



HORIZON 2020



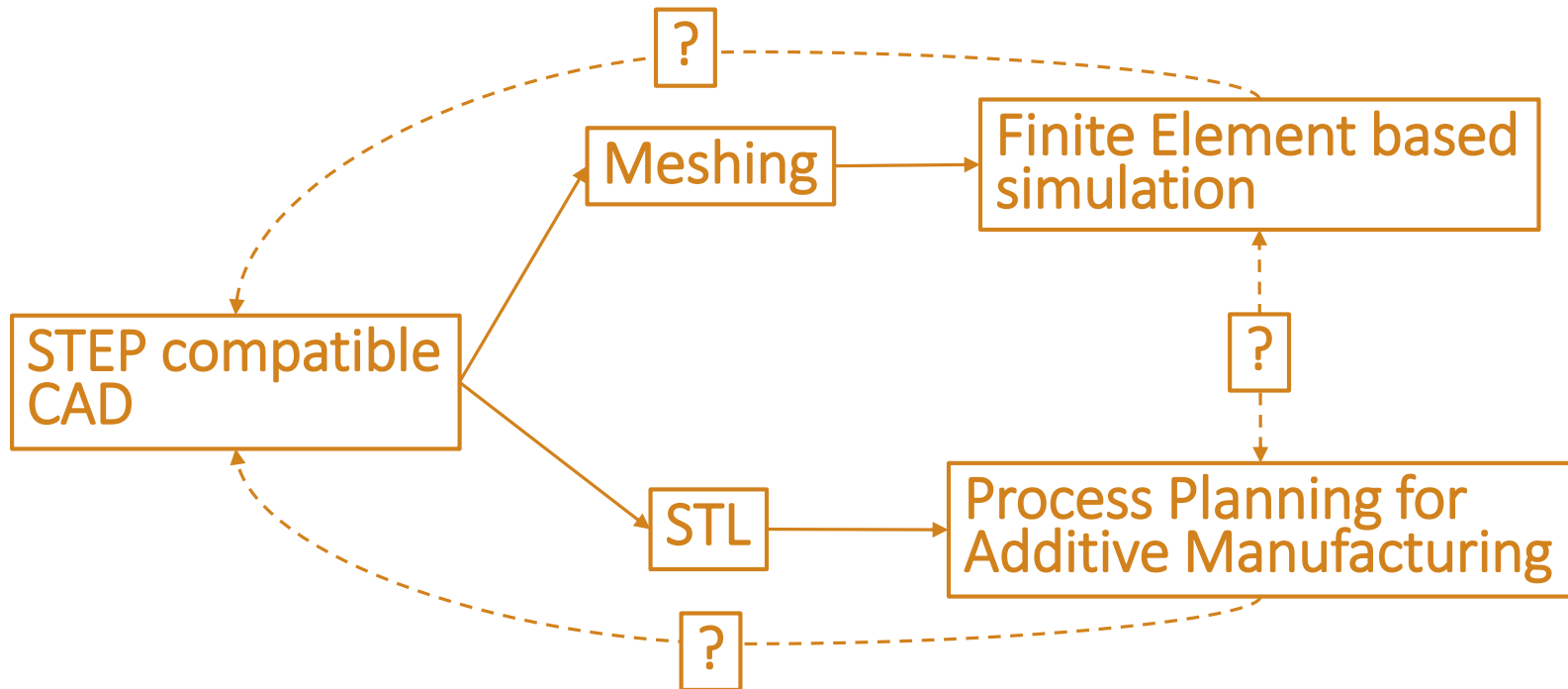
Computer Aided Technologies for Additive Manufacturing

