



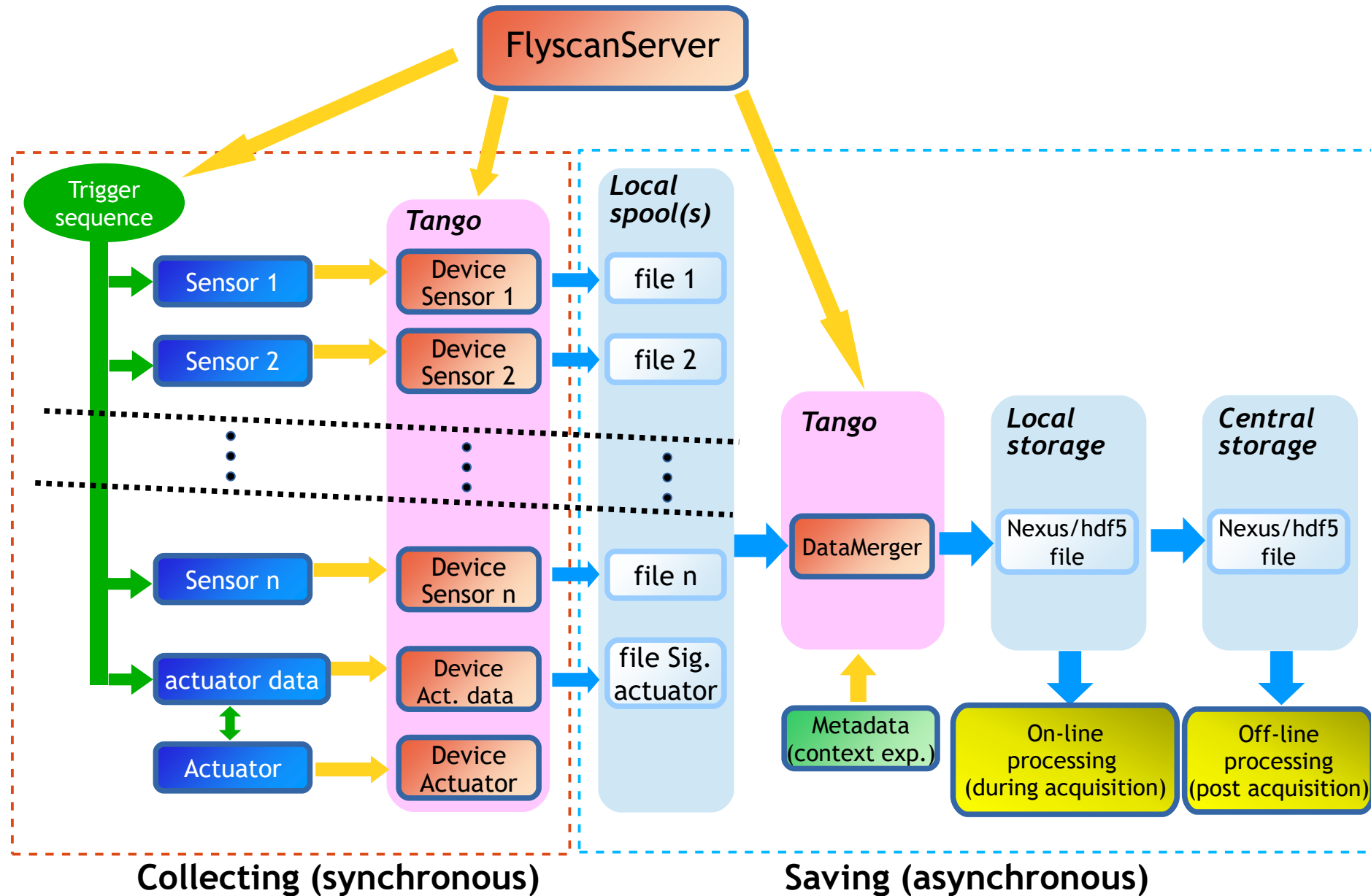
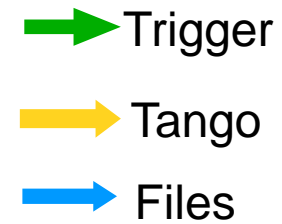
SOLEIL Flyscan presentation

