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# Proceedings of the 1989 ADAM Workshop

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## **Part I**

### **Overview**

The following report is the first in a series of three reports prepared by the Office of the Auditor General of Canada (OAG) on the Canadian Forces (CF) in response to the recommendations made by the Standing Senate Committee on National Security, Defence and Veterans Affairs (SSC) in its report entitled *Review of the Canadian Forces' Readiness to Defend Sovereignty and National Security Interests*, presented to the Senate of Canada on July 1989.

The purpose of this report is to provide an overview of the current state of the Canadian Forces (CF) and to identify areas where improvements can be made. The report will also highlight the challenges facing the CF in the future, particularly in terms of maintaining readiness and ensuring the safety of personnel.

This report is intended to be a comprehensive overview of the CF's operations, including its personnel, equipment, and facilities. It will also examine the effectiveness of the CF's command and control structures, as well as its ability to respond to various types of emergencies.

The report will be divided into several sections, each focusing on a specific aspect of the CF's operations. These sections will include an analysis of the CF's personnel, an examination of its equipment and facilities, and an assessment of its command and control structures. The report will also include recommendations for improvement, based on the findings of the audit.

The report will be presented in a clear and concise manner, with the aim of providing decision-makers with the information they need to make informed decisions about the future of the CF. The report will also serve as a valuable resource for those interested in learning more about the Canadian Forces.

# Chapter 1

## Introduction

### 1.1 The ADAM Workshops

ADAM is now a major software project; it provides a fully integrated environment for both data reduction and data acquisition. It is being used in Hawaii, Australia and the Canary Islands, as well as the UK, and has been adopted by Starlink as the environment in which Starlink data reduction software should run. One of the most remarkable things about ADAM is that it has been developed as a co-operative effort between groups that are spread across the world. Although the initial system came out of RGO, and ROE provided by far the major effort in designing and implementing the VAX version, various parts of what is now regarded as 'ADAM' have also come from other establishments. Co-ordinating a project being developed in this way is not an easy job, but the somewhat varied parentage of ADAM – although sometimes an administrative nightmare – is also one of its strengths; it is not a system developed in one place to serve the specific needs of that one place.

One way in which this development is co-ordinated is by a series of workshops. These have taken place at about 18 month intervals since the first one in late 1985. The workshops are attended by people actively developing and/or making extensive use of ADAM, and provide a forum for detailed discussion of the problems in the current system and plans for its extension.

The 1989 ADAM Workshop was held at Cosener's House, Abingdon from 3rd to 7th July 1989. An 'Open Meeting' was held on Friday 30th June at RAL to enable members of the Starlink community to provide input to the Workshop discussions.

Before the previous workshop, in Hawaii, a trend had started to emerge for different establishments to plug the gaps in ADAM (which at the time was missing a number of important facilities) with local solutions. The Hawaii Workshop consolidated these local extensions, adopting some and rejecting others. As a result, ADAM, as reviewed by this third workshop, was a much more complete and uniform system, and it was possible to start to look in detail at the various enhancements that were still needed; in particular, to make it efficient as a data reduction environment.

This document summarises the conclusions and actions arising from the Workshop and presents brief reports on the discussions, prepared, in most cases, by the session chairmen. Part III consists of documents submitted, prior to the Workshop, for consideration during it; their content was not necessarily endorsed by the Workshop. Part IV consists of those reports and proposals, arising out of Workshop action items, which have already been submitted.

## 1.2 Participants

William Lupton	AAO	CBS%AAOEPP::WFL
Keith Shortridge	AAO	CBS%AAOEPP::KS
Tony Farrell	AAO	CBS%AAOEPP::TJF
Jeremy Bailey	JAC	CBS%JACH::JAB
Bernard McNally (BVM)	JAC	now REVAD::BMC
Dennis Kelly	ROE	REVAD::BDK
Lewis Jones	RGO	GXVB::LRJ
Jonathan Burch	RGO	GXVB::JMB
Nigel Houghton (NRH)	La Palma	RGVAD::LPMAIL (Subject Nigel Houghton)
Bob Vallance	UofB	BHVAD::RJV
Peter Allan	UofM	MAVAD::PMA
Malcolm Currie (MJC)	Starlink	RLVAD::CUR
Alan Chipperfield	Starlink	RLVAD::AJC
Dave Terrett	Starlink	RLVAD::DLT
Rodney Warren-Smith	Starlink	RLVAD::RFWS
Patrick Wallace	Starlink	RLVAD::PTW
Mike Lawden	Starlink	RLVAD::MDL

