Evolution To Thinking In Systems – More Than The Sum Of The Parts

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Systems & Systems Approach

System: *a group of interacting, interrelated, or interdependent elements forming a purposeful whole of a complexity that requires specific structures and work methods in order to support applications and services relevant to IEC stakeholders.*

The whole is more than the sum of the parts….

?

=

The Starting Point……

- Many Technical Committees, Subcommittees & Working Groups
- Many Address Specific Products or Uses, Sometimes Overlap

Do They Communicate?

Do They Collaborate?

IEC TC / SC Culture

- Each committee has their own culture
- Many are stable, address specific industry groups
- Many want to be the SINGLE place to address all aspects of their domain
- Do they (can they) reach other groups?
  - Inside IEC?
  - Outside of IEC?

Forts or Bridges?

Technology Convergence

Products become multifunctional, complex

Vintage phone image: Kittisak Taramas © 123RF.com

Factors Driving The Systems Approach

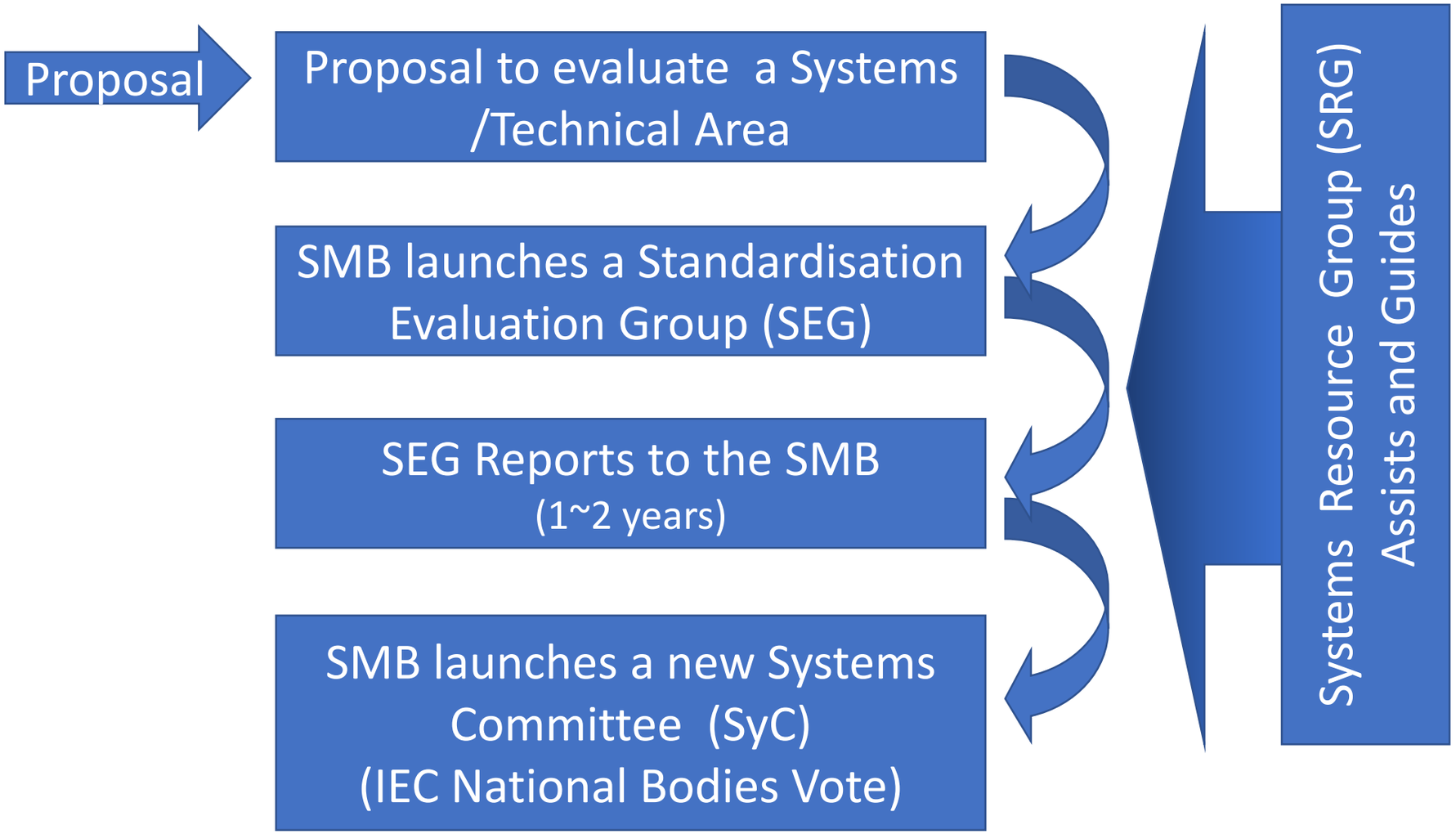
- **Technology Integration**
  - Addressing interfaces and interactions between components
- **Technology Convergence**
  - Increased collaboration between standardization groups
- **Organizational Aspects**
  - Culture change
  - New ways of thinking
  - Engaging new participants