Factories of the Future prosjektet CAXMan

Tor Dokken, SINTEF ICT, CAXMan Coordinator
tor.dokken@sintef.no

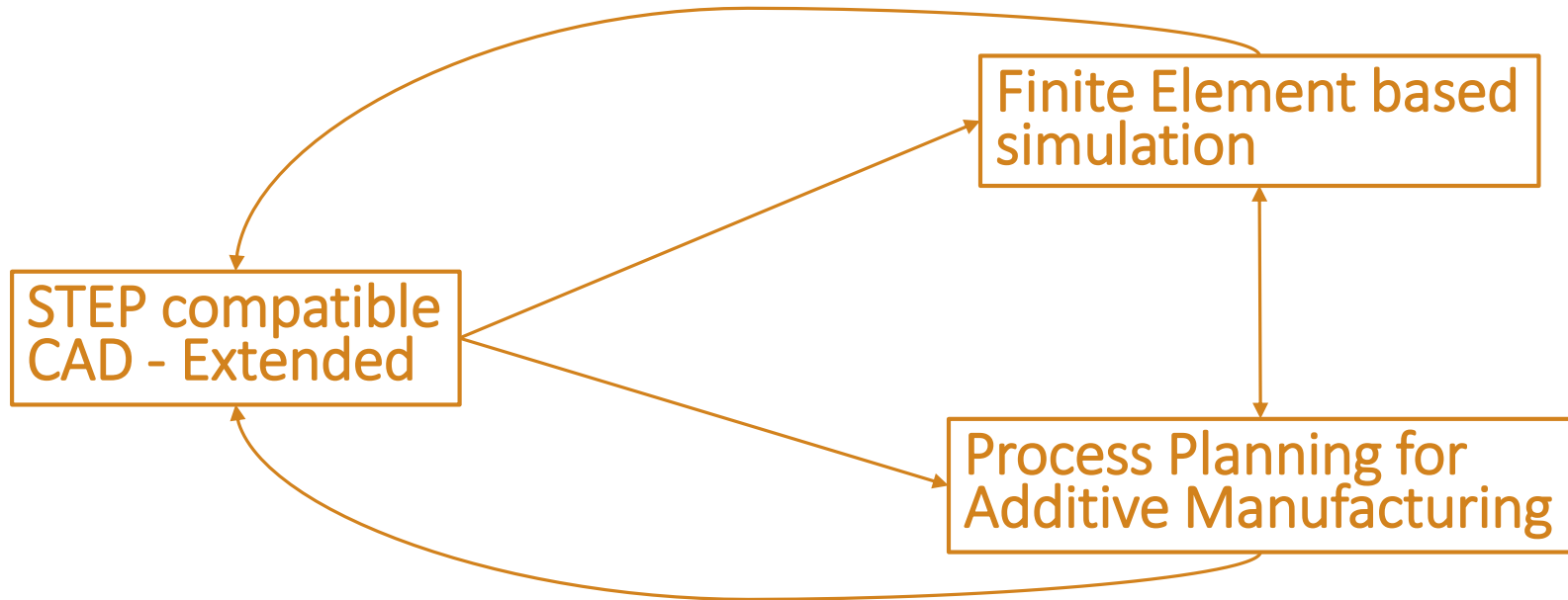
WMF pre-workshop Barcelona, 02 May, 2016
<http://www.caxman.eu>

State-of-the-art information flow: CAD to Finite Elements and Additive Manufacturing



- Meshing and STL conversion reduce shape quality
- Updating CAD-models from modified mesh/STL a challenge
- Different areas of competences with weak information interoperability

CAxMan vision: Interoperability between CAD, FEA and AM



- CAD extended with novel 3-variate isogeometric analysis extensions of in STEP
- Isogeometric Analysis or FEA harvesting 3-variate CAD
- AM extensions to STEP Part 242 Edition 2

Complex to extend current CAD-systems with novel representations

- The Isogeometric extensions of STEP adds 3-variate (mathematical volumetric) representations to STEP
- Current CAD-systems are based on the 2-variate (mathematical surface) representation and can not be expected to include the new possibilities in foreseeable future (legacy of models and software)

Offering results as Cloud services

The Cloud facilitates direct distribution of new services, applications and workflows directly to the end user (e.g., SMEs) without software installation on the client device.

