

Setting the Standard for Automation™



Tool-less provisioning on ISA100.11a

Standards

Certification

Education & Training

Publishing

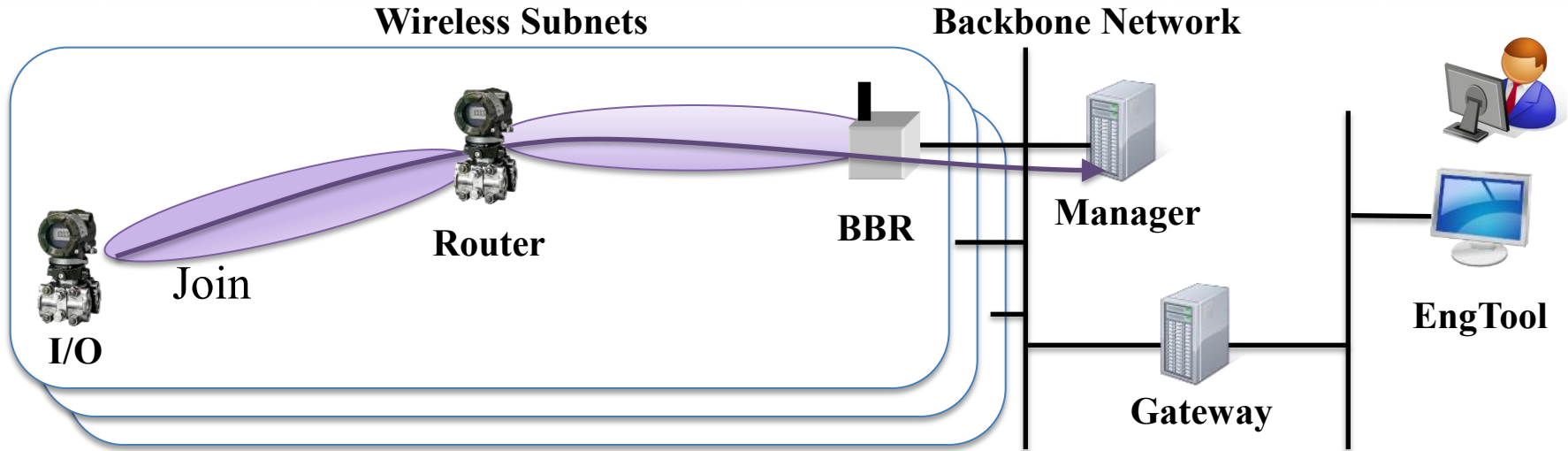
Conferences & Exhibits

- Kazunori Miyazawa is a research engineer of Yokogawa Electric corporation. He received a master degree of mechanical engineering of Meiji University in March, 1999. He belong to Yokogawa Electric corporation from April 1999. He is a member of WIDE project from 2001. He developed Linux IPv6 IPsec stack and a key exchange application as a core member of USAGI project that deployed IPv6 on Linux community.
- Currently he is a leader of PKI project of technical working group of ISA100 WCI.



- ISA100.11a architecture and provisioning
- Overview of Tool-less provisioning
- Router for Tool-less provisioning
- Feasibility Study
- Further study items
- Conclusion

