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COMPLEMENTARY NOTES

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The ASEET Team Plan provides a detailed and organized approach to identify the Ada education and training needs of the Department of Defense and the methodology and materials to fulfill those needs. The Plan provides a description of the activities to be undertaken by the Ada Software Engineering Education and Training (ASEET) Team.

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TABLE OF CONTENTS

	PAGE
SECTION I: INTRODUCTION	I-1
Section I includes a short introduction to the ASEET Team and outlines the contents of the ASEET Public Report.	
SECTION II: ASEET PLAN, VERSION 1.0	II-1
Section II contains Version 1.0 of the ASEET Plan. This plan provided a description of the activities to be undertaken by the ASEET Team. A detailed outline of the various tasks were presented, including the assumptions made by the Team, alternatives considered, resources required, an implementation schedule, and the Team's recommended alternative.	
SECTION III: PAST TECHNICAL ACTIVITIES	III-1
Section III updates the approach taken and accomplishments of the ASEET Team since obtaining approval of Version 1.0 of the ASEET Plan.	
SECTION IV: CONCEPT OF OPERATIONS FOR THE ASEET MATERIALS LIBRARY	IV-1
Section IV includes a copy of the concept of operations for the development of the AML by the Courseware Working Group of the ASEET Team. This document specifies the concept of operations for an AML to be located at the AJPO.	
SECTION V: SECOND ANNUAL ASEET SYMPOSIUM	V-1
Section V is a copy of the table of contents from the Second Annual ASEET Symposium proceedings. Copies of the proceeding may be obtained from the ASEET Materials Library or DTIC. There were no proceedings from the First Annual ASEET Symposium; however Section III explains how to obtain copies of the slides from that symposium.	
SECTION VI: CURRENT ASEET TEAM MEMBERSHIP	VI-1
Section VI presents the current team structure, including both team and working group memberships.	

I. INTRODUCTION

Early in the development of the Ada program, the Ada Joint Program Office (AJPO) recognized that in order to realize the full potential of Ada, an effective, timely Ada education and training program must be developed. The AJPO began coordinating efforts to develop an Ada software engineering education and training program and established the Ada Software Engineering Education Working Group (Ada SEEDWG) in early 1985 to provide preliminary guidance in planning for the education and training effort. A charter for this group was written and coordinated with the Air Force, Army and Navy. A copy of the charter is provided on the next page. By June 1985, this group had evolved from a working group into the Ada Software Engineering Education and Training (ASEET) Team in order to be consistent with other tasks under the AJPO's purview. The purpose of the ASEET Task is to support the Office of the Undersecretary of Defense for Acquisition (Research and Advanced Technology/Computer and Electronics Technology) in formulating policy and in promoting implementation activities that will result in high quality software engineering. (SPO) ←

The ASEET Team is chaired by the Air Force, and the chair works directly with the AJPO in the execution of the ASEET Task. The Team is composed of representatives from the Army, Navy, Marine Corps, Air Force and other selected DoD agencies. The group meets on a quarterly basis to discuss Ada education and training within the DoD. The Team has been partitioned into four working groups: Education and Training Requirements Working Group, Courseware Working Group, Professional Development Working Group and the Coordination Working Group.

The purpose of the ASEET Public Report is to describe the activities of the ASEET Team since its conception in 1985.

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Charter of the Ada Software Engineering Education Working Group

Purpose

The purpose of the Ada Software Engineering Education Working Group (SEEDWG) shall be to support CUSDR (R&AT)/AJPO in formulating policy and guidance which ensures that quality software engineering is accomplished through Ada education and training within the DoD in order to reduce the life cycle cost of software.

Membership

The SEEDWG will be cochaired by the Air Force and Army reporting to the AJPO. The membership of the SEEDWG shall be composed of representatives designated by each service and other DoD agencies as appropriate. Members should be qualified to adequately represent the Ada technical community and the education and manpower/personnel/training (MPT) communities.

Urgency of Need

Congress has mandated the accelerated use of Ada in mission critical computer resources. The full potential of Ada can only be realized through effective, timely Ada education and training.

Scope of Responsibilities

The main responsibility of the SEEDWG is to prepare and maintain a DoD Ada Software Engineering Education and Training Plan. The framework for the plan is the draft "Concept Paper for the Development of a DoD Ada Software Engineering Education and Training Plan" of 26 October 1984. Additional responsibilities of the SEEDWG will include:

- (a) Defining the target audience
- (b) Establishing both learning objectives and curriculum guidance
- (c) Promoting common course module development to maximize resources
- (d) Establishing an Ada Certification Program
- (e) Promoting evaluation/feedback on course adjustments to facilitate learning objectives and to establish a lessons learned forum
- (f) Providing resource recommendations to the AJPO

Any documentation from this working group shall be subject to review and approval by the services and agencies.

Service Coordination: Air Force

Army

Navy

AJPO Coordination:

FIGURE I-1
CHARTER

II. ASEET PLAN, VERSION 1.0

**DoD Ada* SOFTWARE ENGINEERING
EDUCATION AND TRAINING PLAN**

Prepared by

The Ada* Software Engineering
Education and Training (ASEET) Team

January 1986

Prepared for

Ada Joint Program Office (AJPO)

Office of the Under Secretary of Defense for Research and Engineering

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EXECUTIVE SUMMARY

The Ada Software Engineering Education and Training (ASEET) Plan provides a detailed and organized approach to identify (1) the Ada education and training needs of the Department of Defense (DoD) and (2) the methodology and materials to fulfill those needs. The Plan provides a description of the activities to be undertaken by the Ada Software Engineering Education and Training (ASEET) Team. This Plan provides a grand scheme of the activities of the ASEET Task. Various tasks are outlined with detailed alternatives on how to perform these tasks.

The ASEET Team, formerly the Ada Software Engineering Education Working Group (SEEDWG), was established in early 1985 as a tri-service organization. The Team offers support to the AJPO in formulating and implementing policy to ensure quality Ada software engineering within the DoD. Although the Team's focus is the DoD, the activities of the Team may also be beneficial to industry and academia.

The scope of the Plan, detailed in Section 2.0, includes seven major activities:

(1) Identify Education and Training Requirements

The Team recognizes the need for analyzing the education and training requirements within the DoD. For the purpose of this study, education is defined as the field of study that deals mainly with methods of teaching and learning in schools; and training is defined as the act, process, or method of undergoing instruction, discipline, or drill. Education and training requirements, based on past experiences and job classifications, must be identified. Skill requirements, current skills inventories and trained personnel requirements will then be evaluated.

(2) Conduct Ada Research Projects

The Team will investigate the establishment of Ada Research Centers (ARCs). Activities for these Centers may include gathering and analyzing data on existing Ada projects; maintaining a database of information of all projects and courseware; collecting and developing Ada software engineering courseware; collecting and developing courseware for the education and training of Ada instructors; and testing all courseware before it is released.

(3) Manage DoD Ada Software Engineering Course Materials

The Team will develop procedures for the Services to use in managing, coordinating and disseminating course materials. Various courses are being developed; however, no coordination currently exists for these efforts. Through coordination, duplication of effort can be reduced and new instructional approaches disseminated to achieve the best possible quality in course materials.

(4) Study the Requirements for Certification of Ada Software Engineers

The ASEET Team realizes that certification is an important and controversial issue within the Ada community. The Team will study the issue of formal certification of Ada Software Engineers. If certification is deemed feasible and desirable, the Team will develop procedures for the coordination of the development, implementation, and maintenance of a certification process.

(5) Provide a DoD Focal Point for ASEET

The ASEET Team will act as a focal point between the DoD and ASEET activities and will provide a forum to answer questions related to ASEET activities.

(6) Promote Industry/Academia Participation in the ASEET Task

The ASEET Team will encourage industry and academia to participate in all appropriate tasks.

(7) Promote Community Use and Acceptance of the ASEET Task

The ASEET Team will take the necessary steps to encourage the use and acceptance of its activities by the software community.

As described in Section 4.4, the ASEET Team is partitioned into four working groups. Chairpersons for these working groups will be designated by the ASEET Team Chairperson.

(1) Education and Training Requirements Working Group

This working group is responsible for meeting the objectives outlined in activity (1) above.

(2) Research Projects Working Group

This working group is responsible for meeting the objectives outlined in activities (2) and (3) above.

(3) Certification Working Group

This working group is responsible for meeting the objectives outlined in activity (4) above.

(4) Coordination Working Group

This working group is responsible for meeting the objectives outlined in activities (5), (6), and (7) above.

Section 5.0 of the Plan, entitled Technical Approach, provides a more detailed outline of the activities, including :

- Assumptions,
- Alternatives,
- Resource Requirements,
- Implementation Schedule,
- Approach to Selection of an Alternative, and
- Recommended Alternative.

The ASEET deliverables, specified in the technical approach, are listed in Section 6.0 of the Plan.

The ASEET Team Chairperson reports directly to the Ada Joint Program Office. However, the Team coordinates its activities with several other organizations including the individual services, Software Technology for Adaptable, Reliable Systems (STARS), other DoD efforts, academia and professional organizations (e.g., Special Interest Group on Ada within the Association for Computing Machinery (SIGAda), IEEE Computer Society, AdaEurope, Ada Jovial Users Group (AdaJUG) and the Armed Forces Communications and Electronics Association (AFCEA)).

1.0 INTRODUCTION

1.1 Objective of the ASEET Plan

The Ada Software Engineering Education and Training (ASEET) Plan provides a detailed and organized approach to identify (1) the Ada education and training needs of the Department of Defense (DoD) and (2) the methodology and materials to fulfill those needs. The ASEET Plan provides the DoD with an overview of the goals and the direction of Ada software engineering education and training. The ASEET Task, sponsored by the Ada Joint Program Office (AJPO), implements the ASEET Plan. The ASEET Plan will be updated at least annually throughout the duration of the ASEET Task.

This document is organized as follows:

Section 1: INTRODUCTION

Section 1 presents the objectives of the ASEET Plan and historical background information leading to the establishment of the ASEET Team.

Section 2: ASEET RELATIONSHIP TO OTHER ORGANIZATIONS

Section 2 describes the relationship of the ASEET Task to other DoD and technical organizations.

Section 3: SCOPE

Section 3 delineates the ASEET Task objectives.

Section 4: MANAGEMENT APPROACH

Section 4 provides the management structure for the ASEET Task and identifies specific tasks for Working Groups within the ASEET Team.

