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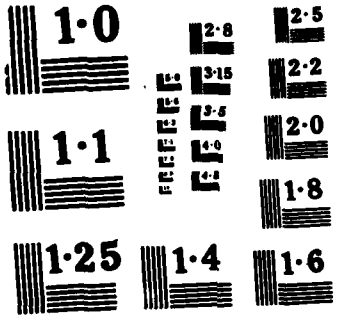

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STARS METHODOLOGY AREA SUMMARY

Volume I: Organization and Plans

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Robert Converse
Catherine W. McDonald
William Riddle
Christine Youngblut

March 1985

Prepared for

Office of the Under Secretary of Defense for Research and Engineering

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This report consists of two volumes: Volume I presents the organization and plans of the STARS Methodology Coordination Team. Volume II is a technical report concerned with the development of methodology classification, evaluation and selection technologies and a framework of characteristics that can be used to support these technologies.

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PREFACE

Initially, the Ada* Joint Program Office (AJPO) sponsored Professors Peter Freeman and Anthony Wasserman to identify requirements for software development methodologies that would allow the Department of Defense (DoD) to realize the full potential of Ada. Their report, referred to as METHODMAN, was published in November 1982. Since that time, the work on methodologies to support Ada has been transferred to the DoD Joint Program Office for the program entitled Software Technology for Adaptable and Reliable Systems (STARS). The STARS Joint Program Office (SJPO) objective is to improve the productivity level of software system development and support as well as the resulting quality of deployed software systems.

This document is quite different from METHODMAN; it is essentially a report describing work performed under the Methodology Area of the DoD STARS Program during 1984. Indeed, plans call for such reports to be published annually. This report consists of two volumes: Volume I presents the overall objectives and plans associated with the Methodology Area and provides a status report for the activities from the past year; Volume II is a technical report concerned with the development of methodology classification, evaluation and selection technologies and a framework of characteristics that can be used to support these technologies.

One similarity with METHODMAN remains, however. This document is a report of work in progress. Public review and comment on this work is vitally important to its success. Therefore, comments from the community at large are encouraged and will be actively considered in the continuing work in the STARS Methodology Area. Constructive comments should be mailed to:

Facilitator, STARS Methodology Area
Mr. Peter Fonash
AMC/BAM (AMCDE-SB)
5001 Eisenhower Avenue
Alexandria, Virginia 22333-0001

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The authors would like to thank those people who participated in the limited review of this document. Suggestions not incorporated in this document will be addressed in future publications under the STARS Methodology Area.

The authors also appreciate the efforts of Joe Batz, Carol Morgan and Robert Mathis from the STARS Joint Program Office, and Tom Probert and Jack Kramer of IDA for their comments on previous versions of this document. Special thanks go to Lou Chmura, Sam Redwine, Pete Fonash, George Sumrall and all the other members of the MCT who contributed so heavily to the material presented here.

Finally, the authors would like to thank Jo Ann Stilley and Betty Henderson for their assistance in preparing the document. Mrs. Stilley spent many hours typing the various drafts and the final version. Ms. Henderson prepared all of the figures and tables.

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1.0 INTRODUCTION

The Ada programming language supports many modern software engineering concepts such as information hiding and data abstraction. The use of these features in the development and life cycle support of software for mission critical systems promises extensive improvements in terms of reduced software development costs, software quality and ease of life cycle support. However, if Ada software systems are produced and modified using the development and life cycle support processes common during the past decade, then the potential improvements cannot be expected. Instead, approaches that are consistent with both Ada and modern software engineering principles must be used.

In March 1982, the Department of Defense (DoD) Ada Joint Program Office (AJPO) tasked Professors Peter Freeman and Anthony Wasserman, from the University of California, to develop a rationale and a set of requirements for Ada-oriented development and life cycle support methodologies. As part of this effort, Freeman and Wasserman prepared a document, "Ada Methodologies: Concepts and Requirements" (1). This document, commonly referred to as METHODMAN, provided a rationale for Ada-oriented development methodologies that addresses management and technical issues. In addition, it provides a preliminary framework for classifying Ada-compatible development methodologies and a preliminary set of requirements for such methodologies in terms of general, desirable attributes.

Professors Freeman and Wasserman also conducted a survey of 24 existing development methodologies. The survey was in the form of a questionnaire completed by the developers of the methodologies. The responses were used to assess each methodology in terms of life cycle coverage, suitability for a variety of applications, support of several key technical concepts and support for or use of specific Ada constructs. The survey results were published in "Ada Methodology Questionnaire Summary" (2).

Finally, Professors Freeman and Wasserman proposed a plan for experimentally comparing software design methods in a report entitled "Comparing Software Design Methods for Ada: A Study Plan" (3). In it they argue the need to evaluate software methodologies objectively and propose one such experiment. This particular experiment focuses on measuring differences among various software design methods as indicated by the "maintainability" of the resulting software system.

