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**Briefing DTD User's Guide
for the
Software Technology for Adaptable, Reliable Systems
(STARS) Program**

AD-A228 473

Contract No. F19628-88-D-0032

Task IR65: SGML Document Descriptions

CDRL Sequence No. 1820

01 July 1990

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Prepared for:

**Electronic Systems Division
Air Force Systems Command, USAF
Hanscom AFB, MA 01731-5000**

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1. INTRODUCTION

The Briefing DTD is a new DTD prepared using the SGML Text Composition System (STCS) developed under STARS Foundation contract N00014-87-C-2386 and revised under STARS contract F19628-88-D-0032. The Briefing is intended to be used to prepare overhead slides in a landscape orientation using the Postscript(tm) output of the STCS formatter. The Briefing has been designed using presentations typical of the STARS program. Specifically two presentations from the February 1990 STARS Quarterly PMR were selected and encoded from hardcopy using the Briefing DTD and processed using the STCS software. The first was the presentation by Mr. James Solderitsch of Unisys on Repository Technology, the second was the IBM PMR status report by Mr. W.D. Ceely and Mr. R.J. Drake. The IBM status report briefing material is provided in an appendix to demonstrate use of the Briefing DTD.

2. WRITING A BRIEFING

This section provides all information necessary to mark up a series of slides to be used in a briefing or presentation.

2.1 Briefing Document Type Definition (DTD)

The correct format of a Briefing SGML file is controlled by the Briefing Document Type Definition (DTD) file. That file is listed below.

```
<!DOCTYPE briefing [  
  
<!ENTITY % yesorno      "(yes|no)" >  
<!ENTITY % list         "( bullet | seqlist )" >  
<!ENTITY % stuff        "para | table | figure | graphic | %list;" >  
<!ENTITY % linear       "( slide | masthead | quadchrt )" * >  
<!ENTITY % topical      "( next | slide | masthead | quadchrt )" * >  
<!ENTITY % dates        "( begndate , enddate )" >  
<!ENTITY % quad         "para | %list; | performer | %dates; " >  
<!ENTITY % stars        "Software Technology for Adaptable Reliable Systems" >  
  
<!ELEMENT briefing      - - ( titlepg? , ( ( contents , %topical; ) | %linear; )  
) >  
<!ATTLIST briefing      logo      CDATA ""  
                          pgcount  CDATA ""  
                          retain    CDATA ""  
                          docref    CDATA ""  
  
>  
<!ELEMENT contents      - o ( topic+ ) >  
<!ELEMENT topic         - o ( #PCDATA ) >  
<!ELEMENT masthead      - o ( #PCDATA ) >  
<!ELEMENT slide         - o ( head? , ( %stuff; ) * , foot? ) >  
<!ELEMENT next          - o  EMPTY   >  
  
<!ELEMENT head          - o ( #PCDATA ) >  
<!ELEMENT foot          - o ( #PCDATA ) >  
<!ELEMENT para          - o ( #PCDATA ) >  
  
<!ELEMENT titlepg       - o ( title , subtitle? , date? , audience? , presenter? ,  
                          address* , phone? ) >  
<!ELEMENT title         - o ( #PCDATA ) >  
<!ELEMENT subtitle      - o ( #PCDATA ) >  
<!ELEMENT date          - o ( #PCDATA ) >  
<!ELEMENT audience      - o ( #PCDATA ) >  
<!ELEMENT presenter     - o ( #PCDATA ) >  
<!ELEMENT address       - o ( #PCDATA ) >  
<!ELEMENT phone         - o ( #PCDATA ) >  
  
<!ELEMENT quadchrt      - - ( ul , ur , ll , lr? ) >  
<!ELEMENT ul            - - ( head , ( %quad; ) * ) >  
<!ELEMENT ur            - - ( head , ( %quad; ) * ) >  
<!ELEMENT ll            - - ( head , ( %quad; ) * ) >
```

```

<!ELEMENT lr          - - ( head , ( %quad; ) * ) >
<!ELEMENT performer   - o ( #PCDATA ) >
<!ELEMENT begndate    - o ( #PCDATA ) >
<!ELEMENT enddate     - o ( #PCDATA ) >

<!ELEMENT table       - - ( head? , row+ ) >
<!ELEMENT row         - - ( column+ | caption ) >
<!ELEMENT column      - o ( #PCDATA ) >
<!ELEMENT caption     - o ( #PCDATA ) >

<!ELEMENT figure      - - RCDATA >
<!ELEMENT graphic     - o EMPTY >
<!ATTLIST graphic     xrefid CDATA "">

<!ELEMENT bullet      - o ( item+ ) >
<!ELEMENT seqlist     - o ( item+ ) >
<!ELEMENT item        - o ( #PCDATA , h2* ) >
<!ELEMENT h2          - o ( #PCDATA , h3* ) >
<!ELEMENT h3          - o ( #PCDATA ) >

]>

```

Briefing Document Type Definition (DTD)

2.2 Looking at the Briefing Elements

The components of the document (called "elements") are described below.

Tagname	Occurrence*	Identity
briefing	1	briefing
I. titlepg	0-1	title page
A. title	1	title
B. subtitle	0-1	sub-title
C. date	0-1	date
D. audience	0-1	audience
E. presenter	0-1	presenter
F. address	0-N	address
G. phone	0-1	phone
II. contents	0-1	table of contents
A. topic	1-N	topic
+ - III. slide	0-N	slide
1. head	0-1	head
+ - 2. para	0-N	para
3. table	0-N	table
1. head	0-1	table head
2. row	1-N	row
-OR- -- a. column	1-N	column

		-OR- b. caption	1	caption
		4. figure	0-N	figure
		5. graphic	0-N	graphic
	+-	6. list	0-N	
OR-	+-	1. bullet	0-N	bulleted list
		a. item	1-N	bulleted item
	-OR-	1. h2	0-N	sub-item 2
		a. h3	0-N	sub-item 3
	+-	2. seqlist	0-N	sequential list
		a. item	1-N	sequential list item
		1. h2	0-N	sub-item 2
		a. h3	0-N	sub-item 3
		7. foot	0-1	foot
	IV.	next	0-N	iterated table of contents
	V.	masthead	0-N	masthead
+-	VI.	quadchrt	0-N	quad chart
	1.	ul	1	upper left quad
	+-	a. head	1	quad head
		b. para	0-N	quad para
		c. list	0-N	quad list
		+- 1. bullet	0-N	bulleted list
		a. item	1-N	bulleted item
		-OR- 1. h2	0-N	sub-item 2
		a. h3	0-N	sub-item 3
		+- 2. seqlist	0-N	sequential list
		a. item	1-N	sequential list item
	-OR-	1. h2	0-N	sub-item 2
		a. h3	0-N	sub-item 3
		d. performer	0-N	performer
	+-	e. dates	0-N	
		1. begndate	0-N	begin date
		2. enddate	0-N	end date
	2.	ur (a-f above)	1	upper right quad
	3.	ll (a-f above)	1	lower left quad
	4.	lr (a-f above)	0-1	lower right quad

* Items listed as 0-N are not required and may be used as many times as desired. Items listed as 1 are required and may occur only once in a document. Items listed as 1-N are required and may be used as many times as desired.

Briefing Document Structure

2.2.1 MAJOR ELEMENTS

The major elements of the Briefing DTD are described below.

2.2.1.1 BRIEFING

TAGS: <briefing> </briefing>
OCCURRENCE: Required

This element represents the briefing or presentation to be marked up. It consists of an optional title page, an optional contents page, and the structure of the briefing, which is a series of slides and quadchrs. Only the structure is required. The start-tag <briefing> opens a briefing and the end-tag </briefing> closes a briefing. The tag <briefing> must be immediately followed by another start-tag, since there is no text associated with the element.

2.2.1.2 TITLEPG (title page)

TAGS: <titlepg>
OCCURRENCE: Optional

This element represents the information that appears before the body of the presentation. The only required element in the title page is the title. Optional elements include a subtitle, a date, the intended audience, the presenter's name, an address, and a phone number.

2.2.1.3 CONTENTS

TAGS: <contents>
OCCURRENCE: Optional

This element represents an optional table of contents. Unlike the table of contents for a report or manual, the entries for this table must be provided in the tagged document, rather than constructed from headers. Also unlike the usual table of contents, this one will mark the first element as active. Successive copies of this table can be output using the NEXT element, which will output the same table but will mark the next element as the active one. After the last element has been marked, any further calls of NEXT will output an unmarked table. The only element within contents are the topics to be listed. At least one is required, although any number may be listed.

2.2.1.4 SLIDE

TAGS: <slide>
OCCURRENCE: Optional, repeatable

The slide is expected to be the most common element used. The slide has an optional head and foot, with any number of paragraphs, tables, figures, graphics, and sequential or bulleted lists.

2.2.1.5 NEXT

TAGS: <next>
OCCURRENCE: Optional, repeatable

The element next can only be used if the contents element was given. Next will output the same list of topics as was given in contents, but will mark the next topic as the active one. Next has no text and does not require an end-tag.

2.2.1.6 MASTHEAD

TAGS: <masthead>
OCCURRENCE: Optional, repeatable

The element masthead is optional. When the masthead element is given, the string associated with it is listed as the current masthead and is printed in large type at the top of every slide. The masthead can be altered by repeating the element with a new string. If the string given is null, then no masthead will be printed. Space will not be left for it. Masthead contains a single string as text and does not require an end-tag.

2.2.1.7 QUADCHRT

TAGS: <quadchrt> </quadchrt>
OCCURRENCE: Optional, repeatable

The element quadchrt is optional. A quad-chart is a means of splitting a page into four equal sections to allow more data to be displayed at one time and to allow easy comparison and contrast of related material. Quad-charts contain required sections ul (upper-left), ur (upper-right), ll (lower-left), and an optional lr (lower-right) section.

3. TITLE PAGE ELEMENTS

The title page is optional. The title page consists of a number of elements, of which only the title is required. The title page elements are as follows:

- o Title (required)
- o Subtitle
- o Date
- o Audience
- o Presenter
- o Address
- o Phone

3.1 TITLE

TAGS: <title>
OCCURRENCE: Required

The title is a string representing the title of the briefing or presentation. The title is the only required element of a title page. It will be centered in large type on the title page.

3.2 SUBTITLE

TAGS: <subtitle>
OCCURRENCE: Optional

The subtitle is a string representing an optional subtitle of the briefing or presentation. It will be centered on the title page in type slightly smaller than that of the main title.

3.3 DATE

TAGS: <date>
OCCURRENCE: Optional

The date will generally be the date on which the presentation is scheduled to be given. It will be centered on the title page in the same typeface as the subtitle.

3.4 AUDIENCE

TAGS: <audience>
OCCURRENCE: Optional

The audience is the name of the group for whom the briefing or presentation is being given. It will be centered on the title page in the same typeface as the subtitle.

3.5 PRESENTER

TAGS: <Presenter>
OCCURRENCE: Optional

The presenter is the name of the person giving the briefing or presentation. It will be centered on the title page in the same typeface as the subtitle.

3.6 ADDRESS

TAGS: <Address>
OCCURRENCE: Optional, repeatable

The address is a string representing some portion of the address of the person or organization giving the briefing. Any number of address strings may be used. It will be centered on the title page in the same typeface as the subtitle.

3.7 PHONE

TAGS: <Phone>
OCCURRENCE: Optional

Phone refers to the phone number of the presenter or the presenting organization. It will be centered on the title page in the same typeface as the subtitle.

4. STRUCTURAL ELEMENTS

4.1 CONTENTS

The contents page is optional. The contents page consists of one or more topics. The first topic will be marked as the current topic. Once the Contents tag has been used, the Next element is used to output the same contents page, with the current topic marker moved to the next element. If Next is used again after the last topic is marked, then the contents page will again be output but without a marker.

4.1.1 TOPIC

TAGS: <topic>
OCCURRENCE: Required, repeatable

A topic is a string, usually the title of the subject of one section of the briefing or presentation. There must be at least one topic associated with the contents tag. The marker for the current topic is an arrow pointing to the topic.

4.2 NEXT

The next element is optional and can only be used in a briefing where the contents element has already been used. Next causes the contents page to be re-output with the current marked topic following the previous current element. If it is used again after the last topic is marked, then the contents page will be output without a marker. The next element has no text associated with it.

4.3 MASTHEAD

The masthead is a line of text, usually a descriptive title, which indicates a logical connection between a grouping of slides in a presentation.

The masthead tag has a string associated with it that will be preserved by the processor as the current masthead. If no masthead has been set, the slides will be printed as designed without a masthead showing, and no space will be left for the masthead. Once the masthead is set, each slide will have the masthead printed in large type at the top of the slide. The masthead tag can be given again with a different string. This will replace the old masthead with the new current one. The masthead tag can also be given with an empty string as its contents. This will serve to deactivate the masthead until another occurrence of the tag.

5. SLIDE ELEMENTS

A slide is the basic element of the briefing DTD. If the masthead tag is used with a non-empty string, then the masthead will be printed at the top of the slide. If the masthead tag is not used or if it was used with an empty string as its content, then no masthead will be printed. Space is not reserved for a masthead if the masthead tag is not being used. A slide can consist of the following elements:

- o Head
- o Para
- o Table
- o Figure
- o Graphic
- o Bullet (Bulleted List)
- o Seqlist (Sequential List)
- o Foot

5.1 HEAD

TAGS: <head>
OCCURRENCE: Optional

A head is a string, usually the title of the slide. It is usually printed smaller than the masthead, but greater than the text of the slide. Only the masthead can precede the head on a slide.

5.2 PARA

TAGS: <para>
OCCURRENCE: Optional, repeatable

A para is a section of text representing a paragraph. Any number of paras can be used in a slide, but no check is made for the vertical bounds. If too much text is given, the text will run off the bottom of the slide and onto the next one.

5.3 TABLE

TAGS: <table> </table>
OCCURRENCE: Optional, repeatable

A table has an optional head and one or more rows. A row is either a caption or a series of one or more columns. Any number of rows may be used in a table, as any number of columns

may be used in a row. Tables are output in a different font from the rest of the briefing, since a fixed-font must be used to ensure proper column alignment.

5.3.1 HEAD

TAGS: <head>
OCCURRENCE: Optional

A head is a string, usually the title of the table.

5.3.2 ROW

TAGS: <row> </row>
OCCURRENCE: Required, repeatable

A row is a table element. A row is either a caption or a number of columns.

5.3.2.1 CAPTION

TAGS: <caption>
OCCURRENCE: Optional, Repeatable

A caption is used to replace a row element as annotation of a table entry. A caption is a string of text, related to one or more of the columns in the preceding row. Captions are indented from the left margin of the first column of the table. Captions are printed in the same font as other slide elements whereas all other table entries are displayed in the *Courier* font to permit character alignment of the table.

5.3.2.2 COLUMN

TAGS: <column>
OCCURRENCE: Optional, Repeatable

A column is a row element. A column can be any kind of text and is generally of a known length. A column can be a number, a word, or a short string. The same number column in each row of one table will be aligned along the right border. Columns are not output in the same font as the captions are, since columns must be fixed-font, and captions need not be.

5.4 FIGURE

TAGS: <figure> </figure>
OCCURRENCE: Optional, repeatable

A figure is used to prepare slide content which is an exact character copy of the input. It is up to the author of the briefing to see that his figures do not exceed the space available on a slide.

5.5 GRAPHIC

TAGS: <graphic>
OCCURRENCE: Optional, repeatable

A graphic reserves a page in the output that is to be replaced with externally prepared artwork manually inserted into the presentation at the location of the tag. A graphic has no text but it does have an attribute called 'xrefid'. The text entered for this attribute is used as the title of the graphic and is printed at the top of the page reserved for the external material. If the attribute is omitted, a completely blank page will be output. Using this tag for inserted elements allows the correct page sequence to be maintained and acts as a reminder of where the item is to be inserted.

5.6 BULLET (Bulleted List)

TAGS: <bullet>
OCCURRENCE: Optional, repeatable

A bulleted list is a list in which each item in the list is indicated by a bullet (a circular mark preceding the items). The bullets clearly mark each list item separately from wrapped lines or subordinate lines. Bulleted lists are composed of one or more items, which in turn are composed of text and zero or more sub-items (h2). The sub-items are themselves composed of text and zero or more sub sub-items (h3). The example briefing shows bulleted lists with sub-items.

5.6.1 ITEM

TAGS: <item>
OCCURRENCE: required, repeatable

A list item is composed of text and zero or more sub-items (h2). The sub-items are themselves composed of text and zero or more sub sub-items (h3).

5.6.1.1 H2

TAGS: <h2>
OCCURRENCE: Optional, repeatable

A list sub-item is a part of an item from a list. A list sub-item is composed of text and zero or more sub sub-items (h3). It is printed as indented from its parent item.

