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Agenda Item 3: Operation and Performance of the MEVA III Network and Pending Transition Matters

3.3 Review of Transition Issues

FAA EXPERIENCE OF THE MEVA III INSTALLATION

(Presented by the FAA)

EXECUTIVE SUMMARY	
This paper comments on the FAA experience with provisioning of the MEVA III system.	
Action:	Suggested actions presented in section 3
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Safety• Air Navigation Capacity and Efficiency
<i>References:</i>	<ul style="list-style-type: none">• MEVA III Installation matters

1. Introduction

1.1 During the period from December 2014 to March 2015, the MEVA III vendor, COMSOFT GmbH, performed testing, installation, and transition to the MEVA III system from MEVA II.

1.2 Because of the termination of the MEVA II contract on March 31, 2015, COMSOFT committed to an aggressive installation and transition schedule. The overall result was that COMSOFT, with support of Newcom International, executed their plan well and successfully performed the transition to the new system without serious interruption of services to the Air Traffic community.

1.3 The FAA has MEVA III equipment located at three facilities:

- Miami Air Route Traffic Control Center (ARTCC), with voice connections only, has redundant baseband equipment which is linked by T1 lines to satellite modems at Newcom's Opa Locka facility. The separation between MEVA II and MEVA III satellite interfaces was highly advantageous for the transition.

- Atlanta Network Enterprise Management Center (NEMC) supports data connections for Aeronautical Fixed Telecommunications Network (AFTN) and Air Traffic Services Message Handling System (AMHS) links to MEVA members. It has redundant chains of equipment and uses the antenna system previously employed in MEVA II.
- San Juan Combined Center Radar Approach Control (CERAP) supports voice connections, at present, with redundant chains of equipment, again using the antenna system previously employed in MEVA II.

2. Discussion

2.1 Issues arose during each phase of the project; comments are presented below.

Factory Acceptance Testing

1.1 Factory Acceptance testing (FAT) was executed on the assembled MEVA III system at COMSOFT laboratory facilities in Germany during December 2015. Because of the tight schedule, this testing was performed in lieu of additional testing at the FAA's Technical Center in Atlantic City, N.J.

1.2 The FAT essentially demonstrated and confirmed the configuration and management of the system rather than its ability to perform the required communications services. Voice calls were made from station to station on the 2-wire interface, but there was no testing of the shout lines. Minimal voice quality testing was performed.

1.3 At the request of the FAA, COMSOFT demonstrated that the system could support an X.25 AFTN connection by successfully transferring 400 AFTN messages each of 200 characters payload. The ability to support an AMHS connection was deferred to a pre-transition test between Atlanta and Havana as part of ongoing interoperability testing.

1.4 In retrospect, if more attention had been paid to testing each of the services, some of the voice and data issues discovered during deployment may have been identified earlier.

Delivery

1.5 COMSOFT emailed shipping documents on December 16, 2014 in advance of sending the equipment for the Atlanta site. Although delivery addresses were reviewed as correct, no one realized or understood the delivery term "CIP" (Carriage and Insurance Paid) which only covers delivery of equipment to the port of entry. There was apparently a previous understanding that each country would be responsible for the importation and further delivery from the point of entry to the site.

1.6 Since MEVA III is a leased service and the FAA is not taking possession of the equipment, a normal import process could not be executed. With the additional difficulties of contacting people during the Holiday period, the problem could not be readily solved and Customs impounded the shipment on January 5, 2015. After revising the documentation, COMSOFT were able to execute the import and finally delivered the equipment to the Atlanta site on February 4, 2015.

1.7 Based on the Atlanta experience, COMSOFT were able to revise the shipping instructions for the San Juan equipment and it was delivered without issue on February 16, 2015. It was previously agreed that Miami equipment would be imported by Newcom International and was delivered to site on February 3, 2015.

Installation and Site Acceptance Testing

1.8 The electrical interfaces intended for the MEVA III equipment did not meet the FAA electrical standard nor conform to U.S. National Electrical Manufacturers Association (NEMA) standards. Having recognized this before delivery, Comsoft provided U.S. Uninterrupted Power Supply (UPS) equipment which both conformed to the correct interface and provided some degree of equipment isolation to interruptions in the non-critical power supply. In retrospect, the FAA would have preferred U.S. compliant power cords and power strips within the rack rather than the supplied European variants. *Better attention to the electrical interface during site survey should have prevented these issues.*