Public review and comments on these documents were solicited in early 1983, and replies were received from many individuals and organizations. The replies were analyzed by Mr. Ray Houghton, from the National Bureau of Standards, who led the AJPO work on methodologies from November 1982 through August 1983. On the

whole, METHODMAN was well received, but several comments contained useful ideas for expanding the scope of the effort. In September 1983, the AJPO established the Ada Methodology Project with a project scope that included consideration and analysis of the comments and suggestions received from the public review.

Since the establishment of the DoD Software Technology for Adaptable and Reliable Systems (STARS) Program in 1983, the Ada Methodology Project has fallen under the purview of the STARS Methodology Area. Consequently, it is now known as the STARS Methodology Project. Since September 1983, this work has had two main thrusts. In the management area, significant effort has been expended in the preparation of a group charter, long-term plans and short-term plans for FY85, FY86 and FY87. In the technical area, the work has focused on providing a solid conceptual basis for future methodology activities.

This publication (Volumes I and II) contains descriptions of the organization, goals and strategy of the STARS Methodology Project and a summary of the comments raised concerning METHODMAN. It also contains a detailed discussion of the technical work that has occurred since September 1983.

Volume I contains four sections. Section 2 outlines the objectives of the Methodology Area, a discussion of the relationships between Methodology and the other STARS Areas, and a description of the basic organizational structure for the Methodology Coordination Team (MCT). Section 3 contains a detailed description of the work breakdown structure for the MCT, the current status and activities for each working group, and a description of the mechanisms to be used for distribution of reports and documents. The final section, Section 4, provides an overall summary.

2.0 STARS METHODOLOGY AREA

The overall goal of the STARS projectis to improve software productivity while achieving greater system reliability and adaptability. Improvements will be sought in four areas: general technology; acquisition/business practices; personnel; and application-specific technology. In the area of general technology, the objective is to organize and automate software technology over the total life cycle. In the area of acquisition/business practices, the objective is to ensure that contractors and government can manage software projects, that contractors have the proper incentive to apply modern techniques and that the government can periodically assess the quality of the software portions of the systems it procures. In the personnel area, the objective is to improve the skills and efficiency of people who acquire, produce and support mission critical software. Finally, the applications technology objective is to assure that the new technologies meet DoD needs.

Within the STARS project, there are six areas of work. These areas are:

- Software Engineering Environment (SEE);
- Measurement;
- Methodology;
- Applications;
- Business Practices; and
- Human Resources.

For each area, a lead Service has been identified. Responsibility for the Methodology Area has been assigned to the Army. The Army focal point is nominated by and reports to the STARS Army Program Manager. The STARS Army Program Manager is assisted in the Methodology Area by the Methodology Coordination Team. The MCT consists of representatives from each Service, NASA, and other Government Agencies. MCT members are listed in Appendix A.

2.1 Mission, Goals and Objectives

The overall objective of the Methodology Area is to identify a set of Ada-compatible methodologies from which a DoD program manager can intelligently select for use on a project. The specified set of methodologies can contain existing methodologies, new methodologies, or some combination of methodologies that, when integrated within a software environment, satisfy the project manager's requirements. In other words, the MCT will not define

and develop a whole new set of methodologies for use on DoD programs; it will retain and apply as much as possible from those that already exist.

The Methodology Area will develop and apply technologies for the classification, evaluation and selection (CES) of methodologies that significantly improve the productivity associated with software system development and life cycle support, and that significantly improve the quality of the resulting software system. The focus will be on methodologies compatible with the Ada programming language and the established principles of software engineering inherent to Ada (e.g., abstraction, information hiding, modularity, localization, uniformity, completeness and confirmability). This will also support the entire life cycle of complex mission critical systems. Ultimately, tools supporting the most effective methodologies will exist within the Software Engineering Environment (SEE).

2.2 Strategy

The strategy adopted to achieve the goals and objectives stated above is to: provide technologies to classify, evaluate and select methodologies; demonstrate the effectiveness of the selected methodologies; advance the state-of-the-art in methodology technology where necessary; identify the requirements for Ada-compatible methodologies; and ultimately produce requirements specifications for a set of methodologies.

Surveys of existing methodologies used or being developed within government, industry and universities will be conducted. The results of the surveys will be stored in a computerized database. A framework for CES and associated CES technology will be developed. The framework and CES technology will be applied to the database. This work will result in the identification of gaps in current methodology technologies. Where necessary, efforts will be undertaken to define methodologies for specific functions within the life cycle to fill these gaps. Areas where additional research is necessary can then be identified, and a set of methodology support tools for inclusion in the STARS SEE can then be specified and prototypes built. An integral part of the work will be gathering the performance and productivity data needed to be able to measure progress and compare alternative methodologies.

