

Apply Industry 4.0 to the electric Infrastructure & Network

Madrid, Sept 30th – Oct 1st



What

I&N Challenges



Challenge: Apply Industry 4.0 to the electric Infrastructure & Network

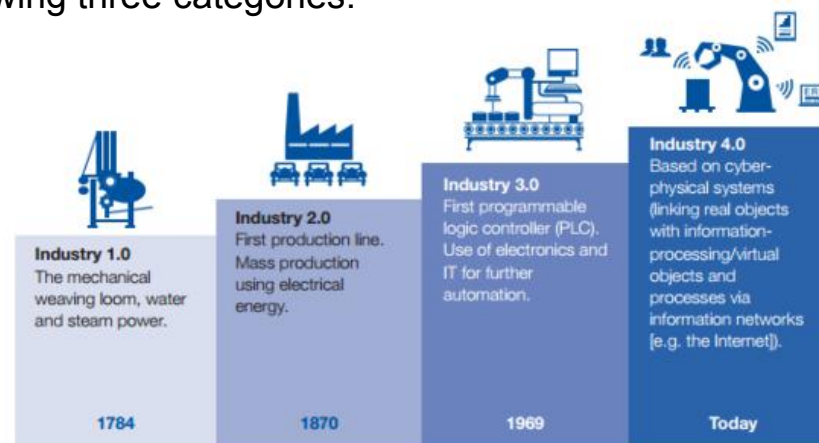
Develop technological equipment for the operating network team.

Main Objectives:

1. **Support the operator with his tasks**, in order to improve their security and decrease the operational costs and

To develop the equipment concentrate on the following three categories:

1. **Internet of Things**
2. **Assistant robot aka. “work pod”**
3. **3D printing**



I&N Challenges. IoT



Automatic regulation
of oxygen level in
case of escaping gas.

Alert in case of
entering a
dangerous zone.



Automatic shutdown
of potentially harmful
machines.

Automatic traffic detour around a worksite.

What

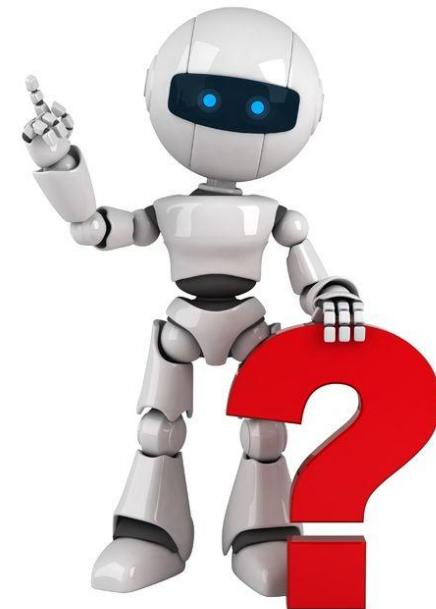
I&N Challenges. Assistant robot aka. “work pod”



Category 2: Assistant cobot aka. “work pod”

The **work pod** should fulfill the following demands:

- **Help with daily tasks**
- **Transportable**
- **Be able to recognize risk situation, represent real conditions and alarm previous access the work forces to the site**
- **Detect some risk conditions as voltage, electromagnetic fields, ...**
- **Help to follow the 5 security rules**

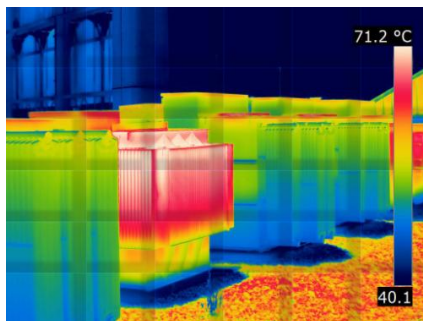


What

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Possible equipment of “work pod”:

1. Sensors for the **detection of voltage**
2. Sensors for the **detection of gases**
3. Video **cameras** (thermographic), that are able to detect hotspots, capture relevant information of the network physical conditions, laser vision to build up maps, etc....



21/09/2016

This type of cobot is already available to the domestic market
(For example: <http://www.keecker.com/>)
and Endesa is working on a cobot to recharge electric vehicles in garages

What

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endesa

- 4. Ability to **fly** (Drone) to be able to accomplish tasks by the means of supervision, general operation or powerline services in the air
- 5. Capable of **network operations** (articulated elements to be able to realize operations or repair measures on the network, as well as the possibility of remote control handling by the operator)

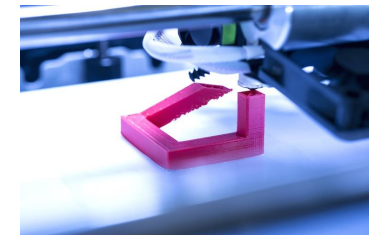


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6. Ability to **communicate**
7. Ability to **handle processes** to for example send requests to the portable 3D-Printer in the car of the operator
8. Any other ability that cant help to to decrease the operational costs



What

I&N Challenges. 3D printing

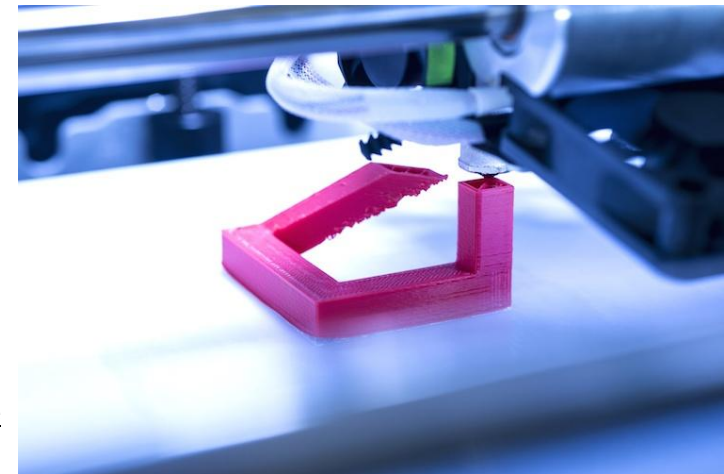


Category 3: 3D printing facilities to repair, replace or create workpieces or tools that are required to restore the functionality of the network.

- Part of the revolution industry 4.0 is the decentral fabrication of workpieces in **Fab Labs**, encouraging the so called circular economy.
- This does not only affect the fabrication process but also the maintenance service by being able to **optimize the replacement parts** in the stock of the security and field support.

21/09/2016

There are already certain experiences regarding the application of 3D printers available:
<https://www.coresystems.net/blog/3d-printing-spare-parts-in-field-service>





Thanks

