

International Standardization and its relevance for Model Based Development

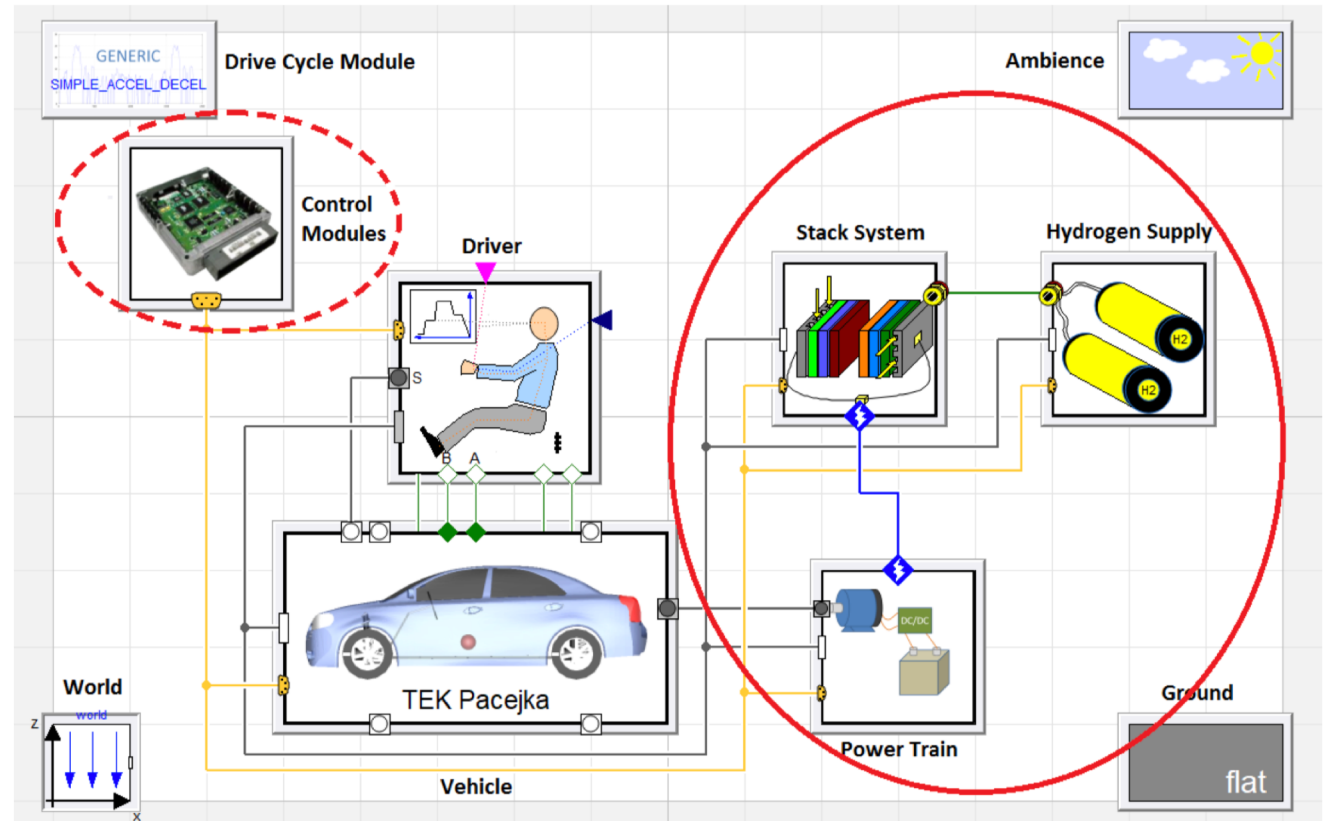
Charlotta Johnsson

Professor, Dept. of Automatic Control, Lund University

Chair, ISO TC184/SC5

Model Based Development

The system model is at the center of the development process: from requirements dev., through design, to implementation, simulation and testing



Ref: Sara Sigfridsson, Lunds Universitet

International Standardization

- ... help businesses of any size and sector.
- ... reduce costs, increase productivity, and access new markets.
- ... is seen as an enabler.
- ... is pointed out as one of the most important enablers for realizing Smart X (X = Cities, Industry, energy, systems, etc).
- .. assumes and requires collaboration between individuals, nations, and corporations.