Because of the current interest in Ada-based program design languages (PDLs), a second initial task is to classify, evaluate, specify and provide acquisition guidelines for such PDLs. Demonstrations will be conducted to verify the usability of an Ada-based PDL selection procedure. Additional benefits of the PDL demonstrations to be used in later methodology tasks include: experience in the conduct of demonstrations and collection of valuable measurement and methodology information.

2.3 Relationship to Other STARS Activities

The adoption of Ada-compatible methodologies has a direct impact throughout the mission critical computer resource community. This is reflected in the many relationships between this area and the other five STARS areas. With respect to the Software Engineering Environment Area, the specification of methodologies influences the definition of tools supporting those methodologies in a particular STARS SEE installation. The relationship to the Human Resources Area stems from the significant influence that methodologies have on the man/machine interface of a SEE. Not only must the man/machine interface to the tools contained in the SEE be considered, but the human interface to the methodologies themselves must also be considered. Thus, the methodology must be easy to learn and apply by the community that it is designed to support. Also in the Human Resources Area, training may be required to facilitate the application and use of selected methodologies. In addition, the extent of human involvement may change dramatically as a function of the methodology applied and the support for that methodology provided by the SEE. With respect to the Measurement Area, the tools and technologies for measurement and metrics provide the Methodology Area with the basic techniques and experimental paradigms for evaluating methodologies. With respect to the Business Practices Area, coordination is required to ensure that meaningful direction (policy) for use of appropriate approved methodologies is provided by the Government. Finally, with respect to the Applications Area, the methodology specification must be driven by Applications Area inputs and must directly support mission critical applications. These relationships are shown in Figure 2-1.

