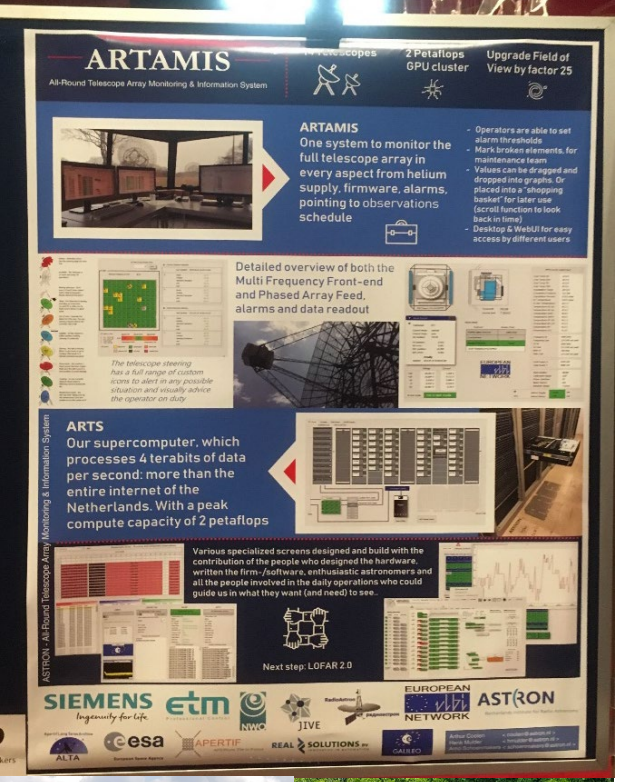
LOFAR

Monitoring & Control

Henk Mulder

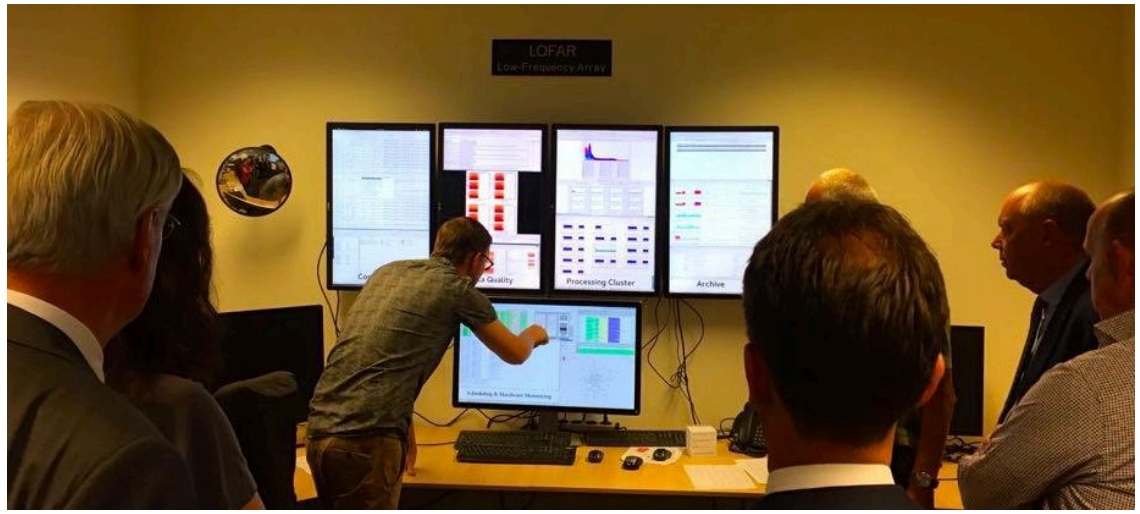
ILT-TO meeting 6 Nov 2019

ASTRON
Netherlands Institute for Radio Astronomy



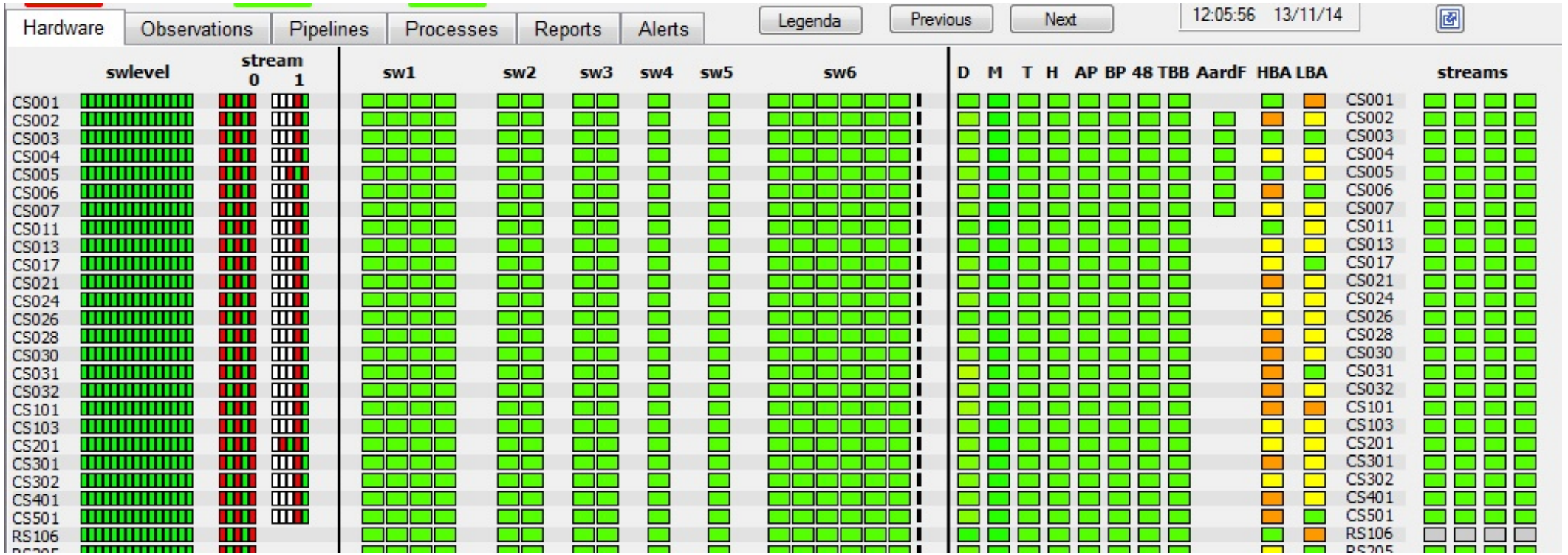
Operations..

