

The Swedish Arena for Additive Manufacturing of Metals – Looking back on 2016-2024

The Swedish Arena for Additive Manufacturing of Metals



is a network for collaboration with the goal to increase adoption and speed up sustainable industrialization of metal AM

- Acting as an interface and entrance point to metal AM in Sweden
- Coordinate and support needs for industrialization of metal AM
- Networking and knowledge sharing
- Competence development

Inauguration 25th of August 2016



• <https://youtu.be/d5w8MemwLsM>

Roadmap for research and innovation to industrialize additive manufacturing of metals in Sweden (RAMP-UP 2017)

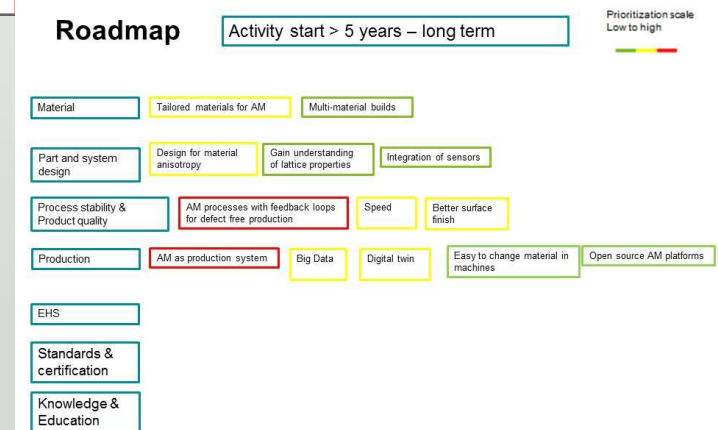
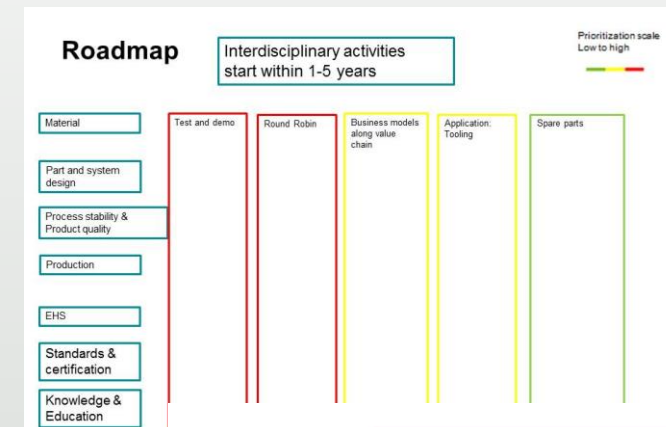
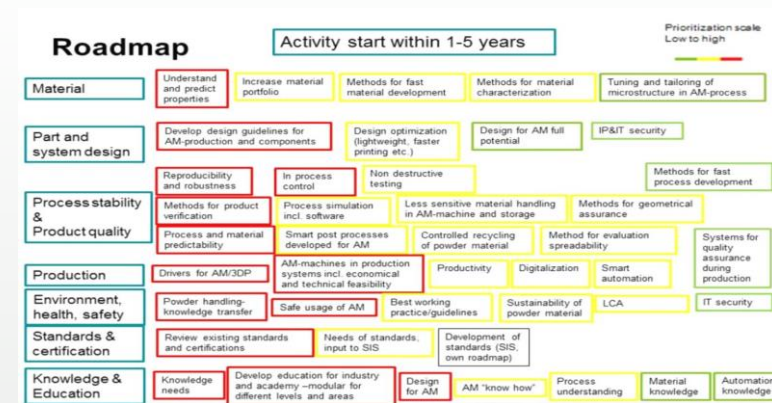
For the next 5 years the overall vision is that a great number of small, medium and large sized companies have evaluated AM and thereby been able to set the direction for how to best utilize AM for strengthening their competitiveness, both nationally as well as internationally.

For the next 20 years the vision is that Sweden, by a fast and resource effective industrialization, has taken a pole position in key competence areas as well as a prime provider in a number of areas and applications.

Roadmap

- Material
- Part and system design
- Process stability and product quality
- Production
- Environment, health and safety
- Standards and certification
- Knowledge and education

Around 60 participants per workshop!