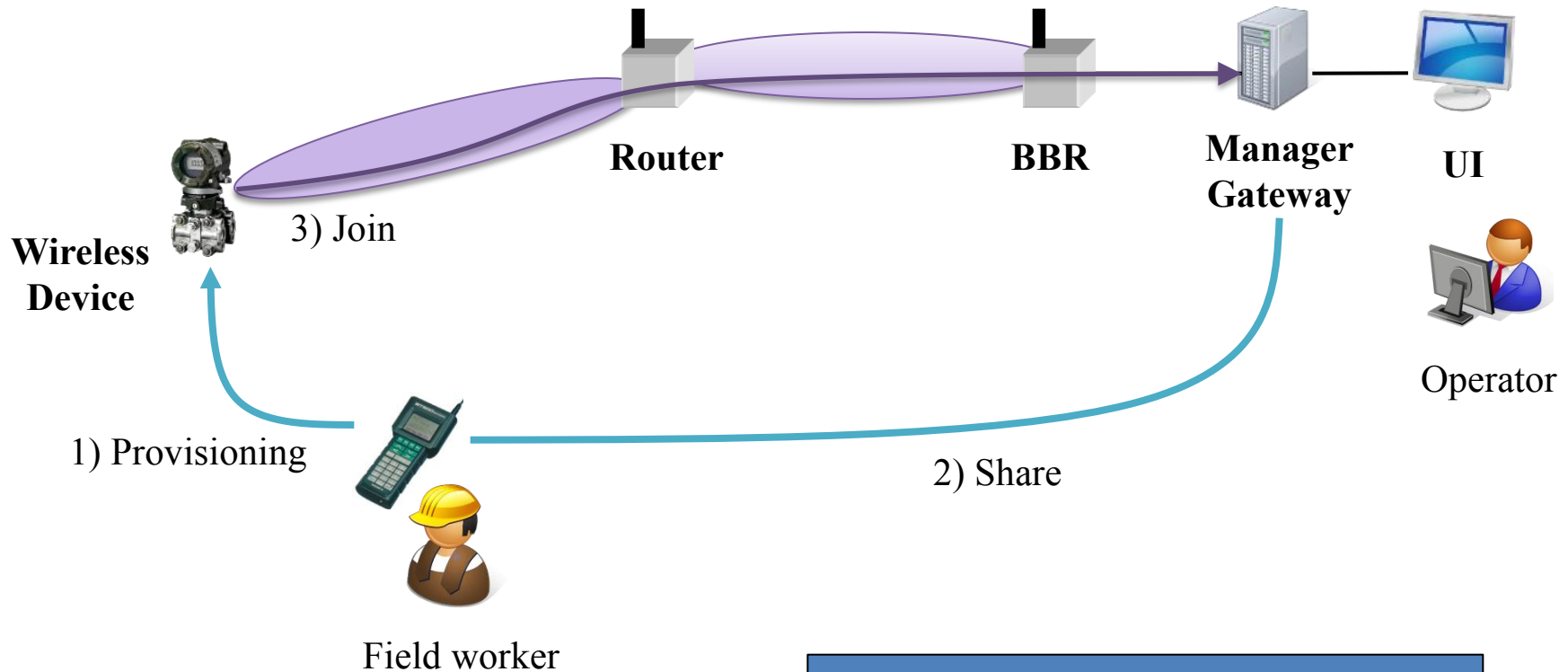
ISA100.11a network architecture



Security and Keys of ISA100.11a

	Shared with	Generate or derive	Protect by
DL key	DL subnet	Security manager	Master key
TL session key	Communication End points	Security manager	Master key
Master key	Device and manager	From join key	Join key
Join key	Device and manager	Provisioning	Provisioning method

