



About

Piotr Goryl, Tango Steering Committee Meeting, ESRF/Zoom, 145-15.09.2021

We collaborate on software and control systems.

► www.s2innovation.com

► contact@s2innovation.com

Milestones

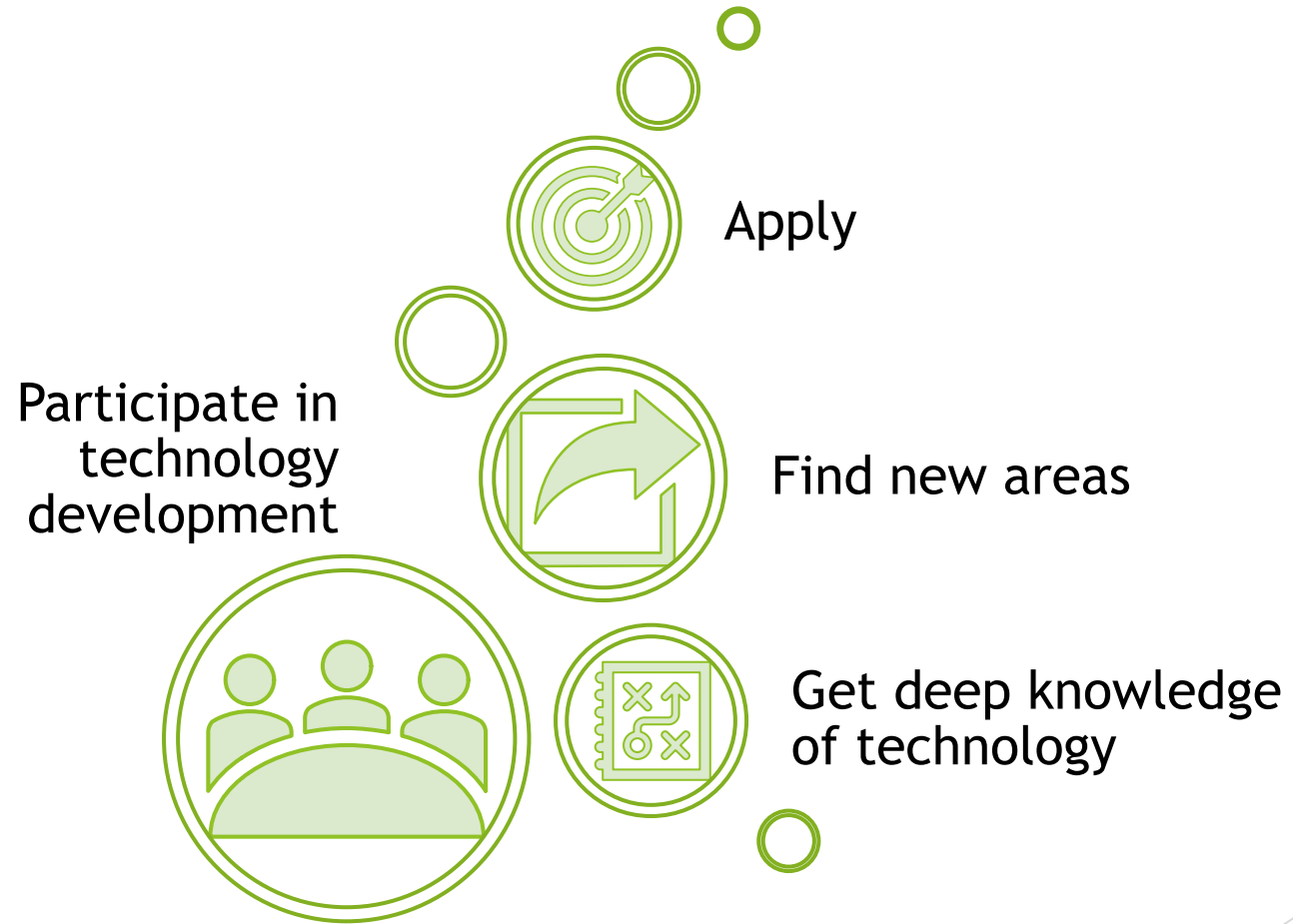
- ▶ S2Innovation has started in December 2017
 - ▶ Founded by:
 - ▶ Piotr Goryl, former Head of IT and Controls at NCPS SOLARIS, Krakow PL
 - ▶ Wojtek Soroka, former Administration and Procurement officer at NCPS SOLARIS
- ▶ In 2019, Investment from Cosylab d.d.
- ▶ From the beginning providing services for Tango Community