5.6.1.1.1 H3

TAGS: <h3>
OCCURRENCE: Optional, repeatable

A list sub sub-item is a part of a sub-item from a list. A list sub sub-item is text only. It is printed as indented from its parent sub-item.

5.7 SEQLIST (Sequential List)

TAGS: <seqlist>
OCCURRENCE: Optional, repeatable

A sequential list is a list in which each item in the list is indicated by a number representing its place in the list. Like the bulleted list, a sequential list clearly distinguishes each entry in the list. Additionally, sequential lists clearly preserve the relationship of the items. For example, if a list is to be followed by explanatory text, or if the list itself details sections of a presentation, use of a sequential list allows the individual list items to be referred to by number. Sequential lists, like bulleted lists, are composed of one or more items, which in turn are composed of text and zero or more sub-items (h2). The sub-items are themselves composed of text and zero or more sub sub-items (h3). The elements of a list are described under BULLET.

6. QUAD-CHART ELEMENTS

Quad-charts are optional. A quad-chart is functionally a slide that is divided into four equal-sized sub-slides. Of these, only the lower right section is optional. The others are all required. The quad-chart slide does not contain a masthead.

Quad-charts are made up of the following sections:

- o UL -- Upper Left quad
- o UR -- Upper Right quad
- o LL -- Lower Left quad
- o LR -- Lower Right quad

Each quad is comprised of a head and zero or more selections from the following list:

1. Para
2. Bullet (Bulleted List)
3. Seqlist (Sequential List)
4. Performer
5. BegnDate
6. EndDate

Each of the four areas in a quad-chart is commonly referred to as a "quad". Each quad contains a head as well as any combination of elements from the above list. Paras, Bulleted lists, and Sequential lists are handled as in a slide, except that the area available for use is only 1/4 the size. Performer, BegnDate, and EndDate represent text entries. It is up to the author of the SGML-tagged document to ensure that the text given for a quad does not exceed the available space for that quad.

NOTE: Refer to the sample SGML file in the appendix, "Sample Briefing Markup File", for an example of a quad-chart.

6.1 UL (Upper Left Quad)

TAGS:
OCCURRENCE: Required

UL represents the upper left quad of the given quadchrt. It must be the first quad referenced in a quadchrt.

6.2 UR (Upper Right Quad)

TAGS: <ur>
OCCURRENCE: Required

UR represents the upper right quad of the given quadchrt. It must be the second quad referenced in a quadchrt.

6.3 LL (Lower Left Quad)

TAGS: <ll>
OCCURRENCE: Required

LL represents the lower left quad of the given quadchrt. It must be the third quad referenced in a quadchrt.

6.4 LR (Lower Right Quad)

TAGS: <lr>
OCCURRENCE: Optional

LR represents the lower right quad of the given quadchrt. It must be the last quad referenced in a quadchrt. Unlike the other three quads, it is NOT required.

APPENDIX A.

APPENDIX: SAMPLE BRIEFING MARKUP FILE

The following text is a sample briefing file with SGML markup. The output produced by processing this file is attached as a separately prepared appendix, "Sample Briefing Output". Slides are printed in landscape orientation.

NOTE: Diagrams cannot be included when using the STCS SGML software. If a diagram is required within a quad-chart, it is necessary to leave the quad blank, and manually insert the diagram. This process requires the diagram be produced by some external means.

```
<!doctype briefing>
<briefing>
<titlepg>
<title>STARS Program Management Review
<date>February 22, 1990
<presenter>W.D. Ceely and R.J. Drake
<address>IBM
<address>800 North Frederick Pike
<address>Gaithersburg, MD 20879
<masthead>STARS PMR: TECHNICAL
<slide>
<head>TECHNICAL PROGRAM REVIEW
<bullet>
<item>Technical Overview, Goals, Products, Task Summaries - Dick Drake
<item>Management Task Summary, Status Summary, Concerns and Special
Achievements - Dave Ceely
<slide>
<head>PROGRAM OVERVIEW - 5 YEAR STRATEGY
<bullet>
<item>BACKGROUND
<h2>Each prime provided 5 Year Strategy as part of original proposal
<h2>Each prime awarded Task Q6.1: Consolidated Five Year Strategy
<h2>Joint working sessions conducted to develop plan/presentation to DARPA
(8/88 - 9/88)
<h2>Presentation made to DARPA on September 9, 1988
<h2>Results documented in STARS Consolidated Technical Development Plan
(CDRL 0070). Produced by IBM and coordinated with Government, Boeing and
Unisys.
<h2>R-Increment update of Consolidated Plan rescheduled to adjust to
re-orientation of STARS program
<h2>Revised Consolidated Five year Plan being developed jointly by the three
primes and government
<masthead>PROGRAM OVERVIEW - 5 YEAR STRATEGY (continued)
<slide>
<bullet>
<item>GOALS
<h2>Improve Productivity
<h2>Improve Quality and Reliability
<h2>Promote Development and Application of Reusable Software
<h2>Reduce Time of Development
```

<h2>Reduce Cost of Development

<slide>

<bullet>

<item>PRODUCTS AT END OF 5 YEARS

<h2>Three commercially viable, competitive SEE's

<h2>Six service applications fully developed on SEE's

<h2>Critical-mass marketplace for CASE tool developers

<h3> U.S. leadership in CASE marketplace

<h2>Complementary advances in software process, methods, and metrics

<h2>Widely used DoD software component repository

<masthead>STARS PMR: TECHNICAL

<slide>

<head>R-INCREMENT OVERVIEW

<bullet>

<item>Goals

<h2>Provide the Most Useful Ada Repository in U.S.

<h3>Achieve public access

<h3>Get ready to transfer the technology outside of STARS

<h3>Promote value-added use of STARS products

<h3>First step toward a National Asset Repository

<h3>Establish reuse infrastructure

<h2>Define the Software First Life-Cycle

<h2>Establish a Generic S/W Engineering Environment Framework

<h2>Implement Breakthrough Initiative

<masthead>R-INCREMENT OVERVIEW (continued)

<slide>

<bullet>

<item>Products

<h2>Consolidated Five Year Plan (IR00)

<h2>Portable Environment Framework Virtual Interfaces (IR20)

<h2>Application Blueprint for a Generic SEE and Domain Analysis for C3 (IR20)

<h2>Repository and reuse Guidelines (IR40, IR10, IR11)

<h2>Enhanced Repository Capability (IR40)

<h2>Reusable Components (IR40)

<h2>Workstation CAI Capability and Components (IR68)

<h2>Policies and Procedures to Support an Open Repository (IR11)

<h2>Operational STARS Repository (IR10)

<h2>Methodology for STARS Structured Specification Development (IQM15) show ()

<h2>Software-First CDRL/DID Definition (IR66)

<h2>Software-First Life Cycle (SFLC) Definition (IQ15)

<slide>

<bullet>

<item>Products (continued)

<h2>STARS Orientation Workshop (IR63)

<h2>Cleanroom Methodology for Component Certification (IR70)

<h2>Document Type Definition (DTDs) for Common STARS Documents (IR65)

<h2>SQL/Ada Programmed Language Interface (IR67)

<h2>Breakthrough Center Documentation Inventory/Library System (IR83)

<masthead>STARS PMR: TECHNICAL

<slide>

<head>R-INCREMENT MAP TO 5 YEAR STRATEGY

<bullet>

<item>ENVIRONMENT

- <h2>Application Blueprint for a generic SEE
- <h2>Domain Analysis for C3 Application Blueprint
- <h2>Portable Environment Framework

<item>PROCESS

- <h2>Methodology for STARS Structured Specification Development
- <h2>Preliminary Definition of the Software First Lifecycle
- <h2>Preliminary Definition of Software First Lifecycle Object
- <h2>Prototype Process Manager
- <h2>STARS Orientation Workshop

<slide>

<head>R-INCREMENT MAP TO 5 YEAR STRATEGY

<bullet>

<item>REUSE

- <h2>Most Useful Ada Repository in U.S.
- <h2>Facet-based Search/Retrieval
- <h2>Filtered/Organized Reusable Components in the SEE Domain
- <h2>Policies and Procedures to Support an Open Repository
- <h2>Methodology for Component Reliability Certification

<masthead>STARS PMR: TECHNICAL SUMMARY

<quadchrt>

<head>TASK DESCRIPTION

<para>This task is responsible for the development, integration, and evaluation

of the IBM STARS Software Engineering Environment. Initial emphasis placed on the development of certain parts of the SEE framework. This task will develop the Application Blueprint theory, which envisions a generic architecture for the construction of software solutions.

<performer>SAIC Clearwater, IBM Gaithersburg

<begndate>4/19/89

<enddate>04/13/90

<ur>

<head>GOALS/PRODUCTS

<bullet>

<item>GOAL: Develop a portable, adaptable Software Engineering Framework

<item>PRODUCTS

- <h2> Application Blueprints: CDRL's 1480 and 1490
- <h2> Virtual Operating System Interface: CDRL 1500
- <h2> User Interface: CDRL 1510
- <h2> VOSI Ada Command Environment: CDRL 1520

</ur>

<ll>

<head>APPROACH/PROGRESS

<bullet>

<item>APPROACH

<h2> Write a Virtual Operating Sys. Interface (VOSI) as a subset of the CAIS (DoD-STD-1830)

<h2> Divide the User Interface Into Panel Manager and Window Manager. Based on IBM CUA.

<h2> Use Unisys ACE for VOSI Ada Cmd Env

<item>PROGRESS
<h2> Completed Application Blueprint theory
<h2> Completed Implementation of VOSI for VAX/VMS. Implementation for IBM PC/PC-DOS in test.
<h2> Completed draft spec of Panel Mgr. Began implementation of Window Mgr for VAX/VMS.
</h1>
<hr>
<head>DELIVERABLES/MILESTONES
</hr>
</quadchrt>
<quadchrt>

<head>TASK DESCRIPTION
<para>This task will provide for enhancements to the Q increment IBM STARS repository, additions to the set of components in the repository, and consolidation of related guidelines. The three key products, guidebook, components, and capabilities, will together establish a fully operational prototype Ada reuse repository that will support the STARS program and potentially other DoD software development projects.
<performer>IBM, SAIC
<begndate>4/19/89
<enddate>04/13/90

<hr>
<head>GOALS/PRODUCTS
<bullet>
<item>GOAL: Create the most useful Ada repository in the US
<item>PRODUCTS
<h?> Repository Guidebook (1550)
<h.> Repository Components (1560)
<h2> Repository Capabilities (1600)
</hr>
<h1>
<head>APPROACH/PROGRESS
<bullet>
<item>APPROACH
<h2> Develop policies and procedure for repository
<h2> Provide enhancements to the repository system
<h2> Gather and refine reusable components
<item>PROGRESS
<h2> IBM STARS Team Repository V2.3 available - third major prototype during R-increment
<h2> Work continuing on port to VOSI and final Guidebook
<h2> Component content growth proving to be difficult task
</h1>
<hr>
<head>DELIVERABLES/MILESTONES
</hr>
</quadchrt>
<quadchrt>

<head>TASK DESCRIPTION

<para>This task is responsible for the operation, control and maintenance of the IBM Team STARS Repository. The repository supports communications, collection of deliverables and access to reusable components. Repository technology and components are developed in task IR40 and made available in this task.

<performer>SAIC Clearwater

<begndate>4/19/89

<enddate>04/30/90

<ur>

<head>GOALS/PRODUCTS

<bullet>

<item>GOAL: Operate, maintain and control a repository sufficient to support the STARS project needs for information interchange and software reuse.

<item>PRODUCTS

<h2> An operational repository

<h2> Practical Aspects of Repository Operation (CDRL 1440)

</ur>

<ll>

<head>APPROACH/PROGRESS

<bullet>

<item>APPROACH

<h2> Maintain and upgrade the hardware resources procured during the Q-increment

<h2> Install, control and maintain the repository system and reusable components

provided by IR40

<h2> Provide on-line access to all STARS Information.

<item>PROGRESS

<h2> AdaMat available for use

<h2> Operation procedures in place

<h2> NEWS V.5.8 operational w/msg exchange to Boeing Repos

<h2> ParseStation from Datalogics ordered for SGML

</ll>

<lr>

<head>DELIVERABLES/MILESTONES

</lr>

</quadchrt>

<masthead>STARS PMR: TECHNICAL

<slide>

<head>KEY ISSUES/CONCERNS - TECHNICAL

<bullet>

<item>Coordination among the primes and government on:

<h2>Position on Industry Standards

<h2>Consolidated Set of Guidelines

<h2>Coordination of Conference Participation

<item>Consolidated Five Year Plan

<slide>

<head>KEY ISSUES/CONCERNS - CONTRACTUAL

<bullet>

<item>Addition of new Subcontractors takes too long
<item>Frequency of Proposing New Work
<item>Planning information for S-Increment (and beyond)
<item>Repository Version 2.3 Operational
<item>Completed Development of Virtual Operation System Interface (VOSI)
<item>Presented Results of Phase II IQM15; Air Traffic Control IOM and Lessons Learned
<item>Completed a Definition of Software-First Life Cycle using ETVX model
</briefing>

APPENDIX B.

APPENDIX: SAMPLE BRIEFING OUTPUT

The output from the STCS formatter using the Briefing Text Composition Specification is attached. The source of this material is the IBM PMR status report by Mr. W.D. Ceely and Mr. R.J. Drake presented at the quarterly PMR held February 1990 in Clearwater, FL. The contents of the source presentation have been reproduced using the Briefing DTD. It has been printed on a Postscript printer.

NOTE: Diagrams cannot be included when using the STCS SGML software. If a diagram is required within a quad-chart, it is necessary to leave the quad blank, and manually insert the diagram. This process requires the diagram be produced by some external means.

IR65: SGML Document Descriptions

**Contract Data Requirement CDRL 1820, Type A005(B)
Contract No. F19628-88-D-0032**

CDRL 1820 Version Description Document

20 April 1990

Prepared for:

**Electronic Systems Division (PKG-1)
Air Force Systems Command, USAF
Hanscom AFB, MA 01731-5000**

Prepared by:

**Science Applications International Corporation
Software and Systems Integration Group
Ada Software Division
311 Park Place Boulevard, Suite 360
Clearwater, FL 34619**

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1. SCOPE

This document provides an overview for the R-increment enhancements to the SGML Text Composition System (STCS) software. This software was developed in its original form under the STARS Foundations program (contract N00014-87-C-2386), administered by the Naval Research Laboratory. The current delivery includes modifications to the STCS software as briefly described below. Additional information can be found in documentation files within the subdirectories that comprise this delivery.

The STCS software is a non-conforming parser for the Standard Generalized Markup Language (SGML, ISO 8879:1986) and an output formatter. The STCS software was first delivered to the NRL on November 18, 1988 and was later modified as part of STARS Prime task IQ13 in which the parser speed was improved. The STCS modifications described here were performed under STARS Prime task IR65 for the purpose of improving existing Document Type Definitions (DTD), creating new DTDs, and preparing the format specifications using the STCS software to produce formatted output.

2. IDENTIFICATION

2.1 SGML Text Composition System (STCS)

Chief Programmer for the work performed under the current contract is Steven Kutoroff, who can be reached at:

Science Applications International Corporation
Ada Software Division
311 Park Place Blvd.
Clearwater, FL, 34619
Phone: 813-799-0663

2.2 System Overview

SGML is a descriptive generic markup language developed by the International Standards Organization (ISO 8879:1986). Unlike procedural and presentational systems upon which most word processing programs are based, SGML frees authors from responsibility for physical formatting of their texts. Instead, a set of descriptive markup "tags" identify the elements of a text in terms of their logical function. SGML itself is both host system and implementation independent. The initial version of this implementation has been ported from the VAX/VMS environment to both PC compatible 80286 based computers using the Alsys compiler and a Gould Unix system.

At this time, the document formatting standard for SGML is still in development. The STCS software was based on early standards work and performs its function in two steps: SGML document parsing to an intermediate composition document followed by document formatting. In the first step, the document is checked for conformance to the DTD and the document tags are expanded to their generic form, i.e. as fully qualified identifiers which trace the nesting of each tag to the document structure. In the second step, the generic identifiers are matched with processing instructions which make use of a set of predefined formatting procedures that process the document content to final output for a Postscript printer or to ASCII text.

Document design and the preparation of a Text Composition Specification (TCS) are two separate functions. An SGML document designer provides authors with a selection of document types in the form of SGML Document Type Definitions. The concept for the TCS was derived from the ISO document "Information Processing Systems - Text and Office Systems - Text Description and Processing Languages - Text Composition Semantics and Syntax". Tenth Working Draft, ISO TC97/SC18/WG8 N266, 1986 May 12. The basic functions defined in N266 were implemented as Ada procedures and the TCS for each DTD is implemented as an Ada package body which uses these procedures. Formatting specifications are defined in terms of Ada code in which the processing for each generic identifier is declared using the supplied library of formatting procedures. Document design requires familiarity with document requirements, and TCS design requires a working knowledge of Ada and a basic understanding of typesetting procedures. The TCS code is provided with variations that permit output to be prepared for Postscript printers as well as ASCII text files.

