NAVY F/A-18
CRASH SURVIVABLE FLIGHT
INCIDENT RECORDER (CSFIR)

TECHNICAL REPORT
OF THE
COORDINATION MEETING
28 April, 1999

CONTRACT GS-24F-3027G
DELIVERY ORDER N00019-99-F-0680
DATA ITEM A001
6 May, 1999

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Distribution Statement A. Distribution approved for public release; distribution is unlimited.
On 28 April, 1999 representatives from the Navy, Boeing and Smiths Industries (SI) met at the Naval Air Weapons Development Center, China Lake, CA for a Coordination / Kick Off Meeting in support of the F/A-18 Crash Survivable Flight Incident Recorder System (CSFIR) integration program. Smiths Industries is enhancing the software currently under development for its Voice and Data Recorder (VADR®) under this contract. This enhancement will allow the uploading of software updates and version verifications of the F/A-18 flight software via a MIL-STD-1553 multiplex data bus. This will be accomplished using the Memory Loader / Verifier Set (MLVS). A list of attendees is in attachment #1.

A copy of the presentation material is shown in attachment #3. The resulting action items are shown in attachment #2.

Additionally, on 27 April 1999, Smiths Industries witnessed a MLVS demonstration of the uploading of a new OFP into Deployable Flight Incident Recorder Smiths in the F/A-18 simulation laboratory. Smiths Industries connected its computer and 1553 bus card to the bus and captured the bus traffic. This bus traffic capture will be used during the software development effort.

In addition to the briefing material, the following items were discussed.

1. The ICWGs meetings contracted are designed to support general F/A-18 CSFIR issues such as training and familiarization, not just MLVS exclusive issues.
2. All Navy testing of the MLVS CSFIR software will be conducted at China Lake and will be closely coordinated between the MLVS and F/A-18 groups.
3. PMA-209 will furnish the MLVS (action item #2) to SI, however SI will need to procure a Linear Type II PCMCIA card for use with the MLVS.
4. SI will need to obtain software, for example “Card Copy,” to program the PCMCIA card in the linear format.
5. SI will need the MLVS connector pin out and signal definitions for its integration / test work. The MLVS currently hooks up to the aircraft 1553 bus and 28volt power. China Lake will supply SI with the MLVS signal definition and pin-out (Action item #1).

This concluded the Coordination Meeting.
# ATTACHMENT #1

F/A-18 CSFIR MLVS Coordination Meeting  
28 April, 1999  
Attendance List

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Telephone</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
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<td>616-241-8928</td>
<td><a href="mailto:otten_william@si.com">otten_william@si.com</a></td>
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<tr>
<td>Parillo, Bill</td>
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<td><a href="mailto:parillowa@navair.navy.mil">parillowa@navair.navy.mil</a></td>
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<td>Smith, Leo</td>
<td>Boeing</td>
<td>314-233-2079</td>
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<tr>
<td>Turnbull, Bill</td>
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<td>VanDorp, Jeff</td>
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<td>Vermeulen, Ted</td>
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2 of 3
### ATTACHMENT #2
F/A-18 CSFIR MLVS Coordination Meeting
28 April, 1999
Action Items

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<td>1</td>
<td>Provide drawings for MLVS connector pins and signal definition to SI</td>
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<td>SI</td>
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<td>Provide MLVS to SI for use under this program</td>
<td>PMA-209</td>
<td>SI</td>
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US Navy CSFIR Program

F/A-18 Software Enhancement
1553 / MLVS Upload Capability

Technical Coordination Meeting
April 28, 1999

SMITHS INDUSTRIES
Aerospace
Agenda

- Program Overview / Schedule
- ICD & SRS Changes
- VADR Software Design
- Laboratory Demonstration
- Issues / Concerns / Action Items
MLVS SI Program Overview / Schedule

- Program Overview
- Task Description
- Deliverables/Data Item Submittals
- Schedule
- Accomplishments to date
Program Overview