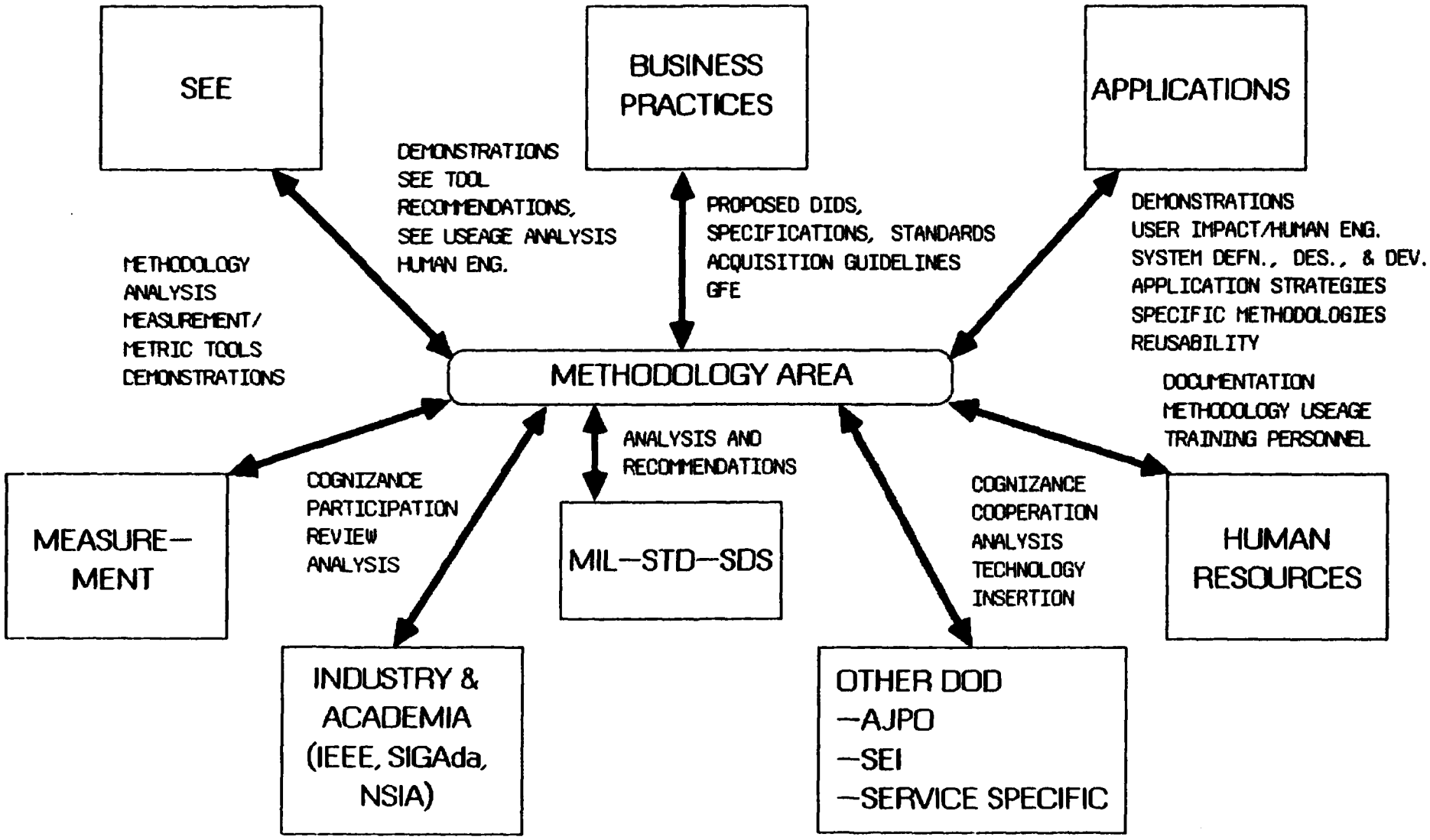

Figure 2.1: Relationship Between Methodology Area and Other Areas

3.0 PLANS AND PRODUCTS

During 1984, the MCT concentrated on planning activities. To satisfy management requirements, the following documents were produced:

- Methodology Area Charter;
- Methodology Area Seven-Year Plan;
- Methodology Area FY85 Plan;
- Methodology Area FY86 & FY87 Plan;
- METHODMAN Evolution Plan; and
- A plan for conducting Methodology Workshops.

The MCT produced a successor to METHODMAN and initiated a survey of existing methodologies from which a methodology catalogue will be produced and a database will be developed. Volume II of this publication contains specific technical results realized during 1984.

As a result of the planning process, five task areas were defined for the STARS Methodology Project. For each of these, a working group has been established within the MCT. The five task areas are:

- Methodology Classification, Evaluation and Selection (CES);
- Program Design Language (PDL);
- Methodology Demonstrations;
- Methodology Research and Development; and
- Technology Insertion.

The general products expected from each working group are listed in Table 3-1. The relationship among the five task areas is shown in Figure 3-1 and the MCT/Working Group structure is shown in Figure 3-2.

TABLE 3-1

METHODOLOGY AREA PRODUCTS

CLASSIFICATION, EVALUATION AND SELECTION	TENTATIVE DATES
Methodology Area Documents	Nov 84 ... Oct 91
MCT Meetings (At Least Bi-monthly)	Oct 84 ... Oct 91
Characteristics Framework	Oct 85
Evaluation Measures	Oct 86
Selected Methodology Evaluations	Oct 87 ... Oct 91
Rationale for Methodology Specifications	Oct 91
PROGRAM DESIGN LANGUAGE	**TENTATIVE DATES**
PDL Survey	Jan 85, Oct 87
PDL Guidelines	Oct 85
PDL Application Report	Oct 85
PDL DIDs	Oct 85, Oct 86
PDL Demonstration Reports	Oct 85 ... Oct 87
PDL Specifications	Oct 86
METHODOLOGY DEMONSTRATIONS	**TENTATIVE DATES**
Measurement/Metric Plan	Oct 85
Methodology Demonstration Plans	Mar 86
Measurement/Metric Tool Set	Oct 86
Prototype Methodology Tool Set	
- Initial Set (For Demo. & SEE I)	Jul 87
- Additional Tools for SEE II	Oct 89
- Additional Tools for Envir. 95	Jul 91
Measurement/Metric Reports	Jun 86 ... Oct 91
Methodology Demonstration Reports	Oct 87 ... Oct 91
Methodology Specifications and DIDs	Oct 89, Oct 91
METHODOLOGY RESEARCH AND DEVELOPMENT	**TENTATIVE DATES**
Methodology R&D	Jul 85
Methodology Developments	
- New Methodologies	
. Evolutionary Soft. Dev.	Apr 86, Apr 87
. Rapid Prototyping	Oct 86, Oct 87
. AI Testing Methodologies	Oct 86, Oct 87
- Methodology Extensions	
. Demo. of Soft. Eng. Meth.	Oct 86, Oct 87
- Methodology Integration	
. Distributed Systems	Oct 87, Oct 88

TABLE 3-1 (Continued)

METHODOLOGY AREA PRODUCTS

	TENTATIVE DATES
Methodology Research	
- Security	Jun 87 ... Oct 91
- Reliability Projects	Jun 87 ... Oct 91
- Maintainability Projects	Jun 87 ... Oct 91
- Reusability Projects	Jun 87 ... Oct 91
- Human Engineering Projects	Jun 87 ... Oct 91
TECHNOLOGY INSERTION	**TENTATIVE DATES**
Disseminate Info./Distrib. Docs	Nov 84 ... Oct 91
Workshops	Jul 85 ... Oct 91
Course Material	Oct 86 ... Oct 91
DoD-STD-SDS Development Coordination	Oct 86 ... Oct 91
Database Support	Mar 85 ... Oct 91