“Standards make market access easier, in particular for SMEs. They can enhance brand recognition and give customers the guarantee that the technology is tested and reliable.”

Jens Albens
CEO, NanotronTechnologies Ltd,
Germany

ME

- Model Based Development
 - No expert,
 - but solid background in Automatic Control
 - Hence, theoretically convinced
- International Standardization
 - Expert,
 - and experienced in national/international standardization work
 - Hence, practically convinced



What is a standard?

Regulations (Rules)

- Legal – Mandatory
- Example: US FDA (Food and Drug Administration) rules

Standards

- Not mandatory
- Quality, Commercial, industrial or other
- Certification / Accreditation scheme
- Example : ISO, ISA, IEC

Guidelines / Guidances

- Not mandatory
- Represent current way of thinking
- Example GAMP, FDA Guidance documents

ISO 80000: Quantities and Units

ISO 80000 gives general information and definitions concerning quantities, system of quantities, units, and symbols

Examples: Meter (m), Kilogram (kg), Seconds (s), Amperer (A), kelvin (K), Mol (mol), candela (cd)



Standardization ...

UN and/or WTO has appointed three global standardisation organizations

National mirror organizations in the majority of the world's 195 independent countries



What is delivered? (Focus on Industrial Applications)

IEC 61131

ISO 15704

ISO 16300

ISO 15746

IEC 61512

IEC 62264

ISO 20242

ISO 22549

ISO 22400

IEC 62449

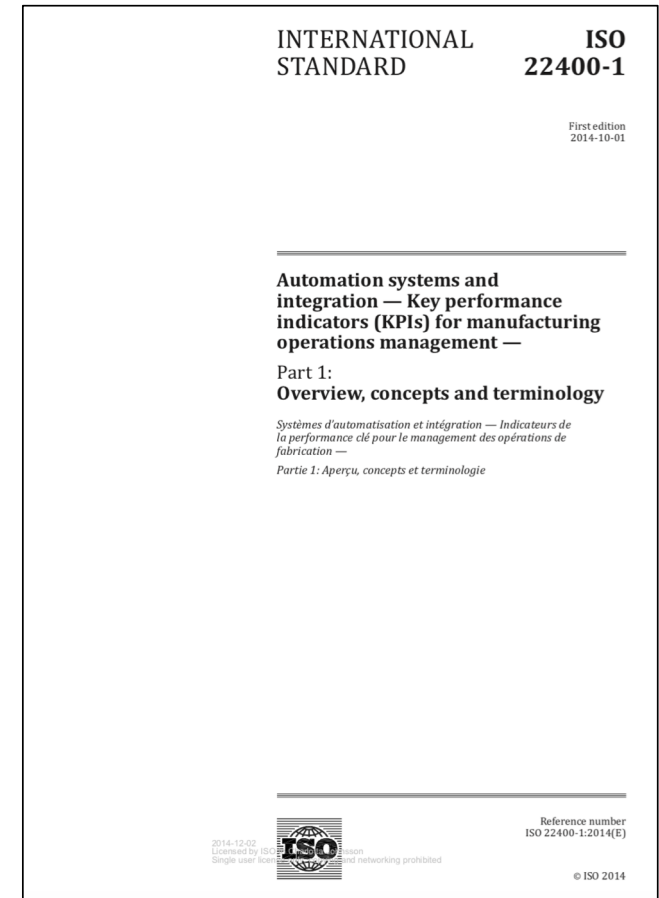
ISO 18828

ISO 20140

IEC/ISO 62264

ISO 16400

TR 16161



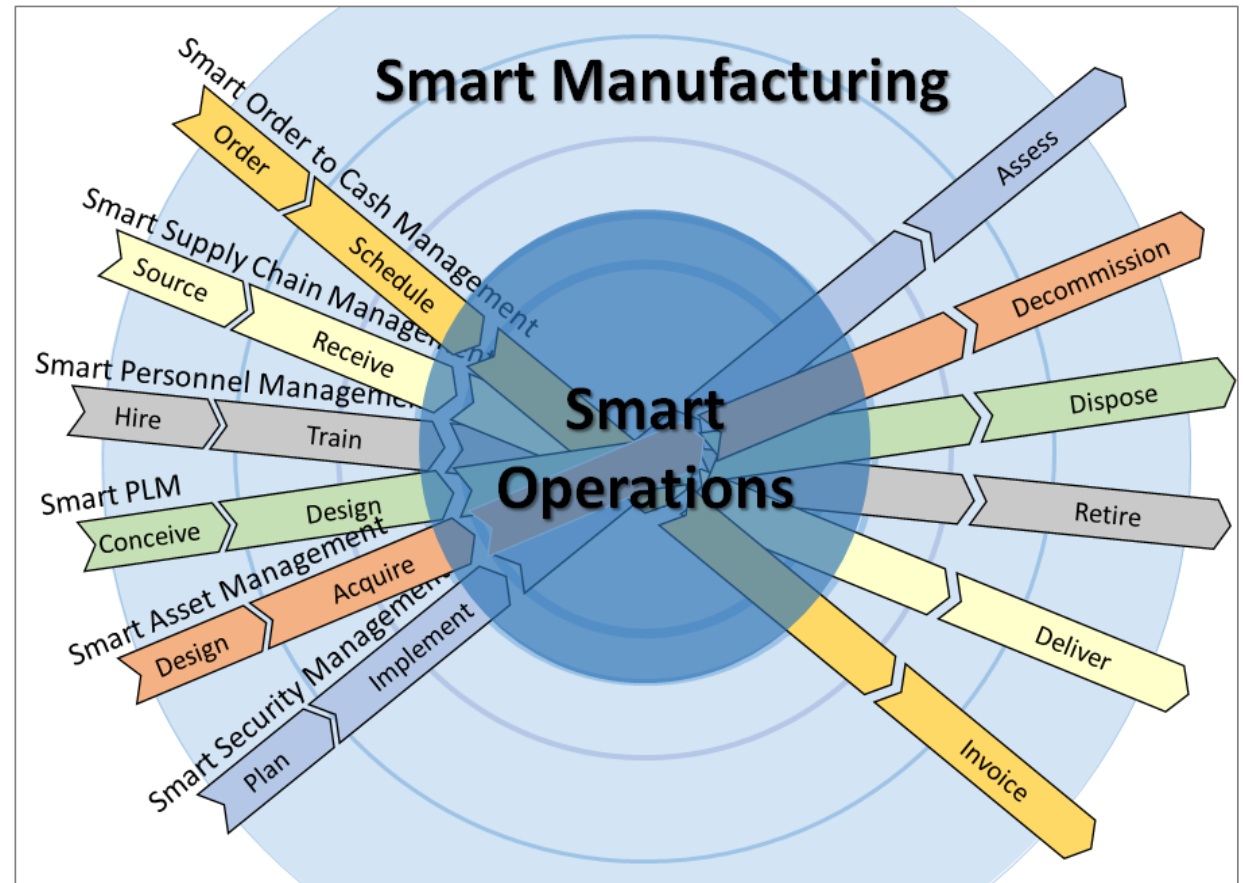


Standards
related to
(Smart)
Industry

ISO/IEC JTC 1 SC7 / SC17 / SC27 / SC32 / SC37 / SC38 / SC40	Information technology
ISO TC 10 SC 10	Technical product documentation
ISO TC 39 SC 10	Process plant documentation
ISO TC 184 SC1 / SC4 / SC5	Automation systems and integration
ISO TC 211	Geographic information/Geomatics
ISO TC 261	Additive manufacturing
ISO TC 292	Security and resilienc
ISO TC 299	Robotics

Smart industry

... fully-integrated, collaborative manufacturing systems that respond in real time to meet changing demands and conditions in the factory, in the supply network, and in customer needs