- Update Existing F/A-18 Software to allow Flight Software uploads to the VADR via 1553 from the MLVS
- Software delivered in MLVS format on a floppy per MDC96A0140 rev A
- Software to emulate existing Deployable Flight Incident Recorder
  - DFIR communications protocol defined in Appendix A of MDA 74-870172 rev C
  - Software Protocol defined in MIL-STD-2217 protocol B
Task Description

- Design, Develop, Test, and Deliver F/A-18 Software with new MLVS upload feature
- Provide Informal Demonstration to Navy at SI
- Provide Interface Change Notice to Boeing to reflect added software capability
- Support Meetings
  - ICWGs at NAS Lemoore, MCAS Beaufort, NAS Oceana
  - Program Reviews at Pax River
  - TIMs at China Lake
Task Description (cont)

- Update SI Documentation
  - SI Software Requirement Specification
  - SI Software Test Procedure
  - Software Life Cycle documents
  - Software Correlation Drawing

- Ensure that all VADRs (new production and repaired units) shipped from SI to TACAIR have ‘generic’ software loaded, capable of accepting software update via 1553 / MLVS and RS422.

27 April 1999
Deliverables / Data Item Submittals

- Technical Report - Coordination Meeting (CDRL A001)
- Updated F/A-18 Software Requirement Specification (CDRL A002)
- F/A-18 Computer Software - Preliminary (CDRL A003)
- F/A-18 Computer Software - Final (CDRL A003)
- Software Design Description - AV-8B and F/A-18 (CDRL A004)
Schedule (1553 Upload Enhancement)

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<td>Define SW Design Approach</td>
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Accomplishments to date

- Signed Contract (???)
- Reviewed Initial Technical Assumptions (results presented at this coordination meeting)
ICD & SRS Changes

- Add MLVS command words to Appendix A of the ICD
- Add MLVS unique Capabilities to SRS
VADR Software Design

- Overview
- Loader Program (LP)
- Core Software concept
- Control Program and MUX Program design
Core Software Concept

- All VADR software functionality contained in core image.
- Core software designed to meet application common requirements.
- Application specific requirements met by filling configuration data structure with application specific values.
- Separate part numbers for Core and Application Software
Control Program (CP) Core Concept

Configurable Items:
- Crash Protected Memory (CPM) Size
- CPM Partition Specifications
- Frequency Input Sample Rate
- Audio Channels
- 1553 Card Installed
- VADR RS-422 Address
- Configured CP Part Number
- Record Inhibit Parameters

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Multiplex Program (MP)

- AV-8B MP uses a core MP concept
- F/A-18 MP does not use core concept because of unique DFIRS protocol.
Loader Program (LP)

- Allows uploading a CP or MP
- Transfers control to CP or MP
- Exists in program memory with CP and MP
- Executes from RAM when loading
- Uses RS-422
- No Modification (to date) required for CSFIR project
1553 Upload Approach

- Add MLVS protocol to F/A-18 MP
- Features:
  - Minimizes impact to other programs
  - Allows different RT addresses for each MP
- Constraints:
  - Requires update to each MP
  - Restricts 1553 upload to only F/A-18 software
AV-8B 1553 Upload?

- Currently not a requirement
- Current Software is not configured as an RT
- MLVS requires RT to upload new software
- RT Address same as on F/A-18?
Test Approach

- Pre-Production
  -01-01 No MLVS

- Add MLVS capability

- China Lake Testing

- SRS and Software Adjustments

- Informal Test at SI

- Pre-Production
  -02-01

- China Lake Testing

- SRS and Software Adjustments

- Final Test Procedure

- Formal Test

- Test Report

- Production Release Software

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Planned Activities for the Next Two Months

- Finalize Technical approach
- Complete software design
- Begin software coding
- Update SRS
- Provide ICN to Boeing
Issues / Concerns

- Timing of ICWG's and TIMs
- SW development schedule matches F/A-18 integration and val / ver schedule
- SI requires MLVS loaner unit for software integration testing.