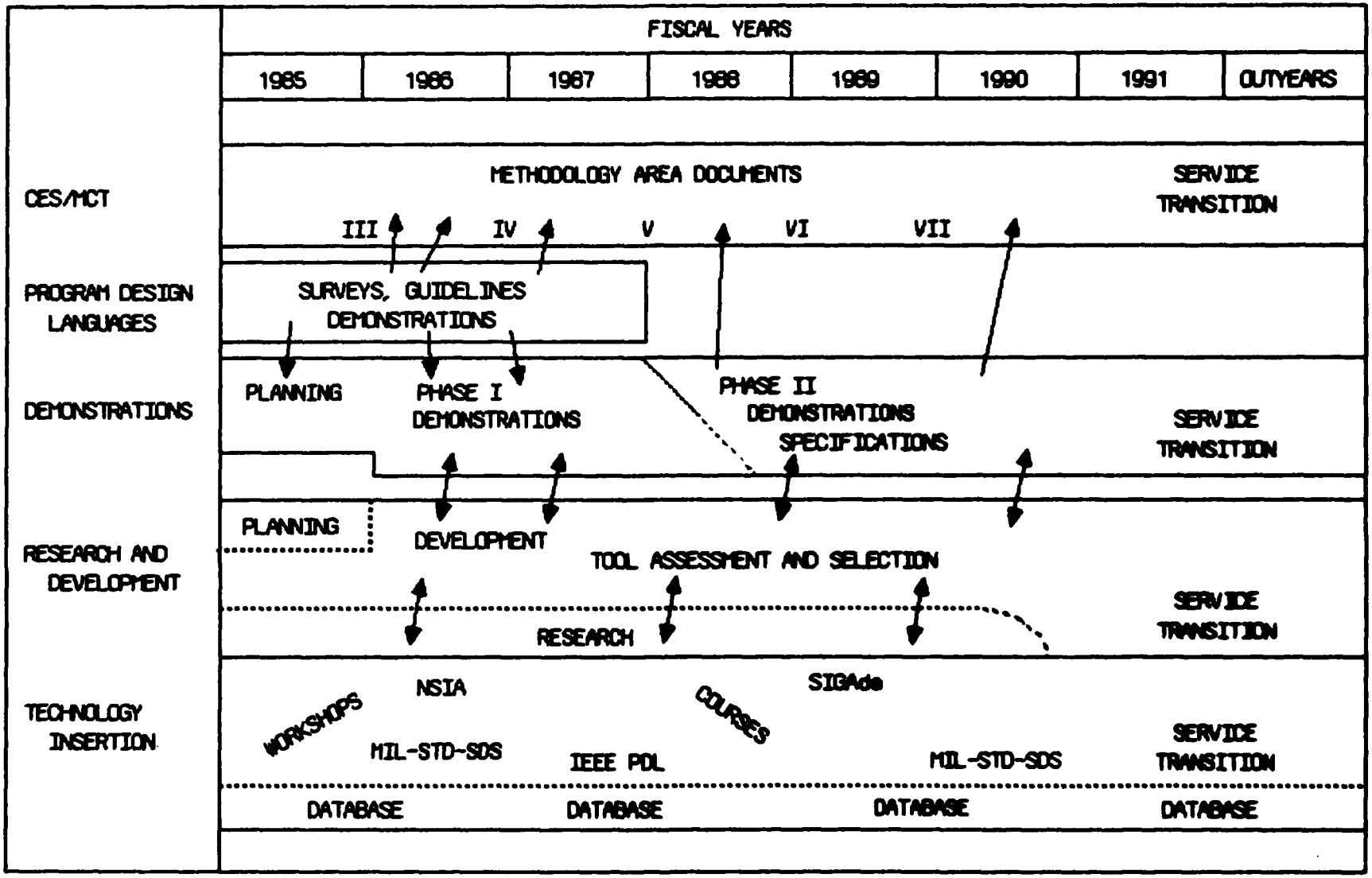

Figure 3.1: Relationships Among Methodology Area Task Areas

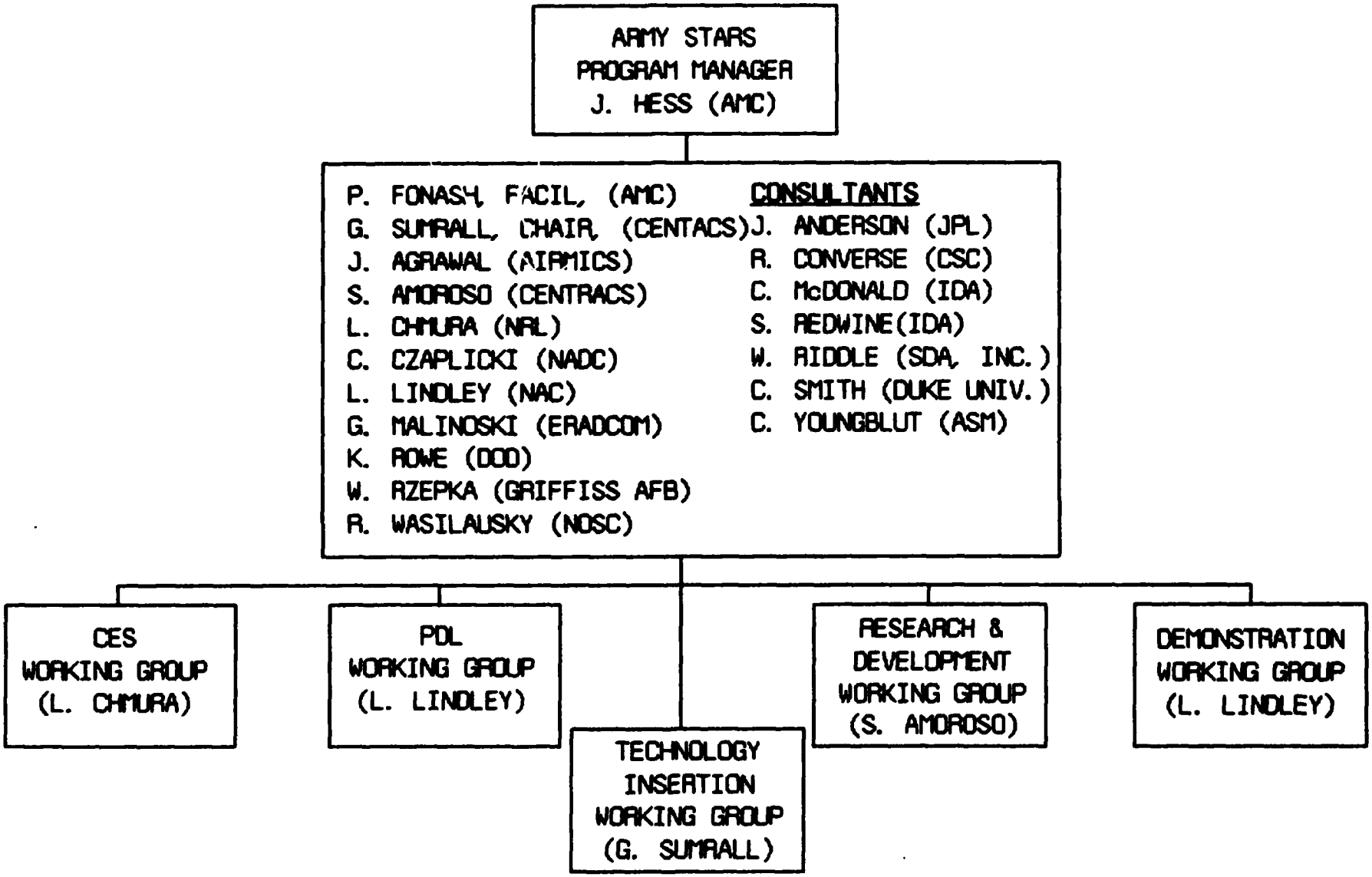

Figure 3.2: Methodology Coordination Team Structure

3.1 Classification, Evaluation and Selection

3.1.1 Classification, Evaluation and Selection Objectives

The basic objectives for the Classification, Evaluation and Selection (CES) Working Group are: to identify and organize characteristics of and requirements for Ada-compatible software life cycle methodologies; and to develop technologies for classifying, evaluating and selecting software life cycle methodologies. The CES Working Group will produce the Methodology Area Document Series to summarize annual progress and provide a rationale for other technical documents developed by the CES and other working groups. In addition, the following types of products will be prepared (these are long range products; preliminary versions will be published as they become available):

- Methodology Catalogue - a collection of information on specific methodologies and methods;
- Experience Digest - a collection of short reports on experience in the use of various methodologies and methods;
- Annotated Bibliography - a list of references on methodologies and methods;
- Methodology Consumer's Guide - the results of evaluating methodologies and methods in a form suitable for selecting a methodology;
- Classification Handbook - guidance on how to classify methodologies and methods;
- Evaluation Handbook - guidance on how to measure the value of methodologies and methods;
- Selection Handbook - guidance for selecting methodologies and methods for use on specific DoD projects
- Environment Assessments- an assessment of the methodology aspects of automated support environments with a concentration on the STARS SEE;
- Methodology Dictionary - definitions of the terminology for discussing methodologies and issues related to them;
- Ada-Methodology Specification - a statement of requirements for Ada-compatible methodologies and methods that support development and post-deployment support of DoD software;

- Demonstration Suggestions - a set of recommendations for measurements and measurement tools, candidate methodologies, prototype tools, and actual demonstrations to be performed; and

- R&D Suggestions - a set of recommendations for work to extend the state-of-the-art in methodologies and methods.

