





The Internet Of Things and The Control System

Vincent Hardion, 2013/10/08

Internet Of Thing is not ...



WHERE'S WALL-E?



History of Internet

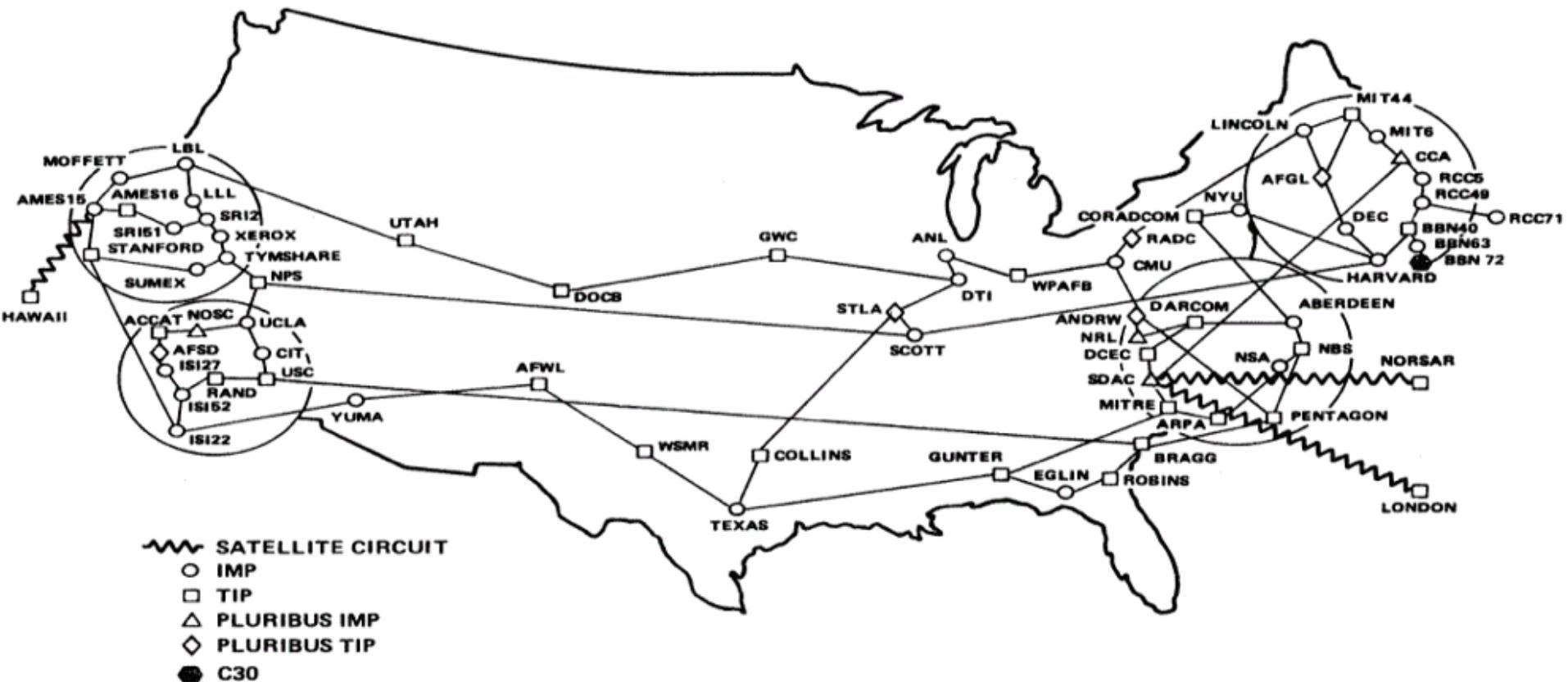


History of Internet



History of Internet

ARPANET GEOGRAPHIC MAP, OCTOBER 1980

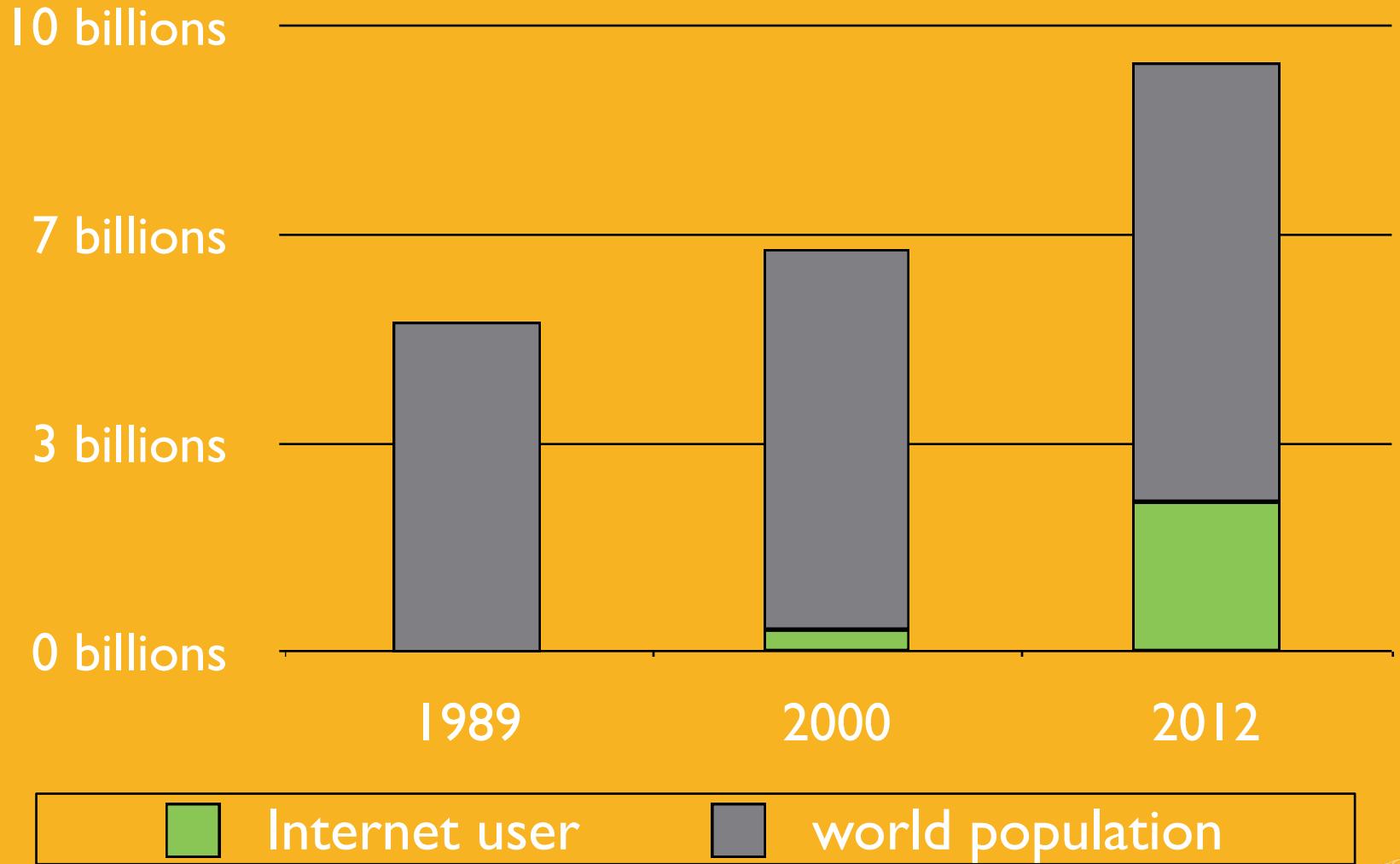


History of Internet

Tim Berners Lee
bring us the World Wide Web in 1989



History of Internet

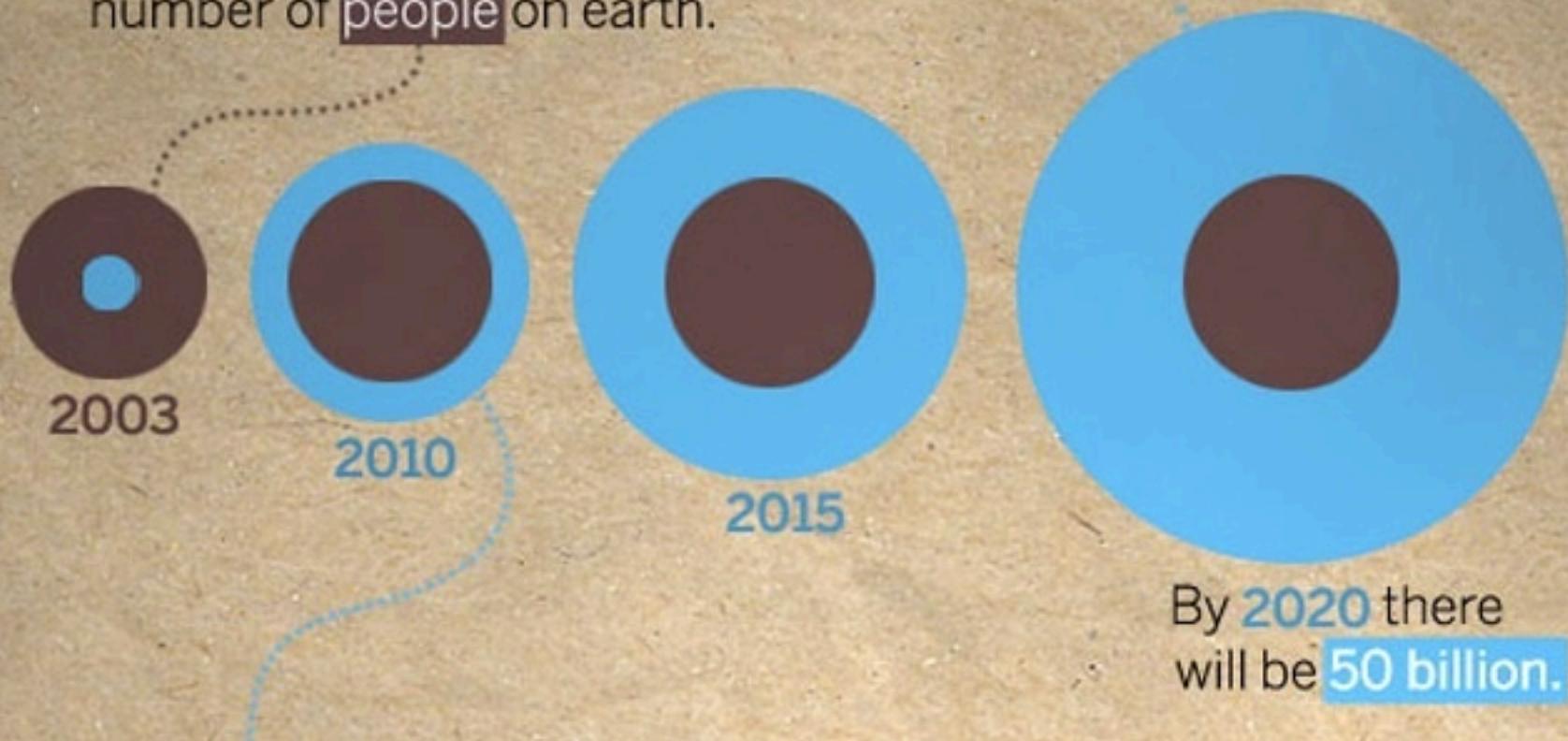


The IOT Revolution

**Idea: Start a new revolution in
communication domain for the machine**

The IOT Revolution

During 2008, the number of **things** connected to the Internet exceeded the number of **people** on earth.



These **things** are not just smartphones and tablets.

The Things of IOT



Computers, Smart phones, tablets, tux
droids, cars, shoes, alarm clock, house, bin
tray, solar tracker ;-) and even cow.