Also attending some sessions were:

Jo Murray	Starlink	RLVAD::JM
John Sherman (JCS)	Starlink	No e-mail
Dave Giaretta	RAL	STADAT::DLG
Monica Kendall	RAL	STADAT::MLK
Clive Page	UoFL	LTVAD::CGP

Mail addresses from Starlink machines are given in the third column.

Participants may be referred to by their initials, which in most cases are the same as the username in the mail address. Where this is not the case, initials are given in parentheses after the participant's name.

## 1.3 Abbreviations and Glossary

AAO	Anglo-Australian Observatory
AAT	Anglo-Australian Telescope
ACT	An application-dependent routine to perform the task actions (see AED/1)
ADAMSC	ADAM Steering Committee
ADC	A library for handling relational data (see SUN/71)
AED	ADAM Environment Description
AON	ADAM Observer Note
ASG	ADAM Support Group (Starlink funded, from April 1990)
AST	VMS Asynchronous System Trap
Asterix	An X-ray data processing applications package (see SUN/85)
CMS	DEC's Code Management System
DCL	DIGITAL Command Language used with DEC's VMS operating system
DEC	Digital Equipment Corporation

### 1.3. ABBREVIATIONS AND GLOSSARY

ERR	ADAM's error reporting facility (see AED/14)
Figaro	A general data reduction system (author KS) (see SUN/86)
GKS	Graphical Kernel System (see SUN/83)
GNS	Graphics Workstation Name Service (see SUN/57)
HDS	Hierarchical Data System (see SUN/92)
ICL	Interactive Command Language (author JAB)
IDI	Image Display Interface – an international standard in astronomy (see SUN/65)
IFL	Interface file (see AED/3)
INT	Isaac Newton Telescope (La Palma)
IPMAF	IRAS Post Mission Analysis Facility (RAL)
IRAS	Infra-Red Astronomy Satellite
JAC	Joint Astronomy Centre (Hilo, Hawaii)
JCMT	James Clerk Maxwell Telescope (Hawaii)
KAPPA	Kernel Applications Package (see SUN/95)
MMS	DEC's Module Management System
MON	A fast monitoring and transfer system (see AED/2 and AED/9)
MONGO	An interactive plotting program (see SUN/64)
MSG	ADAM's message facility (see AED/14)
MSP	Message System Primitive Routines (see SSN/2)
NBS	Noticeboard System (author WFL)
NCAR	Graphics package from The National Center for Atmospheric Research (see SUN/88)
Obs	Observatories (AAO, La Palma, JAC)
PGPLOT	A graphics subroutine library (author T J Pearson, Caltech) (see SUN/15)
RAL	Rutherford Appleton Laboratory
RGO	Royal Greenwich Observatory
ROE	Royal Observatory, Edinburgh
ROSAT	A joint USA, UK and West German X-ray satellite (due for launch May 1990)
RPT	A low-level error reporting facility (author Johan Hamaker, JCMT)
SCAR	Starlink Catalogue Access and Reporting (see SUN/70)
SG	Starlink Guide
SIG	Special Interest Group
SLW	Sid Wright – author of much of the original Starlink Software Environment (SSE)
SMG	DEC's screen management library
SMS	ADAM's Screen Management System user interface
SSE	The original Starlink Software Environment – superseded by ADAM
SSN	Starlink System Note
SUN	Starlink User Note
UKIRT	United Kingdom Infra-Red Telescope (Hawaii)
UofB	University of Birmingham
UofE	University of Edinburgh
UofL	University of Leicester
UofM	University of Manchester
VMS	An operating system for DEC VAX computers
WHT	William Herschel Telescope (La Palma)

## Chapter 2

# Summary

### 2.1 Conclusions and Actions

This section summarises the main conclusions and actions generated at the Workshop. More detailed discussion of the topics may be found in the reports on the sessions. It should be noted that, because most participants have numerous other duties, no timetables or guarantees were given by people accepting actions – the Workshop itself has no authority to direct effort. Nevertheless, many actions have already been completed.