3.1.2 Classification, Evaluation and Selection Status Report

3.1.2.1 METHODMAN Comments

Public comment on METHODMAN was solicited in early 1983 and replies were received from various individuals and organizations. The commentary was favorable as a whole, but reflected a general feeling that the material in the METHODMAN document was limited in several respects:

- only "traditional" methodologies were addressed

- it focused primarily on the development part of the software life cycle,

- no relationship was established to the emerging DoD software life cycle defined in DoD-STD-SDS,

- the set of characteristics given for classifying software methodologies was incomplete and many of the identified characteristics were not concrete enough to be measured,

- the organization of the set of characteristics was ad hoc, and

- the requirements given for Ada-compatible methodologies were too general and not specifically related to the characteristics.

3.1.2.2 Addressing the Comments of METHODMAN

In Volume II of this publication, the intent is to address the comments concerning METHODMAN. In particular, this publication focuses on the need to more completely identify the structure of methodology characteristics.

The framework presented here is able to reflect the characteristics of a wide variety of methodologies. In addition to traditional methodologies, it provides a frame of reference for dealing with other types such as object-oriented and prototyping

methodologies. Furthermore, the approach detailed here is sufficiently flexible to allow future expansion for additional types of methodologies.

The current document attempts to ensure complete identification of measurable characteristics in several ways. In addition to providing general guidance for complete and consistent identification of methodology characteristics, it also provides a relatively "formal" approach for enumerating individual characteristics. Not only will this enumeration approach safeguard against missing pertinent characteristics, but it will also ensure that all characteristics are specified in concrete and measurable terms.

This publication extends the scope to address software methodologies that support both development and post-deployment support activities. It considers the software life-cycle in some depth and illustrates how a software system can be viewed as a sequence of software versions and the categorization of these versions into several types.

This publication addresses the need to organize the characteristics in a meaningful way by introducing a characteristics framework. This framework can be used to structure characteristics in a manner that will support the classification, evaluation and selection technologies. It is also intended to be:

- extensible so that additional characteristics may be incorporated as they are identified as a result of:
  - -- noticing gaps or omissions.
  - -- extending the framework to cover new methodologies, or
  - -- fleshing out the classification, evaluation and selection technologies,
- a firm basis for the specification of methodology requirements through the quantification of acceptable values for specific characteristics.

3.2 Program Design Language

The objectives for the Program Design Language Working Group are: to develop a procedure for evaluating and selecting appropriate Ada-based PDLs for use on specific projects; and to develop a specification and corresponding data item description for an Ada-based PDL as a result of early PDL demonstrations. Surveys of existing Ada-based PDLs and the use of such PDLs will be conducted. Demonstrations will be performed to validate the

evaluation and selection procedure and support the specification of Ada-based PDLs. Benefits of the demonstrations will be measurement information and experience in conducting software demonstrations. This experience will be of value in subsequent methodology demonstration activities. The PDL activities are short-term activities that support long-term CES objectives. The products expected from this working group in FY85 are:

- a survey of existing Ada-based Program Design Languages;
- a survey of PDL users and an assessment of the usefulness of the PDL to the project on which it has been applied;
- a design for a PDL comparative demonstration;
- a PDL demonstration;
- a draft set of PDL guidelines;
- a draft set of Data Item Descriptions (DIDs) for a PDL; and
- an Ada-based PDL evaluation and selection procedure.

3.3 Methodology Demonstrations

The objective for the Methodology Demonstrations Working Group is to support the CES Working Group in the development of the CES technologies. Specific activities for this working group are to: investigate methodology measurement issues; identify or develop appropriate methodology metrics; specify and develop prototype techniques and tools to collect and analyze methodology metrics; and validate the classification, evaluation and selection technologies. The selection criteria developed by the CES Working Group will be used to select some methodologies for demonstrations and for which support should be provided within the STARS SEE. Prototype methodology support tools will be built and incorporated into an existing environment, e.g., the Army Ada Language System (ALS), that will be used to support these demonstrations. The expected FY85 products are:

- a six-year plan for the Demonstration activities; and
- an initial set of measurement/metrics to be collected during the demonstrations.

3.4 Methodology Research and Development

The objective for the Methodology Research and Development Working Group is to provide the impetus to develop advanced software methods that lead to improved quality of the software systems and improved productivity associated with their development and support. Areas of research and development in the near term will address: the development of new methodologies in such areas as rapid prototyping and evolutionary software development; the application of existing methodologies to testing; and the extension of existing methodologies into issues concerning distributed systems. In the long term, research and development will be performed to address methodology issues concerning the security, reusability, maintainability, reliability and human engineering of software systems. This research will also suggest tools that provide automated support for these new types of methodologies. Demonstrations of these methodologies and the supporting tools will be performed by the Methodology Demonstrations Working Group. Expected near-term products are:

- a Methodology R&D Plan;
- application of artificial intelligence techniques to testing methodologies;
- rapid prototyping and evolutionary software development efforts; and
- a Demonstration of the Software Engineering Methods defined by Dr. David L. Parnas, including an analysis of the effort required to transition the object-oriented method to Ada.