3. RELATED SOFTWARE

The STCS software must compete for use against commercial products for SGML processing. Although the STCS software is not in full conformance to ISO 8879:1986, commercial SGML software is often expensive due to the small market. The STCS software is significantly slower than the Datalogics SGML parser which was purchased for the STARS VAX computer for under \$4000; however, the companion output formatter from the same vendor costs over \$100,000.

The Datalogics parser contains fewer deficiencies than STCS, but several problems have been noted, some of which are handled correctly by STCS. The STCS software has an advantage with its ability to produce formatted output for both Postscript(tm) and simple ASCII text printers. This versatility has made it satisfactory for producing STARS documents. It may be possible to use a commercial parser as a front end to the existing formatter; this possibility needs further investigation.

4. VERSION DESCRIPTION

The changes made to the STCS code are listed below:

1. Update REPORT DTD to conformance with SGML,
2. Add new tag CMPTR to REPORT DTD and TCS format specification,
3. Create a new DTD for an overhead slide presentation, BRIEFING.DTD,
4. Create the TCS formatter for the Briefing,
5. Correct operation of Report FIGURE, CHART, and GRAPHIC tags,
6. Add support to the formatter to support above corrections,
7. Corrected the format of Composition Document file, and
8. Documentation updates.

4.1 Inventory of Contents

The following is a list of all source code files for the STCS software in compile order with annotations on compilation milestones:

```
my_integer_io_.ada
my_float_io_.ada
calendar_utilities_.ada
numeric_utilities_.ada
numeric_utilities.ada
string_utilities_.ada
stext_utils_.ada
stext_utils.ada
extended_char_utils_.ada
stack_package_.ada
queue_package_.ada
open_producer_consumer_.ada
open_producer_consumer.ada
ordered_tree_.ada
ordered_tree.ada
unordered_tree_.ada
unordered_tree.ada
balanced_tree_.ada
balanced_tree.ada
dynamic_ext_char_utils_.ada
linked_list_.ada
linked_list.ada
symbol_table_.ada
symbol_table.ada
integer_utilities_.ada
stext_utils_80_.ada
calendar_utilities.ada
string_utilities.ada
extended_char_utils.ada
dynamic_ext_char_utils.ada
vms_interfaces_.ada
stack_package.ada
```



```
queue_package.ada
managed_linked_list_.ada
managed_linked_list.ada
stack_.ada
stack.ada
extended_character_io_.ada
extended_character_io.ada
entity_manager_.ada      ! start of Application code
entity_manager.ada
base_tokenizer_.ada
base_tokenizer.ada
lexical_scanner_.ada
lexical_scanner.ada
production_processor_.ada
production_processor.ada
production_output.ada
parser.ada
bnf_star_actions_.ada
bnf_list_parser_.ada
general_parser_.ada
bnf_star_actions.ada
bnf_list_parser.ada
general_parser.ada
sgml_notice_.ada
sgml_notice.ada
sgml_command_line_.ada
sgml_command_line.ada
sgml_command_line_vax.ada
sgml_token_initialization_.ada
sgml_token_initialization.ada
sgml_applications_.ada
sgml_error_.ada
sgml_error.ada
sgml_version_.ada
comp_doc_io_.ada
comp_doc_io.ada
sgml_parser_.ada
sgml_parser_actions_.ada
sgml_parser.ada
add_entity_declarations.ada
sgml_parser_actions.ada
sgml.ada                  ! Application SGML may be linked
dtd_to_bnf_actions_.ada
dtd_to_bnf_.ada
dtd_to_bnf_actions.ada
dtd_to_bnf.ada
dtdtobnf.ada             ! Application DTDTOBNF may be linked
units_.ada
roman_numerals_.ada
roman_numerals.ada
composer_units_.ada
document_style_definitions_.ada
```

composer_errors_.ada
font_metrics_.ada
font_metrics.ada
font_metrics_load_font.ada
font_metrics_measure_text.ada
postscript_font_utilities_.ada
postscript_font_utilities.ada
composer_types_.ada
text_blocks_.ada
postscript_utilities_.ada
postscript_utilities.ada
text_blocks.ada
line_utilities_.ada
line_utilities.ada
text_block_output_.ada
text_block_output_postscript.ada
dispatcher_.ada
tcs_types_postscript_.ada
text_composition_language_.ada
composer_.ada
current_text_.ada
current_line_.ada
current_page_.ada
dispatcher.ada
current_text.ada
current_line.ada
composer.ada
current_page.ada
text_composition_language.ada

! The TCS applications below may now be built

report_tcs.ada
memo_tcs.ada
letter_tcs.ada
briefing_tcs.ada

The following support files are also a part of this delivery.

avangbk.afm
avangbko.afm
avangd.afm
avangdo.afm
bookmd.afm
bookmdi.afm
bookml.afm
bookmli.afm
couri.afm
courib.afm
couribo.afm
courio.afm
helve.afm
helveb.afm

! Adobe Font Metric Files

helvebo.afm	
helven.afm	
helvenb.afm	
helvenbo.afm	
helveno.afm	
helveo.afm	
newcsb.afm	
newcsbi.afm	
newcsi.afm	
newcsr.afm	
palatb.afm	
palatbi.afm	
palati.afm	
palatr.afm	
symbol.afm	
timesb.afm	
timesbi.afm	
timesi.afm	
timesr.afm	
zapfcmi.afm	
zapfd.afm	
font_map.af	! File which maps font names to files
prologue.ps	
sgml_dtd.bnf	
tcsbuild.com	! Command file used to build TCS applications
make_vax.com	! Command file to compile and build applications

4.2 Changes Installed

The following units have been changed or added in this delivery:

briefing.dtd	! new
briefing_tcs.ada	! new
composer.ada	
composer_.ada	
comp_doc_io_.ada	
current_page.ada	
current_page_.ada	
dispatcher.ada	
dispatcher_.ada	
letter.dtd	
managed_linked_list_.ada	! added
managed_linked_list.ada	! added
memo.dtd	
report.dtd	
report_tcs.ada	
sgml_notice_.ada	
sgml_parser_actions.ada	
stcs.sgm	
tcs.sgm	
tcs_types_ascii_.ada	

```
tcs_types_postscript_.ada  
text_composition_language.ada  
text_composition_language_.ada
```

4.3 Adaptation Data

The compilation sequence specified compiles the modules for Postscript output. The ASCII text output is prepared by the compilation of the following Ada source code files in the order specified:

```
ascii_utilities_.ada  
ascii_utilities.ada  
text_block_output_ascii.ada  
tcs_types_ascii_.ada      ! replaces postscript version of specification
```

Once these units are compiled the DTD specific executables may be compiled and linked using the same procedures as for the Postscript output. Formatted output files will have the file name extension .TXT when the above units are compiled. It is suggested that the above units be compiled into a sublibrary of the library for the Postscript output.

4.4 Interface Compatibility

The format of the intermediate file used between the SGML parser and the document specific TCS application (called the composition document) has been changed. In previous versions the "." character was used to separate elements of the generic identifiers. That character is valid in element identifiers and has been changed to a "_" character. In addition, the separation character is now defined in the package specification COMP_DOC_IO in order to export the character to all packages that "WITH" it.

4.5 Summary of Change

The changes to the code have improved the appearance of the output of Report style documents. FIGURE elements will no longer be split across pages, if insufficient room remains on the current page to contain a figure, it will start on a new page. GRAPHIC elements are now used to reserve an output page for insertion of an externally prepared graphic element. The CHART element is unchanged in its output. These changes provide for greater control in document appearance. A new tag, CMPTR, may be used to emphasize text elements as being input or output of a computer within document content. On a Postscript printer, the content of a CMPTR tag is printed in the mono-spaced Courier font in place of the proportionally spaced Times font. Output to an ASCII text file will show no difference in formatting for CMPTR element content.

A new DTD for preparing overhead slide presentations was created using the STCS software. The DTD and formatter for this document type is documented separately. The formatter has been prepared for Postscript output only.

4.6 Installation Instructions

The font metric files have the file extension .AFM and should be stored in a commonly

accessible area. The file or directory name of that area must be edited into the first line of the file `FONT_MAP.AF`. On the VAX this line contains "SGML_FONTS:", a system wide logical name defined to support the program. The content of this line is prepended to the file name for a font when an Adobe Font Metric file is opened for Postscript printing. The `FONT_MAP.AF` file contains the file names corresponding to font names for each font in Adobe Systems Postscript printers. The following files should be copied into the same or another commonly accessible area:

```
font_map.af
prologue.ps
sgml_dtd.bnf
```

The file `PROLOGUE.PS` contains Postscript instructions to be processed for each page of output and may be used to place a logo or border on each page.

The source code file `SGML_NOTICE.ADA` contains a constant declaration named `FILE_PREFIX` which must be supplied with the name of the commonly accessible area used for the above specified files. The value of this string constant is prepended to file names referenced in the code. The value of this string on the VAX is "SGML:", a system wide logical name defined to support the program.

The file `SGML_COMMAND_LINE_VAX.ADA` contains the only VAX VMS specific code in the delivery. It is used to obtain the command line argument used as a file designator to each application; it will have to be modified if the program is to be ported to a different Ada compiler or host computer.

The source files may then be compiled into an Ada library in the order specified in the Inventory of Contents heading above. The applications `DTDTOBNF` and `SGML` should then be linked. The application `DTDTOBNF` should be executed for each of the supplied DTD files to produce the "BNF*" file used by `SGML`. The "BNF*" files have the file name extension `.BNS` and should be copied into the common area, though the application `SGML` will search the local directory before looking in the common area for a "BNF*" file.

The last step in preparing to use the SGML software is to compile and link the DTD specific formatting programs using the Digital Command Language procedure `TCSBUILD.COM`, or its equivalent for another host.

4.7 Possible Problems

The most likely problem in setting up these applications is file naming and locating the common area. The default file names are compatible with a wide range of operating systems. Verify that all porting procedures have been completed as described. Call the author of this work should problems be encountered.

4.8 Future Enhancements

The primary failing of this product is the speed of the SGML parser and the limited number of SGML features it supports. The parser uses a generic parsing algorithm and should be replaced with a faster algorithm and a larger part of the SGML syntax or a new parser should be developed based on sounder parsing algorithms.

5. NOTES

Refer to the supplied Briefing and Report User's guides. These documents describe the use of the DTDs to produce source document instances. When using the STCS software, each source instance file to the parser must start with a document type declaration of the form:

```
<!doctype report>

-- or --

<!doctype report[
  <!entity mo cdata "<">
  <!entity mc cdata ">">
  <!entity me cdata "</">
]>
```

The second example shows the use of entity declarations in a document instance. Use of the STCS software is shown below producing the Postscript output of the file `mydoc.sgm` prepared using the Report DTD on a VAX/VMS computer.

```
$ SGML mydoc.sgm
```

```
SGML SYSTEM -- Version 1.2.4
Science Applications International Corporation (SAIC)
Use limited to U.S. Gov't agencies and contractors.
Developed Under Naval Research Laboratory Contract No. N00014-87-C-2386
Developed Under Contract No. F19628-88-D-0032 for USAF ESD, Hanscom AFB
```

```
Initializing parser
Processing BNS document
Processing source document
SGML processing complete
$ REPORT mydoc.cdc
```

```
Text Composition System -- Version 1.2.4
Science Applications International Corporation (SAIC)
Use limited to U.S. Gov't agencies and contractors.
Developed Under Naval Research Laboratory Contract No. N00014-87-C-2386
Developed Under Contract No. F19628-88-D-0032 for USAF ESD, Hanscom AFB
```

```
$ rename report_output.ps mydoc.ps
$ print/param=data_type=postscript mydoc.ps
$ delete mydoc.cdc;
```

Note: A "\$" is the standard prompt on VAX/VMS.

IR65: SGML Document Descriptions

**Contract Data Requirement CDRL 1820, Type A005(B)
Contract No. F19628-88-D-0032**

Technical Report: Formatting Recommendations

June 4, 1990

Prepared for:

**Electronic Systems Division (PKG-1)
Air Force Systems Command, USAF
Hanscom AFB, MA 01731-5000**

Prepared by:

**Science Applications International Corporation
Software and Systems Integration Group
Ada Software Division
311 Park Place Boulevard, Suite 360
Clearwater, FL 34619**

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1. Introduction

Software Technology for Adaptable Reliable Systems (STARS) CDRL item 1810 for task IR65 presented the foundation for using the Standard Generalized Markup Language (SGML, ISO 8879e:1986) and set the goal for the development of Document Type Definitions (DTD). This document presents the DTDs for a briefing, a report, and the recommendation for the DTD to be used in the STARS program for document interchange.

The Briefing DTD is a new DTD prepared using the SGML Text Composition System (STCS) developed under STARS Foundation contract N00014-87-C-2386 and revised under STARS contract F19628-88-D-0032. The Briefing is intended to be used to prepare overhead slides in a landscape orientation using the Postscript(tm) output of the STCS formatter. The Briefing has been designed using presentations typical of the STARS program. Specifically two presentations from the February 1990 STARS Quarterly PMR were selected and encoded from hardcopy using the Briefing DTD and processed using the STCS software. The first was the presentation by Mr. James Solderitsch of Unisys on Repository Technology, the second was the IBM PMR status report by Mr. W.D. Ceely and Mr. R.J. Drake.

NOTE: The Briefing is not compatible with ASCII text file output, only Postscript(tm) is supported.

The Report DTD was developed under STARS Foundation contract N00014-87-C-2386 and has been used by IBM Subcontractor SAIC for delivery of its technical reports to STARS. A form of this very simple DTD has also been used by Unisys. This DTD was modified and the STCS formatter updated to assist in the preparation of the STARS User Guide by task IR10A. The changes are presented along with new user documentation.

The third DTD presented is the proposed STARS Document DTD recommended for universal use in the STARS program. This DTD is recommended to facilitate the interchange of technical materials. It would have been possible to extend the Report DTD above to include all document elements required of STARS reports; however, this was ruled out as not in the program's long term interest.

Within the STARS program alone, any standard DTD or even standardizing on a particular word processor would accomplish the document interchange goal. However, if the STARS products are to be useful to the improved development of DoD software projects and since the STARS products will not be complete for several years, then the interchange standard should be an existing standard or one planned for use by larger and longer term projects than STARS. Efforts to standardize on SGML and develop standard DTDs already exist in the DoD, such as the Computer-Aided Acquisition and Logistics Support (CALS) initiative and the Air Force Technical Order Management System (AFTOMS). The STARS Document DTD was derived from the CALS MIL-M-28001 DTD.

While it would be possible to use the full CALS DTD for STARS, the DTD is complex (over 800 lines of text). Such complexity is likely to impede its acceptance by any but professionals in document publication. The CALS MIL-M-28001 DTD has been simplified for STARS by removing markup elements specific to technical manuals and which have little application to STARS technical reports. The intent was to develop a DTD which is CALS compliant but is a subset of the full CALS DTD, that is, a document prepared to the intent as well as the structure of the proposed DTD should be processable by tools intended for CALS and AFTOMS documents. The STARS Document DTD remains sufficiently complex that authoring

tools, such as SGML smart editors, are recommended for document production. The IR65 report CDRL 1830 (available June 1990) will describe commercial options to the authoring and preparation of SGML documents.

NOTE: A standardized DTD does provide for document interchange; it does not provide a means to process a formatted document.

2. The Briefing DTD

The Briefing DTD was developed by examining copies of a number of overhead transparency presentations of primarily text content for their common elements and structure. This analysis formed the basis for the development of the generic identifiers which became the basic tag set and the organization which became the structure enforced by the SGML DTD.

The Briefing is organized to support the preparation of slide presentations of three distinct types:

1. a series of slides on a single topic using lists and text,
2. a presentation consisting of several major topics, and
3. a presentation including quad-charts as used for PMR.

The elements of these three types may be used in any combination.

The elements needed to support a presentation which consists of a series of slides on a single topic are generic elements such as lists, text, and features to support manually imported external graphics. The presentation given by Mr. James Solderitsch of Unisys on Repository Technology at the February 1990 STARS Quarterly PMR is typical of this type. The marked-up source of this presentation and its processed output are included in this deliverable under the name UNISYS.SGM and UNISYS.PS respectively.

