- Technical overview
- Community
- Use cases
- Industrialization project

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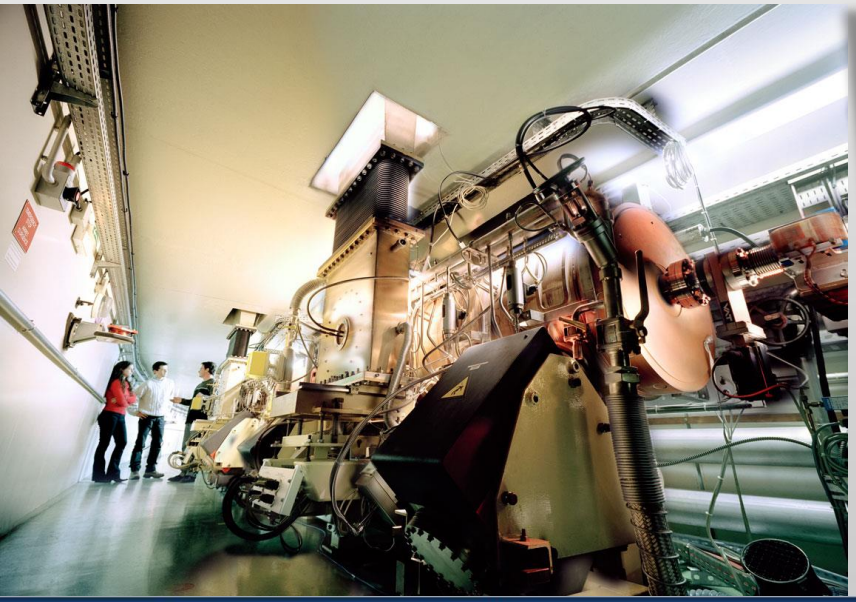
TANGO
Connecting things together

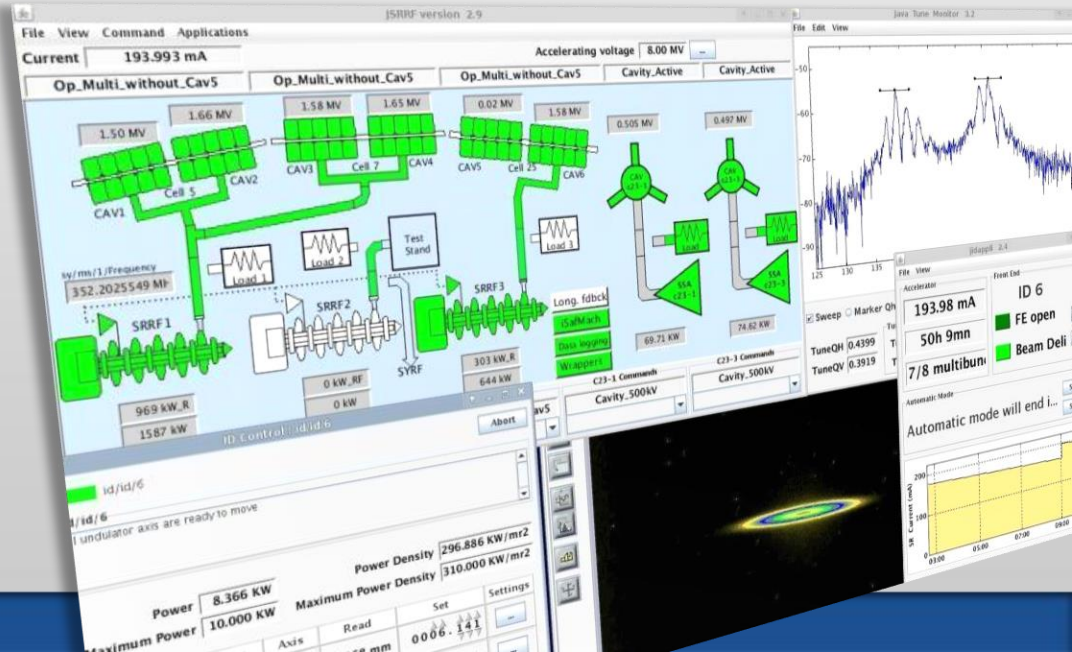
A European Control System framework

«Remote control anything and everything»

- A mature Open Source product
- > 100 man years of development
- Used in 15+ big instruments
- Active community

- Object oriented, topology independent, highly scalable,
- Operating system independent
- Multi language





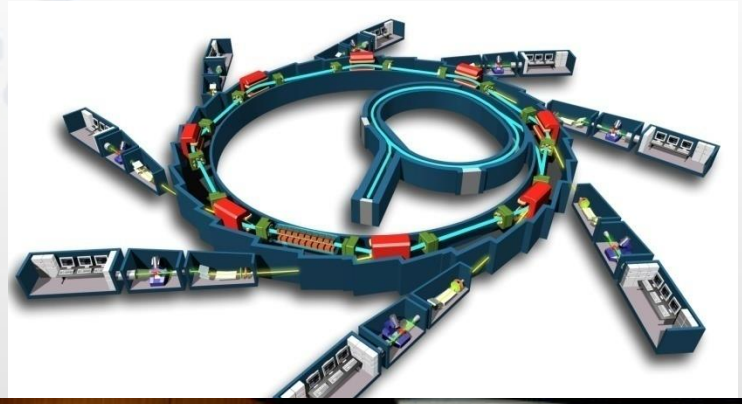
TANGO is HIGHLY scalable !

