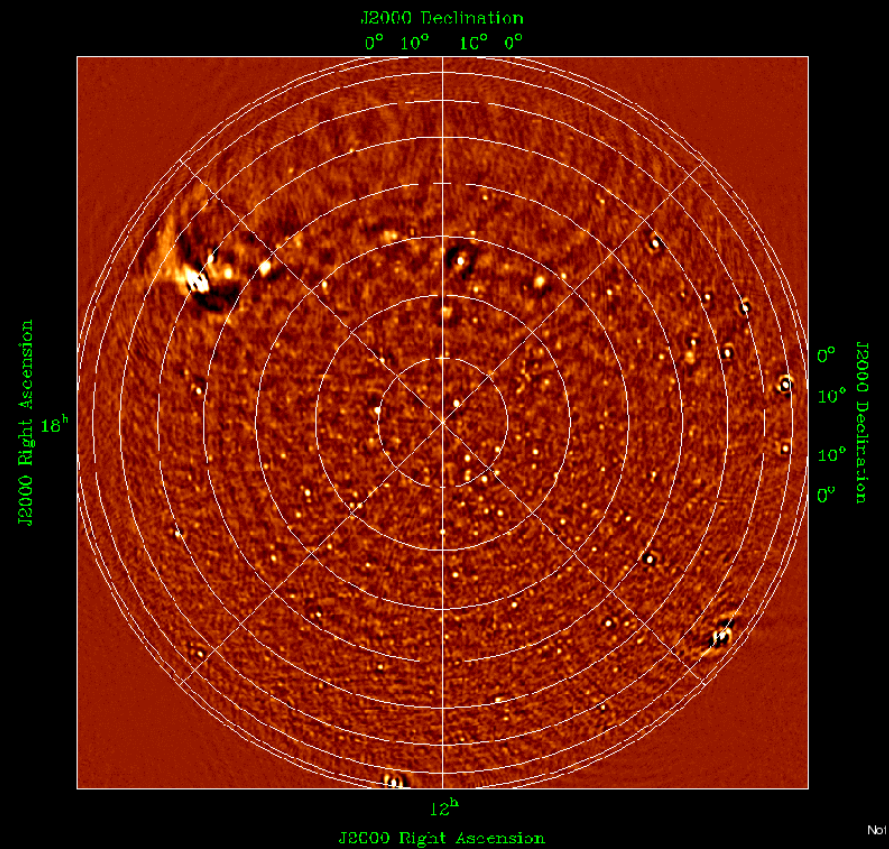


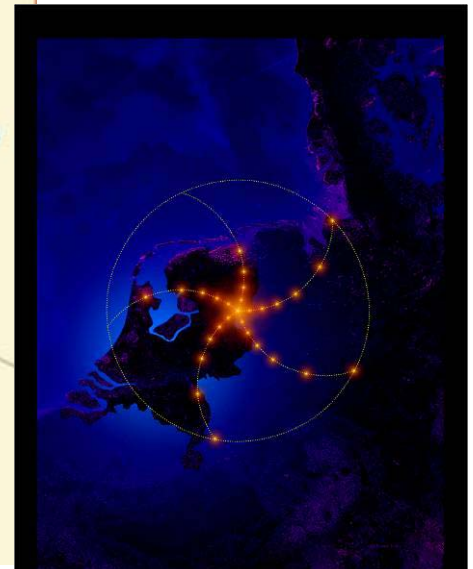
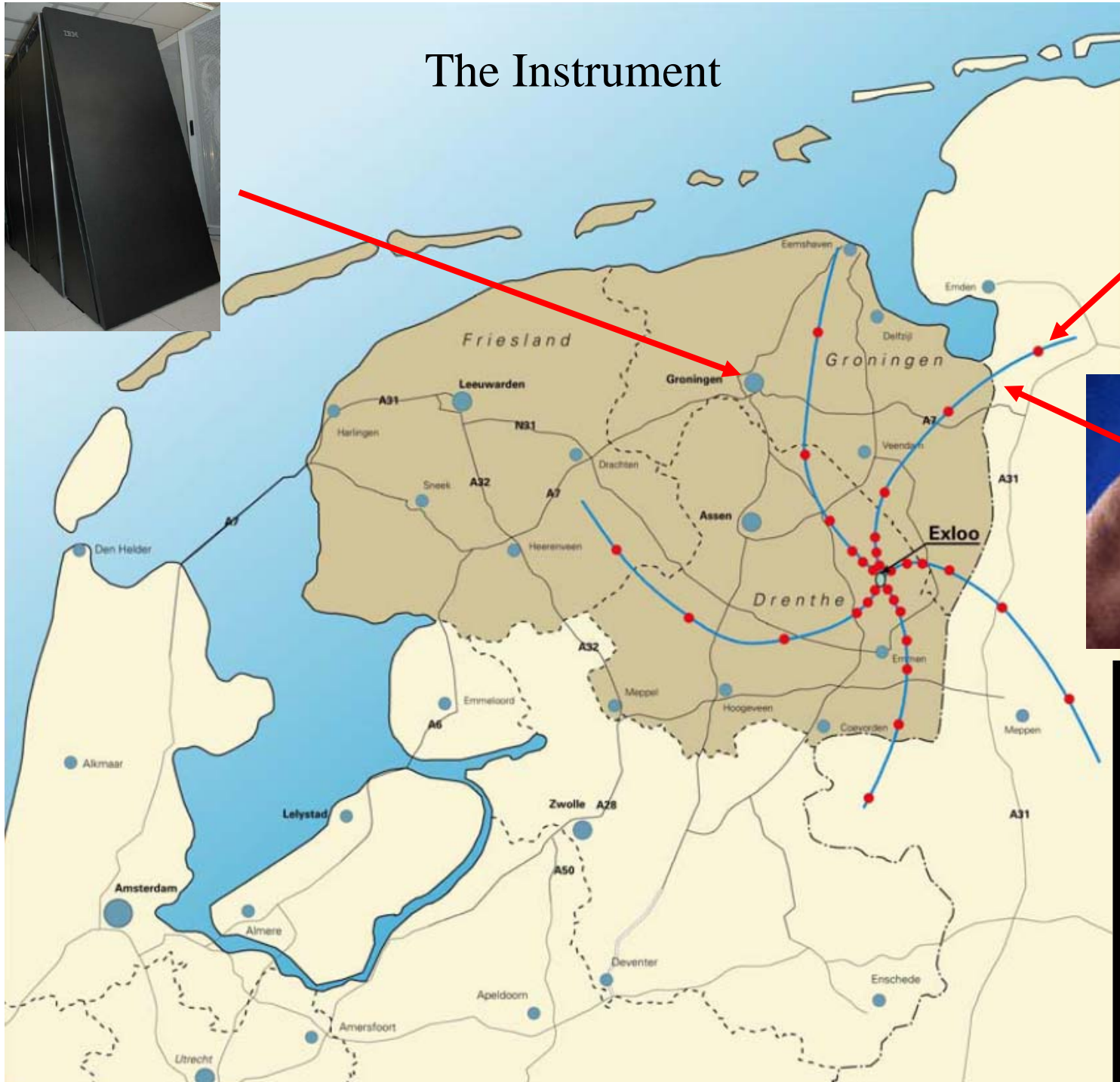
LOFAR System Overview

André W. Gunst

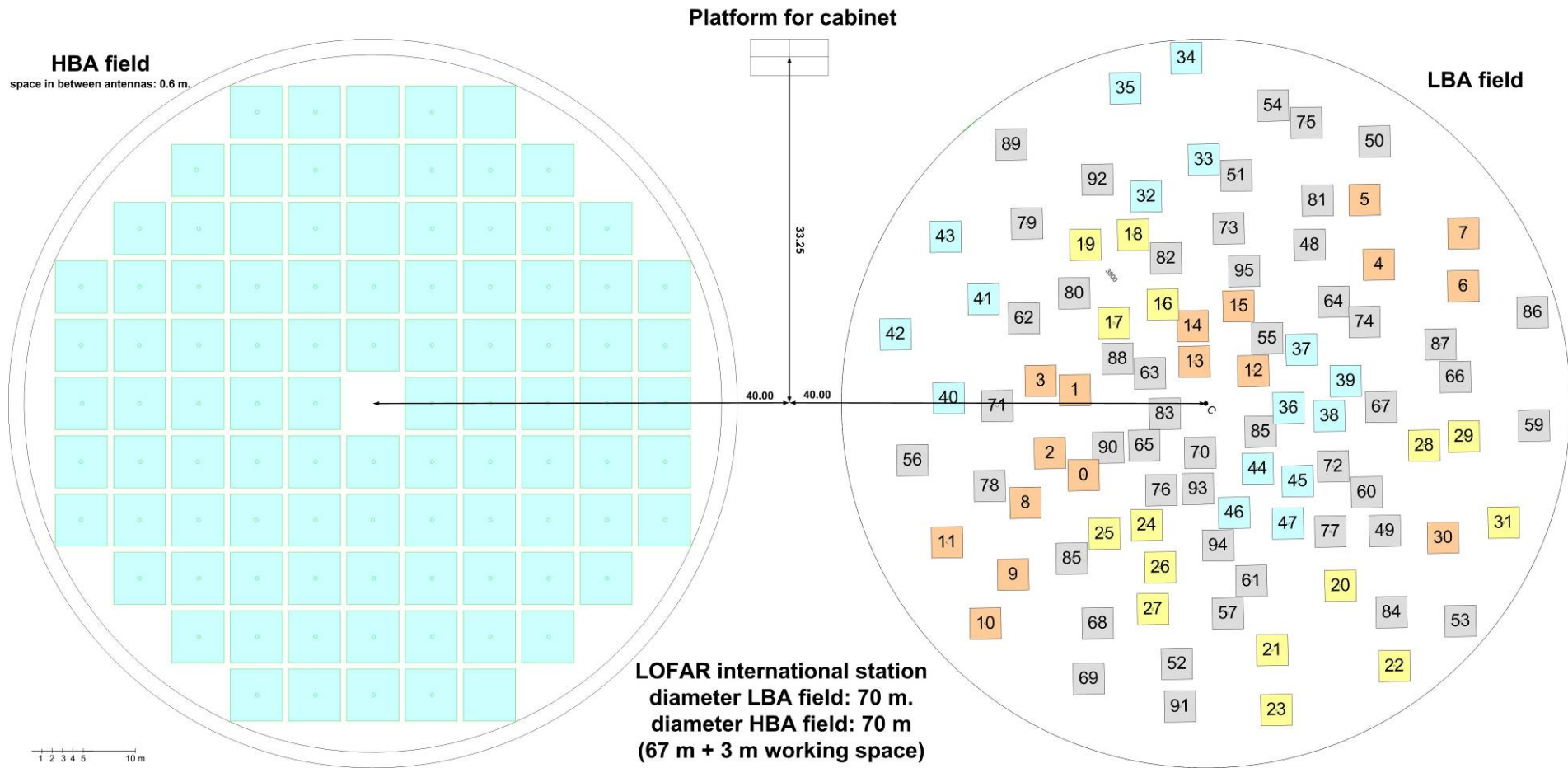


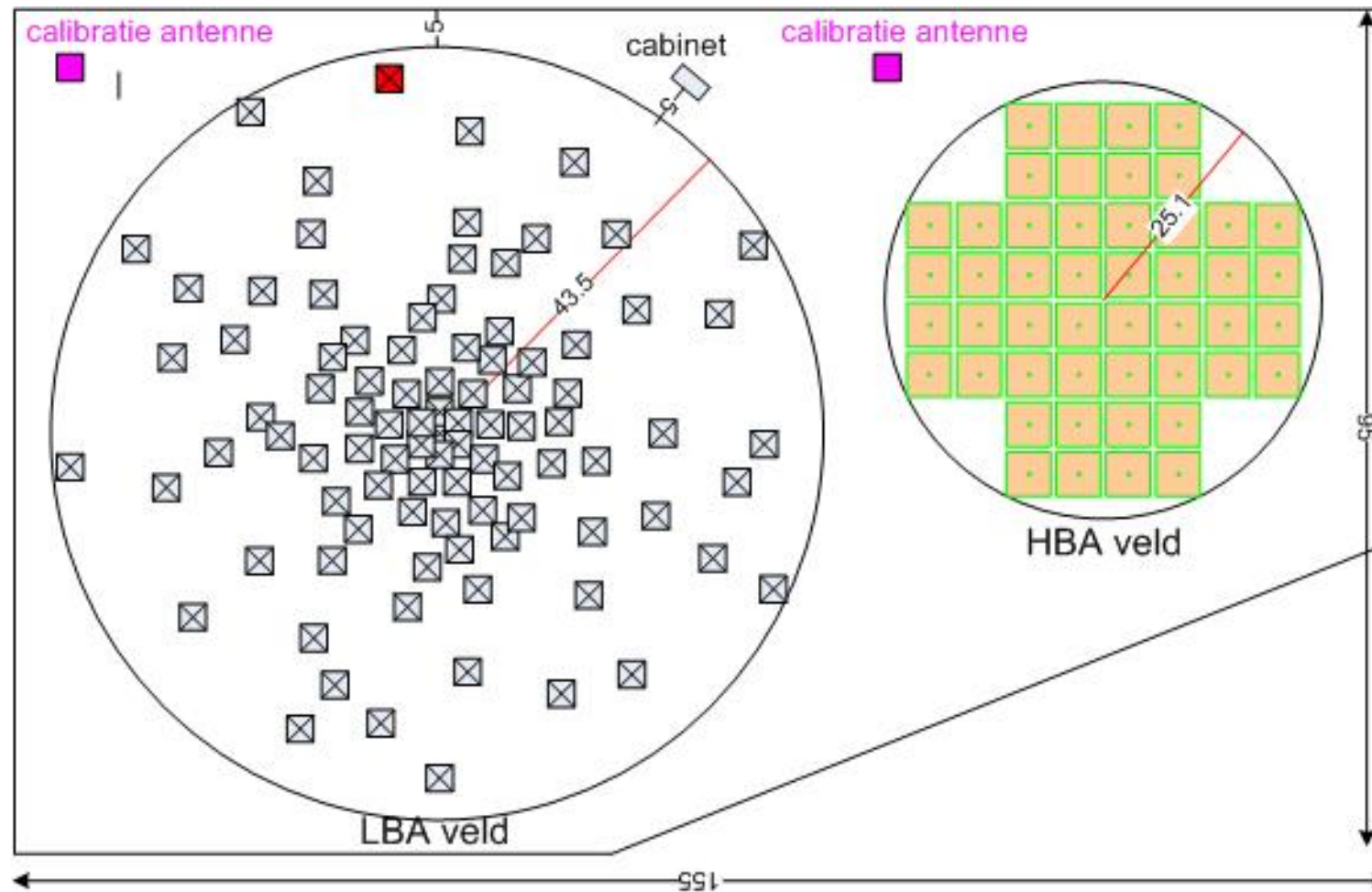
- System overview
- Stations
- Central Systems
- Control System

The Instrument



- International stations: 96 High Band Antennas
- Remote stations: 48 HBAs
- Core stations: 2x24 HBAs