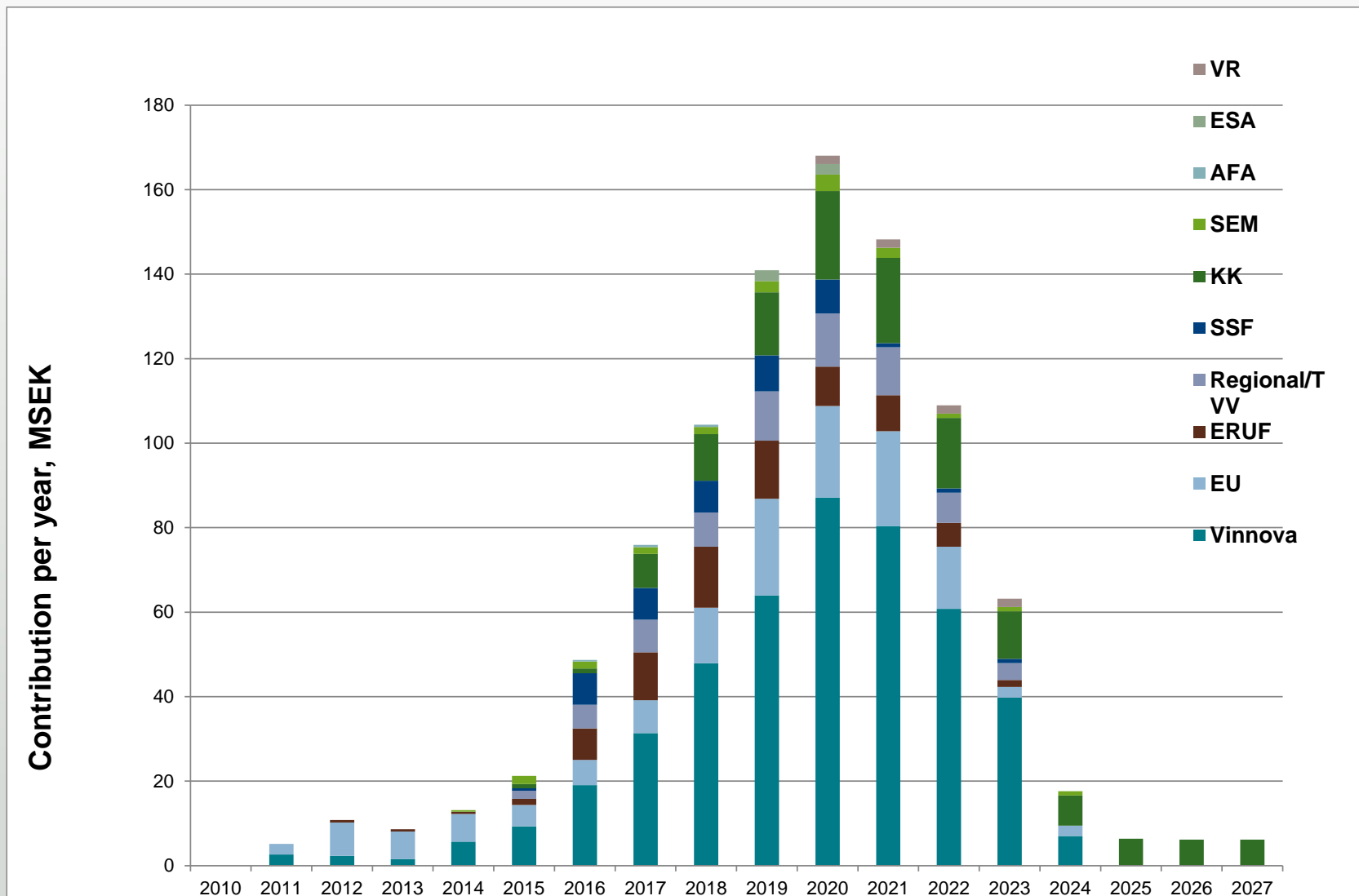


Roadmap - Follow-up projects

- RAMP-UP – Roadmap for research and innovation to industrialize additive manufacturing of metals in Sweden, 2017
- SIP Metallic Materials AM Call based on roadmap, 2018
- INTOACTION – Coordination of research within additive manufacturing of metals (mapping, coordination of implementation of roadmap and effects), 2018
- Standardization of Metal Additive Manufacturing, 2019
- FuRAM – Follow-up on research needs for industrialization of metal AM, 2021

Funded by Vinnova/SIP Metallic Materials

Funding for metal AM research in Sweden



Data spring 2021

In-kind is not included

Workshops



- Input to form the AM-Arena (2)
- Roadmap RAMP-UP (2)
- Design for AM
- NDT
- Machining of AM
- Post processing
- Mechanical properties
- Research needs for industrialization FuRAM
- Standardization in metal AM; an industrial perspective
- Standards (5)
- Quality control and product qualification
- Examples of real industrial applications
- Post treatment and surface treatment
- New processes and printers
- Production yield and process robustness
- Influence of powder characteristics on printability