Section 5: TECHNICAL APPROACH

Section 5 provides an overview of the technical approach to the implementation of the ASEET Plan.

Section 6: ASEET DELIVERABLES

Section 6 describes all of the deliverables expected from the ASEET Task.

Section 7: ASEET WORK BREAKDOWN STRUCTURE

Section 7 presents a Work Breakdown Structure that delineates all of the activities to be accomplished in the ASEET Task.

Section 8: IDENTIFICATION OF MILESTONES

Section 8 presents schedules and milestones associated with the ASEET Task.

Section 9: ACRONYMS

Section 9 presents a list of acronyms used within this document.

Section 10: REFERENCES

Section 10 provides a list of references used within this document.

1.2 Background

In 1975, the DoD began the process of limiting the high order languages (HOLs) to be used when writing software for embedded computers, in order to ease the high cost associated with language proliferation. The High Order Language Working Group (HOLWG) was formed in 1975 to establish a single HOL for new DoD Embedded Computer Systems (ECSs). An international request for proposals was issued for a new common language. In 1979, after wide public review, the DoD selected the language developed by Cii-Honeywell Bull and named the language Ada in honor of the first computer programmer, Augusta Ada Byron, the daughter of Lord Byron.

On 12 December 1980, the Under Secretary of Defense for Research and Engineering established the Ada Joint Program Office (AJPO) to manage the DoD effort to implement, introduce, and provide life-cycle support for Ada. The AJPO is the principal DoD agent for development, support, and distribution of tools; establishment of common libraries; and coordination of all DoD Ada activities. To avoid duplication of efforts and to maximize sharing of resources, the AJPO coordinates all Ada efforts within DoD to ensure their compatibility with the requirements of the other military services and all the DoD agencies.

In a 10 June 1983 memorandum⁽¹⁾, Dr. Richard D. DeLauer, Under Secretary of Defense (Research and Engineering) stated that "The Ada Programming Language shall become the single, common computer programming

language for defense mission-critical applications. Ada shall be the programming language:

- o January 1984 for programs entering advanced development, and
- o 1 July 1984 for programs entering full-scale engineering development."

Congress mandated the accelerated use of Ada in mission critical computer resources.⁽²⁾

The AJPO recognized that in order to realize the full potential of Ada, an effective, timely Ada education and training program must be developed. The AJPO also realized that a program concerned strictly with the Ada language was not enough; therefore, the AJPO began coordinating efforts to develop an ASEET program. The first step was to develop a Concept Paper for the Development of a DoD Ada Software Engineering Education and Training Plan.⁽³⁾ This document, published in November 1984, sets forth the concepts necessary for Ada software engineering education and training. The realization of these concepts will result in an effective use of Ada in the shortest time possible to realize cost savings and to achieve reliability and adaptability in computer software development.

The Ada Software Engineering Education Working Group (Ada SEEDWG), a tri-service organization co-chaired by the Air Force and Army under the guidance of the AJPO, was established in early 1985 to provide preliminary guidance in planning for this effort. By June 1985, this group had evolved from a working group into the ASEET Team in order to be consistent with other tasks under the AJPO purview. The purpose of the ASEET Task is to support OUSDRE(R&AT)/AJPO in formulating policy and in promoting implementation activities that will result in quality software engineering.

2.0 TEAM RELATIONSHIP TO OTHER ORGANIZATIONS

Figure 2.1 illustrates the relationship of the ASEET Team to other organizations.

2.1 Army, Navy, Air Force Efforts

The Army, Navy, and Air Force now offer Ada courses at their academies and at various installations. The Navy is in the process of developing Ada courses for unique Ada Language System/Navy (ALS/N) topics. The ASEET Team will interact with the three services for information exchange and consultation, particularly in the areas of course materials and effective teaching methods.

2.2 Other DoD Efforts

Various DoD agencies offer ASEET opportunities both to their employees and the services. The ASEET Team will interact with these groups to exchange ideas and suggestions in the area of Ada education and training.

2.3 Academia

The ASEET Team realizes that educating DoD personnel in Ada Software Engineering is a significant task. It would be beneficial to the DoD if new employees who are recent college graduates had an understanding of software engineering and Ada. To assist them in these efforts, the ASEET Team will coordinate with various universities and colleges to promote the teaching of Ada software engineering.

2.4 Professional Organizations

The ASEET Team anticipates that SIGAda, AdaEurope, the Ada-JOVIAL Users Group (AdaJUG), and other professional organizations will provide valuable contributions to the ASEET effort. Several of these organizations have already established ASEET working groups and are investigating many of the same issues as the ASEET Team. The ASEET Team has no formal relationship with these groups; however, the Team will, as the task matures and new tasks are considered, solicit inputs from members of these professional organizations.

2.5 Ada Board

The purpose of the Ada Board is to advise the Director of the AJPO on policy and issues related to the Ada Program. The ASEET Team will interact with the Ada Board for information exchange on issues related to the ASEET effort.

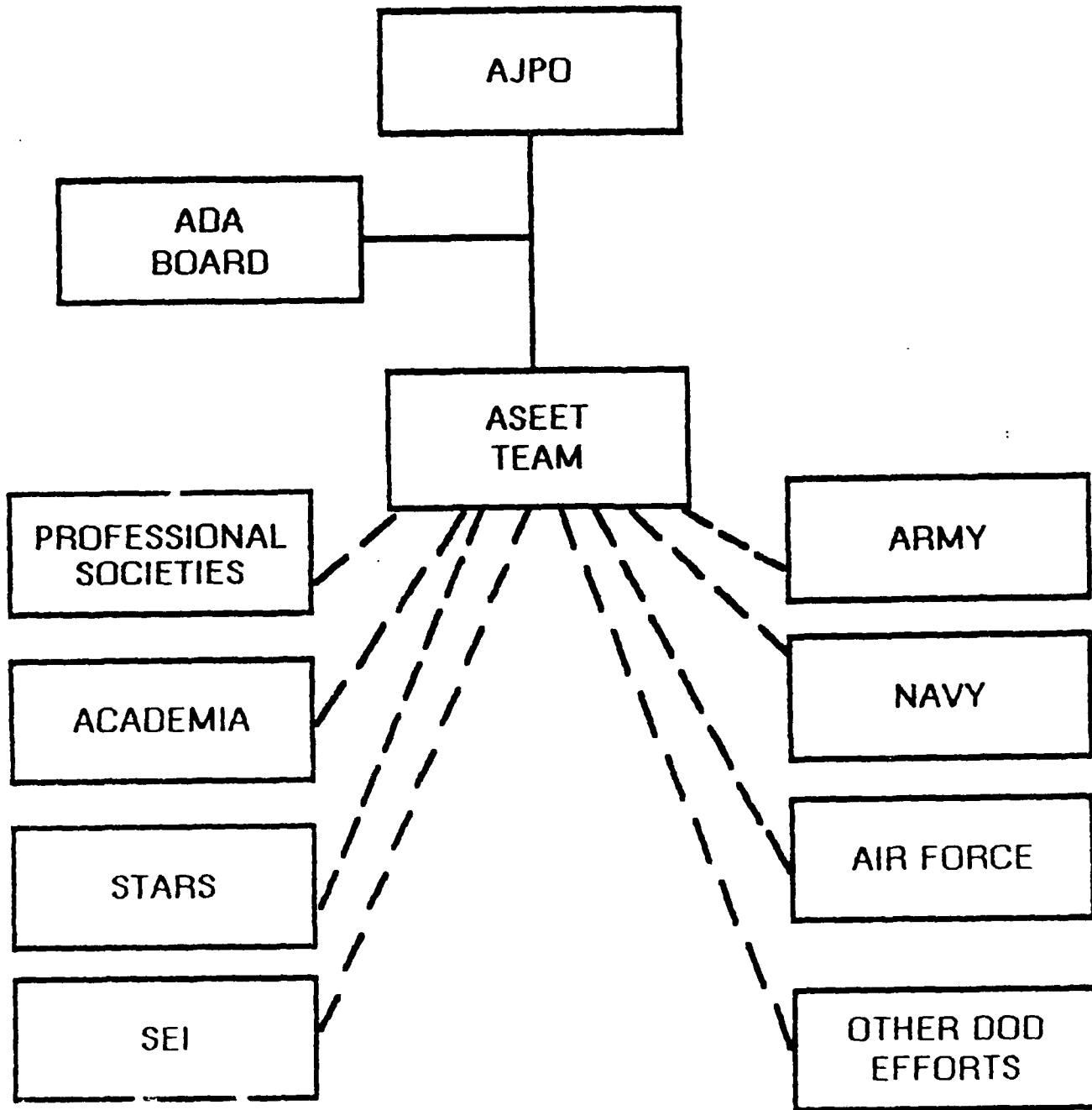


Figure 2.1
ASEET TEAM RELATIONSHIP TO OTHER ORGANIZATIONS

2.6 Software Technology for Adaptable, Reliable Systems (STARS)

The STARS Program, under the direction of the DoD, was established to develop and promote new software technology. The ASEET Team will closely coordinate with the STARS Human Resources effort. As appropriate, a representative from the Human Resources task force will be invited to participate. STARS effort will be invited to participate in ASEET Team meetings and provide coordination between the two tasks. The ASEET Team Chairperson will also arrange to have periodic joint meetings with the Human Resources Area Coordination Team.

2.7 Software Engineering Institute

The Software Engineering Institute (SEI) is chartered, in part, with the identification, evaluation and transition to practice of new software engineering tools and techniques. The ASEET Team Chairperson will coordinate, as necessary, with the SEI Education and Training coordinators.

3.0 SCOPE

3.1 Identify Education and Training Requirements

The ASEET Team realizes that education and training requirements will depend on such things as past experience and job classification. ASEET spans many different levels from the software engineer to the project manager. Before a comprehensive training plan can be developed, a requirements analysis must be performed, based on the following:

1. Skills Requirements: Effective education and training is dependent on well defined learning objectives. Learning objectives will be identified that satisfy the skills required to utilize Ada and its related software engineering technology.

2. Current Skills Inventory: Before a comprehensive education and training program can be established, an inventory of the current skills of those in the job classifications identified previously will be developed. This inventory will be analyzed against the required skills, and the results will determine the education and training requirements, both in techniques and numbers.

