

BIM Development and Standards Support for CV Applications

Project Meeting

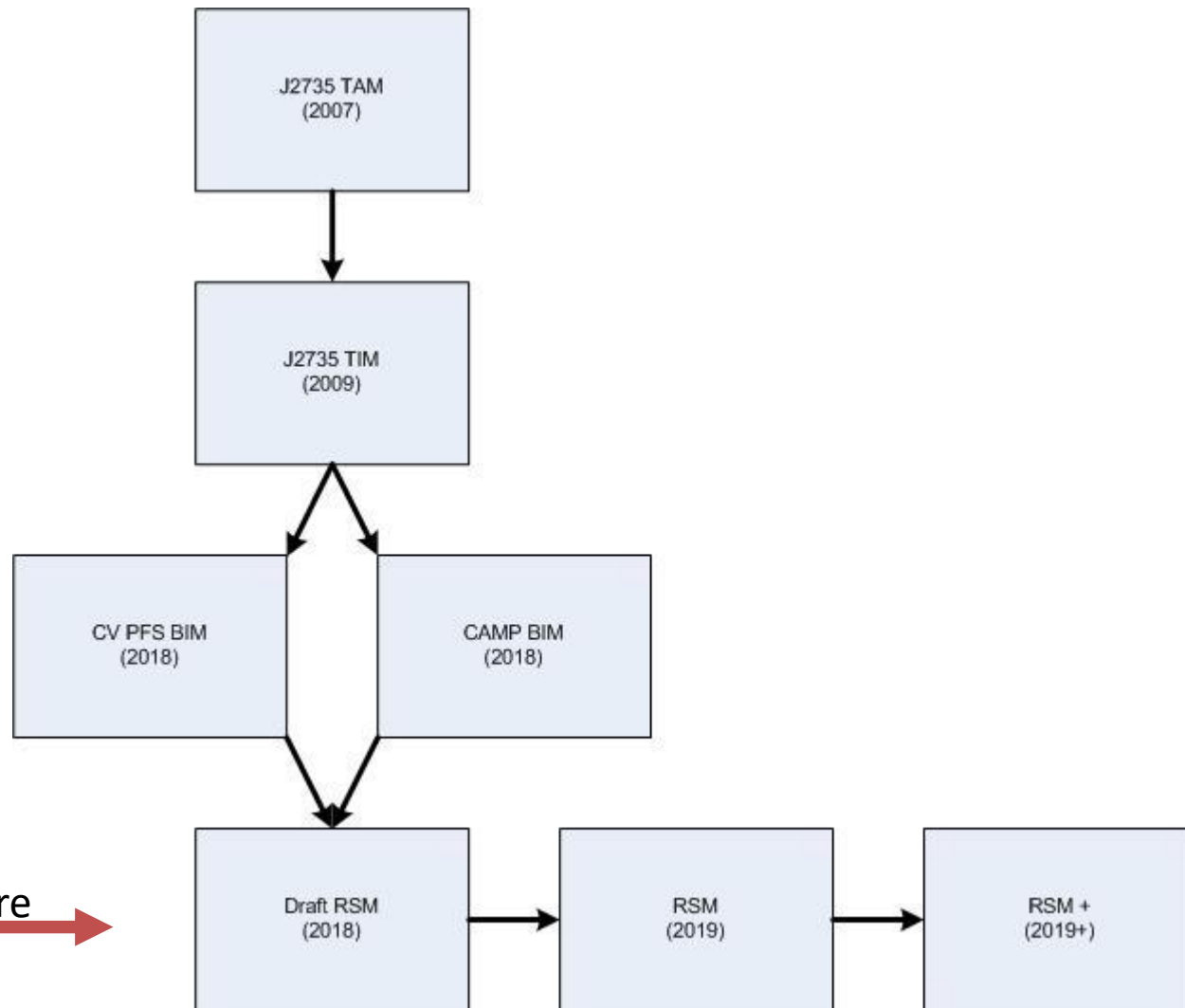
December 20, 2018



Overview

- TIM > BIM > RSM
- Standardization Status
- Discussion/Comments

Message Evolution



Evolution:TIM

- TravelerInformation ::= SEQUENCE {
- msgID DSRCmsgID,
- packetID UniqueMSGID OPTIONAL,
- urlB URL-Base OPTIONAL,
- dataFrameCount Count OPTIONAL,
- dataFrames SEQUENCE (SIZE(1..8)) OF SEQUENCE {
 - frameType TravelerInfoType, -- (enum, advisory or road sign) -- Part I, Frame header
 - msgID CHOICE
 - furtherInfoID FurtherInfoID,
 - roadSignID RoadSignID -- links to ATIS msg an ID to other data
 - startYear DYear OPTIONAL,
 - startTime MinuteOfTheYear, -- Current year used if missing
 - durationTime MinutesDuration,
 - priority SignPriority,
 - commonAnchor Position3D OPTIONAL, -- Part II, Applicable Regions of Use, -- a shared anchorpoint
 - commonLaneWidth LaneWidth OPTIONAL, -- a shared lane width
 - commonDirectionality DirectionOfUse OPTIONAL, -- a shared direction of use
 - regions SEQUENCE (SIZE(1..16)) OF ValidRegion,
 - content CHOICE -- Part III, Content
 - advisory ITIS.ITIScodesAndText, -- typical ITIS warnings
 - workZone WorkZone, -- work zone signs and directions
 - genericSign GenericSignage, -- MUTCD signs and directions
 - speedLimit SpeedLimit, -- speed limits and cautions
 - exitService ExitService -- roadside available services
 - -- other types may be added in future revisions
 - url URL-Short OPTIONAL -- May link to image or other content

Evolution: BIM (CAMP)

- BIM:
 - Common information (enumerated event types, time, approach region, speed limit, etc)
 - Curve Speed Warning, RSZW (lane closures)
- Flat structures
- High resolution lanes (region)
- High detail (road surface material, surface condition, friction, etc)