- Documenting field maintenance / writing procedures / making a wiki (preparing for the moment Henri goes to R&D)
- Galileo satellite tracking
- Replacement of Real Time Station Monitor & Station Test (MMIS)
- Lots and lots of Apertif work

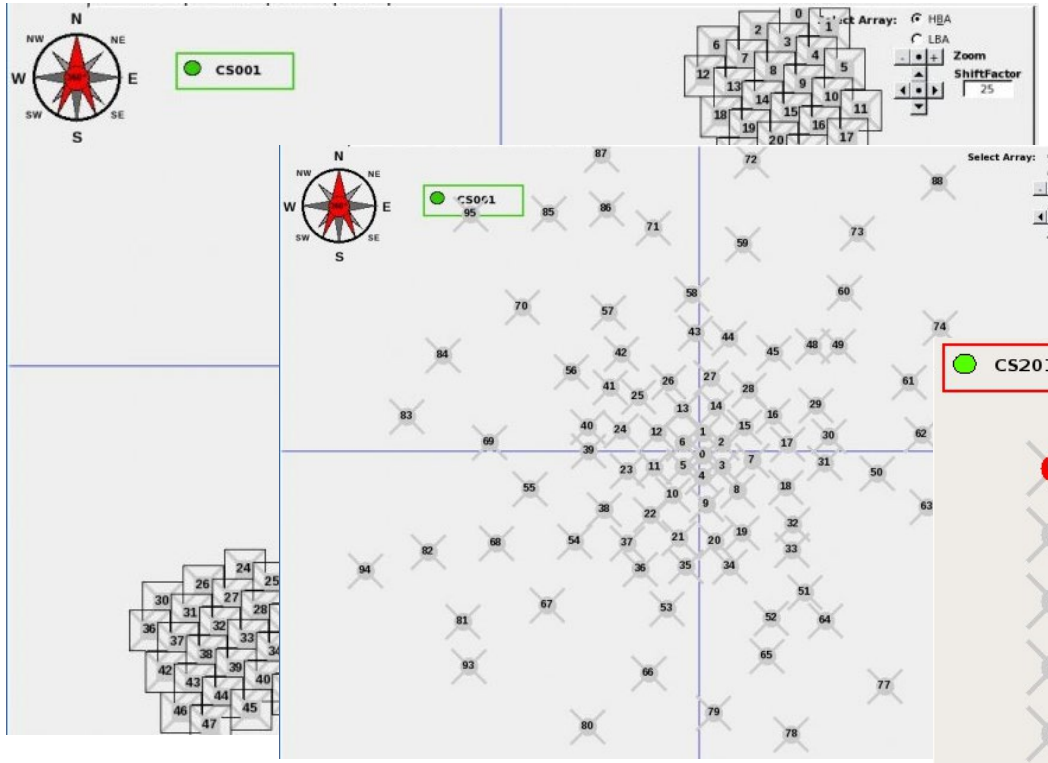


LOFAR Navigator

The mainscreen



Station view (Tile/ Antenna info)



Last states: show all states

Prio	Time	State comment
50	2018.06.18 08:47:26.779	
50	2018.06.18 09:18:09.931	FLAT
50	2018.06.18 10:06:50.487	HN
40	2018.06.18 11:26:23.484	FLAT
50	2018.06.18 11:45:16.510	FLAT

Select state to set: Select state...

Select LBA/HBA comment to set: Free choice

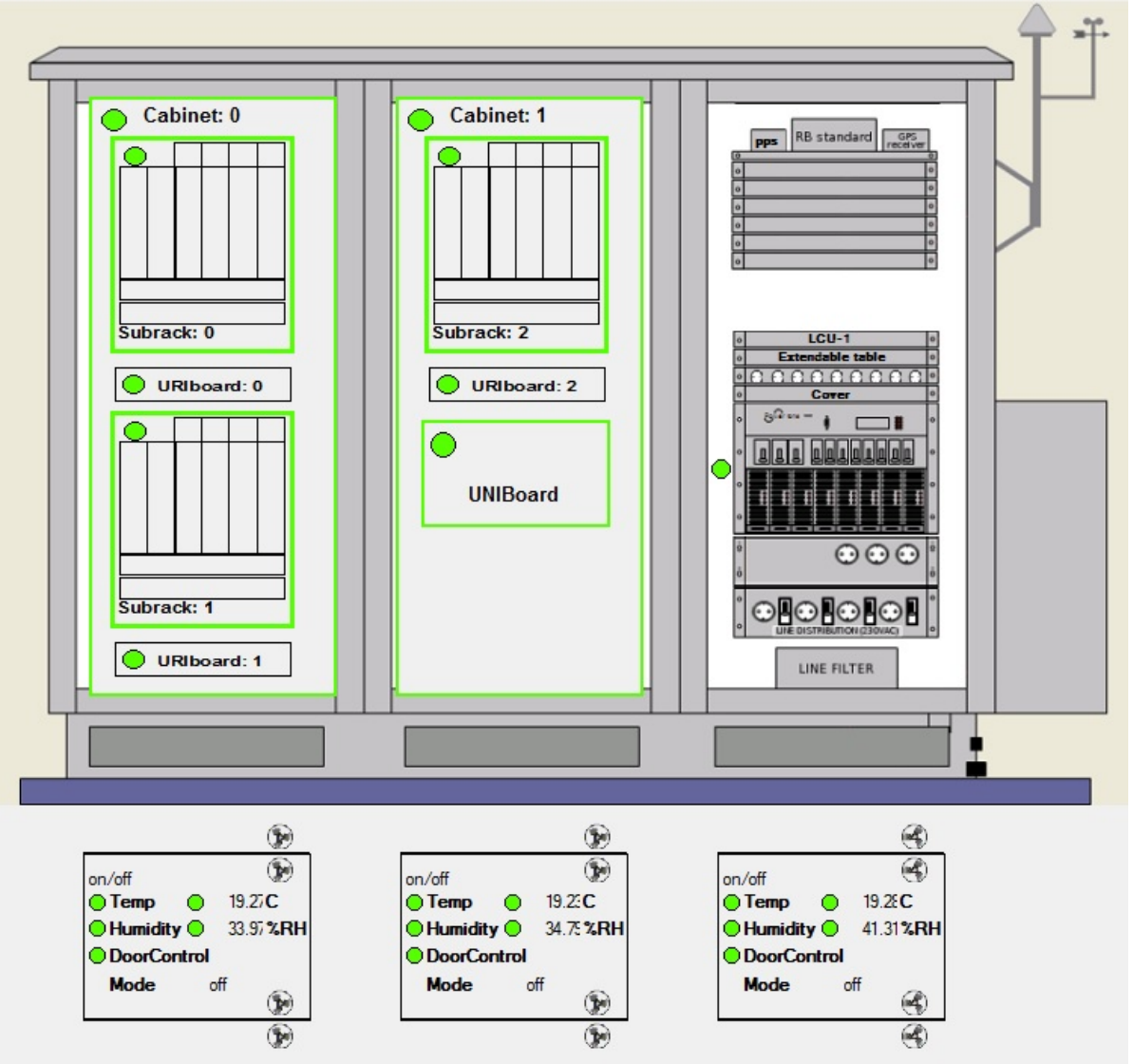
Set recursive (to all childs)