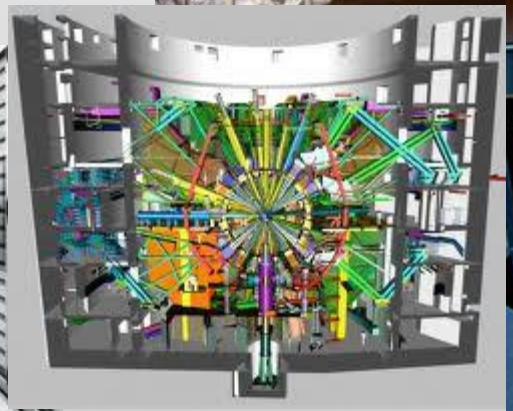
Connecting things together

From small embedded platforms

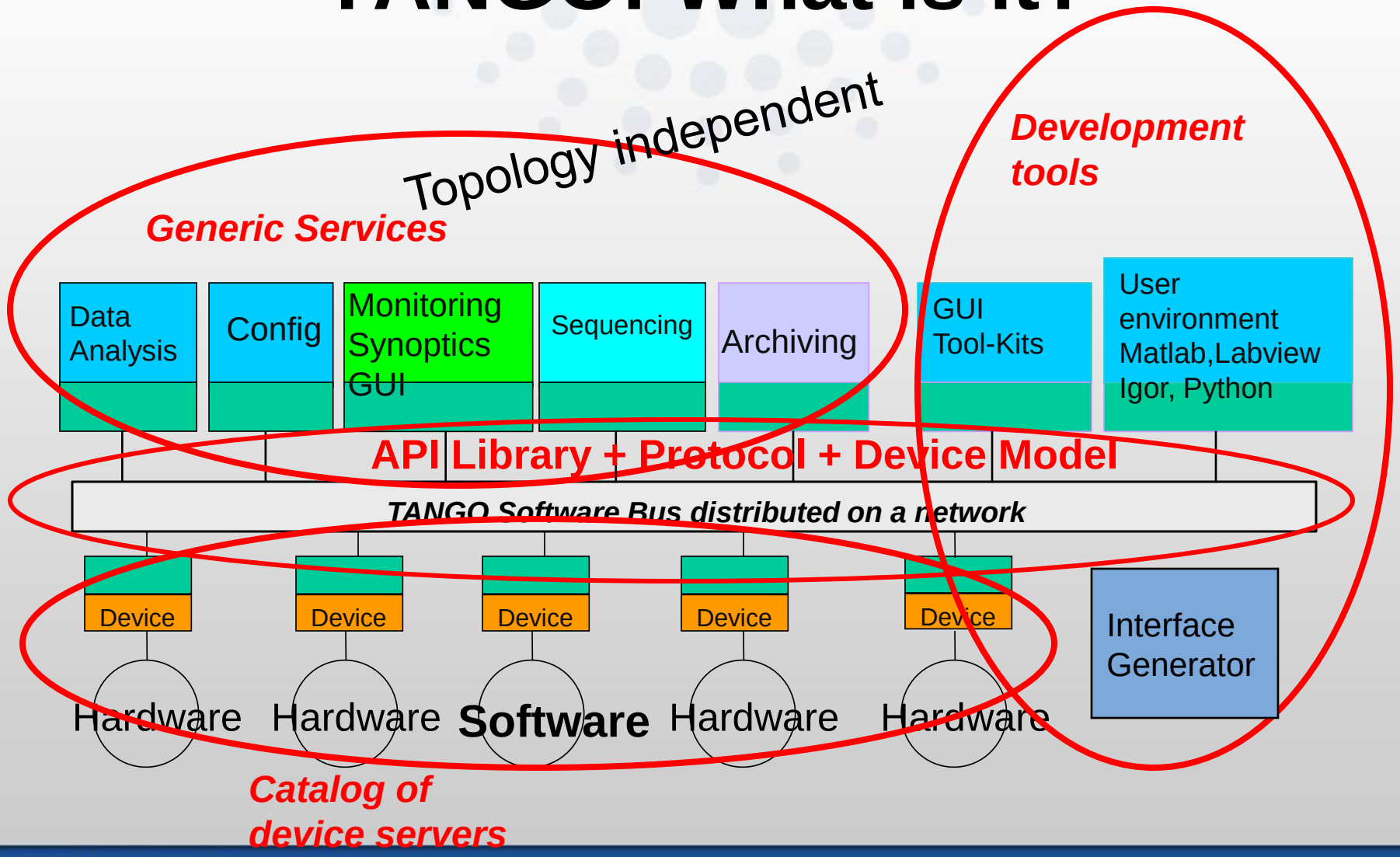
TANGO