Evolution: BIM (CV PFS)

- BIM
 - CommonContainer (time and location)
 - + content containers
 - StaticSignageContainer, SituationalContainer, DynamicInfoContainer, LimitedAccessContainer, IncidentsContainer, EmergencyVehicleContainer (+others TBD)
- Hierarchical message structure
 - Modular frames defined for reusable content
- Multiple region types allowed
 - Point, Polygon, RoadwayName, Path, -- +Circle? +RegionID/DestinationID/MapID? +RoadSegmentID? +Moving - Variable region?

Evolution: RSM (v1)

- RSM:
 - Common information (modular)
 - Content
 - RSZW
 - Curve Speed Warning
 - Static Signage
 - Dynamic Signage/Information
 - Incidents
 - Cross Message Linking (other messages, audio, out of band comms, etc)

- Hierarchical message structure
 - Modular frames defined for reusable content – slightly “flattened”
- Multiple region types allowed
 - Added CAMP lane definitions as an optional region type
- Added “Cross message linking” (submitted separately to SAE)

Evolution: RSM (v2+)

- RSM:
 - Common information (modular)
 - Content
 - RSZW
 - Curve Speed Warning
 - Static Signage
 - Dynamic Signage/Information
 - Incidents
 - **Other Structured Information Containers Here**
 - Cross Message Linking (other messages, audio, out of band comms, etc)

- Potential to add/modify/augment previous structures (time, regions, etc)

- Other needs and inputs have been either slated for future consideration to the RSM (later revision of J2945/4), or are (or will be) covered by another existing J2945/X document
 - Weather information in J2945/3
 - Probe management and information in J2945/12
 - Intersection information and Mapping in J2945/10 and J2945/11
 - Route restrictions (HAZMAT, weight, size, HOV/HOT, etc) may fall under Mapping