Mission and Vision

- ▶ S2Innovation delivers control systems software for innovative industry and Big Science laboratories. Our specialization is development of dedicated software for monitoring and control of research and industrial productions processes using both open-source and commercial toolkits.
- ▶ Our mission is to use knowledge and experience from scientific projects as a base for delivering increased efficiency to the industry, helping transformation to Industry 4.0+.

Knowledge and technology exchange shall bring profit to the whole community

Strategy



The team

Additional support from

- ▶ Krystian Kędroń,
- ▶ Grzegorz Kowalski,
- ▶ Michał Fałowski,
- ▶ +3 students.



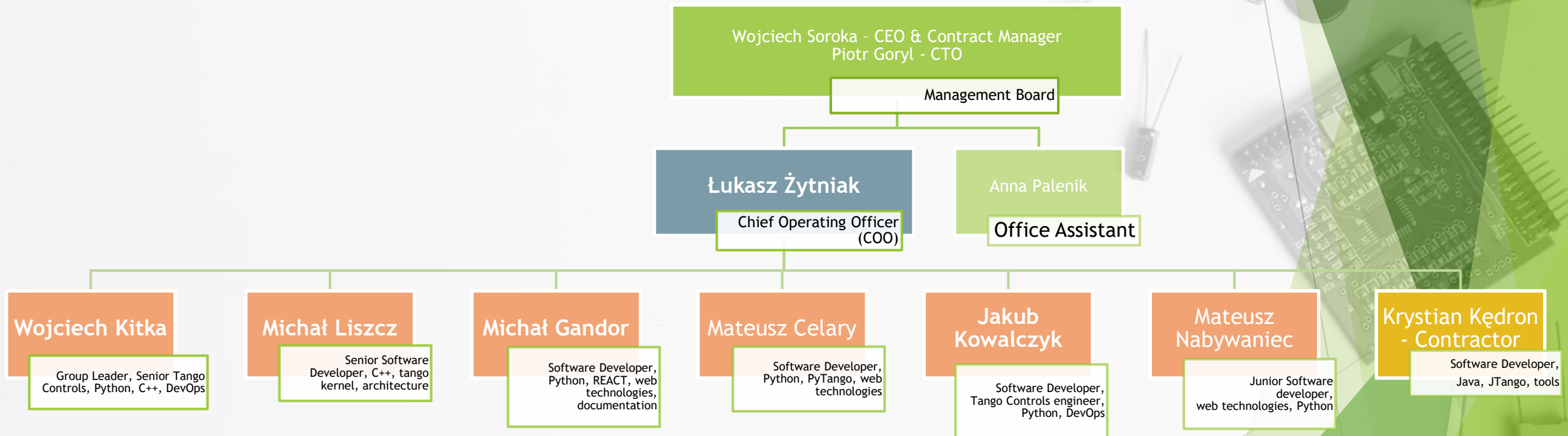
and growing...

Our expertise

- ▶ Control systems engineering:
 - ▶ For particle accelerators,
 - ▶ For large scale infrastructure,
 - ▶ For laboratories,
- ▶ Software development:
 - ▶ Python, C++, Java, .Net, HTML/JavaScript/CSS, Matlab,...
- ▶ PLC
- ▶ Computation,
- ▶ Documentation,
- ▶ DevOps,
- ▶ And many others ...



S2Innovation organization for Tango Controls services



TangoBox

(ESRF/Tango Community orders, 2018 - 20)

- S2Innovation have prepared the latest TangoBox virtual machine
- TangoBox is a virtual machine image with a lot of Tango Controls tools preinstalled. It is available as a VirtualBox image or on Amazon AWS. You may also download it from [here](https://gitlab.com/tango-controls/tangobox).
- The sources are here: <https://gitlab.com/tango-controls/tangobox>



Tango Controls documented

(ESRF/Tango Community orders, 2018 -)

► S2Innovation participates in the Tango Controls documentation writing, shaping-out and maintenance

► Check it here:

<https://tango-controls.readthedocs.io>

► The sources are here:

<https://gitlab.com/tango-controls/tango-doc>

🏠 Tango Controls



latest

Tango Controls

entation is

Docs » Welcome to Tango Controls documentation!

