VMAP Standard & VMAP Working Groups

VMAP User Forum
18-19 February 2025

www.vmap-standard.org

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VMAP IO Lib v1.2.0

- Released in May 2024

- Focus on integration of Sensor Data Storage Specifications

- Additionally, integration of Numerical Specifications discussed in the Full Model Working Group

- Possibility to visualize data sets using Paraview v5.12, 5.11, 5.10

- Pre-build Python lib v3.9, v3.10, v3.11 for Windows are already provided.

- Python v2.7 is provided for Abaqus Solver Users

VMAP Working Group – Full Model Storage

- Working Group Members: DLR BT, DLR SY, FhG SCAI, BAM, BMW, HTW-Berlin, Key to Metals, BETA CAE

- Monthly Meetings to discuss the further developments about boundary conditions

- VMAP IO Lib v1.2.0 allows integration of Numerical Specifications -> Conditions

- Next Steps: Storage of Boundary Conditions under initial Conditions & BC.

- Next presentation by Oliver Kunc from DLR will provide more information on this.
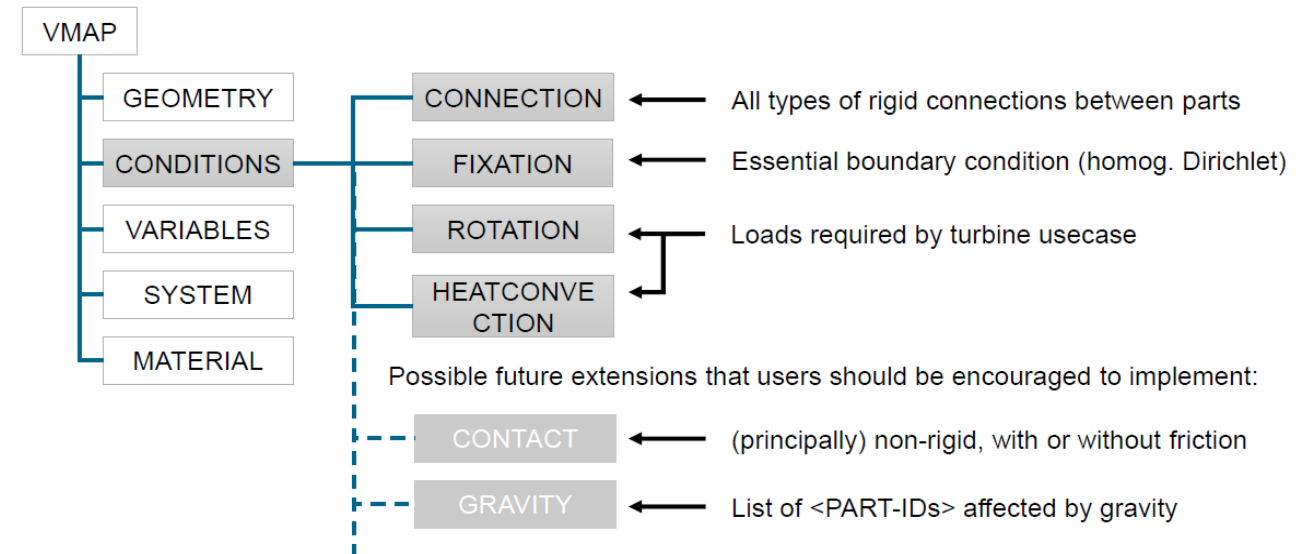
VMAP Working Group Sensor Data Storage