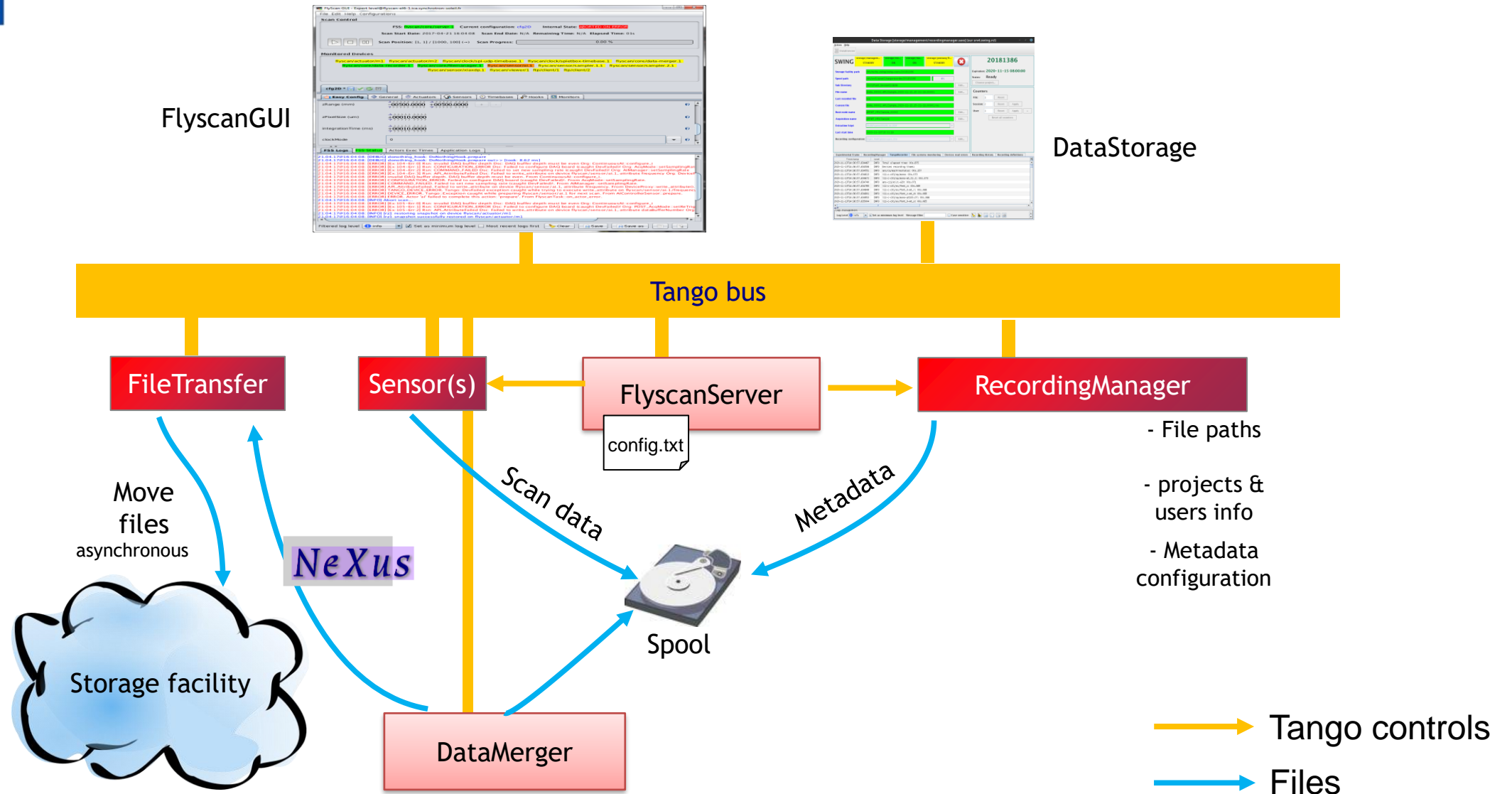
Outline

- Generalities
- Architecture / Data flow
- Plugins
- Configurations
- UI
- Perspectives

- Eco-system
 - FlyscanServer: Tango device (C++)
 - With plugins
 - Continuous and step scans in N dimensions
-
- Project started in 2010
 - In production since 2014
 - On 12 BL (out of 29) (2 more in 2023)

Flyscan - Architecture





Flyscan - Plugins

- **Types**

- Actuators
- Sensors
- Timebases
- Hooks

- **Standard interfaces**

- Init
- Prepare
- Start
- Abort
- ...