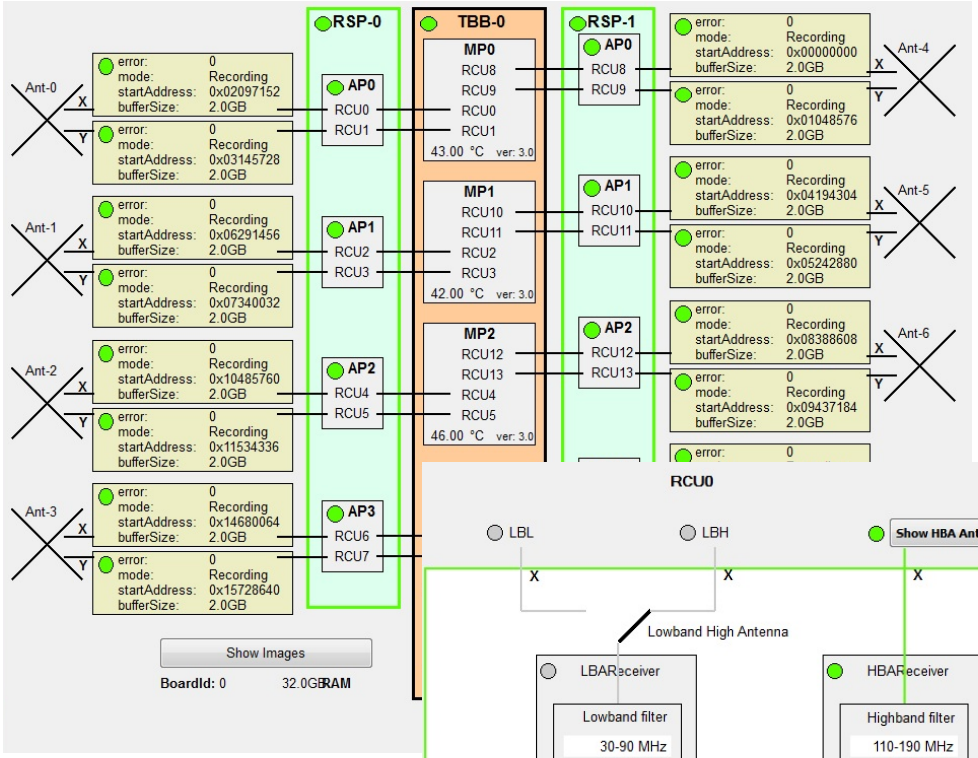
Priority	Time	DP element/Description	Alert text	State comment	Direction	Ackno
50	2018.06.18 11:45:16.510	CS201:LOFAR_PIC_LBA000.status.state	Broken	FLAT	CAME	x
50	2018.03.19 15:21:05.679	CS201:LOFAR_PIC_LBA040.status.state	Broken		CAME	x
50	2018.01.16 11:36:12.368	CS201:LOFAR_PIC_LBA012.status.state	Broken		CAME	x
50	2018.01.10 12:41:31.995	CS201:LOFAR_PIC_LBA038.status.state	Broken		CAME	x
50	2017.11.17 13:16:28.333	CS201:LOFAR_PIC_LBA088.status.state	Broken		CAME	x
50	2017.11.17 13:16:12.785	CS201:LOFAR_PIC_LBA089.status.state	Broken		CAME	x

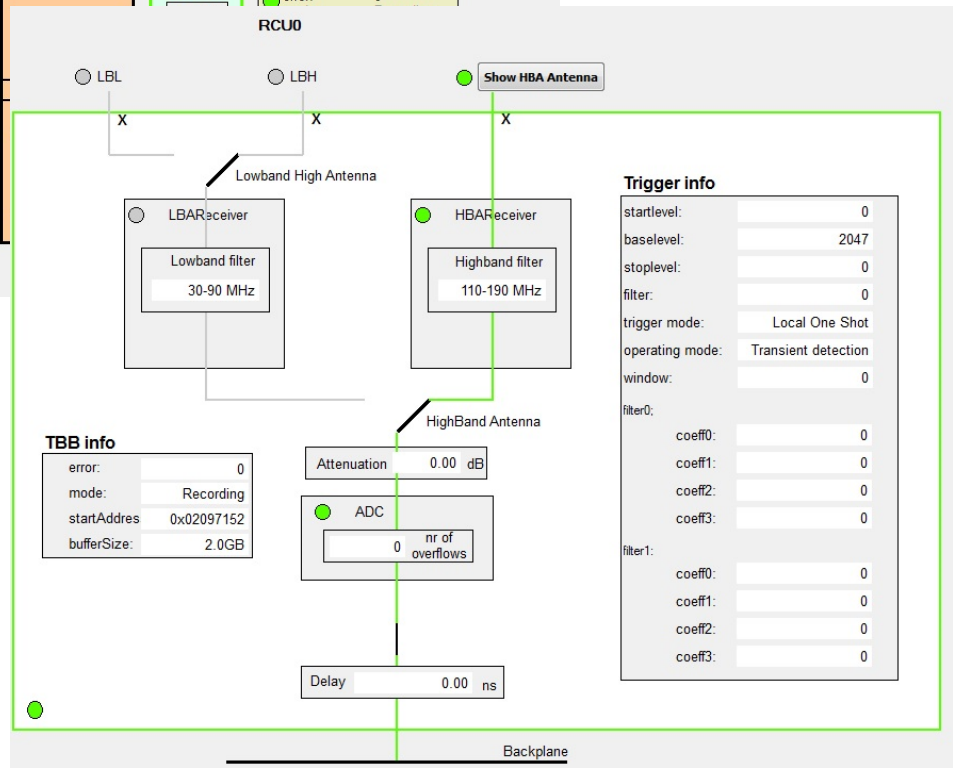
1/14

Alarmfilter

Cabinet view (boards/fans/..)







