

IEEE SCC20 Diagnostic and Maintenance Control Subcommittee
05-A Meeting
Lockheed-Martin, Orlando, FL
January 11-13, 2005

Meeting Minutes

Approved Agenda

Tuesday, January 11, 2005

- Call to Order
- Approval of Agenda
- Reports
 - Chair's Report
 - Secretary's Report
 - Liaison Reports
- AI-ESTATE Amendment
 - Bayesian Model Discussion
 - Work on Initial Draft
 - Model Corrections
 - XML Schema Review/Development
 - XML Service-Related Discussion

Wednesday, January 12, 2005

- Test Description Joint Meeting
- SIMICA Discussions
 - SIMICA Architecture and Document Structure/Content
 - "Closed Loop Diagnostics" Discussion
 - Data Element/Data Source Review
 - Review False Alarm Annex
 - Work on Information Model
- Test Results P1636.1 Standard
 - Discuss Use Cases
 - Draft Requirements Document
 - Information Model
 - Role of Common
 - Role Relative to SIMICA
 - Prepare for Ballot as Trial Use Standard

Thursday, January 13, 2005

- Final Discussions on All Topics
- Review Old Action Items
- Review New Action Items
- Set Time and Location of 05-B Meeting
- Set Agenda for 05-B Meeting
- Adjourn

Daily Meeting Notes

Day 1: Tuesday, 11 January 2005

Attendees are shown below.

Co-Chair Tim Wilmering called the meeting to order at 9:30 am.

Immediately following the call to order, those present introduced themselves and explained their roles within the DMC.

1.1 Agenda Review

The 05A agenda was reviewed and accepted as modified.

1.2 Chair's Report

P1636.1 PAR has been submitted to the standards board for action at their March meeting. The 1522 standard has been approved and is awaiting assignment of an IEEE Project Editor.

1.3 Secretary's Report

The action items and open issues were reviewed. The minutes were reviewed and approved.

1.4 Liaison Reports

A discussion was held on the relationship between DMC discussions and OSA-CBM. Tom Hoop agreed to make a presentation on the MIMOSA-EAI work at the next CONUS meeting.

Mukund Modi was appointed as the ARI liaison. He will make his first report at the 05-B meeting.

John Sheppard provided a CS liaison report that explained the five mandatory principles of the IEEE and related an issue discussed at the CS SAB level on perceived violation of process.

1.5 AI-ESTATE Amendment

We started discussion of the initial draft (0.2) of the amendment, provided by Pat Kalgren. In the initial discussion, a question was raised as to whether the requirements need to be incorporated into the amendment.

Discussion moved to whether to put the XML schemas in the body of the amendment or as a normative annex. One of the issues relates to the magnitude of material being included (especially if all material from XMLSpy is included). It was determined that the XML schemata will be in one (or more) normative annex. The output from XMLSpy will be provided in one (or more) separate normative annex. This annex will also provide an explicit mapping between the XML and the EXPRESS models. The current informative annex B will be modified to include an overview of the mapping approach between XML and EXPRESS.

On the subject of extensibility, the question was raised whether a need for a formal extensibility mechanism is required on the XML schemas. It was agreed that the AI-ESTATE schemata need to be adapted to work with the EXTEND_SCHEMA concept, and appropriate language included

in clause 4.4. The extension mechanism using `##other` in XML was presented. It was pointed out that this is similar to the “arbitrary attribute” of AI-ESTATE ten years ago.

1.6 SIMICA/Test Results

Discussion began by reviewing the need for a requirements document and then charged forward into a discussion on information model. No resolution came from the Tuesday discussion.

Day 2: Wednesday, 12 January 2005

2.1 SIMICA

Discussion commenced on the SIMICA standard, initially centering on orientation and presentation of the PAR.

Tim and John presented high-level views of the maturation domain. Joe Stanco then presented a detailed activity model of the Navy product life cycle and support process. He then proceeded to present a discussion of the major data elements used by the Navy.

The meeting split where several people went into the TII meeting to discuss the role of test description. In parallel, the SIMICA discussion continued with presentation of maintenance information from Lockheed for general maturation. This is based on a use case from JSF. The information will be folded into the model developed by Joe Stanco and Mukund Modi. Michelle Harris also indicated she will be talking with her reasoner people to obtain information needed for closed-loop diagnosis.