- **Parameters**

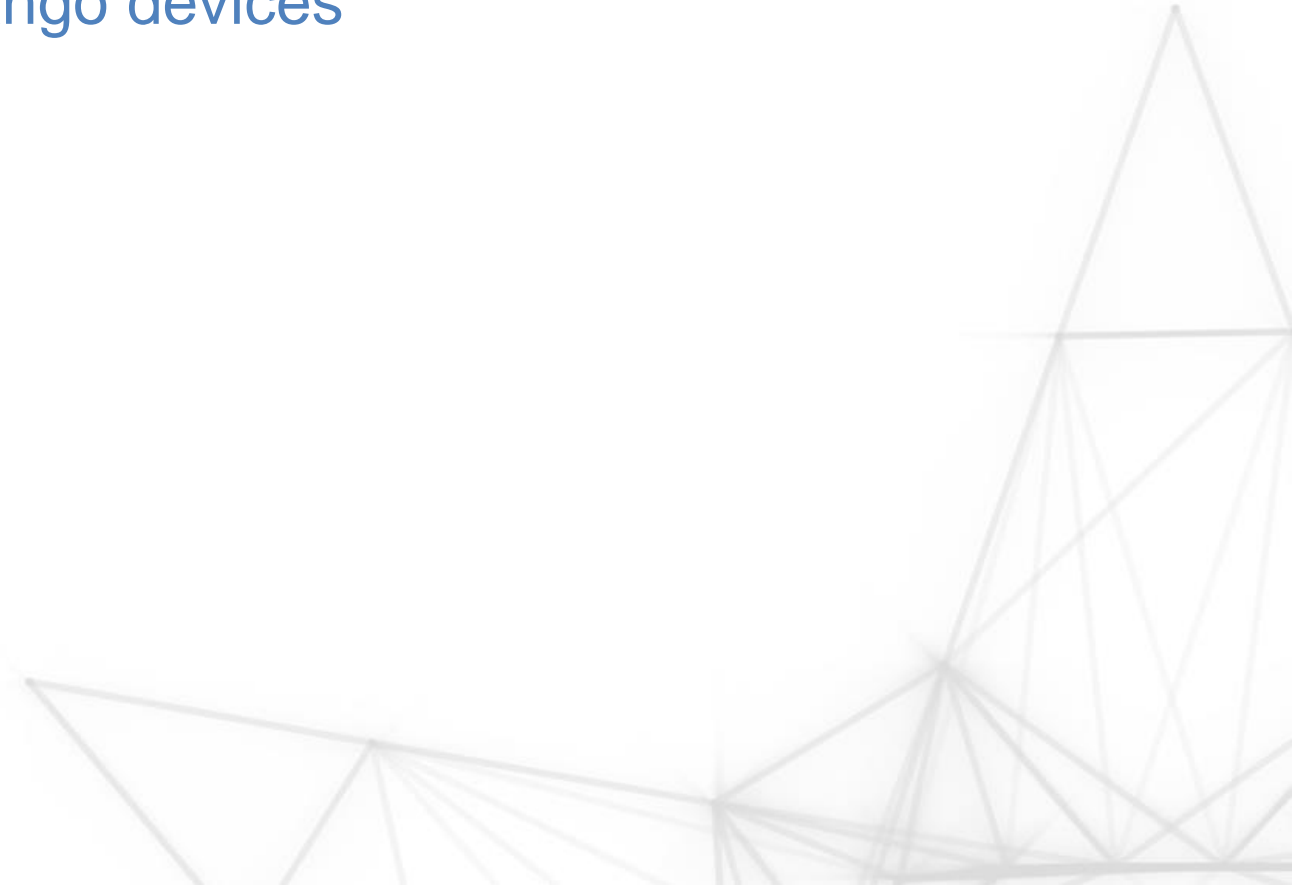
- Continuous_velocity
- ...



