



USAF TELEMaintenance TECHNOLOGY SURVEY

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AFLMA LETTER REPORT LM200020900

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AIR FORCE LOGISTICS MANAGEMENT AGENCY

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DEPARTMENT OF THE AIR FORCE
AIR FORCE LOGISTICS MANAGEMENT AGENCY

LETTER REPORT
USAF TELEMaintenance TECHNOLOGY SURVEY
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CAPT CAULEY VON HOFFMAN
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AFLMA PROJECT NUMBER: LM200020900
AUGUST 2000

BACKGROUND: A study accomplished by Logistics Management Institute (LMI) identified numerous potential advantages of telemaintenance to improve the effectiveness and efficiency of maintenance resources. In the LMI study and for the purpose of this report, telemaintenance is described as "... the transfer of information electronically between the maintainer and remote resources to perform a maintenance action."¹ The study provided specific examples of current initiatives throughout the DoD and concluded that the fragmented nature of these efforts may hamper the development and implementation of telemaintenance concepts.

PROBLEM STATEMENT: There is no consolidated listing of USAF telemaintenance initiatives or identification of USAF offices responsible for those initiatives. HQ USAF/ILM tasked AFLMA/LGM to conduct a survey of Air Force telemaintenance technology initiatives currently underway.

OBJECTIVES: Provide ILM with a report that identifies Air Force telemaintenance technology applicable to aircraft maintenance. Report should include telemaintenance project title, description of effort, organization, and point of contact (POC) information.

METHODOLOGY: The sponsor-imposed suspense of 15 days from receipt of tasking limited our available methods and scope of research. To achieve our objectives within established time constraints we took the following steps:

1. Searched DoD Scientific and Technical Information Network for telemaintenance related literature available from Defense Technical Information Center.

¹ David M. Cutter, *Telemaintenance as a Process to Increase Maintenance Effectiveness and Efficiency*, Logistics Management Institute, LG903L1/March 2000.

2. Contacted, via telephone and/or e-mail, the Air Expeditionary Force Battlelab, Air Force Research Laboratory (AFRL), Air Force Materiel Command (AFMC), Air Force Special Operations Command (AFSOC), and the following System Program Offices (SPO): B-1, B-2, C-5, C-17, C-130, F-15, F-16, F-22, F-117, Precision Attack, and Integrated Maintenance Data System.
3. Surveyed the POC on existence or in-work future capability of a telemaintenance technology system for on- or off-equipment aircraft maintenance.

DISCUSSION: This section describes the consolidated results collected from literature search and direct organizational contacts.

1. Literature Search Results. The literature search yielded the following information:
 - a. Telemaintenance-related projects have been undertaken by Defense Advanced Research Projects Agency, Navy Personnel Research and Development Center, and General Dynamics Land Systems Division (U.S. Army).
 - b. A joint Navy/Air Force study was completed that presents a comparison of technician performance supported by Interactive Electronic Technical Manuals with performance using conventional paper-based technical manuals.²
 - c. Technical Order 00-25-107, *MAINTENANCE ASSISTANCE*, provides instructions for requesting technical assistance from AFMC depot engineers and equipment specialists. Sarah-Lite message, e-mail, telefax, or telephone may be used to forward requests.
2. Direct Organizational Contact Results. Most organizations contacted provided a negative response concerning telemaintenance initiatives. The few positive replies follow:
 - a. AFSOC/LGM³ and Precision Attack SPO⁴ representatives stated that depot engineers and equipment specialists routinely communicate recommendations and authorizations via e-mail and telephone with base-level maintenance personnel. Digital camera images are often included with e-mail transmissions to help engineers assess damage to equipment and potential for failure, and to determine the feasibility for continued use.
 - b. The C-130J aircraft has fully integrated digital electronics that provide maintenance personnel with fault detection code information that may be electronically transferred. Additionally, technical manuals are in digital format facilitating electronic transfer of information from home

² Mark T. Kramer, Theodore J. Rainey, C. Samuel, *Results of a Joint Navy/Air Force Operational Test to Evaluate USAF Integrated Maintenance Information Systems (IMIS), Interactive Electronic Technical Manual (IETM) Technology Applied to the F/A-18 Aircraft*, CARDEROCKDIV-93/007, 14 June 1993.

³ SMSgt Edward Morse, Functional Manager, Combat Systems, HQ AFSOC/LGM, DSN 579-2356.