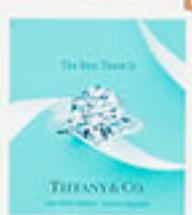




POWELL
AND
MARKET

HYDE & BEACH
FISHERMANS
WHARF

24

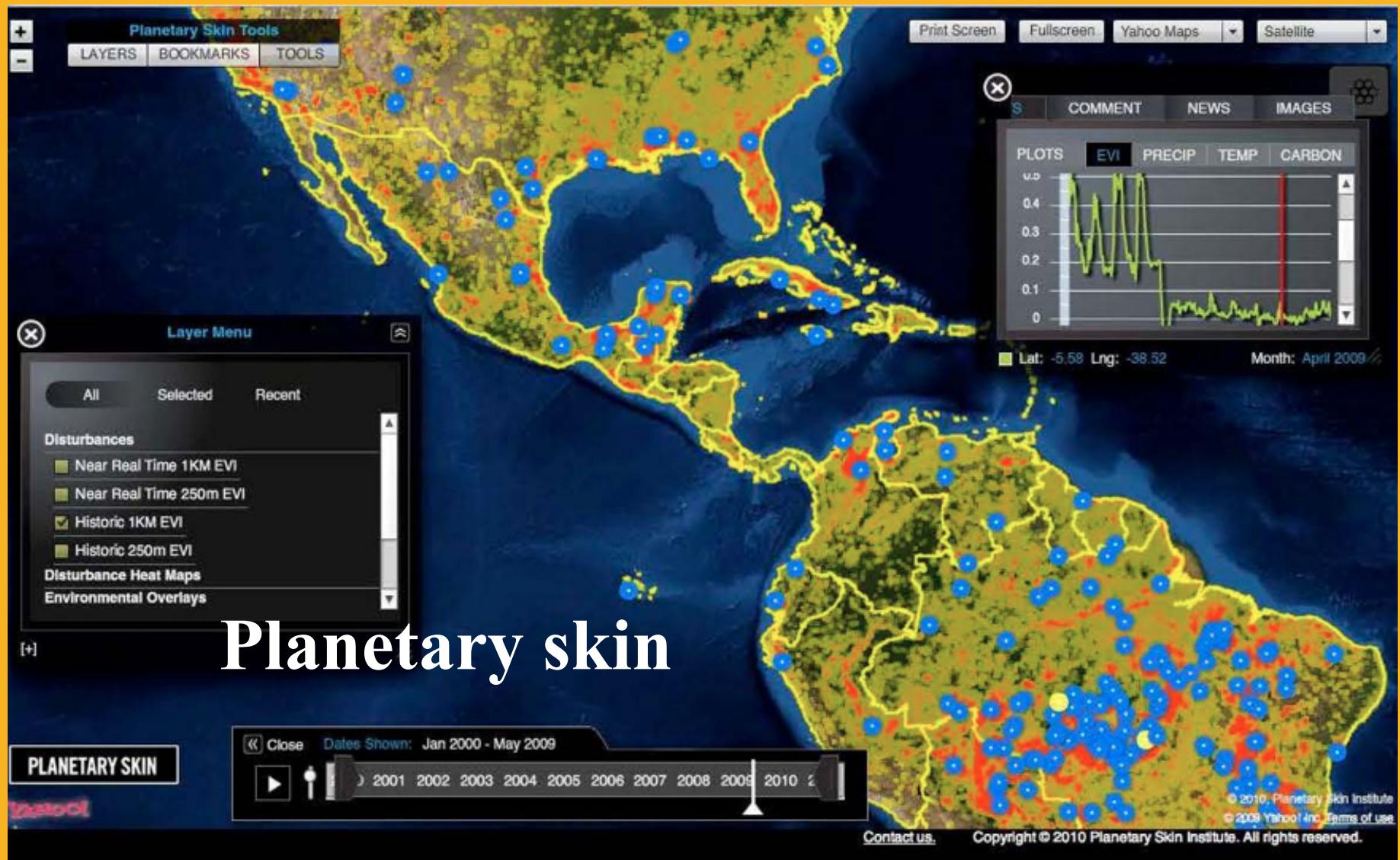


The IOT applications

Smart Energy



Smart Environment



Smart City

Smart Urban PLANNING

Interactive Street Sensing gathers data about the city – the city's pulse. Sensors on every lamppost in the city measure data about noise, traffic, environment, crowds, temperature – literally anything. Data is transmitted and processed and information is presented as ...

– dynamic infographics, showing interesting detail about the city as a living organism, e.g. how it is used by people, flow of traffic and impact on the environment ...

– for example, a map illustrating real-time and historic data of pollution can be viewed.

Smart Urban WASTE Management

The implementation of smart urban waste management will allow a more efficient waste collection and optimising the way in which it is performed today.

Smart urban waste management will provide useful information to the public by encouraging and promoting an easier and more environmentally friendly way of collecting waste. This can be achieved by identifying and emptying bins and containers when they are close to their fill level but not overflowing at private households, enterprises and public areas.

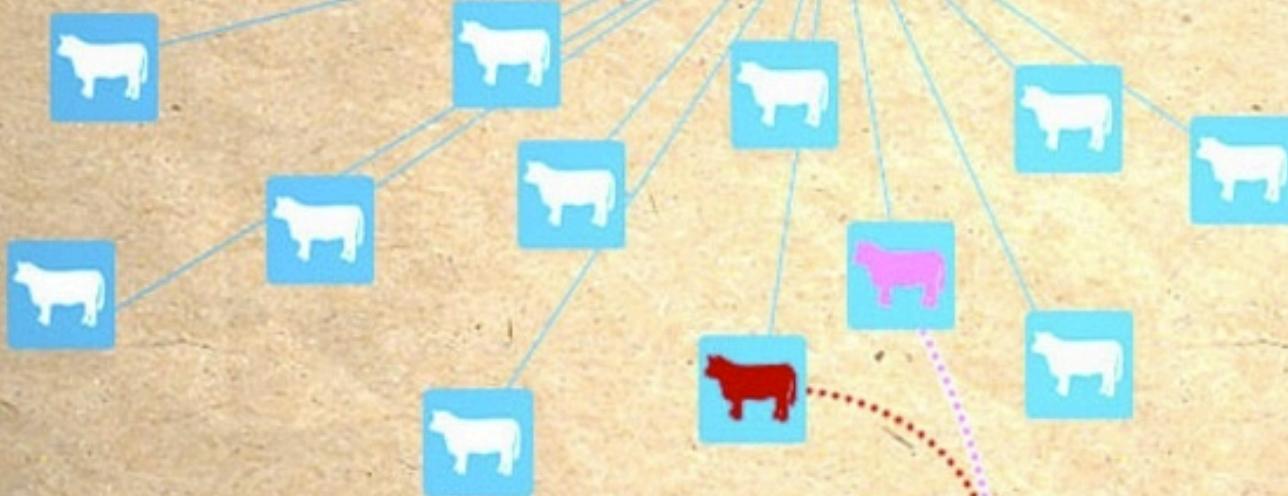
In addition, incentives can be brought forward to encourage citizens to produce less waste and recycle more.

Smart agriculture

These **things** are not just smartphones and tablets.

They're every **thing**.

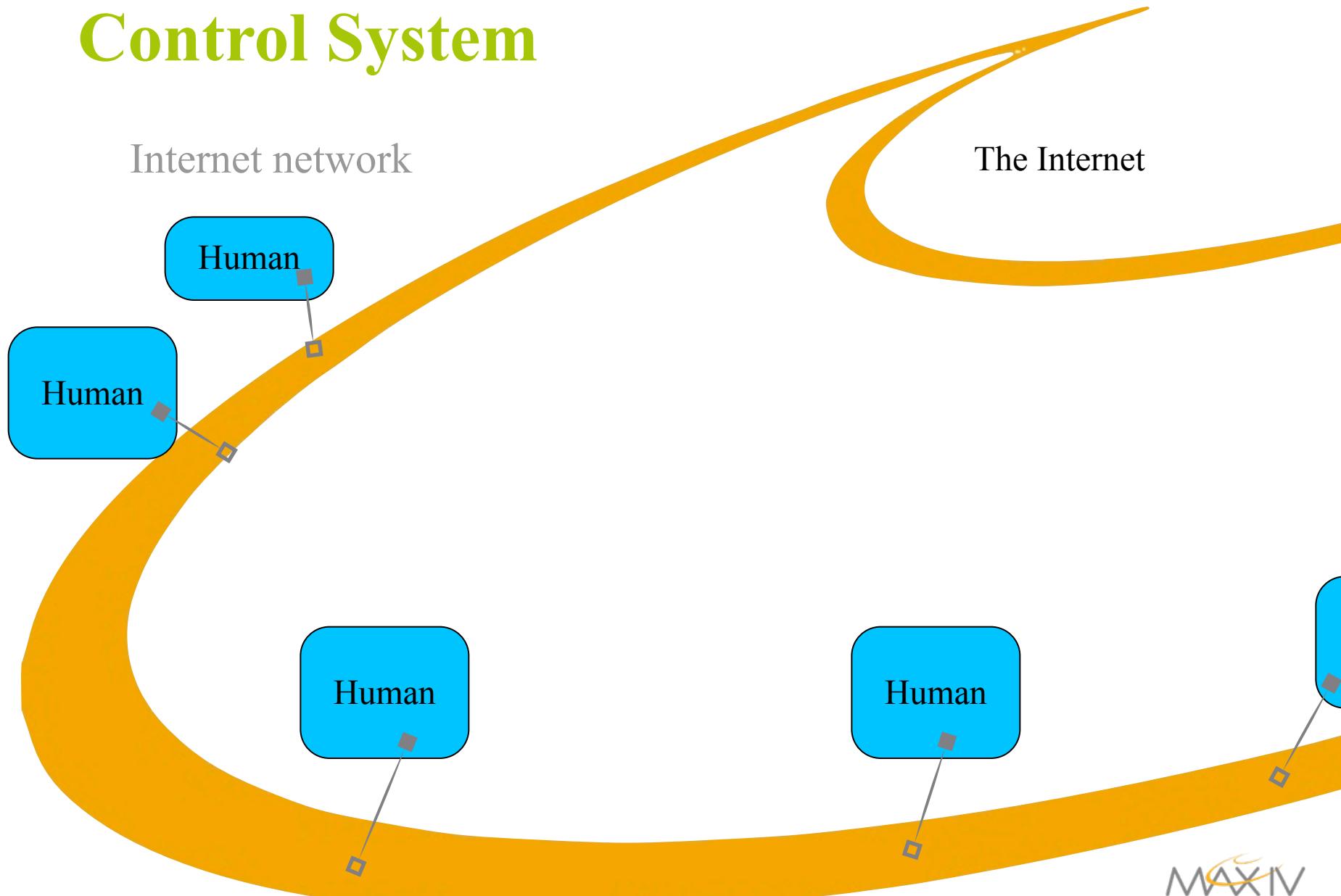
A Dutch startup, **Sparked**, is using wireless sensors on **cattle**.



