, without error.

D - Maintain aircraft position using aids to navigation; standards are prescribed in learning objectives D.1 through D.7.

D.1 Intercept, maintain and exit an arc during departure and approach phases to within 1 nautical mile and 3 radials.
D.2 Maintain a course during the departure, en route and approach phases within 3°.
D.3 Execute a TACAN point-to-point during the departure, en route and approach phases within 3 nautical miles.
D.4 Identify designated checkpoints and the target, during low-level flight using Tactical Pilotage Chart to the accuracy of: Turn points: 80%; Intermediate Checkpoints: 50%; Target: 100%.
D.5 Correct the aircraft position during a low-level flight with instructor assistance, given a Tactical Pilotage Chart and aircraft position at least 1 mile off the route centerline or 12 seconds off preflighted time, to the accuracy of: Course: remains within 2 nautical miles of route centerline; Target Time: Within 30 seconds of preflighted time.
D.6 Adjust the preflighted heading and airspeed on a low-level flight with adverse wind effects, to the accuracy of: Course: Remains within 2 nautical miles of route centerline; Target Time: Within 30 seconds of preflighted time.
D.7 Conduct 2-minute prior and mark-on-top procedures in the prescribed format during a low-level flight at each turn point without error.

E - Evaluate fuel and time estimates, and meteorological conditions in flight; standards are prescribed in learning objectives E.1 through E.3.

E.1 Evaluate updated computations to determine mission completion feasibility during instrument flight at each turn point, or when ground speed varies 1 nautical mile per minute from previous measurement; given JET LOG, OPNAVINST 3710.7 (Series) fuel requirements, without error.

E.2 Evaluate the observed and forecast meteorological conditions to avoid hazards to flight and arrive at a destination or alternate above OPNAV weather minimums given terminal forecast while in flight without error.

E.3 Determine the mission completion feasibility during a low-level flight, given mission completion fuel computations to arrive overhead the destination airfield with sufficient fuel remaining to meet OPNAV minimum fuel requirements.

F - Transmit and receive identification, position, altitude, and intention in compliance with FAR and local directives as well as tactical doctrines; standards are prescribed in learning objectives F.1 through F.2.

F.1 Communicate with the following agencies: Clearance Delivery, Ground Control, Tower, Departure Control, Center, FSS, Metro, Approach Control, Squadron Base Radio during the flight evolution given a UHF radio and appropriate publications so that 80% of the transmissions need not be repeated.

F.2 Communicate with a wingman during two-plane formation flight via UHF or hand signals so that 80% of the transmissions need not be repeated.

G - Operate and assess the reliability of the aircraft systems during the flight evolution, reporting malfunctions to the instructor; standards are prescribed in learning objectives G.1 through G.4.

G.1 Operate the ICS during the flight evolution in accordance with T-39D aircraft NATOPS.

G.2 Operate and assess the reliability of the aircraft environmental system during the flight evolution in accordance with T-39D aircraft NATOPS.

G.3 Operate and assess the reliability of the navigation aids during the flight evolution in accordance with T-39D aircraft NATOPS.

G.4 Operate and assess the reliability of the aircraft flight instruments during the flight evolution, given barometric pressure, in accordance with T-39D aircraft NATOPS, local directives and FLIP.

H - Recall designated advanced performance maneuvers and basic fighter maneuvers during debrief; standards are prescribed in learning objectives H.1 and H.2.

H.1 Describe advanced performance maneuvers during debrief, given training aids, without error.
H.2 Describe basic fighter maneuvers and state their applications during debrief, given training aids, without error.

ADVANCED NFO TACTICAL NAVIGATION TRAINING
TERMINAL LEARNING OBJECTIVES (TLO's)
AND
LEARNING OBJECTIVES (LO's)

A - Plan a flight using recommended procedures and FLIP, standards are prescribed in learning objectives A.1 through A.4.

A.1 Prepare a low-level or radar navigation chart using appropriate planning materials and publications to the accuracy of: Fuel: 150 lbs.; Time: 10 seconds; Course: 2°.
A.2 Complete a DD-175 using FLIP and NOTAMS with only one error.
A.3 Complete a DD-175-1 given a telephone, weathervision or in-person weather brief without error.
A.4 Prepare a JET LOG in accordance with flight support lectures without error.
A.5 Construct radar predictions using furnished materials and recommended procedures with 80% accuracy.

B - Maintain aircraft position using navigation aids and visual reference to the ground; standards are prescribed in learning objectives B.1 through B.5.

B.1 Intercept and track a given course during flight given en route charts and publications, workable NAVAIDS, and ATC instructions to the accuracy of 4 nautical miles.
B.2 Intercept and track a given course during flight and trainer evolutions utilizing the installed radar to within 10 nautical miles.
B.3 Intercept and track a given course during low-level flight utilizing visual reference to the ground to the accuracy of 5 nautical miles and 30 seconds.
B.4 Execute turn point procedures during flight or trainer evolutions without error.
B.5 Return the aircraft to planned course during flight or trainer evolutions given charts and en route publications, NAVAIDS, radar, or visual reference to the ground to the accuracy of 4 nautical miles with radar, and 5 nautical miles and 12 seconds visually.

C - Communicate in an aircraft using the radio and intercommunications set (ICS) utilizing standard Navy and Federal Aviation Administration (FAA) terminology; standards are prescribed in learning objectives C.1 and C.2.

C.1 Communicate over the aircraft radios to appropriate controlling agencies utilizing Navy and FAA terminology incidental to and during flight so that the transmission need not be repeated 95% of the time.

C.2 Communicate with embarked crewmembers using ICS systems incidental to and during flight without error.

D - Recall specified procedures in accordance with aircraft NATOPS; standards are prescribed in learning objectives D.1 and D.2.

D.1 Recall aircraft operating limitations, normal procedures and immediate-action emergency procedures on T-39D closed-book exam, during briefs, aircraft preflight, to the accuracy of 80% for exams and without error for briefs, and aircraft preflight.

D.2 Recall aircraft operating limitations, normal procedures, emergency procedures, immediate-action emergency procedures and aircraft systems during TA-4J open and closed-book NATOPS exams; and during briefs and aircraft preflight, to the accuracy of 80% for exams and without error for briefs and preflight.

E - Operate and assess reliability of aircraft systems during flight; standards are prescribed in learning objectives E.1 through E.5.

E.1 Operate and assess the reliability of T-39D aircraft systems, report all malfunctions to the instructor or pilot incidental to or during flight in accordance with NATOPS.

E.2 Operate and assess the reliability of TA-4J aircraft systems, report all malfunctions to the pilot incidental to or during flight in accordance with NATOPS.

E.3 Perform all applicable checklists during flight, when required in accordance with NATOPS, no items omitted.

E.4 Recognize and respond to potentially unsafe situations as they develop during flight given OPNAV, FAA, NATOPS, and local directives without error 90% of the time.

E.5 Operate and assess the reliability of the installed radar during flight evolutions without error.

F - Evaluate progress of the flight in relation to preflight planning data; standards are prescribed in learning objectives F.1 through F.3.

F.1 Avoid hazards to flight by evaluating differences between forecast and observed weather en route, during flight, given instructor assistance without error.

F.2 Determine final destination by evaluating the difference between forecast and developing terminal weather, to land with final destination weather at or above published minimums without error.

F.3 Arrive at a final destination with fuel reserves as prescribed by local directives, given preflight planned fuel and actual fuel remaining, without error.

G - Identify advanced tactical maneuvers and function as a crewmember in a high "G," maneuvering environment; standards are prescribed in learning objectives G.1 through G.5.

G.1 Brief advanced tactical maneuvers as taught during ATM support lectures during preflight brief without error.

G.2 Maintain spatial orientation to recognize maneuvers performed by pilot during flight given sustained high "G" forces without error.

G.3 Maintain orientation outside the cockpit to recognize maneuvers being performed by a bogey aircraft during flight given sustained high "G" forces without error.

G.4 Recommend application of appropriate offensive or defensive maneuvers after assessing tactical situation during flight given a one-on-one controlled engagement, given high "G" forces to the accuracy of 75%.

G.5 Utilize standard, clock-coded lookout doctrine to sight bogey aircraft and call the position to the pilot during flight given a one-on-one controlled engagement, given high "G" forces to the accuracy of $\pm$15° and $\pm$50% in range 80% of the time.

ADVANCED NFO RADAR INTERCEPT OPERATOR (RIO) TRAINING
TERMINAL LEARNING OBJECTIVES (TLO's)
AND
LEARNING OBJECTIVES (LO's)

A - Operate a tactical radar weapons system in the air-to-air environment; standards are prescribed in learning objectives A.1 through A.6.

A.1 Calibrate parameters of the radar display during trainer periods and flight evolutions to the accuracy of: level antenna $\pm$ 1°, Rate of Closure Circle (ROC) level indication $\pm$ 1°, ROC overtake errors $\pm$ 50 knots.

A.2 Manipulate the radar set controls expeditiously in order to obtain descernable radar images during trainer periods and flight evolutions to the accuracy of 80%.

A.3 Differentiate an aircraft radar image from clutter, noise or the altitude line in search or track modes, in trainer and during flight evolutions to the accuracy of 80%.

A.4 Maintain antenna beam centered on radar image (spotlight) or initiate system lock-up as required to maintain contact with the aircraft radar image during radar trainer periods or flights 80% of the time.

A.5 Interpret the radar display to ascertain the bogey's position relative to the fighter aircraft during trainer periods and flight evolutions to the accuracy of ± 2° of azimuth, ± 1° of elevation at 5 miles ± 50 knots of overtake, ± 1 mile outside 10 miles, and 1/2 mile inside 10 miles.

A.6 Assess aircraft radar images to differentiate assigned bogey from other radar returns during radar trainer periods or flights 80% of the time.

B - Intercept bogey aircraft in the airborne environment; standards are prescribed in learning objectives B.1 through B.4.

B.1 Perform sidewinder intercepts in search or track mode in trainer and during flight evolutions to the accuracy of 80%.

B.2 Perform attack-reattack intercepts in search or track mode in trainer and during flight evolutions to the accuracy of 80%.

B.3 Perform conversion intercepts in trainer and during flight evolutions to the accuracy of 80%.

B.4 Perform intercepts versus a bogey of unknown heading in trainer and during flight evolutions to the accuracy of 80%.

C - Communicate in an aircraft using the radio and the intercommunications set (ICS) utilizing standard Navy and Federal Aviation Administration (FAA) terminology; standards are prescribed in learning objectives C.1 and C.2.

C.1 Communicate over the aircraft radios to appropriate controlling agencies utilizing proper Navy and FAA terminology incidental to and during flight so that the transmission need not be repeated 95% of the time.

C.2 Communicate with embarked crewmembers using ICS systems incidental to and during flight without error.

D - Maintain aircraft position using navigation aids and visual reference to the ground; standards are prescribed in learning objectives D.1 through D.6.

D.1 Intercept and track a given course during flight given en route charts and publications, workable NAVAIDS, and any instructions for holding or deviation to the accuracy of 4 nautical miles.

D.2 Perform point-to-point navigation during flight given en route charts and publications and workable NAVAIDS to the accuracy of ± 2 nautical miles.

D.3 Maintain a given arc during flight given workable NAVAIDS to the accuracy of ± 1 nautical mile.

D.4 Maintain appropriate profiles for climbs, descents and level flight during flight given preflight data, en route charts and publications and workable NAVAIDS, to the accuracy of ± 10 knots or .01 mach number.

D.5 Determine geographic position by visual reference to the outside environment during flight given topographical charts without error.

D.6 Maintain visual flight rules during flight without error.

E - Evaluate progress of the flight in relation to preflight planning data; standards are prescribed in learning objectives E.1 through E.3.

E.1 Avoid hazards to flight by evaluating differences between forecast and observed weather en route, during flight, given instructor assistance without error.

E.2 Determine final destination by evaluating the difference between forecast and developing terminal weather, to land with final destination weather at or above published minimums, without error.

E.3 Arrive at a final destination with fuel reserves as prescribed by local directives, given preflight planned fuel and actual fuel remaining, without error.

F - Recall specified procedures in accordance with aircraft NATOPS; standards are prescribed in learning objectives F.1 and F.2.

F.1 Recall aircraft operating limitations, normal procedures and immediate-action emergency procedures on T-39D closed-book exam, during briefs, aircraft preflight, to the accuracy of 80% for exams and without error for brief, and aircraft preflight.

F.2 Recall aircraft operating limitations, normal procedures, emergency procedures, immediate-action emergency procedures and aircraft systems during TA-4J open and closed-book NATOPS exams; and during briefs and aircraft preflight, to the accuracy of 80% for exams and without error for briefs and preflight.

G - Operate and assess reliability of aircraft systems during flight; standards are prescribed in learning objectives G.1 through G.4.

G.1 Operate and assess the reliability of T-39D aircraft systems, report all malfunctions to the instructor or pilot incidental to or during flight in accordance with NATOPS.

G.2 Operate and assess the reliability of TA-4J aircraft systems, report all malfunctions to the pilot incidental to or during flight in accordance with NATOPS.

G.3 Utilize all applicable checklists during flight, when required in accordance with NATOPS, no items omitted.

G.4 Recognize and respond to potentially unsafe situations as they develop during flight given OPNAV, FAA, NATOPS, and local directives.

H - Identify advanced tactical maneuvers and function as a crew member in a high "G," maneuvering environment; standards are prescribed in learning objectives H.1 through H.5.

H.1 Describe advanced tactical maneuvers as taught during ATM support lectures during preflight brief without error.

H.2 Maintain spatial orientation to recognize maneuvers performed by pilot during flight given sustained high "G" forces without error.

H.3 Maintain orientation outside the cockpit to recognize maneuvers being performed by a bogey aircraft during flight given sustained high "G" forces without error.

H.4 Recommend application of appropriate offensive or defensive maneuvers after assessing tactical situation during flight given a one-on-one controlled engagement, given high "G" forces to the accuracy of 75%.

H.5 Utilize standard, clock-coded lookout doctrine to sight bogey aircraft and call the position to the pilot during flight given a one-on-one controlled engagement, given high "G" forces to the accuracy of $\pm$ 15° and $\pm$ 50% in range 80% of the time.

A P P E N D I X B

SORT OF SPECIFIC BEHAVIORAL OBJECTIVES

TO DOMAIN AND LEVEL

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
1	ACTION: Perform pre-flight inspection and determine aircraft flight status. CONDITIONS: Day/night, aircraft records available for inspection (yellow sheet), pre-flight inspection checklist available. STANDARDS: Note/analyze previous maintenance descrepancies, using pre-flight inspection checklist, visually inspect aircraft for safe flight conditions checking all items on checklist without assistance and without error.	P	4
1.1	ACTION: Explain the use of NATOPS checklists relative to aircraft operations. CONDITIONS: Aircraft NATOPS checklists available. STANDARDS: Explain verbally and/or in writing, without assistance and with 100% accuracy.	C	2
1.2	ACTION: Relate the importance of using NATOPS publications/checklists to aircraft performance and safety. CONDITIONS: Accepts the importance of use of NATOPS checklists. STANDARDS: Explain verbally and/or in writing, without assistance and without error.	A	3
1.2.1	ACTION: Describe the organization and content of the aircraft NATOPS publications, relating to the items listed below. A. Aircraft Description B. Systems C. Servicing D. Operational Limitation E. Operating Procedures F. Flight Procedures and Characteristics G. All Weather Operation H. Communication Equipment I. Performance Data J. Weapon System K. Tactics CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe in sufficient detail to recognize the NATOPS operational utilization, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
1.2.2	ACTION: Describe the configuration of the aircraft* and distinguishing features. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing without assistance and with 100% accuracy.	C	2
1.2.3	ACTION: Describe the aircraft servicing requirements. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing without assistance and with 100% accuracy.	C	2
1.2.4	ACTION: State the safety precautions to be observed in and around the aircraft during pre-flight inspection. CONDITIONS: Aircraft NATOPS available. STANDARDS: State verbally and/or in writing without assistance and with 90% accuracy.	C	1
1.2.5	ACTION: Identify the aircraft systems and components to be checked during pre-flight inspection. CONDITIONS: Aircraft NATOPS available. STANDARDS: Identify verbally and/or in writing without assistance and with 90% accuracy.	C	1
2	ACTION: Perform before entering cockpit checks. CONDITIONS: Day/night, aircraft pre-flight completed and determined ready for flight; before entering cockpit checklist available; aircraft cockpit or simulated cockpit available. STANDARDS: Pre-flight ejection seat and remove prescribed pins, IAW NATOPS check-list without assistance and without errors.	P	(4)5
2.1	ACTION: Explain the aircraft normal/ emergency escape/ejection system operation. CONDITIONS: IAW Aircraft NATOPS. STANDARDS: Describe verbally and/or in writing without assistance and with 100% accuracy.	C	2

*Aircraft to which NFO is assigned.