- CAxMan builds on the fp7 IP CloudFlow (2013-2017)(next talk) and its Cloud infrastructure, and selected services, applications and workflows.
- CaxMan follows with interest the commercial exploitation of the CloudFlow Competence Centre
- IPR and knowledge of CloudFlow background used in CAxMan is ensured as the core partners of CloudFlow are in CAxMan

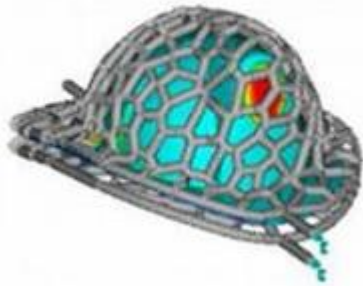


CxMan - Facts

- Duration: September 1, 2015 – August 31, 2018
- EU-contribution: 7,143,300€
- Effort: 748 person Months
- Coordinator: SINTEF
- Partners from
 - Austria: 1
 - France: 2
 - Germany: 2
 - Italy: 2
 - Norway: 3
 - Slovenia: 1
 - Spain: 2



Use Case partners



Injection molds
cooling system
(France)



Special gear box
(Italy)



OTHER SME Industrial partners

Commercial 3D
Printing (Norway)



CAD/CAM
systems (France)



Metrology
(Spain)

Business
Modelling
(Austria)



HPC Centre
(Slovenia)



Research partners

3D Geometry
(Norway)



Computer
Graphics
(Germany)

Workflow
manager
(Germany)

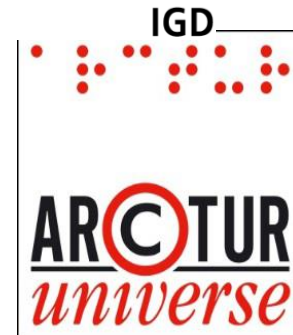


Thermal and
stress analysis
(Spain)

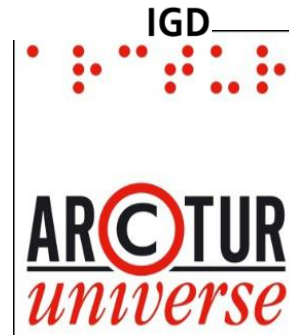


FEM, PDEs,
Isogeometry
analysis and
process planning
(Italy)