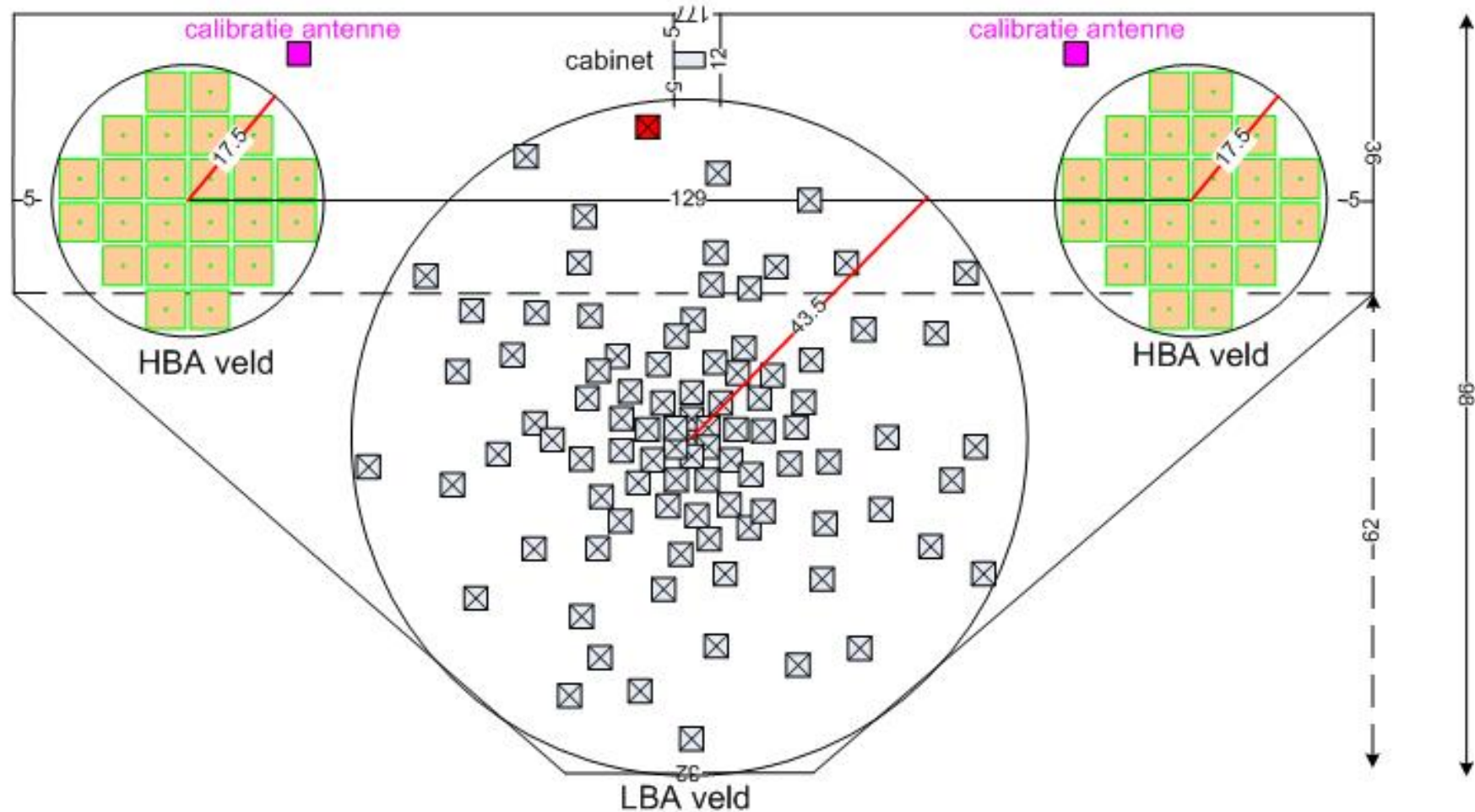


LOFAR remote station:

=> LBA veld heeft diameter van 87 meter en bevat 96 antennes

=> HBA veld heeft diameter van 50.2 meter en bevat 48 antennes



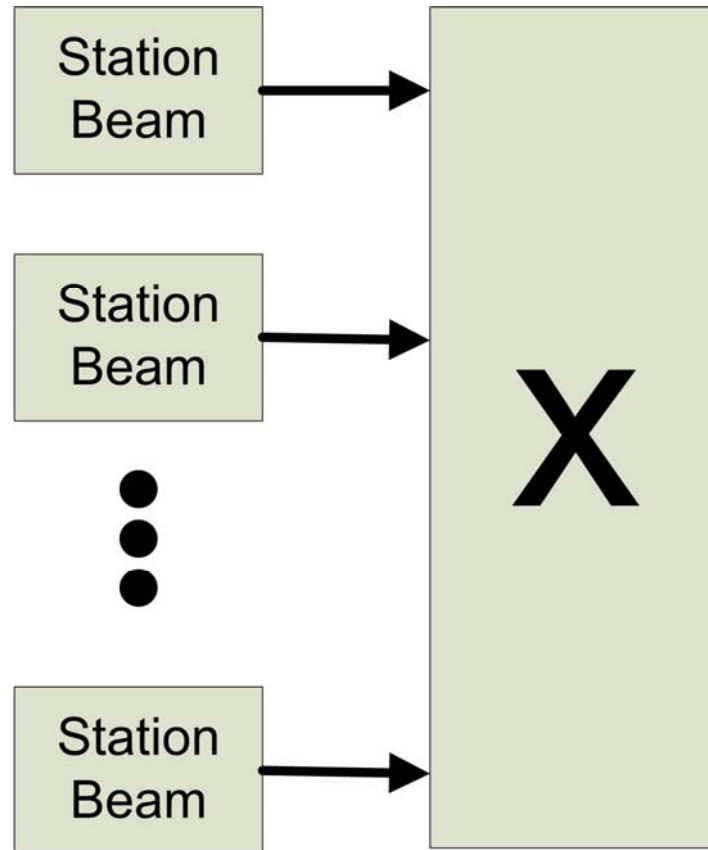


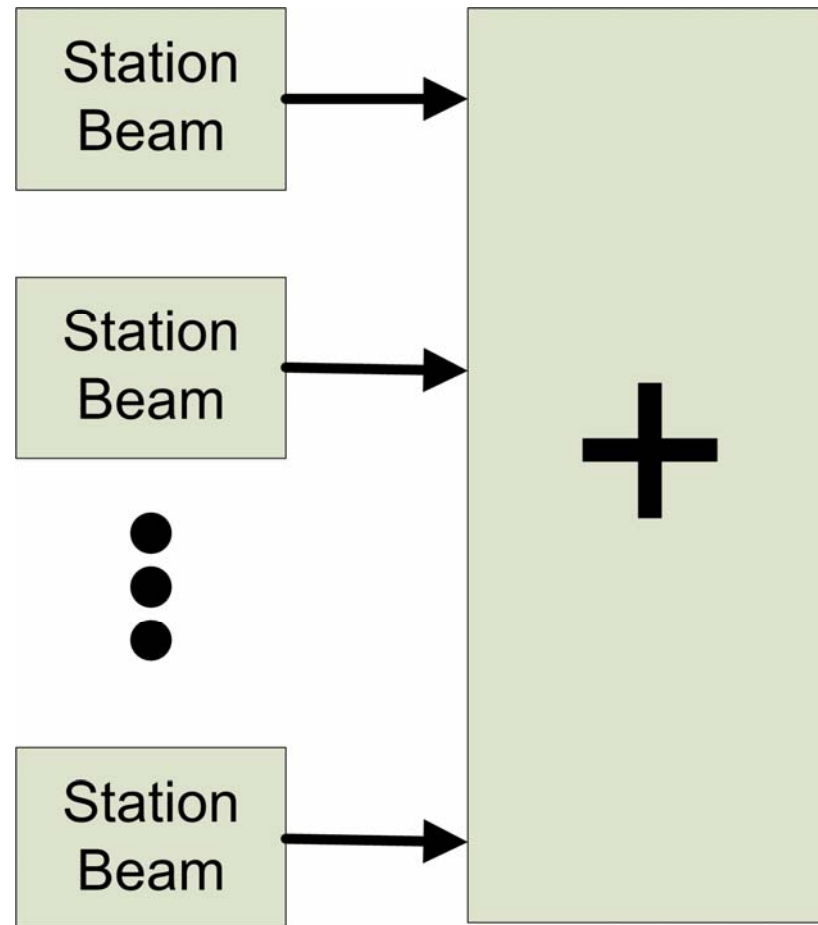
LOFAR CORE station:

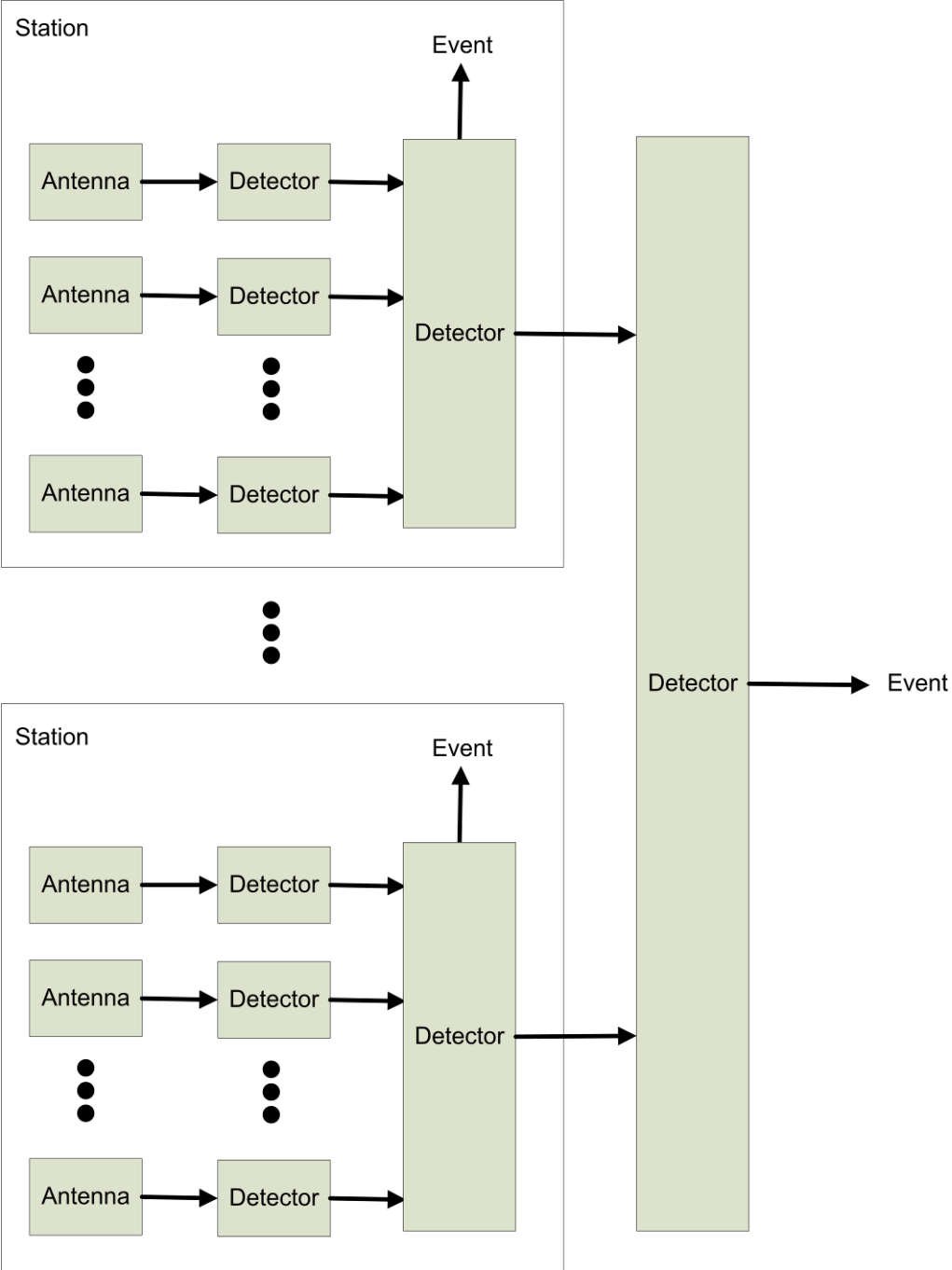
=> LBA veld heeft diameter van 87 meter en bevat 96 antennes

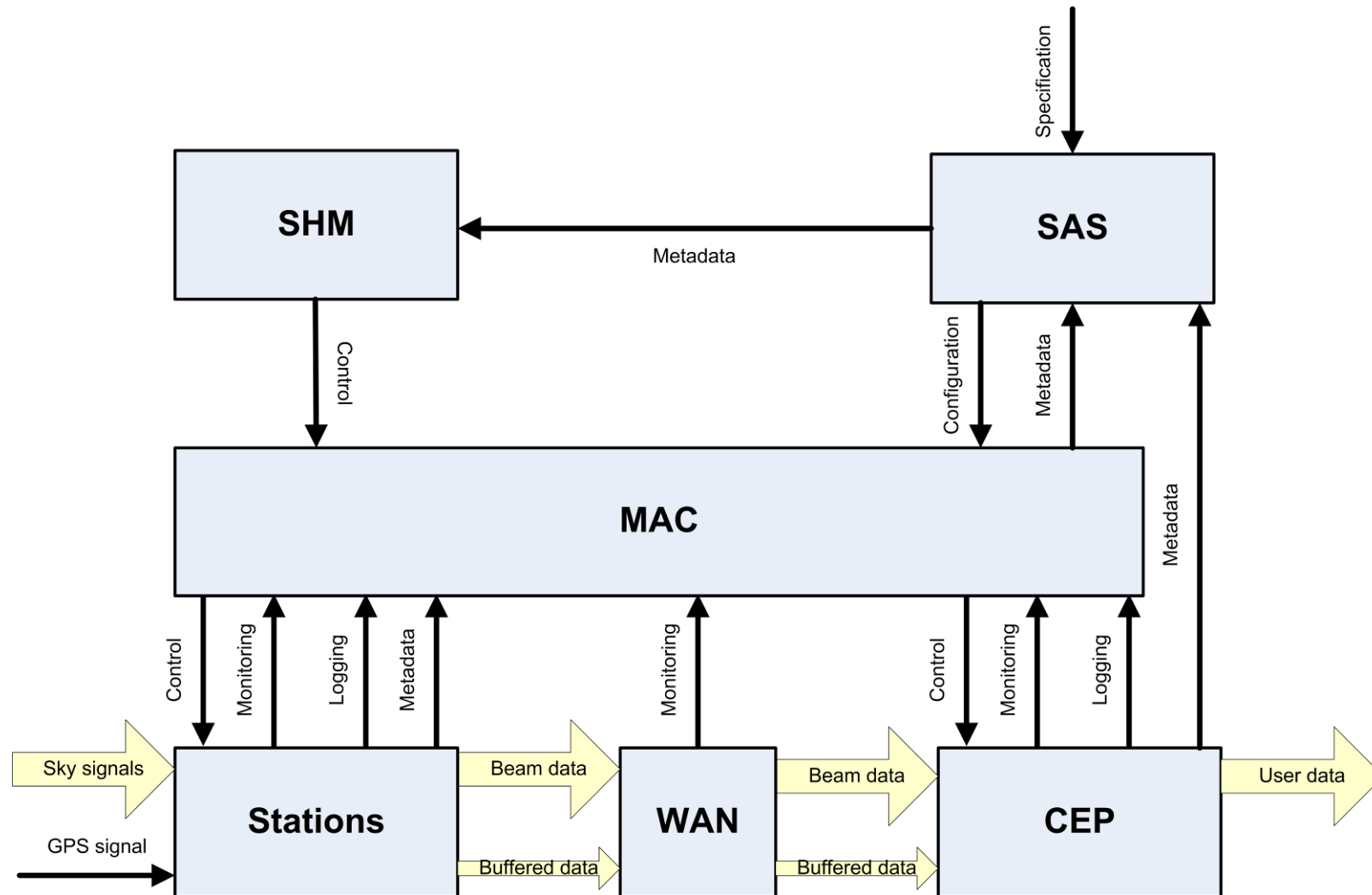
=> 2 HBA velden (elk met een diameter van 35 meter) bevatten elk 24 antennes