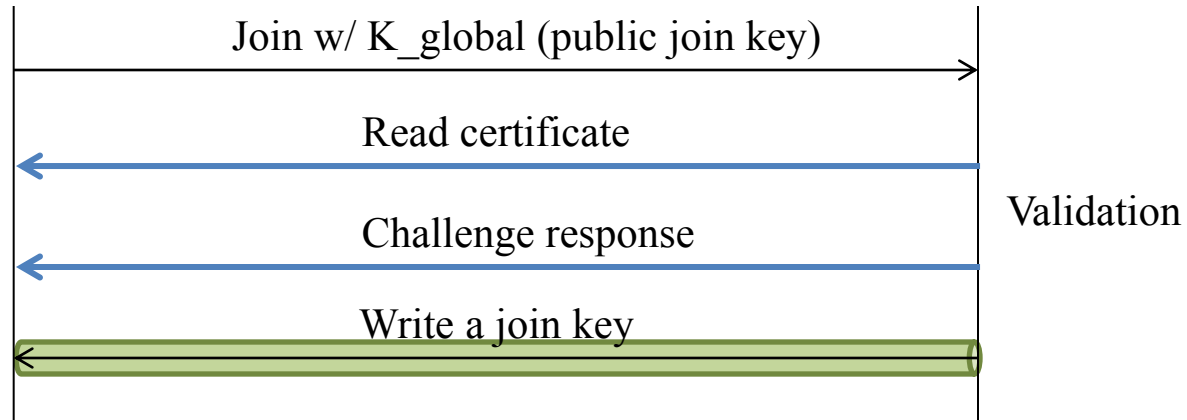
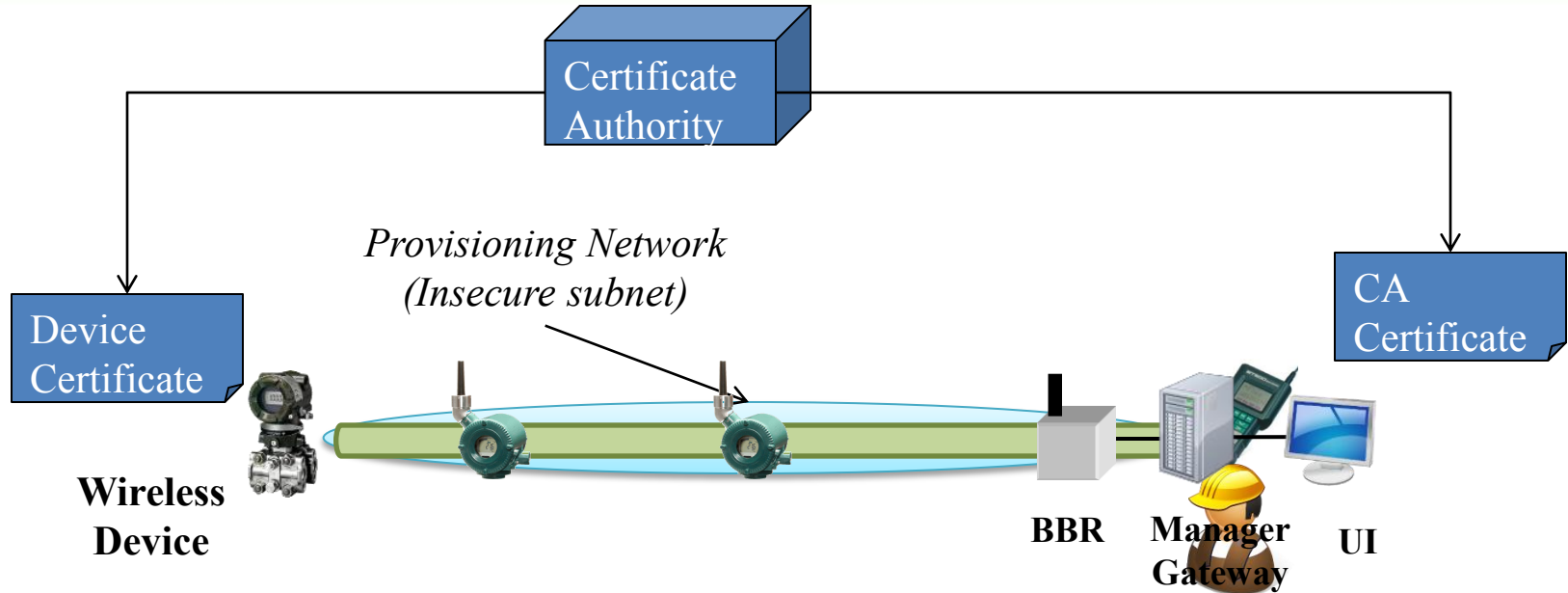
OOB provisioning depends on trustworthiness of a field worker