FlyscanServer



- C++ / python
- ~50 plugins
- can support 1 or more Tango devices



Flyscan - Configs

- FlyscanServer:
 - Work with a configuration
 - Ascii file
 - INI like
 - « Static »

```
mapping_2d_FL.cfg X
93 -
94 [info]
95 name = mapping_2d_FL
96 keywords = 2D Mapping
97 authors = ICA & LUCIA
98 comment = General purpose XZ mapping
99 revision = 1
100 version = 1.0.0
101 flyscan_version = 1.0.0
102 -|
103 [acquisition]
104 dimensions = [21, 3]
105 continuous = True
106 zigzag = true
107 -
108 [recording]
109 split = 1
110 -
111 [actors]
112 actuator:
113 type = StandardMotor
114 name = first_dim_axis
115 dimension = 1
116 trajectory = [(0.0, 100.0, 21)]
117 enable = True
118 parameter:tango_device:value = flyscan/actuator/m1
119 parameter:treat_alarm_as_error:value = False
120 parameter:step_by_step_velocity:value = 1000.0
121 parameter:continuous_velocity:value = 25.0
122 parameter:acceleration:value = 8192.0
123 parameter:deceleration:value = 8192.0
124 -
125 actuator:
126 type = StandardMotor
127 name = second_dim_axis
128 dimension = 2
129 trajectory = [(0.0, 30.0, 3)]
130 enable = True
131 parameter:tango_device:value = flyscan/actuator/m2
132 parameter:treat_alarm_as_error:value = False
133 parameter:step_by_step_velocity:value = 1000.0
134 parameter:acceleration:value = 8192.0
135 parameter:deceleration:value = 8192.0
136 -
137 timebase:
138 type = PandaboxUdpTimebase
139 name = pandabox_udp_tmb
140
```

EasyConfig

- python script :
 - That use a set of parameters defined with the user, eg: from, to, step, integration_time, ...
 - That will populate the static config file with computed values from parameters above, eg:
continuous_velocity = f(from, to, step, integration_time)
- « dynamic »

```
# specify first_dim_axis speeds and [acc/dec]eleration
first_dim_axis.parameters.step_by_step_velocity = 1000.
first_dim_axis.parameters.continuous_velocity = old_div(1000. * self._first_dim_pixel_size_in_um, self._integration_time_in_ms)
first_dim_axis.parameters.acceleration = 8192.
first_dim_axis.parameters.deceleration = 8192.
```

Flyscan - UI

FlyScan GUI 3.5.21-117 (\$ { build-date }) - Expert level

File Edit Help Configurations

Scan Control

FSS: flyscan/core/Server.1 Current configuration: mapping Internal State: SCAN DONE

Scan Start Date: 2023-07-21 14:54:32 Scan End Date: 2023-07-21 15:21:54 Remaining Time: -01m:07s Elapsed Time: 26m:13s

Scan Position: [1, 24] / [120, 24] (...) Scan Progress: 100.00 %

Monitored Devices

D13-1-C00/CA/CPT.1
d13-1-c00/dt/xpad.1
d13-1-cx1/ex/dif.1-chi_e
d13-1-cx1/ex/dif.1-theta
flyscan/clock/pandabox-timebase.1
flyscan/clock/pandabox-udp-timebase.1
flyscan/core/data-merger.1
flyscan/core/ftp-client.cpt.1
flyscan/sensor/sampler.1
flyscan/sensor/sampler.2
flyscan/viewer1

mapping

Easy Config | General | Actuators | Sensors | Timebases | Hooks

enable

configurator

first_dim_axis

first_dim_axis_range (mm or deg)

first_dim_pixel_size_in_um (um)

second_dim_axis

second_dim_axis_range (mm or deg)

second_dim_pixel_size_in_um (um)

enable_xpad

enable_cirpad

enable_sdd

FSS Logs | FSS Status | Actors Exec Times | Application Logs

Timestamp	Level	Message
2023-07-21T15:20:44.647423	INFO	[first_dim_axis_sampler] snapshot successfully restored on flyscan/sensor/sampler.1
2023-07-21T15:20:44.647648	INFO	[second_dim_axis_sampler] snapshot successfully restored on flyscan/sensor/sampler.2
2023-07-21T15:20:44.654279	INFO	[first_dim_axis] snapshot successfully restored on d13-1-cx1/ex/dif.1-theta
2023-07-21T15:20:44.671464	INFO	[xpad] snapshot successfully restored on d13-1-c00/dt/xpad.1
2023-07-21T15:20:45.005432	INFO	[cyberstar211] snapshot successfully restored on D13-1-C00/CA/CPT.1
2023-07-21T15:20:45.705939	INFO	Scan is done