Connecting things together
inside

… to big scientific instruments
> 1 000 000 signals and actuators

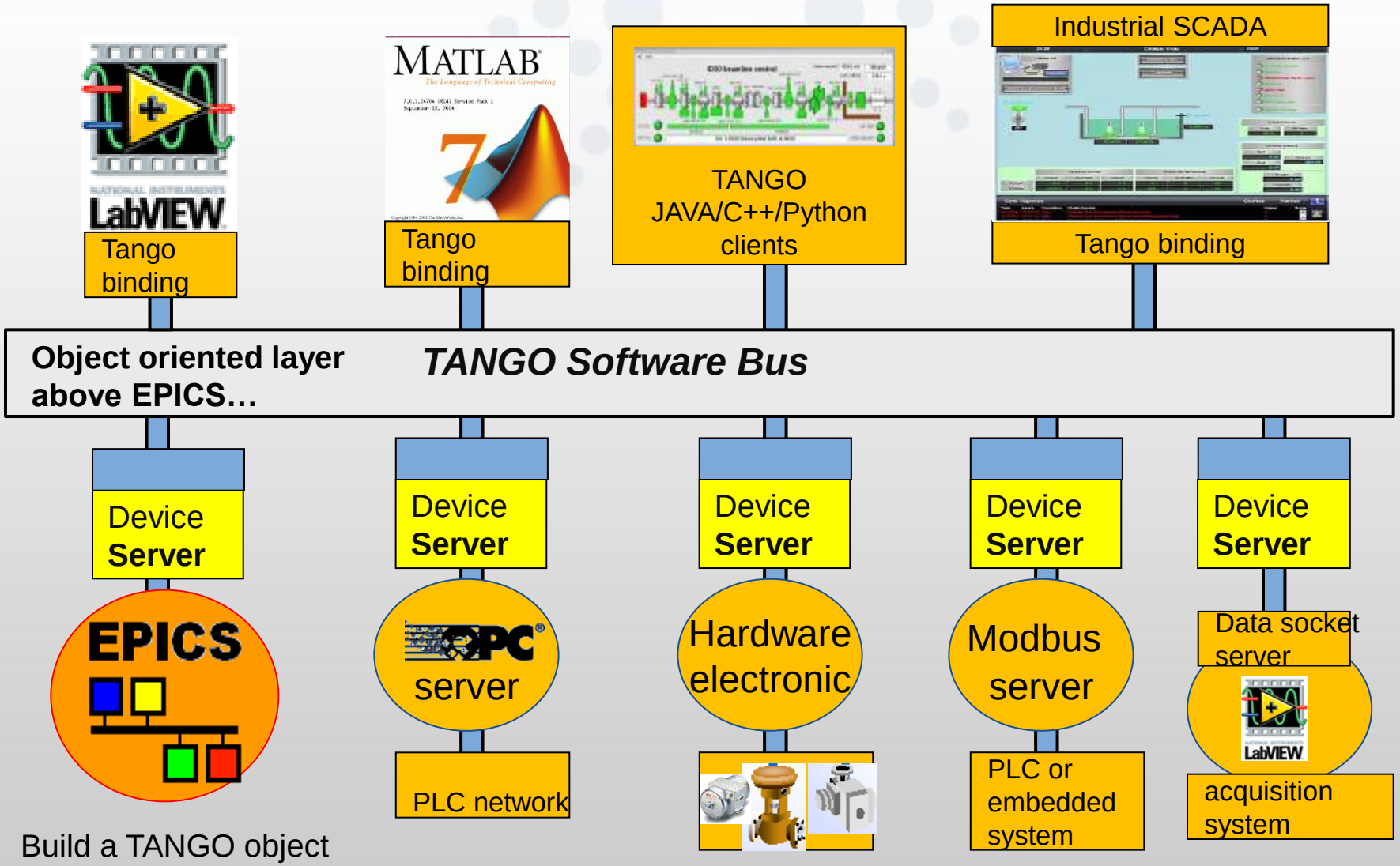




TANGO: What is it?