A presentation which covers several topics is often prepared in the same manner as the single topic presentation. Each topic change might be introduced by a slide or the masthead on each slide might denote the topic area. The Briefing DTD supports such a layout; however, it also provides for a contents slide after the title page which itemizes each topic to be covered and a means of repeating the topic slide with a moving pointer showing the advancement from topic to topic. This organization is often used in educational presentations since the repetition of the contents slide is helpful in showing the progression of material. The CONTENTS and the NEXT tags in the Briefing DTD support this feature.

Quad-charts are an important part of many presentations as a means to summarize performance on a task or contract. The Briefing DTD supports preparation of the textual component of a quad chart. Each quad of a quad-chart is addressed separately with its contents. The lower right quad is optional since it is often used for schedules or Gantt charts which cannot be supported by the STCS software. Support for the preparation of quad-charts is included in the Briefing DTD; however, there is no provision for the insertion of external graphics or a Gantt chart except by physical cutting and pasting, due to limitations in the formatter.

The Briefing DTD is described in a separately delivered component of CDRL 1820 titled "Document Description, Briefing DTD User's Guide". The document describing the Briefing DTD is thus a separate reference for those who wish to use it. The filenames for the Briefing are:

BRIEFING.DTD	the Briefing DTD
BRIEFING.SGM	Briefing Document Type Definition User's Guide SGML source prepared using the Report DTD
BRIEFING.PS	Postscript(tm) version of the Briefing User's Guide
BRIEFING.TCS	the Text Composition System formatting instructions for the Briefing DTD (named BRIEFING_TCS.ADA on VAX systems)
STARSPMR.SGM	Sample markup file with quadcharts
UNISYS.SGM	Sample markup file

The Briefing Text Composition Specification was developed using the STARS Foundation STCS code and does not include the ability to support graphics. The TCS uses the limited line drawing capability of STCS to frame each quad of the quadchart. The preparation of simple tables is also supported with a small set of tags that makes use of the character size and spacing control available in STCS.

Attributes have been defined for the Briefing DTD which are not used by the existing TCS. These attributes are intended to support the additional capabilities expected of SGML and DSSSL based formatters. There are four such attributes for the Briefing itself, they are:

1. logo - define the source file for the logo to be placed on each slide,
2. pgcount - specify page numbering on the slides,
3. retain - specify a retention period for the material in the briefing,
4. docref - allow specification of a document reference for the DTD.

Processing of the pgcount attribute could be included in the Briefing TCS; however, few slide presentations are actually numbered. A known weakness of the Briefing DTD is that element names for the sub-components of the sequential and bulleted lists are not mnemonic. The top level element of a list is the ITEM, as used in the Report. The sub-components of ITEM are H2 and H3.

2.1 Presentation Format

Text is presented in the Helvetica font for all information except tables and character based figures which are in Courier. Text sizes are proportional to the heading or indentation level. Indentation is used in sequential and bulleted lists to distinguish levels of material. Text style and sizes are specified below:

Element Name	Description	Output Style
briefing	doctype introducer	Landscape 8.5" x 11" 1" top & bottom margin 1.5" left & right margin
title	title of presentation	Helvetica Bold 30 point
subtitle	sub-title of presentation	Helvetica Bold 22 point
date	date of presentation	Helvetica Bold 22 point
audience	audience	Helvetica Bold 22 point
presenter	presenter name	Helvetica Bold 22 point
address	address	Helvetica Bold 22 point
phone	phone	Helvetica Bold 22 point
contents	table of contents	Helvetica 18 point
topic	topic in contents	Helvetica 18 point
head	slide heading	Helvetica Bold 22 point
para	slide paragraph	Helvetica 14 point
table	slide table	Courier 14 point
head	slide table head	Helvetica Bold 22 point
column	table column	Courier 14 point
caption	table caption	Helvetica 14 point
figure	slide figure	Courier 14 point
graphic	graphic	NA
bullet	bulleted list	NA
seqlist	sequential list	NA
item	bullet or numbered list item	Helvetica 18 point and # or o
h2	sub-item 2	Helvetica 14 point + .5" indent
h3	sub-item 3	Helvetica 14 point + .5" indent
foot	slide footer	Helvetica Bold 22 point
next	iterated table of contents	NA
masthead	masthead	Helvetica Bold 26 point
quadchrt	quad chart introducer	draws quad borders
ul	upper left quad	sets margins for UL quad
ur	upper right quad	sets margins for UR quad
ll	lower left quad	sets margins for LL quad
lr	lower right quad	sets margins for LR quad
head	quad head	Helvetica 18 point
para	quad para	Helvetica 12 point
bullet	quadchart bulleted list	NA
seqlist	quadchart sequential list	NA
item	quadchart bullet or numbered list item	Helvetica 14 point
h2	quadchart list sub-item 2	Helvetica 12 point + .25" indent
h3	quadchart list sub-item 3	Helvetica 12 point + .25" indent
performer	performer	Helvetica 14 point
bgndate	begin date	Helvetica 14 point
enddate	end date	Helvetica 14 point

The selection of Helvetica as the display font is based on its generally satisfactory appearance over a large range of sizes and its ease of reading. Helvetica is a sans-serif

proportionally spaced font. The variations in font size relate visual impact to the hierarchy of the items on the page. Sizes for the quadchart are reduced to accomodate the reduced display area. The Courier font is used for character based figures and tables to allow character alignment by columns since Courier is a fixed spaced font.

3. The Report DTD

The Report DTD has been in use since fall 1988 when the STCS software first became operational. It has been in use unchanged from that date until March 1990 when the DTD was first processed by a commercial SGML product, ParseStation by Datalogics of Chicago, Illinois. Syntax errors which were not caught by the Foundations SGML parser were corrected. The Report DTD was also modified to reduce the need for end tags and to add a new tag to enable the markup of content which is to be presented in a computer display style. The element tags used for such markup are `<cmpttr>` and `</cmpttr>`. The result of such markup is `cmpttr` (displayed in the Courier font when processed by the STCS software and printed using Postscript(tm)).

The format specification for the Report was updated at the same time with improved spacing control. The element `<figure>` is now controlled so it will not break across page boundaries, unless the figure exceeds one page in size. The element `<graphic>` will now leave a blank page which may be replaced with an externally produced page. The `<graphic>` element can be used for insertion of pages without disturbing the printed page count or the table of contents.

The Report DTD is described in a separately delivered component of CDRL 1820 titled "Document Description, Report DTD User's Guide". The document describing the Report DTD is thus a separate reference for those who wish to use it. The filenames for the Report are:

REPORT.DTD	the Report DTD
REPORT.SGM	Report Document Type Definition User's Guide SGML source prepared using the Report DTD
REPORT.PS	Postscript(tm) version of the Report User's Guide
REPORT.TCS	the Text Composition System formatting instructions for the Report DTD (named REPORT_TCS.ADA on VAX systems)

In addition to code changes to the Report TCS, changes were made to the text composition process and code to enable these improvements. These changes are detailed in the Version Description Document which accompanies this deliverable.

4. The Proposed STARS Document DTD

The Report DTD is not adequate for universal adaptation by the STARS program. Even if missing features, such as footnotes and tables were added, the DTD would be inadequate because it does not implement its basic tagging in a way that is compatible with similar DTDs and common practice. For example, the markup for subsections requires careful attention to the balance of end tags. Correcting these problems would make the Report DTD incompatible with older documents prepared to it and therefore eliminate any advantage in improving it.

For this reason the proposed DTD for STARS use is based on the much more complex DTD developed for the Computer Aided Acquisition and Logistics Support (CALS) program. The CALS DTD is a complex DTD since it is intended for the production of technical manuals (TM), such as those used in the support of weapon systems. While such TMs have little in common with the reports prepared by the STARS program, the DoD software projects orientation means that documents prepared to the STARS Document DTD will be processable by the same software and produce similar results to DoD software project TMs.

The CALS DTD is primarily intended for the production of TMs which follow MIL-M-38784C, a print oriented standard. The markup rules and the tag set is defined to satisfy the need for a particular style of printing technical manuals. CALS MIL-M-28001 is using SGML as a way to migrate from printed manuals to pageless manuals for electronic distribution, a cost reduction measure.

The proposed STARS Document DTD was derived from the CALS DTD by systematically deleting tags peculiar to technical manuals, such as tags used solely to identify part numbers. Additionally, tags used for document identification peculiar to technical manuals were removed. No new tags have been defined with the exception of one new sub-section level and the main stars element; any tags deemed useful to STARS, such as task number identification on the title page, can be handled by specific recommendations on the use of existing elements.

4.1 Element Definitions

The following table briefly describes the expected content for the elements of the proposed STARS Document DTD.

abbrsect	abbreviation section
address	address information (for signature block)
appendix	appendix (sequenced by letters)
body	body of document
chart	chart
colspec	column specification
contents	table of contents
date	date (for signature block)
def	definition in a definition list
deflist	list of definitions
docno	document number
doctype	document type
emphasis	emphasized text
entry	table entry
entrytbl	table entry which consists of another table-like format
figindex	figure index number
figure	figure
foreword	foreward to document

front	front part of document
ftnote	footnote
ftnref	footnote reference
glossary	glossary
graphic	external graphic entity reference
idinfo	document identification information
illuslist	list of illustrations
index	index of document
indxflag	identifies an item to be indexed
intro	introduction to document
item	list item
macrograph	graphic composed of multiple other graphics
nomen	nomenclature
note	note
notice	notice
organiz	organization (in signature block)
para	paragraph
para0	titled paragraph/subsection which can then have subparagraphs/other subsections
position	position (in signature block)
preface	preface of the document
prepubno	previous publication number
prtitle	primary title
pubdate	publication date
pubno	publication number
purpose	document purpose
randlist	random order list (bullet list)
rear	rear document elements
revnum	revision number
row	table row
section	section
seqlist	sequential list (numbered list)
sigblk	signature block
signer	person who is signing the document
spanspec	table entry that spans more than one column
stars	STARS document
step1	numbered step in a process
step2	numbered sub-step in a process
step3	numbered sub-sub-step in a process
stitle	subtitle
subfig	subfigure
subject	subject of the title
subpara1	sub-paragraph
subpara2	sub-sub-paragraph
subpara3	sub-sub-sub-paragraph
subpara4	sub-sub-sub-sub-paragraph
subscript	subscript
supscript	superscript
table	table
tablelist	list of tables
tbody	body of table
term	term in definition list

tfoot	table foot
tgroup	table group
thead	table head
title	title
titleblk	title block for the front of the document
user	primary user of a document
verbatim	text reproduced "as is"
volnum	volume number
xref	cross reference

4.2 STARS Element Usage

The following sections describe the usage of the STARS Document DTD elements listed above. A complete example of a STARS document is given as an appendix.

A document can be separated into three main sections: a front, a body and a rear. The front contains all title page information, introductory text and table of contents. The body contains the main text of the document. The rear contains the index, glossary and appendixes. The STARS document is organized in this manner. The STARS document consists of a front, body and rear.

4.2.1 Front Elements

The front element contains all the elements typically found in the front of a document. These include an identification section, a foreward, preface or introduction, a table of contents, an illustration list, and a list of tables.

The identification section (IDINFO) is used for those elements that uniquely identify a document on a title page. These include a publication number, a previous publication number, a change number, a revision number, a title block, a notice, a publication date, and a change date. The title block (TITLEBLK) consists of a volume number, a revision number, a document type, a primary title, and a subtitle. The primary title consists of a nomenclature and a subject.

In the STARS document, the existing front tags can be used to display all necessary information for a STARS CDRL cover page. The primary title nomenclature is used synonymously with task number while subject is used for the actual title of the document. This allows the title of the CDRL to be displayed as "{task number} {document title}". In order to display "Prepared for" and "Prepared by" information, a table in the notice section of the identification section is used. The table is specified as a page wide table with one column and no borders or separators. A table is used in order to assure that the "Prepared for" and "Prepared by" information is displayed centered with one string of text per line.

```
<front>
  <idinfo>
    <pubno> <docno> 1820
    <titleblk>
      <doctype> A005(B)
      <prtitle> <nomen>   IR65
                <subject> SGML Document Descriptions
      <stitle> Technical Report: Formatting Recommendations
    </titleblk>
    <contractno> F19628-88-D-0032
    <notice>
      <table tocentry="0" frame="none" colsep="0" rowsep="0" pgwide="1">
        <tgroup cols="1">
          <colspec align="center">
            <thead><row><entry> Prepared for:
            <tbody><row><entry> Electronic Systems Division (PKG-1)
                    <row><entry> Air Force Systems Command, USAF
                    <row><entry> Hanscom AFB, MA 01731-5000
          </tgroup>
          <tgroup cols="1">
            <colspec align="center">
              <thead><row><entry> Prepared by:
              <tbody><row><entry> Science Applications International Corporation
                      <row><entry> Software and Systems Integration Group
                      <row><entry> Ada Software Division
                      <row><entry> 311 Park Place Boulevard, Suite 360
                      <row><entry> Clearwater, FL 34619
            </tbody>
          </tgroup>
        </table>
      </notice>
      <pubdate>30 March 1990
    </idinfo>
    <intro> <para>
      The Briefing DTD ...
    </intro>
  </front>
```

4.2.2 Body Elements

The body element contains all the elements typically found in the body of a document. The body is composed of two or more sections. Sections are composed of two or more subsections. The subsections can be broken down into four more levels of subsections.

4.2.2.1 Subsections and Paragraphs

Sections break down into subsections (para0). Subsections consist of a title, paragraphs and optional elements such as notes and steps. In addition, a subsection can contain other subsections (subpara1, subpara2, subpara3, subpara4), figures, charts or tables. There are also enumerated steps with three possible sublevels. These optional items may occur any place within a subsection.

The main component of a subsection is the paragraph. A paragraph contains actual text, footnote references, index markers, emphasized text, verbatim text (explained below), graphic displays (explained below), subscripts, superscripts, or figure indexes. Text cannot contain reserved tokens such as the start tag open ("**<**"), the start tag close ("**>**"), the end tag open ("**</**") or the ampersand/entity open ("**&**"). In order to represent these tokens within the text, an entity reference or the verbatim tag must be used. For example:

Meyers, Smith & Smith, Inc.

must be put into text as

Meyers, Smith & Smith, Inc.

4.2.2.2 Tables, Charts, Figures, Graphics, and Verbatim

The STARS Document DTD has several elements available for the presentation of data which is not in standard paragraph form. These elements include Verbatim, Graphics, Figures, Tables and Charts.

4.2.2.2.1 Verbatim

Verbatim text is text which appears in the document "as is". All text included between the verbatim open and close tag will be included in the document without any adjustments to spacing or interpretation of embedded tags, tokens or entity references. Verbatim text can be used for examples of code or even SGML markup.

```
<verbatim>
    if The_Parameter = Debug_Option then
        Execute_Debug_Facility ;
    else
        Execute ;
    end if ;
</verbatim>
```

4.2.2.2.2 Graphic

Graphic material is included in the STARS document by specifying an external source that contains the graphic material. The external source is specified with the graphic tag attributes. The graphic tag can be used to include Postscript(tm) charts, company logos, etc., provided that the included graphic is within the limitations of the format process.

4.2.2.2.3 Tables and Charts

Tables and charts are used to specify tabular material. An advantage of the STARS document DTD is the variety of options available for tabular display. Table attributes include:

- o multiple columns, rows
- o the width of a column may be specified
- o the number of columns may be specified
- o tables and charts can have several sections (tgroups), each with its own title
- o tables may be displayed in portrait or landscape mode
- o separators and borders are optional
- o titles and headings can be at the top or bottom of the table/chart
- o separators and borders are optional
- o table data may be right and/or left justified or centered
- o table data may extend across several columns (spanspec).
- o table/chart entries can be either graphic or verbatim

4.2.2.2.4 Figures

Figures are composed of a title and figure material which is either graphic or verbatim. A figure may also be composed of multiple graphics (macrograph) or it may contain a sub-figure. The figure is the most commonly used of the elements discussed in this section.

4.2.2.3 Lists

There are three different kinds of list that are valid within the STARS document. These include a definition list, a sequential list and a random order list. The definition list consists of two columns: one for terms and one for definitions. The definitions can contain paragraph material and tables. The sequential list is a numbered list of paragraph material and tables. The random order list is a bulleted list of paragraph material and tables. All lists can contain other lists. Within the enumerated list, it is possible to specify the type of numbering used. Through this option, it is possible to create an outline such as:

- I. STARS Document
 - A. Front
 - 1. Idinfo
 - a. Pubno
 - b. Prepubno
 - c. Chgnum
 - .
 - .
 - .
 - 2. Foreword
 - 3. Preface
 - 4. Intro
 - .
 - .
 - .
 - B. Body
 - .
 - .
 - .