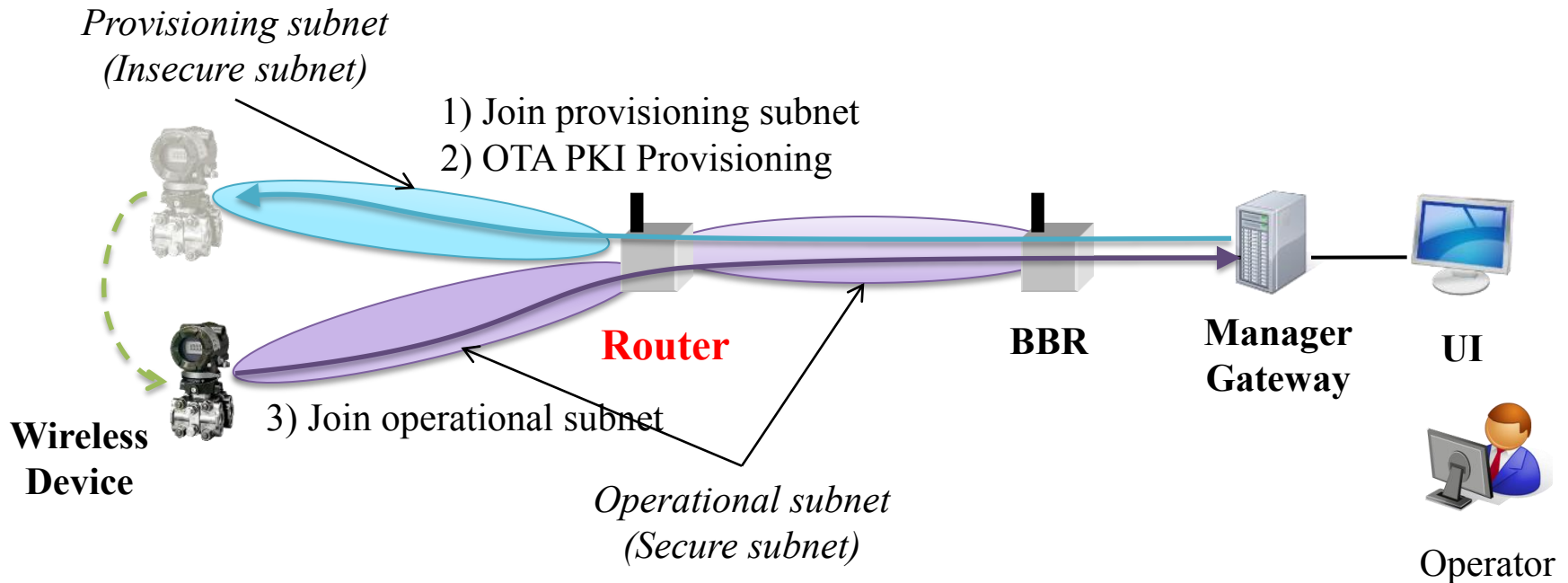
Potential risks

- ✓ Install to another device
- ✓ Lost or steal handheld

OTA provisioning secured with PKI



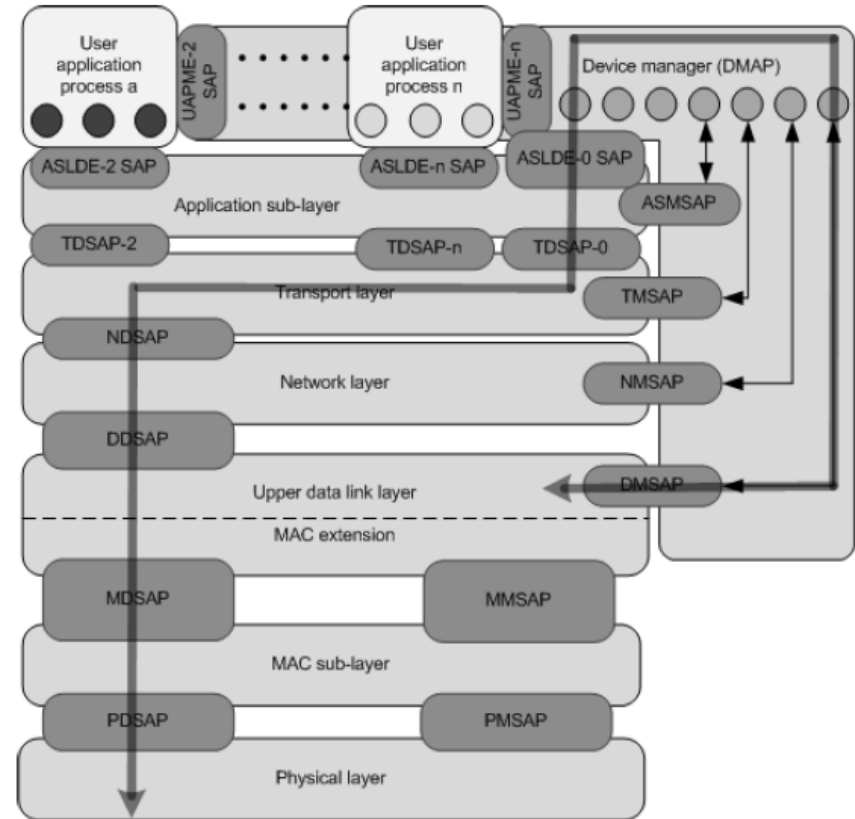
Overview of Tool-less provisioning



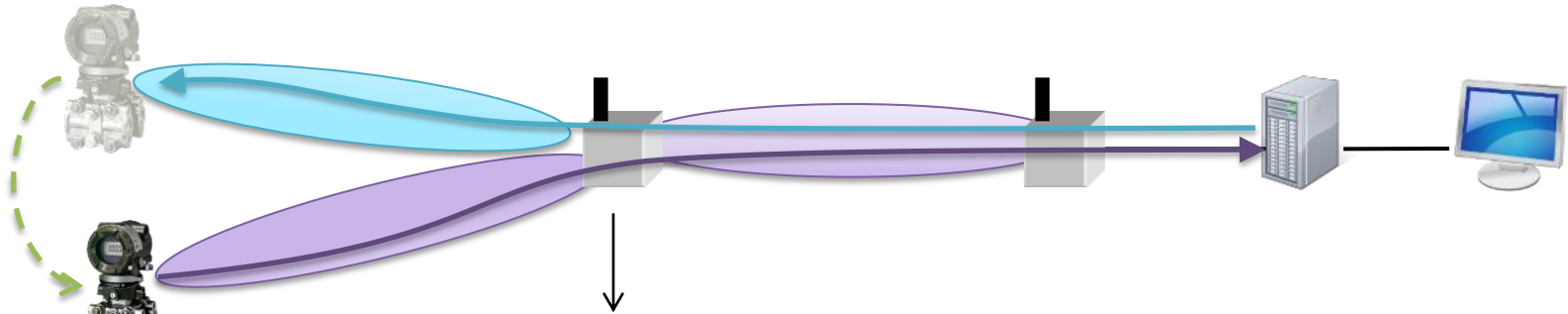
- ### Issues
- How to manage provisioning subnet?
 - How to transport provisioning communication?
- ### Restrictions
- Conformance with ISA100.11a
 - Small foot print

