MICROCOPY RESOLUTION TEST CHART
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Revision A

COMPUTER PROGRAM TEST PLAN
FOR THE SH-2F HELICOPTER WEAPON SYSTEM
TRAINER (DEVICE 2F106) SOFTWARE CONVERSION
MODIFICATION

Contract No. N62269-84-C-0424 (Competitive Award)
Contract Value: $468,000

Prepared for:

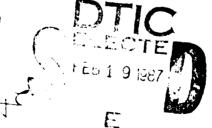Naval Air Development Center
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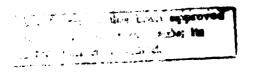NAVAIRSYSCOM
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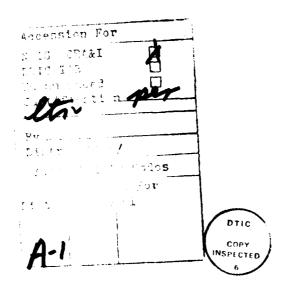Murray, Utah 84107

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1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this document is to describe the Test Plan developed by Eyring Research Institute for integration of NAVAIRDEVCEN Phase 2 software enhancements into the SH-2F WST software system, and for technical support of the Flight Control Loader upgrade (CLINs 0002 and 0003). This Test Plan is intended to allow verification that the enhanced and upgraded SH-2F WST software meets applicable technical requirements. Software testing will be performed under Contract No. N62269-84-C-0424 for the Naval Air Development Center, Warminster, Pa.

The scope of this Test Plan includes all levels of testing required to properly verify the correct functionality and operability of the installed SH-2F NAVAIRDEVCEN Phase 2 enhancements and integrated Flight Control Loader (FCL) software. The objective of this Test Plan is to provide a structured test program that will allow NAVAIRDEVCEN and Eyring personnel to evaluate the suitability of the installed SH-2F Phase 2 and FCL enhancements for acceptance certification.

Acceptance testing of both training devices (2F106NOR and 2F106NI) will be conducted on a qualitative and quantitative basis. Quantitative testing for CLIN 0002 and 0003 software enhancements is designed to verify that all software elements affected by the Phase 2 package and FCL upgrade operate according to specification and within prescribed parameters. Data collection and plotting of specific variables will verify the flight performance characteristics of the upgraded software supplied by NAVAIRDEVCEN.

Qualitative testing of CLIN 0002 and 0003 software, in the form of a typical-mission demonstration ride, will verify that all aspects of trainer functionality have been retained in the Phase 2 and FCL stages of the trainer improvement program. For this reason, the test procedures document provided for acceptance testing of CLIN 0002 and 0003 software will include the procedures used to test the VOS version software software installation (CLIN 0001). However, testing for CLIN 0002 and 0003 will be restricted to only those programs that are affected by the Phase 2 and FCL enhancements; i.e, the stand-alone utility programs and diagnostic programs accepted during CLIN 0001 testing will not be retested during CLIN 0002 and 0003 acceptance testing. CLIN 0002 and 0003 acceptance testing will be conducted in accordance with test procedures developed and provided by NAVAIRDEVCEN.

Testing described in this document will be conducted at the trainer sites (2F106NOR and 2F106NI) under normal environmental conditions. Dates of test initiation at both sites are as mutually agreed by Eyring and Naval Air Development Center.

2.0 APPLICABLE DOCUMENTS

The Test Plan described herein was developed using NAVTRADEVCEN publication 73-CO-0130-16, "Trainer Test Procedures and Results Report (Device 2F106), Vols. I-III," revised 14 August 1978; and "SH-2F Test Procedures and Results Report (Preliminary)," dated 14 December 1984. Eyring Research Institute has modified document 73-C0-0130-16 to reflect the testing requirements of the SH-2F WST Phase 2 and Flight Control Loader (FCL) software improvements, and will submit the modified document (Eyring Document No. 800-0671) as "Computer Program Test Procedures for the SH-2F WST VOS Version Modification." Eyring will append the unmodified "SH-2F Test Procedures and Results Report" to document 800-0671 for the purpose of testing the Phase 2 and FCL software enhancements.

3.0 TESTING REQUIREMENTS

The specific testing requirements for all elements of the SH-2F WST to be tested under this plan are described in Eyring Document No. 800-0671. Testing of the CLIN 0002 and 0003 software product performed in accordance with that document will be of both a quantitative and qualitative nature, and will encompass those areas of the trainer software system directly affected by Phase 2 and Flight Control Loader (FCL) software enhancements.

Quantitative testing of the integrated and installed Phase 2 and Flight Control Loader software enhancements will be performed in accordance with procedures provided by NAVAIRDEVCEN, generally consisting of data collection and data plotting tasks. The variables of the Common Data Base module that are to be plotted will be identified by NAVAIRDEVCEN, including the binary scale factor. To the greatest extent possible, data plotting will be accomplished using the System Test Driver program developed by Eyring for this project. Equipment required to support this program is listed in Section 6.0. Software required to support this program is listed in Section 7.0.