3. Trained Personnel requirements (TPR): To understand the full scope of the ASEET Task, the number of personnel to be educated and trained in Ada software engineering must be determined. The TPR must be divided into various levels from the top echelons of management down to the programmer. An understanding of this TPR will have a significant bearing on the number and type of resources needed to support ASEET. The approach to developing this TPR will include an examination of the background of the software work force. We need to know what portion of the present and projected software development workload will use Ada software engineering and how much of the work force will be directed into the Ada efforts. Potential gains and losses of the Ada work force will be assessed.

3.2 Conduct Ada Research Projects

Ada research projects will be conducted by Ada Research Centers (ARCs). These centers will have the responsibility to:

- (1) Gather and analyze data on existing Ada projects: The areas of interest for which data will be gathered and analyzed will include the ASEET history of the project participants,

the software engineering techniques used, and the productivity of the participants.

(2) Maintain a database of information on all projects and courseware: The data and results of the various studies will be maintained in a database for further use, analysis, and publication.

(3) Collect and develop Ada software engineering courseware: Existing courseware will be gathered and analyzed. The results of the analysis will be used to modify the courseware so that the best known methodologies are being presented to students.

(4) Collect and develop courseware for educating and training Ada instructors: The scope of ASEET spans many different levels. Education and training is needed at the software engineer level as well as at the highest management levels. This requirement is extensive and can be met only by providing an abundance of Ada Software Engineering Instructors who will permeate the DoD and begin the arduous task of educating and training the masses. To accomplish this task, a program must be established to produce instructors qualified to teach a variety of Ada software engineering courses.

(5) Test all courseware before release: New and modified courseware will be used and its effectiveness measured before the material is released for general use.

(6) Conduct additional research projects: When areas of interest are identified for which data is not available, a research project will be established to address that specific area.

3.3 Manage Ada Software Engineering Course Materials

Course materials need to be managed, coordinated, and disseminated. Although numerous organizations are producing course materials in Ada software engineering, no coordination currently exists for these efforts. Coordination is desirable to eliminate such duplication of effort and to take advantage of different perspectives and diverse approaches to achieve the best possible quality in course materials. Through this coordination, materials can be made adaptable to many specific situations and guidelines can be developed to assist organizations in adapting the materials to their specific needs.

3.4 Study the Requirements for Certification of Ada Software Engineers

An Ada Software Engineer (ASE) is one who is directly responsible for the development and/or maintenance of Ada software applications. This task will study the issue of formal certification of Ada Software Engineers. If formal certification is identified as feasible and desirable, then this task will coordinate the development, implementation, and maintenance of a certification process.

Subtasks in this area include:

Conduct a workshop: The purpose of this workshop is to assess the need for, and practicality of, formal certification, and to examine possible alternatives to formal certification which meet the goals identified. The outcome of this workshop will be a recommendation to either proceed with the study of the certification issue or to abandon it. Further, assuming that some form of certification is recommended, a means for conferring certification on Ada Software Engineers will be proposed.

Conduct second workshop: If the certification issue has not been abandoned as a result of the previous workshop, a second workshop will be conducted for the purpose of recommending a plan to implement the certification process chosen.

Other subtasks may be identified by these workshops, and could include such activities as determining the responsible agency for selecting and overseeing contractors to develop certification materials, and to implement and maintain the certification process.

3.5 Provide a DoD Focal Point for ASEET

The ASEET Team will be the focal point between DoD and ASEET activities and will provide a forum to answer questions related to ASEET activities.

3.6 Promote Industry/Academia Participation in the ASEET Task

In order to promote wide spread acceptance of its activities, the ASEET Team will encourage industry and academia to participate in all appropriate tasks.

3.7 Promote Community Use and Acceptance of the ASEET Task

The ASEET Team realizes that if Ada software engineering education and training is to be effective, steps must be taken to promote the use and acceptance of all ASEET activities within the software community.

4.0 MANAGEMENT APPROACH

Figure 4-1 depicts the ASEET Team management structure. Each of the components is identified in the following sections.

4.1 Ada Joint Program Office

The AJPO sponsors the ASEET Task. All activities of the ASEET Team are coordinated with the AJPO through the ASEET Team Chairperson. The AJPO requires that the status of this task be briefed to the AJPO, as well as to the three service representatives, at quarterly Ada tri-service reviews.

4.2 ASEET Team Chairperson

The ASEET Team is chaired by the Air Force. The ASEET Team Chairperson is authorized to work directly with the AJPO in the execution of the ASEET Task. The Chairperson is fully responsible for providing technical direction to the ASEET Team members and for coordinating all of the ASEET Team activities.

4.3 ASEET Team Members

The ASEET Team is composed of representatives from the Air Force, Army, Navy, and other selected agencies.

ASEET Team meetings were originally held monthly. However, once the ASEET plan was written, meetings were convened on a bimonthly basis. Once the ASEET Plan is put in motion, meetings will be convened on a quarterly basis. Members are responsible for representing the technical issues/concerns of their respective organizations at these meetings. Similarly, members are responsible for reporting the status of the activities to their respective organizations.

4.4 Working Groups

The ASEET Team will be partitioned into several working groups. Four groups have already been established and their associated areas of responsibility are delineated in the following sections. These groups are subject to change during the life of the ASEET task. Each group will have a designated task leader, who will have the responsibility of coordinating the activities of the group with the ASEET Team Chairperson. Each task leader will be required to brief the status of the respective group at every ASEET Team meeting.

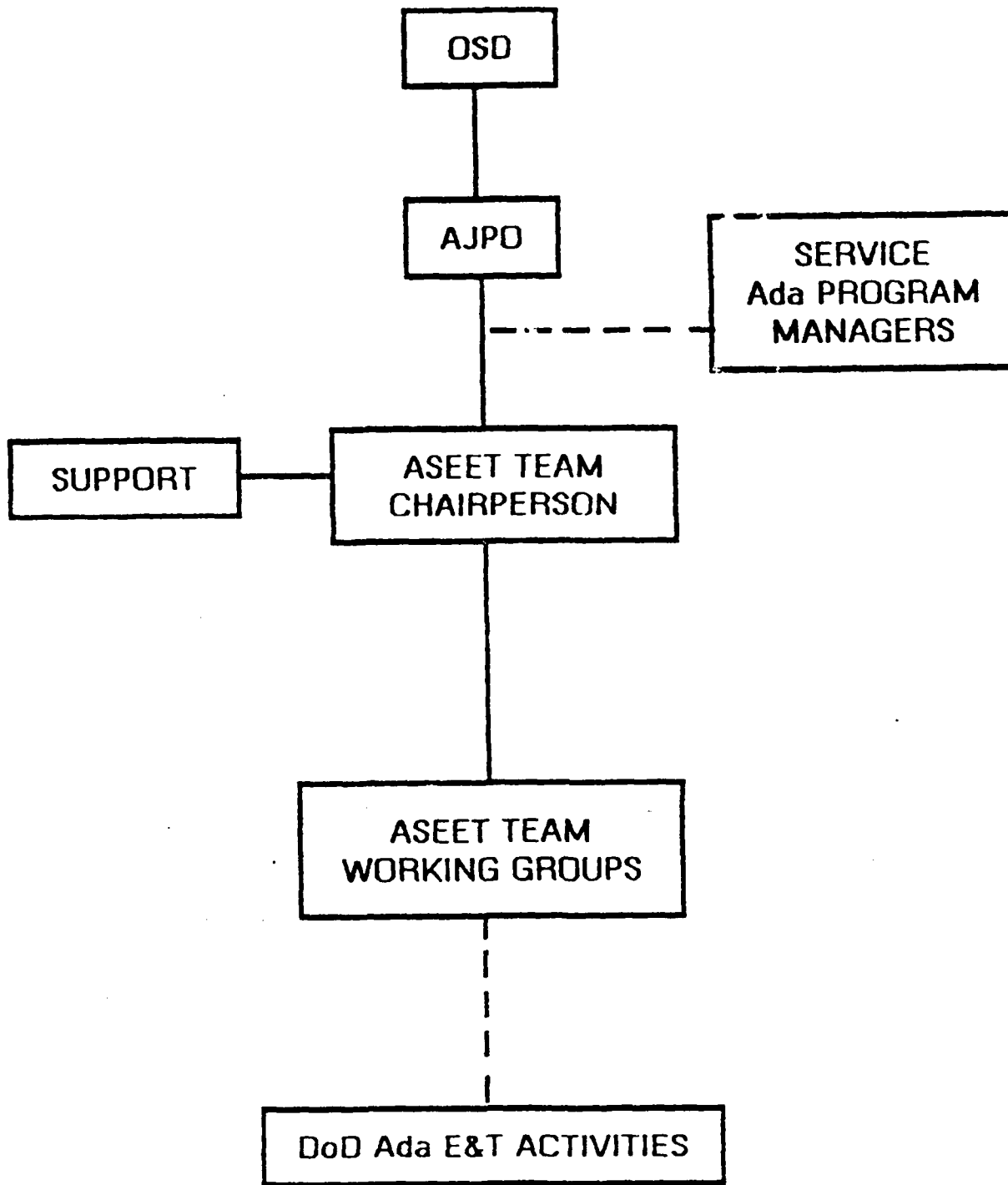


Figure 4.1
ASEET Team Management Structure

- - - information flow
 ——— direct report

4.4.1 Education and Training Requirements Working Group

The Education and Training Requirements Working Group (ETRWG) will consist of a chairperson and members of the ASEET Team. The ASEET Team Chairperson will appoint a chairperson of the ETRWG. The ETRWG will make recommendations to the AJPO through the ASEET Team Chairperson for the accomplishment of the following objectives:

- (1) Determine DoD education and training needs.
- (2) Determine skill requirements.
- (3) Develop a current skills inventory.
- (4) Determine trained personnel requirements.

4.4.2 Research Projects Working Group

The Research Projects Working Group (RPWG) will consist of a chairperson and members of the ASEET Team. The ASEET Team Chairperson will appoint a chairperson for the RPWG. The RPWG will make recommendations to the AJPO through the ASEET Team Chairperson for the accomplishment of the following objectives:

- (1) Establish Ada Research Centers.
 - Gathering and analyze data.
 - Establish project and courseware database.
 - Collect courseware.
 - Collect and develop courseware for instructor education and training.
 - Test courseware.
 - Conduct additional research projects.
- (2) Manage Ada Software Engineering Course Materials.