4.2.3 Rear Elements

The rear of a document contains appendixes, a glossary, and an index. All of these items are optional. An appendix contains a title and multiple sections or subsections. A glossary contains an optional introductory paragraph, a title and a definition list. An index is generated based on index references placed in the body of the document.

APPENDIX A.

APPENDIX: Example of a STARS document

NOTE: The enclosed markup is an example of a partial STARS Document. The markup used should be correct; however, the markup of this document has not been completely verified as correct due to an error in the Datalogics ParseStation SGML Parser. An error was discovered in parsing CDATA (specifically in text containing SGML tagging examples) which has been reported to Datalogics.

```
<stars branch="af" docstat="draft">
<front>
<idinfo>
  <pubno> <docno> 1820
  <titleblk>
    <doctype> A005(B)
    <prtitle> <nomen>   IR65
                <subject> SGML Document Descriptions
    <stitle> Technical Report: Formatting Recommendations
  </titleblk>
  <contractno> F19628-88-D-0032
  <notice>
    <table tocentry="0" frame="none" colsep="0" rowsep="0" pgwide="1">
      <tgroup cols="1">
        <colspec align="center">
          <thead><row><entry> Prepared for:
          <tbody><row><entry> Electronic Systems Division (PKG-1)
                  <row><entry> Air Force Systems Command, USAF
                  <row><entry> Hanscom AFB, MA 01731-5000
        </tgroup>
        <tgroup cols="1">
          <colspec align="center">
            <thead><row><entry> Prepared by:
            <tbody><row><entry> Science Applications International Corporation
                    <row><entry> Software and Systems Integration Group
                    <row><entry> Ada Software Division
                    <row><entry> 311 Park Place Boulevard, Suite 360
                    <row><entry> Clearwater, FL 34619
          </tbody>
        </tgroup>
      </table>
    </notice>
    <pubdate>30 March 1990
  </idinfo>
  <intro> <para>
    The Briefing DTD is a new DTD prepared using the SGML Text Composition
    System (STCS) developed under STARS Foundation contract
    N00014-87-C-2386 and revised under STARS contract F19628-88-D-0032.
    The Briefing is intended to be used to prepare overhead slides in a
    landscape orientation using the Postscript(tm) output of the STCS
    formatter. The Briefing has been designed using presentations typical
    of the STARS program. Specifically two presentations from the February
    1990 STARS Quarterly PMR were selected and encoded from hardcopy using
    the Briefing DTD and processed using the STCS software. The first was
    the presentation by Mr. James Solderitsch of Unisys on Repository
```

Technology, the second was the IBM PMR status report by Mr. W.D. Ceely and Mr. R.J. Drake. The IBM status report briefing material is provided in an appendix to demonstrate use of the Briefing DTD.

</intro>

</front>

<body>

<section> <title> WRITING A BRIEFING </title>

<para>

This section provides all information necessary to mark up a series of slides to be used in a briefing or presentation.

<para0> <title> Briefing Document Type Definition (DTD) </title>

<para>

The correct format of a Briefing SGML file is controlled by the Briefing Document Type Definition (DTD) file. That file is listed below.

<figure> <title> Briefing Document Type Definition (DTD)</title>

<verbatim>

<!DOCTYPE briefing [

```
<!ENTITY % yesorno "(yes|no)" >
<!ENTITY % list      "( bullet | seqlist )" >
<!ENTITY % stuff      "para | table | figure | graphic | %list;" >
<!ENTITY % linear     "( slide | masthead | quadchrt )" >
<!ENTITY % topical    "( next | slide | masthead | quadchrt )" >
<!ENTITY % dates      "( begndate , enddate )" >
<!ENTITY % quad       "para | %list; | performer | %dates; " >
<!ENTITY % stars      "Software Technology for Adaptable Reliable Systems" >
```

```
<!ELEMENT briefing - - ( titlepg? ,
    ( ( contents , %topical; ) | %linear; ) ) show ()>
```

```
<!ATTLIST briefing
    logo      CDATA ""
    pgcount   CDATA ""
    retain    CDATA ""
    docref    CDATA "" >
```

```
<!ELEMENT contents - o ( topic+ ) >
<!ELEMENT topic    - o ( #PCDATA ) >
<!ELEMENT masthead - o ( #PCDATA ) >
<!ELEMENT slide    - o ( head? , ( %stuff; )* , foot? ) >
<!ELEMENT next     - o  EMPTY  >
```

```
<!ELEMENT head     - o ( #PCDATA ) >
<!ELEMENT foot     - o ( #PCDATA ) >
<!ELEMENT para     - o ( #PCDATA ) >
```

```
<!ELEMENT titlepg - o ( title , subtitle? , date? , audience? ,
    presenter? , address* , phone? ) >
```



```

<!ELEMENT title      - o ( #PCDATA ) >
<!ELEMENT subtitle   - o ( #PCDATA ) >
<!ELEMENT date       - o ( #PCDATA ) >
<!ELEMENT audience   - o ( #PCDATA ) >
<!ELEMENT presenter  - o ( #PCDATA ) >
<!ELEMENT address     - o ( #PCDATA ) >
<!ELEMENT phone      - o ( #PCDATA ) >

<!ELEMENT quadchrt   - - ( ul , ur, ll, lr?) >
<!ELEMENT ul         - - ( head , ( %quad; )* ) >
<!ELEMENT ur         - - ( head , ( %quad; )* ) >
<!ELEMENT ll         - - ( head , ( %quad; )* ) >
<!ELEMENT lr         - - ( head , ( %quad; )* ) >
<!ELEMENT performer  - o ( #PCDATA ) >
<!ELEMENT begndate    - o ( #PCDATA ) >
<!ELEMENT enddate     - o ( #PCDATA ) >

<!ELEMENT table      - - ( head? , row+ ) >
<!ELEMENT row        - - ( column+ | caption) >
<!ELEMENT column     - o ( #PCDATA ) >
<!ELEMENT caption    - o ( #PCDATA ) >

<!ELEMENT figure     - - RCDATA >
<!ELEMENT graphic    - o EMPTY >
<!ATTLIST graphic          xrefid CDATA "">

<!ELEMENT bullet     - o ( item+ ) >
<!ELEMENT seqlist    - o ( item+ ) >
<!ELEMENT item       - o ( #PCDATA , h2* ) >
<!ELEMENT h2         - o ( #PCDATA , h3* ) >
<!ELEMENT h3         - o ( #PCDATA ) >

]>
</verbatim>
</figure>

```

<para0> <title> Looking at the Briefing Elements</title>

<para>

The components of the document (called "elements") are outlined in the figure BRIEFING DOCUMENT STRUCTURE and described below.

<figure> <title> Briefing Document Structure</title>

<verbatim>

| Tagname | Occurrence* | Identity |
|--------------|-------------|------------|
| briefing | 1 | briefing |
| I. titlepg | 0-1 | title page |
| A. title | 1 | title |
| B. subtitle | 0-1 | sub-title |
| C. date | 0-1 | date |
| D. audience | 0-1 | audience |
| E. presenter | 0-1 | presenter |

| | | |
|-------------------|-----|----------------------------|
| F. address | 0-N | address |
| G. phone | 0-1 | phone |
| II. contents | 0-1 | table of contents |
| A. topic | 1-N | topic |
| +-- III. slide | 0-N | slide |
| 1. head | 0-1 | head |
| +- 2. para | 0-N | para |
| 3. table | 0-N | table |
| 1. head | 0-1 | table head |
| 2. row | 1-N | row |
| -OR- -- a. column | 1-N | column |
| -OR- b. caption | 1 | caption |
| 4. figure | 0-N | figure |
| 5. graphic | 0-N | graphic |
| +- 6. list | 0-N | |
| OR- +- 1. bullet | 0-N | bulleted list |
| a. item | 1-N | bulleted item |
| -OR- 1. h2 | 0-N | sub-item 2 |
| a. h3 | 0-N | sub-item 3 |
| +- 2. seqlist | 0-N | sequential list |
| a. item | 1-N | sequential list item |
| 1. h2 | 0-N | sub-item 2 |
| a. h3 | 0-N | sub-item 3 |
| 7. foot | 0-1 | foot |
| IV. next | 0-N | iterated table of contents |
| V. masthead | 0-N | masthead |
| +-- VI. quadchrt | 0-N | quad chart |
| 1. ul | 1 | upper left quad |
| +- a. head | 1 | quad head |
| b. para | 0-N | quad para |
| c. list | 0-N | quad list |
| +- 1. bullet | 0-N | bulleted list |
| a. item | 1-N | bulleted item |
| -OR- 1. h2 | 0-N | sub-item 2 |
| a. h3 | 0-N | sub-item 3 |
| +- 2. seqlist | 0-N | sequential list |
| a. item | 1-N | sequential list item |
| -OR- 1. h2 | 0-N | sub-item 2 |
| a. h3 | 0-N | sub-item 3 |
| d. performer | 0-N | performer |
| +- e. dates | 0-N | |
| 1. begndate | 0-N | begin date |
| 2. enddate | 0-N | end date |
| 2. ur (a-f above) | 1 | upper right quad |
| 3. ll (a-f above) | 1 | lower left quad |
| 4. lr (a-f above) | 0-1 | lower right quad |

* Items listed as 0-N are not required and may be used as many times as

desired. Items listed as 1 are required and may occur only once in a document.
</verbatim>
</figure>

<section> <title>MAJOR ELEMENTS</title>
<para>The major elements of the Briefing DTD are described below.

<para0> <title>BRIEFING</title>
<figure> <title> </title>
<verbatim>
TAGS: <briefing> </briefing>
OCCURRENCE: Required
</verbatim>
</figure>
<para>

This element represents the briefing or presentation to be marked up. It consists of an optional title page, an optional contents page, and the structure of the briefing, which is a series of slides and quadchrts. Only the structure is required. The start-tag <verbatim> <briefing> </verbatim> opens a briefing and the end-tag <verbatim> <briefing> </verbatim> closes a briefing. The tag <verbatim> <briefing> </verbatim> must be immediately followed by another start-tag, since there is no text associated with the element.

<para0> <title> TITLEPG (title page)</title>
<figure> <title> </title>
<verbatim>
TAGS: <titlepg>
OCCURRENCE: Optional
</verbatim>
</figure>
<para>

This element represents the information that appears before the body of the presentation. The only required element in the title page is the title. Optional elements include a subtitle, a date, the intended audience, the presenter's name, an address, and a phone number.

<para0> <title> CONTENTS</title>
<figure> <title> </title>
<verbatim>
TAGS: <contents>
OCCURRENCE: Optional
</verbatim>
</figure>
<para>

This element represents an optional table of contents. Unlike the table of contents for a report or manual, the entries for this table must be provided in the tagged document, rather than constructed from headers. Also unlike the usual table of contents, this one will mark the first element as active. Successive copies of this table can be output using the NEXT element, which will output the same table but

will mark the next element as the active one. After the last element has been marked, any further calls of NEXT will output an unmarked table. The only element within contents are the topics to be listed. At least one is required, although any number may be listed.

```
<para0> <title> SLIDE</title>
<figure> <title> </title>
<verbatim>
TAGS:          <slide>
OCCURRENCE:    Optional, repeatable
</verbatim>
</figure>
<para>
```

The slide is expected to be the most common element used. The slide has an optional head and foot, with any number of paragraphs, tables, figures, graphics, and sequential or bulleted lists.

```
<para0> <title> NEXT</title>
<figure> <title> </title>
<verbatim>
TAGS:          <next>
OCCURRENCE:    Optional, repeatable
</verbatim>
</figure>
<para>
```

The element next can only be used if the contents element was given. Next will output the same list of topics as was given in contents, but will mark the next topic as the active one. Next has no text and does not require an end-tag.

```
<para0> <title> MASTHEAD</title>
<figure> <title> </title>
<verbatim>
TAGS:          <masthead>
OCCURRENCE:    Optional, repeatable
</verbatim>
</figure>
<para>
```

The element masthead is optional. When the masthead element is given, the string associated with it is listed as the current masthead, and will be printed in large type at the top of every slide. The masthead can be altered by repeating the element with a new string. If the string given is null, then no masthead will be printed. Space will not be left for it. Masthead contains a single string as text, and does not require an end-tag.

```
<para0> <title> QUADCHRT</title>
<figure> <title> </title>
<verbatim>
TAGS:          <quadchrt>    </quadchrt>
OCCURRENCE:    Optional, repeatable
</verbatim>
```

</figure>

<para>

The element quadchart is optional. A quad-chart is a means of splitting a page into four equal sections, to allow more data to be displayed at one time, and to allow easy comparison and contrast of related material. Quad-charts contain required sections ul (upper-left), ur (upper-right), ll (lower-left), and an optional lr (lower-right) section.

<para0> <title> TITLE PAGE ELEMENTS </title>

<para>

The title page is optional. The title page consists of a number of elements, of which only the title is required. The title page elements are as follows:

<randlist>

<item> Title (required)

<item> Subtitle

<item> Date

<item> Audience

<item> Presenter

<item> Address

<item> Phone

</randlist>

<subpara> <title> TITLE </title>

<figure> <title> </title>

<verbatim>

TAGS: <title>

OCCURRENCE: Required

</verbatim>

</figure>

<para>

The title is a string representing the title of the briefing or presentation. The title is the only required element of a title page. It will be centered in large type on the title page.

<subpara> <title> SUBTITLE</title>

<figure> <title> </title>

<verbatim>

TAGS: <subtitle>

OCCURRENCE: Optional

</verbatim>

</figure>

<para>

The subtitle is a string representing an optional subtitle of the briefing or presentation. It will be centered on the title page in type slightly smaller than that of the main title.

<subpara> <title> DATE</title>

<figure> <title> </title>

<verbatim>

TAGS: <date>

OCCURRENCE: Optional

</verbatim>

</figure>

<para>

The date will generally be the date on which the presentation is scheduled to be given. It will be centered on the title page in the same typeface as the subtitle.

<subpara> <title> AUDIENCE</title>

<figure> <title> </title>

<verbatim>

TAGS: <audience>

OCCURRENCE: Optional

</verbatim>

</figure>

<para>

The audience is the name of the group for whom the briefing or presentation is being given. It will be centered on the title page in the same typeface as the subtitle.

<subpara> <title> PRESENTER</title>

<figure> <title> </title>

<verbatim>

TAGS: <Presenter>

OCCURRENCE: Optional

</verbatim>

</figure>

<para>

The presenter is the name of the person giving the briefing or presentation. It will be centered on the title page in the same typeface as the subtitle.

<subpara> <title> ADDRESS</title>

<figure> <title> </title>

<verbatim>

TAGS: <Address>

OCCURRENCE: Optional, repeatable

</verbatim>

</figure>

<para>

The address is a string representing some portion of the address of the person or organization giving the briefing. Any number of address strings may be used. It will be centered on the title page in the same typeface as the subtitle.

<subpara> <title> PHONE </title>

<figure> <title> </title>

<verbatim>

TAGS: <Phone>

OCCURRENCE: Optional

</verbatim>

</figure>

<para>

Phone refers to the phone number of the presenter or the presenting organization. It will be centered on the title page in the same typeface as the subtitle.

<para0> <title> STRUCTURAL ELEMENTS </title>

<subpara1> <title> CONTENTS</title>

<para>

The contents page is optional. The contents page consists of one or more topics. The first topic will be marked as the current topic. Once the Contents tag has been used, it is possible to use the Next element to output the same contents page, but each use moves the current topic marker to the next element. If it is used again after the last topic is marked, then the contents page will again be output, but without a marker.

<subpara2> <title> TOPIC</title>

<figure> <title> </title>

<verbatim>

TAGS: <topic>

OCCURRENCE: Required, repeatable

</verbatim>

</figure>

<para>

A topic is a string, usually the title of the subject of one section of the briefing or presentation. There must be at least one topic associated with the contents tag. The marker for the current topic is an arrow pointing to the topic.

<subpara1> <title> NEXT</title>

<para>

The next element is optional and can only be used in a briefing where the contents element has already been used. next causes the contents page to be re-output, but the topic which is marked as current will be the topic following the previous current element. If it is used again after the last topic is marked, then the contents page will be output without a marker. The next element has no text associated with it.

<subpara1> <title> MASTHEAD </title>

<para>

The masthead is a line of text, usually a descriptive title, which indicates a logical connection between a grouping of slides in a presentation.

<para>

The masthead tag has a string associated with it that will be preserved by the processor as the current masthead. If no masthead has been set, the slides will be printed as designed without a masthead showing, and no space will be left for the masthead. Once the masthead is set, each slide will have the masthead printed in large type at the top of the slide. The masthead tag can be given again with a different string. This will replace the old masthead with the new current one. The masthead tag can also be given with an empty string as its

contents. This will serve to deactivate the masthead until another occurrence of the tag.