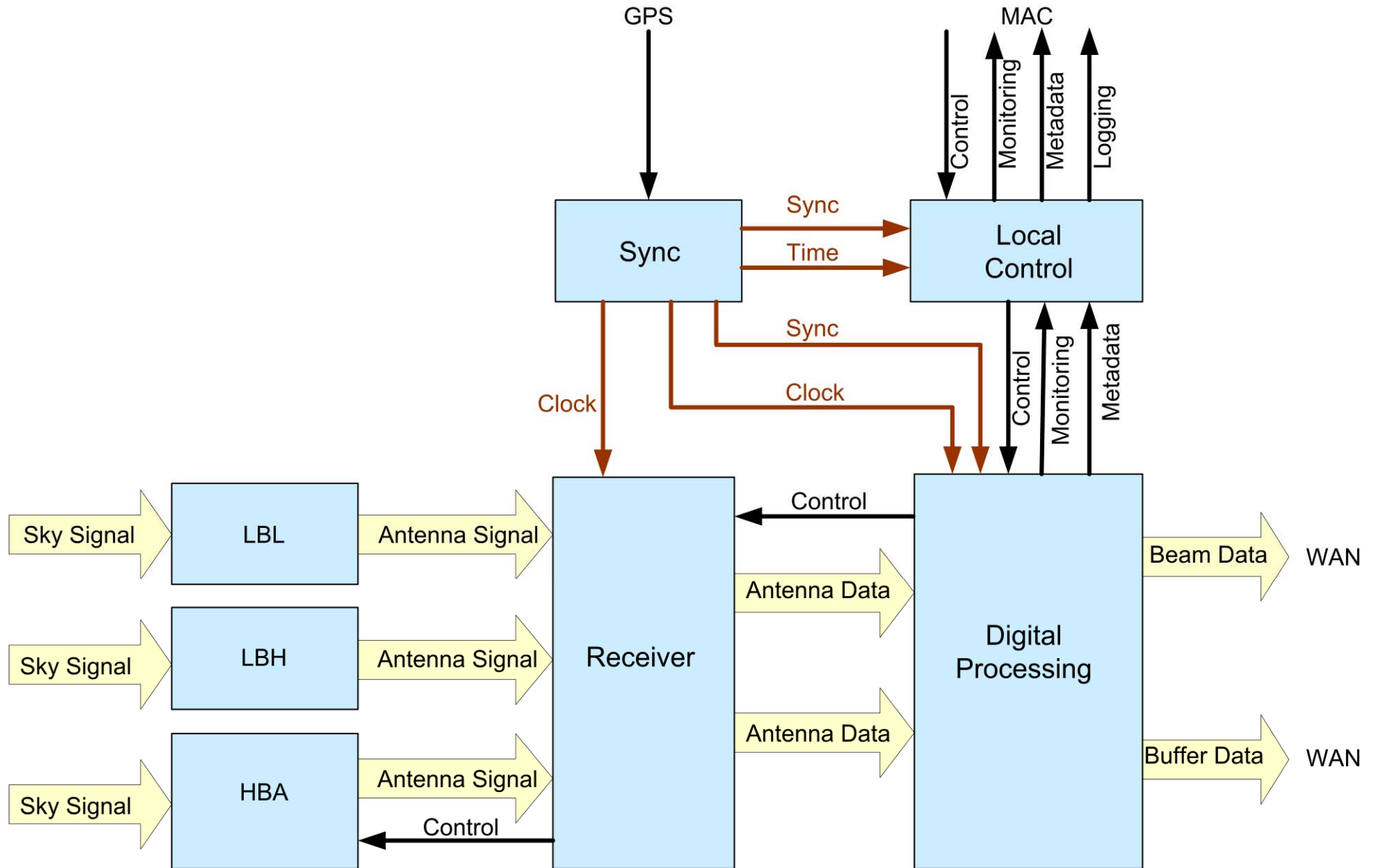
Arie Huijgen, 23 mei 2008 vs 1.0

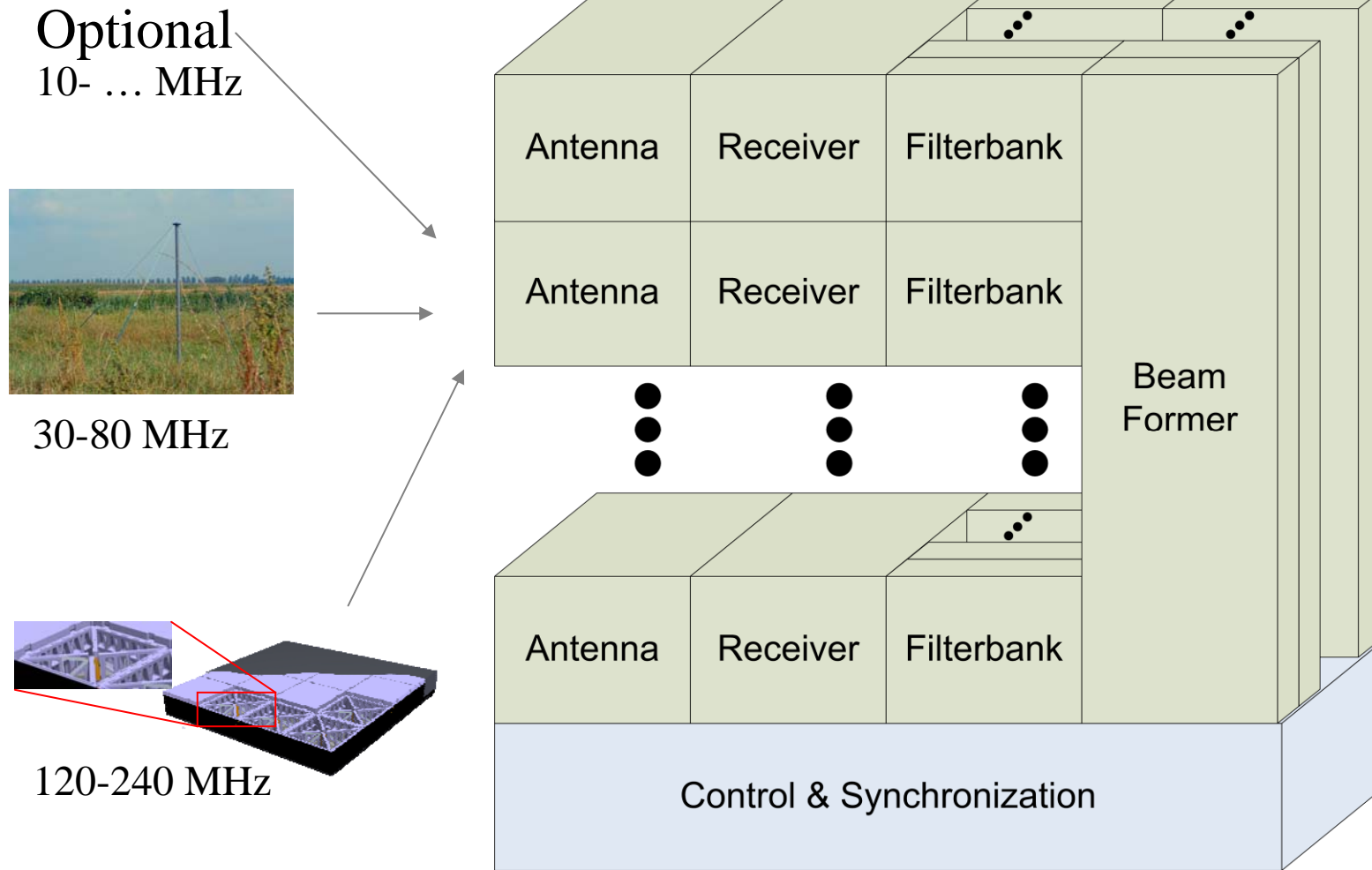


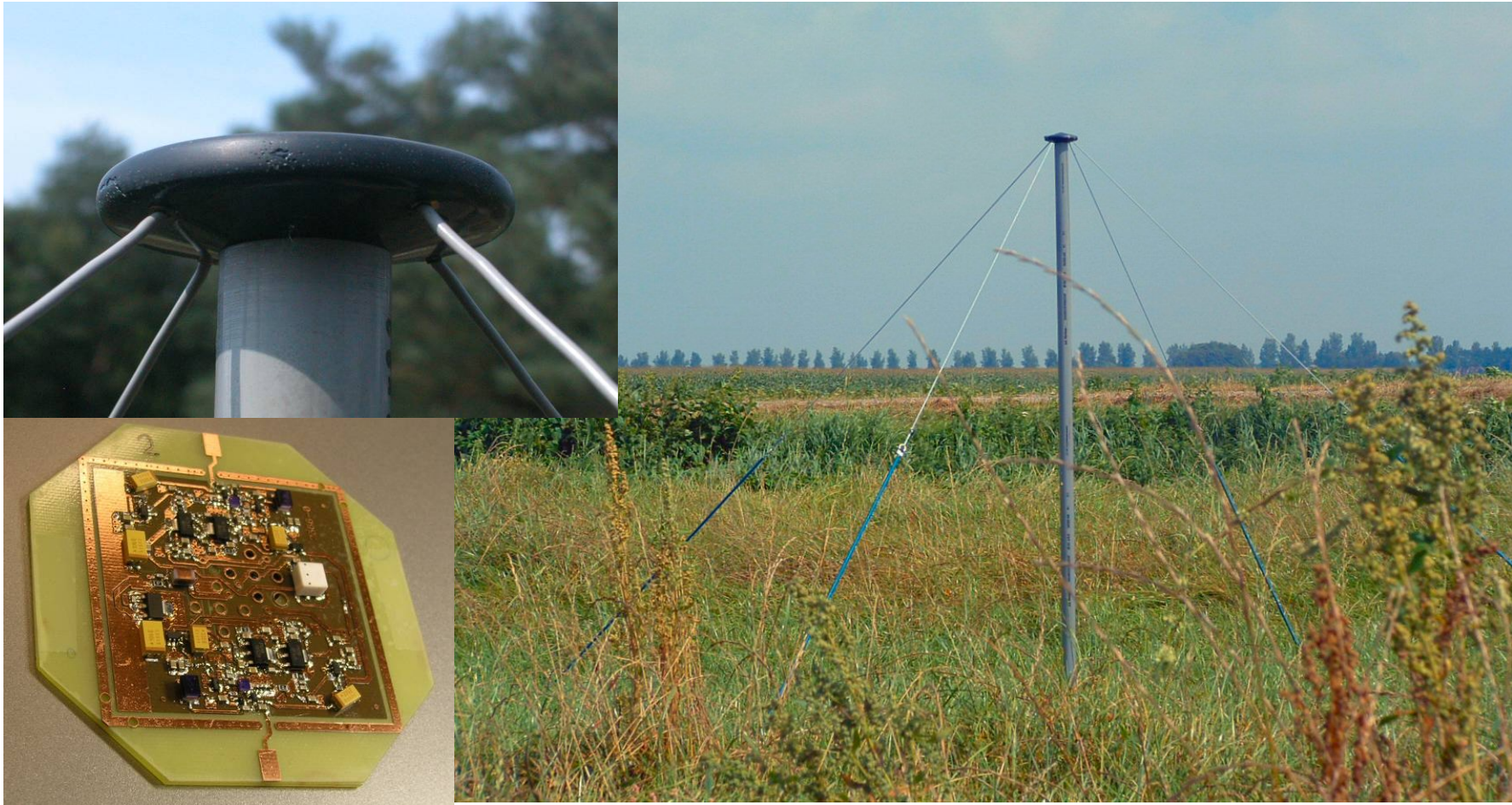


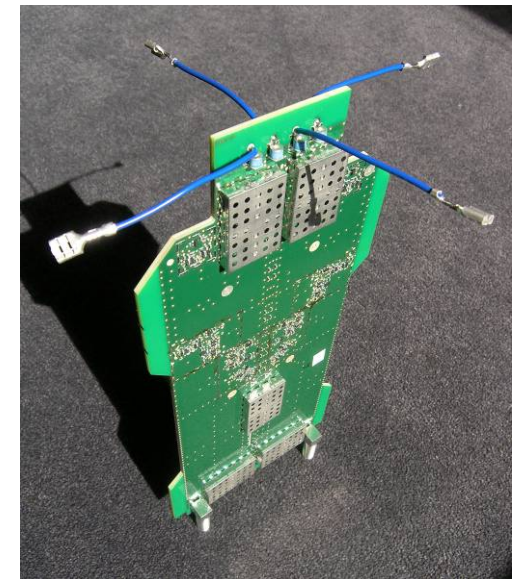
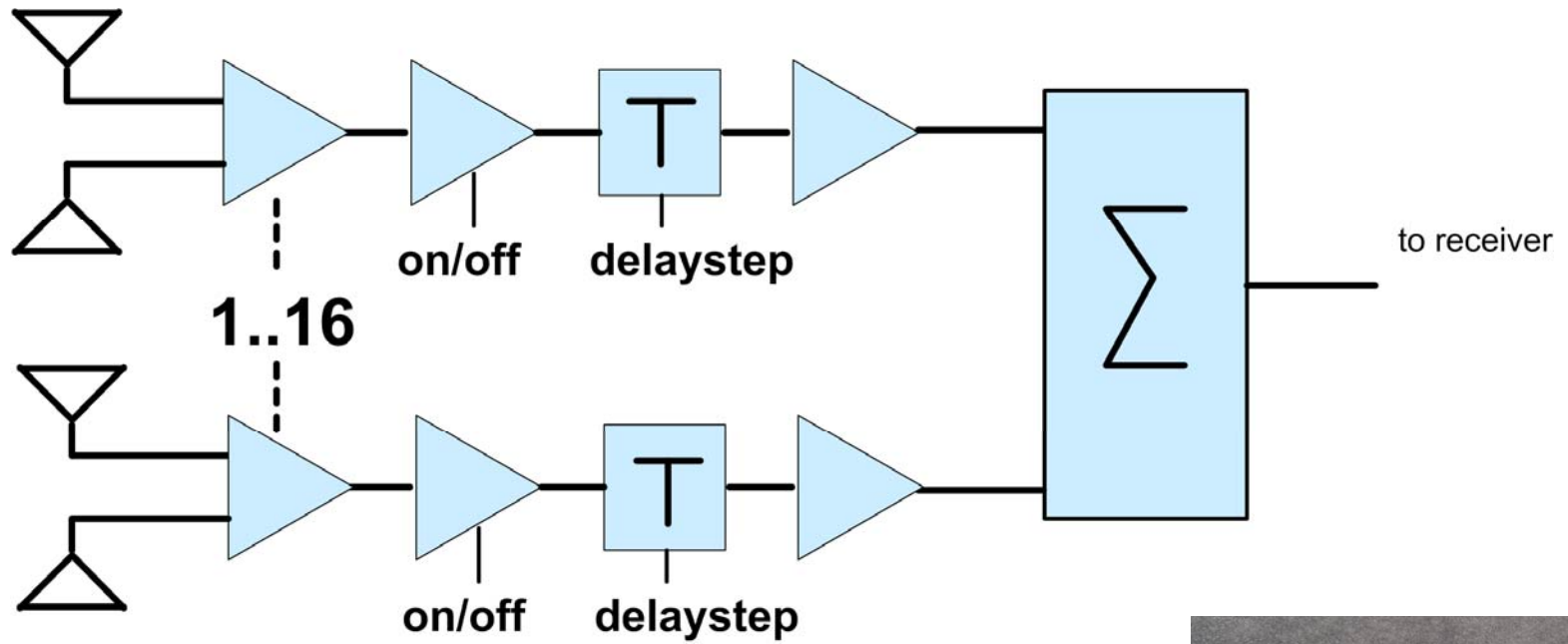