3.5 Technology Insertion

The objective for the Technology Insertion Working Group is to transition the products of the methodology effort to industry, the academic community, the DoD (other STARS activities in particular) and to other Government activities. For example, many of the methodology demonstration results may influence future DOD-STD-SDS(4) revisions. Information dissemination will be accomplished through a series of workshops, the publication of Methodology Area Documents, the maintenance of a publicly available methodology database, participation in public meetings and symposia, and preparation of course material. In FY85, the following products are expected:

- a database containing the data collected by the methodologies survey activity;
- workshops contrasting selected methodologies;

- presentations made to several industry and computer science professional interest groups (such as SIGAda, IEEE and European Software Engineering Communitites) regarding the Methodology Area activities; and

- preparing and distributing the Methodology Area series of documents.

3.5.1 Methodology Area Series of Documents

Since the start of the STARS Methodology Project, there has been an intent to submit all products from the project for wide review. Initially, there was no regular publication schedule. However, as a part of the planning process, an organized reporting scheme has been defined. The scheme consists of the preparation and publication of various documents coupled with their release and the solicitation of detailed review and comment.

3.5.2 Status Reports, Handbooks and Technical Reports

All results of the STARS Methodology Area will be made available by the preparation of three different types of Methodology Area documents: Status Reports; Methodology Technology Manuals; and Technical Reports. Each of these documents serves a different purpose.

The Methodology Area Status Reports will discuss the progress of the project at roughly one year intervals. Additionally, each report will indicate products completed since the publication of the previous status report. The status reports will not, in general, include significant technical material; instead they will contain references to the technical reports and manuals in which the technical information can be found. The final status report (circa 1991) will include a comprehensive "roadmap" to all of the Methodology Area products.

The Methodology Handbooks will constitute the major technical products of the project. They will disseminate information such as the requirements for Ada-compatible methodologies and provide practical user aids such as a guidebook for the selection of methodologies.

The technical reports are those documents that record and report the results of specific projects that have been performed and from which the content of the Methodology Handbooks will be derived. Thus, the technical reports can be regarded as interim products.

3.5.3 Publication and Review of Documents

Of the three types of documents outlined above, only the status reports will be published on a regular basis. The other documents will be published and disseminated as they become available. The status reports will be prepared by the CES Working Group and publicly published. The status reports will indicate the availability of other Methodology Area documents and will contain appropriate instructions for obtaining copies of these other documents. The status reports and the documents to which they point will form the principal basis for review and comment.

It is anticipated that the status reports will lag the actual methodology activity by approximately six months due to the time required for printing and distribution. To provide more current information, the ARPANET or MILNET can be used to access a mailbox, called METHODOLOGY-INFO, at the University of Southern California Engineering Computer Laboratory System B (USC-ECLB). This directory will be generally accessible and every attempt will be made to keep the information in this directory up to date. For interested persons without access to the ECLB mailbox, current information can be obtained from the Ada Information Clearinghouse maintained and co-located with the STARS Joint Program Office.

4.0 SUMMARY

The methodology activities started by the Ada Joint Program Office have been consolidated and expanded under the auspices of the Methodology Area of the DoD STARS Joint Program Office. During 1984, the majority of the activity within this area has involved management planning. Detailed plans have been prepared for accomplishing the Methodology Area goals and a committee structure has been established to accomplish the work called for in these plans.

The technical issues raised by METHODMAN have been addressed to a limited extent. The details of that work are contained in Volume II of this publication; this work will be broadened during 1985.

The reports and documents prepared as a result of technical activities will be released for review as they become available. A status report will be prepared annually. Review and comment on the Methodology Area activities is actively sought and will be welcomed throughout the life of this project.

REFERENCES

(1) Freeman, P., Wasserman, A.I., "Ada Methodologies: Concepts and Requirements", Ada Joint Program Office, Department of Defense, November 1982.

(2) Freeman, P., Porcella, M., and Wasserman, A.I., "Ada Methodology Questionnaire Summary", Ada Joint Program Office, Department of Defense, November 1982.

(3) Freeman, P., and Wasserman, A.I., "Comparing Software Design Methods for Ada: A Study Plan", Ada Joint Program Office, Department of Defense, November 1982.

(4) Department of Defense, "DoD-STD-2167 Defense System Software Development," (Draft), January 30, 1984.

APPENDIX A

METHODOLOGY COORDINATION TEAM

METHODOLOGY COORDINATION TEAM

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