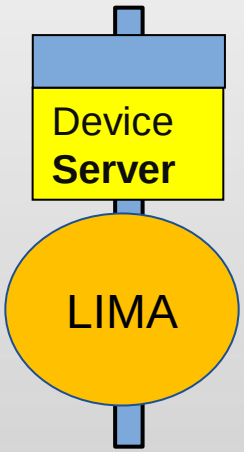
TANGO as a bridge

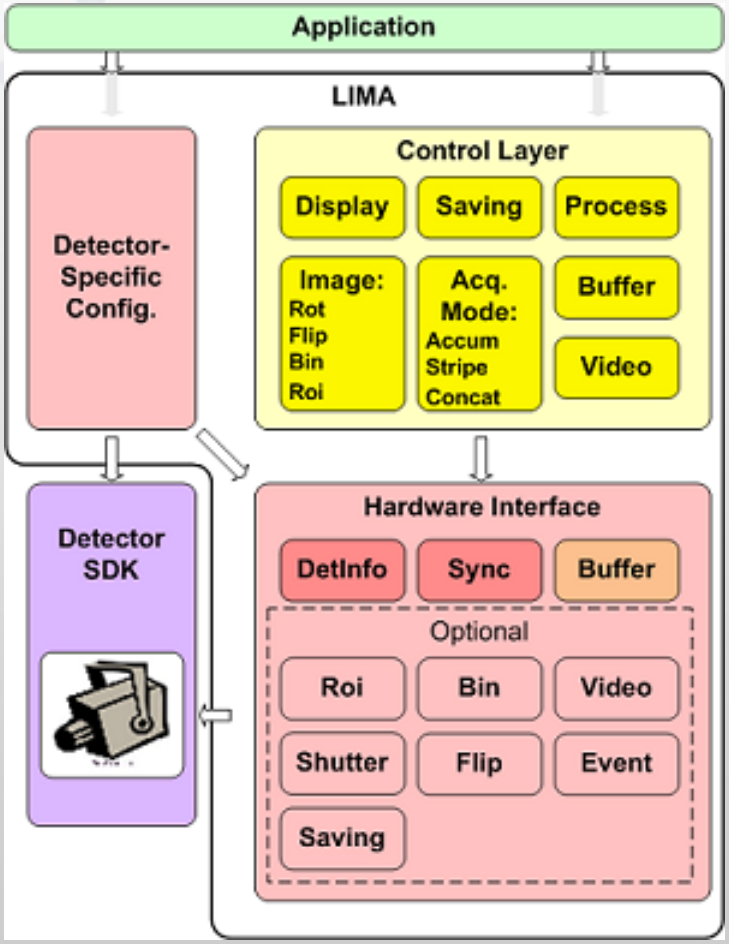


Build a TANGO object from a set of channels

Detectors + TANGO = LIMA

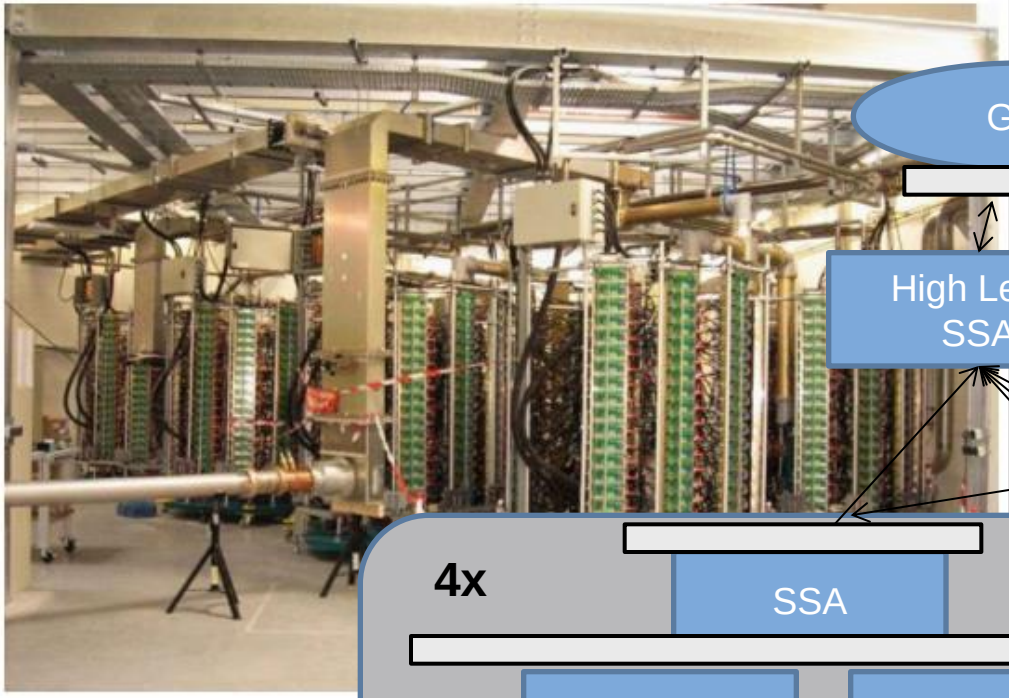
- TANGO uses the LIMA framework to interface all kinds of 2D detectors
- Process integrates online data analysis
- >20 detectors in use at >10 sites