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
3	ACTION: Perform after entering cockpit checks. CONDITIONS: Day/night, aircraft or simulated aircraft cockpit available; after entering cockpit checklist available. STANDARDS: Strap in, connect all leads, complete after entering cockpit checklist without assistance and IAW NATOPS, without errors.	P	(4)5
3.1	ACTION: Locate and identify within the aircraft cockpit, the associated system instruments, displays, indicators, and controls listed below. A. Engine(s) B. Engine(s) Start C. Fuel D. Electrical E. Hydraulic F. Flight Control G. Landing Gear H. Brake I. Pitot and Static J. Air Conditioning and Pressurization K. Oxygen L. Angle-of-Attack M. Anti-Ice and Defrost N. Fire Warning O. Communications P. Navigation Q. Radar R. Escape S. Lighting T. Canopy CONDITIONS: Aircraft cockpit available. STANDARDS: Locate visually and identify each item relative to each system without assistance, and with only minor errors.	P	(4)5
3.1.1	ACTION: Explain the function and operation of each aircraft system/equipment listed below. A. Engine(s) B. Engine(s) Start C. Fuel D. Electrical E. Hydraulic F. Flight Control G. Landing Gear H. Brake I. Pitot and Static	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
3.1.1 (Cont.)	J. Air Conditioning and Pressurization K. Oxygen L. Angle-of-Attack M. Anti-Ice and Defrost N. Fire Warning O. Communication (1) ICS (2) VHF/UHF (3) UHF Auxiliary (4) IFF/SIF P. Navigation (1) Inertial Navigation System (INS) (2) Doppler (3) Radar Altimeter (4) Air Data Computer (5) ACLS (6) Radar (7) ILS Q. Radar R. Escape S. Lighting T. Canopy CONDITIONS: IAW aircraft NATOPS STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.		
4	ACTION: Test aircraft communications/ navigation/radar system equipment for correct operation. CONDITIONS: Aircraft cockpit available. NATOPS checklist available. STANDARDS: Initialize equipment, determine correct operation, IAW equipment checklist procedures, without assistance and without errors.	P	(4)5
5	ACTION: Assist pilot in performing the aircraft pre-start inspection procedures. CONDITIONS: Day/night, aircraft available; pre-start checklist available. STANDARDS: At pilot request, complete pre-start checklist, using challenge/reply, without assistance and without errors.	P	(4)5
5.1	ACTION: Describe the aircraft pre-start procedures. CONDITIONS: NATOPS checklist available.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
5.1 (Cont.)	STANDARDS: Describe verbally and/or in writing, IAW NATOPS, without assistance and with 90% accuracy.		
5.2	ACTION: Identify the aircraft systems and controls to be checked during the pre-start procedures. CONDITIONS: NATOPS available. STANDARDS: Identify verbally and/or in writing IAW NATOPS without assistance and with 90% accuracy.	C	2
5.3	ACTION: Describe the procedures utilized and safety precautions observed prior to engine(s) start. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing without assistance and with 90% accuracy.	C	2
5.4	ACTION: Relate the importance of using the checklist procedures during aircraft ground operation. CONDITIONS: Sees the value in using checklists. STANDARDS: State verbally and/or in writing without assistance and without error.	A	3
6	ACTION: Operate the ICS to communicate with pilot/crewmember as required during ground/flight operations. CONDITIONS: Aircraft communications panel available. STANDARDS: Set-up, test and operate IAW NATOPS, squadron doctrine, and pre-briefed procedures, without assistance and with the clarity which will not require repeating procedures.	P	(4)5
6.1	ACTION: Explain aircraft normal and emergency ICS mode selection. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing without assistance and with 100% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
6.2	ACTION: Explain the use of the aircraft Hot, Cold and Call mike selection switch located on the communication panel. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing without assistance and with 100% accuracy.	C	2
7	ACTION: Assist pilot in performing aircraft engine(s) start. CONDITIONS: Day/night, aircraft available; start checklist available. STANDARDS: At pilot request, complete start procedure checklist, monitor start indications, communicate to pilot when abnormal indications appear, without assistance and without error.	C	(3)4
7.1	ACTION: Assess aircraft engines operation during start. CONDITIONS: Aircraft NATOPS start checklist available; aircraft available. STANDARDS: Interpret engine instruments for normal/abnormal indications, IAW NATOPS limitations, advise pilot as necessary, without assistance and with 90% accuracy.	C	3
7.2	ACTION: Explain the aircraft engine(s) normal/abnormal indications during engine(s) start. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, IAW NATOPS, without assistance and with 90% accuracy.	C	2
7.3	ACTION: Describe the procedures to be implemented when abnormal aircraft engine(s) start is indicated. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, IAW NATOPS, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
8	ACTION: Perform post-start COM/NAV system cockpit checks. CONDITIONS: Day/night, aircraft available; post-start condition with engine operation normal; post-start checklist available. STANDARDS: Set-up COM/NAV equipment, insert flight parameters IAW NATOPS procedures; complete post-start checklist without assistance and without error.	P	(4)5
9	ACTION: Perform communications during ground and flight operations. CONDITIONS: Aircraft available; NWP-41A, local instructions available. STANDARDS: Conduct all communications IAW Navy regulations/instructions without assistance and with the clarity requiring no repetition.	P	(4)5
9.1	ACTION: Operate aircraft UHF/VHF radio. CONDITIONS: Standard UHF/VHF installation in aircraft. STANDARDS: Set-up/control/utilize UHF/VHF aircraft equipment IAW NATOPS, without assistance and without error.	P	(4)5
9.2	ACTION: Operate aircraft IFF/SIF equipment. CONDITIONS: Standard IFF/SIF installation in aircraft. STANDARDS: Set-up/control/utilize IFF/SIF aircraft equipment IAW NATOPS, without assistance and without error.	P	(4)5
9.2.1	ACTION: Explain the format and terms utilized in executing radio voice reports during aircraft ground and air operations. CONDITIONS: NWP-41A available. STANDARDS: Explain verbally and/or in writing IAW NWP-41A without assistance and with 90% accuracy.	C	2
9.2.2	ACTION: Describe standardized voice reporting procedures between aircraft and controlling agencies. CONDITIONS: NWP-41A available. STANDARDS: Explain verbally and/or in writing IAW NWP-41A without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
9.2.3	ACTION: Describe the utilization of the aircraft IFF/SIF system. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing IAW NATOPS without assistance and with 90% accuracy.	C	2
10	ACTION: Perform visual communications. CONDITIONS: Day/night, under varying conditions; i.e., ground operations, tower, in-flight, formation. STANDARDS: Initiate/identify/respond to visual signals between ground personnel, tower, other aircraft IAW NWP-41A without assistance and with 90% accuracy.	P	4
10.1	ACTION: Explain the aircraft visual signals used for day/night, ground/airborne operations and interaction required to communicate with: A. Ground Personnel B. Control Tower (Ground and Airborne Operation) C. Aircraft-to-Aircraft CONDITIONS: NWP-41A available. STANDARDS: Explain verbally and/or in writing, IAW NWP-41A without assistance and with 90% accuracy.	C	2
10.2	ACTION: Describe the standard configurations of lights used in airfield lighting and encountered during night operations. CONDITIONS: NWP-41A available. STANDARDS: Describe verbally and/or in writing, IAW NWP-41A without assistance and with 90% accuracy.	C	2
11	ACTION: Assist pilot in performing aircraft taxi, and obtaining taxi clearance. CONDITIONS: Local course rules; aircraft UHF/VHF available. STANDARDS: Obtain clearance and advise pilot of any obstructions/hazards, during taxi without assistance and without error.	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
11.1	ACTION: Relate the importance of using and adhering to the local course rules during taxi and flight. CONDITIONS: Sees the value of the local course rules, Squadron Doctrine and NATOPS. STANDARDS: Explain verbally and/or in writing the relationship of the adherence to local course rules and flight safety, without assistance and without error.	A	3
11.2	ACTION: Communicate to pilot any safety hazards during taxi. CONDITIONS: Day/night, taxiing aircraft. STANDARDS: Execute correct scan patterns, advise pilot of any obstructions/hazards, during taxi to crew and aircraft safety. Identify to pilot hazardous conditions without assistance and without error.	P	5
12	ACTION: Perform the takeoff checklist. CONDITIONS: Day/night, VFR/IFR aircraft ready for takeoff, takeoff checklist available. STANDARDS: Complete takeoff checklist using challenge/reply system with pilot, without assistance and without deviations.	P	(4)5
12.1	ACTION: Describe systems to be checked in the completion of pre-takeoff procedures. CONDITIONS: NATOPS checklist available. STANDARDS: Describe verbally and/or in writing systems to be checked for "go" status, without assistance and with 100% accuracy.	C	2
12.2	ACTION: Communicate request for takeoff clearance. CONDITIONS: UHF/VHF radio available, aircraft ready for takeoff, day/night, VFR/IFR. STANDARDS: Conduct the required communication, using standardized format, correct frequency, without assistance and with the clarity requiring no repetition.	P	(4)5
12.3	ACTION: Relate the importance of using the correct pre-takeoff checklist procedures. CONDITIONS: See the relationship between correct procedures to aircraft and crew safety.	A	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
12.3 (Cont.)	STANDARDS: Explain verbally and/or in writing without assistance and without error.		
12.4	ACTION: Relate the importance of observing the aircraft operating limitations and restrictions during all ground/flight operations. CONDITIONS: IAW NATOPS; See the relationship between observing aircraft limitations to aircraft/crew safety. STANDARDS: Explain verbally and/or in writing without assistance and without error.	A	3
13	ACTION: Monitor aircraft takeoff. CONDITIONS: Day/night, VFR/IFR, shorebased; aircraft available. STANDARDS: Correctly interpret all cockpit displays, recognize all critical cues, advise pilot as required, without assistance and without error.	C	3
13.1	ACTION: Describe the aircraft systems/controls exercised during an aircraft takeoff. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
14	ACTION: Perform after takeoff communications. CONDITIONS: UHF/VHF aircraft equipment available. Day/night, VFR/IFR. STANDARDS: Conduct all communications IAW Navy regulations/instructions, without assistance and with the clarity requiring no repetition.	P	(4)5
15	ACTION: Perform the correct scan pattern during takeoff. CONDITIONS: Day/night, VFR/IFR, shorebased, aircraft available. STANDARDS: Use the correct scan pattern, without assistance and only minor deviations.	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
16	ACTION: Communicate to pilot aircraft systems malfunctions listed below: A. Engines B. Fuel C. Electrical D. Hydraulic E. Oxygen F. Fire Warning G. Angle-Of-Attack H. Canopy I. Anti-Ice and Defrost J. Radar K. Communication L. Navigation M. Air Conditioning and Pressurization N. Pitot and Static O. Flight Control System P. Escape Q. Landing Gear R. Lighting CONDITIONS: Aircraft available, STANDARDS: Correctly recognize an aircraft system malfunction and communicate information to pilot with 90% accuracy.	P	(4)5
16.1	ACTION: Assess the aircraft systems for normal/abnormal operation by interpretation of the system indicators/displays, as listed below. A. Engines B. Fuel C. Electrical D. Hydraulic E. Oxygen F. Fire Warning G. Angle-Of-Attack H. Canopy I. Anti-Ice and Defrost J. Radar K. Communication L. Navigation M. Air Conditioning and Pressurization N. Pitot and Static O. Flight Control System P. Escape Q. Landing Gear R. Lighting	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
16.1 (Cont.)	CONDITIONS: Aircraft available. STANDARDS: Analyze systems indications, determine normal/abnormal system operation by interpreting indication/displays with 90% accuracy.		
16.1.1	ACTION: Explain aircraft systems malfunctions. CONDITIONS: NATOPS available. STANDARDS: Explain verbally and/or in writing aircraft system operation in sufficient detail to be able to diagnose system malfunctions, without assistance and with 90% accuracy.	C	2
17	ACTION: Assist and/or perform the correct procedures in response to a ground/in-flight emergency. CONDITIONS: Aircraft operation; ground/flight emergencies listed in the aircraft NATOPS. STANDARDS: Assist and/or perform the ground/flight emergency procedures IAW NATOPS without assistance, and with only minor deviations which will not jeopardize aircraft and crew safety.	P	(3)4
17.1	ACTION: Describe the ground/in-flight emergencies listed in the aircraft NATOPS. CONDITIONS: NATOPS available. STANDARDS: Describe verbally and/or in writing the ground/in-flight emergencies, without assistance and with 90% accuracy.	C	2
17.2	ACTION: Explain the correct procedures to be implemented for each ground-in-flight emergency listed in the aircraft NATOPS. CONDITIONS: NATOPS checklists available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
17.3	ACTION: Relate the importance of performing the correct course of action during an aircraft emergency. CONDITIONS: See the relationship between the correct course of action and aircraft/crew safety/survival. STANDARDS: Explain verbally and/or in writing without assistance and without error.	A	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
18	ACTION: Assist and/or perform the correct procedures for each type of takeoff emergency listed in the aircraft NATOPS. CONDITIONS: Aircraft available, day/night, VFR/IFR. STANDARDS: Assist and/or perform the emergency procedures IAW NATOPS without assistance and with only minor deviations.	P	(3)4
18.1	ACTION: Explain the correct procedure to be implemented for each type of takeoff emergency listed in the aircraft NATOPS. CONDITIONS: NATOPS available. STANDARDS: Explain verbally and/or in writing IAW NATOPS, without assistance and with 90% accuracy.	C	2
18.2	ACTION: Describe the procedures utilized and safety precautions observed in the execution of an aborted takeoff. CONDITIONS: NATOPS available. STANDARDS: Explain verbally and/or in writing IAW NATOPS, without assistance and with 90% accuracy.	C	2
18.3	ACTION: Describe the communications to be executed during the abort procedure. CONDITIONS: NATOPS available. STANDARDS: Describe verbally and/or in writing IAW NATOPS, without assistance and with 90% accuracy.	C	2
18.4	ACTION: Relate the importance of performing the abort procedures IAW NATOPS to crew and aircraft safety. CONDITIONS: Accepts the importance of following NATOPS procedures. STANDARDS: Describe verbally and/or in writing, without assistance and without error.	A	3
19	ACTION: Perform, if an emergency situation warrants, ejection from aircraft. CONDITIONS: Aircraft available. STANDARDS: Perform ejection from aircraft IAW NATOPS procedures without assistance and without error.	P	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
19.1	ACTION: Describe the ejection procedures utilized during emergency exit from aircraft. CONDITIONS: Describe verbally and/or in writing, IAW NATOPS, without assistance and with 90% accuracy.	C	2
19.2	ACTION: Relate the importance of using the correct ejection procedures to crew safety. CONDITIONS: Sees the importance of using the correct NATOPS procedures. STANDARDS: Describe verbally and/or in writing the ejection procedures IAW NATOPS procedures, without assistance and without error.	A	3
19.2.1	ACTION: Explain the features and use of the aircraft ejection seat. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, IAW NATOPS, without assistance and with 100% accuracy.	C	2
19.2.2	ACTION: Explain the aircraft normal and emergency escape/ejection systems. CONDITIONS: Aircraft NATOPS available. STANDARDS" Explain verbally and/or in writing, IAW NATOPS, without assistance and with 100% accuracy.	C	2
19.2.3	ACTION: Describe the aircraft emergencies which require ejection from the aircraft. CONDITIONS: NATOPS available. STANDARDS: Describe verbally and/or in writing, IAW NATOPS, without assistance and with 100% accuracy.	C	2
20	ACTION: Perform the correct scan patterns in the execution of transition flight, listed below. A. Initial Climb-To-Altitude B. Straight and Level Flight C. Vertical, Climbing and Descent Maneuvers D. Turn Maneuvers E. Slow Flight F. Speed Changes CONDITIONS: VMC/IMC/aircraft in-flight. STANDARDS: Perform inside/outside/time-sharing scan to aircraft displays, and inside the aircraft specific objects	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
20 (Cont.)	outside the aircraft observing relative position, rate of closure, etc., without assistance and with only minor deviations.		
20.1	ACTION: Relate the importance of utilizing all elements of scan to aircraft and crew safety. CONDITIONS: Realize importance of correct flight scanning techniques. STANDARDS Be able to quickly and accurately identify, classify and determine specific objects for their presence, rate of closure, bearing, and distance without assistance and without error.	A	3
21	ACTION: Monitor in-flight parameters to determine aircraft attitude/altitude/speed, during aircraft transition listed below. A. Initial Climb To Altitude (ICA) B. Straight and Level Flight C. Vertical, Climbing and Descent Maneuvers D. Turn Maneuvers E. Slow Flight F. Speed Changes CONDITIONS: VMC/IMC aircraft in-flight. STANDARDS: Correctly interpret cockpit displays, monitor all relevant instrument/ displays; recognize critical cues, without assistance and with 90% accuracy.	C	(3)4
21.1	ACTION: Describe each of the transition maneuvers, listed below. A. Initial Climb To Altitude (ICA) B. Straight and Level Flight C. Vertical, Climbing and Descent Maneuvers D. Turn Maneuvers E. Slow Flight F. Speed Changes CONDITIONS: NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
21.1.1	ACTION: Explain the aerodynamic principles of the aircraft performance as effected by speed. CONDITIONS: Technical Publications. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
21.1.2	ACTION: Describe airspeed and measurement in the aircraft. CONDITIONS: Technical Publications. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
21.1.3	ACTION: Explain the effects of aircraft configuration on climb-and-glide performance (i.e., lowering gear, external stores, flaps). CONDITIONS: IAW NATOPS STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
21.1.4	ACTION: Explain climb-and-glide angles to aircraft angle-of-attack indication. CONDITIONS: IAW NATOPS STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
21.1.5	ACTION: Explain the contribution to aircraft lateral stability of the following: A. Wing (Dihedral) B. Fuselage C. Vertical Stabilizer D. Flaps E. Power Increase F. Airspeed Decrease CONDITIONS: IAW NATOPS STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
22	ACTION: Monitor aircraft flight parameters to determine entry into and recovery from stalls as listed below. A. Power Off B. Landing Configuration C. Steep Turn D. Break Turn E. Approach Turn CONDITIONS: Aircraft in-flight. STANDARDS: Correctly interpret aircraft attitude, displays; recognize critical cues, without assistance and with 90% accuracy.	C	3
22.1	ACTION: Describe the indications signaling the entry into stalls listed below A. Power Off B. Landing Configuration C. Steep Turn D. Break Turn E. Approach Turn CONDITIONS: NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
22.1.1	ACTION: Explain the various factors affecting lift and drag in turning flight, stalls and departed flight. CONDITIONS: NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
22.1.2	ACTION: Explain why control inputs are critical during high angle-of-attack flight and could cause departure from controlled flight. CONDITIONS: NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
22.1.3	ACTION: State the critical angle-of-attack for the aircraft in a clean and dirty configuration. CONDITIONS: NATOPS available. STANDARDS: State verbally and/or in writing, without assistance and with 90% accuracy.	C	1

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
22.2	ACTION: Explain why a crew must eject at critical altitude, when aircraft is in departed flight. CONDITIONS: NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 100% accuracy.	C	2
23	ACTION: Monitor aircraft recovery from the following: A. Spins B. Departed Flight CONDITIONS: Aircraft in flight. STANDARDS: Correctly interpret aircraft attitude, displays, recognize critical cues, without assistance and with 90% accuracy.	C	3
23.1	ACTION: Relate the importance of recognizing the cause and effect of spins/departed flight. CONDITIONS: Relates to aircraft and crew safety. STANDARDS: State verbally and/or in writing, without assistance and without error.	A	3
23.2	ACTION: Describe the procedures used to determine if the aircraft is in a spin/departed flight. CONDITIONS: NATOPS available. STANDARDS: Describe verbally and/or in writing, and with 90% accuracy.	C	2
23.2.1	ACTION: Explain how departed flight can occur from both high and low airspeed. CONDITIONS: NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
24	ACTION:: Monitor the execution of confidence maneuvers listed below: A. Wingover B. Barrel Roll C. Loop D. Half Cuban Eight E. Immelman F. Aileron Roll G. Split S CONDITIONS: Aircraft in-flight. STANDARDS: Correctly interpret aircraft attitudes, displays, recognize critical cues, without assistance and with 90% accuracy.	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
24.1	ACTION: Describe each of the confidence maneuvers listed below. A. Wingover B. Barrel Roll C. Loop D. Half Cuban Eight E. Immelman F. Aileron Roll G. Split S CONDITIONS: NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
24.2	ACTION: Relate that confidence (aerobatic) maneuvers are the basis for ACM and develop aircrew confidence in the aircraft cockpit environment of extreme pitch and bank. CONDITIONS: Sees the value of adjusting to a high "G" environment. STANDARDS: Describe verbally and/or in writing, without assistance and without error.	A	3
24.2.1	ACTION: Relate climb-and-glide angles to angle-of-attack. CONDITIONS: NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	3
24.2.2	ACTION: Explain the relationship between acceleration, gross weight, and airspeed and their affect on aircraft performance. CONDITIONS: IAW NATOPS STANDARDS: Explain verbally and/or in writing and with 90% accuracy.	C	2
24.2.3	ACTION: Explain the terms, listed below, which relate to aircraft performance. A. Load B. Load Factor C. Load Limit Factor D. Ultimate Load Factor CONDITIONS: IAW NATOPS STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
24.2.4	ACTION: Relate the importance of understanding the mechanism and limitations of the physiological system of the aircrew as part of the overall flight system. CONDITIONS: BUMED data, OPNAVINST 3710.7 STANDARDS: Describe verbally and/or in writing without assistance and with 90% accuracy.	C	3
25	ACTION: Perform time-sharing scan to determine specific objects/targets/aircraft, relative to own aircraft. CONDITIONS: During all regimes of aircraft flight. STANDARDS: Utilize all elements of time-sharing scan to quickly and accurately identify, classify specific objects for their presence, rate of closure, and relative distance, relative to own aircraft, without assistance and without error.	P	(3)4
25.1	ACTION: Communicate to pilot the visual acquisition of friendly/unfriendly aircraft. CONDITIONS: Aircraft in flight. STANDARDS: Operate ICS, communicate with pilot without assistance and without error.	P	4
25.1.1	ACTION: Describe the standard clock coded look-out doctrine that is used to identify other aircraft in the vicinity of own aircraft. CONDITIONS: NWP-41A available. STANDARDS: Describe verbally and/or in writing without assistance and with 100% accuracy.	C	2
25.1.2	ACTION: Explain the factors that affect time-sharing scan pattern. CONDITIONS: BUMED data available. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	2
26	ACTION: Perform correct aircraft in distress procedures. CONDITIONS: NATOPS checklists available. STANDARDS: Perform the procedures, including required communication IAW NATOPS checklist without assistance and without error.	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
26.1	ACTION: Relate the importance of performing the correct "aircraft in distress" and "Lost Plane" procedures to aircraft and/or crew safety. CONDITIONS: Aircrew in distress during flight, NATOPS checklist available. STANDARDS: Describe verbally and/or in writing without assistance and without error.	A	3
26.1.1	ACTION: Describe the aircraft in distress, and lost plane procedure. CONDITIONS: NATOPS checklist available. STANDARDS: Describe verbally and/or in writing without assistance and with 100% accuracy.	C	2
27	ACTION: Monitor the aircraft landing. CONDITIONS: Day/night, VFR, aircraft in-flight. STANDARDS: Correctly interpret all cockpit displays; recognize all critical cues; advise pilot as required, without assistance and without error.	C	3
27.1	ACTION: Perform the landing checklist procedures. CONDITIONS: Day/night, VFR, aircraft in-flight; NATOPS checklist available. STANDARDS: Perform the checklist procedures IAW NATOPS, using challenge/reply without assistance and without error.	P	(4)5
27.2	ACTION: Execute the prior to landing communication procedures. CONDITIONS: Day/night, VFR, aircraft in-flight. STANDARDS: Execute the required landing communication IAW Navy Regulations, without assistance and with clarity which requires no repetition.	P	(4)5
27.3	ACTION: Describe the procedures to be utilized and safety precautions to be observed during landing. CONDITIONS: NATOPS checklist available; aircraft in-flight. STANDARDS: Describe verbally and/or in writing without assistance and with 100% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
27.4	ACTION: Relate the importance of performing the correct procedures during a landing emergency. CONDITIONS: See the relationship between correct procedures to aircraft/crew safety. STANDARDS: Describe verbally and/or in writing without assistance and without error.	A	3
28	ACTION: Monitor the aircraft engine(s) shut-down procedures. CONDITIONS: NATOPS checklist available, aircraft on ground. STANDARDS: Correctly interpret all cockpit displays, advise pilot as required, without assistance and without error.	C	3
28.1	ACTION: Describe the engine(s) shut-down procedures utilized and safety precautions observed. CONDITIONS: NATOPS checklist available. STANDARDS: Describe verbally and/or in writing, IAW NATOPS, without assistance and with 100% accuracy.	C	2
28.2	ACTION: Identify the aircraft systems to be checked and deactivated in the execution of engine(s) shut-down. CONDITIONS: NATOPS checklist available; aircraft available. STANDARDS: Identify verbally and/or in writing IAW NATOPS, without assistance and with 100% accuracy.	C	2
29	ACTION: Perform the secure aircraft/ post-flight inspection. CONDITIONS: NATOPS checklist available; day/night, aircraft on ground. STANDARDS: Perform inspection IAW NATOPS checklist, without assistance and without error.	P	4
29.1	ACTION: Describe the secure aircraft/post-flight inspection procedures. CONDITIONS: NATOPS checklist available. STANDARDS: Describe verbally and/or in writing IAW NATOPS, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
29.2	ACTION: After post-flight inspection determine and record aircraft flight status. CONDITIONS: "Yellow Sheet" available, post-flight inspection completed. STANDARDS: Record flight status, discrepancies on "yellow sheet" without assistance and without error.	C	3
30	ACTION: Adjust to the limitations of night vision during night flight. CONDITIONS: Night, aircraft in-flight. STANDARDS: Adjust to the hazards of spatial disorientation, optical illusion and vertigo which may be encountered during night aircraft operations, without assistance and with only minor deviations which will not jeopardize flight safety.	C	(2)3
30.1	ACTION: Explain the difference/variations in operating the aircrafting procedures and safety precautons to be observed at night versus day. CONDITIONS: Night flight operations. STANDARDS: Explain verbally and/or in writing IAW NATOPS, without assistance and with 90% accuracy.	C	2
30.2	ACTION: Describe the procedures and techniques utilized to alleviate the effects of limited night vision autokinesis, and vertigo. CONDITIONS: BUMED publications available. STANDARDS: Describe verbally and/or in writing IAW BUMED publications, without assistance and with 90% accuracy.	C	2
30.3	ACTION: Relate the importance of the aircrew's reduced ability to detect relative motion due to reduced depth perception during night flight operation. CONDITIONS: See the relationship between correct procedures and aircraft/crew safety. STANDARDS: Explain verbally and/or in writing IAW BUMED publications, without assistance and with 90% accuracy.	A	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
30.3.1	ACTION: Explain night flying physiology related to night vision autokinesis and vertigo. CONDITIONS: BUMED publications available. STANDARDS: Explain verbally and/or in writing IAW BUMED publications, without assistance and with 90% accuracy.	C	2
31	ACTION: Navigate using visual navigation techniques during cross-country flight. CONDITIONS: Day/night, VFR, aircraft in-flight. STANDARDS: Navigate point-to-point to arrive at each checkpoint within ± 5 minutes of ETA.	P	4
31.1	ACTION: Determine aircraft position by visual reference to landmarks and charts. CONDITIONS: Day/night, VFR, aircraft in-flight. STANDARDS: Navigate point-to-point to arrive at each checkpoint within ± 5 minutes of ETA.	C	3
31.2	ACTION: Interpret aeronautical charts, translate symbols and geographic features to ground objects. CONDITIONS: Day/night, VFR, aircraft in-flight. STANDARDS: Interpret to an exact set of coordinates without assistance and without error.	C	3
31.3	ACTION: Locate an exact set or series of coordinates on an aeronautical chart to determine flight checkpoints. CONDITIONS: Aeronautical charts available. STANDARDS: Locate physically, without assistance and with 100% accuracy.	C	3
31.4	ACTION: Determine by visual reference, wind direction and velocity during flight. CONDITIONS: Day, VFR, aircraft in-flight. STANDARDS: Determine wind, without assistance, within 10 knots and 15 degrees.	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
31.5	ACTION: Solve in-flight problems to retain/regain preplanned ETA. CONDITIONS: Given a visual position, day/night, VFR, aircraft in-flight. STANDARDS: Solve problem for correction to airspeed, and heading to retain/regain estimated ETA, without assistance and with 90% accuracy.	C	3
31.5.1	ACTION: Use a navigation computer and appropriate charts to determine the following: A. Wind Speed B. Ground Speed C. Drift/Drift Correction D. Time-to-Ground Reference Points CONDITIONS: Point-to-point fix, computer, charts available. STANDARDS: Use computer to determine wind speed, ground speed, drift/drift correction, and time-to-ground reference points without assistance and with 90% accuracy.	C	3
31.5.2	ACTION: Describe how to formulate a course, and ETA for a predetermined destination. CONDITIONS: Departure point and destination given. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
31.5.3	ACTION: Explain the procedures for correcting a course to regain planned ETA. CONDITIONS: Present position and known destination given. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	2
31.5.4	ACTION: Explain the following: A. How to interpret the information on an aeronautical chart. B. How to identify specific coordinates on charts. C. The specifics of map reading. CONDITIONS: Aeronautical charts available. STANDARDS: Explain verbally and/or in writing without assistance and with 100% accuracy.		

