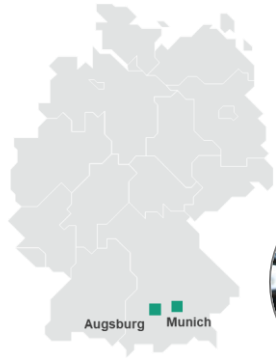

NORMS & STANDARDS FOR ADDITIVE MANUFACTURING

3rd Munich Technology Conference on Additive Manufacturing, 09th October 2019
Prof. Dr.-Ing. Christian Seidel



Additive Manufacturing@Fraunhofer IGCV

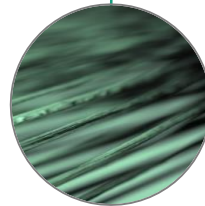
Interdisciplinary Core Competency Engaging 30 Scientists



AM@Casting Technology Dr. Günther

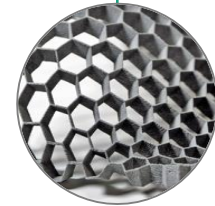
Rapid Tooling for metal parts – binder jetting for processing of sand to create moulds etc.

Head of Additive Manufacturing Prof. Dr. Seidel



AM@Composite Technology Prof. Dr. Taha

Material Extrusion for processing fiber-reinforced polymers



AM@Processing Technology Dr. Schlick | Prof. Dr. Schilp

Laser-based Powder Bed Fusion of Metals and Directed Energy Deposition (DED) processes for the production of metal and metal-ceramic components