Device internal model of ISA100.11a has a restriction

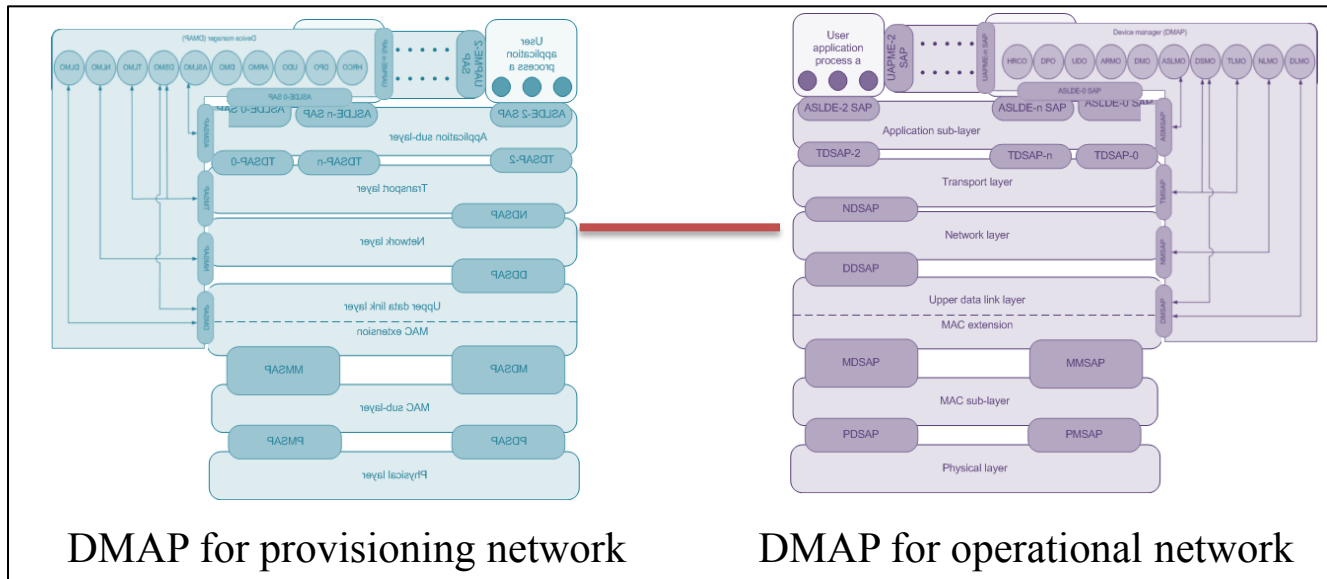
- Reference model
 - Application process
 - Set of objects
 - Communication Endpoint
 - Object
 - Set of attributes
 - Interface of attributes
 - Attribute
- DMAP
 - 1 subnet ID
 - 1 128 bit address
 - 1 16 bit alias address
 - Port number is fixed
- NLMO route table
 - Interface field is Boolean type
 - 0 is DL, 1 is backbone