Why a Systems Approach?

A new level of collaboration

Photo adapted from http://www.everystockphoto.com/photographer.php?photographer_id=9940

How Is An SyC Formed?



How Does An SyC Work?

- SyCs are structured & work like TCs
- Decisions are taken by SyC P-members through votes
- WGs experts nominated by NCs
- Liaisons same as for TCs
- Secretariat held by the IEC CO
- Chair elected by the SMB
- Functionally, they are a combination of:
  - A Technical Committee
  - An Advisory Committee
  - A Standardization Evaluation Group

Develop documents to address domain, interfaces, use cases, map existing work

Look across broad range of groups to identify and collaborate to fill gaps

Understand The Market From A Systems Perspective

SyC Publications

- SyCs have a unique deliverable:

  Systems Reference Deliverable (SRD)

- SRDs can be **normative or informative**
- SRDs are approved using the same voting / process as used for Technical Specifications (TS)
- SyCs can publish an International Standard (IS) under specific conditions
  - Requires prior approval of the SMB
  - Cannot duplicate / conflict with other IS
  - Can be a joint publication (ISO / IEC for example)

SRDs: Many Types Of Content

- Standards Mapping
- Roadmap(s)
- Databases
- Architectures
- Profiles
- Interfaces And Transfer Functions
- Use Cases
- Domain Definition
- ..and more

The R-membership

FOR: Facilitating exchange of information & work for meaningful inputs to the work of the SyC

OPEN TO: Any committee (SyC, TC or SC) + any non IEC group (registered as legal entity) that is determined to have a meaningful input to the work

CAN: access to all official documents and submit comments to documents and nominate experts to the pool of experts and to the WGs (as guests)

CANNOT: Vote or propose an NP.

Pool of Experts

FOR: making SyC more open for participation to projects and groups rather than a specific work

OPEN TO: NCs and R-members that can appoint experts within the Pool of Experts based on their skillset which can add value to the work in The SyC

CAN: access to all official documents of all the SyC

SyC Forums And Advisory Groups

SyCs are permitted hold open forums on topics of choice and with invited participants beyond the group of contributing members of an SyC.