Logs management

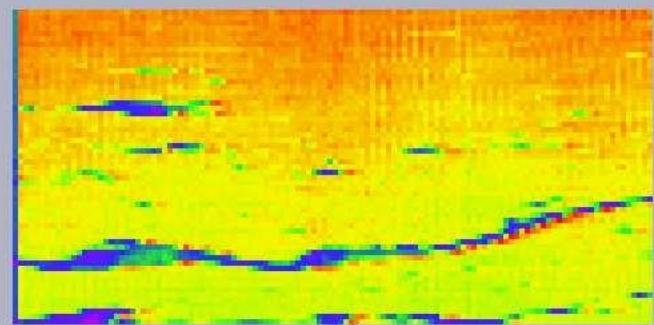
Log Level Set as minimum log level Message filter Case sensitive

- Tango device (Python)
- Read the final experimental file
 - During acquisition
 - Using posix lock
- Expose data as Tango attributes
- Allows some data reduction
 - XRD
 - XRF
 - ...
- Can write the reduced data into the final data file



flyscan/coreViewer.1

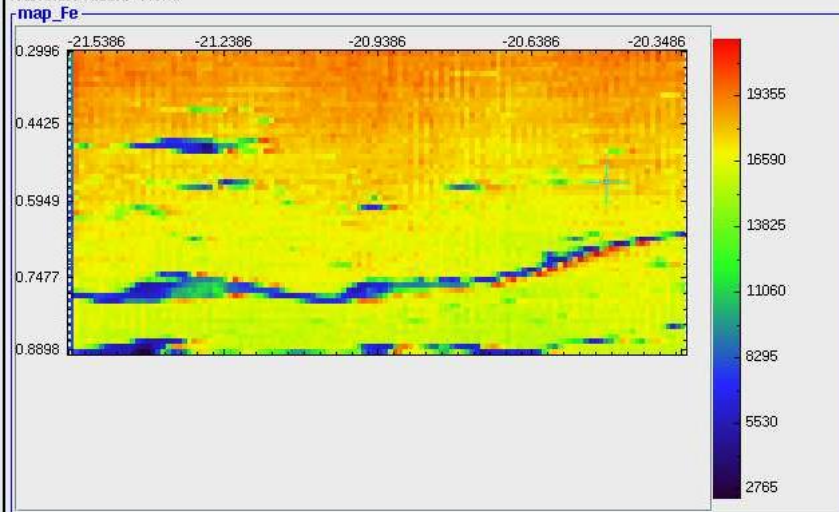
flyscan/core/viewer.1
data-merger has switched to state STANDBY