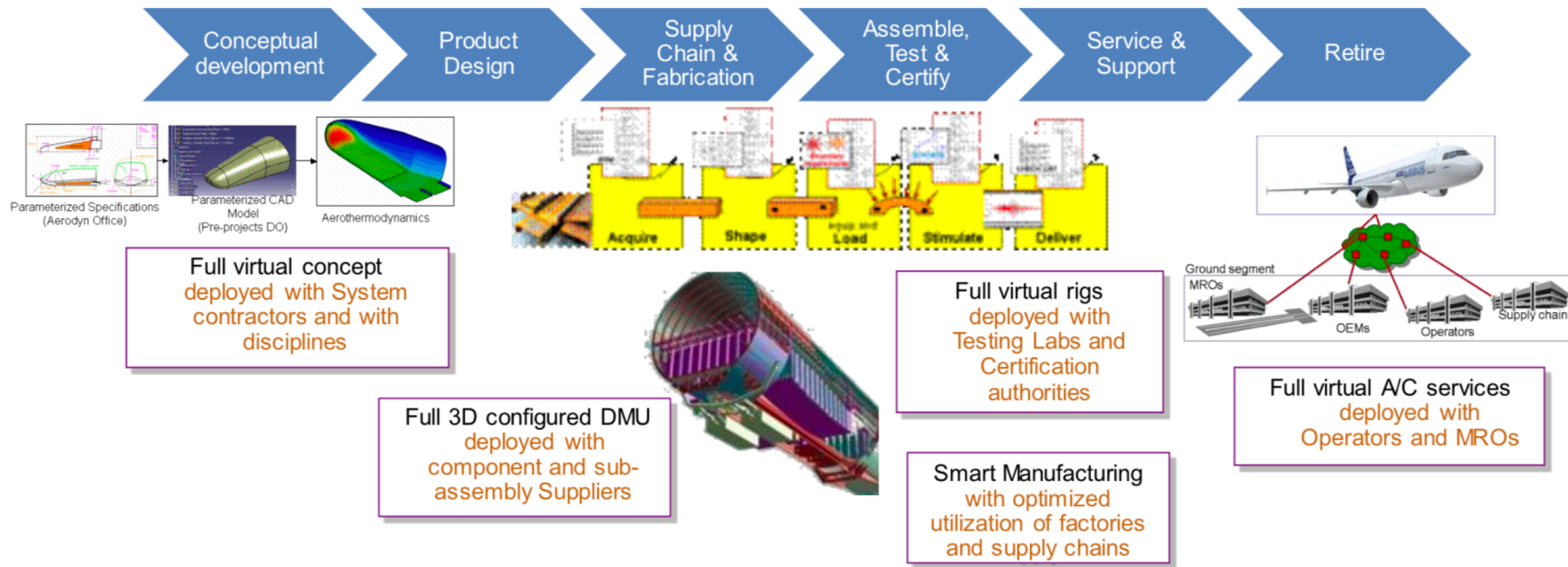
Ref: NIST-model

Smart Industry - Interpretation

Smart Manufacturing extends today's manufacturing. It is characterized by independent actors sharing standardized information. The actors can pro-actively and re-actively act upon the information. The actors collaborate dynamically in network structures. This collaboration occurs among and within lifecycles, on both strategic and operational levels, providing added value for organizations.

Note: examples of actors are companies, products, assets, processes and parts

Example: Aerospace and defence industry



**How to organize collaboration around these artifacts?
How to reach optimum industrial performance?**

Ref: Kenny Swope, SC4 and Boeing

ISO TC184/SC4

Industrial Data

Chair: Kenny Swope, USA
Secretary: Ryan Mayes, USA

765

published ISO standards*
under the direct responsibility
of ISO/TC 184/SC 4

24

ISO standards under development*
under the direct responsibility
of ISO/TC 184/SC 4