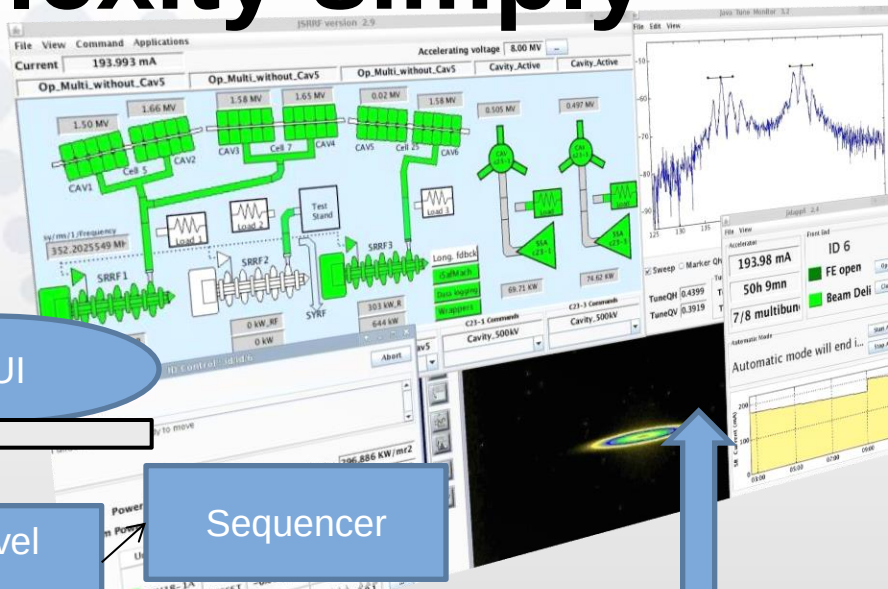




Managing complexity simply

- Hierarchical structures ideal for managing complex systems





GUI

High Level SSA

Sequencer

Python Sequences

4x

SSA

Driver

Dummy Load

ADC Measurements

Interlocks fast

Interlocks slow

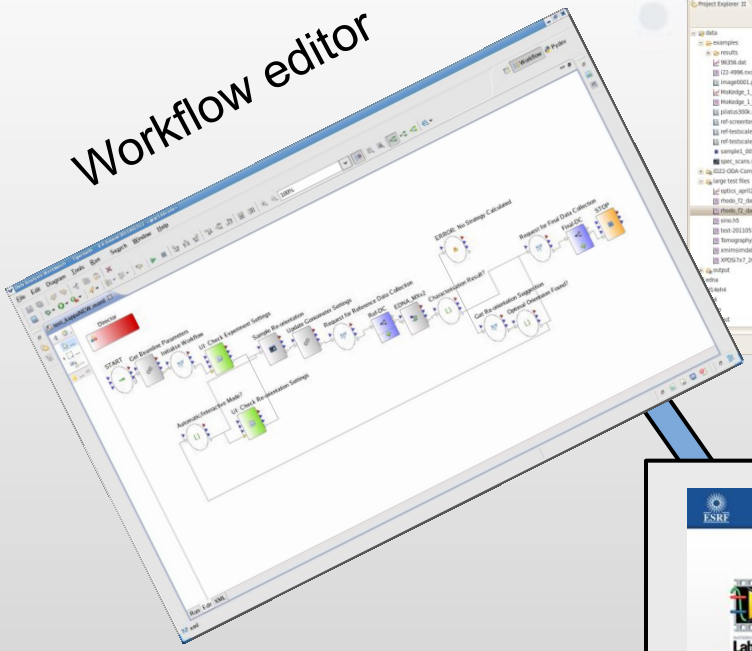
Low Level RF

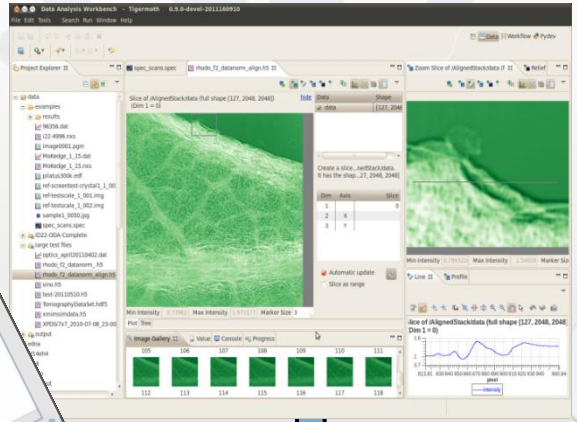
280V PS

Wave Guide Switches

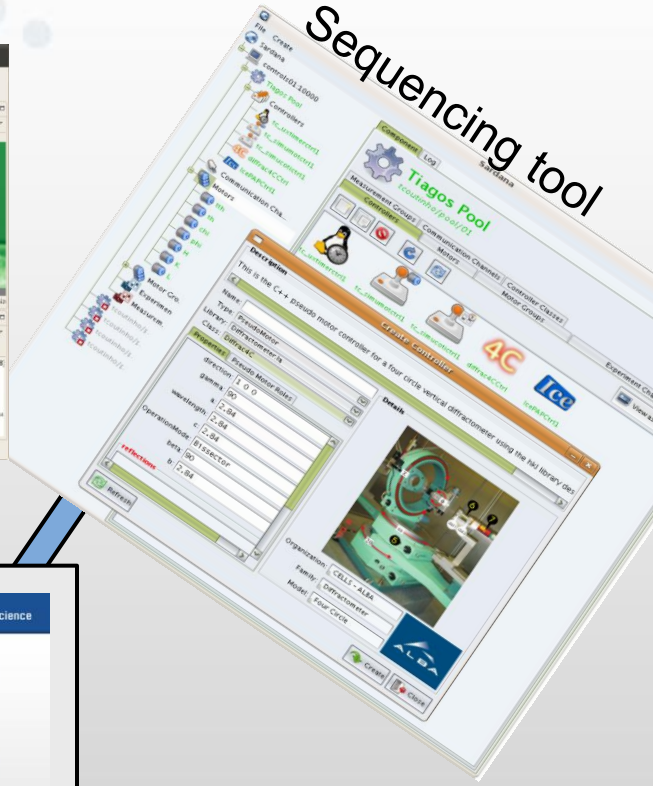
A step further with workflow tools

Workflow editor

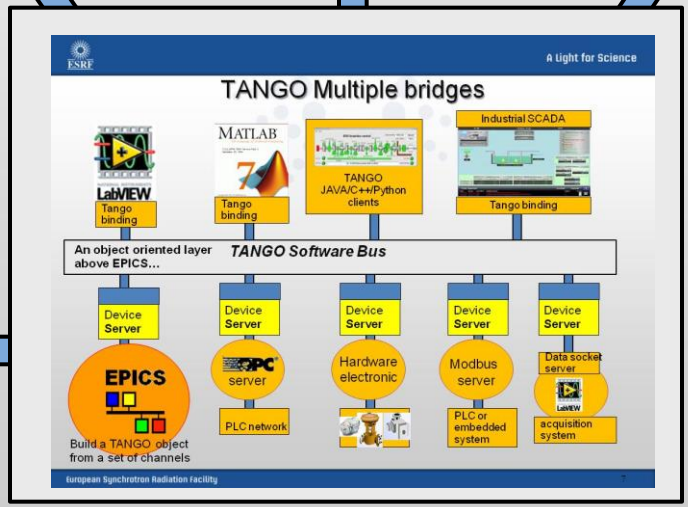