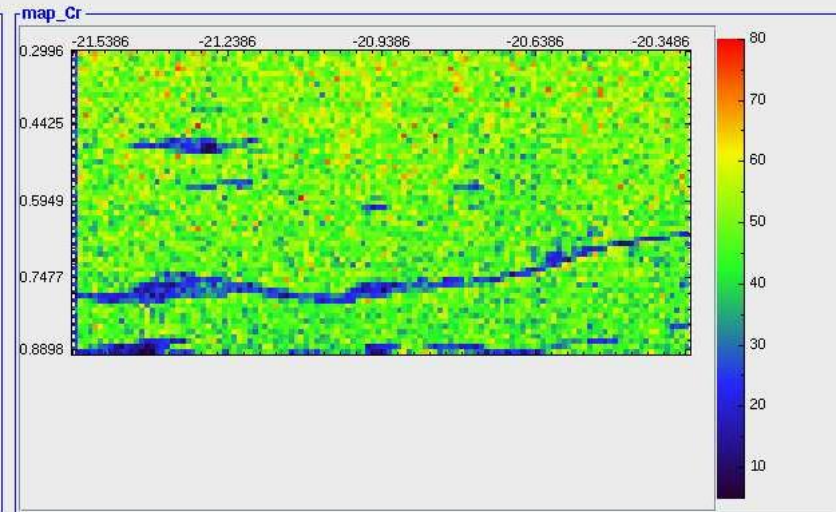
400% [120,59]
Selection: Rect None

Scalar	logs	configuration	loadedPlugins	Isl_xbpm-channel0_sampling_time	Isl_gonio2MTtz3	Isl_xbpm-channel3_sampling_time	Isl_xbpm-flux_sampling_time	Isl_machine_current	Isl_xbpm-channel2	Isl_gonio2MTts2	Isl_xbpm-channel1_sampling_time	Isl_xbpm-channel2_sampling_time
Isl_xbpm-flux	Isl_gonio2MTtz3	Isl_xbpm-channel1	Isl_xbpm-channel0	Isl_gonio2MTtz	Isl_xbpm-channel3	Isl_deadtime00	channel00	map_xbpm-channel0_sampling_time	map_gonio2MTtz3	map_xbpm-channel3_sampling_time	map_xbpm-flux_sampling_time	map_machine_current
map_xbpm-channel2	map_gonio2MTts2	map_xbpm-channel1_sampling_time	map_xbpm-channel2_sampling_time	map_xbpm-flux	map_gonio2MTtz3	map_xbpm-channel1	map_xbpm-channel0	map_gonio2MTtz	map_xbpm-channel3	map_gonio2MTtz	map_xbpm-channel2	map_xbpm-channel3
map_deadtime00	Isl_channel00	map_Au	map_Bi	map_Ca	map_Ce	map_Co	map_Cr	map_Cu	map_Eu	map_Fe	map_Mn	map_Mo
map_Ni	map_Pb	map_Sn	map_Sr	map_Th	map_Ti	map_U	map_Y	map_Zn				