15

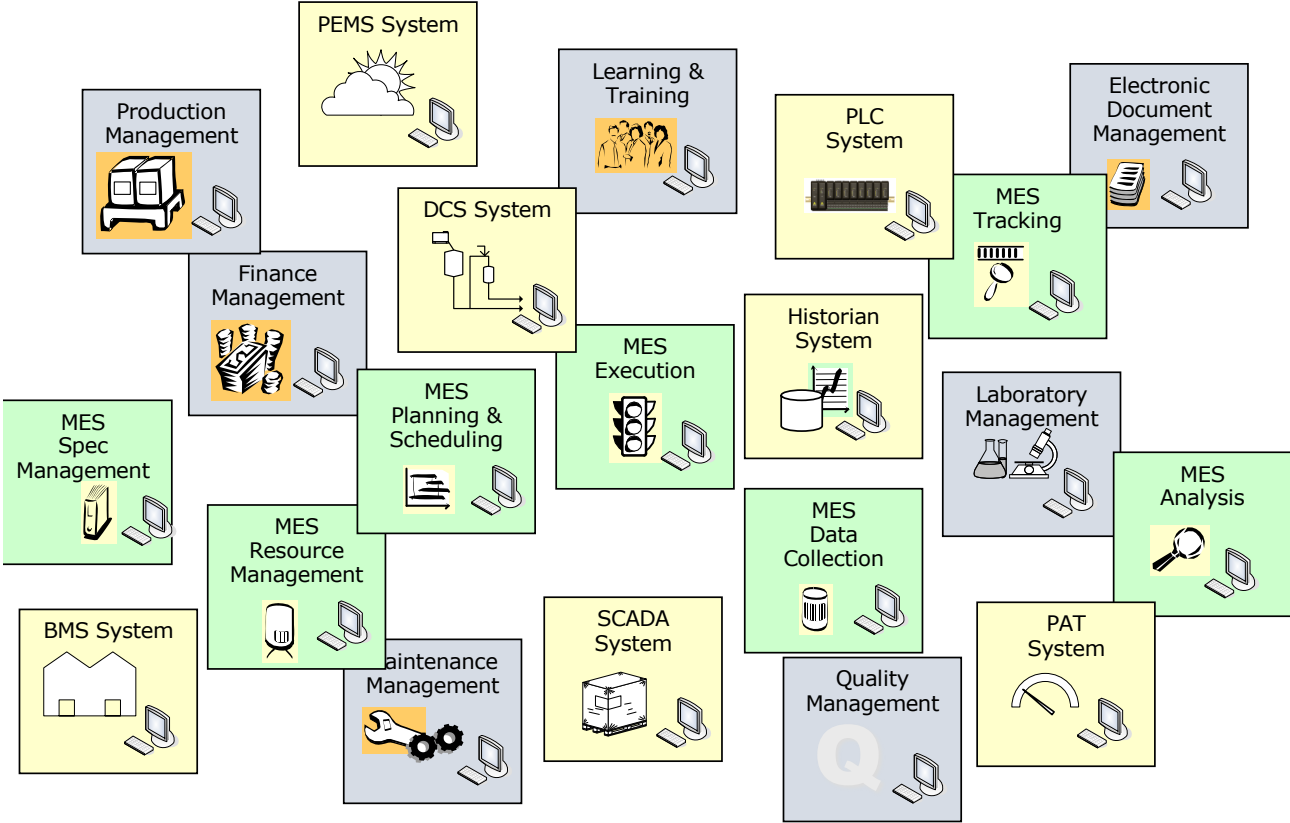
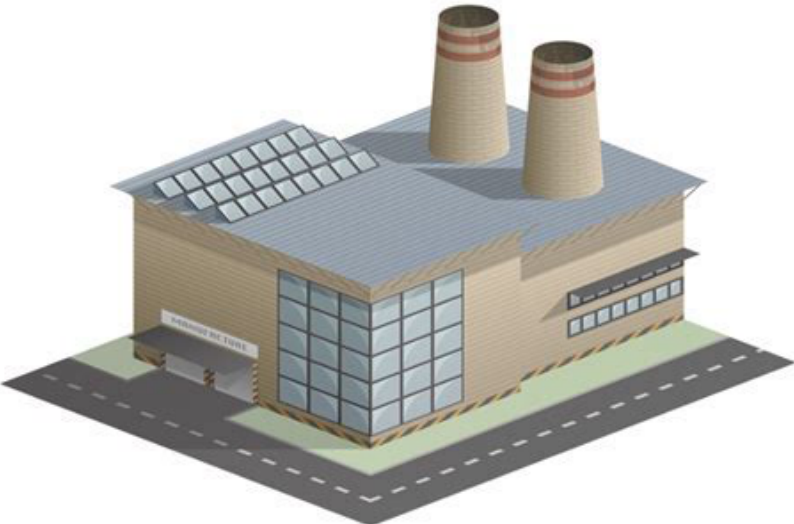
Participating members