Reports and proposals submitted to date in response to actions are included as appendices to this document and referenced here. Actions which were implemented in ADAM Version 1.6, released on 6th December 1989, are flagged with '[V1.6]'.

#### Review of previous workshop

- ADAM V2 will not contain ENGIF. (AJC) [V1.6]
- ADAM V2 will be the last major release that contains ADAMCL, MON and DIAGRAM. (AJC)

#### Software reliability

- Starlink should bid for quality assurance person(s). (PTW)
- The need for checking critical parts of the system is recognised and the ADAM support group is requested to coordinate this effort. (ASG)

#### Documentation

- The ADAM guide needs revising with, amongst other things, more sections on application packages, description of ADAM structure, ... (MDL)
- The ADAM Guide will contain short sections on all ADAM application packages. Suggested authors were: Bob Vallance (ASTERIX), Nick Eaton (DAOPHOT and PHOTOM) and Helen Walker (SCAR).
- Documents in ADAM series (AONs, AEDs *etc.*) will slowly be retired and replaced with Starlink documents. (MDL)

- Starlink documents will acknowledge the author's institution. (MDL)
- Production of ADAM data analysis and data acquisition programmers' manuals is regarded as a high priority for the ADAM support group. (ASG)
- Both ADAM and stand-alone versions of a given package should be described in a single document. (MDL)
- Programmer-level documentation is required for all packages. Such documents should have a standard format of 'philosophy followed by descriptions of routines'. (ASG)

#### **Releases and bug reports**

- ADAMSTART should display an over-all ADAM version number. (AJC) [V1.6]
- Test suites for D-tasks should be provided. (Obs)
- A public ADAM programming conference will be set up. (AJC) (Appendix I.1)
- All ADAM bugs should be reported to RLVAD::STAR. (All) (Appendix I.2)
- Proper timing tests must be performed on ADAM packages so that it will be possible to measure the effect on performance of any future changes. (ASG)
- There is a need for a definite policy on which computer systems ADAM is supported (e.g. on multi-processor systems?). (ASG)
- A strong effort must be made to achieve upwards compatibility of application code. (ASG)
- Proper use should be made of shareable image *major-id* and *minor-id*. (AJC) [V1.6]
- ADAM should use Starlink shareable libraries (rather than linking them into ADAM shareable images). (AJC)
- Starlink will rationalise its use of shareable libraries. (DLT)

#### **Private versions of IFLs**

- The ADAM\_IFL logical name will be used as a search path (IFC then IFL in each directory). (AJC) (Appendix J) [V1.6]
- COMPIFL will support an INCLUDE facility. (AJC)
- It is no longer planned that the automatic run-time compilation of interface files should be removed.

#### **Error reporting**

- Following the inconclusive discussion, a firm proposal is required (RFWS).

#### **HDS**

- Temporary storage problem: on annul of temporary object, will delete it and truncate the file if space at the end of the file is unused. (WFL)

- Dangling locator problem: to be resolved by using a unique sequence number for each locator. (WFL)

### Parameter system

- > 1 line of help text: will use the help text as VMS help library and topic specification. Detailed proposal is required. (JAB) (Appendix G)
- Abbreviated parameter keywords: will use automatic non-ambiguous abbreviation. Detailed proposal is required. (AJC)
- MIN and MAX: will support MIN and MAX responses. Detailed proposal is required. (WFL) (Appendix F)
- ‘\’ in response to prompt: will be supported. Method agreed. (AJC)
- PAR inquiry routines: detailed proposal required. (LRJ)
- Strong typing in IFL: violations will be handled as errors. (AJC)
- User-supplied conversion routines: detailed proposal is required. (LRJ)
- HDS impact on parameter system operation: timing tests are required. (AJC)
- Conversion of responses to upper-case: use IFL keyword. Detailed proposal is required. (AJC)
- Behaviour when getting cancelled parameters: always prompt. (AJC) [V1.6]
- Behaviour of RESET: ignore ‘current’ in vpath and ppath. (AJC) [V1.6]
- Setting parameter state: need modified PAR\_CANST proposal. (AJC)