Edit on GitHub



Welcome to Tango Controls documentation!

Intended audience: all

How this documentation is organized

If you identify yourself with one of the following roles you may directly use related links:

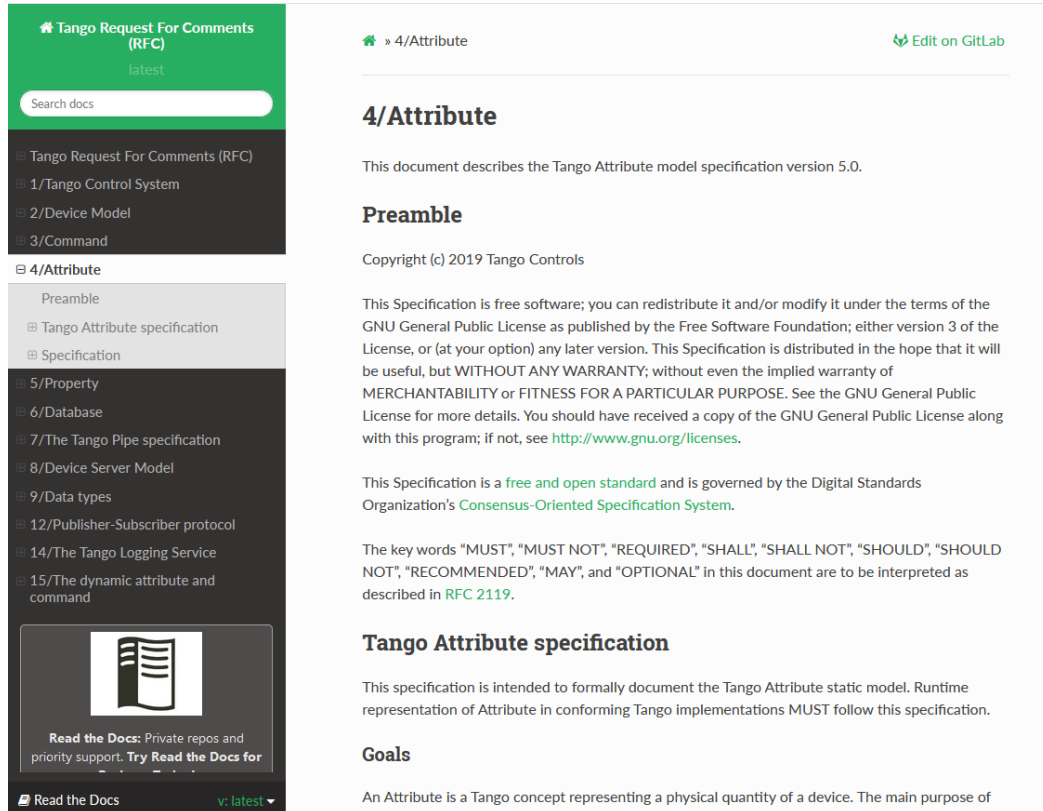
End user	Index	End-user applications guide
Beginner	Index	First steps with Tango Controls
Developer	Index	How to develop for Tango Controls
Administrator	Index	Administration applications guide

The documentation is organized in the following categories (some of them overlap):

- [Overview](#) will give you a quick overview of what Tango Controls is, its origins and who uses it. Start reading here.
- [First steps](#) will lead you through getting started with Tango Controls. This category includes an overview of Tango Controls concepts, procedures for installation and starting the system, as well as *Getting started* tutorials.
- [Developer's Guide](#) documents the API and information for **Developers** needed for the development of **Device Servers** and client applications.
- [Administration](#) section is important mainly for **System Administrators**. However, it also contains some information for both **End Users** and **Developers**, too. It contains useful information about the Tango Controls system deployment, startup and **maintenance**.
- [Tools and extensions](#). Tango comes with rich set of command line tools, graphical tools and programming tools for management, developing graphical applications and controlling the system.