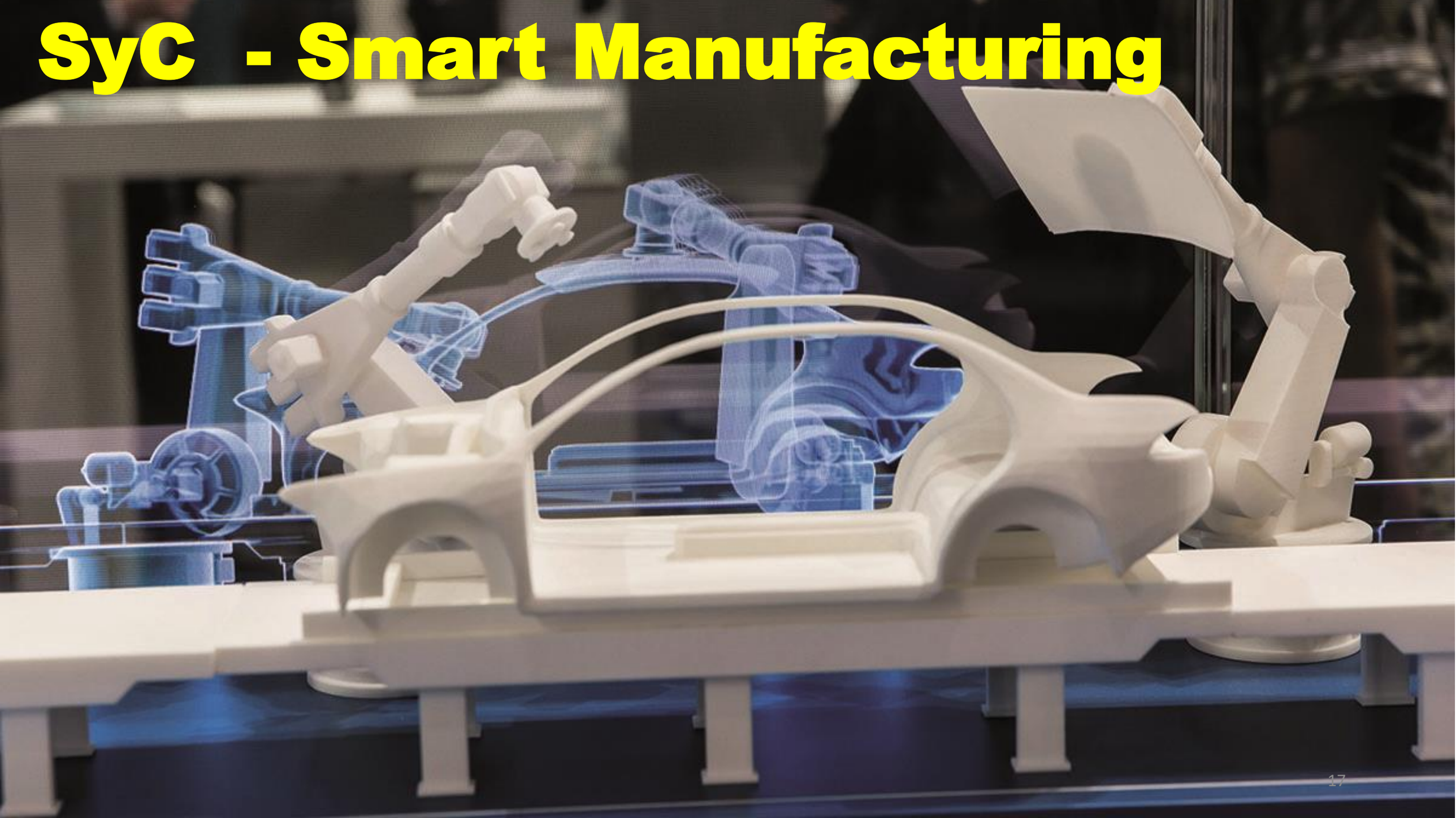
SyCs decide the composition, participation and structure of their sub groups including Advisory Groups, Forums, Steering groups, etc.

Current SyCs In The IEC

- SyC Smart Energy
- SyC AAL (Active Assisted Living)
- SyC Smart Cities
- SyC LVDC (Low Voltage Direct Current & LVDC for Electricity Access)
- SyC SM (Smart Manufacturing)
- SyC Communication Technologies & Architectures

- Systems Resource Group (SRG)

SyC - Smart Manufacturing



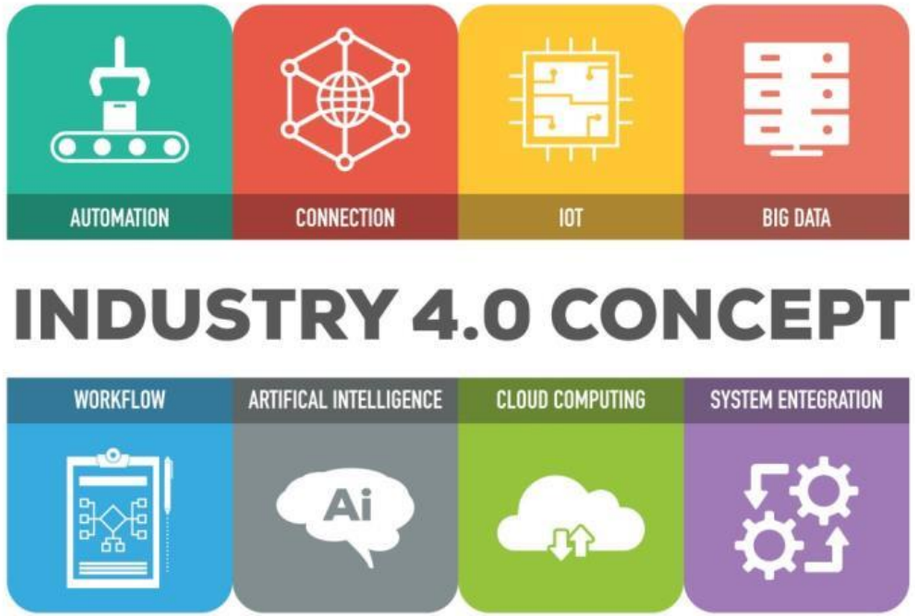
White Paper: Factory Of The Future

- Global needs, benefits, concepts, pre-conditions
- IEC Market Strategy Board – CTOs of leading industries
- Fraunhofer Institute for Manufacturing Engineering and Automation IPA