4.4.3 Certification Working Group

The Certification Working Group (CeWG) will consist of a chairperson and members of the ASEET Team. The ASEET Team Chairperson will appoint a chairperson for the CeWG. The CeWG will make recommendations to the AJPO through the ASEET Team for the accomplishment of the following objectives:

- (1) Conduct a study into the feasibility and desirability of certification

- (2) If certification is recommended, conduct a workshop to recommend an approach to the certification issue:
 - Notify interest industry and government persons and groups of the workshop.
 - Prepare input for workshop participants such as statement of goals of the working group and of the ASEET Team with respect to the issue of certification, and strawman proposals to be studied during the workshop.
 - Evaluate the recommendations.
- (3) If certification is recommended, conduct a second workshop to refine the general recommendations of the first into an approach to implement and maintain a certification process:
 - Notify interested industry and government persons and groups of second workshop.
 - Prepare workshop input such as strawman proposals for the development, implementation, and maintenance of a certification process.
- (4) If certification is recommended, draft RFP's and oversee work to implement and maintain the certification process as defined by the workshops.

4.4.4 Coordination Working Group

The Coordination Working Group (CoWG) will consist of a chairperson and members from the ASEET Team. The ASEET Team Chairperson will appoint a chairperson for the CoWG. The CoWG will make recommendations to the AJPO through the ASEET Team Chairperson for the accomplishment of the following objectives:

- (1) Perform literature searches for efforts relevant to the ASEET Task.
- (2) Develop a Technical Coordination Strategy Document that will:
 - Identify related technical efforts;
 - Identify relationships between the ASEET Task and each of the related tasks;

- Identify areas of mutual benefit.
 - Identify level of coordination.
 - Identify impact of schedules.
 - Identify issues that require resolution.
- (3) Provide technical presentations to the ASEET Team on these related efforts.
 - (4) Prepare position papers which address particular aspects of the ASEET Task with related tasks/efforts.
 - (5) Identify professional organizations that are technically related to the ASEET effort.
 - (6) Coordinate the efforts of the ASEET Team with the activities of the STARS program and the SEI.
 - (7) Develop a Public Coordination Strategy Document which provides an approach for coordinating information exchange with public organizations/activities.
 - (8) Record minutes of all ASEET Team meetings.
 - (9) Coordinate through the AJPO the various ASEET papers/documents which may be included in the annual ASEET Public Report.
 - (10) Prepare a set of ASEET viewgraphs and corresponding text to allow ASEET Team members to present the status of the ASEET Task at public meetings.
 - (11) Prepare ASEET status reports for publication in related journals and newsletters.
 - (12) Catalog all issues related to the ASEET effort.

4.5 Support

Contractor support will be obtained for the purpose of providing administrative and technical support to the ASEET Team.

5.0 TECHNICAL APPROACH

This section provides a more detailed outline of the activities of the ASEET Team. Each section is divided into six subsections: assumptions, alternatives, resource requirements, implementation schedule, approach to selection of an alternative, and recommended alternative.

5.1 Identify Education and Training Requirements

The objective of this task is to assess ASEET requirements throughout the DoD.

5.1.1 Assumptions

- (1) There are different levels of education and training needs throughout the DoD corresponding to the different levels of Ada expertise needed for job performance.
- (2) There is a difference between education and training.
- (3) The ASEET Requirements Assessment includes the following steps:
 - a. Determine skill requirements.
 - b. Develop a current skills inventory.
 - c. Determine trained personnel requirements.

5.1.2 Alternatives

- (1) Do not attempt to survey DoD education and training needs; rely upon estimates from the Services.
- (2) Request the Services to determine these needs independent of the ASEET Team.
- (3) Request the Services to determine these needs in cooperation with the ASEET Team.
- (4) ASEET Team will independently determine these DoD education and training needs.
- (5) Coordinate with the Armed Forces Communications and Electronics Association (AFCEA) Ada education and training activities.
- (6) If other agencies are assessing education and training needs, coordinate with them to obtain information.

(7) Some combination of alternatives 2 through 5 above.

5.1.3 Resource Requirements

Resource requirements will be determined as part of the selection of an alternative.

5.1.4 Implementation Schedule

The schedule will be determined after the selection of an alternative.

5.1.5 Approach to Selection of an Alternative

5.1.5.1 Considerations

The alternative selected should be:

- (1) Comprehensive.
- (2) Cost-effective.
- (3) Timely.

5.1.5.2 Procedure

D: Approval of ASEET Plan by AJPO. ASEET Team Chairperson appoints an ETRWG as defined in the "Management Approach" to this Plan.

D + 1 months: The ETRWG recommends an Ada Education and Training Requirements alternative to the ASEET Team. ASEET Team approval is obtained.

D + 2 months: The ASEET Team Chairperson recommends an Ada Education and Training Requirements alternative to the AJPO. AJPO approval is obtained.

5.1.6 Recommended Alternative

Presently, the ASEET Team is working with the AFCEA education and training study. Three members of the Team have been selected to act as liaisons to AFCEA. If further study is deemed necessary the ETRWG, upon approval of the ASEET Plan, will analyze and select an alternative.

- (4) Courseware which has already been developed for the ASEET is valuable.
- (5) Existing courseware may not be comprehensive enough to satisfy all DoD needs.
- (6) The development of courseware is very expensive.
- (7) Existing courseware and the methods used to present it may not necessarily be the most cost effective for DoD needs.
- (8) Duplication of effort exists in the development of Ada Courseware at various DoD locations; this duplication will continue unless an effective method of coordination is implemented among these locations.
- (9) An effective method for coordination does not exist.
- (10) Courseware requiring computer resources is not necessarily compatible among the various DoD locations.
- (11) Current timesharing computer systems may not effectively support multiple users since the development of Ada software requires numerous resources.
- (12) Effective Ada courseware is required in order for DoD to provide worthwhile Ada software engineering education and training for large numbers of people. (See Requirements Assessment)
- (13) Hands-on computer training is required to effectively learn skills.
- (14) During laboratory sessions, to be most effective, one workstation should be available for each student.
- (15) A test sample size of 15 is large enough to eliminate individual anomalies. A center will require computer resources for a class of 15 students to test courseware.

5.2.2 Alternatives

- (1) Do not establish ARCs; instead, try to coordinate existing courseware from various locations using existing resources (money and computer) and organizations.

- (2) Set up an ARC coordination organization, establish ARCs using existing resources at ARCs.
- (3) Set up an ARC coordination organization, and establish and fund new resources at one ARC location in DoD.
- (4) Set up an ARC coordination organization, and establish and fund new resources at one ARC location in each service.
- (5) Set up an ARC coordination organization, and establish and fund new resources at one ARC location for each level of education and training (technical training, undergraduate education, and graduate education). Distributed one in each service.
- (6) Set up an ARC coordination organization, and establish and fund new resources at one ARC location for each level of education and training in each service and in a DoD agency. Tentative locations for these ARCs are: Fort Benjamin Harrison (USA TRADOC), US Military Academy (USMA), US Army Management Engineering Training Agency (USAMETA), US Naval Academy (USNA), Naval Postgraduate School (NPS), Keesler Technical Training Center (USAF KTTC), US Air Force Academy (USAFA), Air Force Institute of Technology (AFIT), and Defense Systems Management College (DSMC).
- (7) Set up an ARC coordination organization, establish ARCs using existing resources at ARCs. Establish and fund one ARC in academia.
- (8) Set up an ARC coordination organization, establish and fund new resources at one ARC location in DoD, and establish and fund one ARC in academia.
- (9) Set up an ARC coordination organization, establish and fund new resources at one ARC location in each service, and establish and fund one ARC in academia.
- (10) Set up an ARC coordination organization, and establish and fund new resources at one ARC location for each level of education and training in each service. Establish and fund one ARC in academia.
- (11) Set up an ARC coordination organization, establish and fund new resources at one ARC location for each level of education and training in each service and in a DoD agency, and establish and fund one ARC in academia.

- (12) Set up an ARC coordination organization, but use existing resources at ARCs. Establish and fund multiple ARCs in academia.
- (13) Set up an ARC coordination organization, establish and fund new resources at one ARC location in DoD, and establish and fund multiple ARCs in academia.
- (14) Set up an ARC coordination organization, establish and fund new resources at one ARC location in each service, and establish and fund multiple ARCs in academia.
- (15) Set up an ARC coordination organization, and establish and fund new resources at one ARC location for each level of education and training in each service. Establish and fund multiple ARCs in academia.
- (16) Set up an ARC coordination organization, establish and fund new resources at one ARC location for each level of education and training in each service and in a DoD agency, and establish and fund multiple ARCs in academia.

5.2.3 Resource Requirements

These requirements will be determined during the process of selecting an alternative.

5.2.4 Implementation Schedule

The following funding implementation schedule applies to Alternative (6). This is only an example; other alternatives can be implemented in a similar way.

FY 86 - Make decision on computer systems to be used. Purchase 16 workstations, computer-assisted instruction (CAI) system, and database system, together with all support software for initial ARC. Award support contract and place one person full-time at initial ARC. Make database system an ARPANET host. Phase in an in-house administrator at initial ARC.

FY87 - Purchase 15 workstations with complete software for each of four additional ARCs. Continue support at initial ARC. Place one support contract person full time at each of the five ARCs. Set up ARPANET access for each of the five systems. Begin training instructors for the five ARCs.

FY88 - Purchase 15 workstations with complete software for each of the remaining four ARCs. Continue all support at ARCs already established. Place one support contractor full time at each of the remaining four ARCs. Set up ARPANET access for the remaining four ARCs. Continue training instructors.

FY89-90 - Continue administrator at initial ARC, support contract, updates, and maintenance.

5.2.5 Approach to Selection of an Alternative

5.2.5.1 Considerations

Use the most cost-effective method for achieving effective education and training.

- (1) Invest necessary resources to ensure effective and cost effective courseware.
- (2) Take necessary steps to minimize duplication of effort in developing courseware.
- (3) Ensure effective method for distributing courseware.

5.2.5.2 Procedure

D: Approval of ASEET Plan by AJPO. ASEET Team chairperson appoints an Ada Research Projects Working Group (RPWG) as defined in the "Management Approach" to this Plan. The AJPO will enter into a Memorandum of Agreement (MOA) with the institution providing the RPWG chair (the "chairing institution") stipulating that:

- The chairing institution will provide a chairperson for the RPWG who will convene the RPWG to evaluate the Ada Research Projects alternatives and make a recommendation to the AJPO through the ASEET Team Chairperson.
- The AJPO will fund contractor support for the administrative and technical services, as well as for TDY, required for the evaluation.