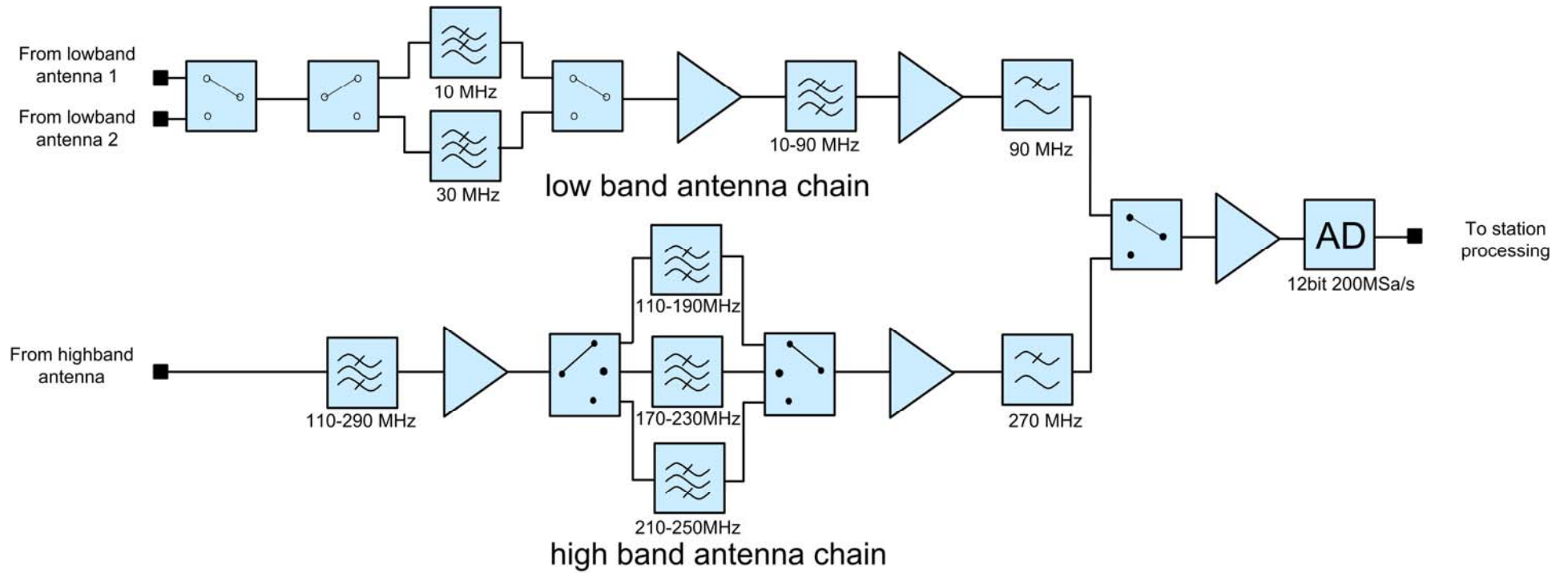


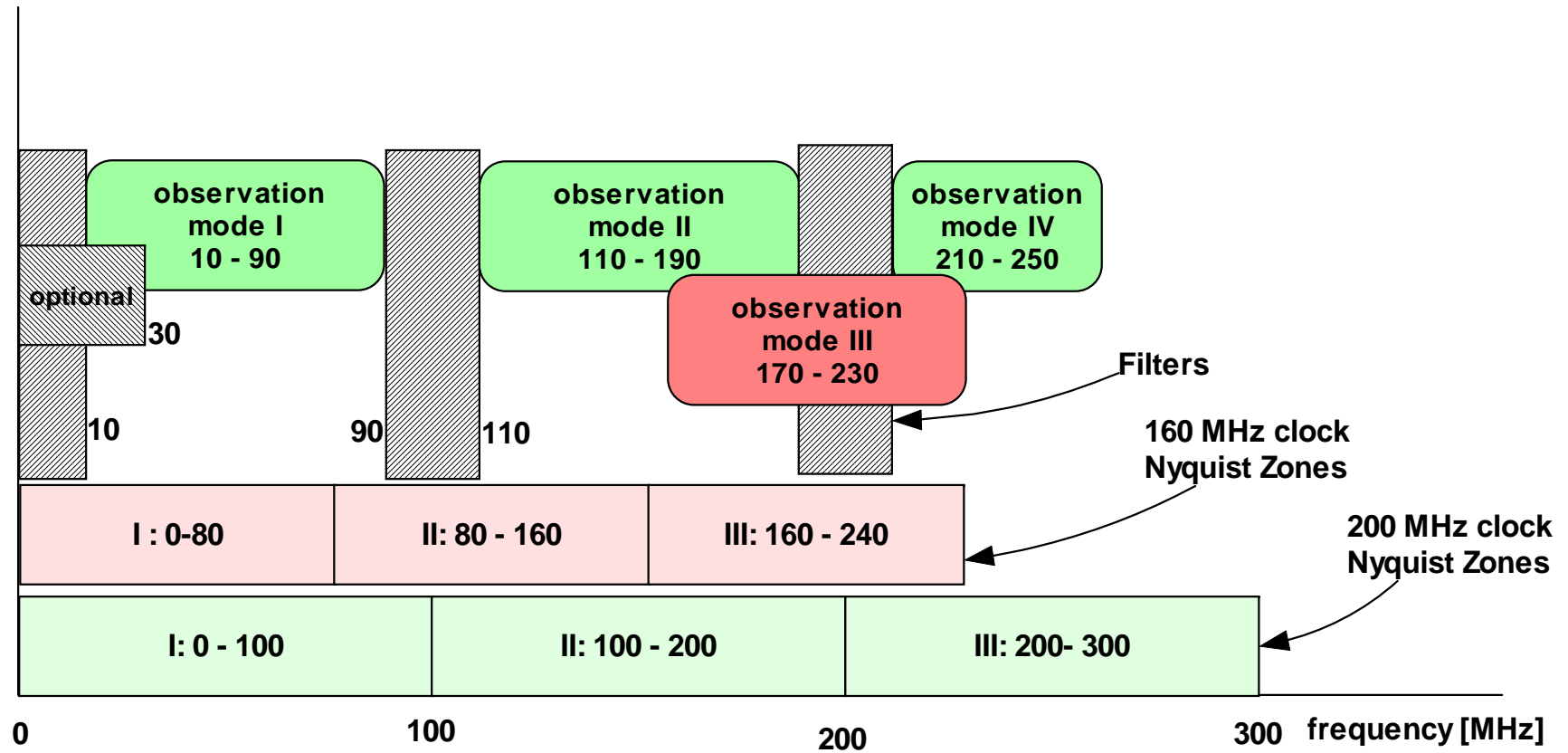


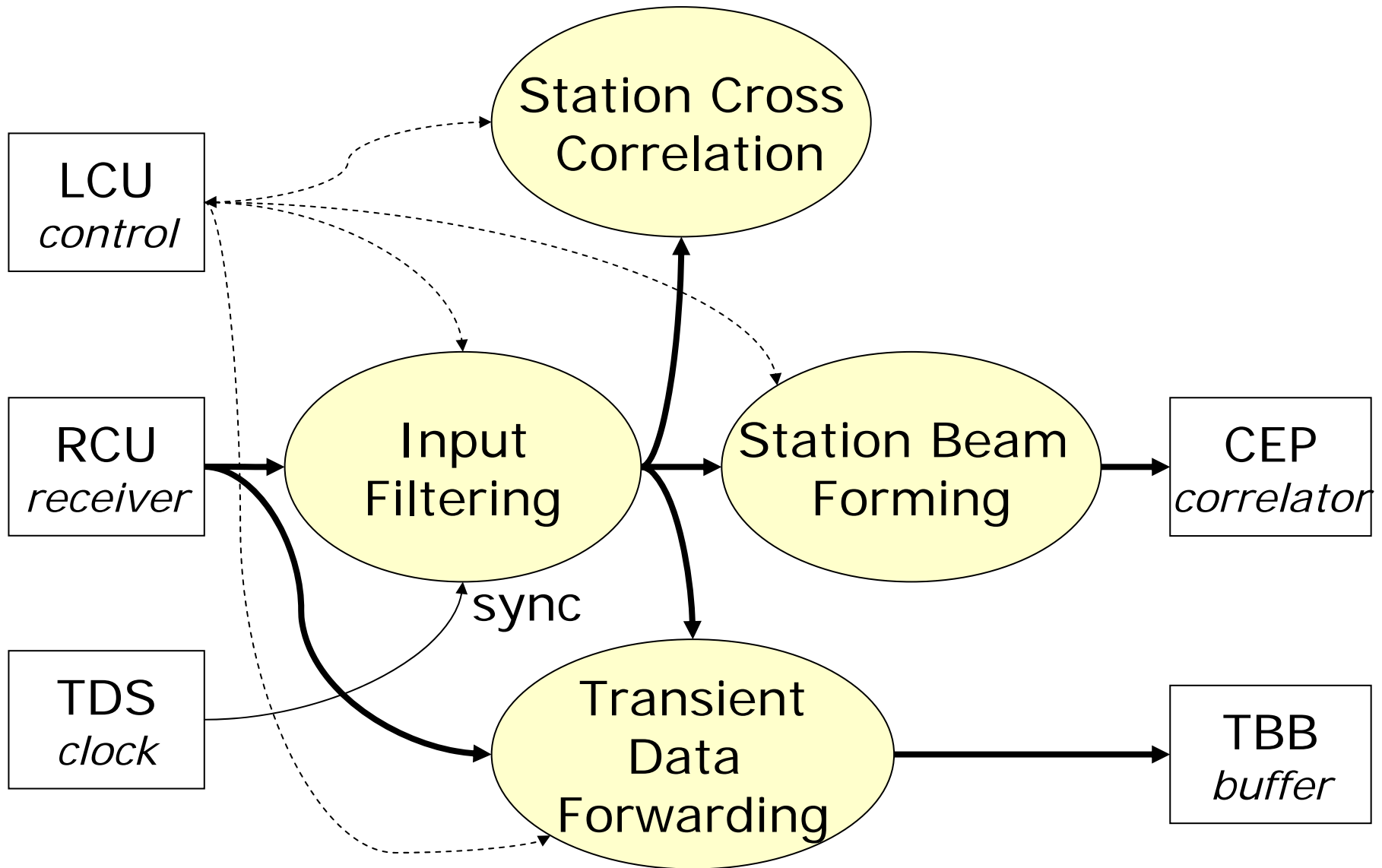




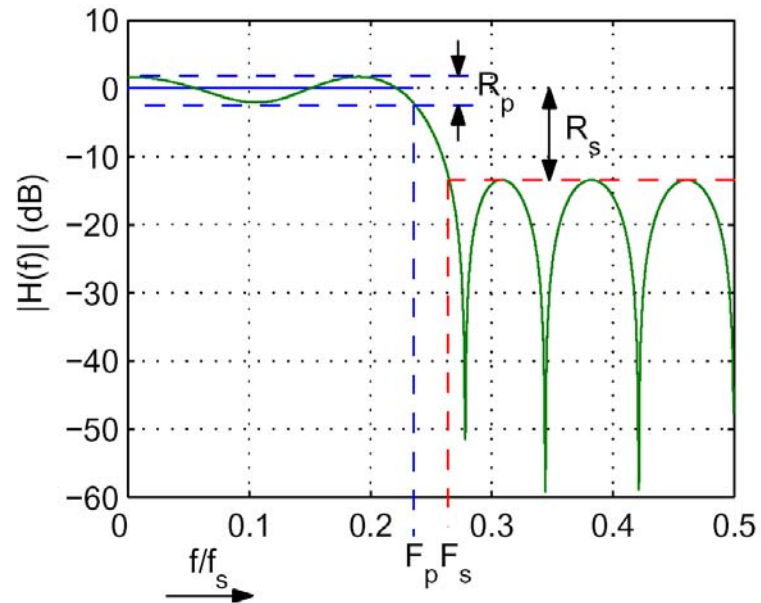
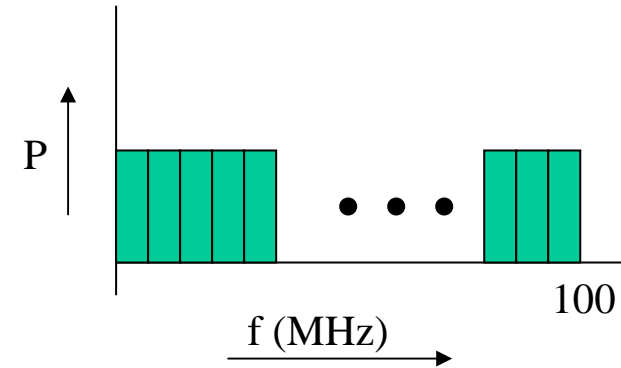