Cabinet Info

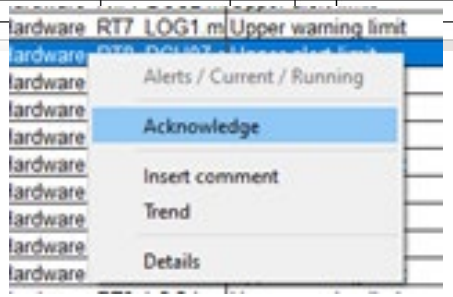
Use the station icon on the antenna overview or alert on the main screen

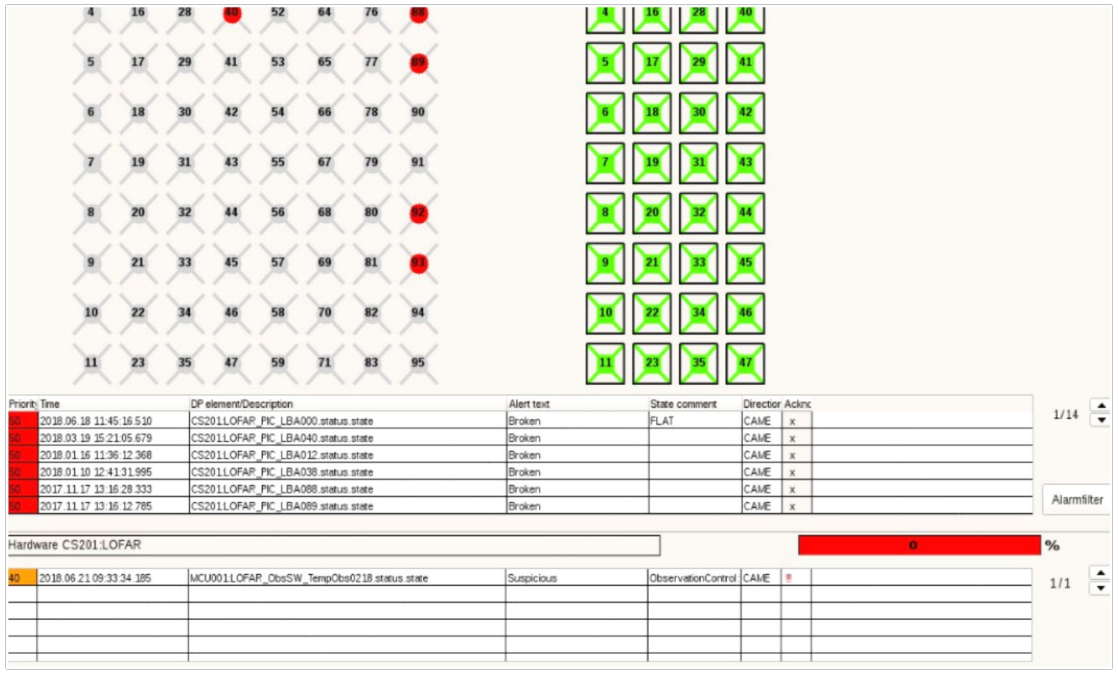
Alarming, trending / history

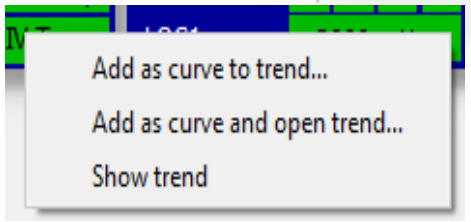
Mode: Actual / Historical
Timerange: Begin 2018-6-20 13:34:50 Now — End: 2018-6-21 14:34:50 Now
System: CS201
Prio/State: Off (0), Operational (10), Maintenance (20), Test (30), Suspicious (40), Broken (50), DP Offline (60)
State comment:
Go !

Priorit	Time	DP element/Description	Alert text	State comment	Direction	Ackno	Ack.time
50	2018.06.18 11:45:16.510	CS201:LOFAR_PIC_LBA000.status.state	Broken	FLAT	CAME	x	2018.06.21 10:04:32.080
50	2018.03.19 15:21:05.679	CS201:LOFAR_PIC_LBA040.status.state	Broken		CAME	x	2018.03.19 15:32:57.635
50	2018.01.16 11:36:12.368	CS201:LOFAR_PIC_LBA012.status.state	Broken		CAME	x	2018.01.16 11:36:21.801
50	2018.01.10 12:41:31.995	CS201:LOFAR_PIC_LBA038.status.state	Broken		CAME	x	2018.01.15 07:51:37.089
50	2017.11.17 13:16:28.333	CS201:LOFAR_PIC_LBA088.status.state	Broken		CAME	x	2017.11.20 10:13:24.321
50	2017.11.17 13:16:12.785	CS201:LOFAR_PIC_LBA089.status.state	Broken		CAME	x	2017.11.20 10:13:21.993
50	2017.11.17 13:15:58.532	CS201:LOFAR_PIC_LBA093.status.state	Broken		CAME	x	2017.11.20 10:13:25.441
50	2017.11.17 13:15:51.001	CS201:LOFAR_PIC_LBA092.status.state	Broken		CAME	x	2017.11.20 10:13:27.686
50	2017.07.20 06:57:19.272	CS201:LOFAR_PIC_Cabinet1_Subrack2_TBBoard5.status.state	Broken		CAME	xxx	2017.07.24 08:15:40.562
50	2017.07.20 06:57:19.270	CS201:LOFAR_PIC_Cabinet1_Subrack2_TBBoard4.status.state	Broken		CAME	xxx	2017.07.24 08:15:40.562
50	2017.07.20 06:57:19.268	CS201:LOFAR_PIC_Cabinet0_Subrack1_TBBoard3.status.state	Broken		CAME	xxx	2017.07.24 08:15:40.561
50	2017.07.20 06:57:19.266	CS201:LOFAR_PIC_Cabinet0_Subrack1_TBBoard2.status.state	Broken		CAME	xxx	2017.07.24 08:15:40.561
50	2017.07.20 06:57:19.264	CS201:LOFAR_PIC_Cabinet0_Subrack0_TBBoard1.status.state	Broken		CAME	xxx	2017.07.24 08:15:40.560
50	2017.07.20 06:57:19.261	CS201:LOFAR_PIC_Cabinet0_Subrack0_TBBoard0.status.state	Broken		CAME	xxx	2017.07.24 08:15:40.526

```
#uses "ApertifCommon.ctl"

string selected_dish = "RT2";

// Let the panel react on the choice of dish made in the selectionrow.
public void setSelection(string dish)
{
  selected_dish = dish;

  // blink vlbi or apertif screen depending on chosen dish
  // RT0 and RT1 are vlbi only and RT2....RTD are Apertif only
  if (ApertifCommon_isVLBIDish(selected_dish))
  {
    pnl_apertif_view.visible = FALSE;
    pnl_vlbi_view.visible = TRUE;
  }
  else if (ApertifCommon_isApertifDish(selected_dish))
  {
    pnl_apertif_view.visible = TRUE;
    pnl_vlbi_view.visible = FALSE;
  }
  else
  {
    DebugN(myPanelName() + "| wrong dishname given: " + selected_dish);
  }

  //  make the choice clear in the "buttons"
  for (int i=1; i<= dynlen(wsrt_dishes);i++) {
    if (dish == wsrt_dishes[i])
    {
       shape s = getShape(wsrt_dishes[i]+"_selection");
       s.setBorderStyle(BS_SUNKEN);
    }
    else
    {
      shape s = getShape(wsrt_dishes[i]+"_selection");
      s.setBorderStyle(BS_RAISED);
    }
  }

  // Set the chosen dish on the top of the screen
  txt_dishInView.text = "Dish in view: " + dish;
}
```