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Observing members

TC 184/ SC 4	Title	Convenor
AG0	Change management advisory group	Kenneth Swope
PPC	Policy & planning committee	Torbjörn Holm
QC	Quality committee	Hikmet Hussain
WG 2	Product characteristics and libraries	Nikolaus Ondracek
WG 3	Oil, gas, process, and power	Paul van Exel
JWG 8	Manufacturing process and management information TC 184/SC4 – TC 184/SC5	Anne-Françoise Cutting-Decelle
WG 11	Implementation methods and conformance	David Loffredo
WG 12	STEP product modeling and resources	Keith Huntten
WG 13	Industrial data quality	Tim King
WG 15	Digital manufacturing	Martin Hardwick
JWG 16	Formats for visualization and other derived forms of product data TC 184/SC 4 – TC 171/SC 2 – JTC 1/SC 24	Soonhung Han
WG 21	SMRL validation team	Keith Huntten
WG 22	Reference data validation team	Nils Sandmark
WG 23	Vocabulary validation team	Aminata Mbengue
JWG 24	Product Properties and classes and their identification	Hiroshi Murayama

Example: Manufacturing operations



Ref: Charlotta Johnsson, SC5 and Lund University

ISO TC184/SC5

Interoperability, integration, and architectures for enterprise systems and automation applications

Chair: Charlotta Johnsson, Sweden

Secretary: Walter Zoller, USA

56

published ISO standards*
under the direct responsibility
of ISO/TC 184/SC 5

12

ISO standards under development*
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of ISO/TC 184/SC 5

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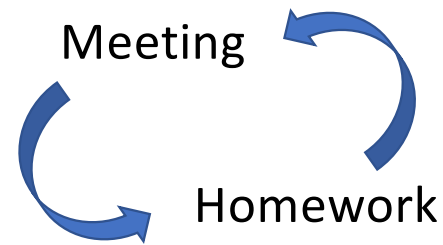
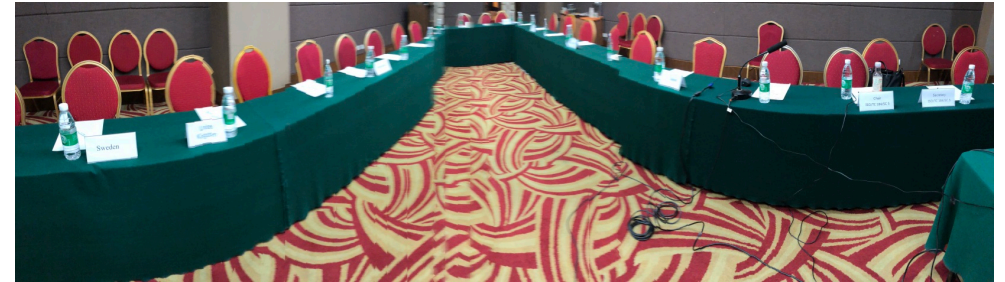
Participating members

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Observing members

Working Group	Title	Convenor
WG1	Modelling and Architecture	Richard Martin (USA)
WG4	Manufacturing software and its environment	Mitchiko Matsuda (Japan)
WG5	Open systems application frameworks	Hongye Su (China)
WG6	Application Service Interface	Robert Patzke (Germany)
WG9	Key performance indicators for manufacturing operations mgmt	Andreas Kirsch (Germany)
WG10	Evaluation of energy efficiency and other relevant factors of a manufacturing system with respect to its environmental influence.	Fumihiko Kimura (Japan)
WG12	Convergence of informatization and industrialization (CII)	Hongye Su (China)
WG13	Equipment Behaviour Catalogue for Virtual Prod.Systems	Naohisa Matsushita (Japan)
SG5	Model-based standards authoring Study Group	Dov Dori (Israel)
SG6	Mass Customization	Wang Xiaohu (China)
SG7	Interoperability of Simulation Models on Different Platforms	Lin Tingyu (China)
JWG5 (IEC)	Enterprise-Control System Integration	Dennis Brandt (USA)
JWG8 (SC4)	Manufacturing process and management information	Jochen Hartung (Germany)

How is the work done?