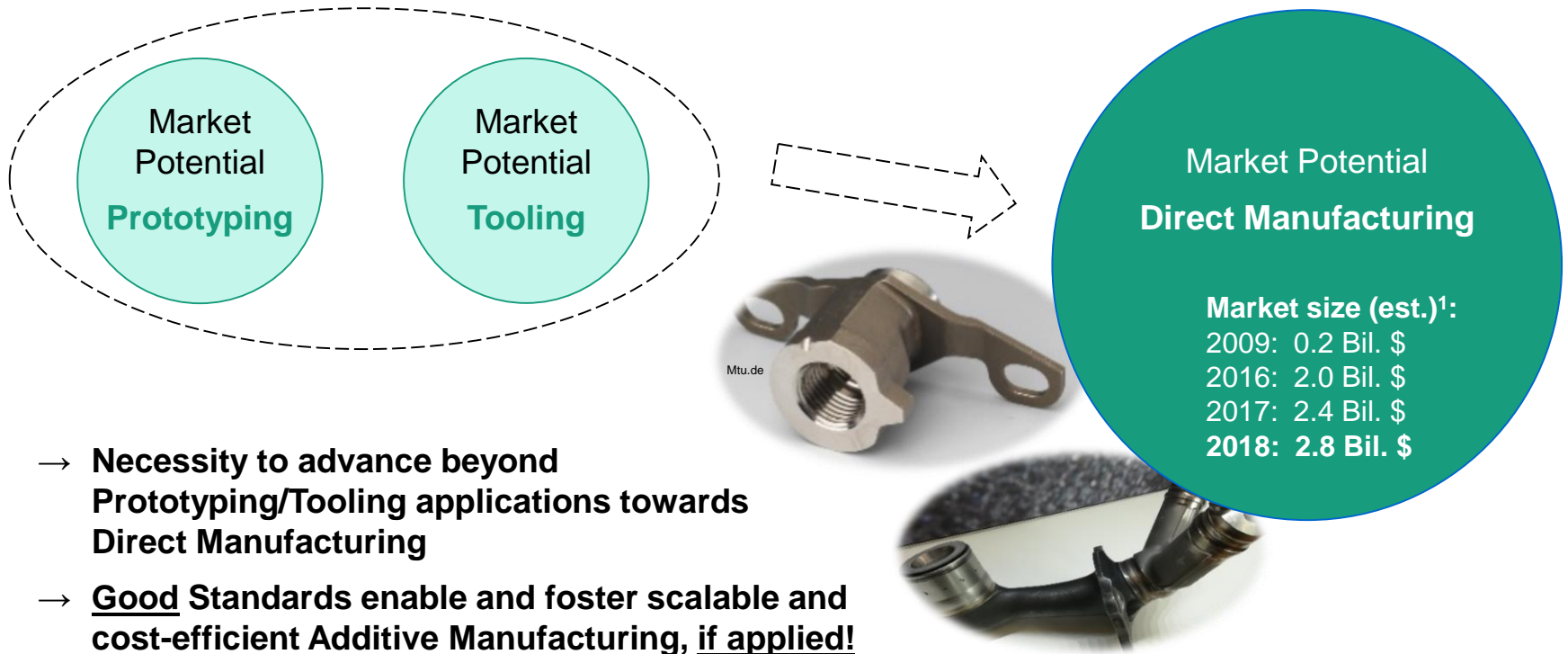


30
Scientists

60
Students

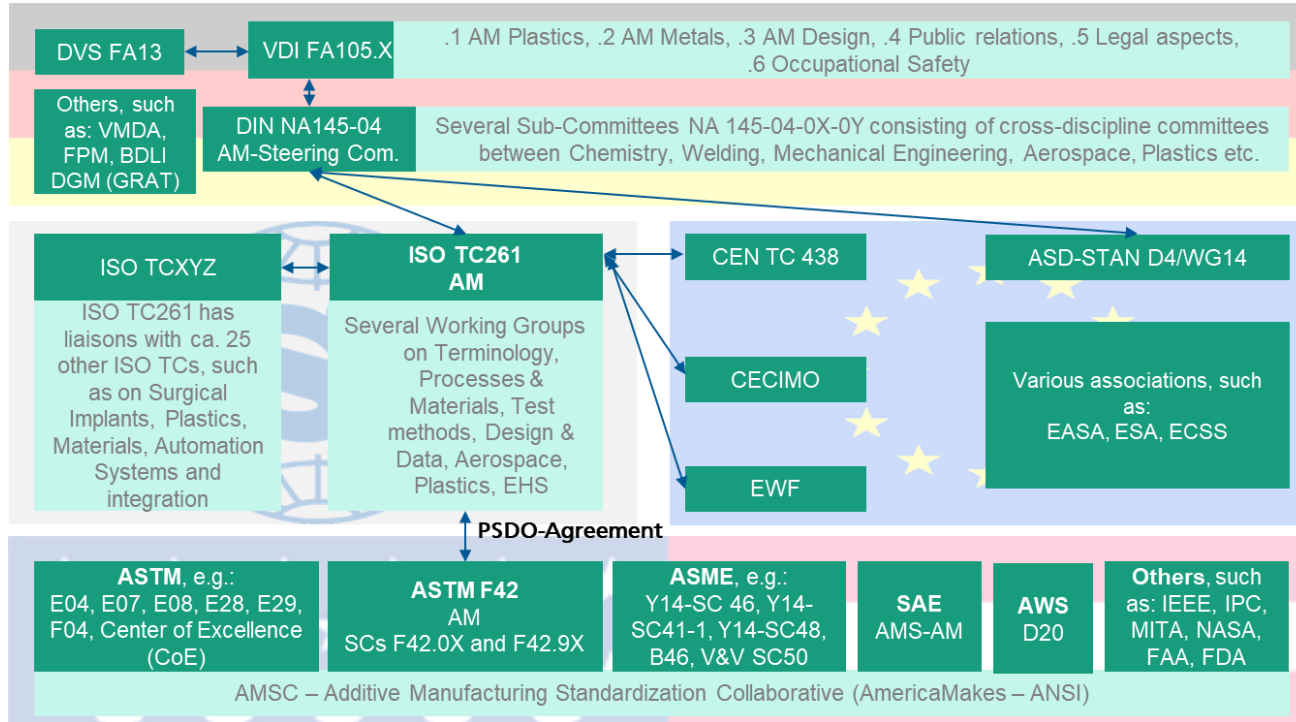
Why Standards are Important Today!

Significant Market Potential for Direct Manufacturing



Worldwide Standardization Activities

Overview on Associations, Certification Bodies and SDOs (incomplete)



↔ Arrows indicate formal cooperation |
 TC = Technical Committee |
 FA & NA = German for Committee |
 AM = Additive Manufacturing |
 EHS = Environment, Health and Safety |
 PSDO = Partner Standards Developing Organization |
 SDO = standards development organizations

Brief Introduction of Collaboration Between ISO TC261 and ASTM F42

“One World, One Standard!”