<para0> <title> SLIDE ELEMENTS </title>
<para>

A slide is the basic element of the briefing DTD. If the masthead tag was used with a non-empty string, then the masthead will be printed at the top of the slide. If the masthead tag was not given, or if it was given with an empty string as its content, then no masthead will be printed. Space will not be reserved for a masthead if it is not being used. A slide can consist of the following elements:

<randlist>
 <item> Head
 <item> Para
 <item> Table
 <item> Figure
 <item> Graphic
 <item> Bullet (Bulleted List)
 <item> Seqlist (Sequential List)
 <item> Foot
</randlist>

<subpara1> <title> HEAD </title>
<figure> <title> </title>
<verbatim>
TAGS: <head>
OCCURRENCE: Optional
</verbatim>
</figure>
<para>

A head is a string, usually the title of the slide. It will be printed smaller than the masthead, but greater than the text of the slide. Only the masthead can precede the head on a slide.

<subpara1> <title> PARA</title>
<figure> <title> </title>
<verbatim>
TAGS: <para>
OCCURRENCE: Optional, repeatable
</verbatim>
</figure>
<para>

A para is a section of text. It essentially represents a paragraph of text. Any number of paras can be used in a slide, but no check is made for the vertical bounds. If too much text is given, the text will run off the bottom of the slide and onto the next one.

<subpara1> <title> TABLE </title>
<figure> <title> </title>
<verbatim>
TAGS: <table> </table>
OCCURRENCE: Optional, repeatable

</verbatim>

</figure>

<para>

A table has an optional head and one or more rows. A row is either a caption or a series of one or more columns. Any number of rows may be used in a table, as any number of columns may be used in a row. Tables are output in a different font from the rest of the briefing, since a fixed-font must be used to ensure proper alignment among columns.

<subpara2> <title> HEAD </title>

<figure> <title> </title>

<verbatim>

TAGS: <head>

OCCURRENCE: Optional

</verbatim>

</figure>

<para>

A head is a string, usually the title of the table.

<subpara2> <title> ROW </title>

<figure> <title> </title>

<verbatim>

TAGS: <row> </row>

OCCURRENCE: Required, repeatable

</verbatim>

</figure>

<para>

A row is a table element. A row is either a caption or a number of columns. Columns within the same table will be aligned.

<subpara3> <title> CAPTION </title>

<figure> <title> </title>

<verbatim>

TAGS: <caption>

OCCURRENCE: Optional, Repeatable

</verbatim>

</figure>

<para>

A caption is used to replace a row element as annotation of a table entry. A caption is a string of text, related to one or more of the columns in the preceeding row. Captions are indented from the left margin of the first column of the table. Captions are printed in the same font as other slide elements whereas all other table entries are displayed in the <cmpr>Courier</cmpr> font to permit character alignment of the table.

<subpara3> <title> COLUMN </title>

<figure> <title> </title>

<verbatim>

TAGS: <column>

OCCURRENCE: Optional, Repeatable

</verbatim>

</figure>

<para>

A column is a row element. A column can be any kind of text and is generally of a known length. A column can be a number, a word, or a short string. The same number column in each row of one table will be aligned along the right border. Columns are not output in the same font as the captions are, since columns must be fixed-font, and captions need not be.

<subpara> <title> FIGURE </title>

<figure>

TAGS: <figure> </figure>

OCCURRENCE: Optional, repeatable

</figure>

<para>

A figure is used to prepare slide content which is an exact character copy of the input. Figures are output in a fixed spacing font and may be used to present a character drawing where screen columns are aligned. It is up to the author of the briefing to see that his figures do not exceed the space available on a slide.

<subpara> <title> GRAPHIC </title>

<figure> <title> </title>

<verbatim>

TAGS: <graphic>

OCCURRENCE: Optional, repeatable

</verbatim>

</figure>

<para>

A graphic reserves a page in the output that is to be replaced with externally prepared artwork manually inserted into the presentation at the location of the tag. A graphic has no text, but it does have an attribute called 'xrefid'. The text entered for this attribute is used as the title of the graphic and is printed at the top of the page reserved for the external material. If the attribute is omitted, a completely blank page will be output. Using this tag for inserted elements will allow the correct page sequence to be maintained and acts as a reminder of where the item is to be inserted.

<subpara> <title> BULLET (Bulleted List) </title>

<figure> <title> </title>

<verbatim>

TAGS: <bullet>

OCCURRENCE: Optional, repeatable

</verbatim>

</figure>

<para>

A bulleted list is a list in which each item in the list is indicated by a bullet (a circular mark preceding the items). The bullets clearly mark each list item separately from wrapped lines or subordinate lines. Bulleted lists are composed of one or more items, which in turn are composed of text and zero or more sub-items (h2). The sub-items

are themselves composed of text and zero or more sub sub-items (h3).
The example briefing shows bulleted lists with sub-items.

<subpara2> <title> ITEM </title>

<figure> <title> </title>

<verbatim>

TAGS: <item>

OCCURRENCE: required, repeatable

</verbatim>

</figure>

<para>

A bulleted list item is composed of text, plus zero or more sub-items (h2). The sub-items are themselves composed of text and zero or more sub sub-items (h3).

<subpara3> <title> H2 </title>

<figure> <title> </title>

<verbatim>

TAGS: <h2>

OCCURRENCE: Optional, repeatable

</verbatim>

</figure>

<para>

A bulleted list sub-item is a part of an item from a bulleted list. A bulleted list sub-item is composed of text and zero or more sub sub-items (h3). It is printed as indented from its parent item.

<subpara4> <title> H3 </title>

<figure> <title> </title>

<verbatim>

TAGS: <h3>

OCCURRENCE: Optional, repeatable

</verbatim>

</figure>

<para>

A bulleted list sub sub-item is a part of a sub-item from a bulleted list. A bulleted list sub sub-item is text only. It is printed as indented from its parent sub-item.

<subpara1> <title> SEQLIST (Sequential List) </title>

<figure> <title> </title>

<verbatim>

TAGS: <seqlist>

OCCURRENCE: Optional, repeatable

</verbatim>

</figure>

<para>

A sequential list is a list in which each item in the list is indicated by a number representing its place in the list. Like the bulleted list, a sequential list clearly distinguishes each entry in the list. Additionally, sequential lists clearly preserve the relationship of the items. For example, if a list is to be followed by

explanatory text, or if the list itself details sections of a presentation, use of a sequential list allows the individual list items to be referenced by number. Sequential lists, like bulleted lists, are composed of one or more items, which in turn are composed of text and zero or more sub-items (h2). The sub-items are themselves composed of text and zero or more sub sub-items (h3). The elements of a list are described under BULLET.

<para0> <title>QUAD-CHART ELEMENTS</title>

<para>

Quad-charts are optional. A quad-chart is functionally a slide that is divided into four equal-sized sub-slides. Of these, only the lower right section is optional. The others are all required. The quad-chart slide does not contain a masthead.

<para>

Quad-charts are made up of the following sections:

<randlist>

- <item> UL -- Upper Left quad
- <item> UR -- Upper Right quad
- <item> LL -- Lower Left quad
- <item> LR -- Lower Right quad

</randlist>

<para>

Each quad is comprised of a head and zero or more selections from the following list:

<seqlist>

- <item>Para
- <item>Bullet (Bulleted List)
- <item>Seqlist (Sequential List)
- <item>Performer
- <item>BegnDate
- <item>EndDate

</seqlist>

<para>

Each of the four areas in a quad-chart is commonly referred to as a "quad". Each quad contains a head as well as any combination of elements from the above list. Para, bulleted list, and sequential list are handled as in a slide, except that the area available for use is only 1/4 the size. Performer, BegnDate, and EndDate all represent text entries. It is up to the author of the SGML-tagged document to ensure that the text given for a quad does not exceed the available space for that quad.

<note>

Refer to the sample SGML file in the appendix for an example of a quad-chart.

</note>

<subpara1> <title> UL (Upper Left Quad) </title>

<figure> <title> </title>

<verbatim>

TAGS:

OCCURRENCE: Required

</verbatim>

</figure>

<para>

UL represents the upper left quad of the given quadchrt. It will always be the first quad listed in a quadchrt.

<subpara> <title> UR (Upper Right Quad)</title>

<figure> <title> </title>

<verbatim>

TAGS: <ur>

OCCURRENCE: Required

</verbatim>

</figure>

<para>

UR represents the upper right quad of the given quadchrt. It will always be the second quad listed in a quadchrt.

<subpara> <title> LL (Lower Left Quad)</title>

<figure> <title> </title>

<verbatim>

TAGS: <ll>

OCCURRENCE: Required

</verbatim>

</figure>

<para>

LL represents the lower left quad of the given quadchrt. It will always be the third quad listed in a quadchrt.

<subpara> <title> LR (Lower Right Quad)</title>

<figure> <title> </title>

<verbatim>

TAGS: <lr>

OCCURRENCE: Optional

</verbatim>

</figure>

<para>

LR represents the lower right quad of the given quadchrt. It will always be the last quad listed in a quadchrt. Unlike the other three quads, it is NOT required. It may be left unused.

</body>

<rear>

<appendix> <title>EXAMPLE SGML FILE</title>

<section> <title>SAMPLE BRIEFING MARKUP FILE</title>

<para>

The following text is a sample briefing file with SGML markup. The output produced by processing this file is attached as a separately prepared appendix. Slides are printed in landscape orientation.

<notice>

Diagrams cannot be included when using the STCS software. If a diagram is required within a quad-chart, it is necessary to leave the

quad blank, and manually insert the diagram. This process requires the diagram be produced by some external means.

</notice>

<figure> <title> </title>

<verbatim>

<!doctype briefing>

<briefing>

<titlepg>

<title>STARS Program Management Review

<date>February 22, 1990

<presenter>W.D. Ceely and R.J. Drake

<address>IBM

<address>800 North Frederick Pike

<address>Gaithersburg, MD 20879

<masthead>STARS PMR: TECHNICAL

<slide>

<head>TECHNICAL PROGRAM REVIEW

<bullet>

<item>Technical Overview, Goals, Products, Task Summaries - Dick Drake

<item>Management Task Summary, Status Summary, Concerns and Special Achievements - Dave Ceely

<slide>

<head>PROGRAM OVERVIEW - 5 YEAR STRATEGY

<bullet>

<item>BACKGROUND

<h2>Each prime provided 5 Year Strategy as part of original proposal

<h2>Each prime awarded Task Q6.1: Consolidated Five Year Strategy

<h2>Joint working sessions conducted to develop plan/presentation to DARPA (8/88 - 9/88)

<h2>Presentation made to DARPA on September 9, 1988

<h2>Results documented in STARS Consolidated Technical Development Plan (CDRL 0070). Produced by IBM and coordinated with Government, Boeing and Unisys.

<h2>R-Increment update of Consolidated Plan rescheduled to adjust to re-orientation of STARS program

<h2>Revised Consolidated Five year Plan being developed jointly by the three primes and government

<masthead>PROGRAM OVERVIEW - 5 YEAR STRATEGY (continued)

<slide>

<bullet>

<item>GOALS

<h2>Improve Productivity

<h2>Improve Quality and Reliability

<h2>Promote Development and Application of Reusable Software

<h2>Reduce Time of Development

<h2>Reduce Cost of Development

<slide>

<bullet>

<item>PRODUCTS AT END OF 5 YEARS

<h2>Three commercially viable, competitive SEE's

<h2>Six service applications fully developed on SEE's

<h2>Critical-mass marketplace for CASE tool developers

<h3> U.S. leadership in CASE marketplace
<h2>Complementary advances in software process, methods, and metrics
<h2>Widely used DoD software component repository
<masthead>STARS PMR: TECHNICAL
<slide>
<head>R-INCREMENT OVERVIEW
<bullet>
<item>Goals
<h2>Provide the Most Useful Ada Repository in U.S.
<h3>Achieve public access
<h3>Get ready to transfer the technology outside of STARS
<h3>Promote value-added use of STARS products
<h3>First step toward a National Asset Repository
<h3>Establish reuse infrastructure
<h2>Define the Software First Life-Cycle
<h2>Establish a Generic S/W Engineering Environment Framework
<h2>Implement Breakthrough Initiative
<masthead>R-INCREMENT OVERVIEW (continued)
<slide>
<bullet>
<item>Products
<h2>Consolidated Five Year Plan (IR00)
<h2>Portable Environment Framework Virtual Interfaces (IR20)
<h2>Application Blueprint for a Generic SEE and Domain Analysis for C3 (IR20)
<h2>Repository and reuse Guidelines (IR40, IR10, IR11)
<h2>Enhanced Repository Capability (IR40)
<h2>Reusable Components (IR40)
<h2>Workstation CAI Capability and Components (IR68)
<h2>Policies and Procedures to Support an Open Repository (IR11)
<h2>Operational STARS Repository (IR10)
<h2>Methodology for STARS Structured Specification Development (IQM15) show ()
<h2>Software-First CDRL/DID Definition (IR66)
<h2>Software-First Life Cycle (SFLC) Definition (IQ15)
<slide>
<bullet>
<item>Products (continued)
<h2>STARS Orientation Workshop (IR63)
<h2>Cleanroom Methodology for Component Certification (IR70)
<h2>Document Type Definition (DTDs) for Common STARS Documents (IR65)
<h2>SQL/Ada Programmed Language Interface (IR67)
<h2>Breakthrough Center Documentation Inventory/Library System (IR83)
<masthead>STARS PMR: TECHNICAL
<slide>
<head>R-INCREMENT MAP TO 5 YEAR STRATEGY
<bullet>
<item>ENVIRONMENT
<h2>Application Blueprint for a generic SEE
<h2>Domain Analysis for C3 Application Blueprint
<h2>Portable Environment Framework
<item>PROCESS
<h2>Methodology for STARS Structured Specification Development

<h2>Preliminary Definition of the Software First Lifecycle
<h2>Preliminary Definition of Software First Lifecycle Object
<h2>Prototype Process Manager
<h2>STARS Orientation Workshop
<slide>
<head>R-INCREMENT MAP TO 5 YEAR STRATEGY
<bullet>
<item>REUSE
<h2>Most Useful Ada Repository in U.S.
<h2>Facet-based Search/Retrieval
<h2>Filtered/Organized Reusable Components in the SEE Domain
<h2>Policies and Procedures to Support an Open Repository
<h2>Methodology for Component Reliability Certification
<masthead>STARS PMR: TECHNICAL SUMMARY
<quadchrt>

<head>TASK DESCRIPTION
<para>This task is responsible for the development, integration, and evaluation of the IBM STARS Software Engineering Environment. Initial emphasis placed on the development of certain parts of the SEE framework. This task will develop the Application Blueprint theory, which envisions a generic architecture for the construction of software solutions.
<performer>SAIC Clearwater, IBM Gaithersburg
<begndate>4/19/89
<enddate>04/13/90

<ur>
<head>GOALS/PRODUCTS
<bullet>
<item>GOAL: Develop a portable, adaptable Software Engineering Framework
<item>PRODUCTS
<h2> Application Blueprints: CDRL's 1480 and 1490
<h2> Virtual Operating System Interface: CDRL 1500
<h2> User Interface: CDRL 1510
<h2> VOSI Ada Command Environment: CDRL 1520
</ur>
<ll>
<head>APPROACH/PROGRESS
<bullet>
<item>APPROACH
<h2> Write a Virtual Operating Sys. Interface (VOSI) as a subset of the CAIS (DoD-STD-1830)
<h2> Divide the User Interface Into Panel Manager and Window Manager. Based on IBM CUA.
<h2> Use Unisys ACE for VOSI Ada Cmd Env
<item>PROGRESS
<h2> Completed Application Blueprint theory
<h2> Completed Implementation of VOSI for VAX/VMS. Implementation for IBM PC/PC-DOS in test.
<h2> Completed draft spec of Panel Mgr. Began implementation of Window Mgr for VAX/VMS.


```
</ll>
<lr>
<head>DELIVERABLES/MILESTONES
</lr>
</quadchrt>
<quadchrt>
<ul>
<head>TASK DESCRIPTION
<para>This task will provide for enhancements to the Q increment IBM
STARS repository, additions to the set of components in the
repository, and consolidation of related guidelines. The three key
products, guidebook, components, and capabilities, will together
establish a fully operational prototype Ada reuse repository that will
support the STARS program and potentially other DoD software
development projects.
<performer>IBM, SAIC
<begndate>4/19/89
<enddate>04/13/90
</ul>
<ur>
<head>GOALS/PRODUCTS
<bullet>
<item>GOAL: Create the most useful Ada repository in the US
<item>PRODUCTS
<h2> Repository Guidebook (1550)
<h2> Repository Components (1560)
<h2> Repository Capabilities (1600)
</ur>
<ll>
<head>APPROACH/PROGRESS
<bullet>
<item>APPROACH
<h2> Develop policies and procedure for repository
<h2> Provide enhancements to the repository system
<h2> Gather and refine reusable components
<item>PROGRESS
<h2> IBM STARS Team Repository V2.3 available - third major prototype
during R-increment
<h2> Work continuing on port to VOSI and final Guidebook
<h2> Component content growth proving to be difficult task
</ll>
<lr>
<head>DELIVERABLES/MILESTONES
</lr>
</quadchrt>
<quadchrt>
<ul>
<head>TASK DESCRIPTION
<para>This task is responsible for the operation, control and
maintenance of the IBM Team STARS Repository. The repository supports
communications, collection of deliverables and access to reusable
components. Repository technology and components are developed in
```

task IR40 and made available in this task.
<performer>SAIC Clearwater
<begndate>4/19/89
<enddate>04/30/90