D + 3 months: The RPWG recommends an Ada Research Projects alternative to the ASEET Team. ASEET Team approval is obtained.

D + 5 months. The ASEET Team Chairperson recommends an Ada Research Projects alternative to the AJPO. AJPO approval is obtained.

5.2.6 Recommended Alternative

Because alternative selection will be accomplished using the process stated in the previous paragraph, recommendation of an Ada Research Projects alternative in this Plan is premature.

5.3 Manage Ada Software Engineering Course Materials

A need exists to manage the acquisition, development, production, maintenance, and dissemination of DoD Ada software engineering course materials

5.3.1 Assumptions

- (1) An adequate system to manage Ada software engineering course materials does not exist.
- (2) Ada software engineering course materials should be standardized.
- (3) Ada software engineering course materials should be centrally managed to the maximum extent practical.
- (4) Centrally managed and standardized Ada software engineering course materials will facilitate the timely assimilation of Ada.

5.3.2 Alternatives

- (1) The AJPO will contract to develop and manage Ada software engineering course materials.
- (2) Select a single service or DoD agency (for example, SEI) to develop and manage Ada software engineering course materials.
- (3) The AJPO will acquire manpower resources to develop and manage Ada software engineering course materials.
- (4) Charter an activity with industry/academia, in conjunction with DoD agencies/services, to develop and manage Ada software engineering course materials.

5.3.3 Resource Requirements

Resource requirements will be determined as part of the selection of an alternative.

5.3.4 Implementation Schedule

The schedule will be determined after the selection of an alternative.

5.3.5 Approach to Selection of an Alternative

5.3.5.1 Considerations

- (1) Resource availability (manpower and money).
- (2) Responsiveness of alternatives to timeliness of need.
- (3) Flexibility; responsiveness to scope, resource changes.
- (4) Political.
- (5) Legal.

5.3.5.2 Procedure

D: Approval of ASEET Plan by AJPO. ASEET Team chairperson appoints an RPWG as defined in the Management Approach to this Plan. The RPWG will be responsible for managing Ada software engineering course materials.

D + 4 months: The RPWG recommends an alternative for managing Ada software engineering education and training materials to the ASEET Team. ASEET Team approval is obtained.

D + 5 months: The ASEET Team Chairperson recommends an alternative for managing Ada software engineering education and training materials to the AJPO. AJPO approval is obtained.

5.3.6 Recommended Alternative

Because alternative selection will be accomplished using the process stated in the preceding paragraph, recommendation of an alternative for managing Ada software engineering education and training materials in this Plan is premature.

5.4 Study the Requirements of Certification of Ada Software Engineers

Toward the goal of ensuring that adequately skilled software engineers are employed for DoD Ada software development and maintenance, the feasibility and effectiveness of a professional certification process will be studied. If it is determined that such a certification process can and should be implemented, a certification program will be developed, implemented, and maintained.

5.4.1 Assumptions

- (1) Some means is needed to ensure that DoD Ada software developers and maintainers are adequately skilled.
- (2) No existing program is sufficiently comprehensive for DoD-wide use in assessing Ada software engineering skills .
- (3) Study of the certification issue is necessary.
- (4) A formal certification process can promote minimum standards of education and training, and enable the assessment of individual education and training programs.

5.4.2 Alternatives

- (1) Study, within the ASEET Team, the certification of Ada Software Engineers.
- (2) Collaborate with other similar efforts (e.g., AFCEA, SIGAda, AdaJUG, IEEE, ICCP).
- (3) Conduct an open workshop to study the certification of Ada Software Engineers.
- (4) Some combination of the above.

5.4.3 Resource Requirements

These requirements will be determined during the process of selecting an alternative.

5.4.4 Implementation Schedule

The implementation schedule will be determined after the selection of an alternative.

5.4.5 Approach to Selection of an Alternative

5.4.5.1 Considerations

- (1) Comprehensive
- (2) Effective.
- (3) Economical.
- (4) Timely.

5.4.5.2 Procedure

D: Approval of ASEET Plan by AJPO. ASEET Team Chairperson appoints a CeWG as defined in the Management Approach to this Plan.

D + 1 months: The CeWG recommends a method for conducting a study of certification to the ASEET Team. ASEET Team approval is obtained.

D + 2 months: The ASEET Team Chairperson recommends a method for conducting a study of certification to the AJPO. AJPO approval is obtained.

5.4.6 Recommended Alternative

The ASEET Team is working with the AFCEA education and training task to identify the need for certification. An ASEET Team member is acting as a liaison to the task force designated to analyze this need. If further study is deemed necessary, the CeWG, upon approval of the ASEET Plan, will analyze and select an alternative.

5.5 Provide DoD Focal Point for ASEET

The objective of this task is to provide a DoD focal point for the ASEET Task.

5.5.1 Assumptions:

- (1) There currently exists a need within the DoD community to provide a focal point for information about ASEET. Questions in this area arise frequently within the services and other DoD

agencies, as well as in professional societies, industry, and academia.

- (2) A forum is needed in which education and training questions can be addressed and discussed and in which related information can be disseminated throughout the ASEET community.

5.5.2 Alternatives

- (1) Use existing forums and resources (i.e., AdaIC).
- (2) Use the ASEET Team as both focal point and forum.
- (3) Establish a new forum.

5.5.3 Resource Requirements

Resource requirements will include representatives from various DoD activities who will interact with a representative from the CoWG. Once this activity begins, other resource requirements may be identified.

5.5.4 Implementation Schedule

- (1) 1/15/86 - Begin distribution of ASEET Plan
- (2) 1/15/86 - Begin soliciting relevant information which may impact or support the activities of the Team.
- (3) 7/1/86 - Begin updating ASEET Plan for distribution
- (4) As this task proceeds, the implementation schedule will be updated.

5.5.5 Approach to Selection of an Alternative

5.5.5.1 Considerations

- (1) Resource availability (manpower and money).
- (2) Responsiveness of DoD activities.

5.5.5.2 Procedure

D: Approval of ASEET Plan by AJPO. ASEET Team Chairperson appoints a CoWG as defined in the Management Approach of this Plan.

5.5.6 Recommended Alternative

The recommended alternative is 5.5.2 (2). In preparing this plan, the team agreed to take on this activity. The ASEET Team will provide a focal point for ASEET activities within the DoD. Public reports on the results of this ASEET Task will be made available to professional societies such as SIGAda and AdaJUG. Similarly, the ASEET Team will solicit relevant information which may impact or support the activities of the team. This is in keeping with the AJPO philosophy of public disclosure. The ASEET Task is the lead DoD effort with regard to ASEET. In this respect, the ASEET Team will participate in, and assist when possible, other programs connected with education and training, such as the STARS Human Resources Area Coordination Team and the SEI.

5.6 Promote Industry/Academia Participation in the ASEET Task

5.6.1 Assumptions

- (1) It is important that industry and academia participate in the ASEET Task to ensure education and training continuity.
- (2) Industry and academia are interested in participating in the ASEET Task.

5.6.2 Alternatives

- (1) Ask industry and academia to participate in the task and accept all volunteers.
- (2) Ask industry and academia to participate in the task; screen and select volunteers.
- (3) Do not ask for industry/academia participation.

5.6.3 Resource Requirements

Resource requirements will include representatives from industry and academia who will interact with a representative from the CoWG. After this activity begins, other resource requirements may be identified.

5.6.4 Implementation Schedule

5.6.5 Approach to Selection of an Alternative

5.6.5.1 Considerations

- (1) Resource availability (manpower and money).
- (2) Responsiveness of industry/academia.

5.6.5.2 Procedure

D: Approval of ASEET Plan by AJPO. ASEET Team Chairperson appoints a CoWG as defined in the Management Approach to this Plan.

5.6.6 Recommended Alternative

The recommended alternative is 5.6.2 (2). In preparing this plan, the team agreed to take on this activity. In order to encourage industry/academia participation in the ASEET effort, an ASEET Workshop will be conducted. Information on the ASEET Workshop will be made publically available and participants will be screened and selected on the basis of position papers that are written relevant to the technical aspects of the ASEET Task. Participants in the Workshop will be invited to attend ASEET Team meetings as Distinguished Reviewers.

5.7 Promote Community Use and Acceptance of the ASEET Task

5.7.1 Assumptions

- (1) The community is interested in the activities of the ASEET Team.
- (2) The community is interested in obtaining information on the ASEET Task.
- (3) ASEET activities may be beneficial to the community in its education and training efforts.

5.7.2 Alternatives

- (1) Actively disseminate ASEET information to the Ada community.
- (2) Respond to requests for ASEET information.

(3) Combination of 1 and 2.

5.7.3 Resource Requirements

None outside of the ASEET Team.

5.7.4 Implementation Schedule

The ASEET Plan will begin immediately disseminating information to the Ada community on the ASEET Task.

5.7.5 Approach to Selection of an Alternative

5.7.5.1 Considerations

- (1) Resource availability (manpower and money).
- (2) Political considerations.
- (3) Legal considerations.

5.7.5.2 Procedure

D: approval of ASEET Plan by AJPO. ASEET Team Chairperson appoints CoWG as defined in the Management Approach to this Plan.

5.7.6 Recommended Alternative

The recommended alternative is 5.7.2 (3). In preparing this plan, the team agreed to take on this activity. Use of ASEET materials acquired or developed through this task will be made available throughout the DoD. These materials will also be of use to industry and academia in their education and training efforts, thereby maximizing the economic benefits of the ASEET Task products and minimizing the cost of doing ASEET related work within DoD, academia, and industry.

6.0 ASEET DELIVERABLES

This section delineates each of the deliverables of the ASEET Task. Working as a whole, the ASEET Team members, the technical consultants, and the technical support contractors are responsible for the development of all documents. However, in order to more clearly reflect the areas of emphasis for the ASEET working groups and support personnel, each document description specifies the individuals who are primarily responsible for the development of that document.

6.1 ASEET Plan

The ASEET Plan provides a detailed and organized approach to the accomplishment of the ASEET Task. The ASEET Plan reflects the management approach, the technical approach, and the schedules for all ASEET activities. The ASEET Plan is considered to be evolutionary and will be updated at least annually to reflect possible proposed modifications to the approaches and schedules and to reflect accomplishments during the previous year. The ASEET Team Chairperson is primarily responsible for the development of the ASEET Plan.