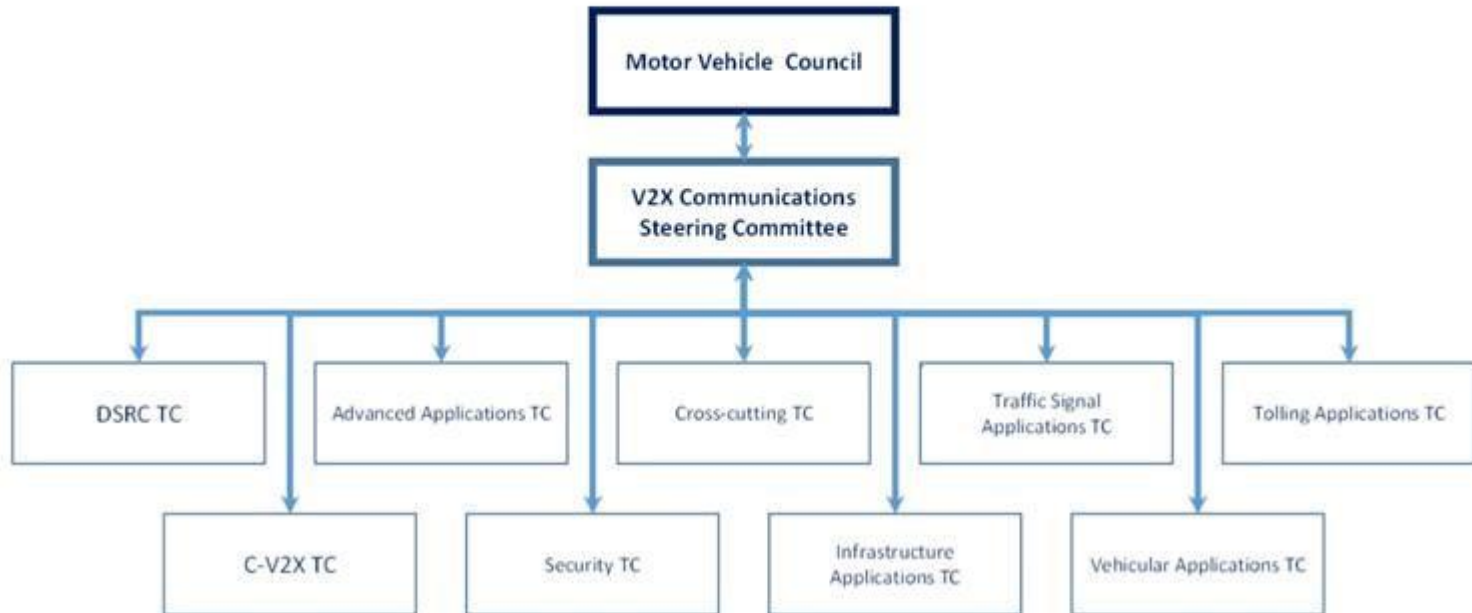
SAE V2X Reorganization

- SAE technical committee reorganization official
 - New structure – February 2019
 - Previously 2 committees
 - DSRC
 - CV2X
 - Now 9 committees + V2X Steering Committee
 - DSRC (radio layer)
 - CV2X (radio layer)
 - Advanced Applications
 - Security
 - Cross Cutting
 - Infrastructure
 - Traffic Signal Applications
 - Vehicular Applications
 - Tolling Applications

SAE V2X Reorganization

SAE V2X Communications Steering Committee Viewing roger berg denso's...