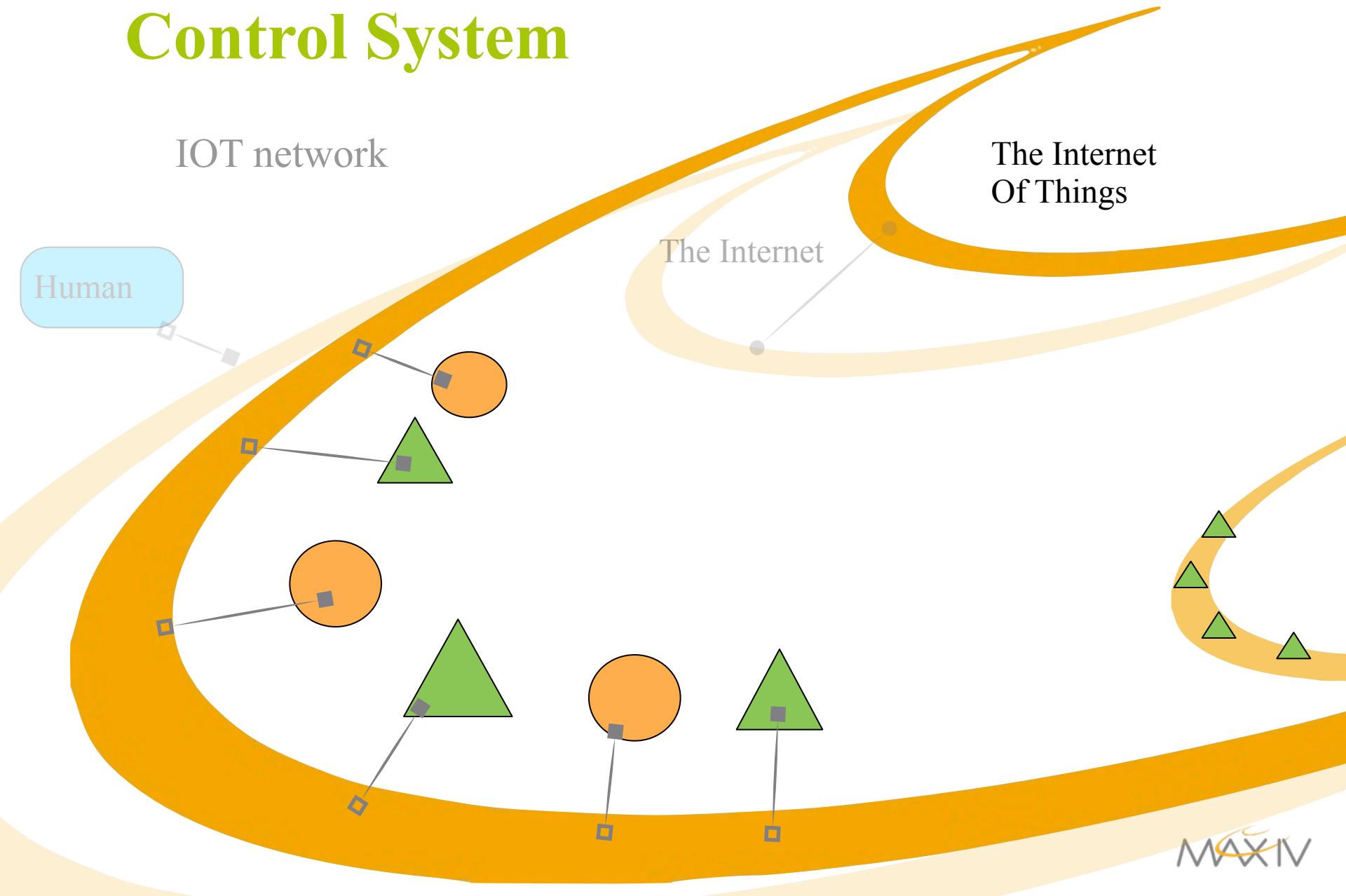
So that when one is sick or pregnant, it sends a message to the farmer. Each **cow** transmits 200 mb of data per year.