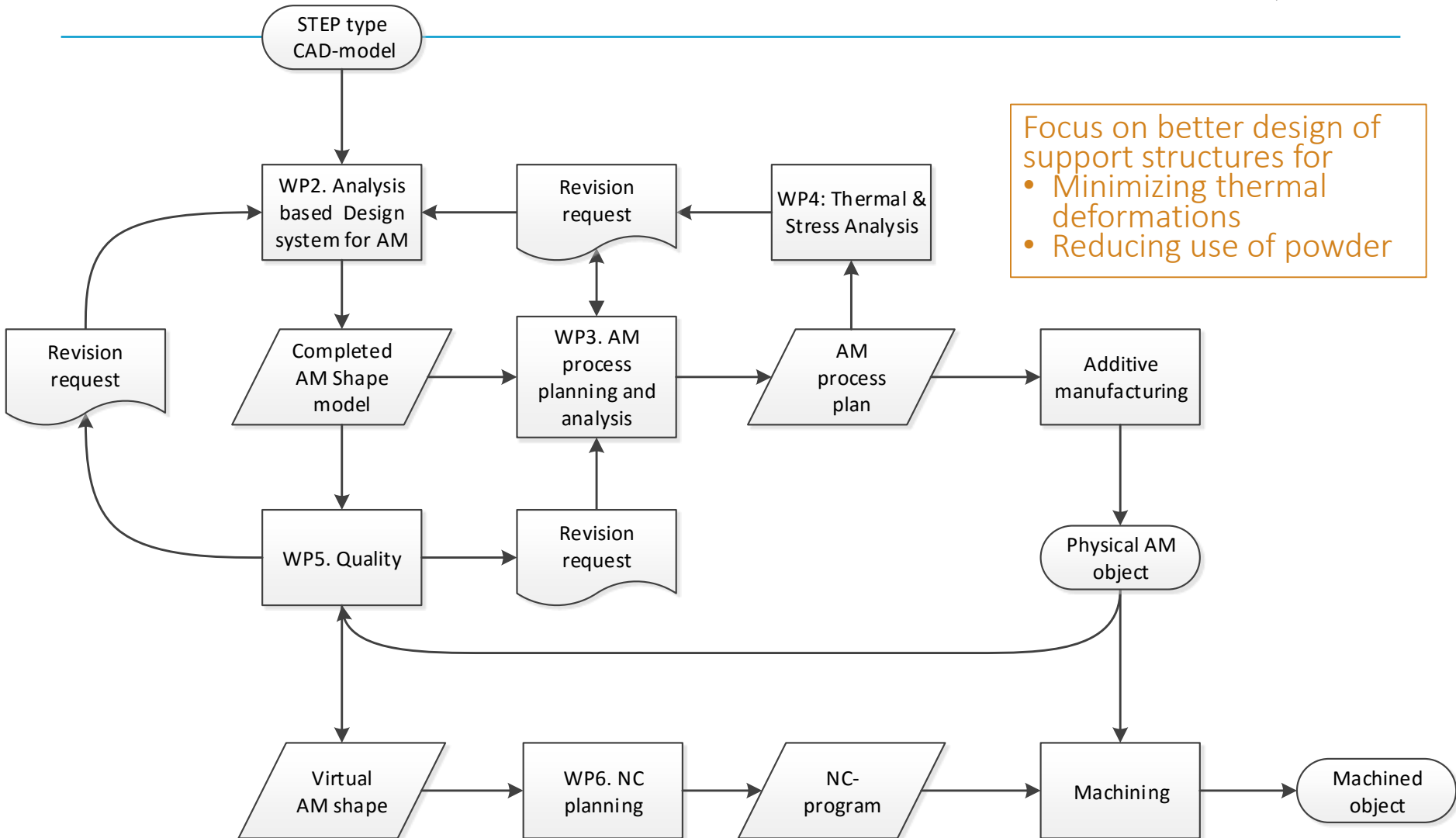
PARTNERS FROM CloudFlow bringing in HPC, Software infrastructure and Services