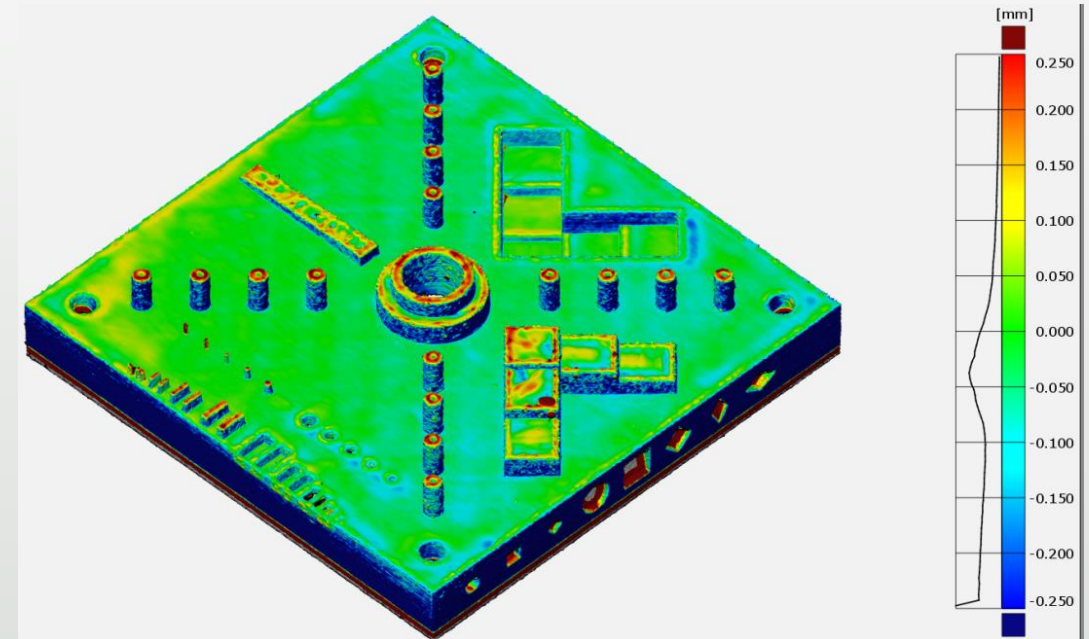
Visits, seminars and courses

- Research university day at Siemens Energy
- AM-day in Stockholm, KTH
- Industrial one-day course for members
- Digital Metal
- Höganäs
- Additivt teknikcenter in Hultsfred
- Sandvik Additive
- Cellink
- Chalmers, HV, KTH, LTH, MiU, RISE, Swerim, UU, Vinnova,...



Projects

- Benchmark the various metal-AM equipment available in the AM-Arena in their performance
- IDEA-PRINT – Design of AM components – topology optimization and tools
- Turn2AM – Machining of additively manufactured parts
- Material database
- Master thesis work



Conferences (Joint and own)