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
31.5.5	ACTION: Describe the flight rules, regulations, local instructions, and courses applicable to flight. CONDITIONS: Day/night, VFR/IFR, FAA/OPNAV regulations and local instructions available. STANDARDS: Describe verbally and/or in writing, IAW FAA/OPNAV regulations and local course rules, without assistance and with 90% accuracy.	C	2
31.5.6	ACTION: Identify and describe the aircraft instruments used for visual navigation. CONDITIONS: Aircraft NATOPS available. STANDARDS: Identify/describe verbally and/or in writing, IAW NATOPS without assistance and with 90% accuracy.	C	2
31.5.7	ACTION: Use the navigation plotter and dividers to measure distance and plotting latitude and longitude. CONDITIONS: Charts, navigation plotter and dividers available. STANDARDS: Use plotter and divider, without assistance and with 90% accuracy.	C	3
32	ACTION: Perform enroute communications. CONDITIONS: Day/night, VFR, aircraft in-flight. STANDARDS: Communicate appropriate agencies without assistance and with the clarity requiring no repetition.	P	(4)5
33	ACTION: Analyze observed meteorological conditions conducive to in-flight weather hazards. CONDITIONS: Day/night, VFR, aircraft in-flight. STANDARDS: Recognize weather hazards, provide alternative course to minimize danger, without assistance and without error.	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
33.1	ACTION: Describe the weather safety precautions to be observed during flight. CONDITIONS: When encountering hazardous weather. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
33.1.1	ACTION: Describe the types and characteristics of weather hazards listed: A. Thunderstorms B. Squall Lines C. Tornadoes and Water Spouts D. Turbulence E. Fog F. Icing CONDITIONS: NIFM, NAVAIR 00-80U-24, available. STANDARDS: Describe verbally and/or in writing without assistance and with 90% accuracy.	C	2
33.1.2	ACTION: Explain the importance of atmospheric pressure changes to weather forecasting. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
33.1.3	ACTION: Explain the characteristics of the high altitude weather phenomenon listed below. A. Jet Stream B. Subtropical Jet Stream C. Clear-Air Turbulence D. Contrails E. Haze Layers F. Canopy Static CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
33.1.4	ACTION: Define weather fronts and explain the conditions associated with them. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Define verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
33.1.5	ACTION: Explain the characteristics listed below, of a cold and warm front. A. Wind Shift Across From a Front B. Temperature Drop/Rise Across the Front C. Cloud Formation D. Direction of Frontal Movement E. Velocity of Frontal Movement F. Width of Weather Band CONDITIONS: Given NIFM and NAVAIR 00-80U-24. STANDARDS: Explain verbally and/or in writing, IAW NIFM/NAVAIR 00-80U-24.	C	2
34	ACTION: Perform communications and obtain clearance during an instrument takeoff/ departure. CONDITIONS: Day/night, IFR, aircraft during takeoff; air traffic control (ATC) available. STANDARDS: Performance to be accurate, without assistance and without sufficient error to violate the clearance.	P	(4)5
34.1	ACTION: Explain the radio procedures and format used during IFR departure. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
34.2	ACTION: Relate that SID's minimize radio communications and clearance delays. CONDITIONS: Sees the value of using standardized formats. STANDARDS: Explain verbally and/or in writing and with 100% accuracy.	A	3
34.2.1	ACTION: Recall the type information included in the ATC clearance. CONDITIONS: For a day/night, IFR takeoff. STANDARDS: Recall verbally and/or in writing, IAW NIFM without assistance and without error.	C	1

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
34.2.2	ACTION: Explain the component parts of an IFR ATC clearance. CONDITIONS: For day/night, IFR flight. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 100% accuracy.	C	2
34.2.3	ACTION: Recall what constitutes clearance acceptance and action to be taken if clearance cannot be complied with. CONDITIONS: IFR regulations for flight. STANDARDS: Recall verbally and/or in writing, IAW NIFM, without assistance and without error.	C	1
35	ACTION: Utilize SID during instrument departure. CONDITIONS: Published SID, day/night, IFR, aircraft in-flight available. STANDARDS: Utilize SID correctly, without assistance and only minor deviations which will not jeopardize departure.	P	(3)4
36	ACTION: Operate and manage VOR to perform navigation. A. Proceeding direct to station B. Inbound course interception C. Inbound course D. Outbound course E. Time-distance check F. Holding G. Non-DME high altitude approach H. Dual VOR high altitude approach I. Low altitude approach J. Interpret Morse Code station identifiers K. Determine own aircraft position CONDITIONS: Enroute and terminal FLIP available, operable VOR, aircraft in-flight, day/night, IFR. STANDARDS: Set up station frequency, determine required heading and aircraft position, inform pilot, IAW NIFM without assistance and without errors.	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
36.1	ACTION: Explain the procedures using VOR, required for: A. Proceeding direct to the selected station B. Inbound course interception C. Outbound after station passage and outbound away from station D. Computing time and distance from an Omni range E. Holding using Omni range F. Non-DME teardrop high altitude approach G. Dual VOR high altitude approach H. VOR low altitude approach CONDITIONS: Enroute and terminal FLIP available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
36.1.1	ACTION: Explain what information is provided and principles of operation of the VHF Omni-Directional Range (VOR). CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM without assistance and with 90% accuracy.	C	2
36.1.2	ACTION: Explain how the course indicator is used as a VOR/TACAN display and ILS display. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
37	ACTION: Operate and manage TACAN to perform navigation as listed: A. Select and tune station B. Check ground speed C. Intercept and maintain a TACAN arc about a station D. Intercept an arc from a radial E. Intercept a radial from an arc F. Proceeding direct between TACAN fixes G. Station passage H. Holding pattern to include entry and departure I. High altitude penetration J. SID K. Interpret Morse Code station identifiers	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
37 (Cont.)	L. Assess accuracy and reliability of other navigation equipment M. Compute wind drift N. Air-to-air rendezvous CONDITIONS: Day/night, IFR, enroute, and terminal FLIP, operable TACAN aircraft in-flight. STANDARDS: Set up station frequency, determine required headings, aircraft speed, patterns, inform pilot without assistance and with only minor deviations which will not jeopardize the aircraft mission.		
37.1	ACTION: Explain the procedures, using TACAN, required for: A. Selecting and tuning station B. Conducting a ground speed check C. Maintaining a TACAN arc around the station D. Intercepting an arc from a radial E. Intercepting a radial from an arc F. Proceeding direct between TACAN fixes G. Indication of station passage H. TACAN holding I. SID J. High altitude penetration K. Detection of 40° Azimuth error lock-on L. Air-to-air TACAN rendezvous CONDITIONS: Enroute and terminal FLIP available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
37.1.1	ACTION: Explain what information is provided and the principles of operation of TACAN. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
37.1.2	ACTION: Explain what navigation information is provided by the: A. DME - Range Indicator B. RMI - Radar Magnetic Indicator C. HSI - Horizontal Situation Indicator D. BDHI - Bearing-Distance-Heading Indicator E. Course Indicator CONDITIONS: NIFM available.	C	2

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SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
37.1.2 (Cont.)	STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.		
38	ACTION: Operate and manage the ADF to perform navigation as listed: A. Course Interception (Inbound-Outbound) B. Station Passage C. Outbound (Intermediate, After Station Passage) D. Tracking E. Time-Distance Check F. VHF Homing G. High Altitude Penetration and Approach H. Low Altitude Approach I. Interpret Morse Code Station Identifiers J. Rendezvous with another aircraft, surface unit, downed airman CONDITIONS: Day/night, IFR, enroute and terminal FLIP, operable ADF and aircraft available. STANDARDS: Set-up station, determine required headings, patterns, inform pilot, IAW NIFM, without assistance and without error.	P	(3)4
38.1	ACTION: Explain the procedures, using ADF, required for: A. Course Interception (Inbound-Outbound) B. Station Passage C. Outbound (Intermediate, After Station Passage) D. Tracking E. Time-Distance Check F. VHF Homing G. High Altitude Penetration and Approach H. Low Altitude Approach I. Interpret Morse Code Station Identifiers J. Rendezvous with another aircraft, surface unit, downed airman CONDITIONS: Enroute and terminal FLIP available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
38.1.1	ACTION: Explain what information is provided and the principles of operation of ADF. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
39	ACTION: Operate and manage the Inertial Navigation System (INS) to perform in-flight navigation. CONDITIONS: Day/night, VFR/IFR, operable INS and aircraft available. STANDARDS: Operate the INS IAW aircraft NATOPS without assistance and with only minor deviations.	P	(3)4
39.1	ACTION: Explain the procedures used to set-up, align, enter information, and update the INS. CONDITIONS: Aircraft NATOPS checklist available. STANDARDS: Explain verbally and/or in writing, IAW aircraft NATOPS checklist, without assistance and with 90% accuracy.	C	2
39.1.1	ACTION: Explain what information is provided and the principles of operation of the INS. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	2
40	ACTION: Perform enroute flight procedures executing the following: A. Maintain aircraft position with onboard navigation equipment. B. Select correct IFF/SIF mode. C. Update and refile flight plan as required. D. Update fuel plan. E. Utilize in-flight weather information. F. Use navigation computer as required. G. Plan a secondary route, if hazardous weather is encountered. H. Execute enroute clearance. I. Execute enroute holding. J. Communicate with pilot and ATC as required.	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
40 (Cont.)	CONDITIONS: On instrument flight plan; operable communications and navigation equipment, aircraft in-flight; day/night IFR. STANDARDS: Performance to be IAW NIFM, without assistance, and with only minor deviations, which will not compromise flight safety.		
40.1	ACTION: Explain the enroute flight procedures performed during IFR flight. A. Maintain aircraft position with onboard navigation equipment. B. Select correct IFF/SIF mode. C. Update and refile flight plan as required. D. Update fuel plan. E. Utilize in-flight weather information. F. Use navigation computer as required. G. Plan a secondary route, if hazardous weather is encountered. H. Execute enroute clearance. I. Execute enroute holding. J. Communicate with pilot and ATC as required. CONDITIONS: Aircraft in-flight. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
40.1.1	ACTION: Describe the standardized voice communications procedures terminology and phrases utilized between aircraft and controlling agencies. CONDITIONS: On instrument flight plan. STANDARDS: Describe verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
40.1.2	ACTION: Explain the necessity of maintaining a position/track of the aircraft with onboard navigation equipment, even if under ground radar surveillance. CONDITIONS: On instrument flight plan. STANDARDS: Explain verbally and/or in writing, without assistance IAW NIFM, and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
40.1.3	ACTION: Explain what action is taken if an enroute clearance cannot be accepted. CONDITIONS: Aircraft in-flight. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
40.1.4	ACTION: Relate the importance of using in-flight weather information to flight safety. CONDITIONS: See the value in using in-flight weather information. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	A	3
40.1.5	ACTION: Determine from terminal forecast whether weather minimum will be exceeded at ETA. CONDITIONS: Weather forecast available. STANDARDS: Explain verbally and/or in writing, without assistance and without error.	C	3
40.1.6	ACTION: Explain what in-flight weather information is available to the flight crew, and how it should be used. CONDITIONS: Weather service information available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
41	ACTION: Analyze flight instruments, during IFR flight for possible/actual pilot vertigo or disorientation. CONDITIONS: Aircraft in-flight. STANDARDS: Analyze flight instruments, evaluate, communicate to pilot, without assistance and without error.	C	3
41.1	ACTION: Explain the senses as they affect the crew's ability to maintain in-flight orientation. CONDITIONS: During instrument flight. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
41.1.1	ACTION: Explain the importance of nutrition, physical condition and proper rest as they effect crew performance. CONDITIONS: BUMED publications available. STANDARDS: Explain verbally and/or in writing and with 90% accuracy.	C	2
42	ACTION: Perform partial panel flight in the event of partial instrument system failure. CONDITIONS: NATOPS, NIFM, aircraft in-flight day/night, IFR. STANDARDS: Analyze failure, select alternative indicators, advise pilot of alternative system use IAW NATOPS, without assistance and with only minor deviations which will not compromise flight safety.	P	(3)4
42.1	ACTION: Describe the alternative corrective procedure for each instrument/display failure. CONDITIONS: Partial panel flight. STANDARDS: Describe verbally and/or in writing IAW NIFM, without assistance and with 90% accuracy.	C	2
42.2	ACTION: Relate the importance of using the correct procedures and techniques in controlling the aircraft during partial panel flight. CONDITIONS: Relates to aircraft/crew safety. STANDARDS: Explain verbally and/or in writing, without assistance and without error.	A	3
42.3	ACTION: Describe the correct scan pattern to be performed during partial panel flight. CONDITIONS: IFR, partial panel flight. STANDARDS: Describe verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
43	ACTION: Respond correctly to attitude instruments/displays indicating an unusual attitude. CONDITIONS: Day/night, IFR. Aircraft in-flight. STANDARDS: Advise pilot of corrective action IAW NIFM, without assistance and with only minor deviations, which will not compromise crew/aircraft safety.	P	4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
43.1	ACTION: Describe the unusual attitude recovery procedures and techniques for: A. Nose Low Recovery B. Nose High Recovery CONDITIONS: Aircraft in-flight; no visual horizon. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
43.2	ACTION: Explain the function and use of the aircraft position, performance and attitude instruments/displays. CONDITIONS: IAW day/night, IFR, aircraft in-flight. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	2
43.3	ACTION: Relate that an unusual attitude can be the result of factors such as turbulence, instrument display failure, inattention, and spatial disorientation. CONDITIONS: Aircraft in-flight; no visual horizon. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	3
43.4	ACTION: Relate the importance of early recognition and correct interpretation of an unusual attitude, and implementation of the correct procedures to aircraft/crew safety. CONDITIONS: Sees the relationship between early recognition and crew safety. STANDARDS: Explain verbally and/or in writing, without assistance and without error.	A	3
44	ACTION: Monitor and advise pilot during IFR penetration/approaches/landings. CONDITIONS: FLIP available, day/night, IFR, aircraft in-flight. STANDARDS: Monitor IAW FLIP, without assistance and with only minor deviations.	C	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
44.1	ACTION: Describe the instrument penetration/approach procedures utilized in a day/night, IFR landing. CONDITIONS: FLIP available; day/night, IFR, aircraft in-flight. STANDARDS: Describe verbally and/or in writing, without assistance, and with 90% accuracy.	C	2
44.2	ACTION: Perform the required communications during IFR penetration, approaches and landing: CONDITIONS: Day/night, IFR, aircraft in-flight. STANDARDS: Perform IAW NIFM, without assistance and with only minor deviations.	P	(4)5
44.3	ACTION: Relate the importance of using and having confidence in the navigation instruments/displays during a day/night, IFR landing. CONDITIONS: See the relationship of using navigation displays to successful landings. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	A	3
44.4	ACTION: Perform the required landing checklist procedures for a day/night, IFR landing. CONDITIONS: Aircraft NATOPS checklist and aircraft in-flight. STANDARDS: Perform landing checklist IAW NATOPS, using challenge/reply, without assistance and without error.	P	(4)5
45	ACTION: Monitor and assist pilot to perform GCA approaches listed below: A. Precision (PAR) B. Air Surveillance Radar (ASR) C. No Gyro D. Low Fuel State CONDITIONS: Day/night, IFR, aircraft in-flight. STANDARDS: Perform IAW NIFM, required communications, assist pilot, without assistance and with only minor deviations.	C	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
45.1	ACTION: Explain the procedures used to provide approach type information using aircraft radar. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM without assistance and with 90% accuracy.	C	2
45.2	ACTION: Explain the voice procedures used for radar instrument approaches. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM without assistance and with 90% accuracy.	C	2
45.3	ACTION: Recall the type of information displayed to the ground radar operator and its limitations. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	1
45.4	ACTION: Recall where the ASR and PSR information regarding availability, frequencies, minimums, and glide slope angle can be found. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing, IAW NIFM, without assistance and with 90% accuracy.	C	1
46	ACTION: Plan and prepare flight plans for VFR/IFR flights/missions by performing the following: A. Plan for enroute points and destination B. Review and comply standard DOD/FAA/OPNAV publications C. Select appropriate SID's, enroute charts, area charts and approach plates D. Obtain and interpret weather information/ briefing E. Compute flight headings, air/ground speed, fuel consumption, best altitude, enroute time and ETA based on forecast weather and winds	C	4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
46 (Cont.)	F. Determine alternate route in case weather conditions preclude using primary route flight plan G. Utilize navigation computer to develop flight plan H. Utilize navigation plotter and dividers for measuring direction, distance and plotting longitude and latitude I. Complete navigation log J. Prepare and file DD-175 CONDITIONS: DOD FLIP publications, NOTAMS, SID, enroute charts, weather data, navigation computer, DD-175, OPNAVINST 3710.7 series, aircraft NATOPS available. STANDARDS: Plan and prepare flight plan IAW OPNAVINST 3710.7 series, without assistance and with only minor errors which will not compromise the completion of the flight mission.		
46.1	ACTION: Explain the information provided and use the publication made during flight planning. A. NOTAMS B. FLIP C. SID D. DD-175 E. OPNAVINST 3710.7 series F. Approach Plates G. NIFM H. NATOPS I. Aeronautical Charts J. Airway Charts CONDITIONS: NOTAMS, FLIPS, SIDS, DD-175, OPNAVINST 3710.7 series available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.1.1	ACTION: Explain the FAR, Navy rules and regulations applicable to cloud clearances, semi-circular rules, VFR, and IFR minimums. CONDITIONS: NIFM, OPNAVINST 3710.7 series available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
46.1.2	ACTION: Recall the regulating authorities that govern Naval aviation. CONDITIONS: NIFM, OPNAVINST 3710.7 series available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	1
46.1.3	ACTION: Recall the Federal Air Regulations, relating to altitude, airspace, restricted areas, aircraft right-of-way, formation and acrobatic flight. CONDITIONS: NIFM, OPNAVINST 3710.7 series available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	1
46.2	ACTION: Explain what information is needed concerning flight destination and where obtained for flight planning. CONDITIONS: NATOPS, NIFM, OPNAVINST 3710.7 series available. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	2
46.2.1	ACTION: Explain the considerations involved in selection of altitude and route during flight planning. CONDITIONS: NATOPS, NIFM, OPNAVINST 3710.7 series available. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	2
46.2.2	ACTION: Determine the best altitude to be flown based on all flight conditions and flight/mission requirements. CONDITIONS: NATOPS, NIFM, weather forecasts available. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
46.2.3	ACTION: Determine from the terminal forecast whether weather minimums will be exceeded at ETA. CONDITIONS: Terminal forecast available. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	3
46.2.4	ACTION: Explain the requirements applicable to the preparation and filing of a DD-175. CONDITIONS: DD-175 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.3	ACTION: Analyze weather information obtained from weather briefings and forecasts to determine acceptability for proposed flight. CONDITIONS: NIFM, NAVAIR 00-80U-24, weather charts available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	3
46.3.1	ACTION: Describe the sources of weather information and forecasts. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.3.2	ACTION: Explain why it is necessary to use both observed and forecast weather information for flight planning. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.3.3	ACTION: Identify primary weather charts utilized in pre-flight planning. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Identify verbally and/or in writing, without assistance and with 90% accuracy.	C	1

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
46.3.4	ACTION: Explain why weather briefing, weather charts and forecast charts have a time limitation. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.3.5	ACTION: Describe the four categories of weather information available for each type listed below: A. Teletype B. Facsimile/Automatic Computer C. Locally Prepared Weather Information D. Local-Continuous Indicating Weather Instruments CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.3.6	ACTION: Identify and interpret standard weather symbols utilized in weather charts. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.3.7	ACTION: Explain how weather information is disseminated by the National Meteorology Center (NMC). CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.3.8	ACTION: Explain the use that can be made during pre-flight planning, of the information contained in the following: A. Surface Analysis Chart B. Constant Pressure Charts C. Winds Aloft Chart D. Weather Depiction Chart E. Level of Maximum Wind Chart F. High Level Horizontal Depiction G. Satellite Pictures of Mosaics H. Radar Summary Chart	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
46.3.8 (Cont.)	I. Freezing Level Chart J. Arrowgram K. Pilot Reports L. Sequence Reports M. Aviation Severe Weather Warnings/ Forecasts N. Terminal Forecasts CONDITIONS: NIFM, NAVAIR 00-80U-24 weather charts available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.		
46.3.9	ACTION: Explain what in-flight weather information services are available to the aircrew. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.3.10	ACTION: Explain the factors listed below which affect weather forecasting. A. Wind Versus Altitude B. Buys-Ballot's Law C. Convergence and Divergence or Related to Cyclonic and Anti-Cyclonic D. Sea and Land Breezes E. Valley and Mountain Breezes CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.4	ACTION: Explain how weight, wind, altitude, and configuration affect aircraft range and endurance. CONDITIONS: Aircraft NATOPS, NIFM available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
46.4.1	ACTION: Explain the various types of altitudes; i.e., density altitude, absolute altitude, pressure altitude. CONDITIONS: NAVAIR 00-80U-24, NIFM available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.4.2	ACTION: Explain the relationship between wind and altitude. CONDITIONS: NAVAIR 00-80U-24, NIFM available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.5	ACTION: Explain the effect of a change in termperature, humidity, altitude, weight, configuration, wind, and surface condition to takeoff and landing distance. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.5.1	ACTION: Define conditional and connective instability. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Define verbally and/or in writing with 90% accuracy.	C	2
46.5.2	ACTION: Explain why the major weather hazards to flight are directly associated with stability or instability and moisture content in the atmosphere. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
46.5.3	ACTION: Define airmasses and their basic characteristics; i.e., temperature and humidity. CONDITIONS: NIFM, NAVAIR 00-80U-24 available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
46.5.4	ACTION: Explain the principles of operation of a barometric altimeter. CONDITIONS: NIFM available. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	2
47	ACTION: Plan and prepare flight plans for tactical navigation flights/missions listed below: A. Low Level Navigation - VMC B. Cross Country - VMC C. Cross Country - IMC (non-airways) CONDITIONS: Aircraft NATOPS, NIFM, FLIP, SID available. STANDARDS: Plan and prepare flight plans IAW OPNAVINST 3710.7 series without assistance and with only minor deviations, which will not compromise the completion of the mission.	C	4
47.1	ACTION: Describe the step-by-step procedures utilized in planning a tactical navigation flight/mission from initial route selection to the filing of the flight plan. CONDITIONS: Aircraft NATOPS, OPNAVINST 3710.7 series available. STANDARDS: Describe verbally and/or in writing without assistance and with 90% accuracy.	C	2
47.2	ACTION: Explain the considerations involved in the planning for a low-level navigation flight. CONDITIONS: Aircraft NATOPS, OPNAVINST 3710.7 series. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
47.3	ACTION: Relate that the purpose of operational navigation flight is to provide the basis for performing operational tactical missions. CONDITIONS: Sees the relationship between operational navigation flight and tactical missions. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	A	3
48	ACTION: Communicate with controlling agencies relative to: A. Position, Mission or Tactical Information B. Emergency Situation C. Enroute Information D. Approach and Departure CONDITIONS: VFR/IFR, day/night, operable communication system controlling agencies available. STANDARDS: Make required communication using standard terminology; initiate/ interpret/respond IAW NATOPS without assistance and with the clarity requiring no repetition.	P	(4)5
48.1	ACTION: Describe the communication procedures used for: A. Aircraft in Distress B. Downed Aircraft C. Lost Plane CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
48.2	ACTION: Relate the importance of performing the correct emergency communication procedure. CONDITIONS: Sees the relationship between correct procedures and aircraft/crew safety. STANDARDS: Explain verbally and/or in writing, without assistance and without error.	A	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
48.3	ACTION: Describe the procedures used to communicate with ground in the event of radio failure. CONDITIONS: NWP-41A available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
49	ACTION: Monitor, during flight, formation or maneuvers listed below: A. Section Takeoff B. Join-Up C. Cross Under D. Cross Over E. Lead Change F. Break G. Parade Formation H. Cruise Formation I. Column Formation J. Trail Position CONDITIONS: Day/night, VFR, operable aircraft. STANDARDS: Advise pilot of any situation which would compromise aircraft/crew safety.	C	3
49.1	ACTION: Describe the formation maneuvers listed below: A. Section Takeoff B. Join-Up C. Cross Under D. Cross Over E. Lead Change F. Break G. Parade Formation H. Cruise Formation I. Column Formation J. Trail Position CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
49.2	ACTION: Relate the importance of air discipline and the use of correct procedures in the execution of formation flight. CONDITIONS: Sees the value of air discipline. STANDARDS: Relate verbally and/or in writing without assistance and without error.	A	3
49.3	ACTION: Describe the hazards associated with formation flying. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing without assistance and with 90% accuracy.	C	2
50	ACTION: Perform an air-to-air TACAN/UHF/ADF rendezvous. CONDITIONS: Operable aircraft and TACAN/UHF/ADF. STANDARDS: Perform an air-to-air rendezvous, provide pilot heading, relative position and airspeed information to effect rendezvous, without assistance and IAW NATOPS.	P	(3)4
50.1	ACTION: Describe the situation in which air-to-air TACAN/UHF/ADF rendezvous are used. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
50.2	ACTION: Explain how the TACAN/UHF/ADF are used in air-to-air rendezvous. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
51	ACTION: Demonstrate the correct procedures/techniques used in the operation of airborne radar. CONDITIONS: Aircraft NATOPS available. STANDARDS: Perform IAW NATOPS without assistance and with 90% accuracy.	C	(2)3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
51.1	ACTION: Describe the airborne radar modes of operation, the function of each and type of display for each. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
51.2	ACTION: Explain the techniques and procedures used to set up and maintain the antenna beam centered on the radar image. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing without assistance and with 90% accuracy.	C	2
51.3	ACTION: Explain the techniques and procedures involved in differentiating the radar image from the effects of noise, clutter, brightening, shadowing, aspect angle, distance, beam effects, and weather. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
51.3.1	ACTION: Explain the basic principles of airborne radar operation. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
51.3.2	ACTION: Explain radar wave propagation and their characteristics. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
51.3.3	ACTION: Describe radar energy forms and their application to radar functions. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
51.3.4	ACTION: Describe the major components that comprise a radar set and their functions. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.		