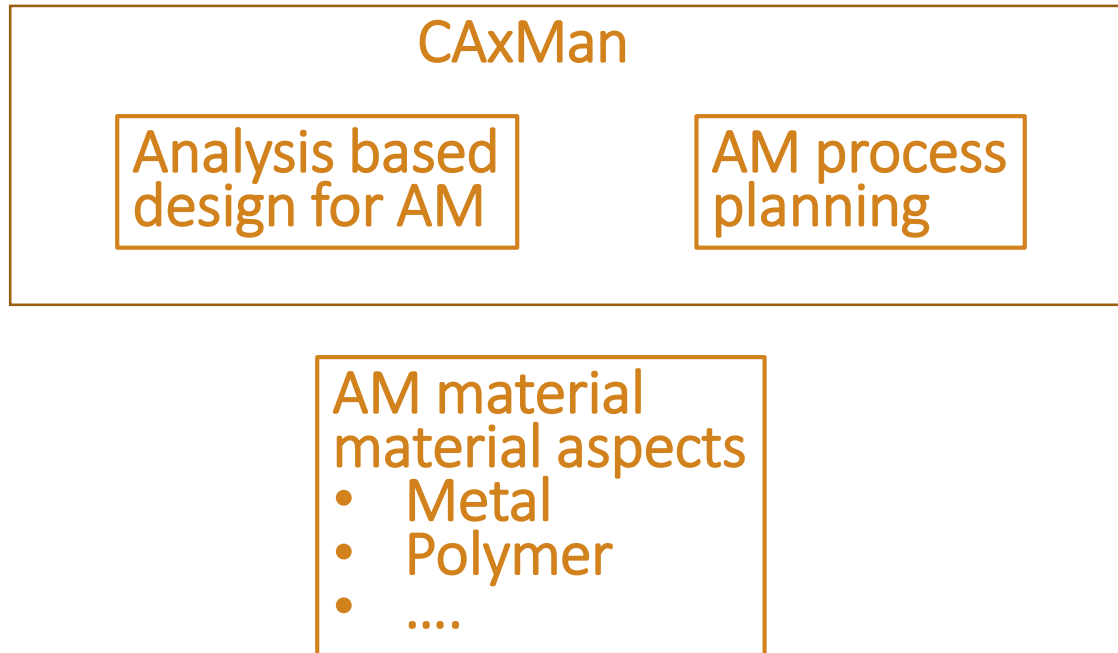
Partners – European Dimension



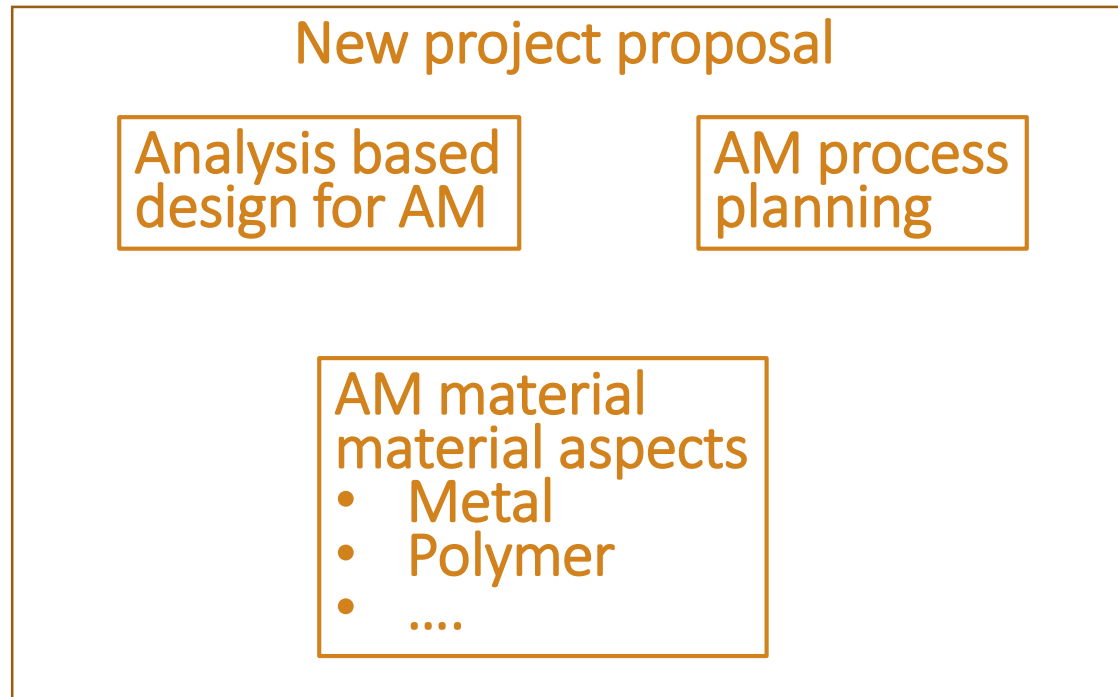
OVERALL IDEA



CAxMan does not address all aspects



FOF-12-2017 (I4MS -3 call) idea: Proposal building on CloudFlow and CAxMan



- Modelling, simulation and analytics
- Digital design for additive Manufacturing
- I4MS: Project with Open calls for new experiments/partners
- Will be further addressed in the panel discussion