Plenary Meeting ISO TC261, Senlis (France)
September 2019

Facts

- collaboration since 2013, ASTM F42 founded in 2009, ISO TC261 founded in 2011
- more than 30 countries involved
- more than 800 experts involved

Serving Industry Needs!

- >30 published AM standards
- more than 50 standards under development
- contributing to industry-specific comprehensive sets of standards

Thank you for your attention.

If you have any questions, please feel free to contact me.

Prof. Dr.-Ing. Christian Seidel

Chairman ISO TC261

Professor for Manufacturing Technologies and
Additive Manufacturing at
University of Applied Sciences Munich

Head of Additive Manufacturing at

Fraunhofer Research Institution for Casting, Composite and
Processing Technology IGCV

Beim Glaspalast 5 | D-86153 Augsburg

Phone +49 821 90670-127 Fax -199

christian.seidel@hm.edu

christian.seidel@igcv.fraunhofer.de

www.igcv.fraunhofer.de/en.html

<https://www.linkedin.com/in/christian-seidel-a6b218182/>

Proud Member of Fraunhofer-Gesellschaft

Fraunhofer IGCV, Located in the Southern Part of Germany (Bavaria), is One out of 72 Fraunhofer-Units



150 Employees

IGCV Administration

Werner-von-Siemens Street 6
Sigma Technopark,
Building 10
86159 Augsburg



Fibre-Reinforced Composites

Main location:
Am Technologiezentrum 2,
86159 Augsburg



Augsburg

Munich



Processing technology

Provino Street 52, Building B1,
86153 Augsburg
and
Beim Glaspalast 5,
86153 Augsburg



Casting technology

15 Zeppelin Street,
85748 Garching near Munich



IGCV@Ludwig

Bölkow Campus

c/o Ludwig Bölkow campus
Willy-Messerschmitt Street 1
82024 Taufkirchen

Some Basic Thoughts on the Topic of Standardization

Simplified ranking between different document types

| Guidelines e.g. ISO/ASTM TR (Technical Reports) | Standards e.g. ISO/ASTM standards | Regulations | Laws |
|--|--|---|---|
| <ul style="list-style-type: none">▪ voluntary application, informative▪ insights into best practices▪ wording: 'could', 'should' etc.▪ less demanding than a standard | <ul style="list-style-type: none">▪ voluntary application, normative▪ technical consensus on best practices▪ use 'shall', 'need to be', 'have to' etc. | <ul style="list-style-type: none">▪ mandatory to comply▪ define how things needs to be done | <ul style="list-style-type: none">▪ mandatory to comply▪ define what needs to be done |

Some basic thoughts on the topic of standardization

Famous examples

“A standard is a common language that promotes the flow of goods between buyer and seller and protects the general welfare.”

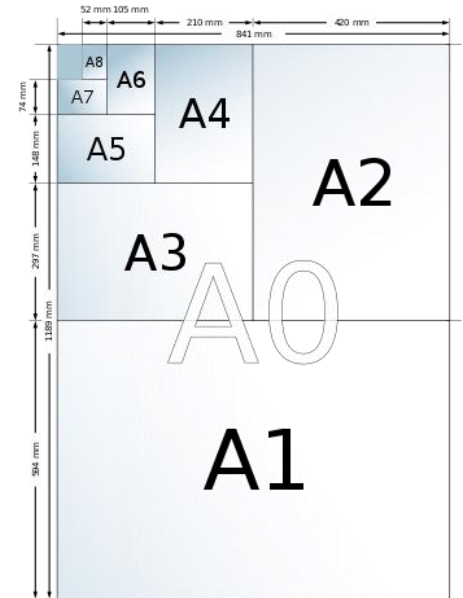


ISO 668 – Standard for freight containers

Who writes the standards?

→ **“For Users – By users!”**

→ **Our experience and know-how → technical consensus**
→ **international standard**



DIN EN ISO 216 –
Standard for paper sizes