Control System



Control System



Control System

Control System network



Scientific Facilities
Control System

Autonomous Device

Orbit Feedback example

Machine
Control System

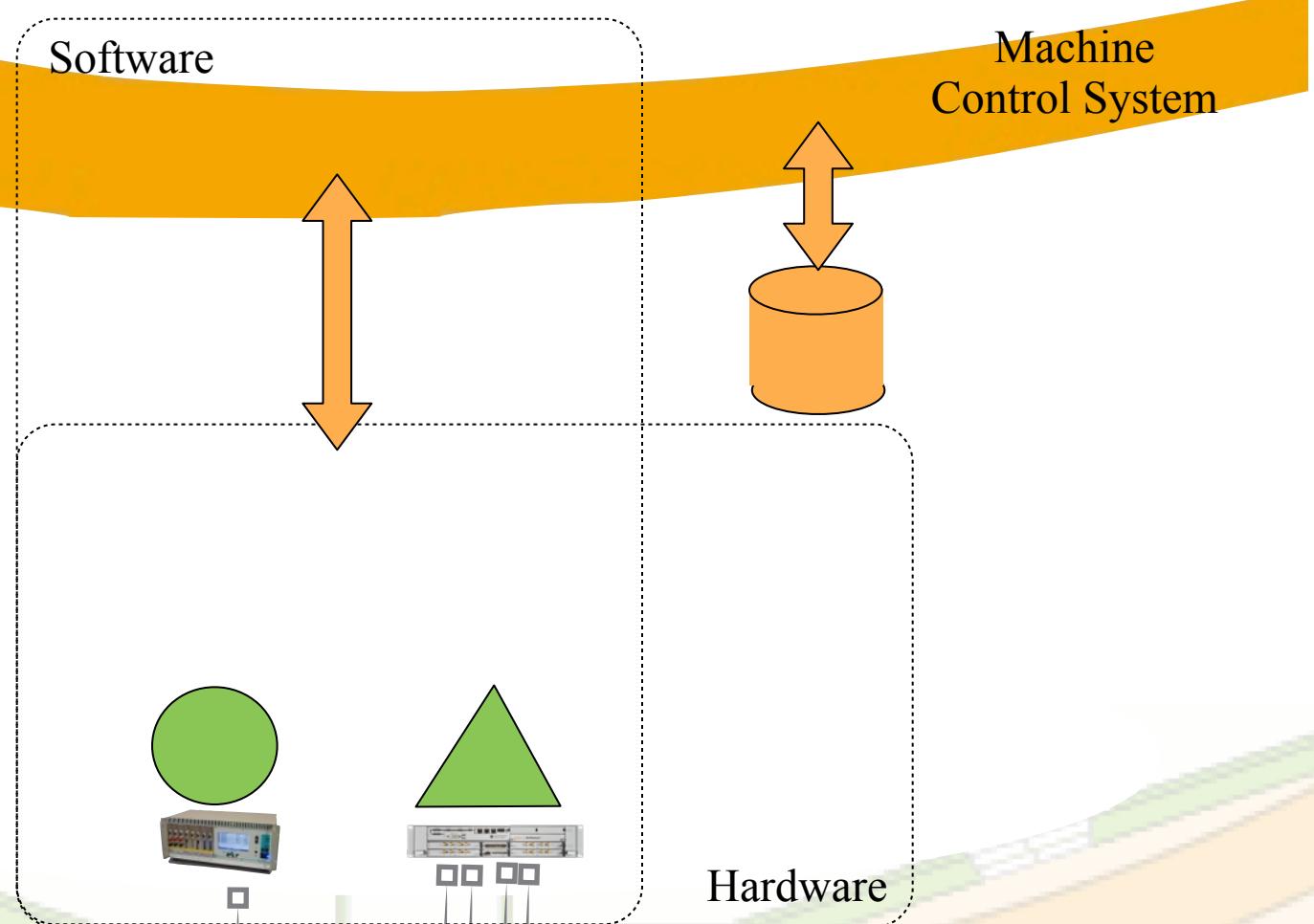
Control system
connection

Hardware

Autonomous Device

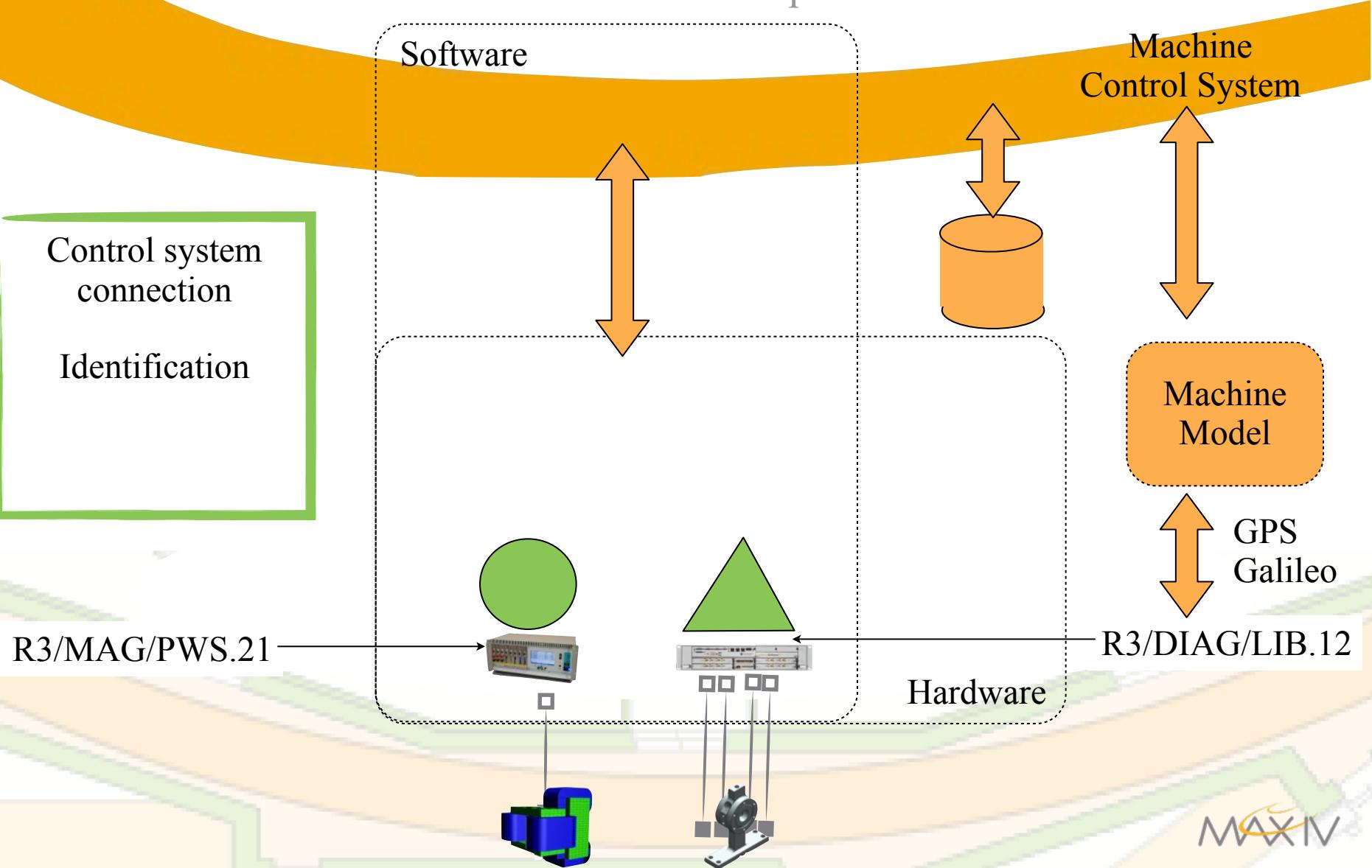
Orbit Feedback example

Control system
connection



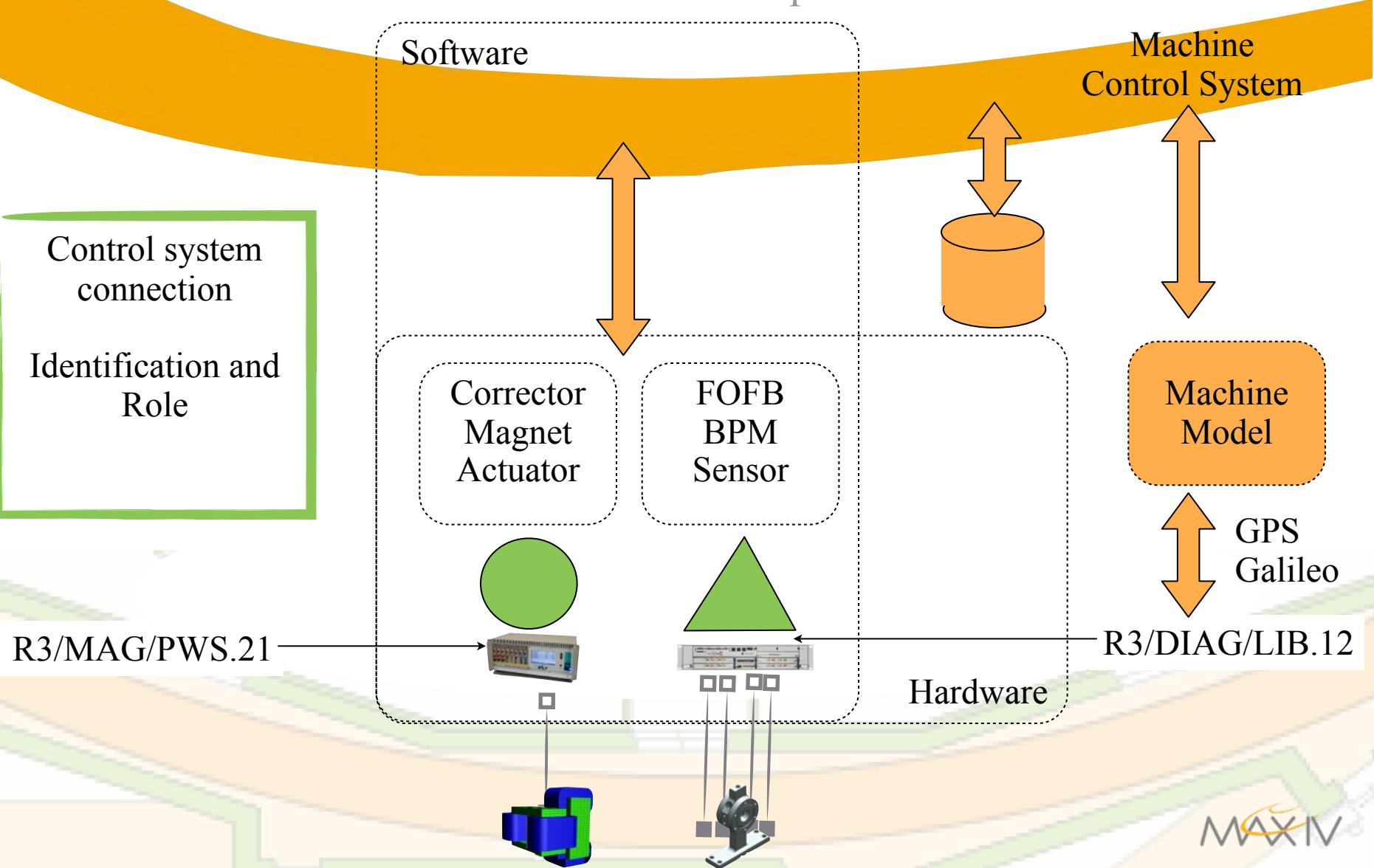
Autonomous Device

Orbit Feedback example



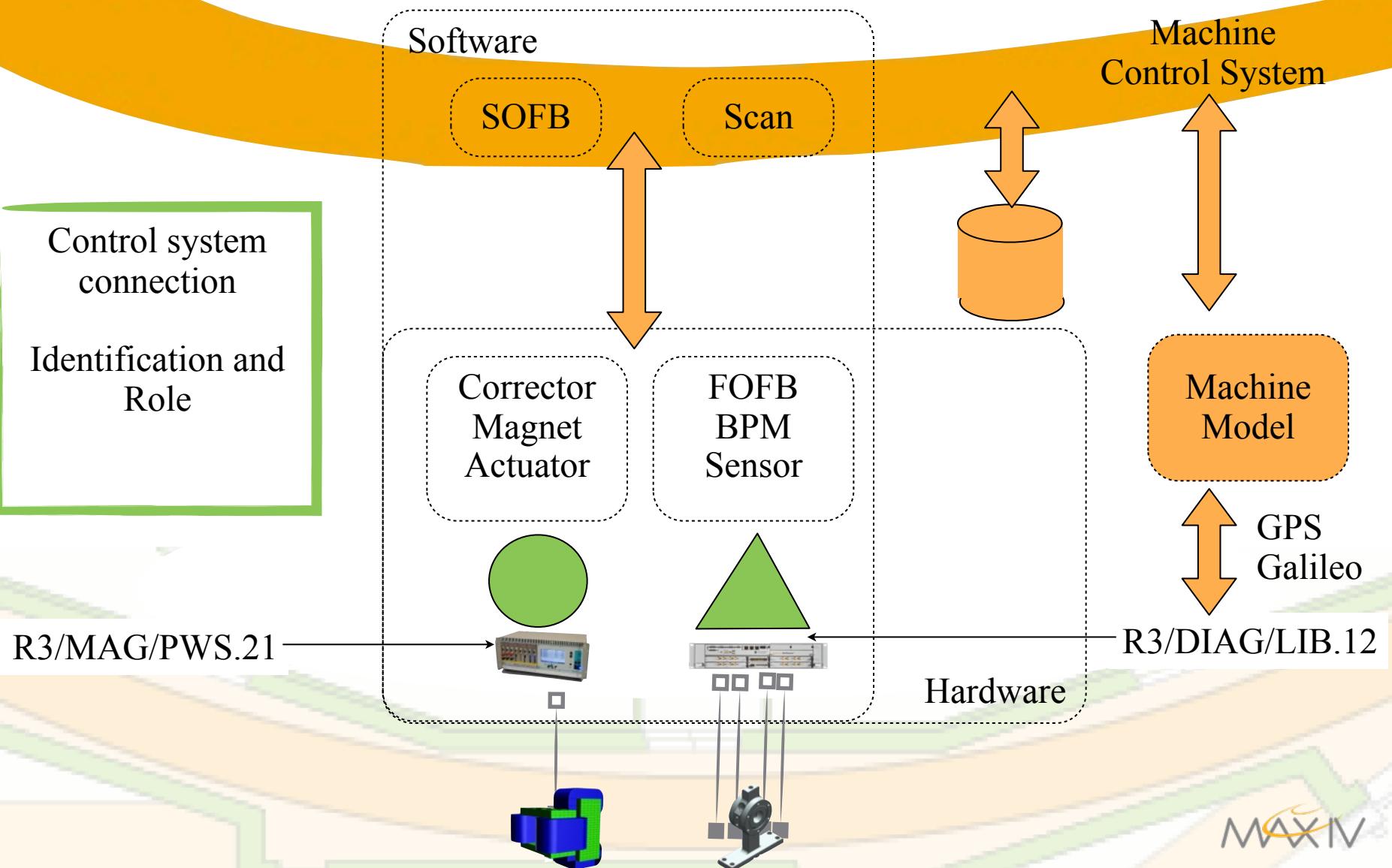
Autonomous Device

Orbit Feedback example



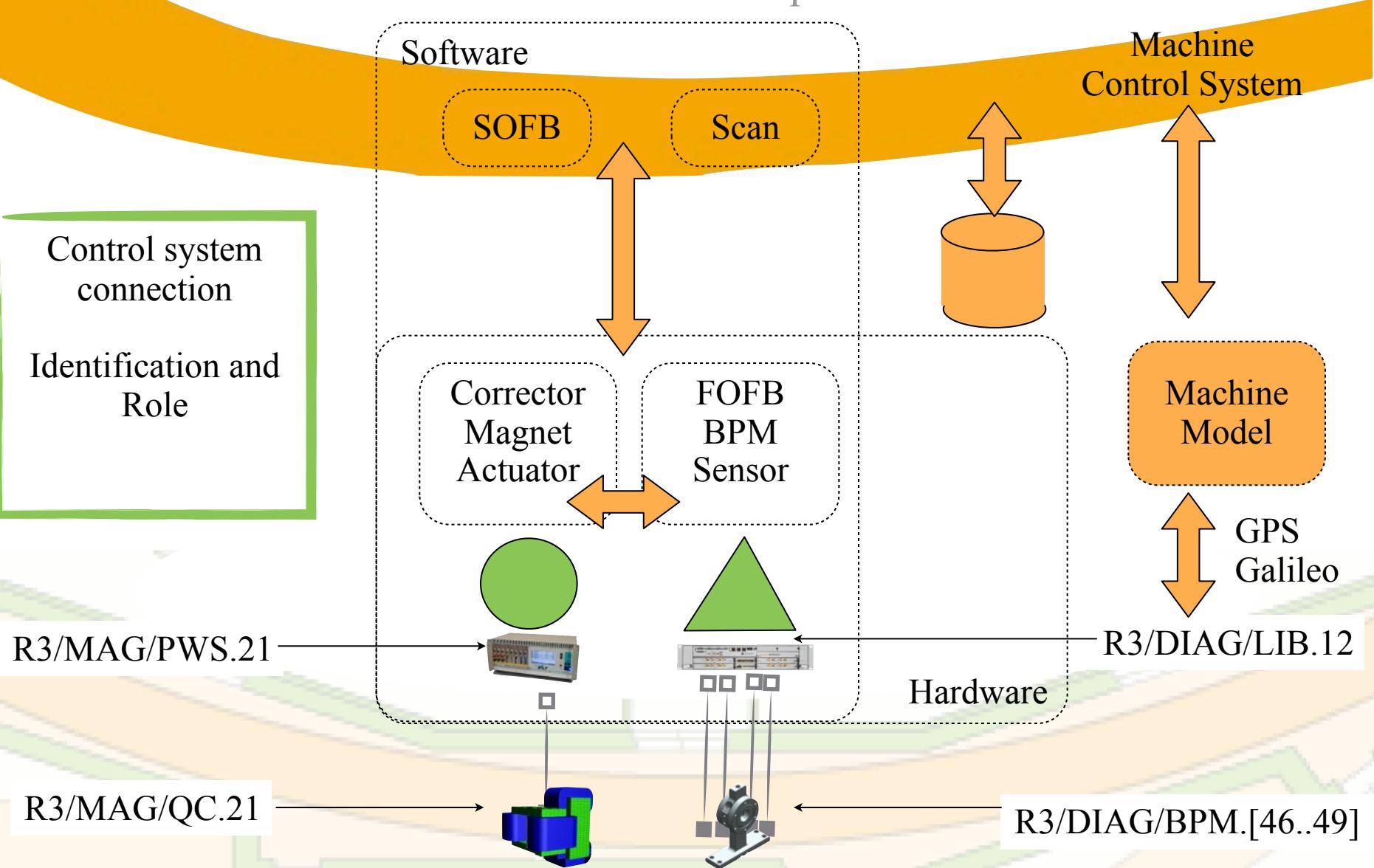