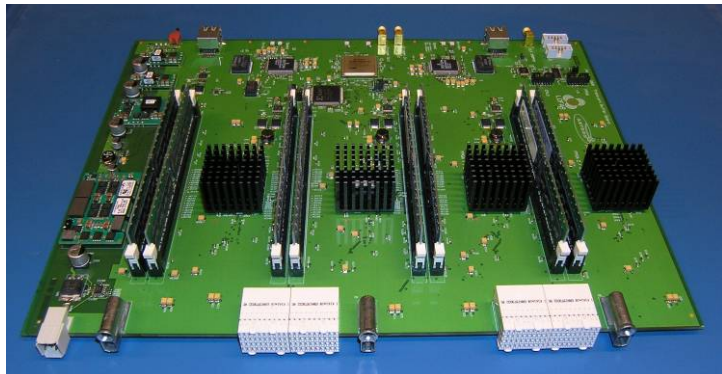
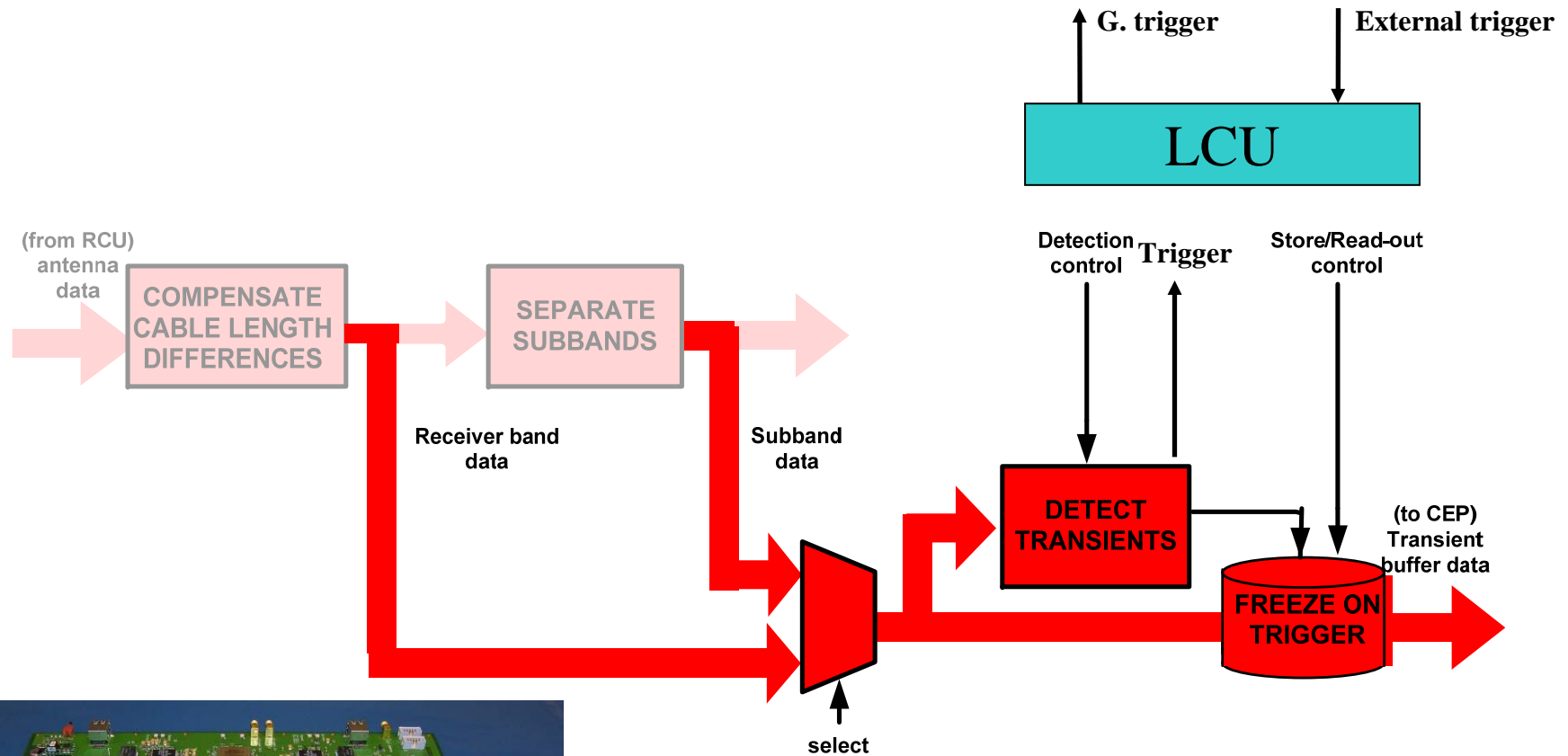


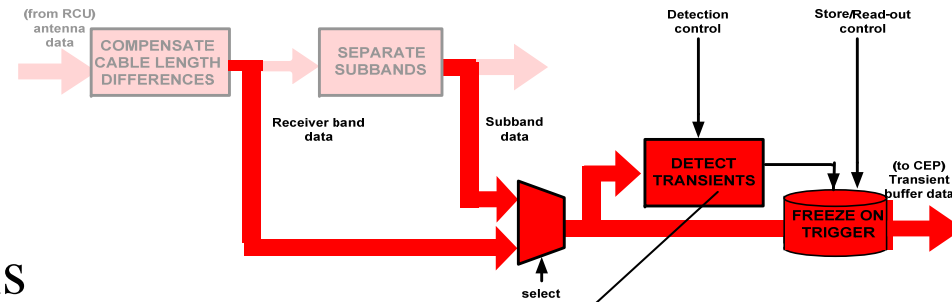


- Sample rate max. 200 MHz
- Number of taps: 4096
- Number of subbands: 512

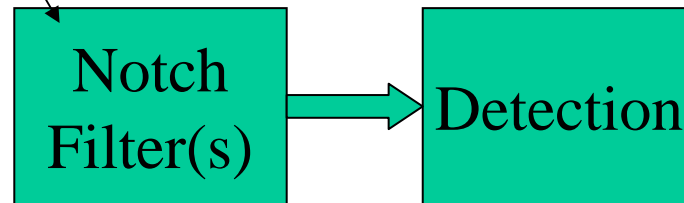






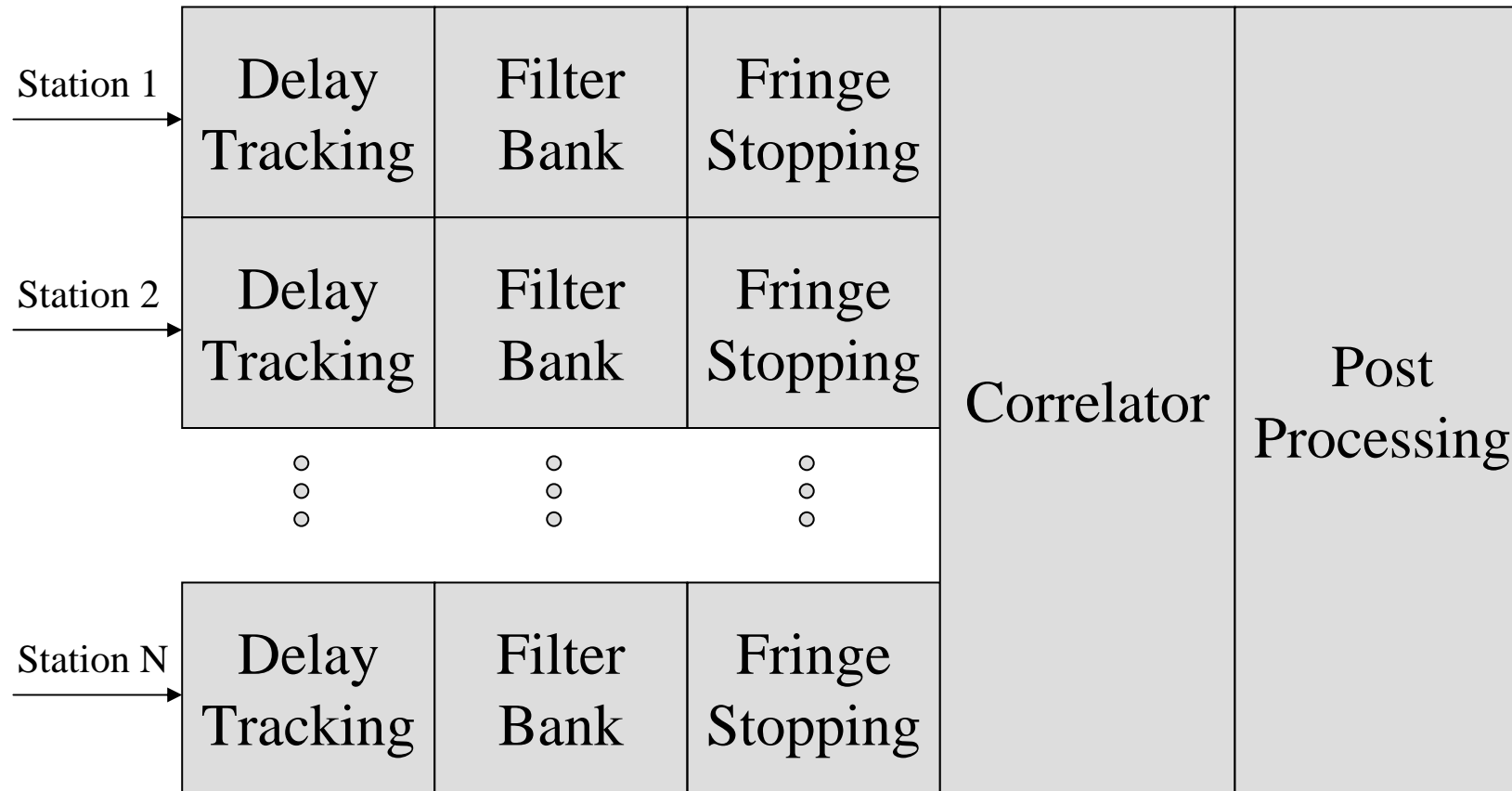


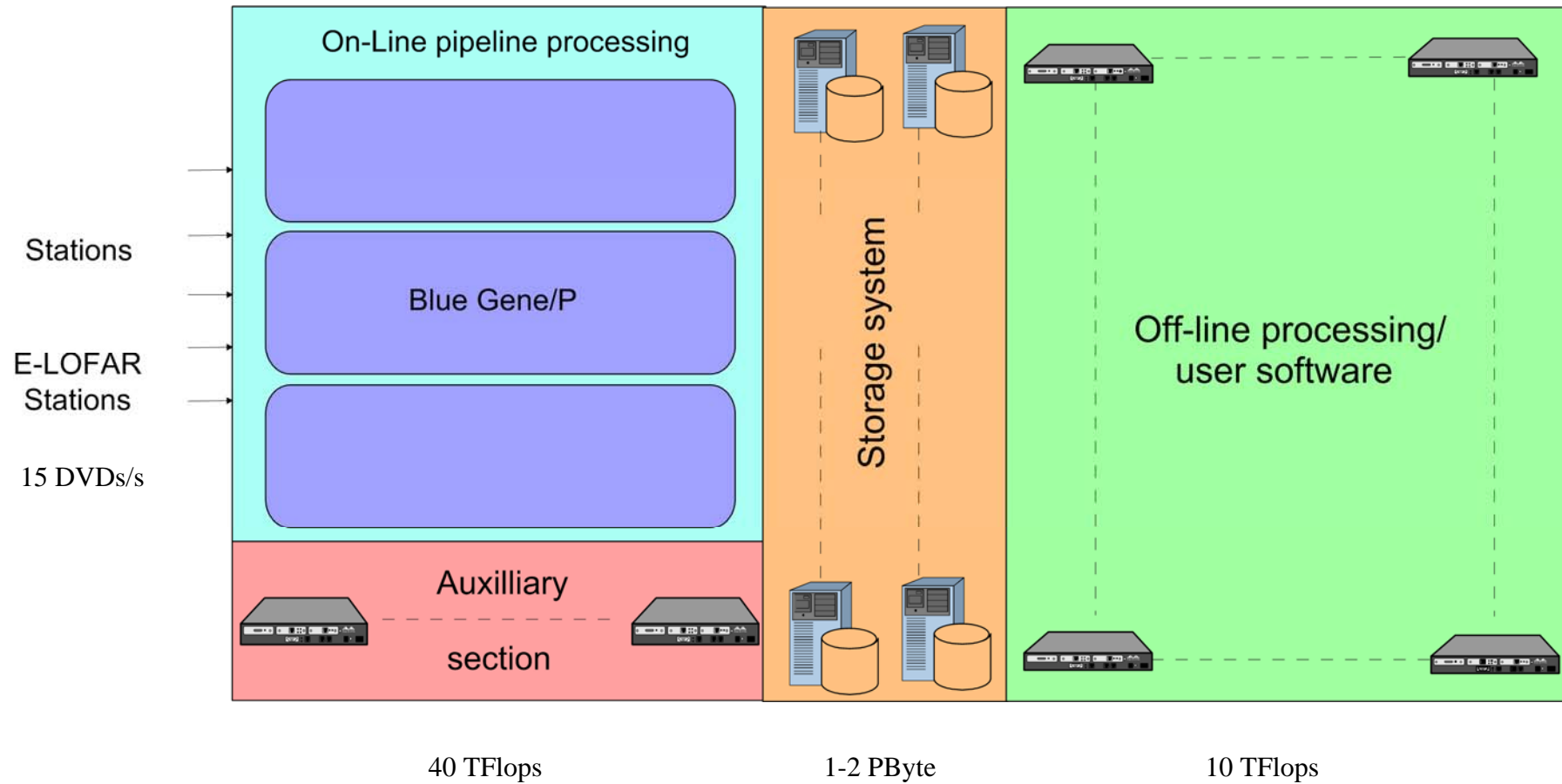
to suppress strong RFI signals at fixed locations



Detection only possible on the stored signals

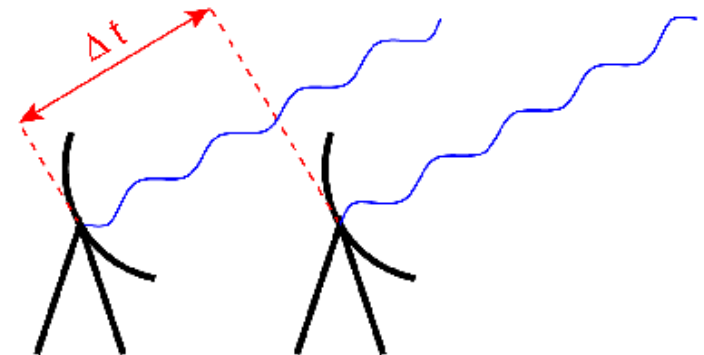
- Input data rate: ~ 230 Gbps (6 DVDs/s)
- Output data rate: ~ 2 Gbps
- Processing capacity: ~ 1.5 Tmul/s
- Storage capacity: 96 Gbyte