1.9 Installation of the equipment at Atlanta was completed on schedule on February 13, 2015. COMSOFT anticipated that the existing radios from MEVA II would be insufficient to support a dual system and wisely installed a temporary 60W BUC. During installation it was discovered that the data interfaces provided were all DTE rather than the standard DCE typical from telco providers (and provided by MEVA II). This required COMSOFT to ship additional non-standard “cross-over” cables to achieve DTE-DTE interconnection since rack re-configuration was impractical at this late stage in the schedule. *Better requirements specification and better attention to the data interface during site survey should have prevented this problem.*

1.10 Installation of equipment in Miami was completed on schedule on February 5, 2015. The MEVA III rack was delivered with RJ45 voice interfaces, whereas FAA facilities use 25-pair, “66-block”, as the standard interconnect. COMSOFT installed two 66-block connectors on site and provided wiring to the Redundancy Switching System (RSS) interface. Although Site Acceptance Testing (SAT) was postponed because of a delay in delivery of the T1 link to Opa Locka, it was completed on February 18, 2015. Only the 2-wire interfaces were tested through the 66-block and cabling to the facility master demarcation point.

1.11 Installation and SAT of the San Juan equipment occurred during March 16-19, 2015, successfully combining the MEVA II and MEVA III system on the same antenna. An additional 66-block interface was added per the lessons learned at Miami.

1.12 In general the installation teams were efficient and competent, but there were problems in outage coordination. Operational services were still being provided through MEVA II by SES, and too often these installation outages were not coordinated with SES and not adequately communicated to Air Traffic operations.

1.13 Because of the late delivery of equipment to Cuba, the FAA was unable to demonstrate the successful transmission of AMHS data between Atlanta and Cuba until very late in the installation schedule. This test was intended as an extension of the FAT but occurred too late to provide any advantage.

Transition Planning

1.14 With the schedule calling for the transition of services to MEVA III during one week, and a limited number of technician teams to support each site, the FAA was expecting additional detailed activity scheduling to avoid a chaotic situation of all sites wanting to perform simultaneous service transitions. After numerous requests without response, the FAA finally proposed a plan which formed the basis for transition activities.

1.15 One problem with the transition was the identification of operational services versus future need. Additionally the lack of circuit identifiers meant that correlation of shout services between sites was difficult, i.e. no relation between a service and the connected service at the remote site.

Transition Execution

1.16 Transition of two-wire dial services between sites at arranged times went relatively smoothly. Having tested the two-wire services to FAA master demarcation points, re-punching the new circuits was straightforward.

1.17 Transition of the 4-wire “shout line” services was more difficult. The wiring between the RSS RJ45 interface and the installed 66-blocks had to be re-cabled. First it was discovered that the user had to “bridge” pins 2&7 of the RJ-45 connector (not required in MEVA II) in order to tie the line high to initiate the connection. The second reason was that incorrect conductor pairing had been used in establishing the connections between the RSS and the installed 66-block.

1.18 Implementation of the AFTN data lines proved difficult. The “cross-over” cables shipped by COMSOFT to compensate for the FAD DTE interface crossed the data but incorrectly crossed the clock signals. A revised cable design and changes to the FAD configuration eventually produced a standard DCE interface at the FAA demarcation point. MEVA members at the remote end of the AFTN link had similar experiences on a variety of interfaces, and the entire transition week was spent testing and correcting interface cables.

Outstanding Issues

1.19 The following are outstanding issues:

- a) Replacement of the CPI 40W BUCs at San Juan has to be completed.
- b) Implementation of the MEVA-REDDIG asynchronous to synchronous X.25 AFTN conversion must be tested and implemented. The FAA still has two AFTN circuits, one to Caracas and one to Lima, still out of commission after the transition to MEVA III.
- c) Voice and data communications to Nassau, Bahamas must be tested and implemented.

Conclusion

1.20 COMSOFT successfully delivered the MEVA III system on time against a very aggressive schedule. Although the planning was poor, much of the success of the transition can be attributed to the excellent technical support and availability of Markus Tenbeck and his ability to provide remote configuration and troubleshooting.

1.21 MEVA members had to expend considerable effort conforming to the supplied DTE data interfaces, leading to confusion and non-standard cabling. It is recommended that new services be configured/changed to support the standard DCE interface.

1.22 COMSOFT has been very good at identifying issues and proactively providing solutions.

1.23 Unlike a purchased system, MEVA III is a leased service. As such it requires a higher level of Program Management and communication. To date, COMSOFT has been slow in identifying program personnel, establishing processes, and implementing communications mechanisms for the coordination of activities, efficient distribution of status and other relevant information.

3. Suggested Action

3.1 The Meeting is invited to review the information presented in this working paper and request COMSOFT to:

- a) identify Program personnel and establish processes:
- b) Complete outstanding issues mentioned in paragraph 2.20: and
- c) Implement communications mechanisms for the coordination of activities, efficient distribution of status and other relevant information