Autonomous Device

Orbit Feedback example



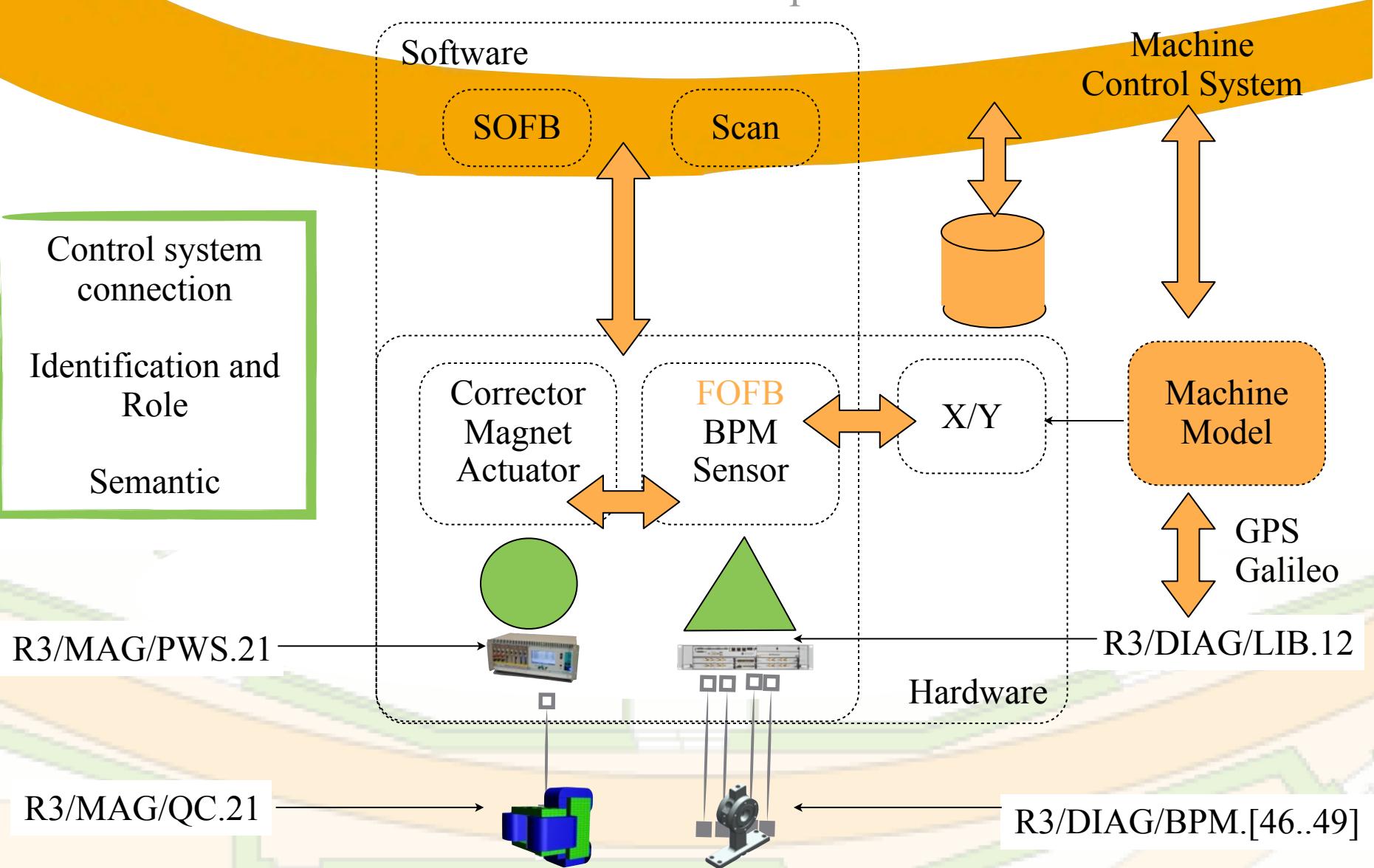
Autonomous Device

Orbit Feedback example



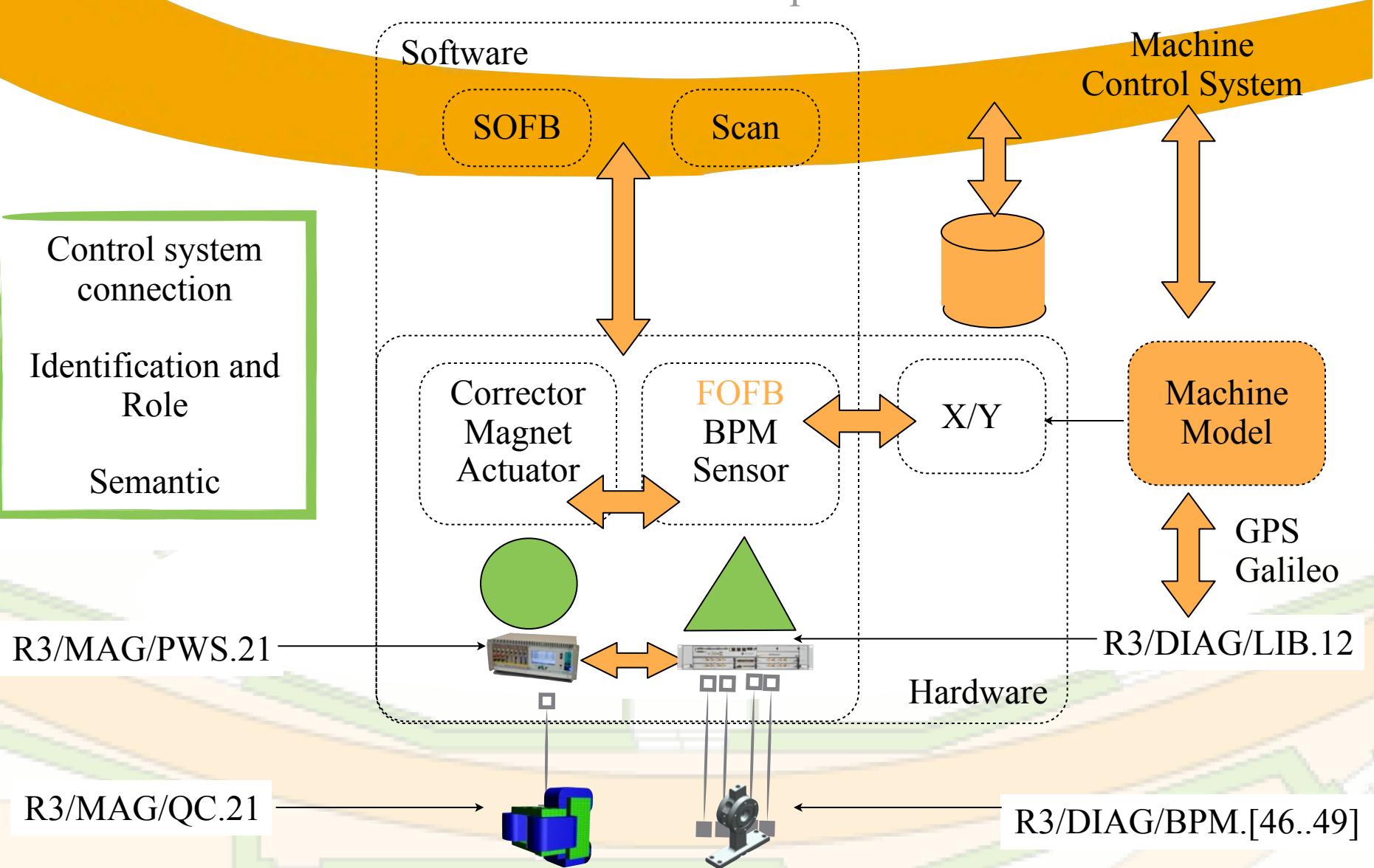
Autonomous Device

Orbit Feedback example



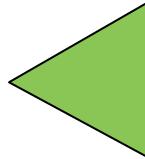
Autonomous Device

Orbit Feedback example



What IOT can bring

R3/DIAG/LIB.12



Do you want to try the
new Fast Orbit Feedback
algorithm during the next
Machine shift ?

Challenges

Behaviour and semantics are part of the convergence of IOT as well as the next generation of control systems in addition to the standardisation of the communication **protocol** and the data representation