www.iec.ch/whitepaper/futurefactory

Industrial Internet of Things: much more than automation

- Market feedback
- Design and customization
- Purchasing
- Manufacturing
- Logistics and warehousing
- Distribution and sale
- Use, waste management, recycling
- Constant feedback loops

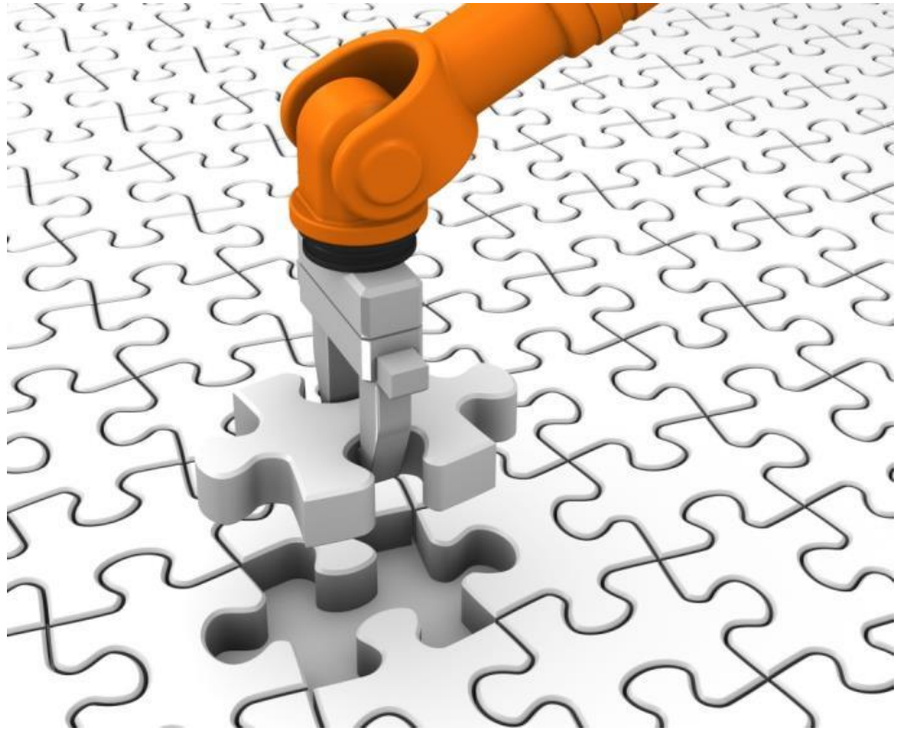


Unprecedented Integration Needed

Smart manufacturing: Standardization of central importance

Parts, batch, continuous process applications in:

Aerospace, automotive, semiconductors, food & beverage, metals & mining, pharmaceuticals, oil & gas, etc.



