

SAE Architecture Analysis and Design Language

AS-2C AADL Subcommittee Meeting

May 14-17, 2018

Pittsburgh, PA, USA

Upcoming SAE/AADL Meetings

Spring 2018– SEI Pittsburgh, May 14-17

Fall 2018 – SAE London, Nov 6-8, Aerospace Systems and Technology Conference, (ASTC). Paper submission deadline May 20.

Winter 2019 - 3rd week of Feb 2019 (18-21) Georgia Tech

Spring 2019 – May Europe - Frederic Mallet has been interested in providing for the AADL meeting north of Nice (Sophia Antipolis) or June 10-14 week before Paris airshow.

Fall 2019 - Sept-Oct US - Typical time for S-18, Embedded Systems Week?, could coordinate with.

Winter 2020 – Jan 2020 ERTSS Toulouse

AS5506 AADL Standard Status

- SAE standard AS5506 Architecture Analysis & Design Language published.
 - Nov, 2004.
 - Jan, 2009 . V2.0 Published w Graphics Annex
<http://www.sae.org/technical/standards/AS5506A>
 - SAE V2.1 AS5506B, Published, Sept 2012
 - SAE V2.2 AS5506C, Ballot completed, Published Jan 21, 2017
- SAE Annexes AS5506/1, June 2006. Includes Annexes for Graphics, Ada & C Programming Guidelines, Error Modeling, Meta Model
- SAE Annexes AS5506/2, January 2011. Includes:
 - Behavior Annex, Data Annex, ARINC 653 Annex.
- AS5506/1A, Published, Sept 2015 – Annex A: ARINC653 Annex, Annex C: Code Generation Annex, Annex E: Error Model Annex
- AS5506/2A - Behavior Annex, published Aug 2017

AS5506 AADL Standard Roadmap

- We now have permission to have separate annexes and they will be bundled to make them more affordable. The annexes could be a bundle.
- Behavior Annex is 2A. Next version of BA=>SAE AS5506/2B.
- Network Annex near ready 3A – [informal ballot for Sept 2018?](#)
- FACE Annex 4A
- Security next – 5A? [May 2019?](#)
- Update AADL Core to V3.0 AS5506D - Upward compatibility needed with translator, if downward compatibility possible, should consider. Needs to be stable as well with translator from 2C, both maintained for a while. [Jun 2019](#)
- [ARINC 653 Annex, will depend on AADL V3 multi-core, 6A](#)
- Data Annex is waiting for AADL V3, 7A, depends on units,
- Code Generation Annex after AADL V3, depends on runtime also, would be 8A
- Updated EMV3 with integration with Behavior Annex (cross dependency)
[Now have internal features between annexes. Need example to show how to them. Example could be an AIR.](#)
[Better logic expressions, type product revision](#)
[Whalen: Safety Annex \(less verbose than EMV2\)](#)
- Formal Behavior – update to 2B: semantics, connection to runtime services,
[Exception handling in Behavior Annex](#)
- [Upgrade to runtime services now, is that against 2.2 creating 2.3 or 3.0.](#)
- [Workflow Guidance Document for use of AADL. AIE. Need volunteer.](#)

AADL WG Activities

Requirements Annex to become Assurance Annex (50% ?) => Peter has textual and assurance case capability in OSATE, planning to combine with Requirements Annex. Post V3.

- Constraints (Analysis) Annex (50% ?) - (Open Lead) First draft provided but not enough consensus to carry forward. Includes OSATE compatible toolset to specify. Should we invite/adopt Resolute?
- Behavior Annex (100%) (Etienne, Pierre D, Jean Pierre, Brian Larson). Completed. Next phase formal annotations (**behavior constraints**) sub annex. (EB, JP, BL) after study of runtime services.
- Network Annex – (90%)(Alexey ...). Next draft by Sept for informal?.
- ARINC 653 Update to new ARINC for Multi-Core with Part 2 and 4. Update when multi-core expression standard ready. Steve Vestal, Alexey?
- Data Annex (95%) and Code Generation Annex (Jerome) => Some work on Data annex and experiments with code generator needed to finalize. Reviewing runtime services this meeting and current issues.
- Security Annex (35%)– Dave Gluch .