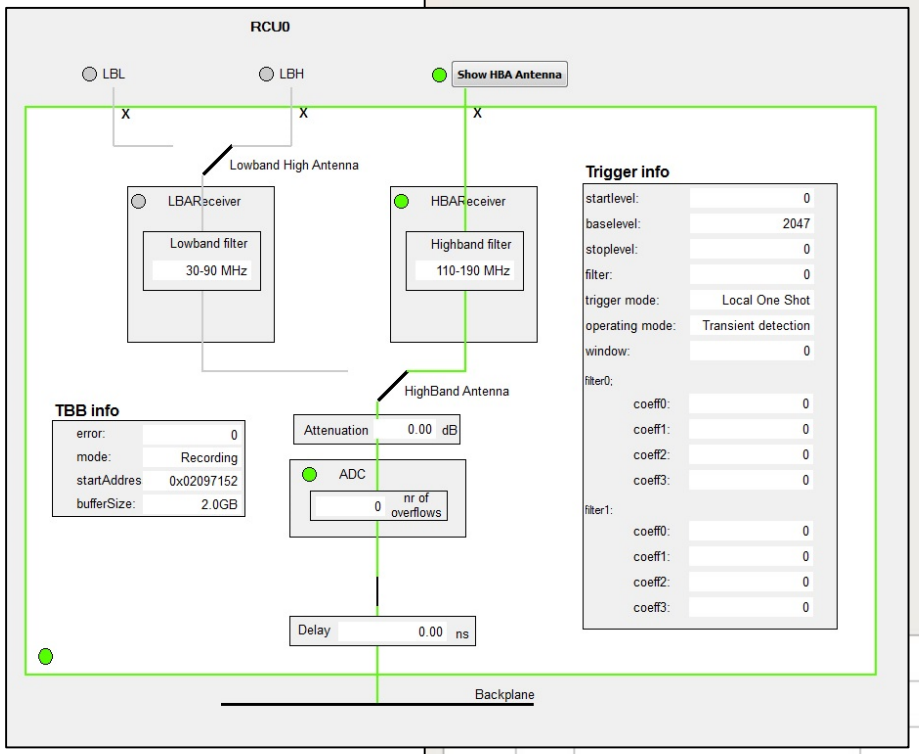


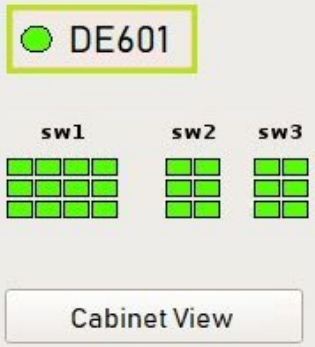
Remove all curves
Close all trend panels
Help

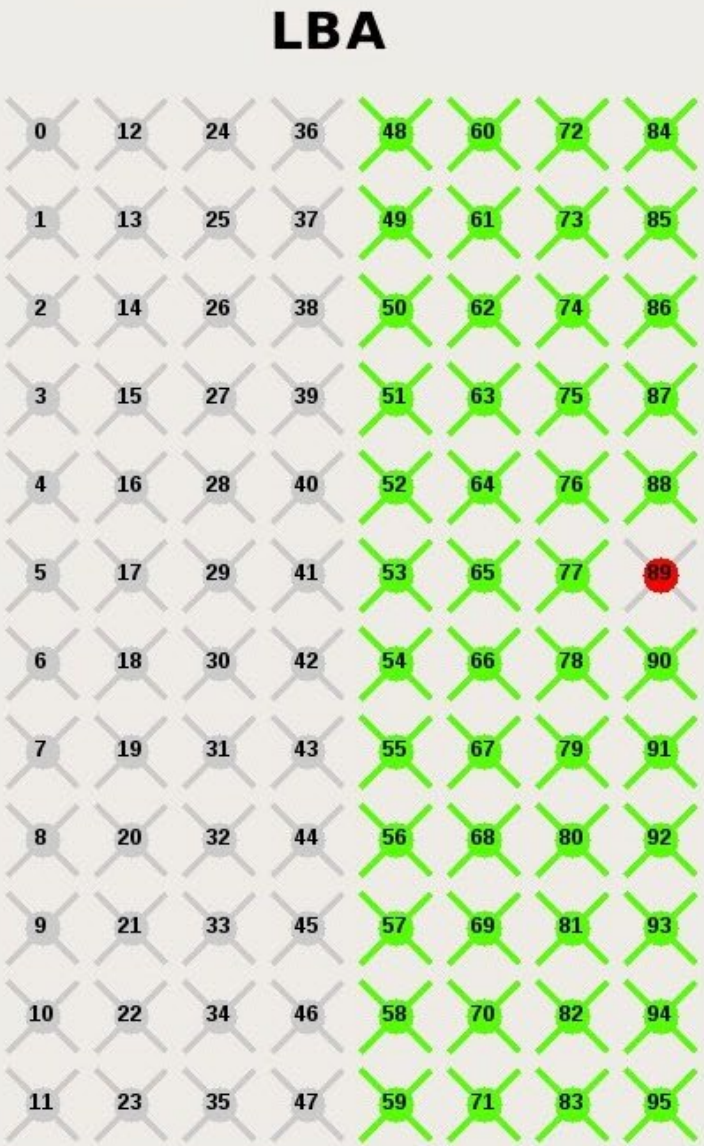
NEW!