### Distributed NBS

- Produce write-up of background and proposed implementation strategy. (WFL) (Appendix K)

### Tasking architectures

- Task type unification: agreed in principle. Need detailed proposal. (TJF)
- ADAM system modifications: complete and release. (WFL)
- Replacement for AZ\$SNDAST: discuss with Lewis Waller. (TJF/LRJ)
- Monolith resource allocation/release: need definite proposal. (TJF)

### ICL

- Double precision for scalars: agreed. (JAB) (Appendix H.1) [V1.6]
- Command line editing: save last n commands in a file. (JAB) (Appendix H.2) [V1.6]
- DCL access: allow ‘\$’ in place of ‘DCL’ and remove DIR command. (JAB) (Appendix H.3 and H.4) [V1.6]

- Lexical functions: provide equivalent of F\$ELEMENT. (JAB) (Appendix H.5.1) [V1.6]
- File existence: provide means of testing file existence. (JAB) (Appendix H.5.2) [V1.6]
- Figaro support: use DEFUSER and modify existing FIGARO command. (JAB) (Appendix H.6) [V1.6]
- Use of wild-cards: need detailed proposal. (PMA)
- Arrays: Need definite proposal. (ASG)

### **Graphics from the command language**

- Philosophy: preferred solution is to have low-level operations in a monolith.
- Need survey of most appropriate graphics package to support. (ASG)
- Leicester PGPlot wrap-around package: circulate details. (CGP)

### **SCAR**

- ADC interfaces: urgently need reviewing to assess suitability for support by the ADAM support group and to ensure that they could support different database systems. (ASG)
- Alternative interfaces: circulate details of STDB interfaces. (DLG)
- Timing: circulate comparative timing tests. (DLG)
- Application access to user interface screen: need definite proposal. (DLT)

### **Figaro**

- Help: use DEFHELP rather than HLP\$LIBRARY definitions. (KS)
- Starlink release of monolith: plan for mid-October with updated documentation but before all known problems are fixed. (KS)
- User variables: access ADAM\_USER:GLOBAL.SDF directly. (KS)

### **ADAM V2**

- Security: discuss security aspects of the ADAMNET process. (BVM/DLT)

### **Workstations**

- Apply for grant for person to work on SMS conversion to DECwindows (with input from Starlink and all observatories). (UofE)

### **Instrument and telescope interfaces**

- Not practicable to standardise interfaces to instruments; possibly possible to standardise interfaces to telescopes.

- Should be possible to standardise the interface between D-tasks and instrument control micros. (BDK/NRH)

### Interrupting ADAM tasks

- Need definite proposal. (TJF)

### Portability

- Use of %VAL can continue. A pre-processor may be needed for some operating systems.
- Should investigate availability of ADA compilers and the true implications of using ADA for all or part of an ADAM system. (NRH)
- Starlink is intending to attempt to port a limited subset of ADAM to a DECstation running Ultrix.
- A port should not be achieved by reducing functionality to the 'lowest common denominator'.

### D-task fixed part

- An enhanced DTASK\_ASTSIGNAL is to be provided. (BDK)
- A detailed proposal for concurrent and/or queued task actions is required. (JMB)
- A feasibility study is required on asynchronous handling of incoming commands by the D-task fixed part. (JMB)
- A facility for invoking one action from another in the same task is not necessary.
- A facility for delivering a user AST to a control task on receipt of a message from a subordinate task was decided against.

### Setting default directory

- Following the inconclusive discussion, a firm proposal is required. (TJF)