Tango Controls RFC

(ESRF/Tango Community orders, 2019 -)



The screenshot shows the Tango Controls RFC website. The left sidebar contains a navigation menu with the following items: Tango Request For Comments (RFC), 1/Tango Control System, 2/Device Model, 3/Command, 4/Attribute (selected), 5/Property, 6/Database, 7/The Tango Pipe specification, 8/Device Server Model, 9/Data types, 12/Publisher-Subscriber protocol, 14/The Tango Logging Service, and 15/The dynamic attribute and command. The main content area is titled '4/Attribute' and includes a search bar, a 'Tango Request For Comments (RFC)' section, and a 'Preamble' section. The Preamble text states: 'This Specification is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This Specification is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. You should have received a copy of the GNU General Public License along with this program; if not, see <http://www.gnu.org/licenses>.' Below the Preamble, there is a section titled 'Tango Attribute specification' and a 'Goals' section.

4/Attribute

This document describes the Tango Attribute model specification version 5.0.

Preamble

Copyright (c) 2019 Tango Controls

This Specification is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This Specification is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. You should have received a copy of the GNU General Public License along with this program; if not, see <http://www.gnu.org/licenses>.

This Specification is a [free and open standard](#) and is governed by the Digital Standards Organization's [Consensus-Oriented Specification System](#).

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#).

Tango Attribute specification

This specification is intended to formally document the Tango Attribute static model. Runtime representation of Attribute in conforming Tango implementations MUST follow this specification.

Goals

An Attribute is a Tango concept representing a physical quantity of a device. The main purpose of

► S2Innovation participates in specification of the Tango Controls protocol with:

- Coordination and repository maintenance
- Specification writing
- Publishing

► It is available here:

► HTML/PDF:
<https://tango-controls.readthedocs.io/projects/rfc/en/latest/index.html>

► Sources:
<https://gitlab.com/tango-controls/rfc>

Tango Controls Benchmarking Suite

M. Liszcz, P.P. Goryl, S2Innovation, Kraków, Poland

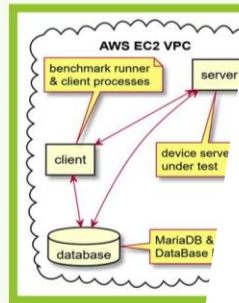
Benchmarking Suite

Tango Controls can be used at both small and very large laboratories and scientific facilities. Deploying Tango at large scale requires solutions for **monitoring efficiency, performance and resource utilization**. To address this need the Tango Controls Benchmarking Suite was developed

Tests on Amazon AWS EC2

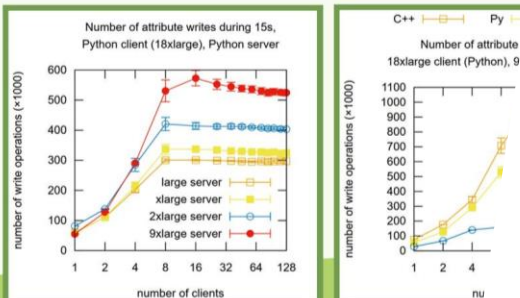
- ▶ A test setup for performance measurements was assembled on Amazon AWS EC2 platform,
- ▶ Different client and server instance sizes were compared.

Instance	vCPUs	Mem. [GiB]
c5n.large	2	5.25
c5n.xlarge	4	10.50
c5n.2xlarge	8	21.00
c5n.4xlarge	16	42.00
c5n.9xlarge	36	96.00



Attribute access performance

- ▶ Server performance increases with the number of available servers
- ▶ Client performance is often limited by the server performance
- ▶ C++ server implementation is much faster than Python



Tango Controls benchmarking tools

(ESRF/Tango Community order, 2018/19)

- ▶ S2Innovation has developed a benchmarking suite for Tango Controls

▶ Benchmark scripts:

- ▶ Attribute read and write, command execution, event subscription, etc. ...
- ▶ Start multiple parallel clients,
- ▶ Produce reports in CSV and ReST formats.

▶ Target device servers:

- ▶ Provide interface required by the scripts,
- ▶ Implemented in Python, C++ and Java.