2 DMAP model



DAR (Dual Advertisement Router) internal model



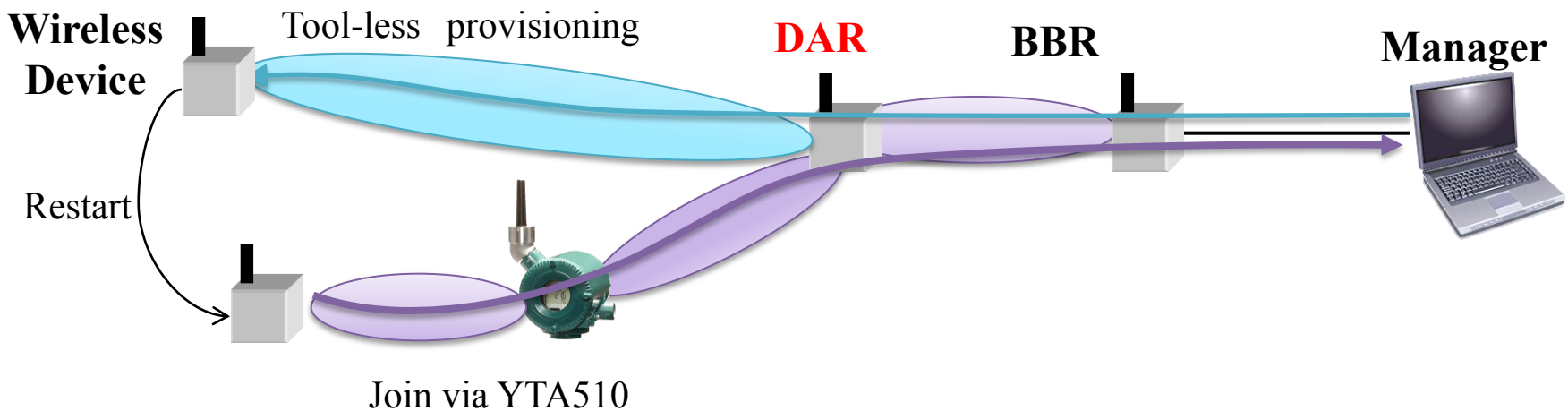
DMAP for provisioning network

DMAP for operational network

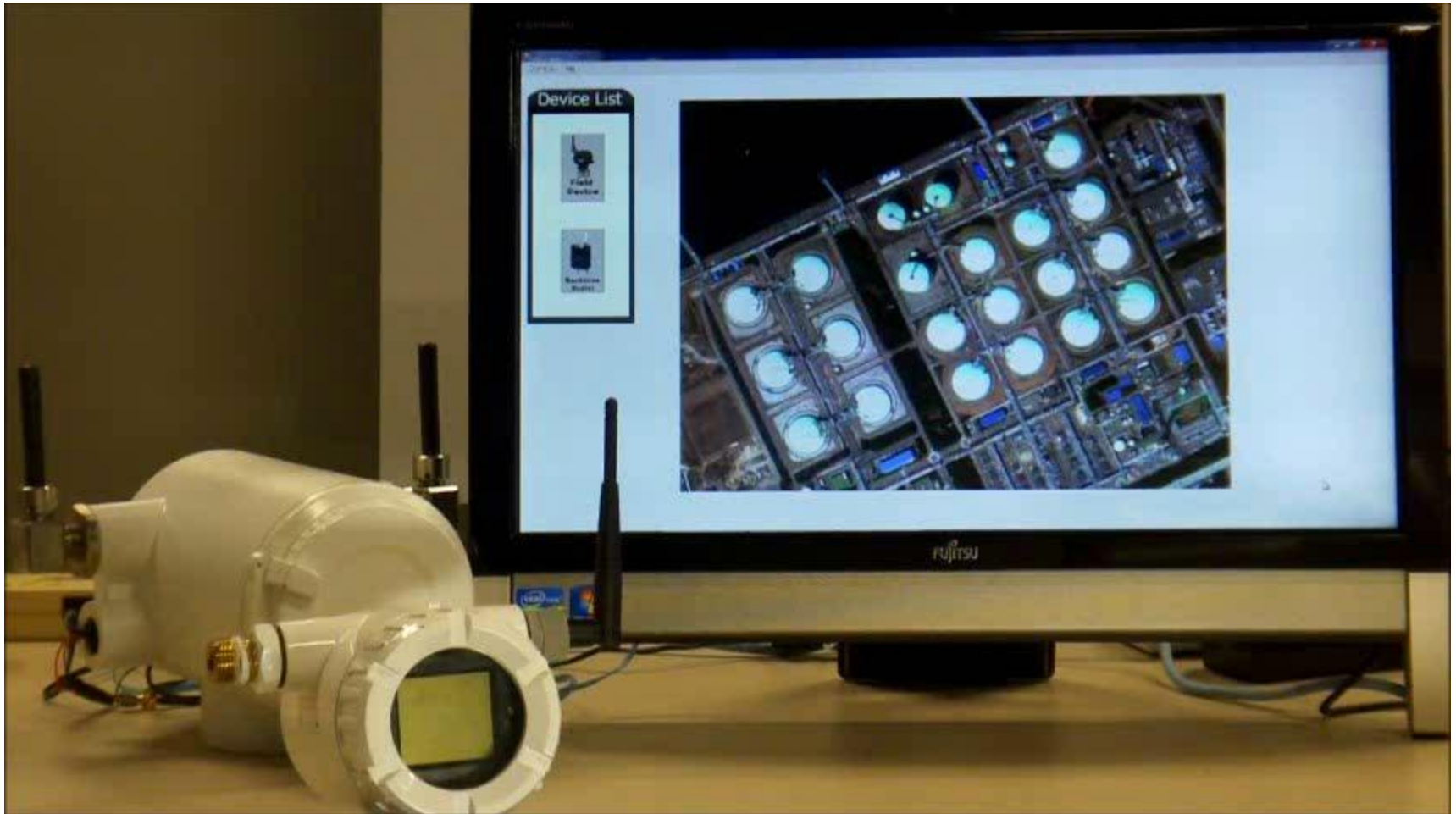
Feasibility study

Conformance of DAR stack with ISA100.11a

- We confirmed that Tool-less provisioning is feasible with conforming to ISA100.11a standard.
 - Interoperable ISA100.11a products (YTA 510)
- We only needs extra communication resource assignment by a system manager.
 - No protocol extension
- What resources are assigned by the manager is depends on a system and it is out of scope of the standard.



Demonstration



- Optimization
 - Proposed Tool-less provisioning architecture focuses on conformance with the ISA100.11a standard.
 - If revising the standard is acceptable, we can optimize the architecture to reduce foot print, bandwidth, energy consumption and so on.
- Automate commissioning
 - Tool-less provisioning allows a wireless device to be able to join a system at network level without manual configuration.
 - However a wireless device requires application configuration to work in a control system. Automate the configuration leverages feature of Tool-less provisioning and contribute to achieve “Lick and stick sensors”.

- OOB provisioning is depends on trustworthiness of a field worker who operates a provisioning device.
- Tool-less provisioning is required from the security point of view.
- Standardization of ISA100.11a is almost concluded and revising to support Tool-less provisioning is unacceptable.
- This presentation shows feasibility of Tool-less provisioning with conformance to the ISA100.11a standard.
- Tool-less provisioning contributes not only security of wireless network system but also life-cycle excellence because it automates provisioning work and reduces expertise.

Thank you for your attention