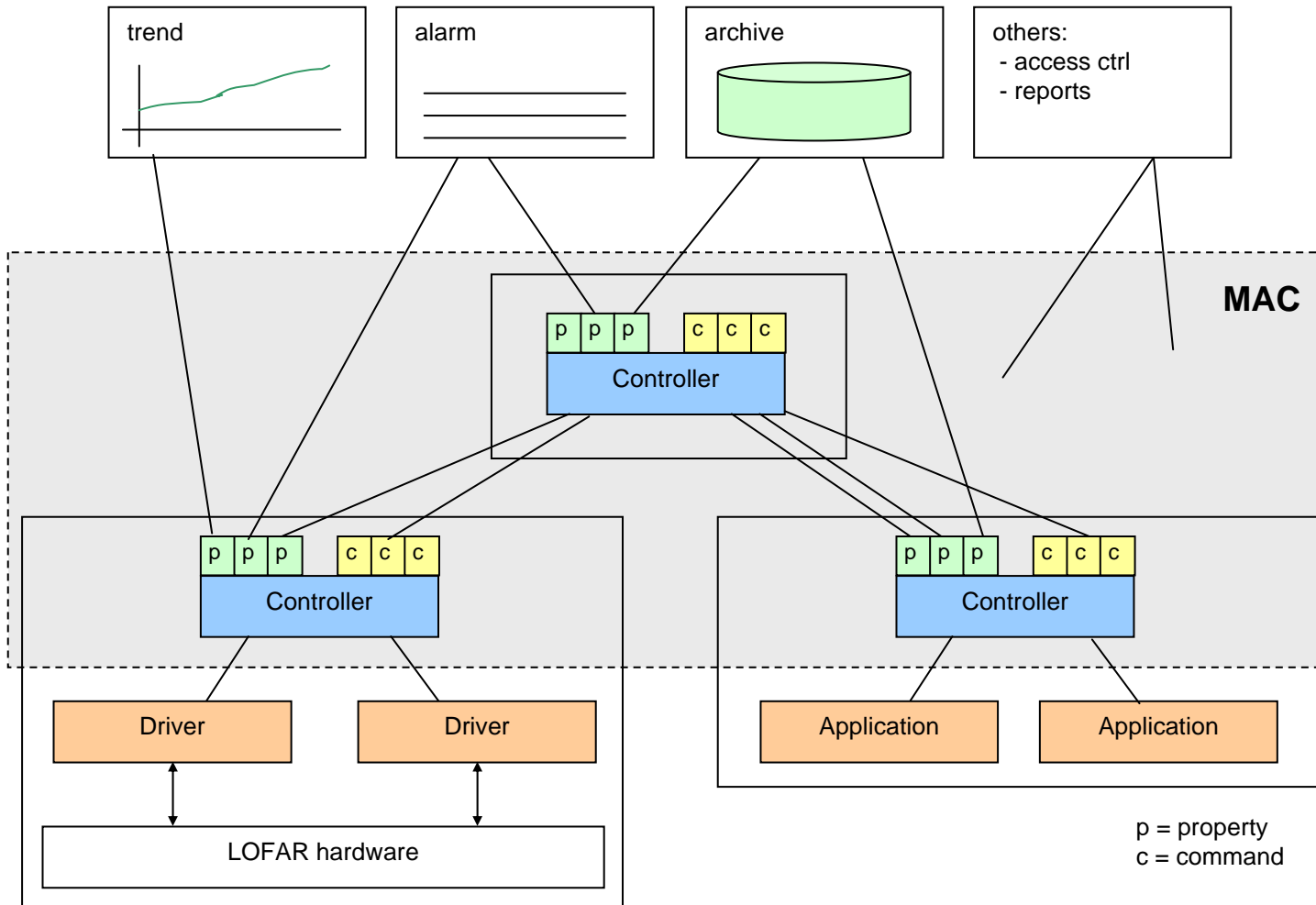


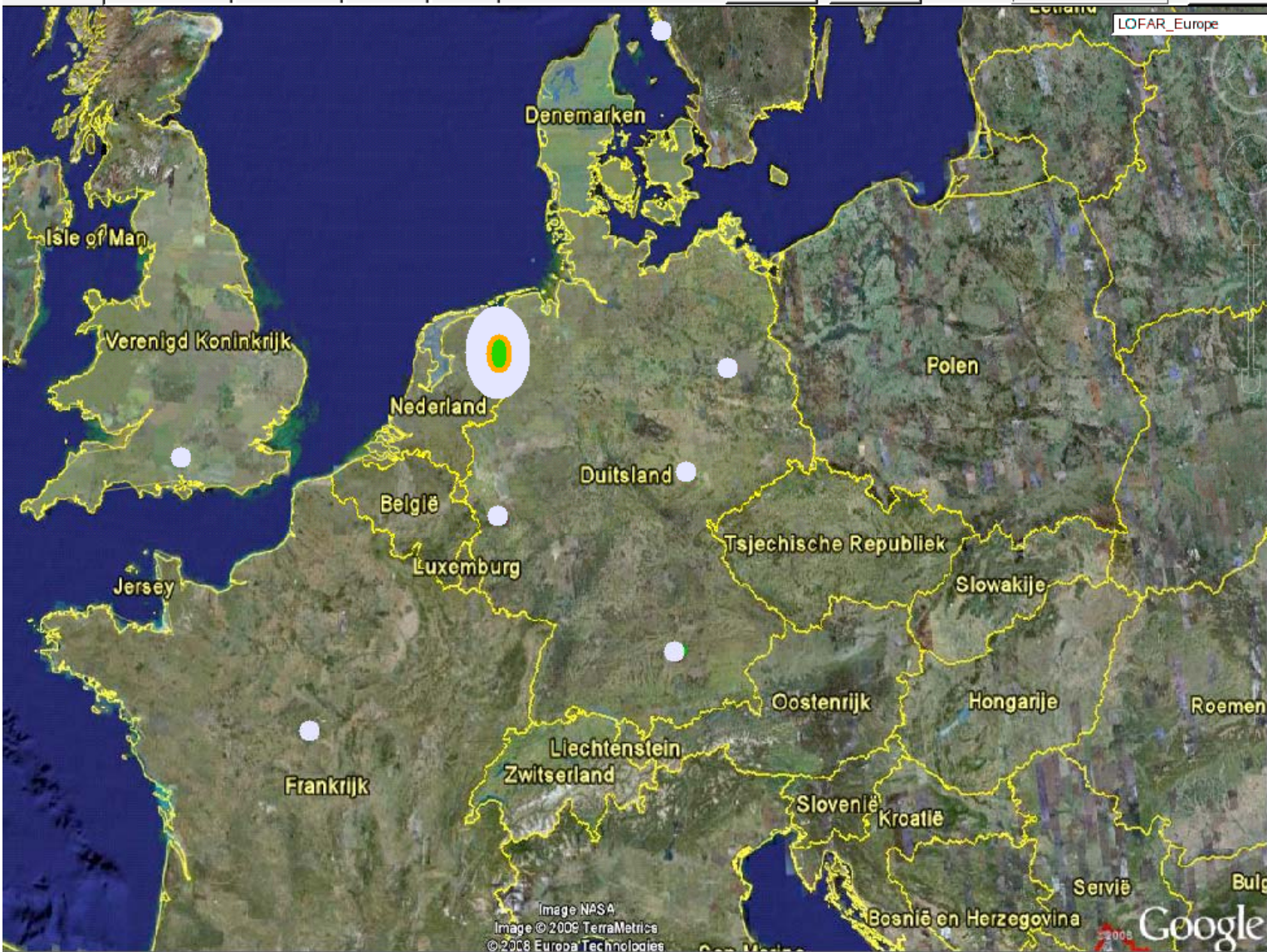
- Receive data streams from each station
- Buffer the data stream
- Synchronise input streams
- Apply delay compensation (over complete sample periods)
- Route data to correct compute node
- High volume processing
- Data reduction



- Short term storage (~5 days)
- Store results of on-line processing
- Creates observation files from the BG/P output
- Provide data for off-line processing
- Store intermediate results for off-line processing

- Create end products
- Dependent on the observation mode
- Data reduction
- Prepare data for export out of LOFAR





- Hardware
- Core
 - Remote
 - DE601
 - DE602
 - DE603
 - DE604
 - FR606
 - SE607
 - UK608

- Processes

- Ping

Hardware MCU001:LOFAR_PIC_Europe

2009.01.12 10:28:35.9	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2	SHM:http://10.144.0.1/shm/data/rsp/cs016/image/2/?ep	ACK
2009.01.12 10:27:45.5	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard3_RCU29	SHM:http://10.144.0.1/shm/data/sst/cs016/image/29/?e	ACK
2009.01.12 10:28:30.0	CS001:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2_RCU18	SHM:http://10.144.0.1/shm/data/sst/cs001/image/18/?e	ACK

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T

B

Hardware

Observations

Processes

Reports

Alerts

Previous

Next

10:30:35 12/01/09

Show TestPanel

Hardware



- LOFAR_Core
- Hardware
 - CS001
 - CS002
 - CS003
 - CS004
 - CS005
 - CS006
 - CS007
 - CS010
 - CS012
 - CS016
 - CS026
 - CS027
 - CS030
 - CS031
 - CS032

- Processes
- Processes

Hardware MCU001.LOFAR_PIC_Core

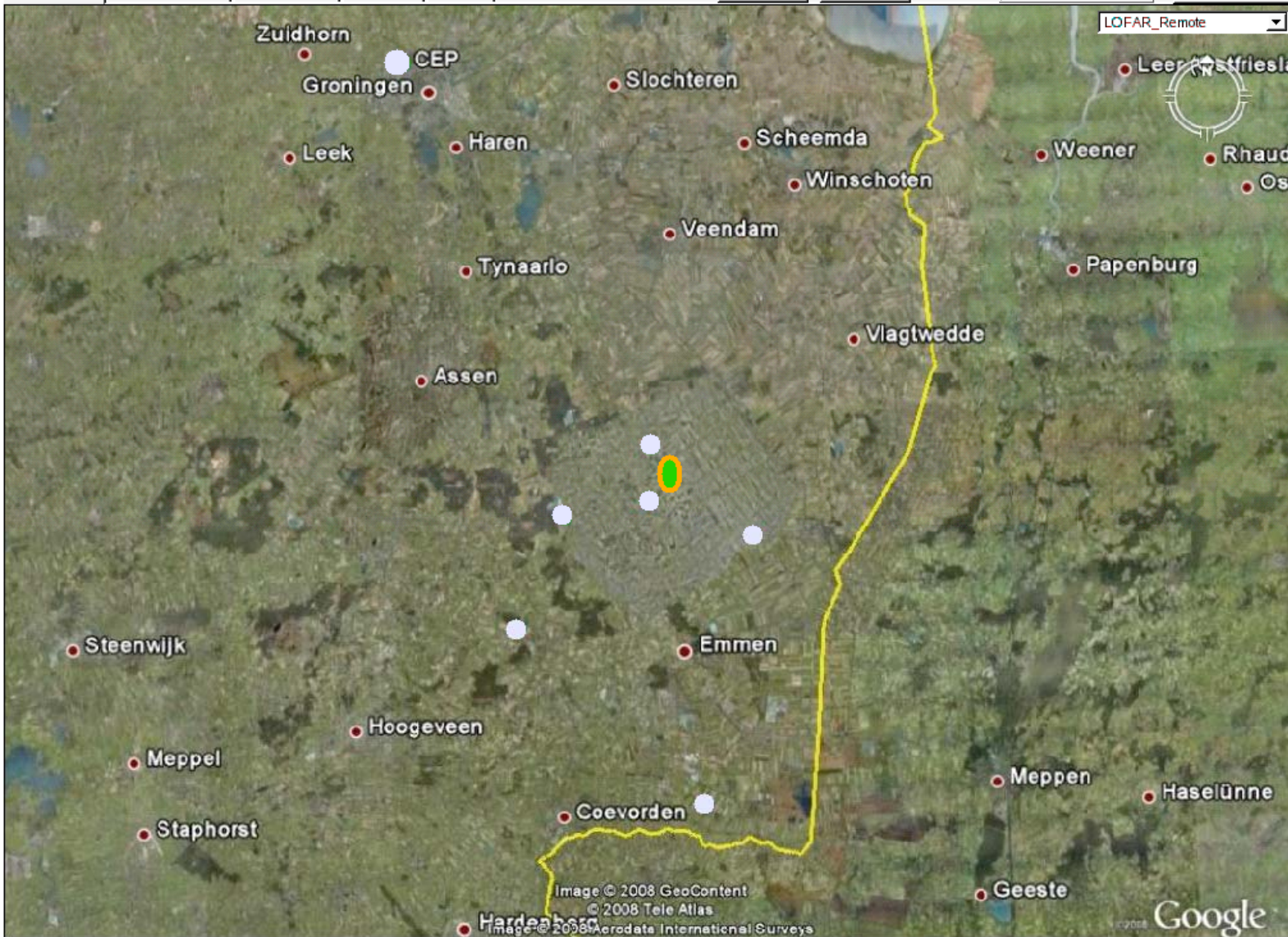
2009.01.12 10:28:35.9	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2	SHM:http://10.144.0.1/shm/data/rspics016/image/2/?ep	ACK
2009.01.12 10:27:45.5	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard3_RCU29	SHM:http://10.144.0.1/shm/data/sstics016/image/29/?e	ACK
2009.01.12 10:28:30.0	CS001:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2_RCU18	SHM:http://10.144.0.1/shm/data/sstics001/image/18/?e	ACK

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T

B

- Locator
- Ring



- Hardware
- Hardware
 - CEP
 - Core
 - RS106
 - RS208
 - RS302
 - RS306
 - RS307
 - RS503

- Processes
- Processes

- Locator
- Ring

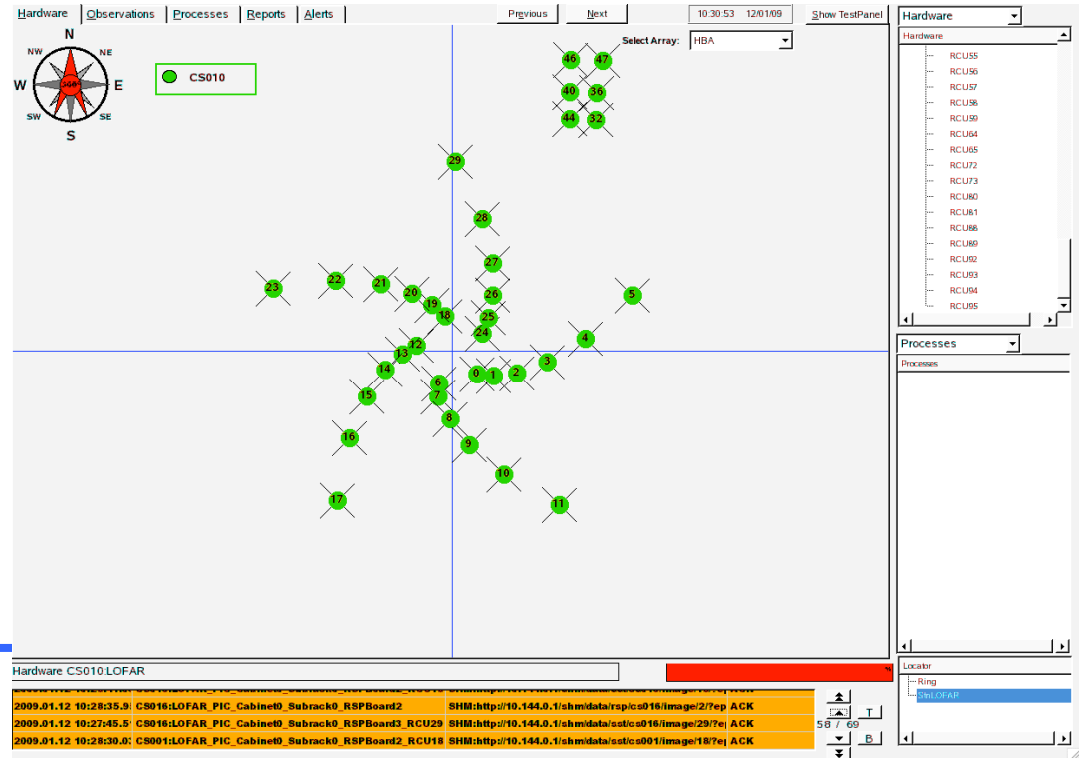
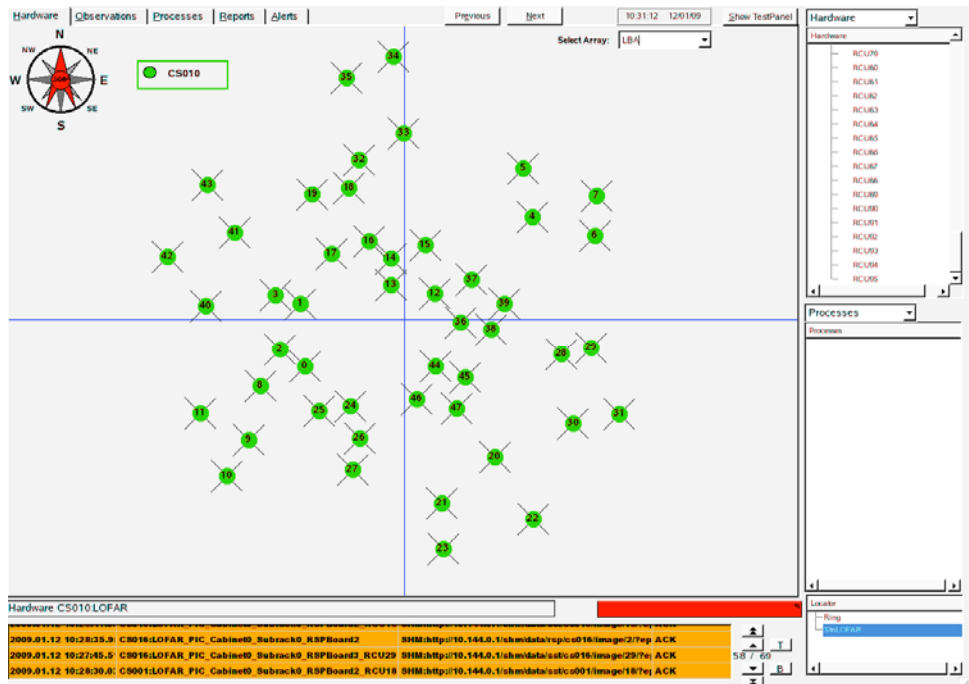
Hardware MCU001.LOFAR_PIC_Remote