<ur>
<head>GOALS/PRODUCTS
<bullet>
<item>GOAL: Operate, maintain and control a repository sufficient to support the STARS project needs for information interchange and software reuse.
<item>PRODUCTS
<h2> An operational repository
<h2> Practical Aspects of Repository Operation (CDRL 1440)
</ur>
<ll>
<head>APPROACH/PROGRESS
<bullet>
<item>APPROACH
<h2> Maintain and upgrade the hardware resources procured during the Q-increment
<h2> Install, control and maintain the repository system and reusable components provided by IR40
<h2> Provide on-line access to all STARS Information.
<item>PROGRESS
<h2> AdaMat available for use
<h2> Operation procedures in place
<h2> NEWS V.5.8 operational w/msg exchange to Boeing Repos
<h2> ParseStation from Datalogics ordered for SGML
</ll>
<lr>
<head>DELIVERABLES/MILESTONES
</lr>
</quadchrt>
<masthead>STARS PMR: TECHNICAL
<slide>
<head>KEY ISSUES/CONCERNS - TECHNICAL
<bullet>
<item>Coordination among the primes and government on:
<h2>Position on Industry Standards
<h2>Consolidated Set of Guidelines
<h2>Coordination of Conference Participation
<item>Consolidated Five Year Plan
<slide>
<head>KEY ISSUES/CONCERNS - CONTRACTUAL
<bullet>
<item>Addition of new Subcontractors takes too long
<item>Frequency of Proposing New Work
<item>Planning information for S-Increment (and beyond)
<item>Repository Version 2.3 Operational
<item>Completed Development of Virtual Operation System Interface (VOSI)
<item>Presented Results of Phase II IQM15; Air Traffic Control IOM and

Lessons Learned

<item>Completed a Definition of Software-First Life Cycle using ETVX model
</briefing>
</verbatim>
</figure>

<appendix> <title>EXAMPLE SGML FILE</title>
<section> <title>SAMPLE BRIEFING OUTPUT</title>
<para>

The output from the STCS formatter using the Briefing Text Composition Specification is attached. The source of this material is the IBM PMR status report by Mr. W.D. Ceely and Mr. R.J. Drake presented at the quarterly PMR held February 1990 in Clearwater, FL. The contents of the source presentation have been reproduced using the Briefing DTD. It has been printed on a Postscript(tm) printer.

</appendix>
</rear>
</stars>

IR65: SGML Document Descriptions, Report DTD User's Guide

**Contract Data Requirement CDRL 1820, Type A005(B)
Contract No. F19628-88-D-0032**

Technical Report: Formatting Recommendations

2 April 1990

Prepared for:

**Electronic Systems Division (PKG-1)
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Hanscom AFB, MA 01731-5000**

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1. INTRODUCTION

This document describes the Report Document Type Definition (DTD) used with the Standard Generalized Markup Language (ISO 8879:1896). This document has been prepared by updating material from the "SAIC SGML/TCL Composition System (STCS) User's Guide" which was prepared for the Naval Research Laboratory under STARS Foundation contract N00014-87-C-2386 in November of 1988. The section in that document which described how to use the Report DTD was extracted and updated. The updates include describing the new element `<cmpr>` and updating the descriptions for `<chart>`, `<figure>`, and `<graphic>`.

2. WRITING A REPORT

This document provides all information necessary to mark up a report or manual. A section of this manual is provided with markup as an example in "Looking at a Manual".

2.1 THE REPORT ELEMENTS

The components of the document (called "elements") are described below.

Tagname	Occurrence*	Identity
report	1	report
I. front	0-1	front matter
A. titlepg	1	title page
+-1. title	0-N	title
2. docno	0-N	document number
-OR- 3. date	0-N	date
3. reldate	0-N	release date
4. author	0-N	author
+-5. address	0-N	address line
B. contents	0-1	table of contents
C. iluslist	0-1	list of illustrations
D. deflist	0-1	list of definitions
1. term	0-N	term
2. def	0-N	definition of term
II. bodym	1	main body
+- A. section	0-N	section
1. sectitle	0-1	section title
2. subbody	0-N	
+- a. head	0-N	heading
-OR- b. para	1-N	paragraph
c. bullet	0-N	sequential list
-OR- 1. item	1-N	item in list
d. seqlist	0-N	sequential (numbered) list
1. item	1-N	item in list
e. chart	0-N	chart
f. figure	0-N	figure
g. graphic	0-N	graphic
+- h. note	0-N	note
+- B. subbody (a-h above)	0-N	
III. rear	0-1	back matter
A. appendix	0-N	appendix
1. apdxtitl	1	appendix title
2. subbody (a-h above)	0-N	
B. deflist	0-1	list of definitions
1. term	0-N	term
2. def	0-N	definition of term
C. index	0-1	index

The following elements may appear anywhere text can occur within a document:

indxflag	0-N	index item
cmptr	0-N	Computer presentation

* Items listed as 0-N are not required and may be used as many times as desired. Items listed as 1 are required and may occur only once in a document. Items listed as 1-N are required and may be used as many times as desired.

Para element may contain the following subelements in addition to PCDATA: bullet, seqlist, chart, figure, graphic, note. No specific order or occurrence is required for these.

2.1.1 MAJOR ELEMENTS

2.1.1.1 REPORT

TAGS: <report> </report>
OCCURRENCE: Required

This element represents the report or manual to be marked up. It consists of front matter, a main body and optional back matter. Only a main body is required. The start-tag <report> is keyed first to open the document. After all text is keyed, the end-tag </report> closes the document. The tag <report> must be immediately followed by another start-tag, since there is no text associated with the document element.

2.1.1.2 FRONT

TAGS: <front> END TAG OPTIONAL
OCCURRENCE: Optional

This element represents the information that appears before the body of the document. The only required element in front matter is a title page. Optional elements include a table of contents, a list of illustrations and a glossary.

2.1.1.3 BODYM (Main Body)

TAGS: <bodym> END TAG OPTIONAL
OCCURRENCE: Required

The body matter includes the text of the report. It may be structured using either sections or

the material referred to as SUBBODY.

2.1.1.4 REAR

TAGS: <rear> END TAG OPTIONAL
OCCURRENCE: Optional

This element represents all information following the report body. All elements within back matter are optional, as is back matter itself. Available options include appendices, a glossary, and an index.

3. FRONT MATTER ELEMENTS

3.1 TITLEPG (Title Page)

TAGS: <titlepg> END TAG OPTIONAL
OCCURRENCE: Required

This element includes the information which is to appear on the title page of the report. This information may consist of a title of multiple lines and several optional items. These items include report number, current date, one or several authors, and multiple address lines. The title page element is valid only in the front matter element.

3.2 TITLE

TAGS: <title> END TAG OPTIONAL
OCCURRENCE: Optional, repeatable

This element represents the title of the document. It is valid only in the title page element. The title may consist of one or more title lines. The sequence of <title> title </title> is repeated for each line of the title.

3.3 DOCNO (Document Number)

TAGS: <docno> END TAG OPTIONAL
OCCURRENCE: Optional

This element represents the document number, code, or name. It is valid only in the title page element. The TCS formatter will print the document number across the top of each page of the document on the first line of the header.

3.4 DATE or RELDATE

TAGS: <date> END TAG MUST BE OMITTED
 <reldate> END TAG OPTIONAL
OCCURRENCE: Optional

There are two options for dating the report. Date represents the current date and is supplied by the system during TCS processing. No end tag is used for this element. Reldate marks a date that you enter and is used when you want to date a document on a given day rather than the date on which it is processed by TCS. The TCS formatter places the date or reldate as the second line of the page header, under the document number.

3.5 AUTHOR

TAGS: <author> END TAG OPTIONAL
OCCURRENCE: Optional, repeatable

The author element is valid only in the title page element. In the case of multiple authors, each author name must be tagged individually.

3.6 ADDRESS

TAGS: <address> END TAG OPTIONAL
OCCURRENCE: Optional, repeatable

The address element is valid only within the title page element. The sequence is repeated for each line of the address.

3.7 CONTENTS (Table of Contents)

TAGS: <contents> END TAG MUST BE OMITTED
OCCURRENCE: Optional

The table of contents is valid only in the front matter element. The start-tag causes the system to generate a listing of the titles and headings with their corresponding beginning page numbers. There is no end-tag because the table of contents is system-generated. The TCS formatter prints the Table of Contents at the end of the document; the page(s) must then be manually moved to follow the title page.

3.8 ILUSLIST (List of Illustrations)

TAGS: <iluslist> END TAG MUST BE OMITTED
OCCURRENCE: Optional

This element represents a listing of all figures and diagrams in the document. It is valid only in the front matter element. The start-tag <iluslist> causes the system to generate the list and insert it at the start-tag. There is no end-tag because this list is generated by the TCS. The TCS formatter prints the Illustration List at the end of the document the page(s) must then be manually moved to follow the title page and Table of Contents.

3.9 DEFLIST (List of Definitions)

TAGS: <deflist> </deflist>
OCCURRENCE: Optional, repeatable

This element represents a glossary. It is valid in the front matter and back matter. The start-tag <deflist> marks the placement of this element within the document. It is immediately followed by the start-tag for the element TERM. The end-tag </deflist> closes the list of definitions.

3.9.1 TERM

TAGS: <term> END TAG OPTIONAL
OCCURRENCE: Required within definition list

This element represents the term to be defined. It is only valid in the list of definitions element.

3.9.2 DEF (Definition)

TAGS: <def> END TAG OPTIONAL
OCCURRENCE: Required within definition list

This element represents the definition of the preceding term. It is only valid in the list of definitions element.

4. MAIN BODY ELEMENTS

4.1 SECTION

TAGS: <section> END TAG OPTIONAL
OCCURRENCE: Optional

The main body optionally contains sections. These sections consist of a section title and one paragraph. Any of the elements explained under SUBBODY also may be included in a section.

4.1.1 SECTITLE (Section Title)

TAGS: <sectitle> END TAG OPTIONAL
OCCURRENCE: Optional

The section title is the most general level of heading in a section. It is numbered as 1., 2., etc.

4.2 SUBBODY

The term SUBBODY is not an actual element and does not have a tagname. It is used in this manual to group the various elements which may appear in a document. These document elements may appear in any order and, except for the element paragraph, are optional. SUBBODY elements are found in the main body or within sections or paragraphs.

4.2.1 HEAD

TAGS: <head> END TAG OPTIONAL
OCCURRENCE: Optional, repeatable

This element is a subsection with a heading. It may be followed by one or more paragraphs or, optionally other elements described under SUBBODY. Subsection elements may be nested. The end-tag is required to maintain header level balance and permit header level nesting.

4.2.2 PARA (Paragraph)

TAGS: <para> END TAG OPTIONAL
OCCURRENCE: Required within main body and each section

The main body and each section must contain at least one paragraph. Any of the elements grouped within SUBBODY may be included in a paragraph with the exception of another

paragraph. The following sequence will enclose a bulleted list within a paragraph:

```
<para> This is the beginning of the paragraph.  
<bullet>  
<item> This is the first list item </item>  
<item> This is the second list item </item>  
<item> This is the third list item </item>  
</bullet>  
This is a continuation of the paragraph. The end-tag is optional for the  
paragraph and the item, but is required for the bulleted list.  
</para>
```

4.2.3 SEQLIST or BULLET (Numbered or Bullet List)

TAGS: <seqlist> </seqlist> OR
 <bullet> </bullet>
OCCURRENCE: Optional

Two types of sequential lists are defined. Each list consists of one of the tag sequences provided above and one or more items. The "seqlist" tags produce a numbered list, and the "bullet" tags produce a bulleted list.

4.2.3.1 ITEM

TAGS: <item> END TAG OPTIONAL
OCCURRENCE: Required in a Bullet or Seqlist

A sequential or bulleted list must include at least one item.

4.2.4 FIGURE

TAGS: <figure> </figure>
OCCURRENCE: Optional

This element represents text or a diagram that is to be embedded within the body. The content of a figure is text which is to be processed without formatting. If there is insufficient space remaining on the page, the system will start the figure on the next page. If the figure is larger than a page, it will start on a new page and use as many pages as required. A figure contains character data, i.e. entity references are not expanded. The TCS formatter outputs a figure in the Courier fixed spacing font when output is to a Postscript printer in order to retain column alignment of characters.

4.2.5 CHART

TAGS: <chart> </chart>
OCCURRENCE: Optional

This element represents text that is to be embedded within the body. A CHART is permitted to flow from one page to another. The text within CHART is not formatted by the system but reproduced as is. A chart is not entered in the illustration list. A chart may contain replaceable character data, i.e. entity references are expanded. The TCS formatter outputs a chart in the *Courier* fixed spacing font when output is to a Postscript printer in order to retain column alignment of characters.

4.2.6 GRAPHIC

TAGS: <graphic> END TAG MUST BE OMITTED
OCCURRENCE: Optional
ATTRIBUTES: xrefid Quoted Text of Figure Name for Illustration List

This element will cause a full blank page to be left in the document for replacement with a full-page diagram or external material. The start-tag <graphic> is used with the attribute xrefid to provide optional reference text for the illustration list. If no attribute is provided, no illustration list entry will be created. The tag is used as: <graphic xrefid="Engine Assembly Exploded View">.

4.2.7 NOTE

TAGS: <note> END TAG OPTIONAL
OCCURRENCE: Optional

This element represents material that is to be set off from the remainder of the text with the attention-grabber "NOTE:".

5. BACK MATTER ELEMENTS

5.1 APPENDIX

TAGS: <appendix> </appendix>
OCCURRENCE: Optional, valid only in back matter

One or more appendices may be included in the document. The start-tag <appendix> is followed by the start-tag for the appendix title. The body of the appendix can contain any of the elements explained under the topic SUBBODY.

5.1.1 APDXTITL (Appendix Title)

TAGS: <apdxtitl> </apdxtitl>
OCCURRENCE: Required within appendix

The start-tag <apdxtitl> is followed by the appendix title and the end-tag </apdxtitl>.

5.2 INDEX

TAGS: <index> END TAG NOT SIGNIFICANT
OCCURRENCE: Optional

This element is valid only in the back matter element. The start-tag <index> causes the system to generate an index of all marked phrases. There is no end-tag since the index is system-generated and includes items flagged in the report by the author.

6. UNIVERSAL ELEMENTS

6.1 INDXFLAG (Indexed Item)

TAGS: <indxflag> </indxflag>
OCCURRENCE: Optional

Words or phrases in any section or element of text can be flagged for inclusion in the index. You must flag every occurrence of every item you want to be indexed. This tag may appear anywhere that text may appear.

6.2 CMPTR

TAGS: <cmptr> </cmptr>
OCCURRENCE: Optional

This tag is used to alter the font of included text to indicate that the text quotes input to or output from a computer. This allows a report to delineate to the reader where text represents a computer key, a verbatim computer command, or a quote from a computer. This tag may appear anywhere that text may appear. For example:

```
<para>When you are first given your user i.d., a default system password
will be assigned to you. This password should be changed by issuing the
<cmptr>SET PASSWORD</cmptr> command. The system will prompt you to enter
your old password. You should type in the old password. Press the
<cmptr><return></cmptr> key after you have entered the old password.
```

The TCS formatter prints the content of this element in the `Courier` font on Postscript printers to distinguish it from surrounding text.