6.2 ASEET Public Report

The ASEET Public Report, which will be made available to the public on an annual basis, will provide information on the activities of the ASEET Team. This report will contain the recorded minutes of all ASEET Team meetings, as well as all position papers prepared by the ASEET Team members. The report will also contain ASEET position papers written by industry/academia participants in the ASEET Workshop, as well as all documentation which results from this Workshop. The CoWG is primarily responsible for the format and collation of all entries in the ASEET Public Report.

6.3 ASEET Technical Coordination Strategy Document

The ASEET Technical Coordination Strategy Document will identify other ongoing DoD/contractual efforts that are technically related to the ASEET Task. This document will provide a strategy for coordination between the ASEET Task and each identified effort. It will specify level of coordination, points of contact, impact of schedules of one effort on another, and benefits gained by each effort as a result of such coordination. This document will be updated throughout the duration of the ASEET Task to incorporate efforts that are initiated during this time. The CoWG is primarily responsible for the development of the ASEET Technical Coordination Strategy Document.

6.4 ASEET Public Coordination Strategy Document

The ASEET Public Coordination Strategy Document will identify public organizations/activities with which coordination with the ASEET Task should be established. This document will provide a strategy for coordination between the ASEET Task and each of these organizations/activities. It will specify level of

coordination, points of contact, and procedures by which the plans and accomplishments of the ASEET Task are presented to the organizations/activities. This document will be updated throughout the duration of the ASEET Task. The CoWG is primarily responsible for the development of the ASEET Public Coordination Strategy Document.

6.5 Education and Training Requirements Selection Report

The Education and Training Requirements Selection Report will describe the selection of an Education and Training Requirements alternative (section 5.1.2). This report will be prepared by the ETRWG and will include a justification for the alternative selected.

6.6 Ada Research Projects Selection Report

The Ada Research Projects Selection Report will describe the selection of an Ada Research Projects alternative (section 5.2.2). This report will be prepared by the RPWG and will include a justification for the alternative selected.

6.7 Management of Ada Course Materials Selection Report

The Management of Ada Course Materials Selection Report will describe the selection of a Management of Ada Course Materials alternative (section 5.3.2). This report will be prepared by the RPWG and will include a justification for the alternative selected.

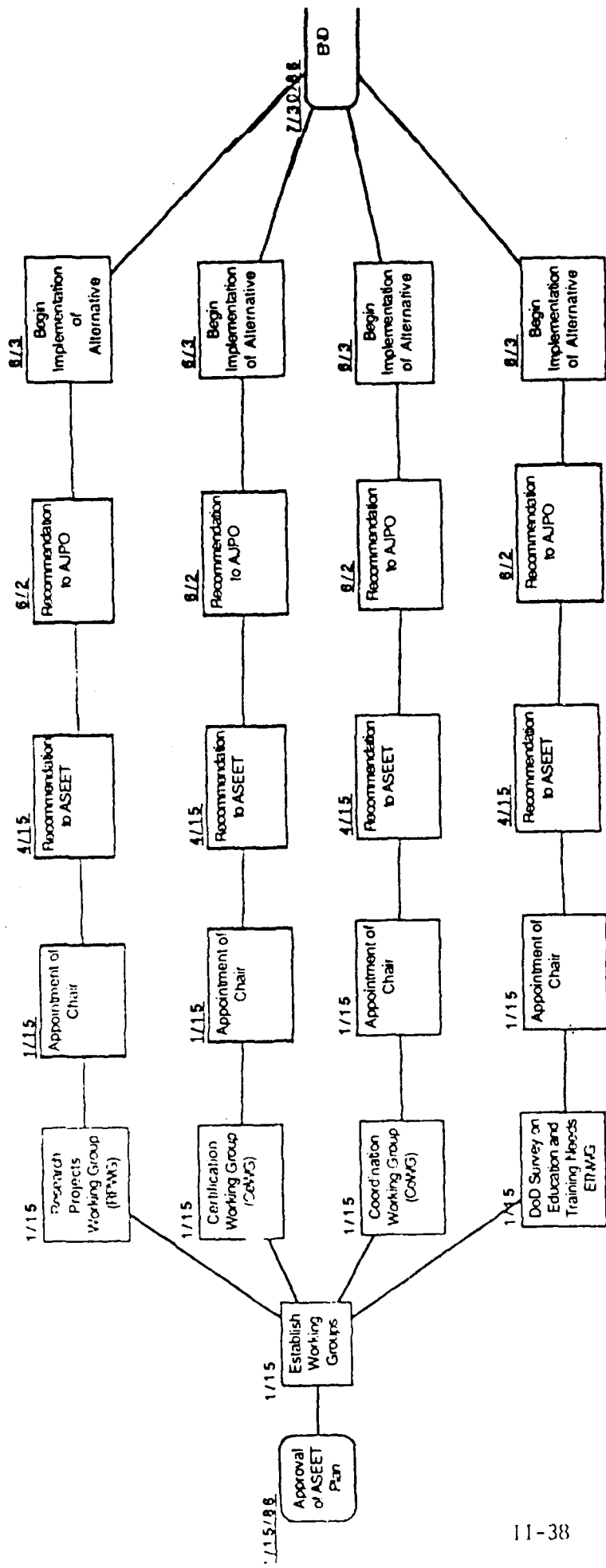
6.8 Ada Certification Study Report

The report on the question of certification of Ada Software Engineers will describe the selection of an alternative (section 4.4.2). This report will be prepared by the CeWG and will include a justification for the alternative selected.

6.9 Database of Research Data and Final Reports

The CoWG will maintain a database of all research data collected by the ASEET Team and all final reports. This database will be maintained by the CoWG and will be made available to the general public.

7.0 ASEET WORK BREAKDOWN STRUCTURE



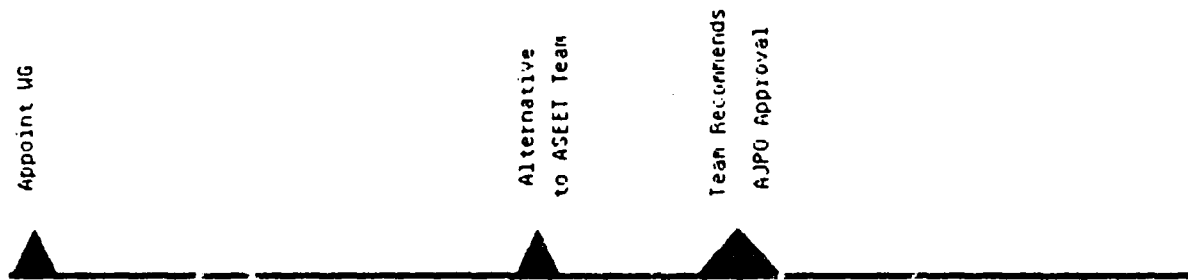
8.0 IDENTIFICATION OF MILESTONES

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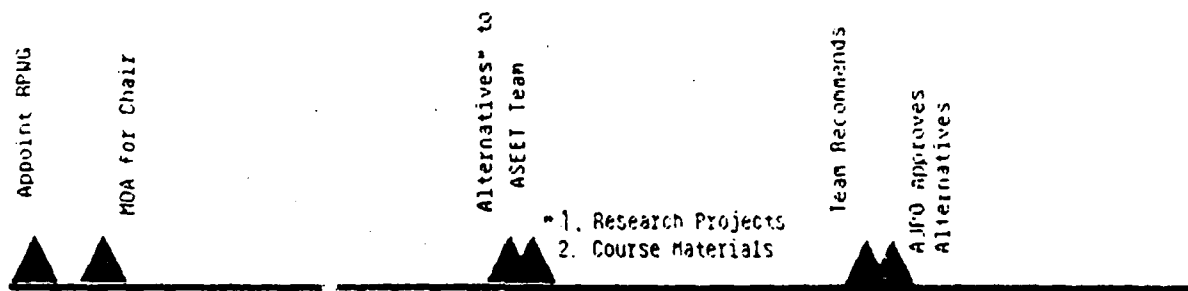
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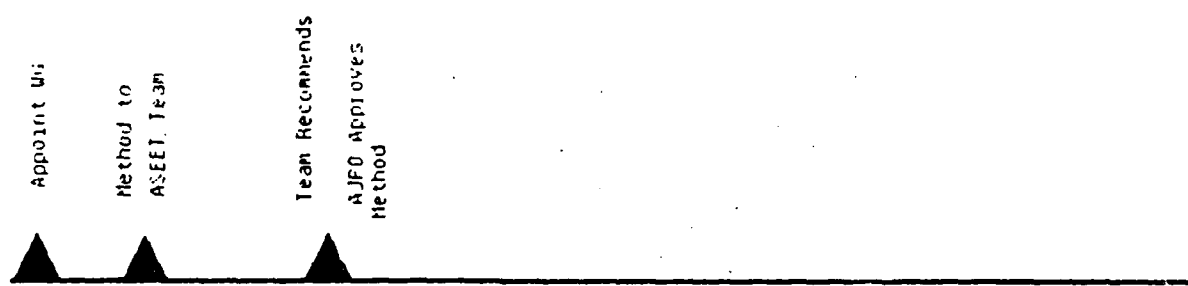
ETRWG



RPWG



CowG



Appoint WG

- 1. Focal Point
- 2. Industry & Academia Participation
- 3. Community Use & Approval

9.0 ACRONYMS

ACM	Association for Computer Machinery
ADA Board	Ada Director's Advisory Board
AdaJUG	Ada-Jovial Users' Group
AFCEA	Armed Forces Communications and Electronics Association
AJPO	Ada Joint Program Office
ALS/N	Ada Language System/Navv
ARC	Ada Research Center
ASE	Ada Software Engineer
ASEET	Ada Software Engineering Education and Training
CAI	Computer-Assisted Instruction
CeWG	Certification Working Group
CoWG	Coordination Working Group
CREASE	Catalog of Resources for Education in Ada and Software Engineering
DoD	Department of Defense
ECS	Embedded Computer System
ETRWG	Education and Training Requirements Working Group
HOL	High Order Language
HOLWG	High Order Language Working Group
ICCP	Institute for Certification of Computer Professionals

IEEE	Institute of Electrical and Electronic Engineers
MOA	Memorandum of Agreement
NASA	National Aeronautics and Space Administration
OSD	Office of the Secretary of Defense
OUSDRE(R&AT)	Office of the Undersecretary of Defense for Research and Engineering (Research and Advanced Technology)
RPWG	Research Projects Working Group
SEEDWG	Software Engineering Education Working Group
SEI	Software Engineering Institute
SIGAda	Special Interest Group - Ada
STARS	Software Technology for Adaptable, Reliable Systems
TPR	Trained Personnel Requirements

10.0 REFERENCES

- (1) DeLauer, Dr. Richard D., Memorandum to Services, 10 June 1983.
- (2) Jordan, Dr. Pauline D., McDonald, Catherine W., and Schaar, Brian, Concept Paper for the Development of a DoD Ada Software Engineering Education and Training Plan, IDA Memorandum Report M-7, November 1984.
- (3) United States Department of Defense, Reference Manual for the Ada Programming Language, ANSI/MIL-STD-1815A, January 1983

III. PAST TECHNICAL ACTIVITIES

This section provides a more detailed outline of the activities of the ASEET Team since the adoption of the ASEET Plan, Version 1.0. The four subsections reflect the activities of the specific working groups.