Mukund Modi gave a presentation on his work developing a methodology and mechanism for collecting and using data required to support an aircraft over its life cycle. Concern was raised about whether the data presented serves as adequate representation of the domain being represented. It was believed that a complete mapping of the sources of the data is required.

The opinion was expressed that since no member of the committee is a subject matter expert on the data collected, full review of the data elements by the committee is required. This is necessary to determine the correctness of the data definitions. A concern was raised that this would require an inordinate amount of time.

2.2 AI-ESTATE (WSDL Discussion)

Oscar Fandino presented work performed on using WSDL for implementing 1232 services. A comparison was made between explicitly typed services (by entity type) versus a more generic approach in which the type is cast. On one entity (`diagnostic_model`), the former approach required 28 services where the latter only required 4. It was pointed out that the workload would be shifted from client to server when going from the former to the latter; however, the interface would be more adaptable/extensible (i.e., can be used with `EXTEND_schema` elements).

Day 3: Thursday, 13 January 2005

3.1 Administrivia

The agenda, action items, and roadmap were reviewed and updated.

3.2 Bayes Model

A brief presentation of the Bayes model was given by John Sheppard.

3.3 Adjournment

The meeting adjourned at 9:30 am.

Action Item Summary

Old Action Items

Action Item 03C-2: Bill Gerstein will update his presentation on the flow of information through the diagnostic process and the role of diagnostic/diagnosability standards in that process (see 2.1 from the 03C minutes).

Status: OPEN, complete but to be presented at 05-B meeting.

Action Item 04A-3: Eric Gould will explore issues of representing constraints in XML Schema and will provide a presentation on findings with a recommendation at the 04-B meeting. This review will include a closer look at the advantages and disadvantages of Part 28 for this task.

Status: OPEN, Identify person for reassignment.

Action Item 04A-4: Mark Kaufman will put together a formal presentation on the missile diagnostic maturation use case that he presented informally at the 04-A meeting.

Status: OPEN

Action Item 04B-4: Mike Bodkin to enumerate data elements to be collected relative to observations/symptoms and maintenance metrics. See 1.8 of 04-B minutes. Due to Tim Wilmering: 5/17/04

Status: OPEN, Reassigned to Michelle Harris

Action 04C-1: Tim Davis assigned action to extract data elements from NALCOMIS to determine overlap with the SIMICA data dictionary. (Provide to Tim Wilmering)

Status: OPEN, reassigned to Mukund Modi. Initial drafts in. AI ongoing.

Action 04C-2: T. Wilmering to get MOQS/NALDA data dictionary or glossary.

Status: OPEN

Action 04C-3: Joe Stanco assigned to work with Tim Wilmering in compiling SIMICA data dictionary. This needs to be completed by November 1, 2004.

Status: OPEN, Mukund Modi also assisting.

Action 04C-4: Mike Seavey to obtain G-ARMY data dictionary. (Provide to Tim Wilmering)

Status: OPEN

Action 04C-5: John Ralph to develop a presentation on a possible WSDL implementation of the AI-ESTATE Services definition.

Status: CLOSED

Action 04D-1: Pat Kalgren will create an initial draft of the 1232 amendment.

Status: CLOSED

Action 04D-2: Joe Stanco will provide information/guidance to Pat Kalgren on format for IEEE Standard Amendments.

Status: CLOSED

Action 04D-3: Mark Kaufman will provide a copy of the recirculation version of P1522 to Pat Kalgren and John Sheppard. John will make sure that version is posted to the private area of the web site.

Status: OPEN

Action 04D-4: Pat Kalgren to add language concerning the distinction between tests, test groups, and test sequences in the amendment. Draft language can be found in 1.6.1 in the 04-D minutes.

Status: OPEN

Action 04D-5: John Sheppard will contact QSI about them providing a prototype implementation of either the DIM or EDIM (i.e., an instance document walking through a real but small example). This example should be in XML using the XML schema generated by the committee.

Status: OPEN

New Action Items

Action 05A-1: Pat Kalgren to investigate whether amendments must include a clause on requirements (cf. P1232a/D0.1/C1.3).

Status: OPEN

Action 05A-2: John Ralph or Tim Davis will investigate issue of addressing the extensibility mechanism described in Clause 4.4 of IEEE Std 1232-2002.

Status: OPEN

Action 05A-3: Tim Davis and Pat Kalgren to develop a cross-reference between EXPRESS entities and XML entities.

Status: OPEN

Action 05A-4: Tim Davis and John Ralph to provide a description on how the XML schemata and EXPRESS models relate, including a brief description (or pointer) of XML (Annex B).