7. LOOKING AT A MANUAL

The following sample is a section of this manual with SGML Report markup. Note that this markup example would remain unchanged regardless of formatting changes. This enables the author to mark up a document once, yet print various versions of it. Although this is a very simple example, you can see the relationship between this marked up section and the formatted FRONT MATTER ELEMENTS section.

```
<section>
<sectitle> FRONT MATTER ELEMENTS
<head> TITLEPG (Title Page)
<figure>
TAGS:          <titlepg>          END TAG OPTIONAL
OCCURRENCE:    Required
</figure>
<para> This element includes the information which is to appear on the title
page of the report. This information may consist of a title of multiple
lines and several optional items. These items include report number, current
date, one or several authors, and multiple address lines.
The title page element is valid only in the front matter element.</para>
</head>
<head> TITLE
<figure>
TAGS:          <title>            END TAG OPTIONAL
OCCURRENCE:    Optional, repeatable
</figure>
<para>This element represents the title of the document.
It is valid only in the title page element.
The title may consist of one or more title lines.
The sequence of <title> title </title> is repeated for
each line of the title.</para>
</head>
<head> DOCNO (Document Number)
<figure>
TAGS:          <docno>          END TAG OPTIONAL
OCCURRENCE:    Optional
</figure>
<para> This element represents the document number, code, or name.
It is valid only in the title page element.
The TCS formatter will print the document number across the top of each
page of the document on the first line of the header.
</para>
</head>
<head> DATE or RELDATE
<figure>
TAGS:          <date>            END TAG MUST BE OMITTED
               <reldate>        END TAG OPTIONAL
OCCURRENCE:    Optional
</figure>
<para>
There are two options for dating the report. Date represents the current
date and is supplied by the system during TCS processing. No end tag is used
for this element. Reldate marks a date that you enter and is used when
```

you want to date a document on a given day rather than the date on which it is processed by TCS.

The TCS formatter places the date or reldate as the second line of the page header, under the document number.

</head>

<head> AUTHOR

<figure>

TAGS: <author> END TAG OPTIONAL

OCCURRENCE: Optional, repeatable

</figure>

<para>

The author element is valid only in the title page element.

In the case of multiple authors, each author name must be tagged individually.

</para>

</head>

<head> ADDRESS

<figure>

TAGS: <address> END TAG OPTIONAL

OCCURRENCE: Optional, repeatable

</figure>

<para>

The address element is valid only within the title page element.

The sequence is repeated for each line of the address. </para>

</head>

<head> CONTENTS (Table of Contents)

<figure>

TAGS: <contents> END TAG MUST BE OMITTED

OCCURRENCE: Optional

</figure>

<para>

The table of contents is valid only in the front matter element.

The start-tag causes the system to generate a listing of the titles and headings with their corresponding beginning page numbers.

There is no end-tag because the table of contents is system-generated.

The TCS formatter prints the Table of Contents at the end of the document; the page(s) must then be manually moved to follow the title page.

</head>

<head> ILUSLIST (List of Illustrations)

<Figure>

TAGS: <iluslist> END TAG MUST BE OMITTED

OCCURRENCE: Optional

</figure>

<para>

This element represents a listing of all figures and diagrams in the document. It is valid only in the front matter element. The start-tag

<iluslist> causes the system to generate the list and insert it at the start-tag. There is no end-tag because this list is generated by the TCS.

The TCS formatter prints the Illustration List at the end of the document; the page(s) must then be manually moved to follow the title page and Table of Contents.

</head>

<head> DEFLIST (List of Definitions)

<figure>

TAGS: <deflist> </deflist>

OCCURRENCE: Optional, repeatable

</figure>

<para>

This element represents a glossary. It is valid in the front matter and back matter. The start-tag <deflist> marks the placement of this element within the document. It is immediately followed by the start-tag for the element TERM. The end-tag </deflist> closes the list of definitions.

<head> TERM

<figure>

TAGS: <term> END TAG OPTIONAL

OCCURRENCE: Required within definition list

</figure>

<para>

This element represents the term to be defined. It is only valid in the list of definitions element.

</head>

<head> DEF (Definition)

<figure>

TAGS: <def> END TAG OPTIONAL

OCCURRENCE: Required within definition list

</figure>

<para>This element represents the definition of the preceding term. It is only valid in the list of definitions element.

</head>

</head>

</section>

APPENDIX A.

APPENDIX: TAG QUICK GUIDE

START TAG -----	END TAG -----	IDENTITY -----
<address>	</address>*	Address
<apdxtitl>	</apdxtitl>	Appendix title
<appendix>	</appendix>	Appendix
<author>	</author>*	Author
<bodym>	</bodym>*	Body matter
<bullet>	</bullet>	Sequential list
<chart>	</chart>	Chart
<contents>#		Generated table of contents
<cmptr>	</cmptr>	Computer Key representation
<date>#		System-generated (current) date
<def>	</def>*	Definition
<deflist>	</deflist>	Definition List
<docno>	</docno>*	Document number
<figure>	</figure>	Figure
<front>	</front>*	Front matter
<graphic>	</graphic>*	Graphic
<head>	</head>*	Headed subsection
<iluslist>#		Generated list of illustrations
<index>#		Generated index
<indxflag>	</indxflag>	Index flag
<item>	</item>*	Sequential list
<note>	</note>*	Note
<para>	</para>*	Paragraph
<rear>	</rear>*	Rear matter
<reldate>	</reldate>*	Date provided by author
<report>	</report>	Report document
<section>	</section>*	Section
<sectitle>	</sectitle>*	Section title
<seqlist>	</seqlist>	Sequential list
<term>	</term>*	Term to be defined
<title>	</title>*	Title
<titlepg>	</titlepg>*	Title page

* End-Tags are optional.

End-Tags must be omitted.

STARS Program Management Review

February 22, 1990

W.D. Ceely and R.J. Drake

IBM

**800 North Frederick Pike
Gaithersburg, MD 20879**

STARS PMR: TECHNICAL

TECHNICAL PROGRAM REVIEW

- o Technical Overview, Goals, Products, Task Summaries - Dick Drake
- o Management Task Summary, Status Summary, Concerns and Special Achievements - Dave Ceely

STARS PMR: TECHNICAL

PROGRAM OVERVIEW - 5 YEAR STRATEGY

o BACKGROUND

Each prime provided 5 Year Strategy as part of original proposal

Each prime awarded Task Q6.1: Consolidated Five Year Strategy

Joint working sessions conducted to develop plan/presentation to DARPA
(8/88 - 9/88)

Presentation made to DARPA on September 9, 1988

Results documented in STARS Consolidated Technical Development Plan
(CDRL 0070). Produced by IBM and coordinated with Government, Boeing
and Unisys.

R-Increment update of Consolidated Plan rescheduled to adjust to
re-orientation of STARS program

Revised Consolidated Five year Plan being developed jointly by the three
primes and government

PROGRAM OVERVIEW - 5 YEAR STRATEGY (continued)

o GOALS

Improve Productivity

Improve Quality and Reliability

Promote Development and Application of Reusable Software

Reduce Time of Development

Reduce Cost of Development

PROGRAM OVERVIEW - 5 YEAR STRATEGY (continued)

o PRODUCTS AT END OF 5 YEARS

Three commercially viable, competitive SEE's

Six service applications fully developed on SEE's

Critical-mass marketplace for CASE tool developers

U.S. leadership in CASE marketplace

Complementary advances in software process, methods, and metrics

Widely used DoD software component repository

STARS PMR: TECHNICAL

R-INCREMENT OVERVIEW

o Goals

Provide the Most Useful Ada Repository in U.S.

Achieve public access

Get ready to transfer the technology outside of STARS

Promote value-added use of STARS products

First step toward a National Asset Repository

Establish reuse infrastructure

Define the Software First Life-Cycle

Establish a Generic S/W Engineering Environment Framework

Implement Breakthrough Initiative

R-INCREMENT OVERVIEW (continued)

o Products

Consolidated Five Year Plan (IR00)

Portable Environment Framework Virtual Interfaces (IR20)

Application Blueprint for a Generic SEE and Domain Analysis for C3 (IR20)

Repository and reuse Guidelines (IR40, IR10, IR11)

Enhanced Repository Capability (IR40)

Reusable Components (IR40)

Workstation CAI Capability and Components (IR68)

Policies and Procedures to Support an Open Repository (IR11)

Operational STARS Repository (IR10)

Methodology for STARS Structured Specification Development (IQM15)

Software-First CDRL/DID Definition (IR66)

Software-First Life Cycle (SFLC) Definition (IQ15)

R-INCREMENT OVERVIEW (continued)

- o Products (continued)
 - STARS Orientation Workshop (IR63)
 - Cleanroom Methodology for Component Certification (IR70)
 - Document Type Definition (DTDs) for Common STARS Documents (IR65)
 - SQL/Ada Programmed Language Interface (IR67)
 - Breakthrough Center Documentation Inventory/Library System (IR83)

STARS PMR: TECHNICAL

R-INCREMENT MAP TO 5 YEAR STRATEGY

o ENVIRONMENT

Application Blueprint for a generic SEE

Domain Analysis for C3 Application Blueprint

Portable Environment Framework

o PROCESS

Methodology for STARS Structured Specification Development

Preliminary Definition of the Software First Lifecycle

Preliminary Definition of Software First Lifecycle Object

Prototype Process Manager

STARS Orientation Workshop

STARS PMR: TECHNICAL

R-INCREMENT MAP TO 5 YEAR STRATEGY

o REUSE

Most Useful Ada Repository in U.S.

Facet-based Search/Retrieval

Filtered/Organized Reusable Components in the SEE Domain

Policies and Procedures to Support an Open Repository

Methodology for Component Reliability Certification

TASK DESCRIPTION

This task is responsible for the development, integration, and evaluation of the IBM STARS Software Engineering Environment. Initial emphasis placed on the development of certain parts of the SEE framework. This task will develop the Application Blueprint theory, which envisions a generic architecture for the construction of software solutions.

SAIC Clearwater, IBM Gaithersburg

4/19/89 - 04/13/90

GOALS/PRODUCTS

- o GOAL: Develop a portable, adaptable Software Engineering Framework
- o PRODUCTS
 - Application Blueprints: CDRL's 1480 and 1490
 - Virtual Operating System Interface: CDRL 1500
 - User Interface: CDRL 1510
 - VOSI Ada Command Environment: CDRL 1520

APPROACH/PROGRESS

- o APPROACH
 - Write a Virtual Operating Sys. Interface (VOSI) as a subset of the CAIS (DoD-STD-1830)
 - Divide the User Interface Into Panel Manager and Window Manager. Based on IBM CUA.
 - Use Unisys ACE for VOSI Ada Cmd Env
- o PROGRESS
 - Completed Application Blueprint theory
 - Completed Implementation of VOSI for VAX/VMS.
 - Implementation for IBM PC/PC-DOS in test.
 - Completed draft spec of Panel Mgr. Began implementation of Window Mgr for VAX/VMS.

DELIVERABLES/MILESTONES

TASK DESCRIPTION

This task will provide for enhancements to the Q increment IBM STARS repository, additions to the set of components in the repository, and consolidation of related guidelines. The three key products, guidebook, components, and capabilities, will together establish a fully operational prototype Ada reuse repository that will support the STARS program and potentially other DoD software development projects.

IBM, SAIC

4/19/89 - 04/13/90

GOALS/PRODUCTS

- o GOAL: Create the most useful Ada repository in the US
- o PRODUCTS
 - Repository Guidebook (1550)
 - Repository Components (1560)
 - Repository Capabilities (1600)

APPROACH/PROGRESS

- o APPROACH
 - Develop policies and procedure for repository
 - Provide enhancements to the repository system
 - Gather and refine reusable components
- o PROGRESS
 - IBM STARS Team Repository V2.3 available - third major prototype during R-increment
 - Work continuing on port to VOSI and final Guidebook
 - Component content growth proving to be difficult task

DELIVERABLES/MILESTONES

TASK DESCRIPTION

This task is responsible for the operation, control and maintenance of the IBM Team STARS Repository. The repository supports communications, collection of deliverables and access to reusable components. Repository technology and components are developed in task IR40 and made available in this task.

SAIC Clearwater

4/19/89 - 04/30/90

GOALS/PRODUCTS

- o GOAL: Operate, maintain and control a repository sufficient to support the STARS project needs for information interchange and software reuse.
- o PRODUCTS
 - An operational repository
 - Practical Aspects of Repository Operation (CDRL 1440)

APPROACH/PROGRESS

- o APPROACH
 - Maintain and upgrade the hardware resources procured during the Q-increment
 - Install, control and maintain the repository system and reusable components provided by IR40
 - Provide on-line access to all STARS Information.
- o PROGRESS
 - AdaMat available for use
 - Operation procedures in place
 - NEWS V.5.8 operational w/msg exchange to Boeing Repos
 - ParseStation from Datalogics ordered for SGML

DELIVERABLES/MILESTONES

STARS PMR: TECHNICAL

KEY ISSUES/CONCERNS - TECHNICAL

- o Coordination among the primes and government on:
 - Position on Industry Standards
 - Consolidated Set of Guidelines
 - Coordination of Conference Participation
- o Consolidated Five Year Plan

STARS PMR: TECHNICAL

KEY ISSUES/CONCERNS - CONTRACTUAL

- o Addition of new Subcontractors takes too long
- o Frequency of Proposing New Work
- o Planning information for S-Increment (and beyond)
- o Repository Version 2.3 Operational
- o Completed Development of Virtual Operation System Interface (VOSI)
- o Presented Results of Phase II IQM15; Air Traffic Control IOM and Lessons Learned
- o Completed a Definition of Software-First Life Cycle using ETVX model

Repository Technology

The Reuseability Library Framework

STARS Quarterly PMR in Clearwater

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Terms

- o Domain - loosely - a family of related systems that provide common functionality or have similar capabilities
- o Domain Analysis - process of capturing the essential objects and relationships between objects (Jim Neighbors)
- o Domain Model - the result of domain analysis

Domain Model

- o Is a special kind of knowledge base
- o Should go beyond static taxonomy (hierarchy)
e.g. should include domain heuristics
- o Should be machine processable
- o Representation should support model evolution
- o In the limit, can lead to system generation through a domain language
- o Must be considered from several points of view

Why Domain Specific Libraries

- o Historical experience: successful libraries are focused
- o Domain-specific libraries will have highest productivity impact
 - Greater proportion of a typical application built from library parts
 - Can yield closer functional fit an efficiency
- o Reuseable sub-systems designed via selection and configuration
- o Wide-spectrum reuse easier to support
 - reuse components other than code such as requirements and tests

RLF Linrarian Motivation

- o Need effective ways of representing components for automated retrieval, insertion and qualification
- o Fixed classification schemes are unnecessarily limiting
 - Library organization will evolve with use
 - Important semantic attributes are domain dependent
- o A knowledge-based approach provides features unavailable with other approaches

A Knowledge-Based Approach

- o Recognizes that software development is knowledge intensive
- o Captures project-specific knowledge in "intelligent" project "information base"
- o Specific advantages of a KB approach:
 - same KB (or portion) can be multiple applications
 - Application can be strengthened by enriching KB
 - KB maintained separately from client applications

Relationship to other Technologies

- o Increased representation power
 - inheritance of properties
 - support for union and intersection of domains as well as subdomains
- o Expanded interaction methods
 - supports query interaction as well as guided browsing
- o User need not become expert in classification scheme
 - supports users of varying roles and activities
 - system adapts to user (not vice versa)

RLF Librarian Features

- o component retrieval and classification
interactive search through library taxonomy supported underlying domain model
- o simple browsing through component taxonomy
focused guidance at choice points in taxonomy
domain model exists independently of the library components themselves
- o component qualification and insertion
classify part against existing base of components using domain model
identify overlap and insure consistency
use Gadfly to support qualification

RLF Architecture

Librarian Architecture

Knowledge Representation Systems

- o AdaKNET: Semantic Network System
- o AdaTAU: Rule-based Inference System
- o Combined and coordinated instances of AdaKNET and AdaTAU form hybrid knowledge-representation systems
- o Both AdaKNET and AdaTAU designed from an Ada perspective
 - architectures as Ada abstractions
 - knowledge representation schemes as abstract data types
 - focus on objects and operations, not knowledge representation
 - separation of procedural and declarative knowledge

Role of AdaKNET in Librarians

- o Taxonomical structure for the domain
 - Provides multiple access paths to components
 - Inheritance provides economical descriptive power
 - Attribute information holds for all lower levels in the taxonomy
 - Distinguishing information is localized
 - Segregates rule bases into localized fragments
- o Coceptual Atrributes
 - Promote modeling of composite pieces of software
 - Can allow DB-like retrieval
 - Allow representation of incompletely specified components such as generics and generated components

Sample Domain Model Fragment

Role of AdaTAU in Librarians

- o Browsing Advice
 - Provide information not readily captured by network
 - Focus on information onscurred by the network
 - Focus on important characteristics of a component
- o Support Component addition
- o Support Component qualification

Librarian Evolution

- o Factoring into constructive/generative components will evolve over lifetime of repository
 - Splitting single components into variants
 - Consolidating separate components into part generator
 - Generators as declarative envelopes to libraries of static components
 - Adding sub-system level components
- o Different techniques of reuse appropriate to different domains
- o Implications for framework technology
- o Uniform view of static and generated parts
- o easily extensible domain model

Active Librarian

Domain-Specific Environment