Challenges

Identification

Protocol

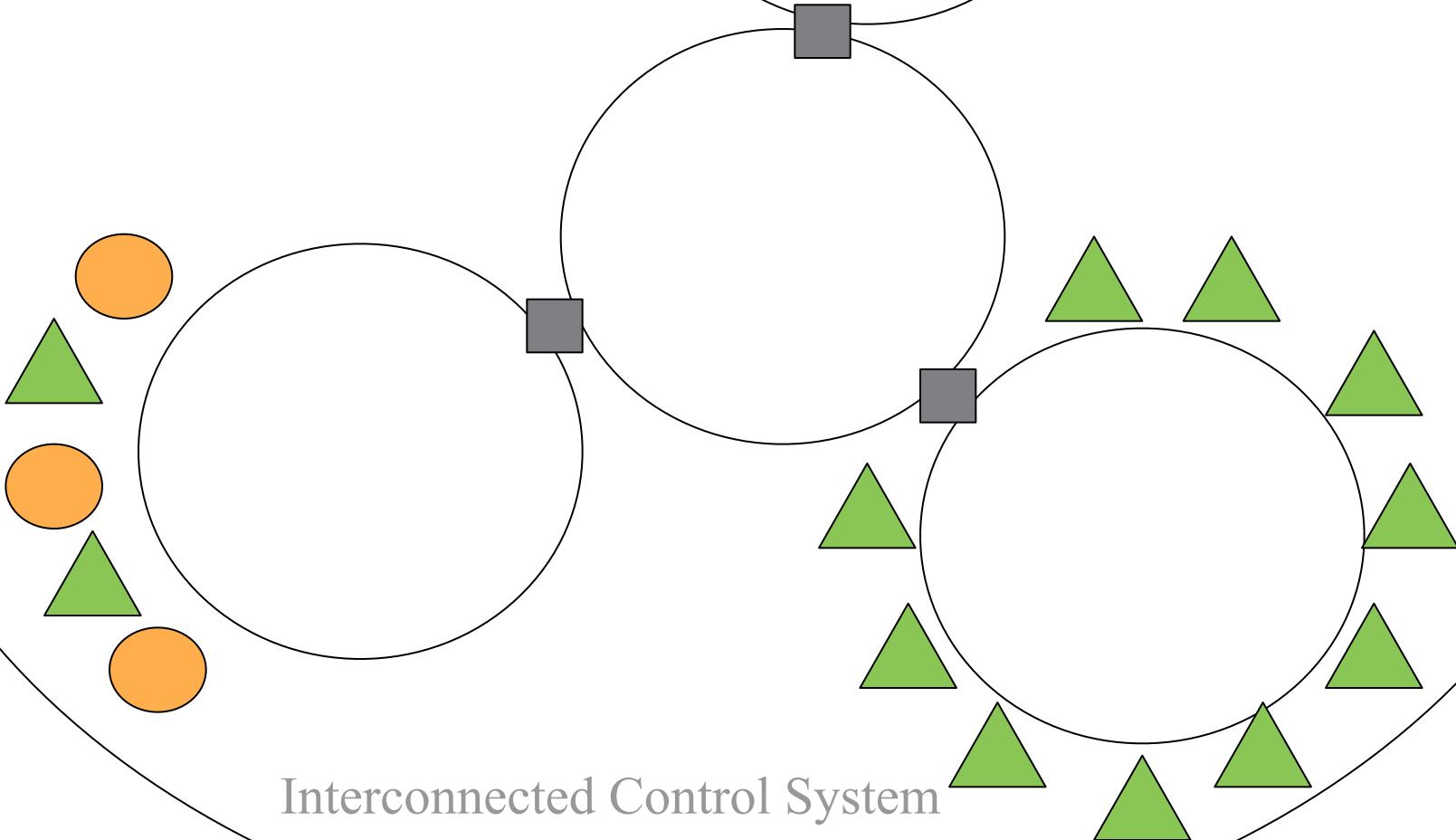
Standardisation

Ontology

Semantic

Artificial Intelligence

Conclusion



Credits

R2D2: <http://www.flickr.com/photos/donsolo/3768623542/>

Nazbatag: http://en.wikipedia.org/wiki/File:Nabaztag-IMG_1666.jpg

Daft Punk: <http://torsoboyprops.deviantart.com/art/Daft-Punk-259138170>

Internet history: <http://internethistory.eu/index.php/internet-history/>

Tim Berners-Lee: <http://pierreangy.deviantart.com/art/Tim-Berners-Lee-Wallpaper-337928976>

Computer: <http://techtoucian.deviantart.com/art/Computer-Icon-191888919>

Smart Phone: http://commons.wikimedia.org/wiki/File:IPhone_5.png

Tablet: http://en.wikipedia.org/wiki/File:IPad_3.png

Car: <http://www.flickr.com/photos/stretchdog/1702041748/>

Alarm clock: <http://www.flickr.com/photos/puckman/4008644628/>

Cable car: http://commons.wikimedia.org/wiki/File:San_Francisco_Cable_Car_MC.jpg

Smart cities: http://www.alexandra.dk/uk/services/publications/documents/iot_comic_book.pdf

IOT infography (things and cow): <http://share.cisco.com/internet-of-things.html> (not CC)