A. Education and Training Requirements Working Group

The objective of this task is to assess Ada software engineering education and training requirements throughout the DoD.

The resources expended to date for this working group have been limited to the liaison activities of three ASEET Team members working with AFCEA on their Ada education and training study. The AFCEA study team has recently completed its report on the present and near-future state of industry's and Government's transition to Ada. The report should be available to the public during the summer of FY87. Although the findings of the AFCEA Team were numerous, those significant to this working group include:

1. Currently available Ada language education and training methods are adequate, and education and training is broadly available.
2. The Ada education and training capacity can be readily expanded to support the future Ada workload.
3. Software engineering training and management awareness of training in Ada are currently inadequate.
4. Companies responding to a questionnaire largely favored apprenticeship, on-the-job, and self-help training over all other forms of Ada training. The next most popular form of training was internal lectures conducted by company employees. Together these methods accounted for more training hours than all other reported forms of Ada training combined.

The implication of these results is that work is still needed in the form of education for top and middle management, as well as for software engineers. However, educational materials should be in a form that can be self-administered rather than through outside courses. The ASEET Team has determined that the ETRWG should conduct follow-on work from the AFCEA study. The technical approach for this task is detailed in Version 2.0 of the ASEET Plan (see Section VI).

B. Courseware Working Group

The Courseware Working Group (CourseWG) was previously known as the Research Projects Working Group (RPWG). The main purpose of the CourseWG is to enhance the dissemination of DoD Ada software engineering education and training course materials and to identify and facilitate needed ASEET Courseware Projects.

The CourseWG has established an ASEET Materials Library (AML). The purpose of the AML is to assist DoD personnel in the review, analysis, preparation, and distribution of DoD and public domain courseware throughout DoD. The AML is located at the AJPO in Washington, D.C. and is now accepting materials. Information about the AML may be obtained by contacting the AML Librarian:

AML Librarian
c/o Ada Information Clearinghouse
3D139 (1211 Fern Street, C107)
The Pentagon
Washington, D.C. 20301-3081
(703) 685-1477

To date, no ASEET Courseware Projects have been identified.

C. Certification Working Group

The Certification Working Group (CeWG) was established to study the feasibility and effectiveness of a professional certification process. A workshop was held during the First Annual ASEET Symposium in Orlando, Florida. At that time, it was determined that such a certification process should be developed, implemented, and maintained. A second workshop was planned to refine the general recommendations of the first workshop into an approach to implement and maintain a certification process. However, in FY87, the CeWG was suspended in response to a recommendation from the AJPO that the ASEET Team allow industry to take the lead in certification by limiting the Team's work in this area to assisting other organizations in achieving certification.

This task has since been subsumed by the Coordination Working Group (CoWG). The CoWG will provide assistance to other organizations that have taken or plan to take a lead in certification.

D. Coordination Working Group

The Coordination Working Group (CoWG) was established to:

- (1) Provide a DoD focal point for the ASEET Task.
- (2) Promote both industry's and academia's participation in the ASEET Task.
- (3) Promote community acceptance of the ASEET Task.

The first major accomplishment of the CoWG was the publication of the ASEET Plan, Version 1.0 which laid the foundation for the ASEET Team activities. Version 2.0 of the ASEET Plan will be published in the next ASEET Public Report. The ASEET Plan is a living document that will be updated annually.

The First Annual ASEET Symposium was held in June 1986. The purpose of the symposium was to provide a forum for universities, industry and government training agencies to sample Ada software engineering education and training materials. Attendees were also given the opportunity to share ideas and lessons learned with other educators and trainers. The program included an Introduction to Ada tutorial, vendor presentations of their products related to Ada education and training, and a panel on lessons learned in teaching Ada. Although there were no formal proceedings from this symposium, a copy of the slides from the tutorial and the lessons learned panel are available through the ASEET Materials Library.

In January 1987, the first Advanced Ada Workshop was held at Keesler Air Force Base. The workshop provided educators and trainers with the opportunity to further their understanding of Ada software engineering principles and practices. This five day workshop was designed for educators and trainers who were or would be establishing an Ada education and training program. Each day consisted of two sessions taught by ASEET Team members: 1) an advanced Ada software engineering tutorial on a particular topic and 2) a tutorial on common teaching difficulties encountered in that area, how to overcome those difficulties, and other useful teaching techniques and approaches. Copies of the slides used during these workshops are available through the ASEET Materials Library.

The Second Annual ASEET Symposium was held in June 1987 in Dallas, Texas. The program included two tutorials (Introduction to Ada and Advanced Ada Topics), refereed papers, and lessons learned panels (one from industry and one from academia). Information pertaining to the proceedings from this symposium can be found in Section VI, and copies of the slides used during the presentations are available through the ASEET Materials Library.

The second Advanced Ada Workshop was held 17-21 August 1987 at the Institute for Defense Analyses in Alexandria, Virginia. The workshop format was similar to the first workshop. The attendees were briefed on the history of the Ada program and a new tutorial on software engineering was introduced. Time was also set aside for discussions on teaching techniques, textbooks, and the Ada Information Clearinghouse. Based on recommendations received from the attendees, the

workshop scheduled in January 1988 at the Software Engineering Institute will include four days of tutorials and three birds of a feather sessions.

E. Professional Development Working Group

The Professional Development Working Group (ProDWG) is the newest working group within the ASEET Team. Established in late FY87, the ProDWG provides briefings and tutorials to increase the professional development of the Ada Community within the DoD and academia. These tutorials and briefings have been prepared by Team members, and the ProDWG is available to assist the Ada software engineering community within the DoD and academia with professional development. The briefings and tutorials presented by this working group on behalf of the ASEET Team will accelerate the proliferation of quality Ada software engineering education and training throughout the DoD. This working group serves as the catalyst to spur organizations and individuals to want to know more about Ada software engineering activities. By responding to requests and actively seeking key locations/organizations to which Ada software engineering concepts and principles may be presented, the entire Ada community, including DoD, benefits.

ProDWG FY87 BRIEFINGS AND TUTORIALS

<u>Date</u>	<u>Activity</u>	<u>Location</u>
18 Oct 86	Presented 8 hour tutorial Alabama Educational Computing Conference	Montgomery, Alabama
13 Nov 86	Participated on Ada Expert's Panel Martin Marietta Ada Workshop	Orlando, Florida
2-5 Dec 86	Briefing to Under-Secretary of the Army, Secretariat Staff, Pentagon Staff, and Army Material Command on Ada Software Engineering	Washington, D.C.
16 Mar 87	Presented 8 hour tutorial Washington Ada Symposium	Washington, D.C.
23 Apr 87	Presented 3 hour briefing/ 8 hour tutorial USAISSDCL	Fort Lee, VA
6 May 87	Presented 8 hour tutorial Faculty of the University of Mississippi	Oxford, MS
7 June 87	Presented 8 hour tutorial ASEET Symposium	Dallas, TX
5-9 July 87	Briefed 13 Army Generals for 2 days on Ada Software Engineering	USMA West Point, NY

**IV. CONCEPT OF OPERATIONS FOR THE ASEET MATERIALS
LIBRARY (AML)**

ASEET Materials Library (AML) Concept of Operations

1.0 Introduction

1.1 Purpose

This document specifies the concept of operations for an ASEET Materials Library (AML) to be located at the Ada Joint Program Office (AJPO), Washington, DC. It provides a concept for gathering, accessing, and distributing library materials, and explains how the library will be used. The purpose of the AML is to assist Department of Defense (DoD) personnel in the review, analysis, preparation, and distribution of DoD and public domain courseware throughout DoD. Although numerous organizations are producing Ada software related education and training materials, centralized assistance and coordination is desirable to eliminate duplication of effort and to take advantage of different perspectives and diverse approaches to achieve the best possible quality in these materials for DoD. Through this coordination, education and training materials can be made available to assist organizations in adapting them to their specific needs.

1.2 Background

The ASEET Team Courseware Working Group (CourseWG) was formed with two objectives in mind: 1) Identify and facilitate needed ASEET research projects and 2) Enhance availability of Ada software engineering education and training.

1.3 Scope

In fulfilling the first objective, the AML will be co-located with the AJPO Reference Library for retrieval of historic information. In fulfilling the second objective, the AML will be set up to help open the distribution channels for Ada courseware within DoD. The AML is not set up to be the main distribution point of DoD educational courseware for the public, but to enhance the availability of DoD educational courseware within DoD. Distribution of courseware to the non- DoD educational community will be through normal Defense Technical Information Center (DTIC), National Technical Information Service (NTIS), and Defense Audio Visual Agency (DAVA).

2.0 Operation of ASEET Materials Library (AML)

2.1 Gathering Materials

Initially, materials will be gathered from resources within the ASEET Team. DoD materials will be accepted first, followed by public domain courseware.

Once material is received the following steps will be followed to add materials to the library:

1) Assign an inventory number

A unique identifier will be assigned to each item that is added to the library.

2) Examine and analyze to determine keyword terms

The course material will be reviewed and analyzed by AJPO Educational Resources (ie. ITRI, IDA or ASEET Team) to determine keywords that would be applicable for this material. Selected keyword terms will be maintained as a controlled list to ensure consistency. An entry form will be filled out as the reviewer examines the material and prepares it for entry into the database.