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
51.3.5	ACTION: Explain the antenna patterns and their characteristics. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
51.3.6	ACTION: Explain the tactical uses of airborne radar in the VF, VA, VS communities. CONDITIONS: NWIP and NWP's available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy	C	2
52	ACTION: Monitor air combat maneuvers (ACM), listed below, performed during a tactical engagement: A. Vertical Recoveries B. Dive Recoveries C. Vertical Scissors D. Horizontal Scissors E. Rolling Scissors F. High Yo-Yo G. Low Yo-Yo H. Displacement Rolls I. Barrel Rolls J. Rolling Reversals K. Horizontal Reversals 1. Accelerated Turn M. Break Turn N. Over-Undershoot O. Loose Deuce Maneuvering P. Disengage and Runout Q. High Energy Flight R. Low, Medium, High Angle Off CONDITIONS: Operable aircraft STANDARDS: Monitor maneuver, perform appropriate scan, advise pilot of relative position of other aircraft without assistance and IAW NATOPS.	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
52.1	ACTION: Describe the maneuvers, listed below, executed during ACM: A. Vertical Recoveries B. Dive Recoveries C. Vertical Scissors D. Horizontal Scissors E. Rolling Scissors F. High Yo-Yo G. Low Yo-Yo H. Displacement Rolls I. Barrel Rolls J. Rolling Reversals K. Horizontal Reversals L. Accelerated Turn M. Break Turn N. Over-Undershoot O. Loose Deuce Maneuvering P. Disengage and Runout Q. High Energy Flight R. Low, Medium, High Angle Off CONDITIONS: Tactics section of aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing IAW aircraft NATOPS without assistance and with 90% accuracy.	C	2
52.2	ACTION: Describe the defensive maneuvers and techniques used during one-vs-one defensive maneuvering to eliminate enemy threat and return to offensive position for each of the situations listed below: A. Rear Quarter Attack B. Abeam Attack C. Forward Quarter Attack D. Overshoot by Attacker CONDITIONS: Tactics section of aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, IAW NATOPS, without assistance and with 90% accuracy.	C	2
52.3	ACTION: Explain the role and function of the NFO and the requirement to adapt to the high speed, high "G" environment during ACM. CONDITIONS: Tactics NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
52.3.1	ACTION: Explain how high altitude operations effect aircraft performance. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
52.3.2	ACTION: Explain why evasive maneuvers at high altitudes can result in flight outside the aircraft operating envelope. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
52.3.3	ACTION: Explain how wing loading effects aircraft turn radius and rate of turn. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
52.3.4	ACTION: Explain the effect of gravity on turns in the vertical plane during ACM. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
52.3.5	ACTION: Relate the importance of nutrition, physical condition and proper rest as they effect crew performance. CONDITIONS: Sees the value of physical condition to optimum crew performance. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	A	3
52.3.6	ACTION: Relate the importance of minimizing self-imposed stress in order to provide an effective man-machine relationship. CONDITIONS: See the value of minimizing self-imposed stress. STANDARDS: Explain verbally and/or in writing, without assistance and without error.	A	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
52.4	ACTION: Execute the correct scan patterns during ACM, to assist pilot in acquiring targets/unfriendly aircraft. CONDITIONS: Operable aircraft in-flight, targets available. STANDARDS: Perform time-sharing scan to acquire targets, inform pilot, without assistance and in a manner which will not compromise aircrew and aircraft safety.	P	(3)4
52.4.1	ACTION: Relate that an effective lookout doctrine during ACM, requires an effective outside visual scan for early detection of targets. CONDITIONS: Tactics section of aircraft NATOPS. STANDARDS: Relate verbally and/or in writing, without assistance and without error.	C	3
52.4.2	ACTION: See the relationship between ACM proficiency and the achievement of air combat mission objectives. CONDITIONS: Sees the relationship. STANDARDS: Explain verbally and/or in writing, without assistance and without error.	A	3
53	ACTION: Communicate to pilot during ACM, target relative position and movement. CONDITIONS: Operable aircraft, targets available. STANDARDS: Communicate to pilot using standard clock code and standard descriptive commentary without assistance and with the clarity which will not require repetition.	P	4
53.1	ACTION: Relate the importance of strict radio discipline and using the correct voice procedures during ACM. CONDITIONS: Sees the relationship. STANDARDS: Relate verbally and/or in writing, without assistance and without error.	A	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
53.2	ACTION: Describe the standard descriptive and directive commentaries used with pilot/aircrew members during ACM/air intercepts. CONDITIONS: Tactics section of NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
53.3	ACTION: Describe the technique used to determine a target's altitude, speed and position relative to own aircraft. CONDITIONS: Tactics section of NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54	ACTION: Operate and manage the airborne radar in the air-to-air environment to perform air-to-air intercepts as listed below: A. Set up radar for air-to-air operation. B. Check radar for normal operation. C. Select optimum range (short, medium. long) for tactical situation. D. Select antenna search patterns for optimum return. E. Optimize radar return. F. Perform air-to-air target search. G. Perform visual and/or radar target acquisition. H. Analyze and interpret target on radar display. I. Inform pilot to fly optimum intercept approach profile. J. Perform target lock-on. CONDITIONS: Operable radar in aircraft. STANDARDS: Operate the air-to-air intercept radar IAW NATOPS, without assistance and to the accuracy of ±2 degrees of Azimuth, ±1 degree of elevation at 5 miles, ±50 miles of overtake, ±1 mile outside of 10 miles and 1/2 mile inside of 10 miles.	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
54.1	ACTION: Calibrate the air-to-air radar for optimum performance during flight. CONDITIONS: Operable radar, aircraft in-flight. STANDARDS: Calibrate radar IAW NATOPS, without assistance, to the accuracy of level antenna ±1 degree, rate of closure circle (ROC) level indication ±1 degree, ROC overtake errors ±50 knots.	P	(3)4
54.2	ACTION: Describe the techniques used to calibrate the radar to optimize the radar display. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.3	ACTION: Describe the techniques required to maintain antenna beam centered on target or to initiate target lock-on. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.3.1	ACTION: Explain antenna beam overlap. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.3.2	ACTION: State the formula and how used to determine radar search limit. CONDITIONS: Aircraft NATOPS available. STANDARDS: State verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.3.3	ACTION: Explain why it is necessary to keep the radar beam centered on target. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.3.4	ACTION: Explain how over control of the radar may degrade the radar return on the display.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
54.3.4 (Cont.)	CONDITIONS: Aircraft NATOPS available. STANDARDS: State verbally and/or in writing, without assistance and with 90% accuracy.		
54.4	ACTION: Explain the procedures and techniques used to differentiate the radar target from clutter, noise and other returns in the search and/or track modes. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.5	ACTION: Explain the procedures and techniques required to analyze and interpret radar returns on the display to identify target position relative to own aircraft. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.6	ACTION: Explain the crewman role and function of the NFO during tactical situations in air-to-air engagements. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.7	ACTION: Describe the duties and the function of an Air Intercept Controller in a tactical situation. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8	ACTION: Perform air-to-air intercepts to acquire target in an airborne tactical environment. CONDITIONS: Operable air intercept radar; operable aircraft. STANDARDS: Perform intercepts IAW NATOPS without assistance and with 90% accuracy.	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
54.8.1	ACTION: Explain the purpose of air-to-air intercepts and the types of intercepts. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8.2	ACTION: Explain the importance of being able to visualize the air intercept as it would appear from the RIO's position in the aircraft. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8.3	ACTION: Explain the use of intercept geometry used in air-to-air intercepts. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8.4	ACTION: Explain the target aspect formula and required collision course corrections during air-to-air intercepts. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8.5	ACTION: Explain intercept progression. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8.6	ACTION: Describe a displacement turn and how and when used in air intercepts. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
54.8.7	ACTION: Describe a counter turn and how and when used in air intercepts. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance, and with 90% accuracy.	C	2
54.8.8	ACTION: Describe the lead collision intercepts and how they are used. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8.9	ACTION: Describe conversion procedures and how used in air-to-air intercepts. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8.10	ACTION: Explain the importance of drift analysis in air-to-air intercepts. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
54.8.11	ACTION: Explain when and why intercept variations must be used during air intercepts. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
55	ACTION: Operate and manage the aircraft weapons system in the air-to-air environment armed with Sparrow and Sidewinder missiles as listed below: A. Check weapon system for operational station. B. Select proper weapon for tactical situation. C. Arm weapon for firing. D. Acquire target on radar and/or within visual range. E. Communicate to pilot heading, airspeed and altitude changes to maintain intercept profile.	P	(3) 4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
55 (Cont.)	F. Launch weapon when locked on target and within the performance envelope of the selected missile. CONDITIONS: Operable armament panel, radar and aircraft in-flight, moving target. STANDARDS: Operate and manage aircraft weapon systems IAW the tactics section of NATOPS, without assistance and with 80% accuracy.		
55.1	ACTION: Explain the procedures for the operation of the aircraft armament panel and launch of a weapon. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
55.2	ACTION: Describe the operating envelope of the Sparrow and Sidewinder missiles. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
55.3	ACTION: Explain why, for effective target intercept, launch of the weapon must be within its operating envelope. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
55.4	ACTION: Explain why correct procedures, during high altitude weapons delivery, must be adhered to insure aircraft remaining within its flight envelope. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
55.5	ACTION: Perform the transition from radar contact to visual acquisition and tracking of an airborne target. CONDITIONS: Operable aircraft and radar. STANDARDS: Perform transition from radar display target to visual target without assistance and with 80% accuracy.	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
56	ACTION: Perform pre-flight planning for radar navigation flight to include the following: A. Prepare a radar navigation chart and a jet log utilizing appropriate charts. B. Determine the route. C. Plot turnpoints, targets, turn radius, and course line. D. Compute mission completion fuel. E. Select checkpoints and divert fields. F. Extract data from enroute charts, aircraft performance charts, DD-175-1 and OPNAVINST 3710.7 (series). G. Plot the radar turnpoint procedures to be executed. H. Complete a DD-175-1. I. Recognize weather conditions effecting flight. CONDITIONS: Planning materials, publications, charts, and aircraft NATOPS available. STANDARDS: Perform pre-flight planning to the accuracy of fuel, 150 pounds; time, 10 seconds; course, 2° without assistance.	C	4
57	ACTION: Operate the airborne radar/manipulate controls as required to solve in-flight navigation problems. CONDITIONS: During flight using installed radar. STANDARDS: Determine position weather 10 nautical miles, track within 2° of course.	P	(3)4
57.1	ACTION: Apply the principles of radar to solve in-flight navigation problems. CONDITIONS: During flight using installed radar. STANDARDS: Determine position within 10 nautical miles, track within 2° of course.	C	3
57.1.1	ACTION: Compute the following radar values: A. Radar Pulse Length B. Pulse Repetition Frequency C. Range-to-Target D. Maximum Theoretical Range CONDITIONS: Aircraft NATOPS available; pulse widths, repetition frequency, interval between transmission and echo reception given. STANDARDS: Compute above values without assistance and without error.	C	3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
57.1.2	ACTION: Explain the meaning of, and the use to a radar navigator, of the following terms: A. Pulse Width B. Pulse Length C. Pulse Repetition Frequency D. Radar - Range Miles E. Range Resolution F. Bearing Resolution G. "Depressed - Center" H. "Section PPI" I. "B Scan" CONDITIONS: Aircraft NATOPS available. STANDARDS: Verbally and/or in writing, without assistance and with 90% accuracy.	C	2
57.2	ACTION: Interpret radar scope presentations to solve in-flight navigation problems. CONDITIONS: During flight using installed radar. STANDARDS: Determine position within 10 nautical miles, track within 2^{0} of course.	C	(2)3
57.3	ACTION: Utilize radar predictions to aid in anticipating actual radar returns. CONDITIONS: During flight. STANDARDS: Utilize radar predictions verbally and/or in writing without assistance and without error.	C	(2)3
57.3.1	ACTION: Construct radar predictions. CONDITIONS: Furnished materials and recommended procedures. STANDARDS: Construct radar predictions verbally and/or in writing without assistance and with 80% accuracy.	C	2
57.4	ACTION: Perform the following radar procedures: A. Warm Up B. Ground Checks C. Passing System Control D. Assess Reliability CONDITIONS: Operable aircraft radar. STANDARDS: Execute above procedures without assistance and with 90% accuracy.	P	(3)4

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
57.5	ACTION: Explain how a radar is set up to obtain an optimum display. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
57.6	ACTION: Explain how over control of the radar display may degrade the display. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
57.7	ACTION: Describe degraded radar operation/ malfunctions. CONDITIONS: Aircraft NATOPS available. STANDARDS: Recognize the degraded operation without assistance and state the cause(s) with 80% accuracy.	C	2
57.8	ACTION: Explain the effect of atmospheric conditions on radar return. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 80% accuracy.	C	2
58	ACTION: Plot own aircraft position using radar information. CONDITIONS: Operable radar. STANDARDS: Plot aircraft position, without assistance and to the accuracy of $\pm$ 1 degree.	C	(2)3
58.1	ACTION: Explain the techniques and procedures used in determining aircraft position in relation to radar returns. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
58.2	ACTION: Identify and interpret terrain features displayed on the radar and correlate with features on navigation chart. CONDITIONS: Radar display, navigation chart available. STANDARDS: Identify and interpret, without assistance and with 90% accuracy.	C	2

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
58.3	ACTION: Describe how ground speed and drift are determined using the radar display. CONDITIONS: Radar display available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
58.4	ACTION: Maintain in-flight navigation log during navigation flight. CONDITIONS: Navigation log available. STANDARDS: Maintain log, without assistance and with 90% accuracy.	C	3
59	ACTION: Navigate, point-to-point, using navigation radar information. CONDITIONS: Operable radar. STANDARDS: Navigate, without assistance, with the accuracy of within 5 miles and 3 minutes of ETA.	P	(3)4
59.1	ACTION: Explain how the radar is used to determine the aircraft position. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
59.2	ACTION: Describe how to interpret and track a given course during flight, using radar. CONDITIONS: Aircraft NATOPS available. STANDARDS: Describe verbally and/or in writing, without assistance and with 90% accuracy.	C	2
59.3	ACTION: Explain how radar is used to avoid terrain hazards during low level navigation flight. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
60	ACTION: Calculate, while airborne, ground speed and winds using radar information. CONDITIONS: During flight using installed radar. STANDARDS: Calculate, without assistance and with the accuracy of ground speed $\pm$ 5 knots, wind $\pm$ 5 knots.	C	(2)3

SBO ALPH-NUM	PLAIN LANGUAGE STATEMENT OF SBO	DOMAIN	LEVEL
61	ACTION: Monitor and evaluate the navigation radar during departure, approach and holding in order to maintain aircraft separation. CONDITIONS: During flight using installed radar. STANDARDS: Evaluate radar display information for other aircraft, advise pilot of any hazards, without assistance and with the accuracy which will not compromise flight safety.	C	3
62	ACTION: Monitor enroute checkpoints with radar as a cross-check for accuracy of aircraft navigation systems. CONDITIONS: During flight using installed radar. STANDARDS: Monitor enroute checkpoints with radar, without assistance and to the accuracy of 5 nautical miles and 2 minutes of ETA.	C	(2)3
62.1	ACTION: Explain the procedures used to cross-check aircraft radar with aircraft navigation systems. CONDITIONS: Aircraft NATOPS available. STANDARDS: Explain verbally and/or in writing, without assistance and with 90% accuracy.	C	2
63	ACTION: Navigate, using DR techniques, checkpoint, cross-checking with radar. CONDITIONS: Day/night, VMC operable radar and aircraft available. STANDARDS: Navigate, without assistance and with the accuracy to arrive at destination within $\pm$ 2 minutes of ETA.	P	(3)4
64	ACTION: Determine aircraft position by topographical information on chart to visual landmarks, and cross-checking with radar. CONDITIONS: Day/night, VMC, operable aircraft and radar. STANDARDS: Determine aircraft position, without assistance and to the accuracy of $\pm$ 2 miles of position.	C	3

A P P E N D I X C

SORT OF SPECIFIC BEHAVIORAL OBJECTIVES TO INDIVIDUAL MEDIA AND TUTORIAL MEDIA

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
1	X						X
1.1	X						
1.2	X						
1.2.1	X						
1.2.2	X						
1.2.3	X						
1.2.4	X	X					
1.2.5	X						
2				X			X
2.1	X						
3					X		X
3.1A		X			X		X
3.1B		X			X		X
3.1C		X			X		X
3.1D		X			X		X
3.1E		X			X		X
3.1F		X			X		X
3.1G		X			X		X
3.1H		X			X		X
3.1I		X			X		X
3.1J		X			X		X
3.1K		X			X		X
3.1L		X			X		X
3.1M		X			X		X
3.1N		X			X		X
3.1O		X			X		X
3.1P		X			X		X
3.1Q		X			X		X
3.1R		X			X		X
3.1S		X			X		X
3.1T		X			X		X

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
3.1.1A	X	X					
3.1.1B	X	X					
3.1.1C	X	X					
3.1.1D	X	X					
3.1.1E	X	X					
3.1.1F	X	X					
3.1.1G	X	X					
3.1.1H	X	X					
3.1.1I	X	X					
3.1.1J	X	X					
3.1.1K	X	X					
3.1.1L	X						
3.1.1M	X						
3.1.1N	X	X					
3.1.1O	X		X				
3.1.1P	X		X				
3.1.1Q	X		X				
3.1.1R	X			X			
3.1.1S	X						
3.1.1T	X						
4					X		X
5					X		X
5.1	X						
5.2	X						
5.3	X						
5.4		X					
6					X		X
6.1	X						
6.2	X						
7					X		X
7.1	X				X		

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
7.2	X						
7.3	X						
8					X		X
9					X		X
9.1					X		X
9.2					X		X
9.2.1	X						
9.2.2	X						
9.2.3	X						
10							X
10.1	X						
10.2	X						
11							X
11.1	X						X
11.2							X
12					X		X
12.1	X						
12.2					X		X
12.3	X				X		
12.4	X		X				
13							X
13.1	X						
14					X		X
15					X		X
16A					X		X
16B					X		X
16C					X		X
16D					X		X
16E					X		X
16F					X		X
16G					X		X

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
16H					X		X
16I					X		X
16J					X		X
16K					X		X
16L					X		X
16M					X		X
16N					X		X
16O					X		X
16P					X		X
16Q					X		X
16R					X		X
16.1A					X		
16.1B					X		
16.1C					X		
16.1D					X		
16.1E					X		
16.1F					X		
16.1G					X		
16.1H					X		
16.1I					X		
16.1J					X		
16.1K					X		
16.1L					X		
16.1M					X		
16.1N					X		
16.1O					X		
16.1P					X		
16.1Q					X		
16.1R					X		
16.1.1	X						
17					X		X

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
17.1	X						
17.2	X						
17.3			X				
18					X		X
18.1	X						
18.2	X						
18.3	X						
18.4		X					
19					X		
19.1	X			X			
19.2	X						
19.2.1	X			X			
19.2.2	X			X			
19.2.3	X						
20					X		X
20.1		X					
21					X		X
21.1	X						
21.1.1	X						
21.1.2	X						
21.1.3	X						
21.1.4	X						
21.1.5	X						
22							X
22.1	X						
22.1.1	X						
22.1.2	X						
22.1.3	X						
22.2	X						
23							X
23.1	X						

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
23.2	X						
23.2.1	X						
24							X
24.1	X						
24.2	X						
24.2.1	X						
24.2.2	X						
24.2.3	X						
24.2.4	X						
25					X		X
25.1							X
25.1.1	X						
25.1.2	X						
26					X		X
26.1	X	X					
26.1.1	X						
27							X
27.1					X		X
27.2					X		X
27.3	X						
27.4		X					
28					X		
28.1	X						
28.2	X						
29							X
29.1	X						
29.2	X						
30			X				X
30.1	X						
30.2	X						
30.3		X					