Sequencing tool



Your plugin



Much more than a software bus

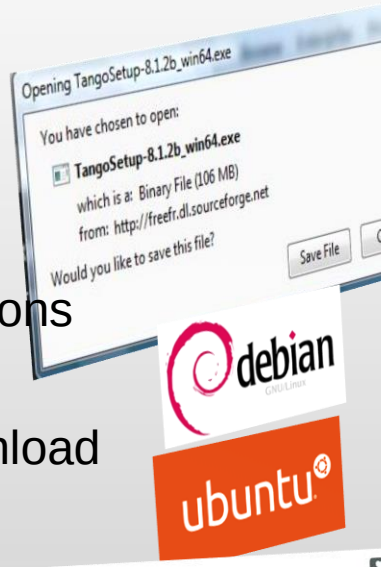
- Code generator for C++, Java, python
- Configuration tool
- Administration tool
- Archiving service
- Access control service
- Logging service
- Scan service
- GUI Toolkit for Java,QT, Python
- Synopsis animation tool
- Alarm service
- Web interface
- Android support
- Tutorials

- Bindings
- Many utility classes
- Hardware access class catalog
- Mailing list support

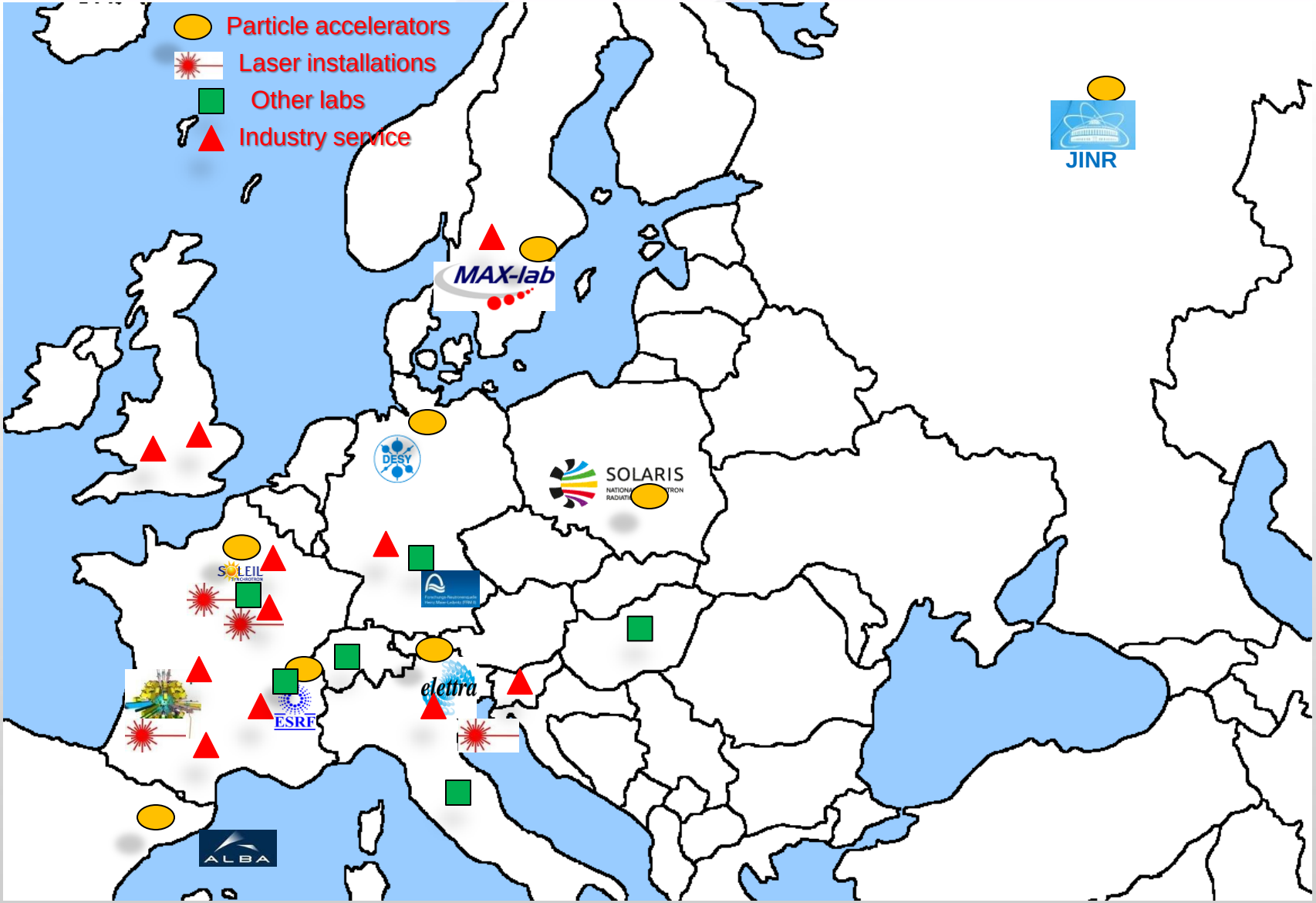
How to try it?