Status: OPEN

Action 05A-5: Tim Wilmering to provide words to accompany the cross-reference from 05A-3 describing how the XML exchange format is built on top of EXPRESS semantic models.

Status: OPEN

Action 05A-6: Subject to results of 05A-2, John Ralph to provide a description of the extension mechanism in ATML. John Sheppard to “harmonize” this description with the extension mechanism in AI-ESTATE.

Status: OPEN

Action 05A-7: Pat Kalgren (with John Sheppard) to prepare a proposal addressing the following issues:

- The failure rate entity in the CEM lacks any way to record a value for failure rate. Three options have been suggested: 1) restore the construct from 1232.1-1997, 2) create an attribute of failure rate tied to non-time-cost, or 3) create an attribute of failure rate tied to frequency.
- Change the action_count attribute of frequency to event_count.
- Although failure rate is an attribute of diagnosis (and therefore fault and failure), and we can get to repair item through fault and failure (via func), there is no explicit relationship between a repair item's failure rate (which is not specifiable in the model) and a diagnosis's failure rate (which is). A repair item's failure rate should be an aggregate of the failure rates of its constituent faults XOR failures.

Status: OPEN

Action 05A-8: Tim Wilmering and John Sheppard to expand the P1636 conceptual model to better represent a candidate information architecture for the P1636 base standard.

Status: OPEN

Action Item 05A-9: Mukund Modi and Joe Stanco to complete cut at their data item list to be provided to the data owners for review by March 15.

Status: OPEN

Action Item 05A-10: Data owners to review like-item groupings for correctness following receipt from Mukund Modi and Joe Stanco by April 1.

Status: OPEN

Action Item 05A-11: Mukund Modi and Joe Stanco to make any necessary modifications based on review conducted in 05A-10 and circulate to committee by April 15.

Status: OPEN

Action Item 05A-12: Keith Beard to meet with ARGCS data people to determine data requirements for “closed-loop diagnostics” and forward to Tim Wilmering for dissemination.

Status: OPEN

Action Item 05A-13: Keith Beard to obtain maturation data requirements for various Army programs and forward to Tim Wilmering for dissemination.

Status: OPEN

Action Item 05A-14: Michelle Harris to obtain data requirements for JSF “closed-loop diagnostics” stuff and forward to Tim Wilmering for dissemination.

Status: OPEN

Action Item 05A-15: Michelle Harris and Oscar Fandino to prototype WSDL service implementation to evaluate performance.

Status: OPEN

Action Item 05A-16: Tim Wilmering and John Ralph to draft requirements document for P1636.1.

Status: OPEN

Open Issue Summary

Current Issues

Issue 00B-1: There are no higher order services currently defined with respect to the static models. To aid in manipulation, analysis etc., of these models higher order services may be beneficial. For example the following service has been proposed by Qualtech.
get_test_outcome_from_diagnosis(diagnosis, set of test) Qualtech: Allows user to get the test outcomes predicted from the seeding of a particular diagnosis (fault). This corresponds to a lookup of the fault in the test-diagnosis (D-matrix) matrix. Additional Notes from 00C: The question has to be addressed as to the general applicability of the services from a standardization perspective. It would be of value to consider these services in the context of the 1522. In particular an annex to 1522 of AI-ESTATE services providing analyses and calculation of metrics might be of value. Additional Note from 05-A: It is possible some of this can be addressed as SIMICA is fleshed out.

The issue of where to address this needs to be decided.

Status: OPEN Medium Priority

Issue 01C-1: Testability metrics based on maintenance philosophy, such as Fault Resolution, can provide a means of validating predictive measures. At this point, the information models used to support definition of metrics in P1522 are insufficient to address maintenance philosophy – it is hoped that this deficiency can be addressed in the future through the creation of the SIMICA information model.

Moved to SIMICA,

Status: OPEN Medium Priority.

Issue 02A-1: Log # 335 – a draft version of the False Alarm Appendix (Annex) submittal contains several sections enumerating metrics for False Alarm and Assurance Tolerance. These metrics are to be considered for later inclusion in the standard – after we have formalized the definitions of False Alarm metrics.

Moved to SIMICA,

Status: OPEN Medium Priority

Issue 03C-1: Committee will investigate ISO STEP work in the area of using XML as an exchange format based on EXPRESS information models.

Status: OPEN High Priority

Issue 03C-2: Committee will examine STEP standards to determine if/how part identification is modeled relative to system indenture identification.