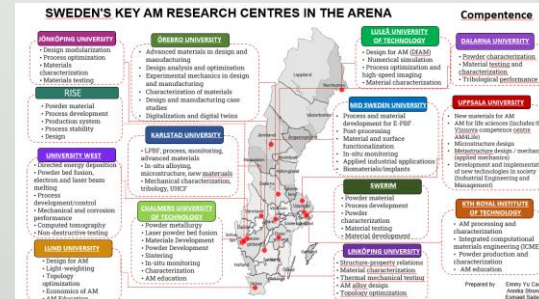
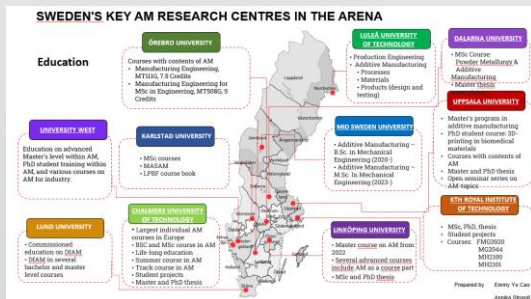
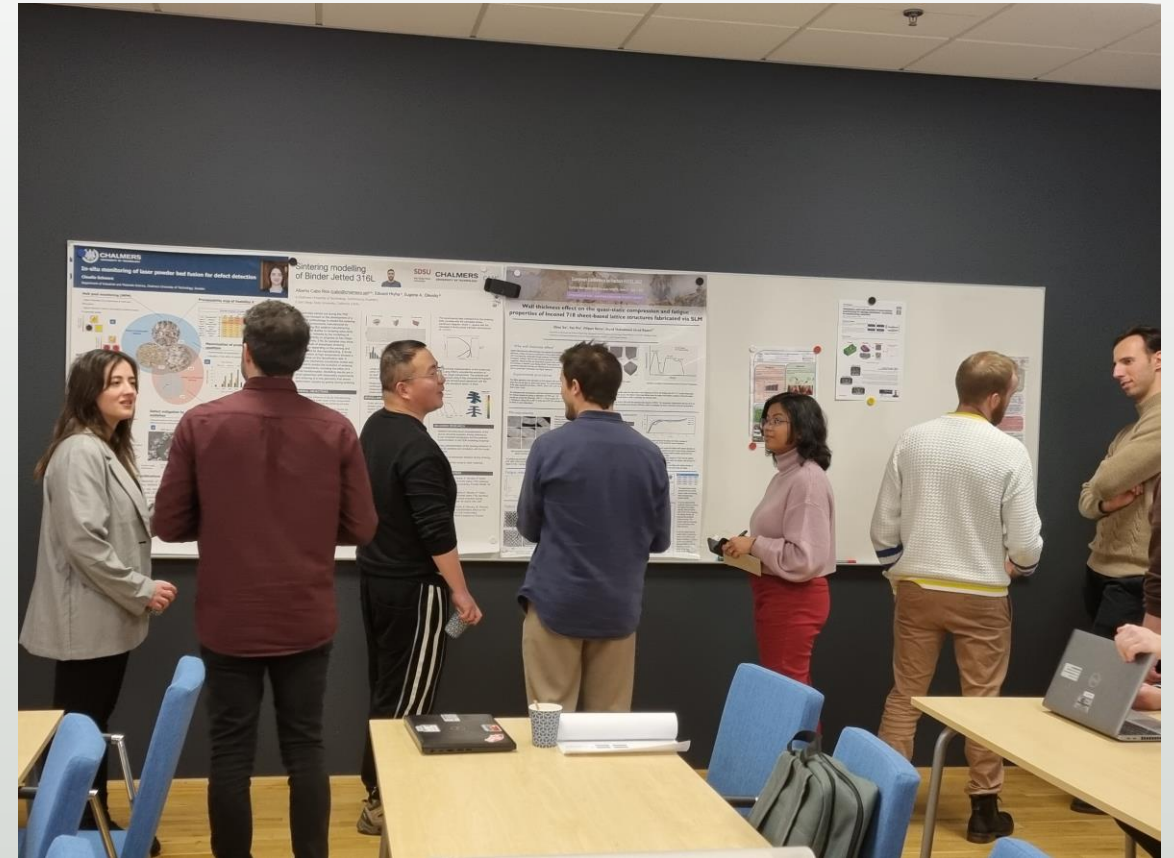
- Elmia 3D + conference 2018 (SVEAT)
- Future AM 2018 (CAM2)
- EBM-user group meeting in Åre 2019
- Alloys for AM 2019 (CAM2)
- Powder Meet 2022 (TO80, SFMT)
- Additive Intelligence 4.0 2024 (RISE AMC, CAM2, AM4Life)
- Powder Meet 2024 (TO80, SFMT)
- Academic conferences 2022 MiU, 2023 KTH, 2024 HV, 2025 LiU



AM-Arena presentations and representation in panels on many occasions e.g. MAMC2019 in Örebro and in different countries e.g. Finland, Germany, Switzerland.

Academic group and PhD-network

- Education map
- Competence database + map
- Academic conferences 2022 MiU, 2023 KTH, 2024 HV, 2025 LiU
- PhD-network launched 2022 (~50 students)



Webinars during Covid

- Indirect AM
- Digitalization
- Environment, health and safety
- FuRAM
- PBF-EB
- Microstructure and Micro-Mechanical Characterization of As-built and Heat treated samples of Hastelloy X produced by PBF-LB
- Applications of optical tomography monitoring of PBF-LB
- AM and biomaterial/life science with focus on metals
- DED
- Binder jetting

Conclusion and outlook

- The AM-Arena has led to increased collaboration within Sweden and, based on the roadmap, taken steps towards the goal to increase adoption and speed up sustainable industrialization of metal AM.
- From 2025 the Arena will no longer exist, and the PhD-network will be hosted by Jernkontoret as part of Steel Academy and SFMT will support them.
- The academic group will continue to take turn to arrange academic conferences and collaborate.
- Reports and maps can still be downloaded from the www.AM-Arena.se for some time.

***Thanks to all members for your contributions and nice discussions!
Looking forward to future collaboration.***

/Annika Strondl, Swerim, coordinator of the AM-Arena