Steering Committee Structure



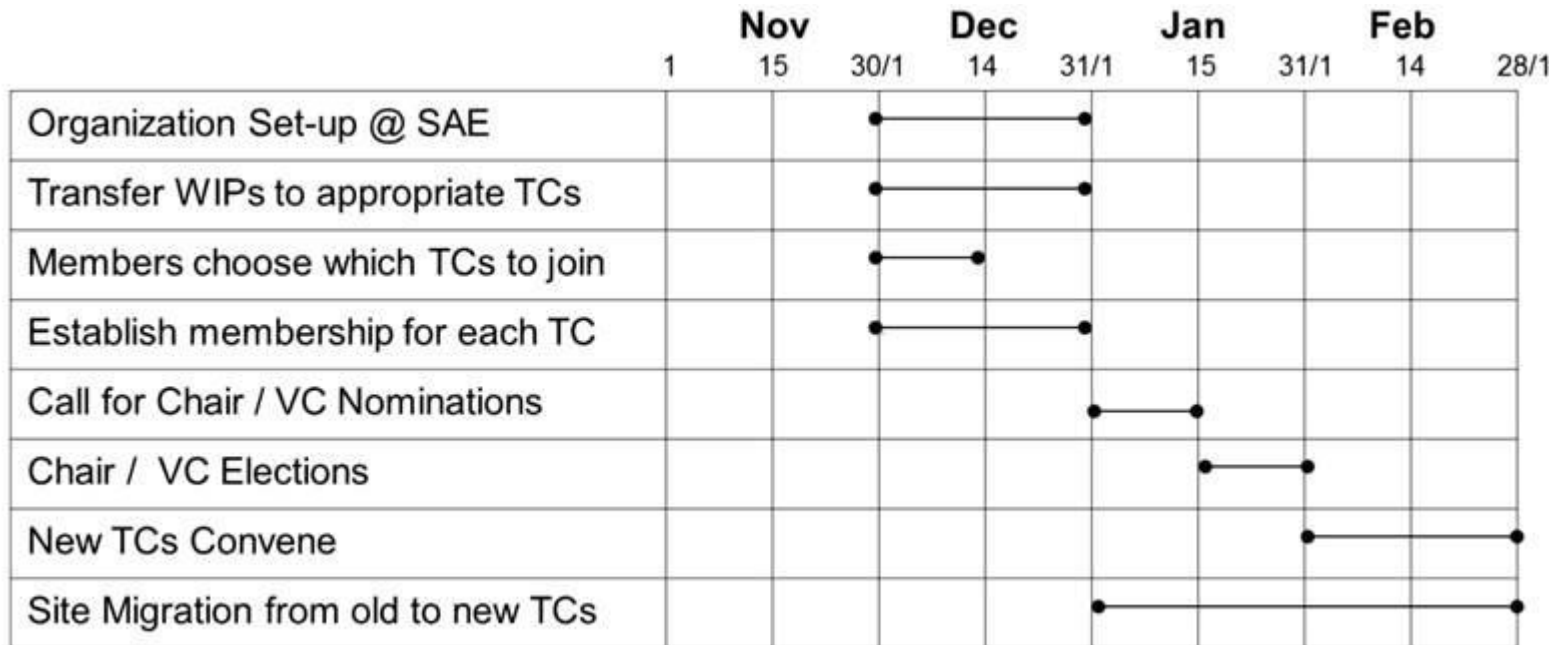
SAE V2X Reorganization

SAE V2X Communications Steering Committee

Committee Composition

DSRC TC	C-V2X TC	Advanced Applications TC	Security TC	Cross Cutting TC	Infrastructure Applications TC	Traffic Signal Applications TC	Vehicular Applications TC	Tolling Applications TC
2945/1 2945/0	3161	3186	2945/5	2735 2945/7	2945/3 2945/4 2945/12	2945/10 2945/11	2945/2 2945/6 2945/8 2945/9	TBD
Scope: DSRC Radio access-specific items	Scope: C-V2X Radio access-specific items	Scope: Lower layer-unknown applications that may require new communication technologies	Scope: Over the air security	Scope: Common to multiple applications or communication technologies	Scope: Infrastructure applications that do not require traffic signal data	Scope: Infrastructure applications that require traffic signal data or interface	Scope: Vehicle communication needs	Scope: Applications for tolling and financial transactions
Nominees: (Chair) (VC)	Nominees: Misener (Chair) Goudy (VC)	Nominees: Daly (Chair) Moradi-Pari (VC)	Nominees: Whyte (Chair) Kenney (VC)	Nominees: Stelts (Chair) Hong Sheng (VC)	Nominees: Mixon (Chair) McNew (VC)	Nominees: Balke (Chair) Pankh (VC)	Nominees: Bai (Chair) Berg (VC)	Nominees: Murtha (Chair) Rausch (VC)

SAE V2X Reorganization



Standardization Status

- J2945/4 Rev I 6
 - presented “final” initial list of use cases (content containers) at December face-to-face meeting
 - CSW, RSZW, SS, DTI, Incidents
 - Does not preclude other applications/content from being added later

- Activities
 - Further flesh out narrative and content of user needs
 - Review requirements section and map back to final user needs
 - Revise requirements as necessary

- Continue adding input from other contributors

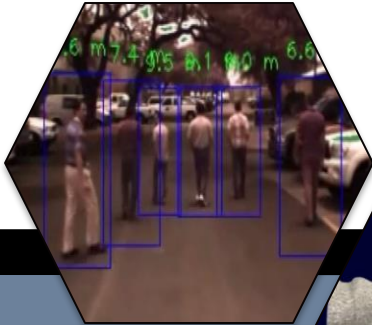
- Rev I 7 – planned mid-January

Standardization Status

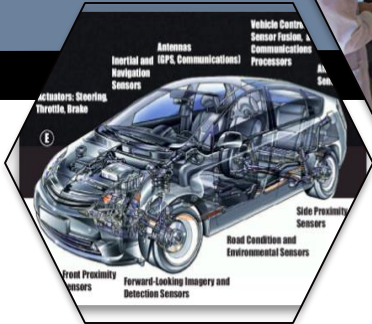
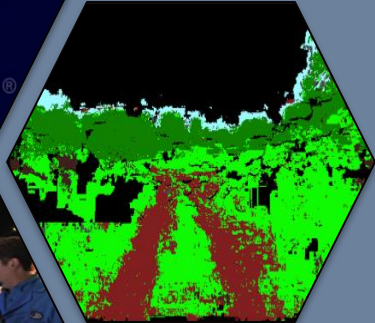
- Apply information from field deployments
 - TxDOT I-35 workzone
 - 9 RSUs near Temple
 - Connected Vehicle module deployed in Lonestar test instance
 - Validate RSMs generated from Lonestar (live operational data) can be parsed and utilized by OBUs from both SwRI and CAMP
 - Adjust/clarify user needs and requirements in J2945/4 as necessary
- Begin balloting process in the new SAETC structure: March 2019
- Previous J2945/x experience: 2-3 ballots, 2-3 month turn around each
- Final approved J2945/4: ~ Fall 2019

Discussion

- Questions / Comments?



Southwest Research Institute @



Thank You!

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