- Working Group Members: HBRS, DLR SY, Uni Patras, FhG SCAI, SICK AG, FhG IZFP
- Monthly Meetings to discuss the further developments in sensor data storage.
- VMAP IO Lib v1.2.0 allows storage of measurement data
- Next Steps: Storage of all measurement, monitoring and simulation data for additive manufacturing processes.
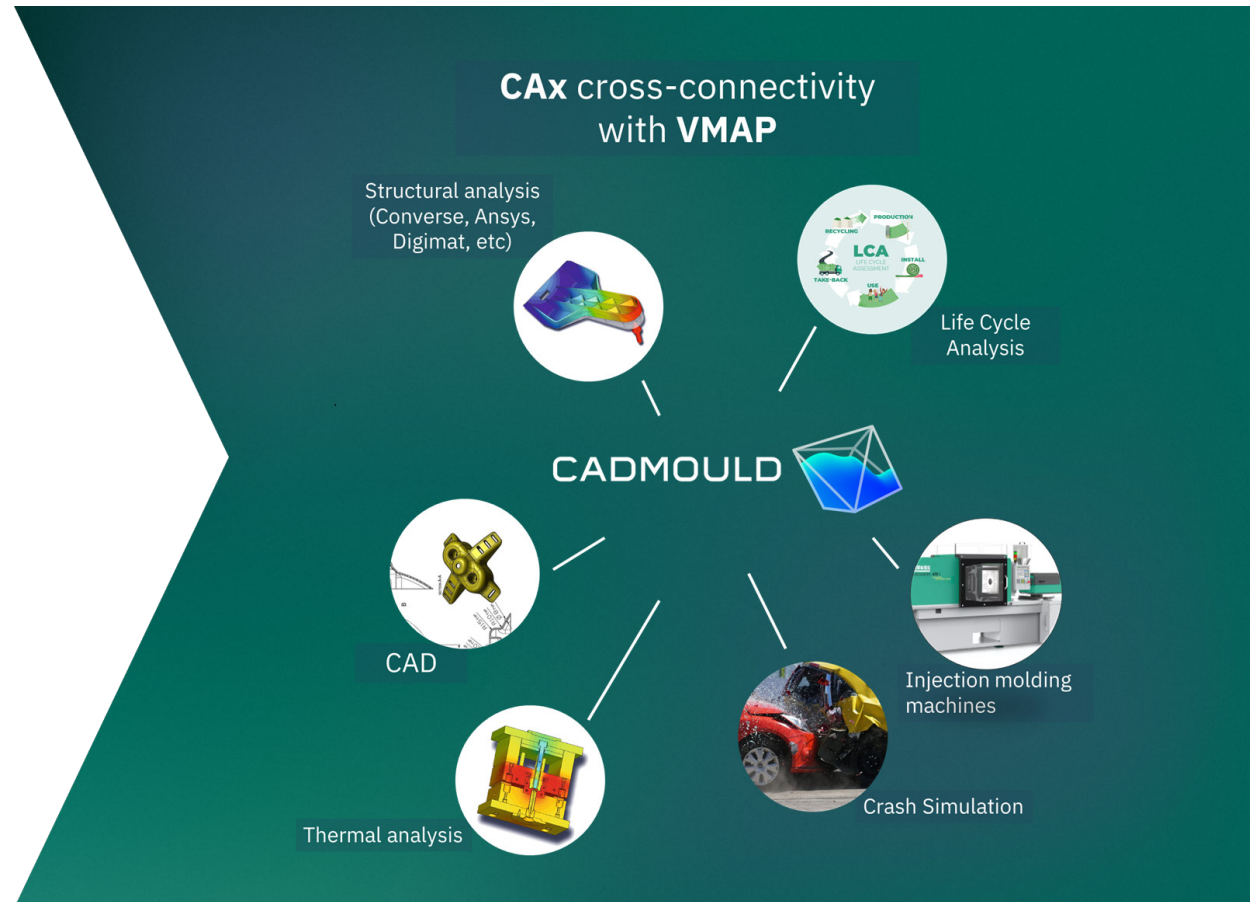- The WG is looking for new members to work further on these aspects.
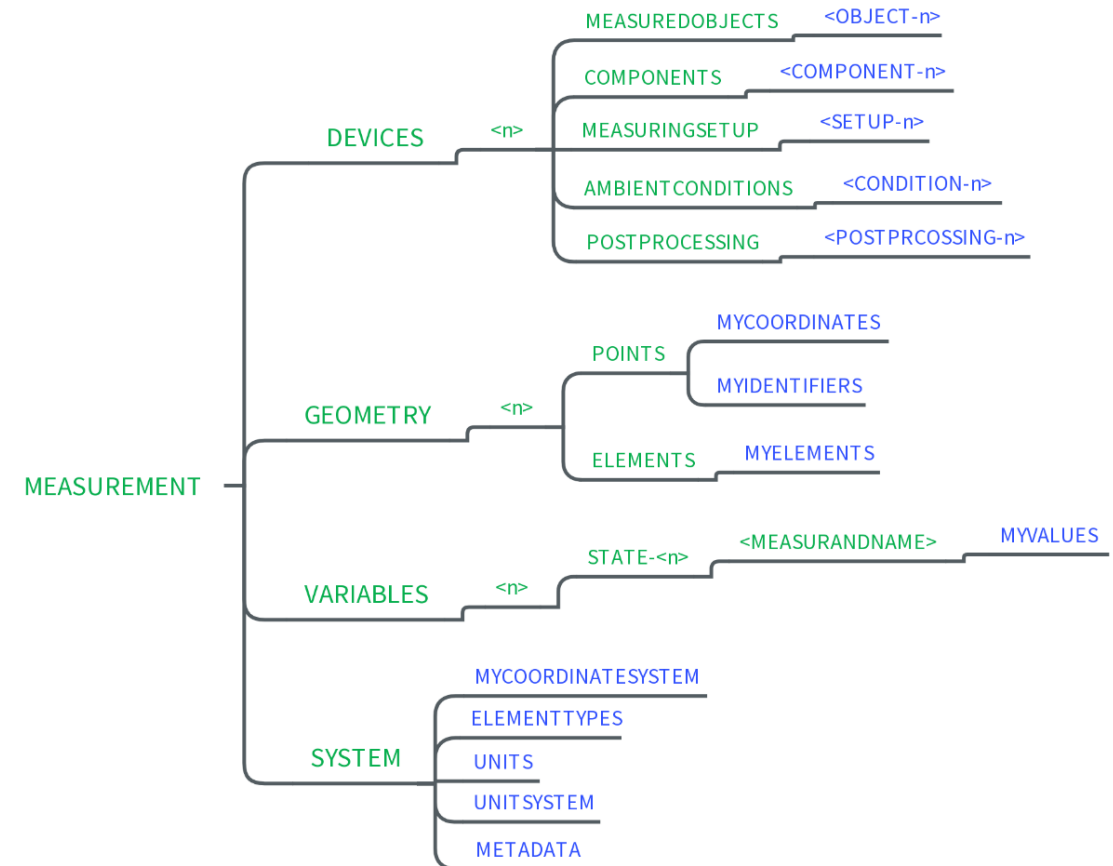
VMAP Working Group – Wrapper Development