Qualitative testing will involve a demonstration ride, during which a Navy flight crew and instructor will perform and evaluate typical training mission activities to ascertain that trainer performance has not been degraded by the conversion modification.

4.0 TEST MANAGEMENT REQUIREMENTS

4.1 Contractor Responsibilities

Eyring will provide sufficient personnel, knowledgeable in all aspects of SH-2F WST software, to monitor and, if necessary, assist Navy personnel in conducting the test procedures. Assistance from Eyring personnel will be limited to loading and initializing the SH-2F Phase 2 and Flight Control Loader (FCL) integrated software, cooperative analysis of trainer malfunctions, and assisting NAVAIRDEVCEN in debugging of software deficiencies discovered during testing.

4.2 Procuring Agency Responsibilities

Naval Air Development Center must provide representatives, sufficiently knowledgeable in all aspects of SH-2F WST Phase 2 and FCL software enhancements to monitor, evaluate, and determine the suitability of the CLIN 0002 and 0003 software for acceptance certification. The principal NAVAIRDEVCEN representative will consult with the Eyring principal representative to determine the overall conduct and schedule of testing.

During testing of the integrated and installed Phase 2/FCL software, the principal NAVAIRDEVCEN representative will direct all data collection, data plotting, data comparison, and debugging efforts required by software problems. Eyring will assist NAVAIRDEVCEN personnel as directed by the principal NAVAIRDEVCEN representative. Upon satisfactory conclusion of the test procedures this representative, or his authorized delegate, will sign the test certification document.

4.3 Other Agency Responsibilities

Naval Training Equipment Center (NTEC) is requested to provide sufficient operating, flight, and instructor personnel to facilitate test performance during the proposed test schedule. NTEC personnel (with assistance from Eyring) will conduct all prescribed test and flight procedures.

5.0   PERSONNEL REQUIREMENTS

Personnel requirements are as stated in Section 4.0.

6.0   HARDWARE REQUIREMENTS

It is expected that all computer equipment listed under Attachment B to the Statement of Work will be made available to test participants throughout the scheduled test period. The computer and its peripherals, as well as the trainer proper, shall not be used for purposes other than testing during the scheduled test period.

Common support equipment required to conduct specific test procedures is listed below. Common support equipment will be provided by the Navy activities participating in the test procedures.

**Common Support Equipment Required
But Not Furnished**

1.   Stopwatch
2.   Remote Memory Monitor (RMM)
3.   Oscilloscope
4.   Two (2) analog, eight-channel strip-chart plotters
5.   Harris Model 4760 printer/plotter.

7.0   SUPPORTING SOFTWARE REQUIREMENTS

Testing and possible on-site software debugging during the test period will require the following support software:

1.   A compatible VOS version (3.1) installed on the computer system prior to start of testing.

2.   VOS utility programs DEBUG, TX, XREF, PRINTF, Vulcanizer, FORTRAN compiler and library, Harris Assembler, and VOS Job Control Language, installed on the computer system prior to start of testing.

3.   System Test Driver Analysis program (STDANL), to support data collection by the System Test Driver program. (The System Test Driver program is a Main Trainer Program module.)

8.0   SCHEDULE

The proposed test schedule is as follows:

1.   Device 2F106NOR, CLIN 0002 and 0003 Acceptance Testing

        -Start of test: 1 July 1985
        -End of test: 6 July 1985 (inc. 4 July)

2.   Device 2F106NI, CLIN 0002 and 0003 Acceptance Testing

        -Start of test: 7 October 1985
        -End of test: 12 October 1985

   Hardware- or software-related malfunctions or anomalies that interrupt the test sequence will be handled as follows:

1.   Malfunctions of the trainer proper, the trainer's computational system, or related hardware will, if possible, be repaired within a reasonable interval (1-2 hours). During the repair interval, or if the time to repair is estimated to extend beyond a reasonable interval, testing may continue on systems or procedures not affected by the malfunction.
2.   Software anomalies that interrupt the test sequence will, if possible, be remedied within a reasonable repair interval (1-2 hours). During the repair interval, or if the time to repair is estimated to extend beyond a reasonable interval, testing may continue on systems or procedures not affected by the malfunction.
3.   Hardware or software malfunctions that interrupt the test sequence, and cannot be repaired before the end of the scheduled test period, will be repaired after the test period expires and a mutually acceptable date for retesting the affected procedure or system will be set.

9.0 QUALITY ASSURANCE

The evaluation criteria described within the test procedures of Eyring Document No. 800-0671 shall be the criteria by which the success or failure of quantitative testing is judged. Accomplishment of each step in the test procedures document will be witnessed and attested by sign-off of authorized Navy and Eyring representatives. Performance anomalies that occur during testing will be cooperatively analyzed by Navy and Eyring personnel. Anomalies will be identified as either hardware-or software-based, and will be resolved as expeditiously as possible before continuing the test sequence. Anomalies that cause significant delays in testing will be handled according to the guidelines provided in Section 8.0 (Schedule).

Test results will be certified by the Eyring representative and submitted in accordance with CDRL Form 1423 requirements to the procuring activity for review.

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