▶ Benchmark runner:

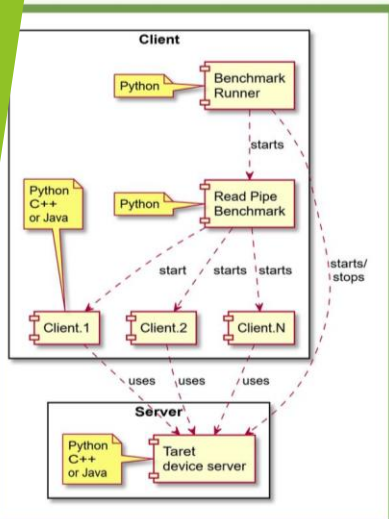
- ▶ Reads configuration from a YAML file,
- ▶ Starts device servers and runs the tests

- ▶ The source code is available here:

<https://gitlab.com/tango-controls/sys-tango-benchmark>

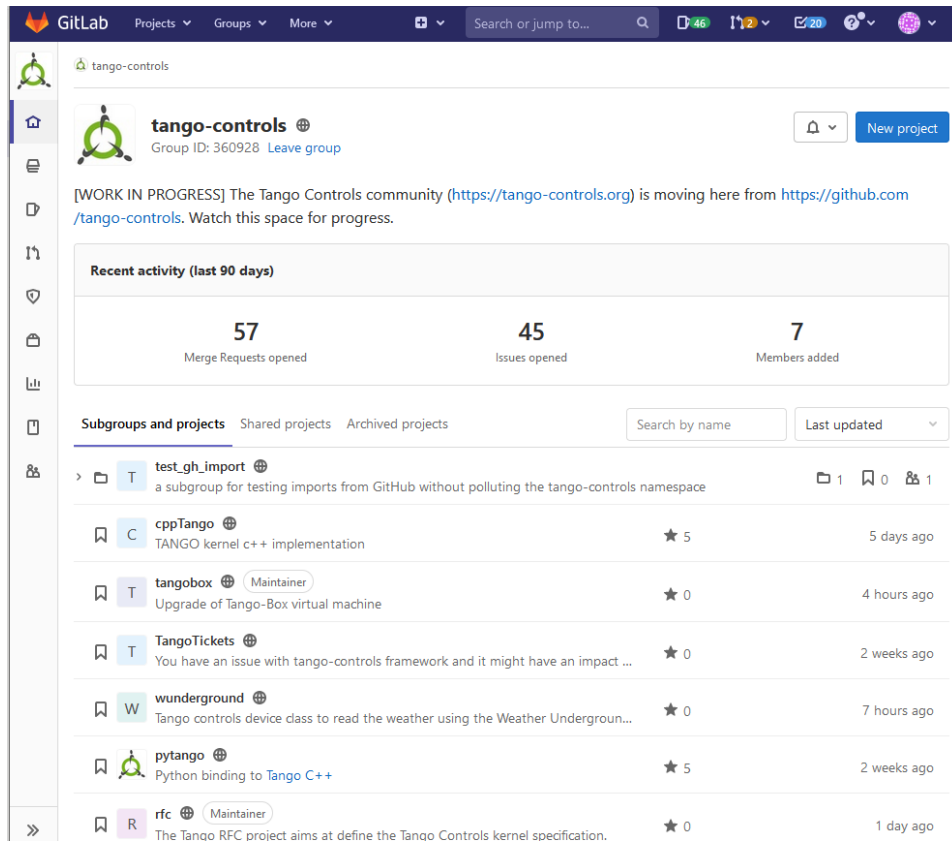
- ▶ There is also an ICALEPCS paper:

<http://accelconf.web.cern.ch/icalepcs2019/papers/wepha056.pdf>



Support for cppTango, PyTango, JTango

(ESRF/Tango Community orders, 2019 -)



The screenshot displays the GitLab interface for the 'tango-controls' group. At the top, there's a navigation bar with 'Projects', 'Groups', and 'More' tabs. Below this, the group name 'tango-controls' is shown with its ID '360928' and a 'Leave group' link. A notice states: '[WORK IN PROGRESS] The Tango Controls community (<https://tango-controls.org>) is moving here from <https://github.com/tango-controls>. Watch this space for progress.'

The 'Recent activity (last 90 days)' section shows three metrics: 57 Merge Requests opened, 45 Issues opened, and 7 Members added.