AADL Annexes Being Developed and Brought to Committee

- Some annexes should be published, some will be developer provided and widely used without publication as part of the standard.
- [FACE Annex proposed by Steve Vestal, 2nd draft provided](#). Could be AIR document plus properties in an Annex.
- [Jerome suggested other AIRs](#). Safety AIR 4754 and 4761, integration with system engineering. AIR by S18 AADL equivalent. Paper by SEI on safety could be converted to an AIR.
- Hybrid Annex – On hold as we consider need. Need the interface from world to system. Interface to Modelica. Brendan and Brian discussing. May be better to have something like the code generation annex. Ties to time domain.
- STPA and AADL – tremendous opportunity from EMV up and down abstraction levels. Related to Security annex. Brendan Hall.
- Exploring FMI wrapper for AADL. OCARINA will have an FMI export. Adds an additional cyber-physical analysis approach. [May lead to annex](#). FMI also being worked by Ellidiss. Jerome Hugues.
- Synchronous Systems - Jean Pierre, Fredrick Mallet – considering how continuous time can be added (“Hybrid annex”, FMI) . Fredrick willing to sponsor meeting at his University in France. 2018?
- Rockwell? – need behavior side of the constraints annex. Industrial experiments with AGREE and Resolute continuing.

Tutorials for User Support

- Tutorials to date: BLESS (Fort Lauderdale), STOOD (Orlando), Paris (ASIIST), Toulouse (Compass), Toulouse (TASTE), Minneapolis (FUSED), Valencia (RDALITE), Jacksonville (BLESS Isolette), Montreal (MASIW), Santa Barbara (AADL Inspector 1.3), Orlando (OSATE Safety), Valencia (TASTE), San Diego 1&2 (no tutorial), Madrid (MASIW), Seattle (used for V3 discussion), Toulouse (No tutorial), Germany (MILS w std AADL or ?), Pittsburgh (will be the two day workshop), Toulouse (ALISA), Atlanta (OCARINA), Fort Worth (attend conference), Pittsburgh (Adventium tools) *So many possible, may need workshop.*

Potential for future meetings:

- Cheddar and Ellidiss STOOD/AADL Inspector
- SCADE AADL
- RAMSES – Fall 2018 proposed by Dominique (London)
- Adventium TradeSpace, or Security Analysis, or Scheduling/Rapid Build, ISOSCELES, STPA related (Pittsburgh)
- MASIW
- TASTE

Joint Research

- AADL/FMI (experiments with OCARINA) funded for FY17
- Considering Behavior Annex integration with new RTS
- Of interest:
- Need for Graphical Capability for modeling with Behavior Annex.
- Seamless refinement from SysML requirements /behavior.

Planning for Nov 2018

- Possible User ½ Day (3 day meeting)
 - Demo of BALSAAADL (30m)
 - Ansys demo: SysML and AADL (2.5h)
 - Integrated safety & security analysis (1h)

Standardization

- News (30m)
- Next Meeting Planning and action items (30m)
- AADL V3.0 topics PF (10 hr)
- Errata Core plus Error Annex PF (1.5)
- Runtime Services JH, EB, BRL (2)
- BA Errata PD, EB, JP, BRL (30m)
- Network Annex Draft (Alexey) (1.5)
- Security Annex Draft (DG) (1.5)
- FACE Annex draft (TS) (30m)
- Total 18.5 hours

AADL Tool Integrations – All - [Update Wiki](#)

Frank Singhoff - AADL/Cheddar – through Ellidiss, TASTE, and OCARINA

Jose Mesquer - AADL/MAUDE –

Jean Pierre Talpin/Brian Larson - AADL/Polychrony/Signal with BLESS

Pierre Dissaux - Ellidiss - AADL/Domain System Engineering - Graphical STOOD, Adele, GLASSES, Analysis AADL Inspector, Simulator, Behavior Annex, Error Annex, Requirements Annex.