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
30.3.1	X						
31							X
31.1							X
31.2		X					
31.3		X					
31.4		X					
31.5	X						
31.5.1	X	X					
31.5.2	X						
31.5.3	X						
31.5.4	X						
31.5.5	X						
31.5.6	X						
31.5.7	X	X					
32					X		X
33							X
33.1	X						
33.1.1	X						
33.1.2	X						
33.1.3	X						
33.1.4	X						
33.1.5	X						
34					X		X
34.1	X						
34.2		X					
34.2.1	X						
34.2.2	X						
34.2.3	X						
35					X		X
36A					X		X
36B					X		X

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
36C					X		X
36D					X		X
36E					X		X
36F					X		X
36G					X		X
36H					X		X
36I					X		X
36J					X		X
36K					X		X
36.1A	X						
36.1B	X						
36.1C	X						
36.1D	X						
36.1E	X						
36.1F	X						
36.1G	X						
36.1H	X						
36.1.1	X						
36.1.2	X						
37A					X		X
37B					X		X
37C					X		X
37D					X		X
37E					X		X
37F					X		X
37G					X		X
37H					X		X
37I					X		X
37J					X		X
37K					X		X
37L					X		X

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
37M					X		X
37N					X		X
37.1A	X						
37.1B	X						
37.1C	X						
37.1D	X						
37.1E	X						
37.1F	X						
37.1G	X						
37.1H	X						
37.1I	X						
37.1J	X						
37.1K	X						
37.1L	X						
37.1.1	X						
37.1.2	X						
38A					X		X
38B					X		X
38C					X		X
38D					X		X
38E					X		X
38F					X		X
38G					X		X
38H					X		X
38I					X		X
38J					X		X
38.1A	X						
38.1B	X						
38.1C	X						
38.1D	X						
38.1E	X						

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
38.1F	X						
38.1G	X						
38.1H	X						
38.1I	X						
38.1J	X						
38.1.1	X						
39					X		X
39.1	X						
39.1.1	X						
40A					X		X
40B					X		X
40C					X		X
40D					X		X
40E					X		X
40F					X		X
40G					X		X
40H					X		X
40I					X		X
40J					X		X
40.1A	X						
40.1B	X						
40.1C	X						
40.1D	X						
40.1E	X						
40.1F	X						
40.1G	X						
40.1H	X						
40.1I	X						
40.1J	X						
40.1.1	X						
40.1.2	X						

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
40.1.3	X						
40.1.4		X					
40.1.5	X						
40.1.6	X						
41							X
41.1	X						
41.2	X						
42					X		X
42.1	X						
42.2	X						
42.3	X						
43							X
43.1	X						
43.2	X						
43.3	X						
43.4	X	X					
44					X		X
44.1	X						
44.2					X		X
44.3	X						
44.4					X		X
45A					X		X
45B					X		X
45C					X		X
45D					X		X
45.1	X						
45.2	X						
45.3	X						
45.4	X						
46A	X		X				
46B	X		X				

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
46C	X		X				
46D	X		X				
46E	X		X				
46F	X		X				
46G	X		X				
46H	X		X				
46I	X		X				
46J	X		X				
46.1A	X						
46.1B	X						
46.1C	X						
46.1D	X						
46.1E	X						
46.1F	X						
46.1G	X						
46.1H	X						
46.1I	X						
46.1J	X						
46.1.1	X						
46.1.2	X						
46.1.3	X						
46.2	X						
46.2.1	X						
46.2.2	X						
46.2.3	X						
46.2.4	X						
46.3	X						
46.3.1	X						
46.3.2	X						
46.3.3	X						
46.3.4	X						

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
46.3.5	X						
46.3.6	X						
46.3.7	X						
46.3.8	X						
46.3.9	X						
46.3.10	X						
46.4	X						
46.4.1	X						
46.4.2	X						
46.5	X						
46.5.1	X						
46.5.2	X						
46.5.3	X						
46.5.4	X						
47	X		X				
47.1	X						
47.2	X						
47.3	X						
48					X		X
48.1	X						
48.2	X						
48.3	X						
49							X
49.1	X						
49.2	X						
49.3	X						
50					X		X
50.1	X						
50.2	X						
51					X		X
51.1	X		X				

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
51.2	X		X				
51.3	X		X				
51.3.1	X		X				
51.3.2	X		X				
51.3.3	X		X				
51.3.4	X		X				
51.3.5	X		X				
51.3.6	X		X				
52							X
52.1	X		X				
52.2	X		X				
52.3	X						
52.3.1	X						
52.3.2	X						
52.3.3	X						
52.3.4	X						
52.3.5	X	X					
52.3.6	X						
52.4					X		X
52.4.1	X						
52.4.2	X						
53							X
53.1		X					
53.2	X	X					
53.3	X						
54A					X		X
54B					X		X
54C					X		X
54D					X		X
54E					X		X
54F					X		X

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
54G					X		X
54H					X		X
54I					X		X
54J					X		X
54.1					X		X
54.2	X						
54.3	X						
54.3.1	X						
54.3.2	X						
54.3.3	X						
54.3.4	X						
54.4	X						
54.5	X						
54.6	X						
54.7	X						
54.8					X		X
54.8.1	X						
54.8.2	X						
54.8.3	X						
54.8.4	X						
54.8.5	X						
54.8.6	X						
54.8.7	X						
54.8.8	X						
54.8.9	X						
54.8.10	X						
54.8.11	X						
55					X		X
55.1	X						
55.2	X						
55.3	X						

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
55.4	X						
55.5	X						
56A	X		X				
56B	X		X				
56C	X		X				
56D	X		X				
56E	X		X				
56F	X		X				
56G	X		X				
56H	X		X				
56I	X		X				
57					X		X
57.1					X		X
57.1.1	X						
57.1.2	X						
57.2					X		X
57.3					X		X
57.3.1	X						
57.4					X		X
57.5	X						
57.6	X						
57.7	X						
57.8	X						
58					X		X
58.1	X						
58.2	X						
58.3	X						
58.4	X						
59					X		X
59.1	X						
59.2	X						

SBO'S ALPHA-NUMERIC IDENTIFIERS	INDIVIDUAL MEDIA				TUTORIAL MEDIA		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMULATOR WHOLE-TASK	(AIRPLANE) FLIGHT
59.3	X						
60					X		X
61							X
62					X		X
62.1	X						
63					X		X
64							X

APPENDIX D

MERGE TO COMPOSITE OF MEDIA AND CATEGORIES

LEGEND

Print	
PT	Programmed Text
FTI/N	Flight Training Instruction/NATOPS
S. Pubs.	Safety Publication
Y.S.	Yellow Sheet
S.P. or Sense P.	Sense Pamphlet
AV (Static)	
Graphic A	Graphic Aid
Photo M	Photo Mock-up
Trans. O.	Transparency Overlay
S/S	Sound/Slide
AV (Dynamic)	
MP (VT)	Motion Picture (Video Tape)
DD	Dynamic Demonstrator
MP (F)	Motion Picture (Film)
Part-Task Trainer (Dynamic)	
CPT	Cockpit Procedures Trainer
CNR	Communication-Navigation-Radar Trainer
SCAN	Scan Trainer
EST	Ejection Seat Trainer
Air Int.	Air Intercept Trainer

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
1	Y.S						X			P4
1.1	FTI/N								C2	
1.2	S. Pubs								C3	
1.2.1	PT								C2	
1.2.2	PT							C2		
1.2.3	PT							C2		
1.2.4	PT	Graphic A						C1		
1.2.5	PT							C1		
2				Mock-up			X		P4	P5
2.1	FTI/N								C2	
3					CPT		X		P4	P5
3.1A		Photo M			CPT		X		P4	P5
3.1B		Photo M			CPT		X		P4	P5
3.1C		Photo M			CPT		X		P4	P5
3.1D		Photo M			CPT		X		P4	P5
3.1E		Photo M			CPT		X		P4	P5
3.1F		Photo M			CPT		X		P4	P5
3.1G		Photo M			CPT		X		P4	P5
3.1H		Photo M			CPT		X		P4	P5
3.1I		Photo M			CPT		X		P4	P5
3.1J		Photo M			CPT		X		P4	P5
3.1K		Photo M			CPT		X		P4	P5
3.1L		Photo M			CPT		X		P4	P5
3.1M		Photo M			CPT		X		P4	P5
3.1N		Photo M			CPT		X		P4	P5
3.1O		Photo M			CPT		X		P4	P5
3.1P		Photo M			CPT		X		P4	P5
3.1Q		Photo M			CPT		X		P4	P5
3.1R		Photo M			CPT		X		P4	P5
3.1S		Photo M			CPT		X		P4	P5
3.1T		Photo M			CPT		X		P4	P5

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
3.1.1A	PT	Trans O.						C2		
3.1.1B	PT	Trans O.						C2		
3.1.1C	PT	Trans O.						C2		
3.1.1D	PT	Trans O.						C2		
3.1.1E	PT	Trans O.						C2		
3.1.1F	PT	Trans O.						C2		
3.1.1G	PT	Trans O.						C2		
3.1.1H	PT	Trans O.						C2		
3.1.1I	PT	Trans O.						C2		
3.1.1J	PT	Graphic A						C2		
3.1.1K	PT	Graphic A						C2		
3.1.1L	PT							C2		
3.1.1M	PT							C2		
3.1.1N	PT	Graphic A						C2		
3.1.1O	PT		MP (VT)					C2		
3.1.1P	PT		MP (VT)					C2		
3.1.1Q	PT		MP (VT)					C2		
3.1.1R	PT			Mock-up				C2		
3.1.1S	PT							C2		
3.1.1T	PT							C2		
4					CPT		X		P4	P5
5					CPT		X		P4	P5
5.1	FTI/N								C2	
5.2	FTI/N								C2	
5.3	FTI/N								C2	
5.4		Graphic A							A3	
6					CPT		X		P4	P5
6.1	FTI/N								C2	
6.2	FTI/N								C2	
7					CPT		X		C3	C4
7.1	FTI/N				CPT				C3	

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
7.2	FTI/N								C2	
7.3	FTI/N								C2	
8					CPT		X		P4	P5
9					CNR		X		P4	P5
9.1					CNR		X		P4	P5
9.2					CNR		X		P4	P5
9.2.1	PT							C2		
9.2.2	PT							C2		
9.2.3	PT							C2		
10							X			P4
10.1	FTI/N								C2	
10.2	FTI/N								C2	
11							X			C3
11.1	FTI/N,SP								A3	
11.2							X			P5
12					CPT		X		P4	P5
12.1	FTI/N								C2	
12.2					CNR		X		P4	P5
12.3	SP								A3	
12.4	SP		MP (VT)						A3	
13							X			C3
13.1	FTI/N								C2	
14					CNR		X		P4	P5
15					SCAN		X		P4	P5
16A					CPT		X		P4	P5
16B					CPT		X		P4	P5
16C					CPT		X		P4	P5
16D					CPT		X		P4	P5
16E					CPT		X		P4	P5
16F					CPT		X		P4	P5
16G					CPT		X		P4	P5

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
16H					CPT		X		P4	P5
16I					CPT		X		P4	P5
16J					CPT		X		P4	P5
16K					CPT		X		P4	P5
16L					CPT		X		P4	P5
16M					CPT		X		P4	P5
16N					CPT		X		P4	P5
16O					CPT		X		P4	P5
16P					CPT		X		P4	P5
16Q					CPT		X		P4	P5
16R					CPT		X		P4	P5
16.1A					CPT				C3	
16.1B					CPT				C3	
16.1C					CPT				C3	
16.1D					CPT				C3	
16.1E					CPT				C3	
16.1F					CPT				C3	
16.1G					CPT				C3	
16.1H					CPT				C3	
16.1I					CPT				C3	
16.1J					CPT				C3	
16.1K					CPT				C3	
16.1L					CPT				C3	
16.1M					CPT				C3	
16.1N					CPT				C3	
16.1O					CPT				C3	
16.1P					CPT				C3	
16.1Q					CPT				C3	
16.1R					CPT				C3	
16.1.1	PI							C2		
17					CPT		X		P3	P4

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
17.1	FTI/N								C2	
17.2	FTI/N								C2	
17.3			MP (VT)						A3	
18					CPT		X		P3	P4
18.1	FTI/N								C2	
18.2	FTI/N								C2	
18.3	FTI/N								C2	
18.4		Graphic A							A3	
19					EST				P3	
19.1	FTI/N			Mock-up					C2	
19.2	SP								A3	
19.2.1	PT			Mock-up				C2		
19.2.2	PT			Mock-up				C2		
19.2.3	PT							C2		
20					SCAN		X		P3	P4
20.1		Graphic A							A3	
21					FIT		X		C3	C4
21.1	FTI/N								C2	
21.1.1	PT							C2		
21.1.2	PT							C2		
21.1.3	PT							C2		
21.1.4	PT							C2		
21.1.5	PT							C2		
22							X			C3
22.1	FTI/N								C2	
22.1.1	PT							C2		
22.1.2	PT							C2		
22.1.3	PT							C2		
22.2	FTI/N								C2	
23							X			C3
23.1	SP								A3	

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
23.2	FTI/N								C2	
23.2.1	PT							C2		
24							X			C3
24.1	FRI/N								C2	
24.2	SP								A3	
24.2.1	PT							C2		
24.2.2	PT							C2		
24.2.3	PT							C2		
24.2.4	PT							C3		
25					SCAN		X		P3	P4
25.1							X			P4
25.1.1	PT							C2		
25.1.2	PT							C2		
26					CPT		X		P3	P4
26.1	FTI/N	Graphic A							A3	
26.1.1	PT							C2		
27							X			C3
27.1					CPT		X		P4	P5
27.2					CNR		X		P4	P5
27.3	FTI/N								C2	
27.4		Graphic A							A3	
28					CPT				C3	
28.1	FTI/N								C2	
28.2	FTI/N								C2	
29							X			P4
29.1	FTI/N								C2	
29.2	FTI/N,YS								C3	
30			OD (Night V)				X		C2	C3
30.1	FTI/N								C2	
30.2	FTI/N								C2	
30.3		Trans O.							A3	

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
30.3.1	PT							C2		
31							X			P4
31.1							X			C3
31.2		S/S							C3	
31.3		Graphic A							C3	
31.4		S/S							C3	
31.5	FTI/N								C3	
31.5.1	PT	Graphic A							C3	
31.5.2	PT								C2	
31.5.3	PT								C2	
31.5.4	PT								C2	
31.5.5	PT								C2	
31.5.6	PT								C2	
31.5.7	PT	Graphic A							C2	
32					CNR		X		P4	P5
33							X			C3
33.1	FTI/N								C2	
33.1.1	PT							C2		
33.1.2	PT							C2		
33.1.3	PT							C2		
33.1.4	PT							C2		
33.1.5	PT							C2		
34					CNR		X		P4	P5
34.1	FTI/N								C2	
34.2		Graphic A							A3	
34.2.1	PT							C1		
34.2.2	PT							C2		
34.2.3	PT							C1		
35					CNR		X		P3	P4
36A					CNR		X		P3	P4
36B					CNR		X		P3	P4

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
36C					CNR		X		P3	P4
36D					CNR		X		P3	P4
36E					CNR		X		P3	P4
36F					CNR		X		P3	P4
36G					CNR		X		P3	P4
36H					CNR		X		P3	P4
36I					CNR		X		P3	P4
36J					CNR		X		P3	P4
36K					CNR		X		P3	P4
36.1A	FTI/N								C2	
36.1B	FTI/N								C2	
36.1C	FTI/N								C2	
36.1D	FTI/N								C2	
36.1E	FTI/N								C2	
36.1F	FTI/N								C2	
36.1G	FTI/N								C2	
36.1H	FTI/N								C2	
36.1.1	PT							C2		
36.1.2	PT							C2		
37A					CNR		X		P3	P4
37B					CNR		X		P3	P4
37C					CNR		X		P3	P4
37D					CNR		X		P3	P4
37E					CNR		X		P3	P4
37F					CNR		X		P3	P4
37G					CNR		X		P3	P4
37H					CNR		X		P3	P4
37I					CNR		X		P3	P4
37J					CNR		X		P3	P4
37K					CNR		X		P3	P4
37L					CNR		X		P3	P4

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
37M					CNR		X		P3	P4
37N					CNR		X		P3	P4
37.1A	FTI/N								C2	
37.1B	FTI/N								C2	
37.1C	FTI/N								C2	
37.1D	FTI/N								C2	
37.1E	FTI/N								C2	
37.1F	FTI/N								C2	
37.1G	FTI/N								C2	
37.1H	FTI/N								C2	
37.1I	FTI/N								C2	
37.1J	FTI/N								C2	
37.1K	FTI/N								C2	
37.1L	FTI/N								C2	
37.1.1	PT							C2		
37.1.2	PT							C2		
38A					CNR		X		P3	P4
38B					CNR		X		P3	P4
38C					CNR		X		P3	P4
38D					CNR		X		P3	P4
38E					CNR		X		P3	P4
38F					CNR		X		P3	P4
38G					CNR		X		P3	P4
38H					CNR		X		P3	P4
38I					CNR		X		P3	P4
38J					CNR		X		P3	P4
38.1A	FTI/N								C2	
38.1B	FTI/N								C2	
38.1C	FTI/N								C2	
38.1D	FTI/N								C2	
38.1E	FTI/N								C2	

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
38.1F	FTI/N								C2	
38.1G	FTI/N								C2	
38.1H	FTI/N								C2	
38.1I	FTI/N								C2	
38.1J	FTI/N								C2	
38.1.1	PT							C2		
39					CNR		X		P3	P4
39.1	FTI/N								C2	
39.1.1	PT							C2		
40					CNR		X		P3	P4
40A					CNR		X		P3	P4
40B					CNR		X		P3	P4
40C					CNR		X		P3	P4
40D					CNR		X		P3	P4
40E					CNR		X		P3	P4
40F					CNR		X		P3	P4
40G					CNR		X		P3	P4
40H					CNR		X		P3	P4
40I					CNR		X		P3	P4
40J					CNR		X		P3	P4
40.1A	FTI/N								C2	
40.1B	FTI/N								C2	
40.1C	FTI/N								C2	
40.1D	FTI/N								C2	
40.1E	FTI/N								C2	
40.1F	FTI/N								C2	
40.1G	FTI/N								C2	
40.1H	FTI/N								C2	
40.1I	FTI/N								C2	
40.1J	FTI/N								C2	
40.1.1	PT							C2		
40.1.2	PT							C2		

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
40.1.3	PT							C2		
40.1.4		Graphic A						A3		
40.1.5	PT							C3		
40.1.6	PT							C2		
41							X		C2	C3
41.1	FTI/N								C2	
41.1.1	PT							C2		
42					CNR		X		P3	P4
42.1	FTI/N								C2	
42.2	Sense P								A3	
42.3	FTI/N								C2	
43							X		P3	P4
43.1	FTI/N								C2	
43.2	FTI/N								C2	
43.3	FTI/N								C3	
43.4	FTI/N	Graphic A							A3	
44							X		C3	C4
44.1	FTI/N								C2	
44.2					CNR		X		P4	P5
44.3	FTI/N								A3	
44.4					CPT		X		P4	P5
45A					CNR		X		C3	C4
45B					CNR		X		C3	
45C					CNR		X		C3	
45D					CNR		X		C3	
45.1	FTI/N								C2	
45.2	FTI/N								C2	
45.3	FTI/N								C2	
45.4	FTI/N								C2	
46A	FTI/N		MP (VT)						C4	
46B	FTI/N		MP (VT)						C4	

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
46C	FTI/N		MP (VT)						C4	
46D	FTI/N		MP (VT)						C4	
46E	FTI/N		MP (VT)						C4	
46F	FTI/N		MP (VT)						C4	
46G	FTI/N		MP (VT)						C4	
46H	FTI/N		MP (VT)						C4	
46I	FTI/N		MP (VT)						C4	
46J	FTI/N		MP (VT)						C4	
46.1A	FTI/N								C2	
46.1B	FTI/N								C2	
46.1C	FTI/N								C2	
46.1D	FTI/N								C2	
46.1E	FTI/N								C2	
46.1F	FTI/N								C2	
46.1G	FTI/N								C2	
46.1H	FTI/N								C2	
46.1I	FTI/N								C2	
46.1J	FTI/N								C2	
46.1.1	PT							C2		
46.1.2	PT							C2		
46.1.3	PT							C2		
46.2	FTI/N								C2	
46.2.1	PT							C2		
46.2.2	PT							C2		
46.2.3	PT							C3		
46.2.4	PT							C2		
46.3	FTI/N								C3	
46.3.1	PT							C2		
46.3.2	PT							C2		
46.3.3	PT							C2		
46.3.4	PT							C2		

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
46.3.5	PT							C2		
46.3.6	PT							C2		
46.3.7	PT							C2		
46.3.8	PT							C2		
46.3.9	PT							C2		
46.3.10	PT							C2		
46.44	FTI/N								C2	
46.4.1	PT							C2		
46.4.2	PT							C2		
46.5	FTI/N								C2	
46.5.1	PT							C2		
46.5.2	PT							C2		
46.5.3	PT							C2		
46.5.4	PT							C2		
47	FTI/N		MP (VT)						C4	
47.1	FTI/N								C2	
47.2	FTI/N								C2	
47.3	Sense P								A3	
48					CNR		X		P4	P5
48.1	FTI/N								C2	
48.2	Sense P								A3	
48.3	FTI/N								C2	
49							X			C3
49.1	FTI/N								C2	
49.2	Sense P								A3	
49.3	FTI/N								C2	
50					CNR		X		P3	P4
50.1	FTI/N								C2	
50.2	FTI/N								C2	
51					CNR		X		C2	C3
51.1	FTI/N		MP (F)						C2	

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
51.2	FTI/N		MP (F)						C2	
51.3	FTI/N		MP (F)						C2	
51.3.1	FTI/N		MP (F)					C2		
51.3.2	FTI/N		MP (F)					C2		
51.3.3	FTI/N		MP (F)					C2		
51.3.4	FTI/N		MP (F)					C2		
51.3.5	FTI/N		MP (F)					C2		
51.3.6	FTI/N		MP (F)					C2		
52							X			C3
52.1	FTI/N		MP (F)						C2	
52.2	FTI/N		MP (F)						C2	
52.3	FTI/N								C2	
52.3.1	PT							C2		
52.3.2	PT							C2		
52.3.3	PT							C2		
52.3.4	PT							C2		
52.3.5	Sense P	Graphic A						A3		
52.3.6	Sense P							A3		
52.4					SCAN		X		P3	P4
52.4.1	PT							C3		
52.4.2	PT							A3		
53							X			P4
53.1		S/S							A3	
53.2	FTI/N	S/S							C2	
53.3	FTI/N								C2	
54A					AIR INT		X		P3	P4
54B					AIR INT		X		P3	P4
54C					AIR INT		X		P3	P4
54D					AIR INT		X		P3	P4
54E					AIR INT		X		P3	P4
54F					AIR INT		X		P3	P4

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
54G					AIR INT		X		P3	P4
54H					AIR INT		X		P3	P4
54I					AIR INT		X		P3	P4
54J					AIR INT		X		P3	P4
54.1					AIR INT.		X		P3	P4
54.2	FTI/N								C2	
54.3	FTI/N								C2	
54.3.1	PT							C2		
54.3.2	PT							C2		
54.3.3	PT							C2		
54.3.4	PT							C2		
54.4	FTI/N								C2	
54.5	FTI/N								C2	
54.6	FTI/N								C2	
54.7	FTI/N								C2	
54.8					AIR INT		X		P3	P4
54.8.1	PT							C2		
54.8.2	PT							C2		
54.8.3	PT							C2		
54.8.4	PT							C2		
54.8.5	PT							C2		
54.8.6	PT							C2		
54.8.7	PT							C2		
54.8.8	PT							C2		
54.8.9	PT							C2		
54.8.10	PT							C2		
54.8.11	PT							C2		
55					AIR INT		X		P3	P4
55.1	FTI/N								C2	
55.2	FTI/N								C2	
55.3	FTI/N								C2	

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
55.4	FTI/N								C2	
55.5	FTI/N								C2	
56A	FTI/N		MP (VT)						C4	
56B	FTI/N		MP (VT)						C4	
56C	FTI/N		MP (VT)						C4	
56D	FTI/N		MP (VT)						C4	
56E	FTI/N		MP (VT)						C4	
56F	FTI/N		MP (VT)						C4	
56G	FTI/N		MP (VT)						C4	
56H	FTI/N		MP (VT)						C4	
56I	FTI/N		MP (VT)						C4	
57					CNR		X		P3	P4
57.1					CNR				C3	
57.1.1	PT							C2		
57.1.2	PT							C2		
57.2					CNR		X		C2	C3
57.3					CNR		X		C2	C3
57.3.1	PT							C2		
57.4					CNR		X		P3	P4
57.5	FTI/N								C2	
57.6	FTI/N								C2	
57.7	FTI/N								C2	
57.8	FTI/N								C2	
58					CNR		X		C2	C3
58.1	FTI/N								C2	
58.2	FTI/N								C2	
58.3	FTI/N								C2	
58.4	FTI/N								C2	
59					CNR		X		P3	P4
59.1	FTI/N								C2	
59.2	FTI/N								C2	

SBO #	INDIVIDUAL MEDIA				TUTORIAL MEDIA			TRAINING PHASES		
	PRINT	A-V (STATIC)	A-V (DYNAMIC)	P-T TRAINER (STATIC)	P-T TRAINER (DYNAMIC)	SIMUL WHOLE-TASK	(AIRPLANE) FLIGHT	ACAD	FLT SPT	FLT
59.3	FTI/N								C2	
60					CNR		X		C2	C3
61							X			C3
62					CRR		X		C2	C3
62.1	FTI/N								C2	
63					CNR		X		P3	P4
64							X			C3

APPENDIX E

DEFINITION OF MEDIA TYPES

PRINT: Material that is used for instruction, consisting of printed pages interlaced with pictures, drawings, graphs, charts and other printed forms that aid in individualized instruction.