Below this, the 'Subgroups and projects' section is visible. It includes a search bar and a dropdown menu. The list of subgroups and projects is as follows:

Icon	Name	Description	Stars	Updated
T	test_gh_import	a subgroup for testing imports from GitHub without polluting the tango-controls namespace	1	0
C	cppTango	TANGO kernel c++ implementation	5	5 days ago
T	tangobox	Upgrade of Tango-Box virtual machine	0	4 hours ago
T	TangoTickets	You have an issue with tango-controls framework and it might have an impact ...	0	2 weeks ago
W	wunderground	Tango controls device class to read the weather using the Weather Undergroun...	0	7 hours ago
P	pytango	Python binding to Tango C++	5	2 weeks ago
R	rfc	The Tango RFC project aims at define the Tango Controls kernel specification.	0	1 day ago

- ▶ S2Innovation participates in development and maintenance of Tango Controls kernel
- ▶ See the following contributions, as an example:

https://gitlab.com/groups/tango-controls/-/merge_requests?scope=all&utf8=%E2%9C%93&state=all&author_username=mliszczycki



[About us](#) [Community](#) [Developers](#) [Partners](#) [Contact](#)

[D mo](#)

[Home](#) [Developers](#) [Classes Catalogue](#)

CLASSES CATALOGUE

There are device classes for the following families:

[All](#) (752 device classes) [AbstractClasses](#)(9), [AcceleratorComponents](#)(4), [Acquisition](#)(93), [Application](#)(1), [Archiving](#)(2), [BeamDiagnostics](#)(15), [BeamlineComponents](#)(17), [Calculation](#)(30), [Communication](#)(36), [Controllers](#)(4), [CounterTimer](#)(20), [InputOutput](#)(38), [Instrumentation](#)(88), [Interlock](#)(1), [MagneticDevices](#)(4), [MeasureInstruments](#)(45), [Miscellaneous](#)(29), [Monitor](#)(1), [Motion](#)(139), [OtherInstruments](#)(28), [PLC](#)(1), [PowerSupply](#)(35), [REST](#)(1), [RadioProtection](#)(3), [SampleEnvironment](#)(5), [Security](#)(2), [Simulators](#)(15), [SoftwareSystem](#)(23), [StandardInterfaces](#)(20), [System](#)(3), [Temperature](#)(17), [Training](#)(2), [Vacuum](#)(26),

SEARCH CATALOGUE

Have you written a new device class? [Please share it.](#)

Below you will find a table with all device classes. Please click a family name above or use search to narrow the list. You may also use [advanced search](#) to find a device class you are looking for.

Page 1 of 76 [Next](#) 10 of 752 device servers

Device Server	Family	Manufacturer	Products
SmarActMCS2Motor	Motion	Smaract	http://www.smaract.de/index.php/products/controllers/mcs2
SmarActMCS2Ctrl	Motion	Smaract	http://www.smaract.com/products/controllers/mcs2

Device Classes Catalogue

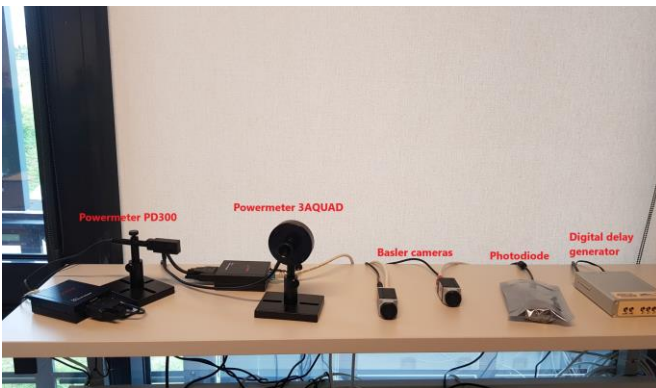
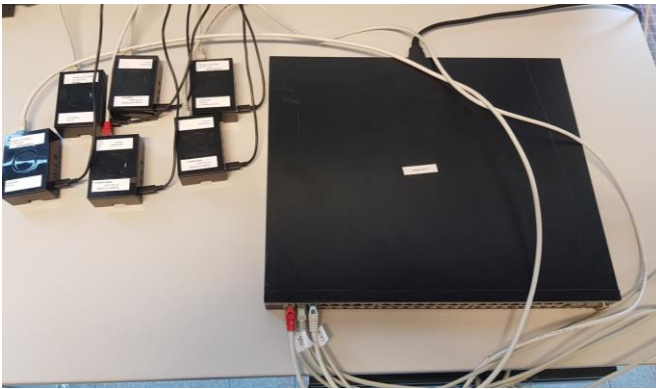
(ESRF/Tango Community orders, 2018 -)

► The Catalogue (updates tents and app source code) is maintained by S2Innovation.