2018 ISO TC184 Supermeeting

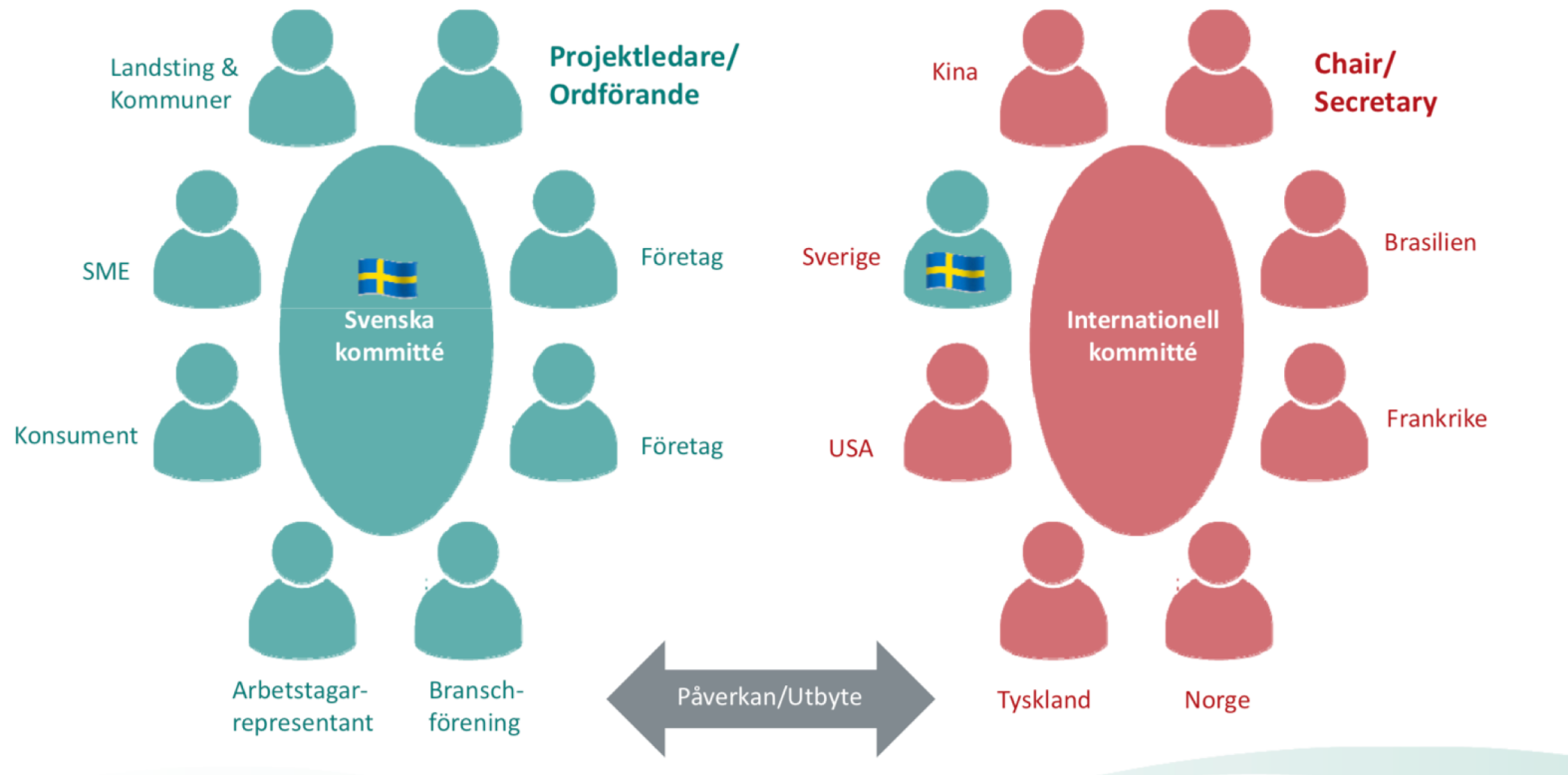
Cavalcade Day

Smart Manufacturing

HOST



How to influence a standard?



Project 4S ...

... connects results from the Swedish Innovation projects for industrial digitalisation (e.g. Vinnova PiiA and Vinnova Prod2030), with ongoing international development work in ISO and IEC standardisation.

... Can provide relevant research projects financial support (travels etc) so that their results can influence the international standardisation work.

For Swedish participants



Standards and Strategies
for Smart Swedish Industry

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THANK YOU!