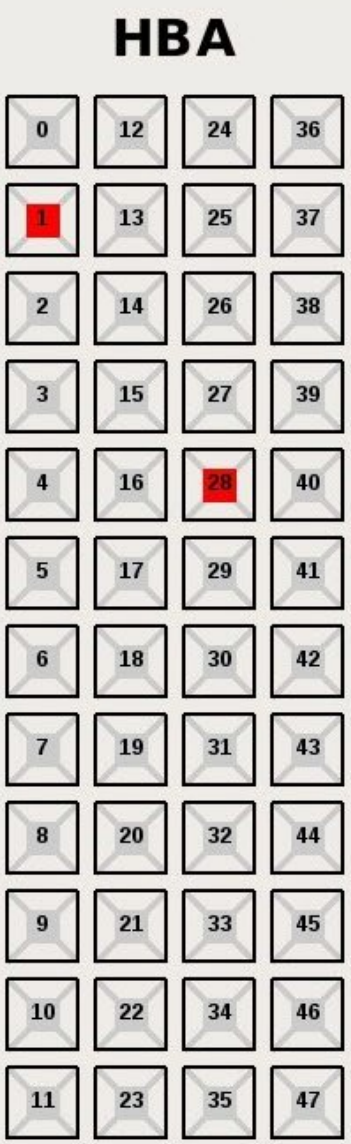
Local and single station monitoring

- panels run on the station
- 3.16 web browser access



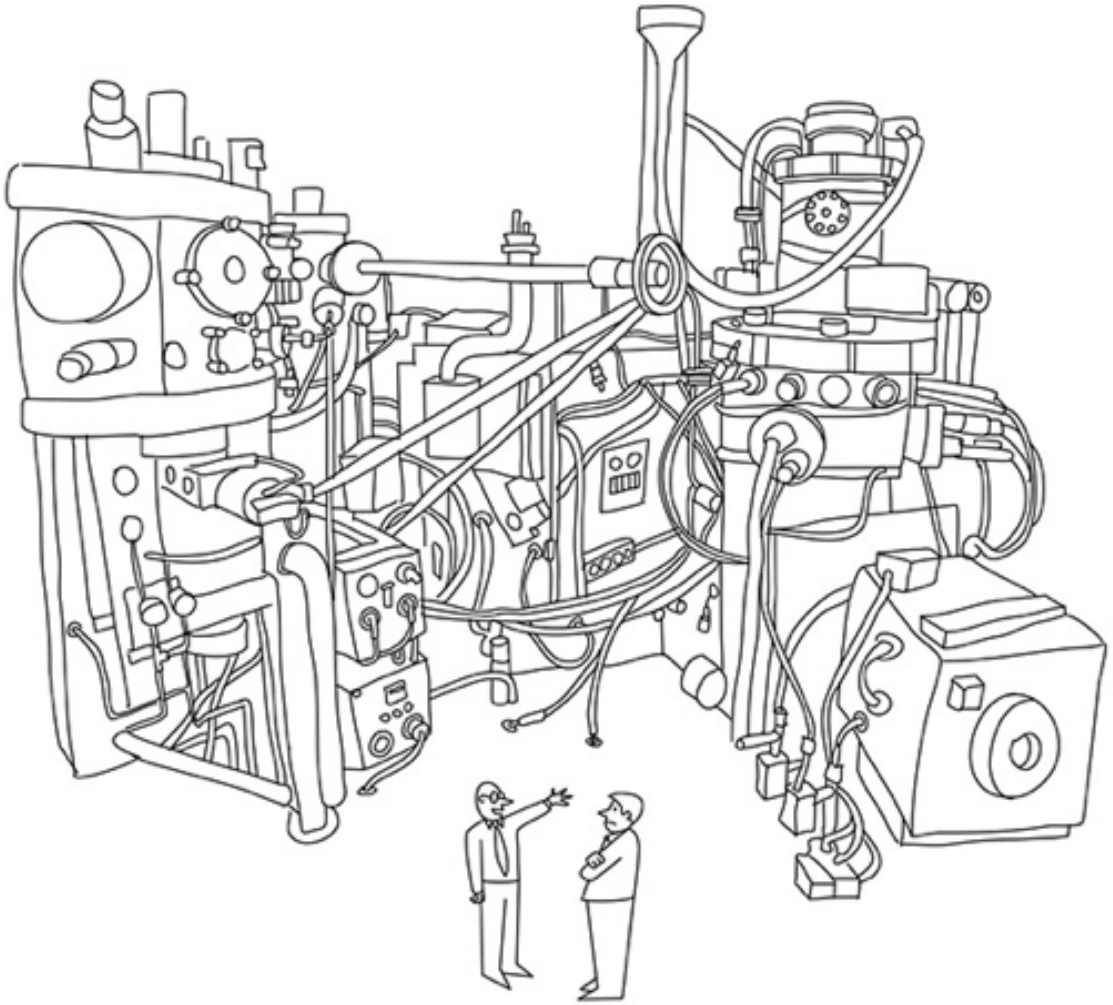




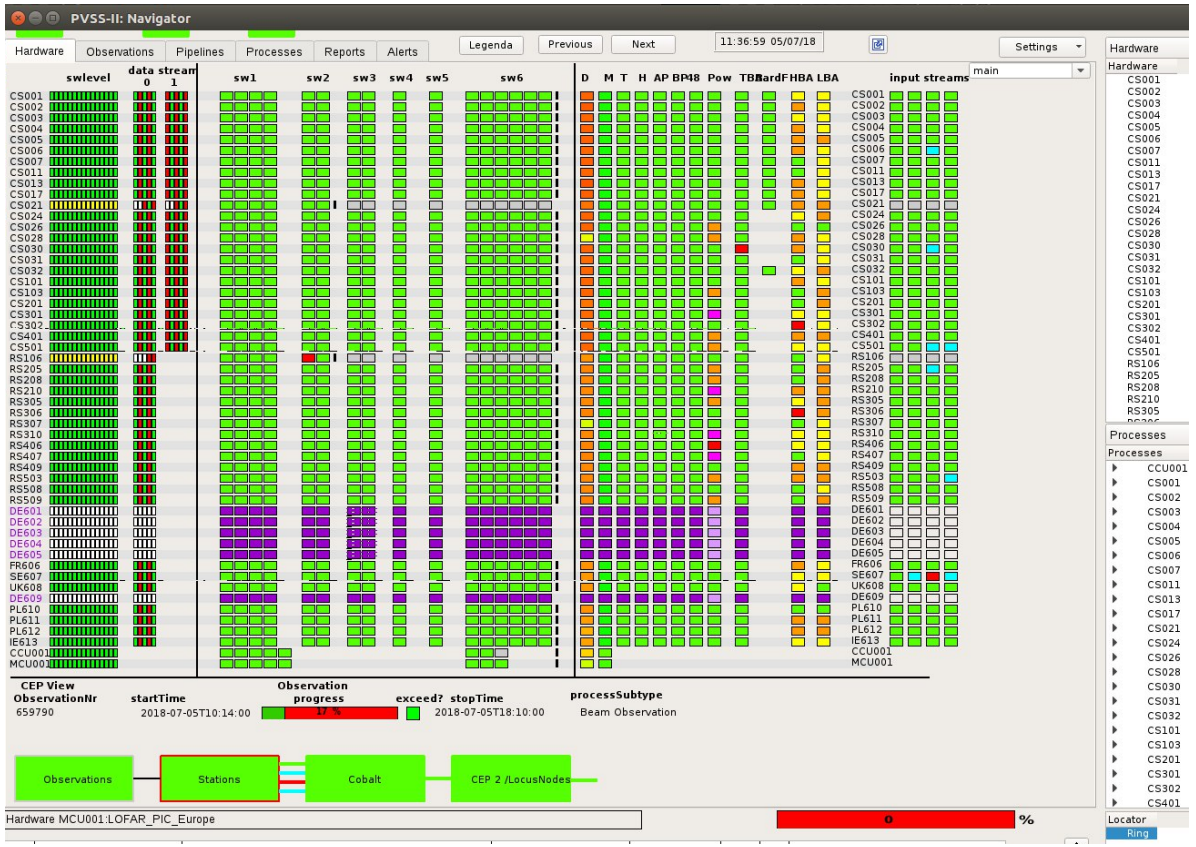


Alarms for antenna / cabinet / etc

It works



(honestly) it’s ready for an upgrade



Designed and build in the beginning of LOFAR

WSRT
Westerbork Monitoring

Server Date: 20XX-XX-XX 20XX.XXX 58XXX MJD || Server Time: XX:XX:XX UTC XX:XX:XX LST