Programmed Text/Programmed Instruction: A program for self-instruction in which the instructional material is presented in a sequence of small units each of which requires immediate responses from the student and provides immediate knowledge of results. This program may be used in conjunction with other publications.

FTI/NATOPS: The Flight Training Instructions (FTI) are published by the Chief of Naval Air Training as a standardization of instruction, by flight phase, and t: Naval Air Training and Operating Procedures Standardization (NATOPS), published by Chief of Naval Operations (CNO) as a means of standardization of operating procedures. These two series of manuals used jointly and/or separately provide the basis for information, standardization of instruction, and guidance of instructors and students in the Naval Air Training Command. They may be used alone and/or with Programmed Instruction.

Safety Publications: Safety Publications are publications issued by the Naval Safety Center, Air Force, Federal Aviation Agency, U. S. Army, U. S. Navy, and other agencies that pertain to Aviation Safety.

Sense Pamphlet: Manuals that are written in casual and/or informal manner, well illustrated, preferably in cartoon style, and stress those situations that affect flight safety, e.g., aircraft systems, environmental conditions, etc.

Yellow Sheet: The term used for the Naval Aircraft Flight Record, OPNAV Form 3760/2.

AUDIOVISUAL (STATIC): A demonstrative audiovisual product utilized to facilitate and reinforce learning through one or both of the physical senses of sight and hearing.

Graphic Aid: A still picture or illustration, such as a chart, poster, diagram, produced from artwork or by photography.

Sound/Slide Program: A demonstrative audiovisual product utilized to recording and a series of 35mm slides, presented in synchronization. Synchronization may be by the operator or by electro-mechanical means.

Photo Mock-up: A full size pictorial display that shows the interior of the cockpit of the VTX, consisting of the windshield, HUD, instrument panel and both side panels. The mock-up is of a durable stiff material that allows mounting of the photo mock-up to resemble a cockpit so a student can be surrounded by the photos in a life size setting that permits cockpit orientation. When assembled, the mock-up is the same size and shape (generally) as the interior of the cockpit.

AUDIOVISUAL (DYNAMIC): A demonstrative audiovisual product utilized to facilitate and reinforce learning through one or both of the physical senses of sight and hearing; demonstrates movements in time or space, steps of a procedure, or changes in condition.

Motion Picture: An audiovisual product for presentation of subject matter. Two types of media are utilized for recording and exhibiting the subject matter as follows:

a. Film, that employs motion picture photographic technology; and

b. Videotape, that employs television technology.

Dynamic Demonstrator (Night Vision): A device that provides an individualized presentation on the techniques used to enhance night vision.

PART TASK (STATIC) TRAINER

Ejection Seat Mockup: A three dimensional, one-to-one scale model of NFO Training aircraft ejection seat, capable of providing procedural training for pre-flight/post-flight inspections and ejection.

PART TASK (DYNAMIC) TRAINER

Scan Trainer (ST): A grouping of three part task trainers that cumulatively provide training in accommodation, speed reading of the flight instruments, peripheral vision and time sharing in and out of the cockpit.

Ejection Seat Trainer (EST): The trainer incorporates an actual aircraft ejection seat in a simulated cockpit. All controls and other features necessary for completing the pre-ejection procedures are provided. When an instructor actuates the safety release, ejection takes place, by allowing the seat and its occupant to rise 8 to 15 feet producing controllable acceleration forces up to a maximum of approximately 10.5G's.

Cockpit Procedure Trainer (CPT): A trainer which incorporates a replica of the aircraft NFO position/cockpit and provides cockpit familiarization and training in power plant and systems procedures of normal, alternate, and emergency types. The aircraft instruments and other indicators are activated to respond to trainee control inputs. Exact dynamic simulation of all functions simulated is provided.

Communication and Navi ation/Radar Trainer (CNR): A multi-station training device designed toprovide communication and navigation/radar cockpit. Cockpit flight instruments, communication, navigation and radar instruments/displays and systems respond to command inputs of the trainee.

Air Intercept Trainer (AIT): A multi-station training device designed to provide air-to-air radar intercept training. Each trainee station simulates the NFO station/cockpit. Cockpit flight instruments, communication and radar instruments/displays and system respond to command inputs of the trainee.

A P P E N D I X F

MICRO ANALYTICAL/EMPIRICAL TRANSLATIONS TO RELATE TO SPECIFICATIONS OR MILITARY CHARACTERISTICS

1.	PRINT	ACADEMICS
2.	PRINT	FLIGHT SUPPORT
3.	AV (STATIC)	ACADEMICS
4.	AV (STATIC)	FLIGHT SUPPORT
5.	AV (DYNAMIC)	ACADEMICS
6.	AV (DYNAMIC)	FLIGHT SUPPORT
7.	PART-TASK (STATIC)	ACADEMICS
8.	PART-TASK (STATIC)	FLIGHT SUPPORT - NONE
9.	PART-TASK (DYNAMIC)	FLIGHT SUPPORT

a. Scan Trainer
b. Cockpit Procedures Trainer
c. Communications and Navigation Trainer (1D23)
d. Air Intercept Trainer

TRAINING SPECIFICATIONS/MILITARY CHARACTERISTICS

MEDIUM Print CATEGORY Academic

Subject: Engineering

1. PI CONTENT AND USE OF NATOPS
Applicable SBOs: 1.2.1

2. PI PRE-FLIGHT REQUIREMENTS
Applicable SBOs: 1.2.4, 1.2.5

3. PI AIRCRAFT DESCRIPTION/CONFIGURATION
Applicable SBOs: 1.2.2, 1.2.3

4. PI FUNCTION AND OPERATION OF AIRCRAFT SYSTEMS
Applicable SBOs: 3.1A - 3.1T

5. PI AIRCRAFT SYSTEMS MALFUNCTIONS
Applicable SBOs: 16.1.1

6. PI AIRCRAFT ESCAPE SYSTEMS
Applicable SBOs: 19.2.1, 19.2.2, 19.2.3

Subject: Aerodynamics

1. PI AIRCRAFT AERODYNAMIC PRINCIPLES
Applicable SBOs: 21.1.1, 21.1.2, 21.1.3, 21.1.4, 21.1.5, 22.1.1, 22.1.2, 22.1.3

2. PI PARAMETERS RELATED TO AIRCRAFT FLIGHT PERFORMANCE
Applicable SBOs: 24.2.1, 24.2.2, 24.2.3

3. PI SPINS AND DEPARTED FLIGHT
Applicable SBOs: 23.2.1

4. PI HIGH SPEED, HIGH ALTITUDE, HIGH "G", ENVIRONMENT
Applicable SBOs: 52.3.1, 52.3.2, 52.3.3, 52.3.4

Subject: Meteorology

1. PI WEATHER PHENOMENA
Applicable SBOs: 33.1.2, 33.1.2

2. PI AIRMASS WEATHER
Applicable SBOs: 46.5.3

3. PI WIND AND ALTITUDE
Applicable SBOs: 46.4.1, 46.4.2, 46.5.4

MEDIUM Print (CONT) CATEGORY Academics

Subject: Meteorology

4.	PI	FRONTAL WEATHER Applicable SBOs: 33.1.4, 33.1.5
5.	PI	WEATHER INFORMATION Applicable SBOs: 40.1.5, 50.1.6, 46.3.1, 46.3.2, 46.3.4, 46.3.5, 46.3.7, 46.3.9
6.	PI	WEATHER HAZARDS TO FLIGHT Applicable SBOs: 33.1.1, 46.5.2
7.	PI	WEATHER FORECASTS Applicable SBOs: 46.2.1, 46.2.2, 46.2.3, 46.3.10
8.	PI	WEATHER CHARTS Applicable SBOs: 46.3.3, 46.3.6, 46.3.8

Subject: Flight Rules and Regulations

1.	PI	COMMUNICATIONS - VOICE REPORTS Applicable SBOs: 9.2.1, 9.2.2, 9.2.3, 40.1.1
2.	PI	AIRCRAFT IN DISTRESS/LOST PLANE RULES Applicable SBOs: 26.1.1
3.	PI	FLIGHT RULES AND REGULATIONS Applicable SBOs: 31.5.5, 46.1.1, 46.1.2, 46.1.3
4.	PI	FILING OF FORM DD-175 Applicable SBOs: 46.2.4

Subject: Visual Navigation

1.	PI	NAVIGATION INSTRUMENTS Applicable SBOs: 31.5.6
2.	PI	AERONAUTICAL CHARTS Applicable SBOs: 31.5.4
3.	PI	COURSE AND ETA FORMULATION Applicable SBOs: 31.5.2, 31.5.3
4.	PI	NAVIGATION COMPUTER, PLOTTER, AND DIVIDERS Applicable SBOs: 31.5.1, 31.5.7

MEDIUM Print (CONT) CATEGORY Academics

Subject: Instrument Navigation

1. PI IFT ATC CLEARANCE
Applicable SBOs: 34.2.1, 34.2.2, 34.2.3, 40.1.3

2. PI OPERATION OF VOR
Applicable SBOs: 36.1.1, 36.1.2

3. PI OPERATION OF TACAN
Applicable SBOs: 37.1.1, 37.1.2

4. PI OPERATION OF ADF
Applicable SBOs: 38.1.1

5. PI OPERATION OF INS
Applicable SBOs: 39.1.1

6. PI ENROUTE INSTRUMENT NAVIGATION
Applicable SBOs: 40.1.2

Subject: Airborne Radar

1. PI TACTICAL USES OF RADAR
Applicable SBOs: 51.3.6

2. PI PRINCIPLES OF RADAR OPERATION
Applicable SBOs: 51.3.1, 51.3.2, 51.3.3, 51.3.4, 51.3.5

3. PI RADAR AIR-TO-AIR INTERCEPTS
Applicable SBOs: 54.3.1, 54.3.2, 54.3.3, 54.3.4, 54.8.1, 54.8.2, 54.8.3, 54.8.4, 54.8.5, 54.8.6, 54.8.7, 54.8.8, 54.8.9, 54.8.10, 54.8.11

4. PI RADAR NAVIGATION
Applicable SBOs: 57.1.1, 57.1.2, 57.3.1

Subject: Tactical Operations

1. PI AIR COMBAT MANEUVERING
Applicable SBOs: 52.4.1, 52.4.2

TRAINING SPECIFICATIONS/MILITARY CHARACTERISTICS

MEDIUM Print (CONT) CATEGORY Academic

Subject: Aviation Physiology

1.	PI	LIMITATIONS OF AIRCREW PHYSIOLOGICAL SYSTEMS Applicable SBOs: 24.2.4
2.	PI	SCAN PATTERNS Applicable SBOs: 25.1.1, 25.1.2
3.	PI	NIGHT VISION Applicable SBOs: 30.3.1
4.	PI	SPATIAL DISORIENTATION Applicable SBOs:
5.	PI Sense P	NUTRITION AND PHYSICAL CONDITION Applicable SBOs: 41.1.1, 52.3.5
6.	PI Sense P	MINIMIZING STRESS Applicable SBOs: 52.3.6

TRAINING SPECIFICATIONS/MILITARY CHARACTERISTICS

MEDIUM	Print	CATEGORY	Flight Support
1.	FTI/N	USE OF NATOPS CHECKLIST Applicable SBOs: 1.1.1.2	
2.	FTI/N	ICS SYSTEM USE Applicable SBOs: 6.1, 6.2	
3.	FTI/N	PRE-START/START PROCEDURES Applicable SBOs: 5.1, 5.2, 5.3, 7.1, 7.2, 7.3	
4.	FTI/N	VISUAL COMMUNICATION PROCEDURES Applicable SBOs: 10.1, 10.2	
5.	FTI/N Sense P	COURSE RULES Applicable SBOs: 11.1	
6.	FTI/N Sense P	PRE-TAKEOFF/TAKE-OFF PROCEDURES Applicable SBOs: 12.1, 12.3, 13.1	
7.	FTI/N Sense P	GROUND/FLIGHT EMERGENCIES Applicable SBOs: 12.4, 17.1, 17.2, 18.1, 18.2, 18.3, 26.1	
8.	FTI/N Sense P	EJECTION PROCEDURES Applicable SBOs: 2.1, 19.1, 19.2, 22.2	
9.	FTI/N	TRANSITION FLIGHT MANEUVERS Applicable SBOs: 21.1	
10.	FTI/N Sense P	STALLS, SPINS, DEPARTED FLIGHT Applicable SBOs: 22.1, 23.1, 23.2	
11.	FTI/N Sense P	CONFIDENCE (ACROBATICS) MANEUVERS Applicable SBOs: 24.1, 24.2	
12.	FTI/N	LANDING PROCEDURES Applicable SBOs: 27.3	
13.	FTI/N Yellow Sheet	ENGINE SHUTDOWN, POST FLIGHT INSPECTION PROCEDURES Applicable SBOs: 28.1, 28.2, 29.1, 29.2	
14.	FTI/N	NIGHT FLIGHT OPERATIONS Applicable SBOs: 30.1, 30.2	
15.	FTI/N Sense P	COURSE RULES Applicable SBOs: 11.1	
16.	FTI/N	IN-FLIGHT NAVIGATION PROBLEM SOLVING Applicable SBOs: 31.5	

MEDIUM Print (CONT) CATEGORY Flight Support

17.	FTI/N	COMMUNICATION PROCEDURES Applicable SBOs: 34.1, 48.1, 48.2, 48.3
18.	FTI/N	VOR/TACAN/ADF PROCEDURES Applicable SBOs: 36.1A, 36.1H, 37.1A, 37.1L, 38.1A, 38.1J
19.	FTI/N	INS PROCEDURES Applicable SBOs: 39.1
20.	FTI/N	AIRWAYS NAVIGATION PROCEDURES Applicable SBOs: 40.1A - 40.1J
21.	FTI/N Sense P	PARTIAL PANEL FLIGHT Applicable SBOs: 42.1, 42.2, 42.3
22.	FTI/N	UNUSUAL ATTITUDE RECOGNITION Applicable SBOs: 43.1, 43.2, 43.3
23.	FTI/N Sense P	IFR PENETRATIONS/APPROACHES/LANDINGS Applicable SBOs: 44.1, 44.3, 45.1, 45.2, 45.3, 45.4
24.	FTI/N Sense P	FLIGHT PLANNING PROCEDURES Applicable SBOs: 46A - 46J, 46.1A - 46.1J, 46.2, 46.3, 46.4, 46.5, 47, 47.1, 47.2, 47.3
25.	FTI/N Sense P	FORMATION MANEUVERS Applicable SBOs: 49.1, 49.2, 49.3
26.	FTI/N	TACAN/UHF/ADF RENDEZVOUS PROCEDURES Applicable SBOs: 50.1, 50.2
27.	FTI/N	AIRBORNE RADAR PROCEDURES/TECHNIQUES Applicable SBOs: 51.1, 51.2, 51.3
28.	FTI/N	TACTICAL AIR COMBAT MANEUVERING Applicable SBOs: 52.1, 52.2, 52.3, 52.4, 53.2, 53.3
29.	FTI/N	RADAR AIR-TO-AIR INTERCEPT PROCEDURES Applicable SBOs: 54.2, 54.3, 54.4, 54.5, 54.6, 54.7
30.	FTI/N	AIR-TO-AIR WEAPON SYSTEMS Applicable SBOs: 55.1, 55.2, 55.3, 55.4, 55.5
31.	FTI/N	RADAR NAVIGATION FLIGHT PLANNING PROCEDURES Applicable SBOs: 56A - 56I

TRAINING SPECIFICATIONS/MILITARY CHARACTERISTICS

MEDIUM Print (CONT) CATEGORY Flight Support

32. FTI/N TACTICAL RADAR NAVIGATION PROCEDURES
Applicable SBOs: 57.5, 57.6, 57.7, 57.8, 58.1, 58.2, 58.3, 58.4, 59.1, 59.2, 59.3, 62.1

TRAINING SPECIFICATIONS/MILITARY CHARACTERISTICS

MEDIUM Audiovisual (Static) CATEGORY (Academics)

1. GRAPHIC AID: PICTORIAL ILLUSTRATION
Aircraft Danger Areas (on-the-ground)
Applicable SBOs: 1.2.4

2. GRAPHIC AID: TRANSPARENCY OVERLAY
A film aid which, through a continuing overlay process builds up the assemblies and components of the engine until the engine is complete.
Applicable SBOs: 3.1.1A

3. GRAPHIC AID: PICTORIAL ILLUSTRATION
Depict the aircraft air conditioning and pressurization and the controls for operating the system.
Applicable SBOs: 3.1.1J

4. GRAPHIC AID: PICTORIAL ILLUSTRATION
Depict the aircraft oxygen system and controls for operating the system.
Applicable SBOs: 3.1.1K

5. GRAPHIC AID: PICTORIAL ILLUSTRATION
Depict the aircraft fire warning system and the indicators which will provide a fire warning alert.
Applicable SBOs: 3.1.1N

6. GRAPHIC AID: CHART
A chart depicting the steps and procedures for the correct use of the navigation computer.
Applicable SBOs: 31.5.1

7. GRAPHIC AID: CHART
A chart depicting the steps and procedures for the correct use of the navigation plotter and dividers
Applicable SBOs: 31.5.7

8. GRAPHIC AID: PICTORIAL ILLUSTRATION
Show the results of not using the available inflight weather information.
Applicable SBOs: 40.1.4

9. GRAPHIC AID: PICTORIAL ILLUSTRATION
Depict the importance of proper nutrition, physical condition, and rest to aircrew performance and safety.
Applicable SBOs: 52.3.5

TRAINING SPECIFICATIONS/MILITARY
CHARACTERISTICS

MEDIUM Audiovisual (Dynamic) CATEGORY Academics

1. MOTION PICTURE (VIDEO TAPE)
A presentation of series of programs that demonstrate the function, operation and the procedures used in the operation of the aircraft, communications, navigation, and radar systems.
Applicable SBOs: 3.1.1O, 3.1.1P, 3.1.1Q

2. MOTION PICTURE (FILM)
A presentation that demonstrates the principles of radar operation; including radar wave propagation, radar energy forms and applications; identifying major components of radar, antenna patterns, and modes of operation.
Applicable SBOs: 51.3.1, 51.3.2, 51.3.3, 51.3.4, 51.3.5, 51.3.6

TRAINING SPECIFICATIONS/MILITARY
CHARACTERISTICS

MEDIUM Audiovisual (Dynamic) CATEGORY Flight Support

1. MOTION PICTURE (VIDEO TAPE)
A presentation in real time showing the direct relationship between observing aircraft operating limitations and restrictions and results of not doing so, i.e., system failure, aircraft accident, etc.
Applicable SBOs: 12.4

2. MOTION PICTURE (VIDEO TAPE)
A presentation in real time showing the direct relationship between the correct emergency procedures and the resulting crew and aircraft safety versus the incorrect procedures and the resulting incident/accident.
Applicable SBOs: 17.3

3. DYNAMIC DEMONSTRATOR (NIGHT VISION)
The device by use of individual synthetic training exercises provides night vision training relative to the limitations of night vision.
Applicable SBOs: 30

4. MOTION PICTURE (VIDEO TAPE)
A presentation on the planning and preparation of a flight plan for a typical flight, including all steps and procedures from the identification of a proposed flight through the signed and approved DD-175.
Applicable SBOs: 46A through 46J

5. MOTION PICTURE (VIDEO TAPE)
A presentation that addressed the peculiarities and critical items of preparing and filing of flight plans for tactical flights/missions.
Applicable SBOs: 47

6. MOTION PICTURE (FILM)
A presentation on the use of radar techniques and procedures, relative to centering of the antenna beam, brightening, shadowing, differentiating images from noise clutter, aspect angle, distance, beam efforts, and weather.
Applicable SBOs: 51.1, 51.1.5, 51.1.6, 51.2, 51.3, 61.1.7

7. MOTION PICTURE (FILM)
A presentation on ACM maneuvering, single aircraft and with adversary aircraft, including all offensive and defensive maneuvers.
Applicable SBOs: 52.1, 52.2

TRAINING SPECIFICATIONS/MILITARY CHARACTERISTICS

MEDIUM Audiovisual (Static) CATEGORY Flight Support

1. PHOTO MOCK-UP
A full size pictorial display that shows the interior of the cockpit including windshield, instrument panel and both side panels-display the actual lights indicators displays, switches, and controls of the aircraft. The photo mock-up will be of the general size and shape of the aircraft, made of durable material which can be folded repeatedly.
Applicable SBOs: 3.1A - 3.1T

GRAPHIC AID: PICTORIAL ILLUSTRATION
Show the safety value of using correct checklist procedures during aircraft ground operation.
Applicable SBOs: 5.4

3. GRAPHIC AID: PICTORIAL ILLUSTRATION
Show the safety value to aircrew in using the correct abort procedures.
Applicable SBOs: 16.4

4. GRAPHIC AID: PICTORIAL ILLUSTRATION
Show the results of not using the correct scan pattern during flight, i.e., aircraft collision, enemy aircraft closure, thunderstorm.
Applicable SBOs: 20.1

5. GRAPHIC AID: PICTORIAL ILLUSTRATION
Show the results of not using the correct "aircraft in distress" and "Lost Plane" procedures.
Applicable SBOs: 26.1

6. GRAPHIC AID: PICTORIAL ILLUSTRATION
Show the results of not using the correct landing emergency procedures to aircraft and crew.
Applicable SBOs: 27.4

7. GRAPHIC AID: TRANSPARENCY OVERLAY
By means of transparency, depict flight scene and by overlays degrade visibility to night reduced vision and show possible consequences.
Applicable SBOs: 30.3

8. SOUND/SLIDE PROGRAM
A series of slides depicting how to interpret an aeronautical chart, explanation of symbols, and the relation to ground objects with an audio exploration by electro-mechanical means.
Applicable SBOs: 31.2

MEDIUM Audiovisual (Static) (CONT) CATEGORY Flight Support

9. GRAPHIC AID: AERONAUTICAL CHART
Actual aeronautical or portion of a chart showing representative coordinates.
Applicable SBOs: 31.3

10. SOUND/SLIDE PROGRAM
A series of slides showing how wind direction and velocity made by/determined during day visual flight with an audio explanation by electro-mechanical means.
Applicable SBOs: 31.4

11. GRAPHIC AID: PICTORIAL ILLUSTRATION
Depict the results of using the correct SID communication procedures.
Applicable SBOs: 34.2

12. GRAPHIC AID: PICTORIAL ILLUSTRATION
Depict the navigation instruments and the results of not following the indications of the instruments.
Applicable SBOs: 43.4

13. SOUND/SLIDE PROGRAM
A series of slides visually depicting various ACM situations, with audio narrative discussing the results of not using radio discipline.
Applicable SBOs: 53.1

14. SOUND/SLIDE PROGRAM
A series of slides visually depicting the tactical ACM/air intercept situation and an audio narrative providing the correct standardized communication for each situation.
Applicable SBOs: 53.2

TRAINING SPECIFICATIONS/MILITARY
CHARACTERISTICS

MEDIUM Audiovisual (Dynamic) CATEGORY Flight Support

8. MOTION PICTURE (VIDEO TAPE)
A presentation on the pre-flight planning and preparation for a radar navigation flight; including all steps and procedures for the flight through the signed and approved DD-175.
Applicable SBOs: 56A through 56I.