Status: OPEN Medium Priority

Issue 04A-1: Create a publicity document for dissemination on the DMC website and possible circulation that discusses the committee approach to standards for diagnostic maturation.

Status: OPEN High Priority

New Issues

Issue 05A-1: Need to revisit all definitions within the information models.

Status: OPEN Medium Priority

Recent Log Items

Items Logged at 04A

- #352 AI-ESTATE Semantics, XML Representation Issues, T. Wilmering
- #353 Draft 0 Common Element Model XML Schema, T. Davis
- #354 Why Diagnostic Maturation is Hard, T. Wilmering
- #355 Diagnostic Maturation Usage Scenario, J. Sheppard
- #356 Draft 0 Diagnostic Inference Model XML Schema, T. Davis
- #357 Draft 0 Enhanced Diagnostic Inference Model XML Schema, T. Davis

Items Logged at 04B

- #358 ATML Use Cases Presentation, M. Bodkin
- #359 Use Case Representation of the Environment where ATML will be utilized, M. Bodkin
- #360 Diagnostics and Prognostics Report, Alabama A&M University, T. Nunn and C. Pendleton
- #361 DMC Standards Roadmap, W. Gerstein
- #362 AI-ESTATE XML Schema Presentation, J. Ralph
- #363 Notes on Developing CEM XML Schema, J. Ralph
- #364 Draft 1 of Common Element Model XML Schema, J. Ralph
- #365 Draft 0.1 P1232a Amendment, DMC

Items Logged at 04C

- #366 Tony Alwardt (Boeing) Services presentation.
- #367 Draft 2 of Common Element Model XML Schema, J. Ralph
- #368 Draft 1 of Fault Tree Model XML Schema, I. Neag
- #369 Steve Cmiel SIMICA Data Element Submittal
- #370 Brit Frank SIMICA Data Element Submittal
- #371 Bill Gerstein SIMICA Data Element Submittal
- #372 Tim Wilmering SIMICA Data Element Submittal (FRACAS)
- #373 SIMICA Master Data Element List
- #374 SIMICA Combined Data Element List
- #375 1232 Bayesian Model Proposal

Items Logged at 04D

- #376 Revised CEM XML Schema
- #377 Revised DCM XML Schema
- #378 Revised DIM XML Schema
- #379 Revised EDIM XML Schema
- #380 Revised FTM XML Schema

Items Logged at 05A

- #381 CS Liaison Report (J. Sheppard) (1/13/05)
- #382 Bayes XML Schema (J. Ralph) (1/13/05)
- #383 Maintenance Process Model (J. Stanco) (1/13/05)
- #384 NAVAIR SIMICA Presentation (J. Stanco/M. Modi) (1/13/05)
- #385 NAVAIR Data Collection (J. Stanco/M. Modi) (1/13/05)
- #386 Navy/Army MAFs (J. Stanco/M. Modi) (1/13/05)

- #387 Navy O-I Process (J. Stanco/M. Modi) (1/13/05)
- #388 Navy O-I Data Flow (J. Stanco/M. Modi) (1/13/05)
- #389 Maturation Data Classes (J. Stanco/M. Modi) (1/13/05)
- #390 WSDL Presentation (O. Fandino) (1/13/05)
- #391 WSDL Example (O. Fandino) (1/13/05)
- #392 JSF Data Collection (M. Harris) (1/13/05)
- #393 Top Level P1636 Conceptual Model (J. Sheppard) (1/13/05)

Draft Agenda: 05-B Meeting

Day 1: Tuesday

- Call to Order
- Approval of Agenda
- Reports
 - Chair's Report
 - Secretary's Report
 - Liaison Reports (CS, I&M/AES, OSA-CBM)
- AI-ESTATE Amendment
 - XML Schema Review
 - XML Service Review
 - Extensions
 - Conformance
 - Review Pre-Final Draft

Day 2: Wednesday

- SIMICA Discussions
 - SIMICA Architecture and Document Structure/Content
 - "Closed Loop Diagnostics" Discussion
 - Data Element/Data Source Review
 - Review False Alarm Annex
 - Work on Information Model
- Review Test Results P1636.1 Draft
 - Discuss Use Cases
 - Approve Requirements Document
 - Information Model
 - Role of Common
 - Prepare for Ballot as Trial Use Standard