⁴ MSgt Arlen Dale, Equipment Specialist, WR-ALC/LYTSP, DSN 468-7421.

station to a deployed location.⁵ Current capability available to units is similar to using Online AF Electronic Publications or the AF Electronic Publishing Library CDROM. Personnel could transfer fault code information with basic e-mail access.

- c. The F-22 Integrated Maintenance Information System (IMIS) consists of a Portable Maintenance Aid (PMA), Maintenance Support Workstation (MSW), and Maintenance Service Units (MSU). The PMA is a small (9.85 pound) computer designed for use on the flightline. It displays interactive electronic technical manuals that offer detailed instructions to inspect, troubleshoot, and replace components. Maintenance personnel plug the PMA into an aircraft data port where it can remotely perform system functional checks and verify failures. Additionally, it has the capability to order parts, record maintenance actions, and load operational flight plan software.⁶
- d. AFRL completed a project in 1998, titled “Integrated Technical Information for the Air Logistics Center.” The objective was to improve depot maintenance capability by developing technology to integrate required technical information. A wireless portable computer provided the technician with all required information. The technician had electronic access to job cards and technical orders, and could e-mail the engineering office for assistance. A budget cut forced the laboratory to limit the program scope and therefore only demonstrate fewer technologies than planned.⁷
- e. The Integrated Maintenance Data System (IMDS) design involves interfaces with a number of systems, including the F-22 IMIS. Implementing a common Radio Frequency Local Area Network infrastructure for both IMIS and IMDS may offer telemaintenance possibilities for wireless PMAs. Theoretical capabilities of an IMDS/IMIS interface are beyond the scope of this report. Furthermore, recent changes to IMDS acquisition strategy will reduce its impact.⁸ Additional integration information may be found in “Memorandum of Agreement Between the F-22 System Program Office (ASC/YF), Integrated Maintenance Data System Program Office (SSG/ILM), Air Force Installation & Logistics (AF/ILMM), and Air Combat Command (ACC/DR F-22 SMO, ACC/LGX1) For the F-22 Integrated Maintenance Information System (IMIS)/Integrated Maintenance Data System (IMDS) Interface.” JUNE 2000, PREPARED BY: F-22 System Program Office (SPO).

⁵ E-mail, Brett T. Norris, Product Support Engineer—Sr., C-130J Technical Publications Group, Lockheed Martin Aeronautics Co., (770) 494-5159, to SMSgt Eric Mazlik, AFLMA/LGM, 2 August 2000.

⁶ F-22 Media Guide – Support System, Available: <http://www.lmasc.lmco.com/f22/mgsupsys.htm>, accessed 7 August 2000.

⁷ E-mail, Paul Faas, AFRL/HESR, DSN 986-4390, to CMSgt John Drew, AFLMA/LGM, 3 August 2000.

⁸ Message R 270833Z JUL 00, HQ USAF/ILM, “Integrated Maintenance Data System (IMDS) Acquisition Strategy Review (ASR) Status,” 27 July 2000.

CONCLUSION: The Air Force maintenance community uses commonly available technologies to enhance information transfer and increase maintenance efficiency/effectiveness. However, our evaluation resulted in the following determinations:

1. We were unable to identify any ongoing Air Force telemaintenance technology initiatives or any initiatives that incorporate remote maintenance assistance capability.
2. We could not identify an assigned office of primary responsibility for telemaintenance issues within the organizations contacted or the Air Force

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REPORT DOCUMENTATION PAGE

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12 December 2000

MEMORANDUM FOR AFLMA/LGM

FROM: SAF/PAS
1690 Air Force Pentagon
Washington DC 20330-1690

SUBJECT: Air Force Logistics Management Agency (AFLMA) Report LM200020900,
USAF Telemaintenance Technology Survey

The subject information has been reviewed; Item(s) 4 & 5 below applies to this case:

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- (2) Department of Defense and is cleared, as amended, for public release.
- (3) Department of the Air Force and is cleared for public release.
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- (6) Future submissions should include 10 copies of material and submitted 10 workdays prior to presentation.
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- (8) Classified information has been identified during the review process. Contact your Security Manager for guidance in removing the information from all unclassified computers.

USAF Telemaintenance Technology
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Project # LM200020900

Project Manager: SMSgt Eric Mazlik
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