TRAINING SPECIFICATIONS/MILITARY
CHARACTERISTICS

MEDIUM Part-Task Trainer (Static) CATEGORY Academics

1. MOCK-UP (EJECTION SEAT)
A mock-up of the ejection seat, installed in the aircraft to which the NFO is assigned, providing for the practice of the steps in the procedure used in pre-flight, post-flight, removal of safety pins, and limited ejection procedures.
Applicable SBOs: 2, 3.1.1R

TRAINING SPECIFICATIONS/MILITARY CHARACTERISTICS

MEDIUM Part-Task Trainer (Dynamic) CATEGORY Flight Support

Scan Trainer

1. EYE ACCOMMODATION AND SPEED READING OF INSTRUMENTS
   Applicable SBOs: 15, 20

2. SCAN AND PERIPHERAL VISION
   Applicable SBOs: 20, 25, 52.4

3. INSTRUMENT SCAN
   Applicable SBOs: 20, 25, 52.4

TRAINING SPECIFICATIONS/MILITARY
CHARACTERISTICS

MEDIUM Part-Task Trainer (Dynamic) CATEGORY Flight Support

Cockpit Procedures Trainer (CPT)

1. STUDENT STATION (COCKPIT) CONFIGURATION
   Applicable SBOs: 3, 3.1, 4, 5, 6, 7.1, 8, 12, 16A, 16B, 16C, 16D, 16E, 16F, 16G, 16H, 16I, 16J, 16K, 16L, 16M, 16N, 16O, 16P, 16Q, 16R, 17, 26, 27.1, 28, 44.4

2. DYNAMIC SYSTEMS SIMULATION
   Applicable SBOs: 4, 6, 7, 7.1, 16A, 16B, 16C, 16D, 16E, 16F, 16G, 16H, 16I, 16J, 16K, 16L, 16M, 16N, 16O, 16P, 16Q, 16R, 16.1A, 16.1B, 16.1C, 16.1D, 16.1E, 16.1F, 16.1G, 16.1H, 16.1I, 16.1J, 16.1K, 16.1L, 16.1M, 16.1N, 16.1O, 16.1P, 16.1Q, 16.1R.

3. DYNAMIC SYSTEM MALFUNCTION/FAILURE SIMULATION
   Applicable SBOs: 17, 18

TRAINING SPECIFICATIONS/MILITARY CHARACTERISTICS

Communications and Navigation Trainer (Device 1D23)

1. TRAINEE STATION CONFIGURATION
   Applicable SBOs: 9, 9.1, 912, 12.2, 36, 37, 38, 39, 42, 45, 48, 57

2. COMMUNICATIONS
   Applicable SBOs: 9, 9.1, 9.2, 12.2, 14, 27.2, 32, 34, 44, 44.2, 45, 48, 50

3. TAKE-OFF, ENROUTE AND LANDING PROCEDURES
   Applicable SBOs: 12,2, 14, 27.2, 32, 34, 35, 40A through 40J

4. OPERATION OF VOR
   Applicable SBOs: 36A through 36K, 50

5. OPERATION OF TACAN
   Applicable SBOs: 37A through 37N, 50

6. OPERATION OF ADF
   Applicable SBOs: 38A through 38J, 50

7. OPERATION OF INS
   Applicable SBOs: 39

8. PARTIAL PANEL PROCEDURES
   Applicable SBOs: 42

9. NAVIGATION RADAR OPERATION
   Applicable SBOs: 51, 57, 57.1, 57.2, 57.3, 57.4, 58, 59, 60, 62, 63

TRAINING SPECIFICATIONS/MILITARY
CHARACTERISTICS

MEDIUM Part-Task Trainer (Dynamic) CATEGORY Flight Support

Air-to-Air Intercept Trainer

1. TRAINEE STATION
   Applicable SBOs: 54

2. AIR-TO-AIR RADAR DISPLAY(S)
   Applicable SBOs: 54A, 54G, 54H

3. AIR-TO-AIR RADAR OPERATION
   Applicable SBOs: 54A, 54B, 54D, 54J, 54.1, 54.8

4. TACTICAL RADAR ENVIRONMENT (TARGETS)
   Applicable SBOs: 54G, 54H, 54.8

5. AIR-TO-AIR RADAR CONTROLS
   Applicable SBOs: 54C, 54D, 54E, 54.8

6. AIR-TO-AIR RADAR WEAPON DELIVERY
   Applicable SBOs: 55A, 55B, 55C, 55D, 55F

7. ICS COMMUNICATIONS
   Applicable SBOs: 54I, 55E

A P P E N D I X G

FUNCTIONAL DESCRIPTIONS

FOR

DEVICES

SCAN TRAINER

COCKPIT PROCEDURE TRAINER (CPT)

COMMUNICATIONS AND NAVIGATION TRAINER (1D23)

AIR INTERCEPT TRAINER

FUNCTIONAL DESCRIPTION

FOR

SCAN TRAINER

AD-A058 392 NAVAL TRAINING EQUIPMENT CENTER ORLANDO FLA F/G 5/9
NAVY TRAINING COMMAND NAVAL FLIGHT OFFICER TRAINING SITUATION A--ETC(U)
JUL 78 W M KOMANSKI, R E PICTON

UNCLASSIFIED NAVTRAEQUIPC-IH-302 NL

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NAVTRAEQUIPCEN IH-302

FUNCTIONAL DESCRIPTION FOR SCAN TRAINER

I. SUMMARY

A. Purpose of the Device

1. To train undergraduate Naval Flight Officers (NFO) in the correct use of eyes to develop effective scan patterns, inside the cockpit, outside the cockpit and inside/outside (time-sharing) the cockpit.

B. Origin of Requirement. CNET SUPPORT letter, Code 01A1: tdh/30, 1500 dated 06 October 1977, tasked the NAVTRAEQUIPCEN with performing a Training Situation Analysis (TSA) for the undergraduate NFO's. Identification of training media to support this training is a product of the TSA.

II. TRAINING ANALYSIS

A. Training Situation Analysis (TSA)

1. A thorough and complete TSA has been conducted for the NFO Training Pipeline, conducted at NAS Pensacola, as documented in report NAVTRAEQUIPCEN IH-302. This analysis considered:

a. The type trainee.

b. The knowledge and skills the trainee will have acquired in the Naval Aviation School Command prior to reporting to NFO basic training.

c. The knowledge and skills required to graduate as an NFO.

d. The type aircraft the newly designated NFO can expect to be assigned to as an integral part of the aircrew.

e. The operational mission the graduate will be expected to perform.

2. An undergraduate NFO job/task inventory was prepared. To complete this inventory the CNATRA curricula for Basic NFO, Intermediate NFO, Advanced NFO navigation, and Advanced NFO radar intercept operator training were utilized. The Terminal Learning Objectives (TLO's), Learning Objectives (LO's) and Learning Steps for each of these curricula were the basis for the task inventory.

3. The NFO job/task inventory was then translated into Specific Behavioral Objectives (SBO's). The SBO's were sorted to the correct domain; i.e., psychomotor, cognitive and affective; and assigned the proficiency level required for graduation as an NFO.

4. A further sort was then made determining where the objective would be accomplished in the CNATRA instructional environment; i.e.,

Academics, Flight Support and/or Flight. A determination, selection and identification of the specific medium which would support each SBO could then be determined and the training objectives for a specific media identified.

B. Training Objectives

1. Reduce eye accommodation time, improve speed reading of instruments and displays and improve peripheral vision in order to develop effective scan patterns.

2. Develop the capability to utilize all elements of time-sharing scan to quickly and accurately identify, classify and determine specific objects for their presence, rate of closure and relative distances while at the same time, maintaining instrument/display scan for indications.

3. Develop the capability to utilize all elements of inside the cockpit scan during instrument flight conditions.

III. DEVICE DESCRIPTION

A. The device will consist of three sections, each with a student station. Each section will have a separate training capability, i.e., Section One, Eye Accommodation and Speed Reading; Section Two, Scan and Peripheral Vision; and Section Three, Time-Sharing Scan. The three sections of the device provide the capability for the student to practice eye exercises. The exercises are in no way intended or applied to improve vision. The exercises will be in accommodation, instrument speed reading, scan, peripheral vision and in time-sharing tasks from inside the cockpit to outside. The exercises and evaluation will be basic and are intended to help the student aviator to practice some basic tasks involving the integration of information from inside and outside the cockpit.

1. The eye accommodation and speed reading section will consist of an enclosure which will contain four instruments (artificial horizon, altimeter, airspeed indicator, and turn and bank indicator). These instruments will be mounted in the same position as in an aircraft cockpit. The student station will be opposite to and in line with the four instruments. It will have the capability for the student to optically, via a series of lens, observe and read the instruments at a distance of approximately one meter. The instruments will be introduced in the sequence that forms a basic instrument scan pattern. The introduction will be one at a time, then in groups of two, then the whole cluster. Capability will be provided for the instructor/operator to set the time exposure for viewing the instruments from .01 to 3 seconds and for the recording of student errors in each time setting. For distant viewing, a Landolt C and/or a Block E is used. Response is required to identify the opening of the C/E (up, down, right, left) and the time required and errors in identification will be recorded. (See attached conceptual drawing.)

2. The scan and peripheral vision training section will consist of a one meter radius light bar, forming a 200° arc, mounted vertically and be capable of being placed in any position from vertical to vertical.

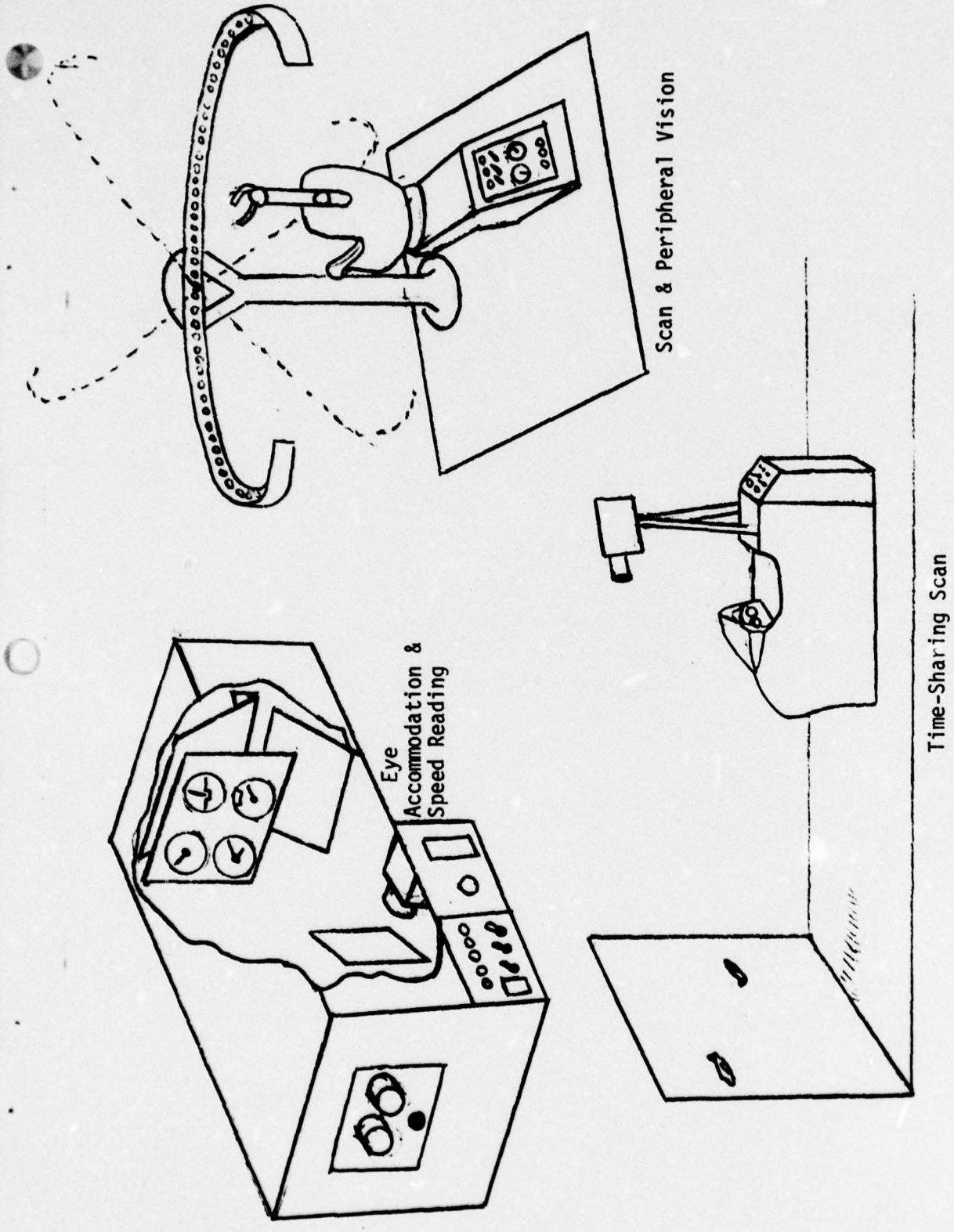
The student station will be centered within the arc. It will consist of a student seat, and a head restrainer that will restrict head movement so that the student must use his eyes instead of head movement to follow the light. Controls and recording capabilities for the instructor/operator will be mounted conveniently behind the student position. Mounted on or in the arc will be a minimum of 200 light-emitting diodes (minimum one per degree). The control of the diodes will permit them to be lighted in a sequence that will permit tracking from right to left or down to up or vice versa. The speed must be variable from one diode at a time and stepped as required to an automatic sequencing that will permit transversing from one end to another in 1/10th of a second. Evaluation will not be accomplished on this training; however, a record is required of the exercises completed and time required. Peripheral vision training will use the same light bar and head restraints that are used for scan training. Measurements will be made on the introduction of training and progress measurements will be recorded for each session. Training will be accomplished by light movements from in-vision to out of vision to exercise and improve awareness of movement. (See attached conceptual drawing.)

3. The time-sharing training section will consist of a student station resembling a cockpit enclosure with vision restrictions found in an aircraft cockpit such as windshield supports, glare shield, heads-up display, and nose position as seen from the cockpit of an aircraft. The instrument panel will have the capability to display four flight instruments (artificial horizon, altimeter, airspeed indicator, and turn and bank indicator) and four engine instruments (tachometer, EGT indicator, oil pressure indicator, and fuel flow indicator). The instrument panel may be an opaque screen with rear projection means to flash any one, or any combination thereof, including all of the instruments with normal or abnormal readings. In the training situation the student will be required to observe the instruments and indicate a correction by the correct control/controls input to overcome or nullify the error. Controls such as stick, rudder and power control will be active. In addition, the trainer will have a movable (from 5-12 feet distance) screen in front of the student station, with the capability of showing up to three intruders at one time. These intruders may be depicted as silhouettes or non-symmetrical designs and will have a controllable closing rate from zero to six hundred knots. The student will designate that he has observed an intruder by depressing a spring loaded switch. There will be two switches; one will be located on the control stick and one on the power control (throttle). The instructor/operator station will have the capability to implement the training problem, control the training situation and record the students reaction time.

B. Device Utilization and Proposed Location

1. It is anticipated each student will utilize the device 6.5 hours.

2. Training will be conducted at NAS Pensacola.



Scan Trainer

FUNCTIONAL DESCRIPTION

FOR

COCKPIT PROCEDURES TRAINER

NAVTRAEQUIPCEN IH-302

FUNCTIONAL DESCRIPTION FOR COCKPIT PROCEDURES TRAINER

I. SUMMARY

A. Purpose of the Device

1. To train undergraduate Naval Flight Officers (NFO's) in the knowledge and skills necessary to perform "pilot assist" tasks for normal and emergency procedures required to safely operate high performance naval aircraft.

2. To reduce the cost in terms of time, money and natural resources required for each trainee to achieve the required level of behavior for military jet flight by the transfer of aircraft flight time to simulator flight time.

B. Origin of Requirement. CNET SUPPORT letter Code 01A1:tdh/30, 1500 dated 06 Oct 77, tasked NAVTRAEQUIPCEN with performing a Training Situation Analysis (TSA) for the undergraduate NFO's. Identification of training media to support this training is a product of the TSA.

II. TRAINING ANALYSIS

A. Training Situation Analysis (TSA)

1. A thorough and complete TSA has been conducted for the NFO Training Pipeline, conducted at NAS Pensacola, as documented in report NAVTRAEQUIPCEN IH-302. This analysis considered:

a. The type trainee.

b. The knowledge and skills the trainee will have acquired in the Naval Aviation School Command prior to reporting to NFO basic training.

c. The knowledge and skills required to graduate as an NFO.

d. The type aircraft the newly designated NFO can expect to be assigned to as an integral part of the aircrew.

e. The operational mission the graduate will be expected to perform.

2. An undergraduate NFO job/task inventory was prepared. To complete this inventory the CNATRA curricula for Basic NFO, Intermediate NFO, Advanced NFO navigation, the Advanced NFO radar intercept operator training were utilized. The Terminal Learning Objectives (TLO's), Learning Objectives (LO's) and Learning Steps for each of these curricula were the basis for the task inventory.

3. The NFO job/task inventory was then translated into Specific Behavioral Objectives (SBO's). The SBO's were sorted to the correct domain, i.e., psychomotor, cognitive, or affective; and assigned the proficiency level required for graduation as an NFO.

4. A further sort was then made determining where the objective would be accomplished in the CNATRA instructional environment, i.e., Academics, Flight Support and/or Flight. A determination, selection and identification of the specific medium which would support each SBO could then be determined and the training objectives for a specific medium identified.

B. Training Objectives

1. The analysis disclosed that a total of fifty behaviors can be achieved in a Cockpit Procedures Trainer (CPT) either to the level of accomplishment required for graduation as an NFO or to a lesser level that allows accomplishment to the graduation proficiency level with a minimum aircraft flight time. In addition, the CPT provides a solid bridge between academic cognitive skills and their psychomotor application in the aircraft.

2. Training objectives for the trainee are as follows:

a. Familiarization with the aircraft cockpit, layout of the instrument panel and side panels, location of instruments, circuit breakers, switches, and controls. The trainee will be able to locate all items without hesitation and error, and without instructor assistance.

b. The development of knowledge and aircrewman skills required to perform aircraft procedures from pre-start to post-flight for both normal and abnormal conditions. The trainee will be able to transfer the procedural skills to a flight situation and assist the pilot in the aircraft's operation.

III. DEVICE DESCRIPTION

A. General Functional Description

1. The device shall consist of a trainee position, instructor/operator station, computational equipment and necessary peripheral equipment. It shall have the capability of providing training in cockpit familiarization, cockpit orientation, aircraft systems familiarization, normal and emergency procedures.

2. The device shall operate in two modes: Ground and Flight.

a. System simulation in both modes shall be dynamic, reacting to trainee input/response or lack of input/response. The system simulation performance shall meet aircraft specifications except the portion(s) of system simulation that would be affected by aircraft aerodynamics reaction to a system's performance. These will not be simulated.

b. Life support system simulation shall be limited to the procedures required to monitor and/or assess the system operation, e.g., pressurization, oxygen, ejection capability not provided. Simulation for these systems shall respond dynamically in that instruments/indicators, switches/controls shall react accurately to trainee input.

c. The flight mode shall be fixed (constant altitude, airspeed and heading). The flight mode purpose is to exercise those systems where there is a different performance at altitude than on the ground, e.g., engine driven fuel pump, icing of static system, air start, etc.

B. The Trainee Station

1. The trainee station of the device shall be a replica of the trainee station of the designated NFO training aircraft including consoles, flight controls, canopy and seat. All aircraft flight controls/actuators and indicators including trim tabs shall be provided and located in the same position as in the aircraft. The trainee seat will be complete including straps and inertial reel, ejection controls, and seat adjustments. See attached conceptual drawing.

2. All instruments, indicators, gauges, controls, lights, switches, etc. affecting aircraft operation shall be provided accurately reflecting system's operation and shall be located in the same position as in the aircraft. All attitude, performance and position instruments will not be activated and are for configuration only, except that when the trainer is in "flight mode" the altimeter and airspeed instrument/indicator will indicate "fixed in" flight readings, e.g., 20,000 - 275 knots.