Day 3: Thursday

- Final Discussions on All Topics
- Review Old Action Items
- Review New Action Items
- Set Time and Location of 05-C Meeting
- Set Agenda for 05-C Meeting
- Adjourn

Committee Roadmap

Project	Task	Due Date
1232 Amendment	Model corrections	March 2005
	Final Draft	April 2005
	Commence Ballot	June 2005
	NBR	August 2005
	Recirculation	December 2005
	Standards Board Approval	March 2006
1636	Revised Information Model	April 2005
	Initial Architecture/Framework	April 2005
	Initial Draft	April 2005
	Review/Revise False Alarm Annex	April 2005
1636.1	Revised XML-Based Exchange Format	April 2005
	Initial Service Definitions and Descriptions	April 2005
	Information Model	April 2005
	Final Information Model	July 2005
	Full Draft Standard	July 2005
	Final Service Definitions and Descriptions	July 2005
	Final XML-Based Exchange Format	July 2005
	Conformance Section	April 2005
	Final Draft Standard	July 2005
	Commence Ballot	September 2005
	NBR	January 2006
	Recirculation	June 2006
	Standards Board Approval	September 2006

Meeting Attendees

Name	Address	Phone/Email
Sherif Abdelwahed	Institute for Software Integrated Systems Vanderbilt University Nashville, TN 37235	(615) 343-7555 sheriff.abdelwahed@vanderbilt.edu
Keith Beard	Northrop Grumman 1650 Research Drive Troy, MI 48083	(919) 656-1271 keith.beard@ngc.com
Tim Davis	NAVAIR Depot Jacksonville Code 4.8.4.4 6206 Aviation Avenue Jacksonville, FL 32221	(904) 317-1685 timothy.w.davis1@navy.mil
Oscar Fandino	LM STS 12506 Lake Underhill Road Orlando, FL 32825	(407) 306-4514 oscar.fandino@lmco.com
Bob Fox	NAVAIR Code 4.8.4.4 6206 Aviation Avenue Jacksonville, FL 32221	(904) 317-1713 foxrr@navair.navy.mil
Tom Gaudette	The Mathworks, Inc. 3 Apple Hill Drive Natick, MA 01760	(508) 647-7759 tom.gaudette@mathworks.com
Bill Gerstein	Hamilton Sundstrand 4747 Harrison Avenue PO Box 7002 Rockford, IL 61125-7002	(815) 226-3879 we.gerstein@hs.utc.com
Michelle Harris	LM STS 12506 Lake Underhill Road MP 827 Orlando, FL 32825	(407) 306-6693 michelle.l.harris@lmco.com
Tom Hoop	SAIC SED, Redstone Arsenal 6725 Odyssey Drive Mail Stop 7 Huntsville, AL 35806	(256) 876-1856 thomas.hoop@us.army.mil
Patrick Kalgren	Impact Technologies, LLC 2571 Park Center Blvd. State College, PA 16821	(814) 861-6273 patrick.kalgren@impact-tek.com
Jay Lindsey	US Army Redstone USARDECOM Attn: AMSRD-ARM-SG-AT-TPS Huntsville, AL 35898-0001	(256) 313-1262 jay.lindsey@us.army.mil

Name	Address	Phone/Email
Mike Malopolski	Northrop Grumman 1650 Research Drive Troy, MI 48083	(248) 536-3932 mike.malopolski@ngc.com
David Mills	DRS TEM PO Box 1929 Huntsville, AL 35807	(256) 895-2212 dmills@drs-tem.com
Mukund Modi	Naval Air Warfare Center ATE SW Center Bldg 551-1, Code 4.8.3.1 Lakehurst, NJ 08733	(732) 323-7002 mukund.modi@navy.mil
Cedric Pendleton	US Army Redstone 2050 Lakefront Drive 1712 Huntsville, AL 35824	(256) 876-7863 cedric.pendleton@us.army.mil
John Ralph	Northrop Grumman 7065 Samuel Morris Drive Columbia, MD 21046	(410) 953-7391 john.ralph@ngc.com
John Sheppard	ARINC 2551 Riva Road Annapolis, MD 21401	(410) 266-2099 jsheppar@arinc.com
Joe Stanco	SSAI (LKE) 7 Whitaker Drive Toms River, NJ 08757	(732) 323-4520 jstanco@ssai.org
Tim Wilmering	Boeing PO Box 516 M/C 5106-3075 St. Louis, MO 63166-0516	(314) 234-6781 timothy.j.wilmering@boeing.com