3:37:09 PM

General | (e)VLBI | Sensors / Weather | Cryolab | RFI plots | other

Lab
READY TEMP

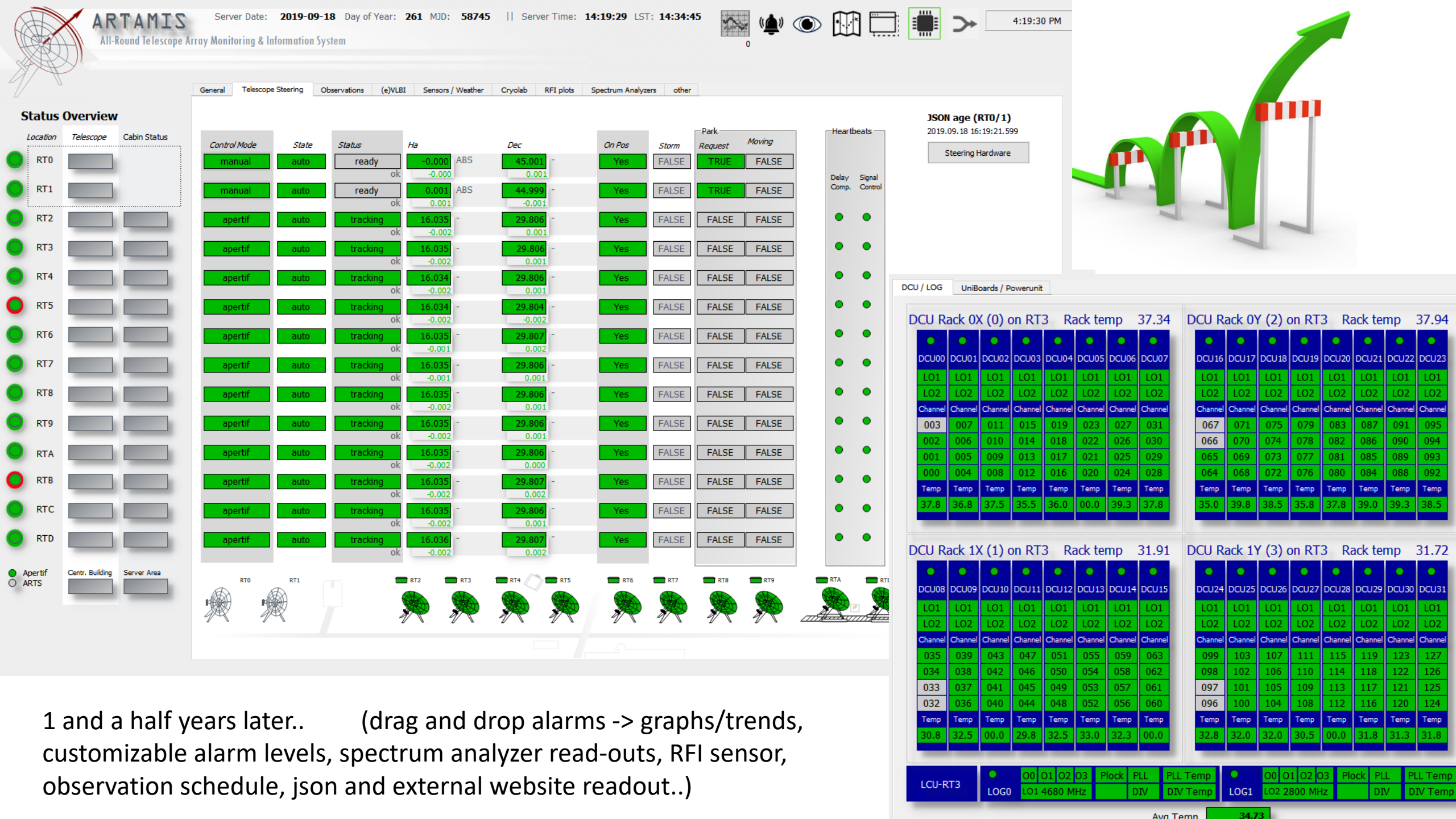
Temp Air	00.00	Celsius
Wind Speed Current	00.00	m/s
Wind Speed Avg	00.00	m/s (10 min)

Status Overview

Location	Telescope	Cabin Status
RT0		
RT1		
RT2		
RT3		
RT4		
RT5		
RT6		
RT7		
RT8		
RT9		
RTA		
RTB		
RTC		
RTD		
	Centr. Building	Server Area

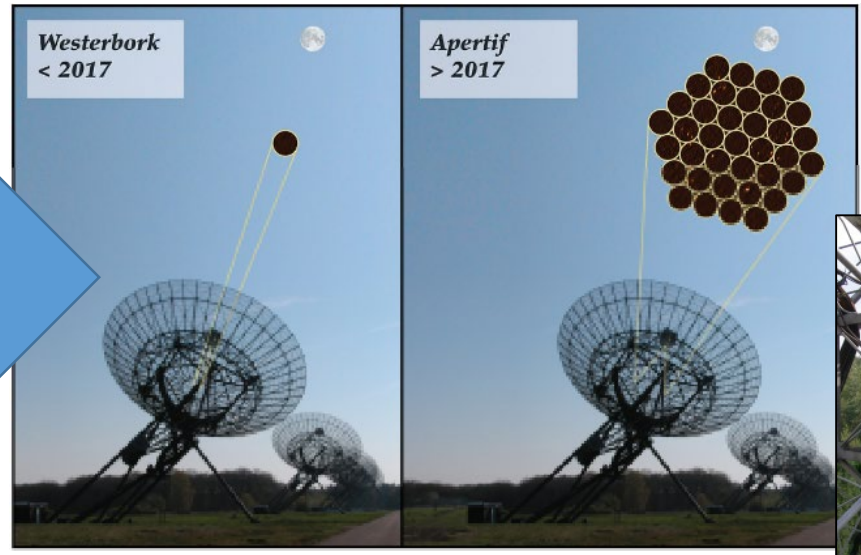
Control Mode	State	Status	Dec	Ha	On Pos
value	value	value	value	value	value
value	value	value	value	value	value
apertif	auto	ready	45.001	-0.001	FALSE
apertif	auto	ready	45	0.001	FALSE
apertif	auto	ready	44.999	0.001	FALSE
apertif	auto	ready	45	0.001	FALSE
apertif	auto	ready	44.999	-0	FALSE
apertif	auto	ready	45.000	0.001	FALSE
apertif	auto	ready	44.999	-0	FALSE
apertif	auto	ready	45.000	-0.001	FALSE
apertif	auto	ready	45	0	FALSE
apertif	auto	ready	45	-0.001	FALSE
apertif	auto	ready	45.000	-0	FALSE
apertif	auto	ready	44.998	-0.001	FALSE