AADL/Real, Lute, Agree – Integrated into OSATE

Brian Larson - AADL/BLESS

Etienne Borde - AADL/Behavior Annex, RAMSES

Peter Feiler, Julien - AADL/SAVI – Updated for V2, extended, new analyses for Safety (FHA, FMEA, Reliability, FTA, Prism) , Simulink to AADL and reverse.

Jerome Hugues - AADL/Mast/Cheddar/FMI ... as part of OCARINA Generator

Alexey Khoroshilov- AADL/MASIW – Modular Avionics System Integrator Workplace, plus verification tools.

Rockwell Collins – SysML to AADL, Lute, Agree, Resolute, Spear, QuasiSyn...

ESA – TASTE, COMPASS (upgraded to use standard AADL)

D-MILS – Security and Safety with compositional verification and system synthesis

WWT – Editor and analysis tools

SCADE – has added AADL, [released commercial version Jan 2018](#)

Dassault Systems – [Translator to AADL, Integration with AADL Inspector](#)

Actions

Action	Date	Lead	OK
Denis to provide Peter with default semantics for ports in ARINC653, related to a more abstract port	1/18	DB	
Jerome to send Peter FMI description language for continuous and discrete ports when available mid 2018.	1/18	JH	
Network Annex using Data volume but should we use data rate unit type? Peter will supply recommendation to Alexey	1/18	PF	
Alexey to email Steve Vestal to get needed definition for Max_Supported_VLS.	1/18	AK	
Alexey to contact Eric Jenn to see if he needs TTE example but we have the properties defined now.	1/18	AK	
V3 Configuration Parameter Match and Replace, Denis to provide example patterns to Peter	1/18	DB	
AADL Core Errata – Peter will contact Steve Vestal to understand purpose of priority extension request.	1/18	PF	

Actions

Action	Date	Lead	OK
AADL Code Gen Annex questions – RTS to make type safe, report error types, send output detection, periodic dispatch management. Jerome will coordinate with Mike, Etienne, Brian	1/18	JH	
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Actions

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BACKUP

Actions

Action	Date	Lead	OK
Demonstrate FMI/AADL for Sept 25 meeting	1/17	JH	
Trademarks – Bruce will ask Dorothy (author just asks perm)	1/17	BL	x
Exploring Binding software flows to hardware flows, trees of flows	1/17	Alexey	
Example to GITHUB for reverse interfaces	1/17	PF	
Send formula for expressing Arrays to Peter	1/17	BL	x
Send out slides on arrays, consider Brendan's input	1/17	PF	
Unified Type System examples	1/17	LW	

Actions

Action	Date	Lead	OK
Consider AltaRica feedback to improve EMV2	1/17	PF, LW	x
Send Brian the BNF for transistions, the encoding in SIGNAL	1/17	JP	
Recommendation – Before formalization, lets look at syntax, semantics for runtime services, then go to formalization annotations as a separate annex., Lead effort.	1/17	EB	x
Provide updates and errata for ARINC Annex	1/17	Alexey, Denis	x
Lay out scope of the security annex	1/17	DG	x
Schedule time to discuss tree flows as part of V3	6/17	BAL	x
Organize telecon with Bren and Peter to develop ideas for proposal on arrays	6/17	BRL	

Actions

Action	Date	Lead	OK
Supply suggested improvements on “refines to” to Peter	6/17	SV	
Set up telecon to discuss with Alexey, Peter, Brendan, Steve the blended use of the error modeling and networking annexes	6/17	PF	
Set up a telecon on the runtime services with Jerome, John, Brian, and Etienne	6/17	BRL	x
Send an example/questions on runtime context variable for accessing ports to Jerome	6/17	EB	
Present upgrades needed to 653 Annex, like additional properties	6/17	SV	x
	9/17		
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Actions

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Actions

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