- TANGO is available free of charge
- Source code distribution
- Downloadable on http://www.tango-controls.org/download
- Binary Packages
  - Available for Ubuntu + Debian Linux in the standard distributions

    sudo apt-get install tango-common tango-db python-pytango
  - Available for Windows on http://www.tango-controls.org/download
- The Tango Box
  - An Ubuntu virtual machine with Tango installed and configured for easy testing
  - Runs on VMware and Virtualbox

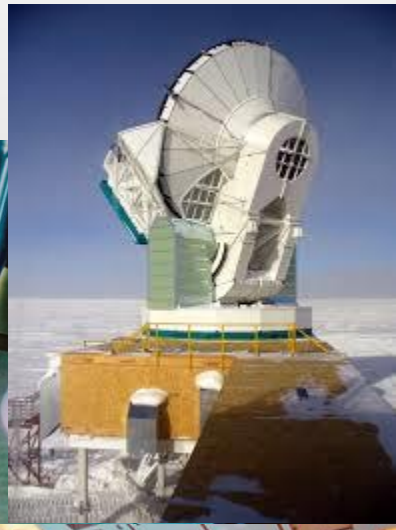


Distribution over Europe



Use cases

- TANGO was born in particle accelerator world, however …
- TANGO is a generic solution for any collection of objects
- Used also in other scientific domains like
- Wind tunnels e.g. ONERA
- Neutron source experiments
- Large laser installation
  - LMJ, PETAL, APOLLON
  - Free Electron Laser (Fermi)
- Small instruments
  - Thomx (art and medecine)
- Small installations
  - Embedded systems
  - Industrial supervision



TANGO Industrialization

Promoting the use of TANGO in and by Industry

Speeding up
technology transfers

- **Funding**

- ***Foster the eco-system,***
- ***Help industry to adopt TANGO***
- ***Make it a de facto standard***

Stimulate the snowball effect
Enhance the eco-system

- Welcome new users and industrial partners
- Increase the number of trained people
- Ease the first steps with TANGO
- Help system integrators to access new markets
- Getting more TANGO enabled hardware
- Provide industrial standard quality + support
- Make it a de-facto standard
  - …

First steps toward industry

- Industry can play a central role in providing support and training on TANGO.
- They have already helped to improve the tutorials, the documentation and the marketing:

- Some companies offer professional training sessions
- We are building a catalogue of referenced competent companies

In progress…

- Redesign of web site with professional communicators
  - http://www.tango-controls.org
- Education program
  - University partnership
- Improve the communication :
  - Better sharing of device servers
  - Better sharing of technical solutions
  - FAQ, Forum …

TANGO – versus industrial SCADA or proprietary DCS

- Open Source
  - Be master of your future.
  - You own your code.
- An active community at your service
  - Science, industry, services, students…
- Free to try and distribute, adopt or give-up
- The hardware of your choice
- Multi-language and multi-platform
- Scalable from 1 device to 1000000 devices
- Can integrate SCADA(s) accesses
- The same protocol at each layer
  - Hardware access
  - Data analysis
  - High level