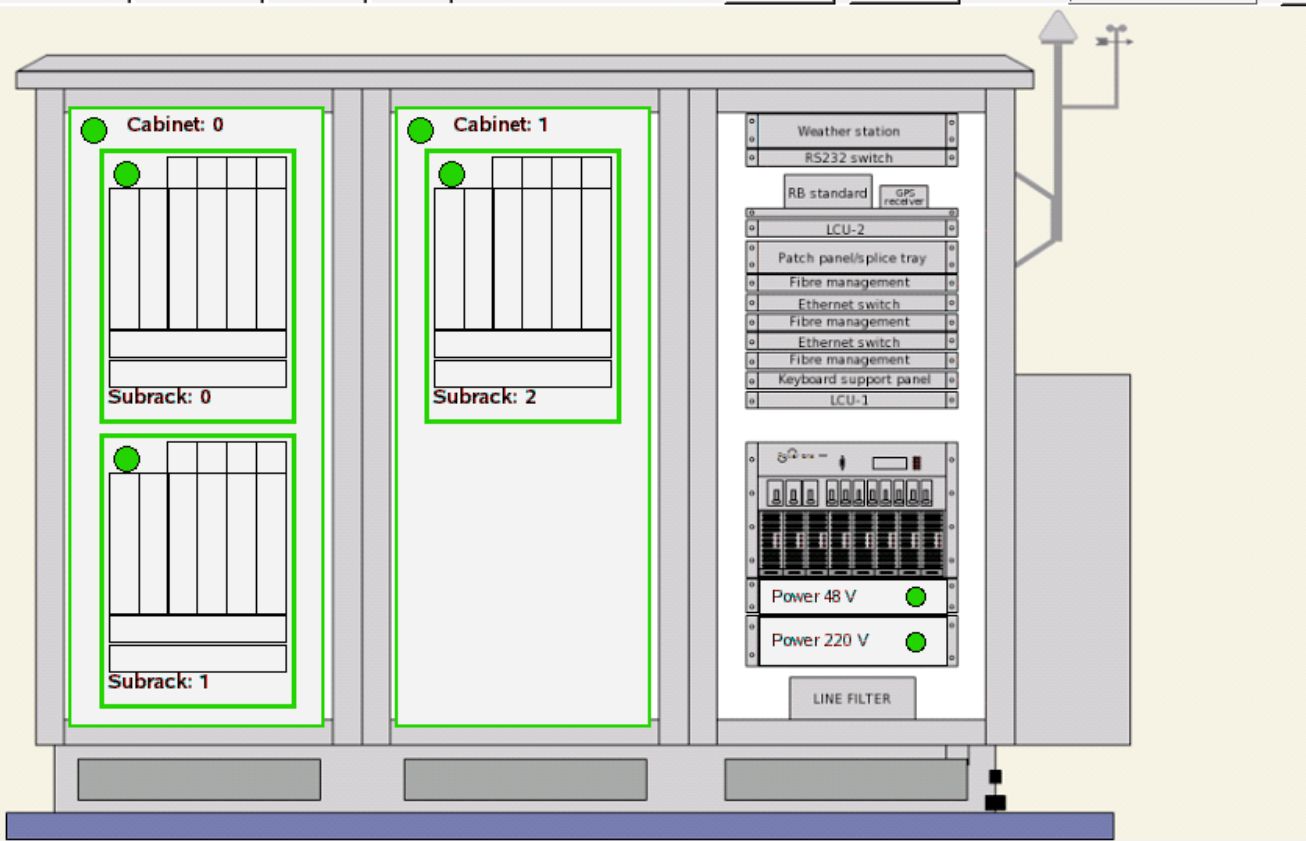
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2009.01.12 10:27:45.5	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard3_RCU29	SHM:http://10.144.0.1/shm/data/sst/cs016/image/29/?ep	ACK
2009.01.12 10:28:30.0	CS001:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2_RCU18	SHM:http://10.144.0.1/shm/data/sst/cs001/image/18/?ep	ACK

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T

B





Hardware

- CS010
 - Cabinet0
 - Subrack0
 - Subrack1
 - Cabinet1
 - Subrack2

Processes

Processes

on/off ● Temp 25.4 C ● Humidity 70.35 %RH ● Door Control Mode on	on/off ● Temp 18.9 C ● Humidity 68.05 %RH ● Door Control Mode on
--	--

Hardware CS010:LOFAR_PIC

2009.01.12 10:28:35.9	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2	SHM:http://10.144.0.1/shm/data/rsp/ics016/image/2/?ep	ACK
2009.01.12 10:27:45.5	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard3_RCU29	SHM:http://10.144.0.1/shm/data/sst/cs016/image/29/?e	ACK
2009.01.12 10:28:30.0	CS001:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2_RCU18	SHM:http://10.144.0.1/shm/data/sst/cs001/image/18/?e	ACK

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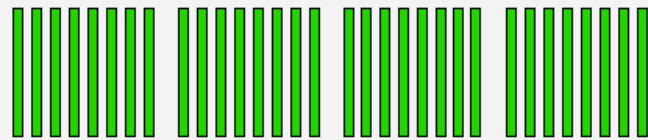
T

B

Locator

- Ring
- StnLOFAR
- StnPIC

Station: CS010
 Cabinet: 0
 Subrack: 0



TBBoard0	TBBoard1	RSP: 0	RSP: 1	RSP: 2	RSP: 3
Voltage 1.2: 0.00 V	Voltage 1.2: 0.00 V	Voltage 1.2: 1.18 V	Voltage 1.2: 1.18 V	Voltage 1.2: 1.18 V	Voltage 1.2: 1.18 V
Voltage 2.5: 0.00 V	Voltage 2.5: 0.00 V	Voltage 2.5: 2.49 V	Voltage 2.5: 2.48 V	Voltage 2.5: 2.49 V	Voltage 2.5: 2.49 V
Voltage 3.3: 0.00 V	Voltage 3.3: 0.00 V	Voltage 3.3: 3.20 V	Voltage 3.3: 3.23 V	Voltage 3.3: 3.20 V	Voltage 3.3: 3.23 V
ver: x.x	ver: x.x	ver: 0	ver: 0	ver: 0	ver: 0

Clock Board 16.00 °C Freq. 200 Mhz
 Vfsp 0.00 V Clock 4.97 V lock160 lock200 ver: x.x

SPU Board 0.00 °C

Hardware

- RCU16
- RCU17
- RCU18
- RCU19
- RCU20
- RCU21
- RCU22
- RCU23
- RSPBoard3
 - RCU24
 - RCU25
 - RCU26
 - RCU27
 - RCU28
 - RCU29
 - RCU30
 - RCU31

Processes

Processes

Locator

- StnLOFAR
- StnPIC
- Cabinet
- SubRack

Hardware CS010:LOFAR_PIC_Cabinet0_Subrack0

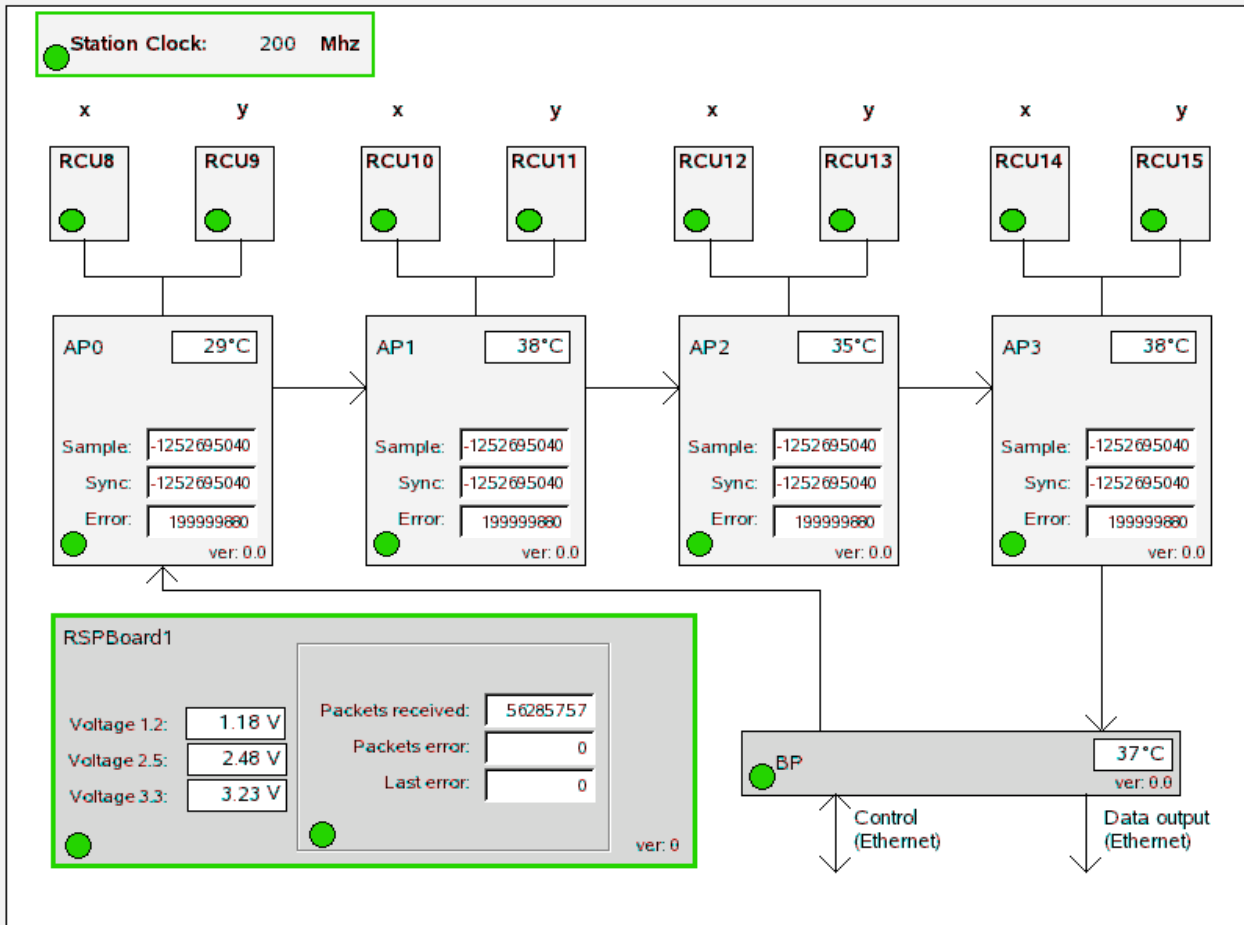
2009.01.12 10:28:35.9	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2	SHM:http://10.144.0.1/shm/data/rsp/cs016/image/2/?ep	ACK
2009.01.12 10:27:45.5	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard3_RCU29	SHM:http://10.144.0.1/shm/data/sst/cs016/image/29/?e	ACK
2009.01.12 10:28:30.0	CS001:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2_RCU18	SHM:http://10.144.0.1/shm/data/sst/cs001/image/18/?e	ACK

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T

B

View: CS010:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard1



Hardware

- Hardware
 - CS010
 - RSPBoard1
 - RCU10
 - RCU11
 - RCU12
 - RCU13
 - RCU14
 - RCU15
 - RCU8
 - RCU9

Processes

Processes

Hardware CS010:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard1

2009.01.12 10:28:35.9	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2	SHM:http://10.144.0.1/shm/data/rsp/cs016/image/2/?ep	ACK
2009.01.12 10:27:45.5	CS016:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard3_RCU29	SHM:http://10.144.0.1/shm/data/sst/cs016/image/29/?e	ACK
2009.01.12 10:28:30.0	CS001:LOFAR_PIC_Cabinet0_Subrack0_RSPBoard2_RCU18	SHM:http://10.144.0.1/shm/data/sst/cs001/image/18/?e	ACK