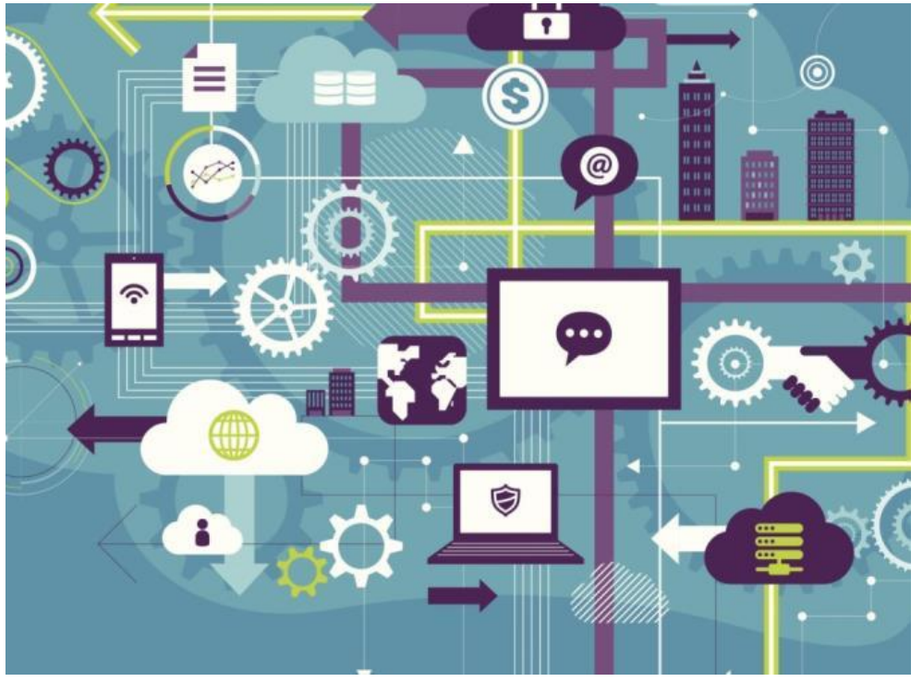
Smart Manufacturing Standards

Plant floor = IEC

- **Plant, equipment, personnel safety**
- **Data & equipment security**
- **Sustainability and environmental compliance**
- **Quality management**

IoT for smart manufacturing

- **Industrial automation and digitalization of processes - Wireless HART, Fieldbus, real-time Ethernet**
- **Interoperability of devices from different vendors**
- **Support full range of communication, monitoring, control, safety, security**



Many Different Technical Committees

Broad range of technologies

- Electric motors
- Batteries & energy storage systems
- Sensors & actuators
- Display devices
- Printed electronics
- Automation & control
- Information technology
- …

IT

Information & Communication Technology

Virtual world - free flow of data

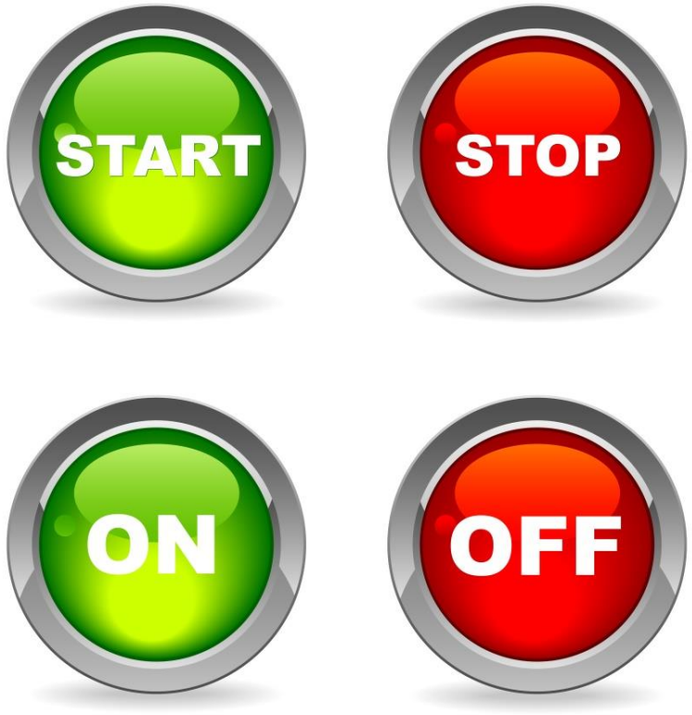
Online and computer networks

Identify, correct, protect from constant and evolving attacks – safeguard every layer

Constant upgrades and patches

OT

Operational Technology



Physical world - ensure that all actions are properly executed - on/off, open/closed

Physical devices and processes – focus on security and efficiency

Long-term investment, upgrades take time

Smart Manufacturing Success

- Will require collaboration with many IEC groups
- Will require collaboration with many groups outside IEC
- Success factors include
  - Vendor agnostic solutions
  - Global solutions
  - Well defined and agreed interfaces and tool sets
  - Coherent standardization programs from all

- Same success factors / risk factors for all systems work

Keys To Systems Success

- Identify and Appoint Real Systems Experts
  - TC Experts Think / Act Differently
- SRG Needs Resources, IEC Staffing
- Low threshold for access to SyCs From NCs
- Broader thinking – New players and new technologies
- Real Collaboration
  - Step aside from “my turf” to “our solutions”
  - Jointly develop a work plan
  - Shared execution – TCs, SyCs, and Outside Groups

…In Conclusion

- Systems Committees are new and IEC is new to Systems work
- The SyCs share the spirit of Systems work, but are structured differently to better respond to their needs
- The success of these works will lie on the capacity to engage TCs and SyCs together

Thank You!

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