► Check the Device Classes Catalogue:
<https://www.tango-controls.org/developers/dsc/>

► Source code:
<https://gitlab.com/tango-controls/dsc>

Laser beam diagnostic system for ICFO, Barcelona, Spain, 2020



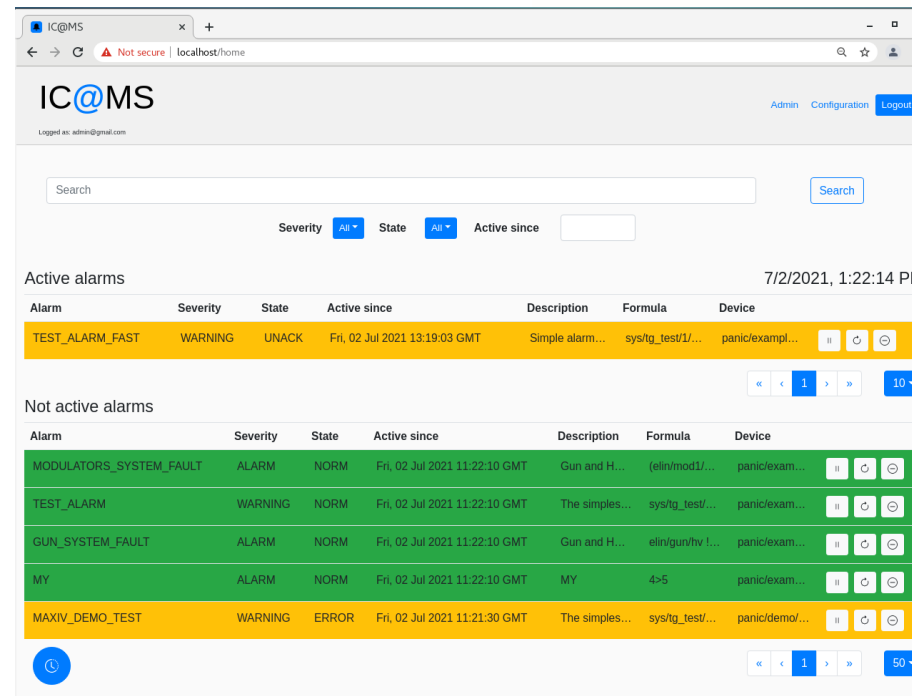
- ▶ Deployment of a distributed Tango Controls system for 6 Raspberry Pi computers:
 - ▶ Tango Controls base functionality (Database, Starter, libraries, Astor, Jive),
 - ▶ WebJive,
 - ▶ Bensikin/SNAP archiving,
 - ▶ Network configuration,
- ▶ Integration of various devices: cameras, spectrometers, photodiodes, a delay generator into Tango
 - ▶ Development of device servers for Basler cameras, Ophir photodiodes, power meters and Ocean optics spectrometers,
 - ▶ Reuse of existing device server for the delay generator
- ▶ User interface based on WebJive,
- ▶ Few improvements to WebJive pushed to its main repository
- ▶ All results are available here:
<https://gitlab.com/s2innovation-partners/icfo>

IC@MS - Integrated, Cloud ready @larm Management System



CLOUD BASED alarm Management System
based on PANIC by ALBA

- ▶ Shortened of downtimes,
- ▶ Increased company efficiency,
- ▶ Reduction of personnel stress:
 - ▶ Alarms handling streamlined,
 - ▶ Increased situation awareness,
 - ▶ Integration of production and infrastructure,
- ▶ Non-typical situations monitored thanks to runtime alarming formulas definition





Our partners in
2020



Our main partners today





Thank you!

S2INNOVATION Sp. z o. o. [Ltd.]

Podole 60 Street,
30-394 Kraków, Poland

(+48) 795 794 004

contact@s2innovation.com