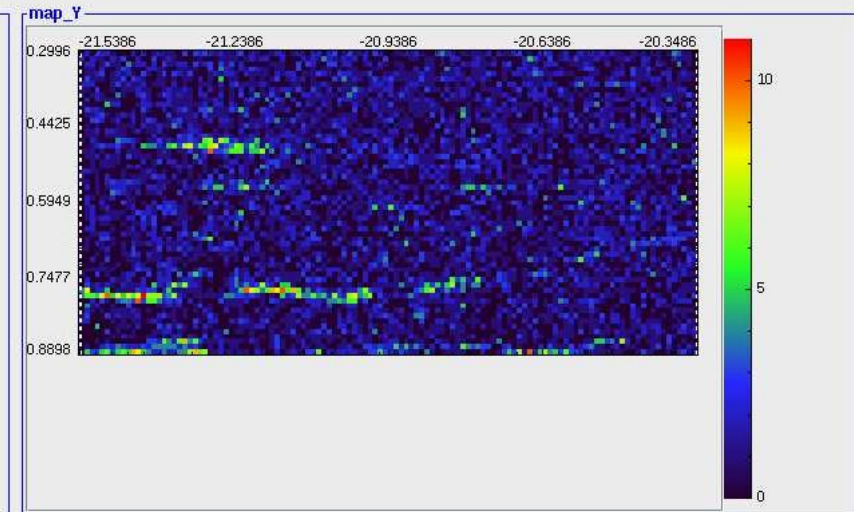
Cartography
Transformation: None



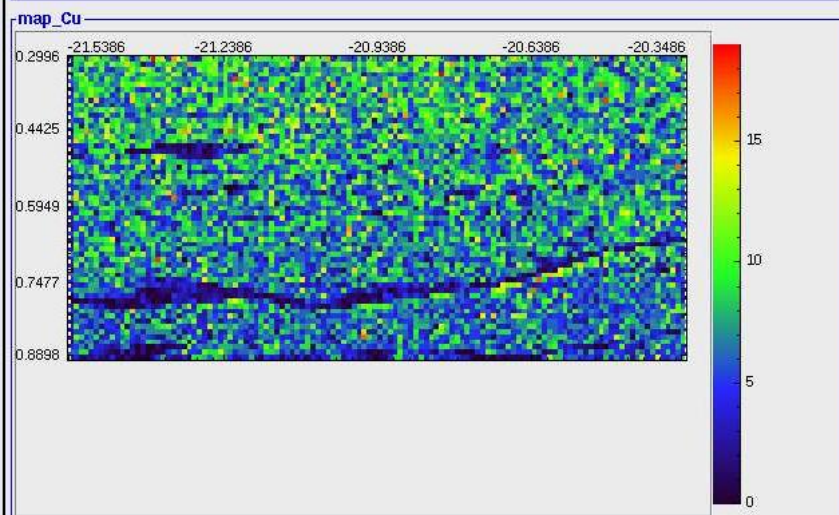
Zoom: 385% axes: [out] Show Statistics



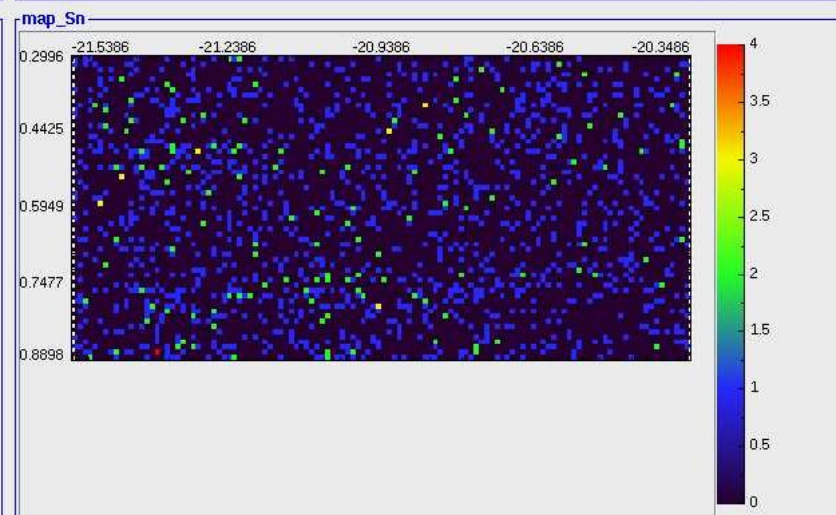
Zoom: 385% axes: [out] Show Statistics



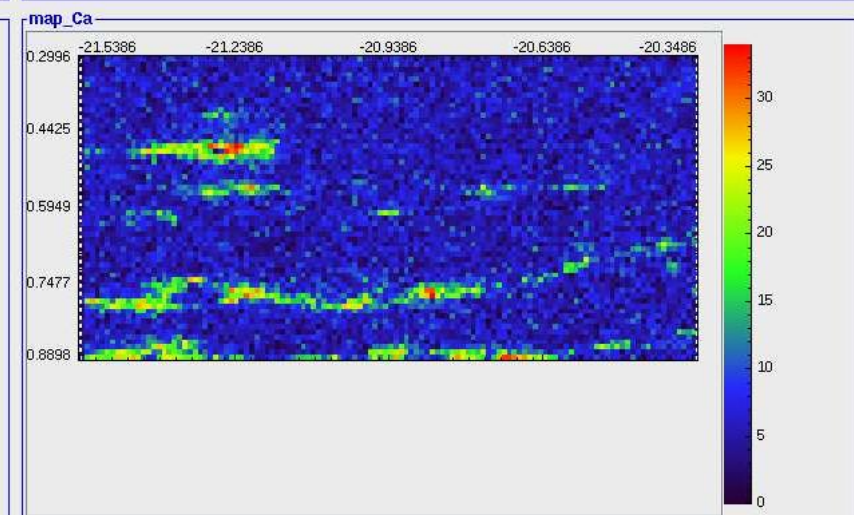
Zoom: 385% axes: [out] Show Statistics



Zoom: 385% axes: [out] Show Statistics



Zoom: 385% axes: [out] Show Statistics



Zoom: 385% axes: [out] Show Statistics

flyscan/core/viewer.1
data-merger has switched to state STANDBY

Motor positions

106-M-CX/EX/GONIO.2-MT_Ts.2	-20.4986	Send	-21.9991 mm	STANDBY
106-M-CX/EX/GONIO.2-MT_Tz	0.5540	Send	-11.0999 mm	STANDBY

- Python interface & ipython profile

```
In [9]: fss.cfgs.cfg2D.easy_config.parameters
Out[9]:
EasyConfigProp()
+- clockMode ..... 0
+- integrationTime ... 10.0
+- split ..... 1
+- xPixelSize ..... 100.0
+- xRange ..... [-10000.0, 10000.0]
+- xrf_config ..... {"P": [400, 430], "K": [652, 689], "S": [452, 485], "C1": [516, 552]}
+- zPixelSize ..... 200.0
+- zRange ..... [-500.0, 500.0]
```

- **SPYC** (SOLEIL's PYthon Command line interface) integration
 - A magic is written for each config
- Passerelle
- IGOR
- Any other Tango client

- Decommissioning of the ScanServer: towards Flyscan
- Flyscan upgrade
 - With automatic retroaction
 - Visualisation improvement
 - Connected to PLUSS (SOLEIL's future event & api manager)



Thank you!





UPGRADE



Backup slides

Continuous scanning application