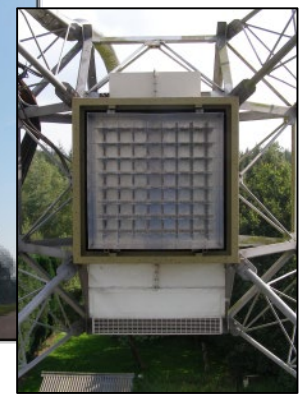
First thing I build in WinCC OA
(color scheme based on the Navigator)



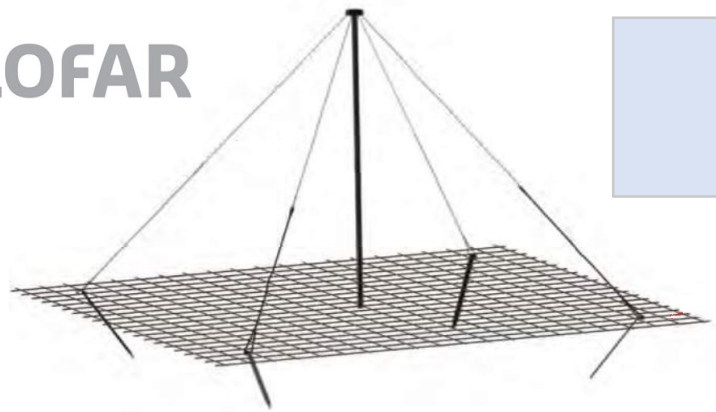
1 and a half years later.. (drag and drop alarms -> graphs/trends, customizable alarm levels, spectrum analyzer read-outs, RFI sensor, observation schedule, json and external website readout..)

CHARGE!!





LOFAR

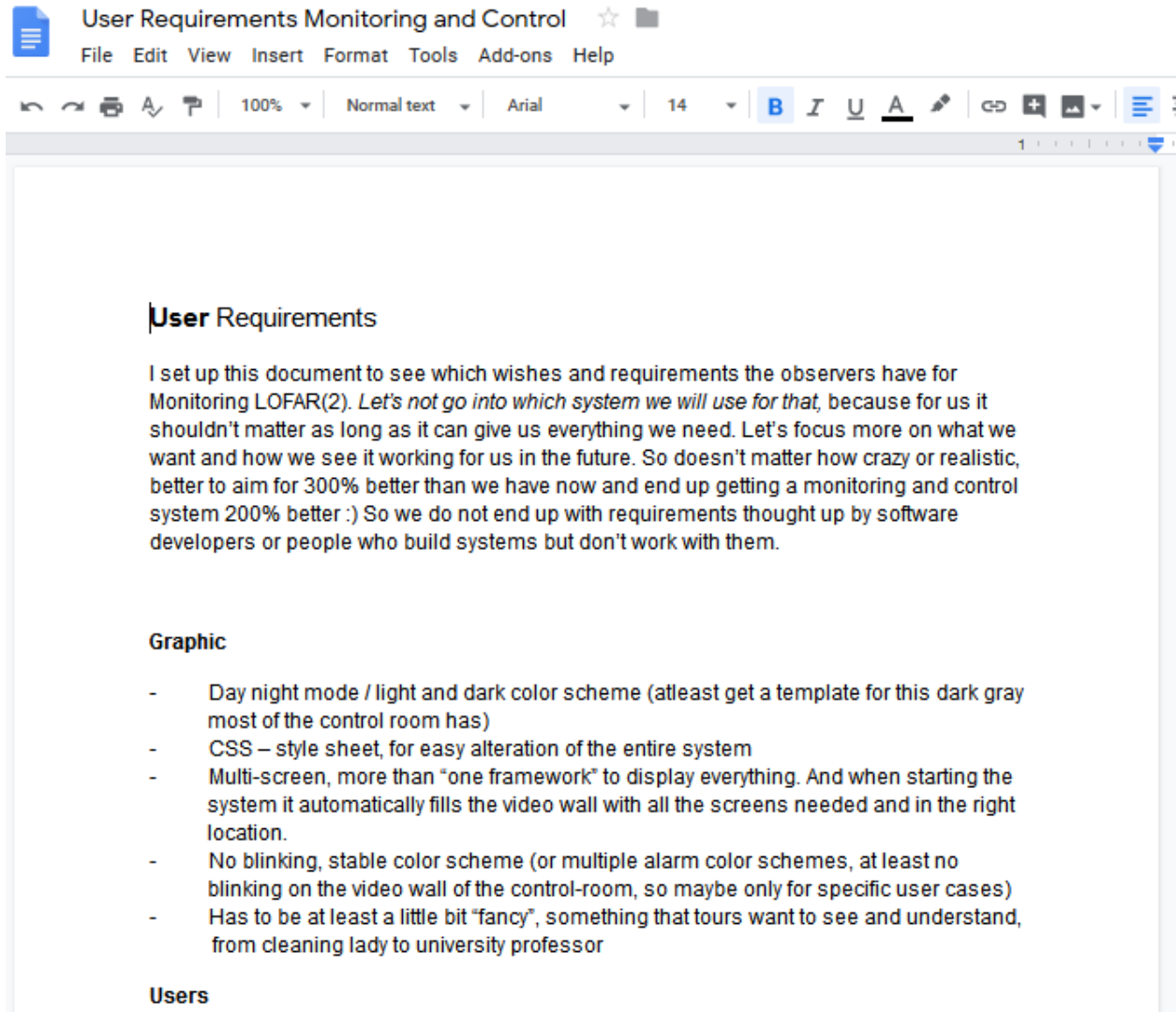


LOFAR 2.0

Step 0, get the software people to give us version 3.16 so we can use the ILT Navigator

Battle plan step 1:

- Put requirements / wishes on paper



User Requirements Monitoring and Control

File Edit View Insert Format Tools Add-ons Help

100% Normal text Arial 14

User Requirements

I set up this document to see which wishes and requirements the observers have for Monitoring LOFAR(2). *Let's not go into which system we will use for that,* because for us it shouldn't matter as long as it can give us everything we need. Let's focus more on what we want and how we see it working for us in the future. So doesn't matter how crazy or realistic, better to aim for 300% better than we have now and end up getting a monitoring and control system 200% better :) So we do not end up with requirements thought up by software developers or people who build systems but don't work with them.

Graphic

- Day night mode / light and dark color scheme (atleast get a template for this dark gray most of the control room has)
- CSS – style sheet, for easy alteration of the entire system
- Multi-screen, more than "one framework" to display everything. And when starting the system it automatically fills the video wall with all the screens needed and in the right location.
- No blinking, stable color scheme (or multiple alarm color schemes, at least no blinking on the video wall of the control-room, so maybe only for specific user cases)
- Has to be at least a little bit "fancy", something that tours want to see and understand, from cleaning lady to university professor

Users

Plan!?