- You need to :
  - unpack yourself
  - adapt it to your needs
- Hardware is not provided
- You have no formal guarantee

Industrial partners can help you by

- Unpacking
- Customizing
- Provide hardware
- Guaranteeing the solution

TANGO – Generating economical activity

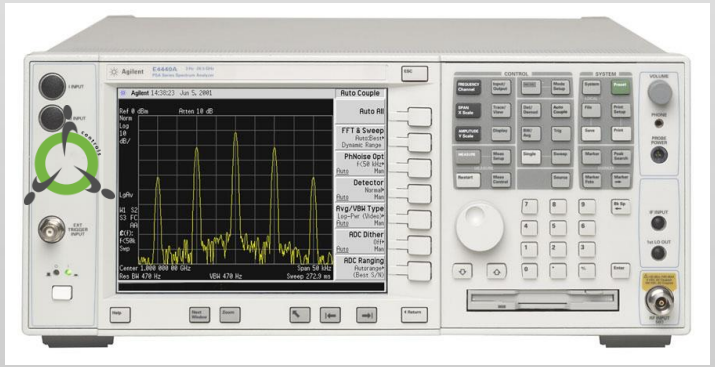
- System integrator added value
  - Development of device server
  - Service and consulting
  - Customization
  - Solution provider including hardware
  - Hotline and guaranty

- Potential markets for system integrators
  - Research Institutes
  - Internal projects use
  - SCADA and DCS market
  - Laboratory automation
  - Automation Test stands
  - Internet of Things

TANGO – Generating economical activity
Instrumentation hardware market

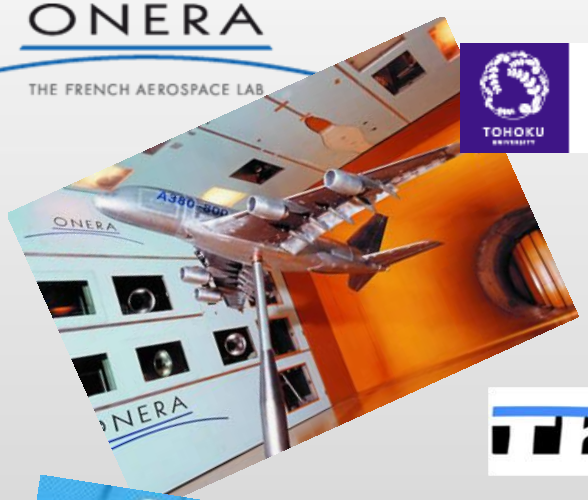
- Tango compatible hardware
  - Supplier provides and guaranty The TANGO interface to their product

- Advantage for the supplier :
  - Sales argument for addressing TANGO community
  - Provide remote control of device
  - Profit for free from TANGO framework
- Advantage for the community/client/user
  - Easier integration
  - Better matching of the hardware features



Recent projects started with TANGO

ONERA
THE FRENCH AEROSPACE LAB



TOHOKU UNIVERSITY
東北大学

The Italian Mars Society
Think beyond your planet...

Google SUMMER OF CODE 2013

ANKA

JÜLICH
FORSCHUNGSZENTRUM

ERAS
EUROPEAN MARS ANALOG STATION

ThomX

JINR

SOLARIS
NATIONAL SYNCHROTRON RADIATION CENTRE

Apollon

LABORATOIRE DE L'ACCÉLÉRATEUR LINÉAIRE

… more and more industrial partners …

NEXEYA
Let's merge our talents

COSYLAB

Atos
Worldgrid

HYTEC ELECTRONICS LTD

OXFORD INSTRUMENTS
The Business of Science®

midi ingénierie
experts en contrôle moteur

Avisto

AEROTECH®
Dedicated to the Science of Motion

Agilent Technologies

Instrumentation Technologies

Photonic Science
Scientific Detector Systems

NanGenex
Member of the DRGT Group

THEOSIS

bertin TECHNOLOGIES

ScandiNova
EXCELLENCE IN PULSED POWER

Softwareschneiderei

Snowball effect : projects evaluating TANGO

eli beamlines

eli Nuclear Physics

LAOG Laboratoire d'AstrOphysique de Grenoble

NanGenex Member of the DRGT Group

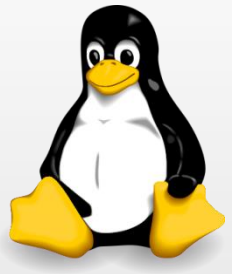
SKA SQUARE KILOMETRE ARRAY www.skatelescope.org

INAF Centro Italiano Archivi Astronomici

and others not mentioned here …

TANGO Software Foundation

- Goal – official entity to manage TANGO
- Legal representative of TANGO community
- Protect interests, logo, licenses etc.
- Define official releases and standards
- Collect and manage funds to promote TANGO
- Examples
  - *Apache Foundation*
  - *Eclipse.org*
  - *Linux.org*



Our goal … TANGO to be the **Android** of SCADA and DCS !

TANGO = a control system for the future

- *Are you ready to join the TANGO community?*
- The community is ready for you !