3. The following systems will be simulated and will react in accordance with the designated NFO aircraft performance data:

a. Engine System

b. Engine Fire Warning

c. Fuel System

d. Electrical system

e. Hydraulic System

f. Oxygen System

g. Angle-of-Attack

h. Canopy System

i. Anti-Ice and Defrost System

j. Intercommunication System (ICS)

k. Air Conditioning and Pressurization System

l. Pitot and Static System

m. Flight Control System

n. Escape System (Except Ejection)

o. Landing Gear System

p. Lighting System

4. The device shall be capable of simulating the designated NFO aircraft system malfunctions and/or failures for the items listed below. This simulation will include instrumentation cues. Incorrect/correct trainee response shall be reflected in simulated aircraft system performance. Aircraft system simulation shall provide for the correct procedures as identified in the aircraft NATOPS.

a. Engine(s)

(1) Internal Engine Fire

(2) False Start

(3) Hung Start

(4) Hot Start

(5) Vibration

b. Angle-of-Attack

(1) Out of Tolerance

c. Fuel System

(1) Fuel Power Failures Above and Below 20,000

(2) Fuel Gauge

d. Hydraulic Power System

(1) Loss of One Pump

(2) Complete Failure

(3) Boost Failure

(4) Landing Gear Extension

(5) Speed Brake Retraction

e. Air Conditioning System

f. Cockpit Pressurization System

g. Oxygen System

h. Anti-Ice System

i. Defrost System

j. Electrical Power System

(1) Fire in System

(2) Failure of One Generator

(3) Failure of Both Generators

(4) Instrument A-C Power (Inverter) Failure

(5) Complete System Failure

k. Ejection System

(1) Escape

(2) Life Support

l. Landing Gear

(1) Unsafe Indication

(2) Loss of Hydraulic Pressure

(3) Handle Will Not Go Down

(4) Main Gear Not Down and Locked; Gear Handle Down

(5) Nose Gear Not Down and Locked; Gear Handle Down

m. Lighting System

n. Flight Control System

o. Pitot and Static System

C. Instructor Station

1. The instructor station shall have the capability of inserting malfunctions, monitoring the trainee and evaluting his performance. Specific capability to include:

a. Capability of establishing simulated initial conditions in order to establish a specific training situation and will include the following:

(1) Ground Operations

(2) In-flight Operations

b. Capability for the introduction of gradual and abrupt malfunctions and failures (see malfunctions and emergencies for listing). The introduction of a malfunction shall produce the appropriate visual stimuli.

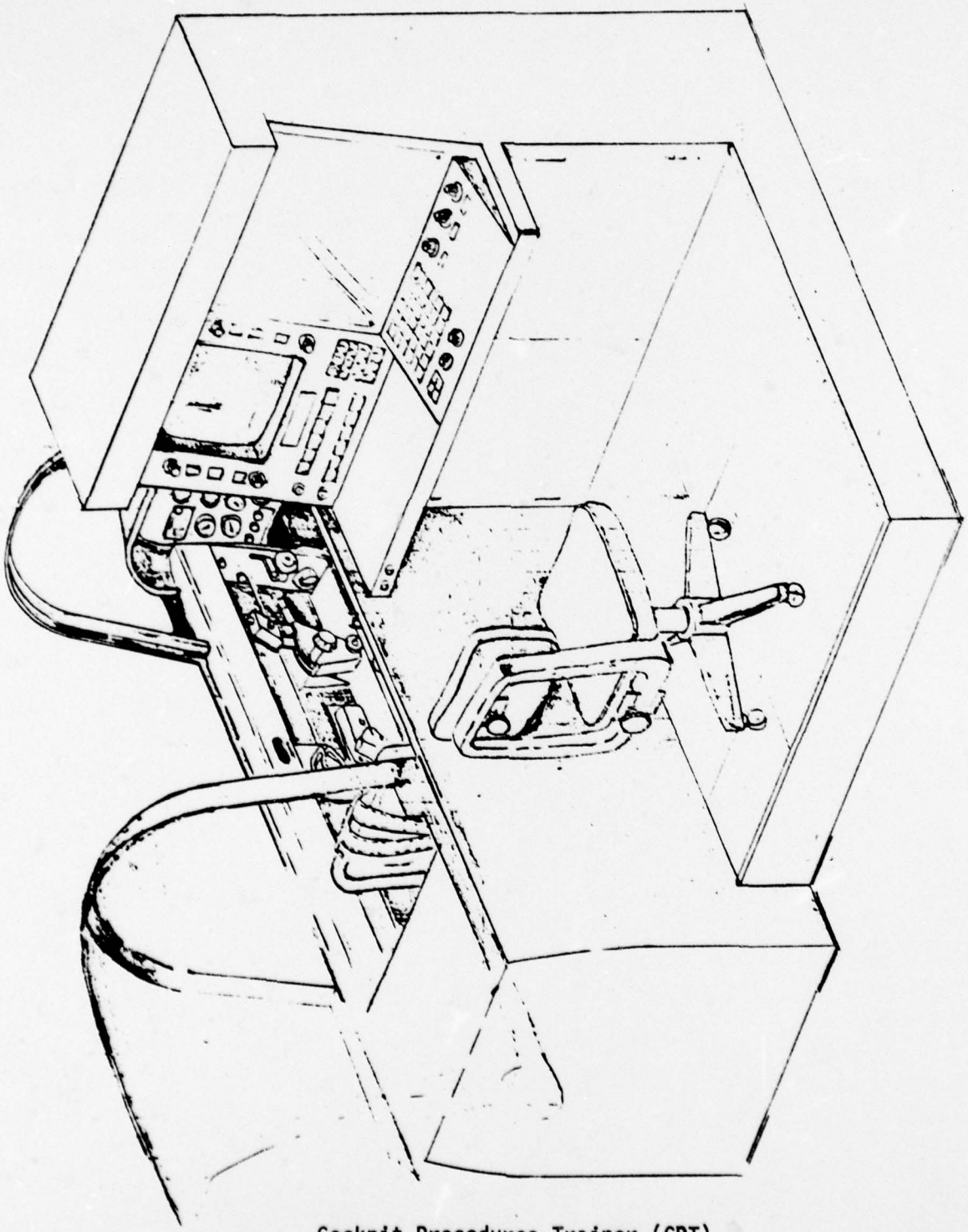
c. Instructor station/operator console shall be designed to afford a full view of the instruments, controls and indicators in the cockpit to eliminate unnecessary duplication. It will be so designed as to allow the instructor/operator console to be positioned and utilized by the trainee to implement the training problem without the instructor/operator being present.

d. A means will be provided at the instructor/operator console to display the training problem and monitor the results of trainee action in the performance of a procedure. There will be a controllable, resetable elapsed time clock of up to five minutes of elapsed time for timing trainee response.

D. Device Utilization and Proposed Location

1. Device utilization is estimated to be ten hours per student over the entire training period.

2. The Naval Flight Officer Training will be conducted at NAS Pensacola.



Cockpit Procedures Trainer (CPT)

NAVTRAEQUIPCEN IH-302

COG "20" DESCRIPTION

FOR

DEVICE 1D23

COMMUNICATION AND NAVIGATION TRAINER

DIRECTORY OF NAVAL TRAINING DEVICES



COMMUNICATION AND NAVIGATION TRAINER, DEVICE 1D23

TRAINING CATEGORY:

NAVIGATION (Dead Reckoning)

ORIGINATING AGENCY:

DCNO/AIR

SECURITY CLASSIFICATION OF DEVICE:

Device 1D23 is unclassified.

INTENDED USE:

The device is used to provide practical training of Naval Flight Officers (NFO) in communication procedures, dead reckoning navigation, airways navigation, relative motion problems and fuel management.

FUNCTIONAL DESCRIPTION:

Device 1D23 is an operator trainer which simulates typical naval aircraft operation with respect to basic aircraft flight performance, fuel consumption, radio communications and navigation system operation. Simulation reflects appropriate response of trainee station cockpit flight instruments and systems, and communications equipment to the operating condition. The device responds to command inputs of the trainee, operator and instructor.

The device consists of 40 Trainee Stations, 6 Instructor/Operator Stations, Computer Complex, and other necessary interface equipment.

Each student station represents a separate aircraft, maneuvering independently within a given problem

Change 1

area. Each trainee station can be operated without the activation of all other stations. The device simulates two problems with one half of the trainee stations working one problem and the remainder of the trainee stations working the second problem. It is also capable of providing individual training for 40 students simultaneously on the same problem.

The device also performs continuous progress monitoring of each trainee, evaluates and provides a permanent record printout of each trainee at the conclusion of each problem, and records all radio communications between operator or instructor and the trainees.

PHYSICAL INFORMATION:

Specifically designed to fit into the designated room in the VT-10 Academic Training Building (Building 3258) at NAS Pensacola. The room is 60.5 ft. by 29 ft. rectangular with six protrusions from various entryways and closets.

ENVIRONMENTAL CHARACTERISTICS:

The device withstands the following climatic conditions:

a. Temperature
   (1) Operating: 60° to 110° F.
   (2) Non-Operating and storage: -65° to 160° F.
b. Relative humidity - Up to 80 percent without condensation.
c. Barometric Pressure
   (1) Operating: From 31.45 to 24.9 inches of mercury.
   (2) Non-Operating: From 31.45 to 24.9 inches of mercury.

EQUIPMENT REQUIRED (NOT SUPPLIED):

None.

POWER REQUIREMENTS:

115 v ac, 60 Hz, 545 amps, Air-conditioning: 215,000 btu/hr.

PUBLICATIONS FURNISHED:

Maintenance Handbook with Parts List; Utilization Handbook; Computer Maintenance Manual; Programming Manual; Maintenance Requirements Cards; Work Unit Code Manual; Complete Set of maintenance drawings.

PERSONNEL:

Instructor(s): 6 qualified NFOs
Operator(s): Instructor operated
Trainees: 40
Trainee Observers: One
Maintenance Men: One

RELATED TRAINING DEVICES:

Replaces Device 1D21

CONTRACT IDENTIFICATION:

Manufactured by General Electric Co., Daytona Beach, Florida 16311 under NAVTRAEQUIPCEN Contract No. N61339-71-C-0197.

LOCAL STOCK NO.: 6930-LL-C00-1599

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FUNCTIONAL DESCRIPTION

FOR

AIR-TO-AIR INTERCEPT TRAINER

NAVTRAEQUIPCEN IH-302

FUNCTIONAL DESCRIPTION FOR AIR-TO-AIR INTERCEPT TRAINER

I. SUMMARY

A. Purpose of the Device

1. To develop undergraduate Naval Flight Officers (NFO's) in the knowledge and skills necessary to perform air-to-air intercepts while aboard high performance naval aircraft.

2. To reduce the cost in terms of time, money and natural resources required for each trainee to achieve the required level of behavior for military jet flight by the transfer of aircraft flight time to simulator flight time.

B. Origin of Requirement. CNET SUPPORT letter, Code 01A1:tdh/30, 1500 dated 06 Oct 77, tasked the NAVTRAEQUIPCEN with performing a Training Situation Analysis (TSA) for the undergraduate NFO's. Identification of training media to support this training is a product of the TSA.

II. TRAINING ANALYSIS

A. Training Situation Analysis (TSA)

1. A thorough and complete TSA has been conducted for the NFO Training Pipeline, as documented in report NAVTRAEQUIPCEN IH-302. This analysis considered:

a. The type trainee

b. The knowledge and skills the trainee will have acquired in the Naval Aviation School Command prior to reporting to NFO basic training.

c. The knowledge and skills required to graduate as an NFO.

d. The type aircraft the newly designated NFO can expect to be assigned to as an integral part of the aircrew.

e. The operational mission the graduate will be expected to perform.

2. An undergraduate NFO job/task inventory was prepared. To complete this inventory the CNATRA curricula for Basic NFO, Intermediate NFO, Advanced NFO tactical navigation, and Advanced NFO Radar Intercept Operator training were utilized. The Terminal Learning Objectives (TLO's), Learning Objectives (LO's) and Learning Steps for each of these curricula were the basis for the task inventory.

3. The NFO job/task inventory was translated into Specific Behavioral Objectives (SBO's). The SBO's were sorted to the correct domain;

i.e., psychomotor, cognitive and affective; and assigned a proficiency level required for graduation as an NFO.

4. A further evaluation was then made determining where the objective would be accomplished in the CNATRA instructional environment; i.e., Academics, Flight Support and/or Flight. A determination, selection, and identification of the specific medium which would support each SBO could then be determined and the training objectives for a specific medium identified.

B. Training Objectives

1. The analysis disclosed that a total of 18 behaviors can be achieved in an Air-to-Air Intercept Trainer to the level of accomplishment required for graduation as a Naval Flight Officer. In addition, the Intercept Trainer provides a solid bridge between academic cognitive skills and their psychomotor application in the aircraft.

2. Training objectives for the student NFO utilizing the Air-to-Air Intercept Trainer are as follows:

The SNFO will be able to:

a. Set up and check the radar for normal operation.

b. Become familiar with and be able to locate and identify all displays and controls.

c. Adjust radar displays for optimum performance.

d. Select optimum range for tactical situation.

e. Select antenna search patterns.

f. Perform air-to-air target search, target acquisition, target lock-on and intercept.

g. Analyze and interpret target on display.

h. Communicate to inform pilot of optimum intercept approach pattern and to maintain that profile.

i. Select and arm proper weapon for firing when within the envelope of the selected missile.

III. DEVICE DESCRIPTION

A. General Functional Description

1. The device will consist of: a trainee position, an Instructor/Operator station, computational equipment and the necessary peripheral equipment. It shall be capable of simulating the functions necessary to exercise the student NFO in the tasks relating to radar air-to-air target

intercept procedures. It shall be capable of continuous monitoring of the student's progress within the training mission and providing the status to the Instructor. The device shall have the capability and flexibility to permit changes to pre-programmed training mission, development of alternate pre-programmed training missions, alternative problem parameters during a training mission, and selection of events to be recorded. It shall be capable of providing a permanent record printout of the student's performance at the conclusion of the training mission with the identification of significant events, relating to the student's performance, which will be utilized for debriefing and scoring.

2. The device shall include an environment generation system which will perform at least the following functions:

a. Airborne Radar Simulation

b. Aircraft Maneuvering Simulation

c. Target Simulation

d. Weapon Simulation

e. Student Station Simulation

f. Instructor Station Simulation

3. Airborne Radar Simulation shall include at least the following functions:

a. Tactical Display System and Detail Data Display System

(1) Search

(2) Track

(3) Track While Search

(4) Anti-Jamming

4. Own aircraft maneuvering shall include at least:

a. Altitude - 0 to 50,000 ft at 100 ft increments.

b. Airspeed - 0 to 600 knots indicated airspeed (IAS) calculated to ground speed 20 MACH in 10 knot increments.

c. Heading - 001° through 360° in 1° increments.

d. Rate of climb-dive - 0 to 6,000 ft per minute in 100 ft increments.

e. Aircraft Attitude

5. Target Simulation shall include ten targets, three of which shall be maneuverable and the rest remaining in formation. Target simulation should also include at least the following:

a. Altitude - 0 to 50,000 ft at 100 ft increments.

b. Airspeed - 0 to 600 knots indicated airspeed (IAS) calculated to ground speed 2.0 MACH in 10 knot increments.

c. Heading - 001° to 360° in 1° increments.

d. Rate of climb-dive - 0 to 6,000 ft per minute in 100 ft increments.

e. Target Size

(1) Large (B-52)

(2) Medium (F-14)

(3) Small (A-4)

6. Weapon Simulation shall include the AIM 7E/F and AIM-9 missiles.

7. Degraded Performance Simulation

B. Trainee Station

1. The trainee station of the air-to-air intercept trainer shall resemble the NFO position in the designated NFO aircraft. All air-to-air/ actuators shall be provided and located in the same position as would be found in the aircraft. The trainer seat will have adjustments for distance to console, height, etc. See attached conceptual drawing.

2. All instruments, displays, indicators, gauges, controls, lights, switches, etc. effecting air-to-air operation shall be provided. These shall accurately reflect the system's operation and be located in the same positions as those in the designated aircraft.

3. At least the following air-to-air systems shall be dynamically simulated and will respond in accordance with the NFO's air-to-air system found in the designated aircraft:

a. Tactical Display - shall allow the trainee to perform air-to-air searches, interceptions and acquisition of targets.

b. Detail Data Display - shall enable the trainee to analyze the target information and determine optimum intercept approach.

c. Dynamic control for the antenna - which the trainee can move in various positions, the following patterns to be utilized:

activate, freeze, reset, insert malfunctions, and establish and change tolerance bands.

3. Capability will be provided for recording all communications between instructor and student to be used for critique at the completion of the training problem. A means will be provided for the instructor or operator to time mark errant communication by the trainee and locate the mark to obtain trainee error for critique at the end of the training session.

4. The Instructor/Operator Station shall have the capability at the end of the programmed lesson to present a static pictorial presentation for the trainee's performance for post mission critique. In addition the device shall be capable of providing a hard copy printout of the trainee's performance. The printout shall include time and event recording such as:

a. Problem Time

b. Time and accuracy of set-up and determining status of system.

c. Time to isolate and correct instructor inserted malfunction.

d. Significant changes in altitude, heading, speed, ranges to target, etc.

e. Own ship position (X-Y) on time base.

f. Target(s) positions (X-Y) on time base.

g. Target assignments.

h. Intercept start

i. Intercept status (each minute)

j. Intercept result

(1) Number of missiles fired

(2) Range

(3) Number of degrees off of attack

(4) Number of hits

(5) Number of misses - reasons, such as; equipment failure, student errors, etc.

k. Re-attack start

(1) Number of re-attacks given missiles used

(1) Azimuth Pattern Scan

(2) Vertical Coverage

(3) Capability for four different bar selections for total elevation coverage.

With this coverage the trainee shall be able to initiate auto track on the acquired target and gain manual control of the antenna during acquisition.

d. A built-in-test to allow the student NFO to check the readiness of the radar system. The test shall be a preflight/inflight operational and ground maintenance examination of the air-to-air system. This built-in-test shall include programs for malfunctions of both the Tactical and Detail Data Displays as well as malfunctions of the antenna/search/scan mechanism and related controls. There shall be a readout that will dynamically indicate results of the test, informing the trainee of the setting changes required and to verify the system operation.

e. Weapons System - shall allow the trainee to conduct and demonstrate simulated attacks against multiple targets. Trainee station shall have the capability to dynamically simulate the controls needed to fire weapons as well as simulate to the trainee a hit/miss situation.

f. Intercommunications System (ICS)

g. Appropriate Lighting - to allow the trainee to operate under conditions paralleling that of flight.

h. Input to/from the instructor/operator station - shall enable the instructor/operator to evaluate and advise the student throughout the entire course of mission, the student to receive instructions and guidance from the instructor.

C. Instructor/Operator Station

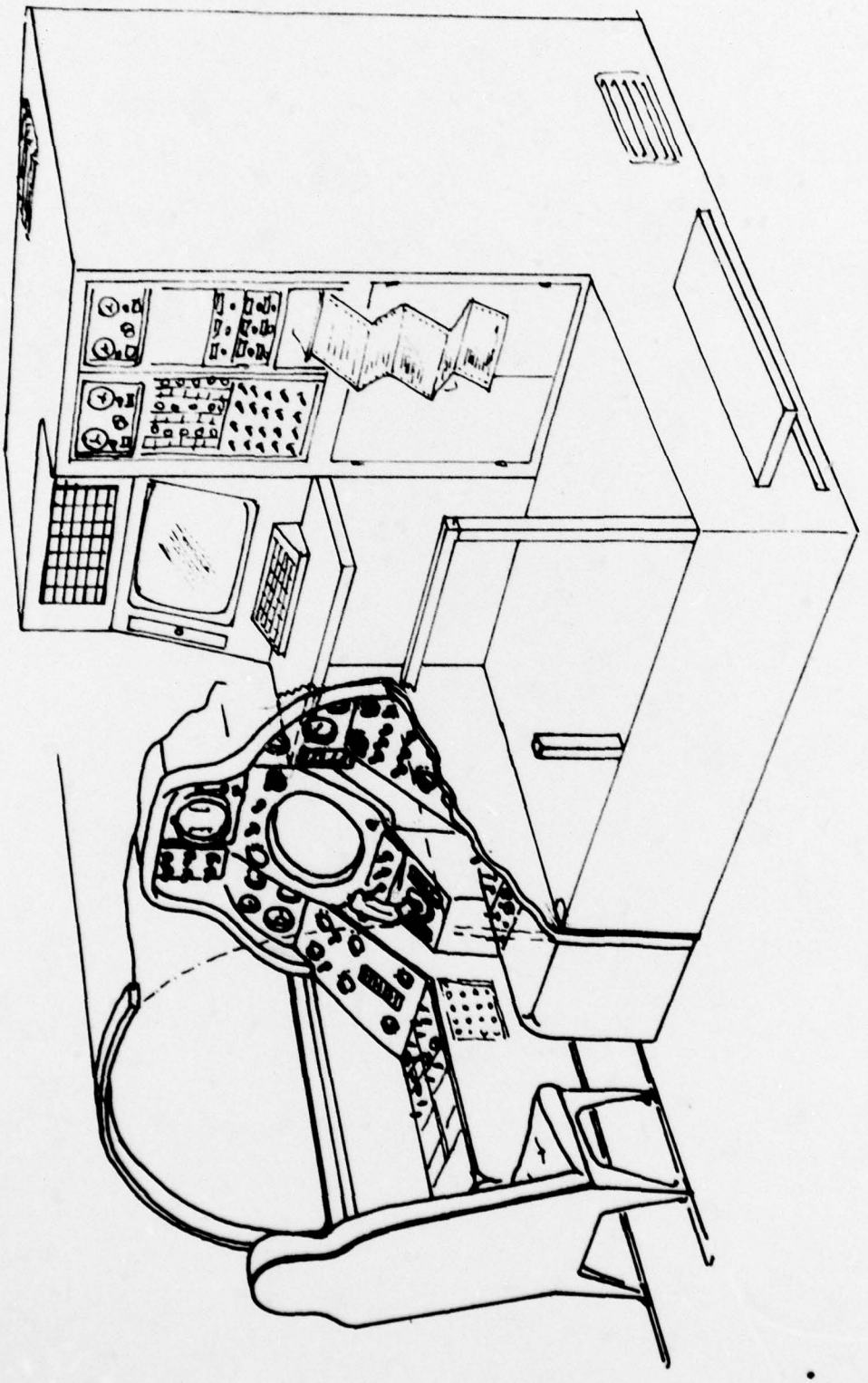
1. Instructor/Operator Station shall have at least the capability to implement the training program, control the training problem, monitor the student progress, change training problem parameters, simulate equipment failure, and override the training problem.

2. An alpha-numeric keyboard shall be the command center of the Instructor/Operator Station. An important capability of this station is the interface with the trainee station, i.e., to initiate the training problem, activate the station, control the lighting environment to be utilized, use of manual or automated lesson to be used, activation of CRT displays in both the trainee and operator station, establish and modify initial conditions,

C. Device Utilization and Proposed Location

1. Device utilization is anticipated to be 2,880 hours annually based on 12 hours a day for 240 days per year.

2. The Naval Flight Officer Training will be conducted at NAS Pensacola.



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