3) Database entry

The database will be updated to reflect new additions to the library.

4) Submit to Public Affairs for clearance.

Any material that is to be distributed outside the DoD must be cleared by Public Affairs. Until material is cleared, it will be kept separate physically (e.g. a holding area for uncleared material).

5) Material reproduced - available to be distributed

Once a reference to the material has been added to the database, it will be reproduced through available resources. Course material in the form of briefing slides and other paper format will be reproduced through government sources. Audiovisual materials will be reproduced through DAVA.

2.1.1 Schedule for adding courseware to library

D: Library Material received. Inventory identifier assigned.

D + 5 days: Examine/Analyze courseware. Determine keywords.
Fill out database entry form.

D + 6 days: Enter information into database. Submit courseware to public affairs for clearance.

D + 13 days: Clearance received from public affairs. Material reproduced and made available for distribution through DTIC, NTIS, and DAVA.

2.2 Distributing Materials

In order to assist the ASEET Team in meeting its goal of opening the distribution channels for courseware throughout DoD and the community, distribution of the courseware will be provided to DoD organizations on a limited basis. Once a particular courseware has stabilized, it will then be submitted to the DTIC and the NTIS for distribution through these channels. (DTIC will distribute documents to military, government and defense contractors who are registered users of DTIC. NTIS will distribute documents to the general public at a cost. Unclassified documents submitted to DTIC will be forwarded and registered at NTIS as well.)

2.3 Utilization of Library

Space for the AML will be provided by the AJPO at the AJPO location. The following is a scenario on how the library could be utilized:

- 1) A caller will contact the Ada Information Clearinghouse with a question on educational material.
- 2) The call will be handled by the educational point of contact (POC).
- 3) The POC will determine the subject that the caller is interested in (i.e., tasking for the undergraduate level student).
- 4) The POC will determine the keywords that match the caller's interest and perform a database search by keyword.
- 5) A summary listing of material available will be printed from the database. These will include information from online searches of the Library of Congress Book List, Dialog System (for periodicals), and our own Bibliographic database.
- 6) The POC will return the call, providing the list of courseware available matching the caller's request. Information will also be provided on how course materials can be obtained.

2.4 AML Database

The database will be part of the existing reference library that is in place at the AJPO. A modification will be made to the reference library database so that course material may be added to the library.

2.5 Publicity

An announcement regarding the AML resource will be made to the ASEET Team during the Second Annual ASEET Symposium announcing the AML resource. The AML resource will also be announced in various Ada related newsletters such as the Ada Information Clearinghouse newsletter and the LCF newsletter. Data will also be distributed at various other workshops, symposia, etc.

3.0 Schedule

25 May 87: Approval by AJPO/ASEET Team.

1 June 87: Shelves ordered. Arrangements made to start receiving the first library courseware. Preliminary Database design completed and approved. Library setup to receive materials. Library area cleared and organized.

9 June 87: Announcement of resources available to the ASEET Team during the ASEET Symposium in Dallas, TX.

15 June 87: More material gathered from ASEET Team members and added to the library. Database up and running.

20 July 87: Library fully operational to handle DoD, industry and university requests.

V. SECOND ANNUAL ASEET SYMPOSIUM

The Second Annual ASEET Symposium was held in Dallas, Texas, 9-11 June 1987. The following is the table of contents from the symposium proceedings. Interested parties may obtain copies of the proceedings through the ASEET Materials Library located at the Ada Joint Program Office in Washington, D.C. or from the Defense Technical Information Center (DTIC).

TABLE OF CONTENTS

	Page
Chairman's Forward.....	1
 Wednesday, 10 June 1987	
Managing the Implementation of an Ada Training Program,..... Mr. Paul Barkowitz, Harris Corporation	3
Reporting on Ada Training Evaluation Guide Project, Ms. Priscilla Fowler, SEI	11
Ada from a Management Perspective, Maj. Charles Engle, US Military Academy Lt. Tony Dominice, Keesler AFB	19
Comparing Designs: A Methodology for Teaching Software Engineering, Ms. Putnam P. Texel, TEXEL & COMPANY	25
Instantiating Ada at the University of Central Fla. (and Why There Are Few Good Texts on Ada and Software Engineering), Dr. Darrell Linton, U. of Central Florida	43
Treatment of the Ada Language in a Programming Language..... (ACM-CS8) Course, Dr. Michael Meeker U. of Wisconsin-Oshkosh	47
Ada from the Trenches: A Classroom Experience, Mr. Jaime Nino, U. of New Orleans	51
Introducing Ada and Its Environments into a Graduate Curriculum, Maj. Pat Lawlis, Ms. Karyl Adams, Air Force Institute of Technology	63
Lessons Learned in Using Formal Specification Techniques in..... an Ada-based Software Engineering Course, Ms. Charlene Hamiwka Mr. Laurence Latour, U. of Maine at Orono	79
A Student Project to Extend Object-Oriented Design,..... Prof. Richard Vidale, Boston University C.R. Hayden, GTE Government Systems	89
An Evolution in Ada Education for Academic Faculty, Ms. Susan Richman, Pennsylvania State Univ.	99

Thursday, 11 June 1987

Software Engineering and Its Ramifications to the Ada Programming Language Training Environment, Mr. Jerry F. Berlin, Harris	107
Ada Training: A Development Team's Perspective, R.J. Vernik, Tinker Air Force Base	117
Ada for the Manager, Freeman L. Moore, Texas Instruments	137
Ada in the MIS World, Eugene Vasilescu, GNV Associates	143
Turning COBOL Programmers into Ada Software Engineers, Maj. Charles Engle and Maj. Colen Willis, US Military Academy	153
Teaching Software Engineering in a First Ada Course, Dr. Robert Mers, North Carolina A&T Univ.	171
Ada Education and the Non-Computer Scientist, Dr. Charles Kirkpatrick and Dr. Paul Knese, Parks College of St. Louis University	179
Ada in Undergraduate Curriculum at Saint Mary College, Mr. Victor Meyer, Saint Mary College	191
The Programming Team and the Accelerated Course as Methods for Teaching Ada, Mr. David Barrett, East Texas State Univ.	203
INDEX	209

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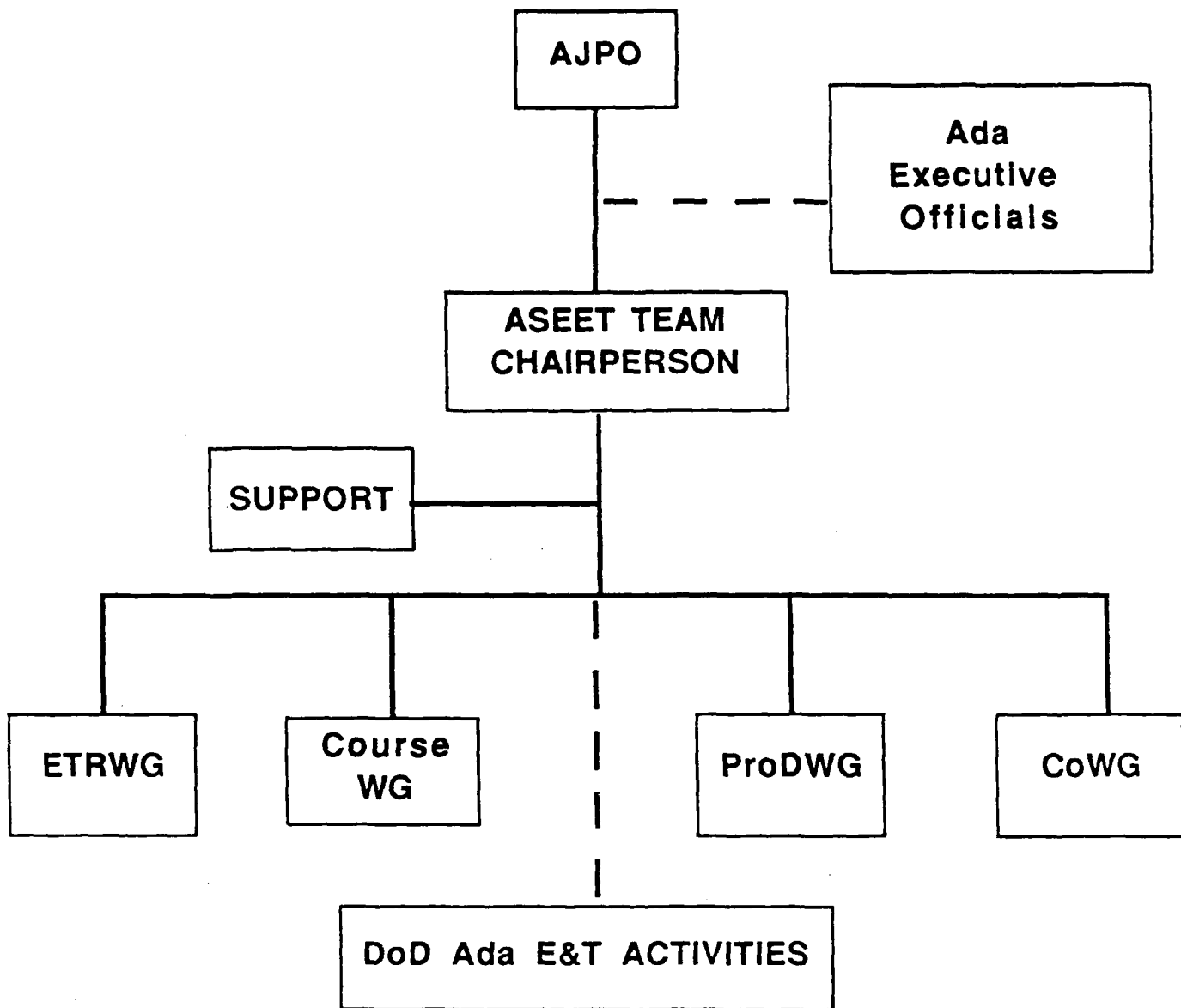
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B. ASEET Team Management Structure



- - - INFORMATION FLOW
— DIRECT REPORT

C. **ASEET Team Working Groups**

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Captain David Cook
Mr. Jim Valentino

Courseware Working Group (CourseWG)

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CDR David Endicott
Ms. Sue O'Neill
Dr. James Tucker
Captain David Umphress

Coordination Working Group (CoWG)

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Professional Development Working Group (ProDWG)

Major Charles Engle - Chair
Captain Roger Beauman
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