- Growing demand to harmonize CAx IO from different engineering domains and industry sectors

- Many ongoing R&D projects on digitisation and standardisation in manufacturing

- Various approaches to realise VMAP support for commercial and open-source simulators

- Following Wrappers are already available:

SCAI MpCCI Mapper

Metal Forming
LS-Dyna, PAMStamp,
AutoForm, Forge, Simufact
Forming, Abaqus, COPRA FEA,
RADIOSS, **VMAP**

Welding
Simufact Welding, ANSYS
Mechanical, Abaqus, **VMAP**

Molding
Moldflow, Cadmould, Moldex3D,
B-Sim, **VMAP**

Composites
LS-Dyna, Abaqus, PAMCrash,
VTK, **VMAP**

Crash / Structural
LS-Dyna, PAMCrash, Abaqus,
Nastran, RADIOSS, OptiStruct,
ANSYS Mechanical, **VMAP**

Measurement
Atos, Argus, Aramis, Autogrid,
STL, Ply, **VMAP**

Potential of VMAP in CADMOULD

Abaqus Wrapper

Production Process

Blow Molding Sim.

Thick-ness

Orientation | E-Mod.

Wall thickness, local material properties

CFD Analysis

HTC

Heat transfer coeff.

Cooling Behavior

Heat Transfer

HTC (from CFD)

Temperatures

(Transient) Temperatures

Abaqus-Odb to VMAP
(Abaqus wrapper "abqToVMAP")
• Node and element data
  • Coordinates
  • Elements
  • Connectivity
• Nodal and element results
  • Displacements
  • Stress, Strain, NTH, STH,…
  • Field and history data
  • …)

Transient Mapping
(MpCCI-Mapper)

VMAP to Abaqus-Odb
(Abaqus wrapper "vmap2odb")
• Node and element data
  • Coordinates
  • Elements
  • Connectivity
• Nodal and element results
  • Displacements
  • Stress, Strain, NTH, STH,…
  • Field and history data
  • …)

Shrinkage and Warpage

Thermal Stress/Displacement

Displacement

Residual Stresses

Deformation, Residual Stresses

Abaqus-Odb to VMAP
(Abaqus wrapper "abqToVMAP")
• Node and element data
  • Coordinates
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  • Displacements
  • Stress, Strain, NTH, STH,…
  • Field and history data
  • …)

Mapping
(MpCCI-Mapper)

VPAP to Abaqus-Inp
(Abaqus wrapper "vmap2inp")
• New Nodal Positions
• Residual Stresses

Virtual Testing

Structure Analysis

Displacement

Load/Displacement curve

1) 2)

1) BSIM to VMAP to Abaqus   2) Acusolve to VMAP to Abaqus

LS-DYNA wrapper status / ≋ENVYO

| Who	Code	Integration Type	VMAP IO-Lib Version	Test / Use Cases supported	Prototype availability
DYNAmore	envyo®	envyo® - integrated adapter	Final project version – v.0.5.2	• Composite UC (Draping/Structural) • Bending Beam TC (thermal) • Metal TC (break forming) • SFRP TC	Already – based on the VMAP status at end of initial project
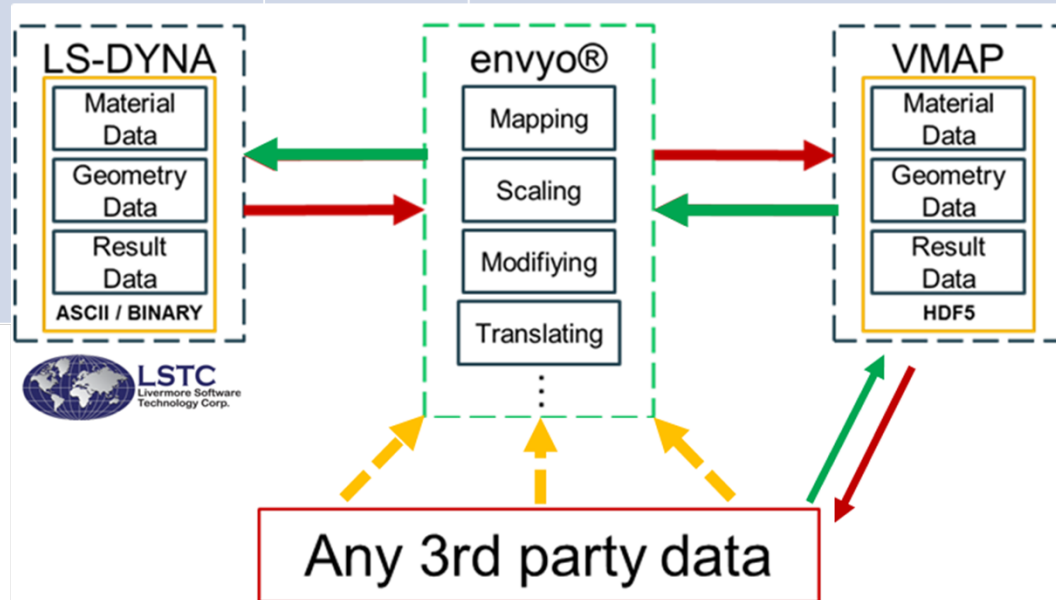
A standardized result data storage format will easen the transfer between 3rd party software tools to LS-DYNA via our mapping tool – and vice versa.

VMAP Working Group – Wrapper Development

- List goes on ...
  - SMILE
  - PERMAS
  - Trasvalor
  - OpenFoam
  - ANSYS inuTech
  - BETA CAE (integrated)

- This Working Group is in its establishment phase. The first meeting was held in Nov. 2024. We are looking for new partners for the development of wrappers/integrated solutions for VMAP

- The Presentation by Andreas Schuster from DLR will also focus on the various inhouse wrappers already in use at DLR.

Fraunhofer
SCAI

Thank you. Questions?

Contact Us
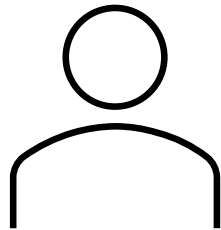
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