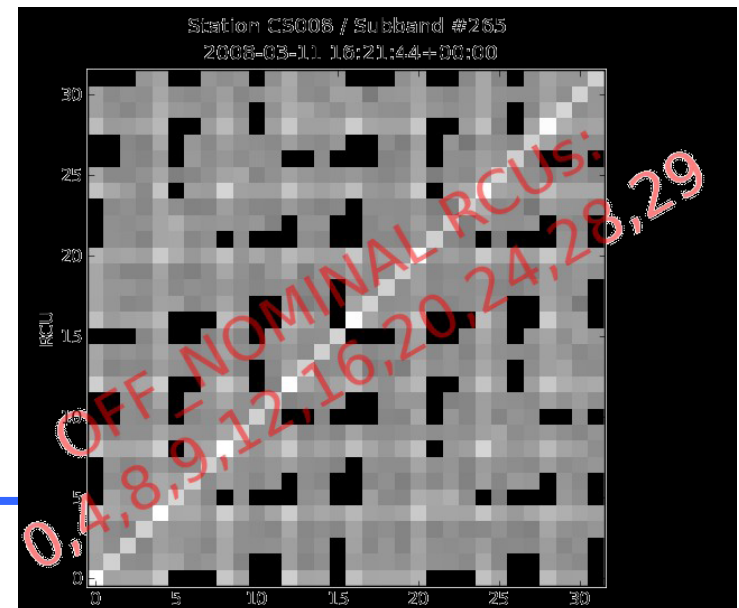
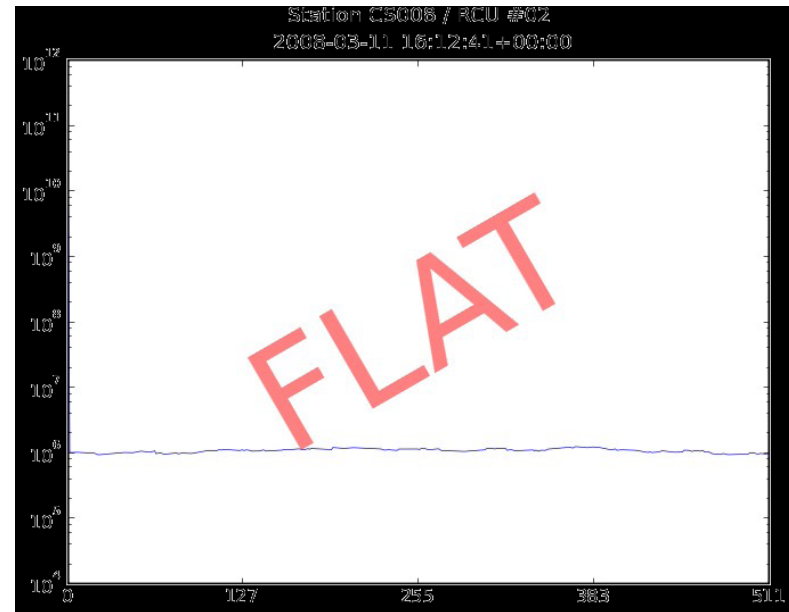
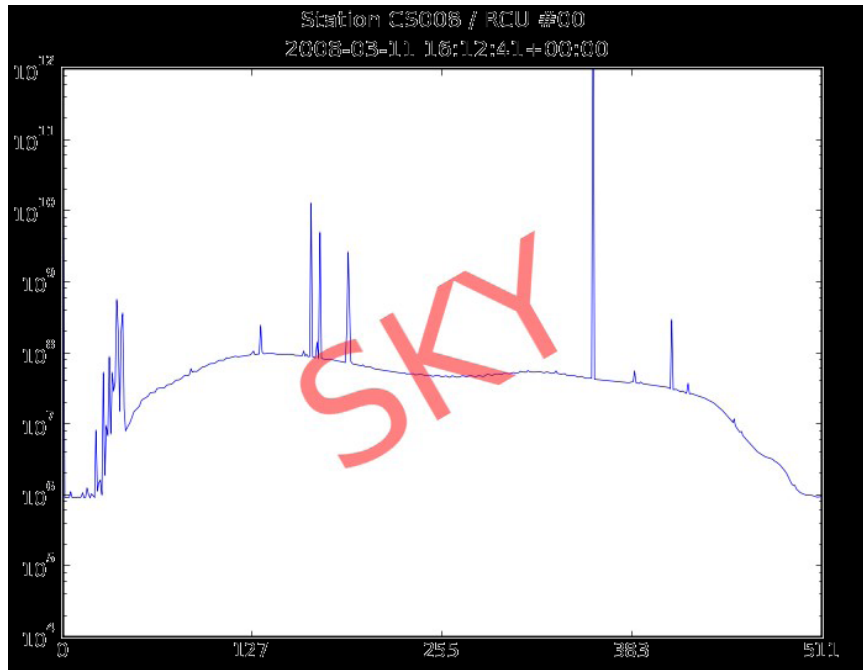
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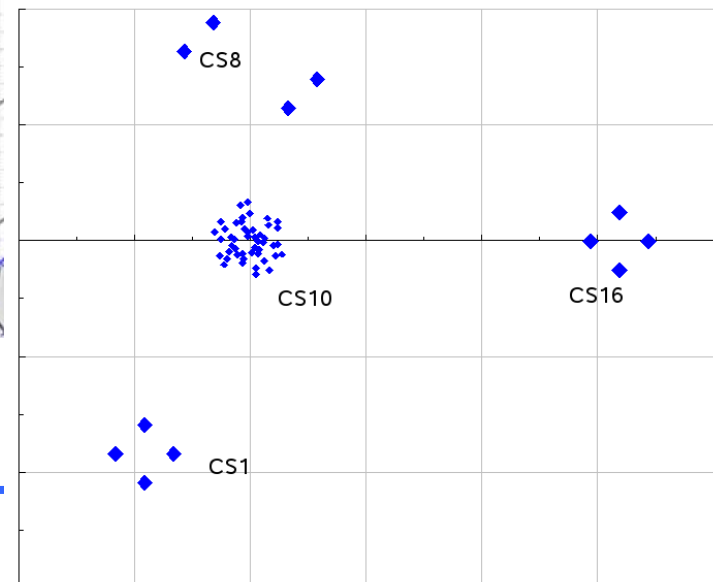
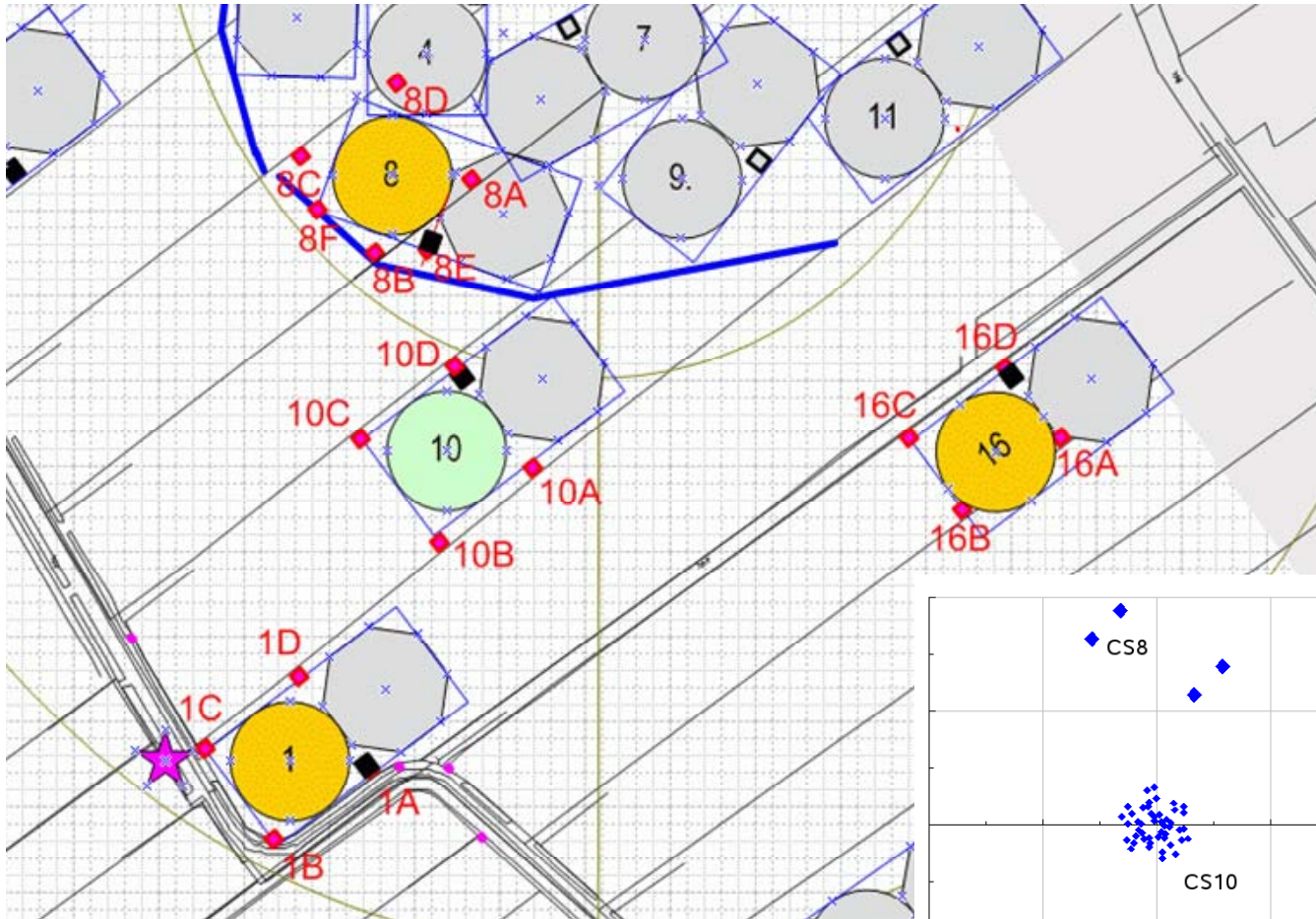
T

B

Locabr

- StnPIC
- Cabinet
- SubRack
- RSPBoard





Exloo

CS008

CS010

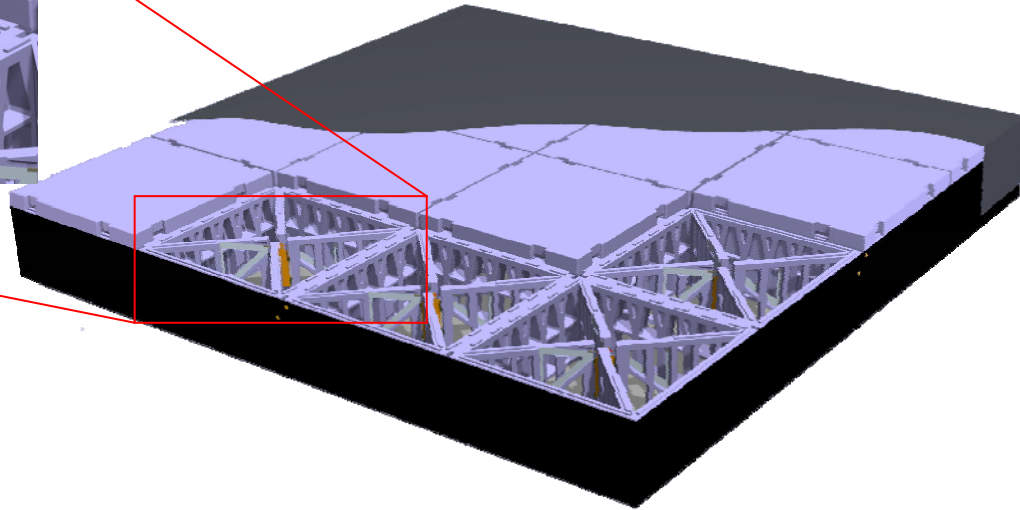
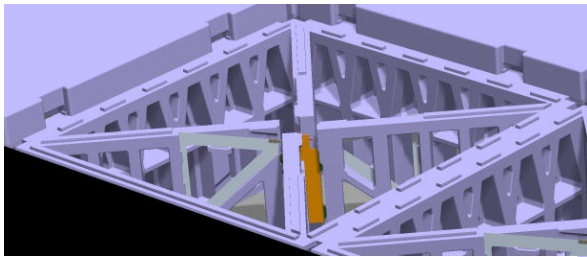
CS001 CS016

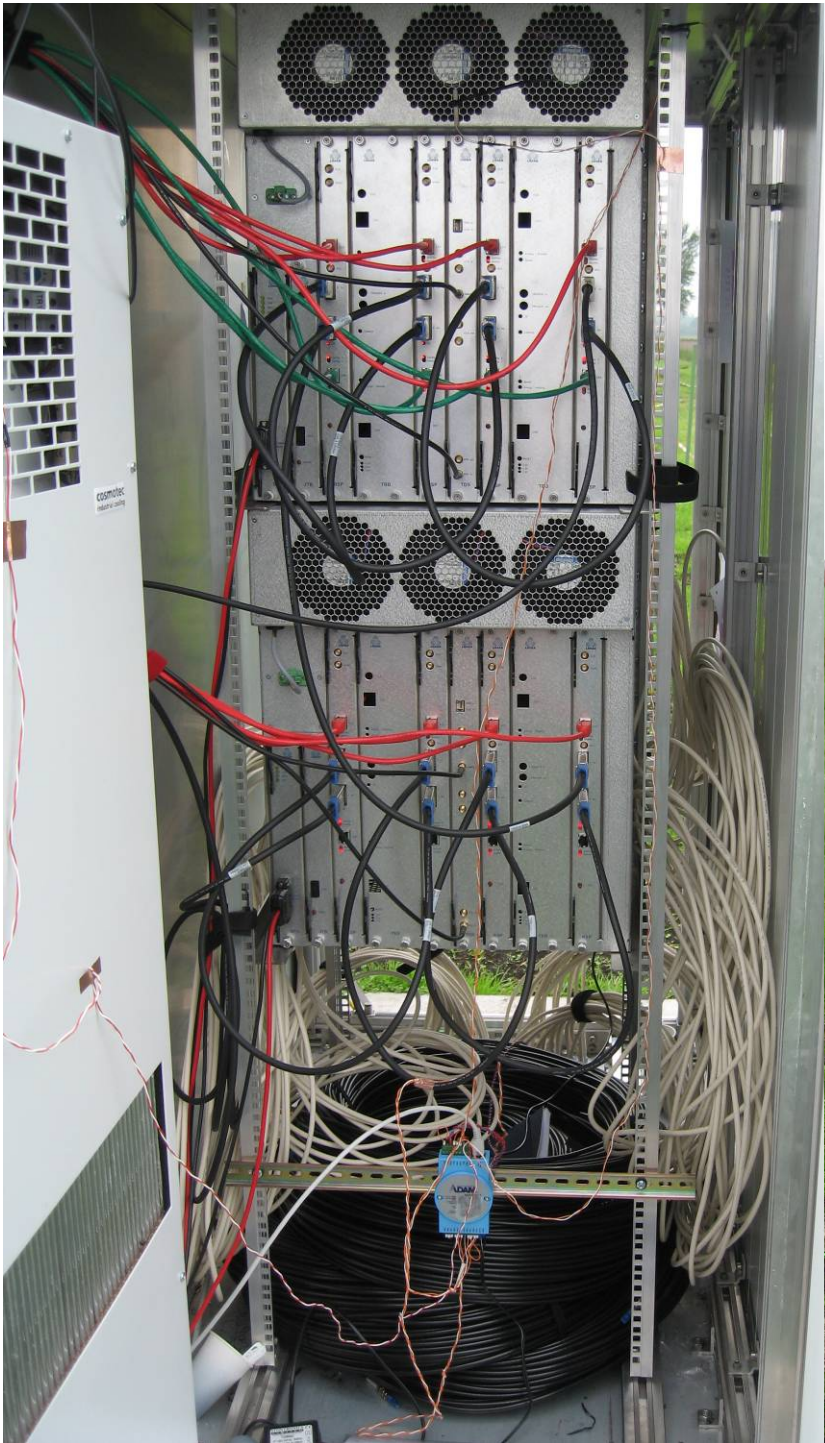


CS-10















- Effelsberg station installed
- Garching, Tautenburg build started
- Negotiations: Potsdam, Sweden, UK, France
- Plans: Poland and Italy



- Prototype stations are operational in the field
- Processing pipeline works from antenna to dataproduct
- LOFAR is a large distributed phased array system
- The hardware is available to build the first stations

The End

