

DRAGNET



A high-speed, wide-angle radio camera for catching extreme astrophysical events

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**Merging
Black Holes**



Supernovae



**Magnetar
Giant Flares**

Extragalactic



**Evaporating
Black Holes**



**Super-giant
Pulses**

**Looking for “fast transients”
with LOFAR**



**Gamma-ray
Bursts**

Galactic

ETI



Flare stars



Terrestrial

**Pernicious RFI
Atmospheric effects**

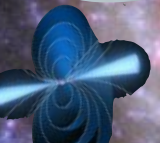


“Blitzars”

Magnetars



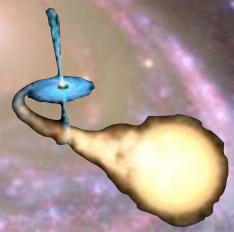
RRATs



Pulsars



Micro-quasars



We are here

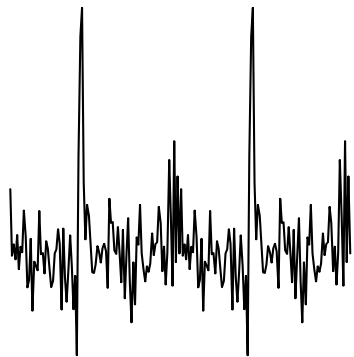
Current Processing Approach

- 225 pointings made so far.
- ~ 900TB of data at SARA in Amsterdam/
- Granted 10,000,000 core hours on Cartesius, the Dutch national super-computer.
- 2.5hrs/per beam/per 24-core-node.
- Processed 55 pointings so far.
- 1.1 million candidates.
- 50 known pulsars detected.
- In other words, it would take 13,000 cores to run the processing real time.

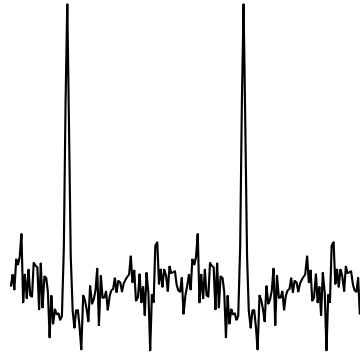


Cartesius

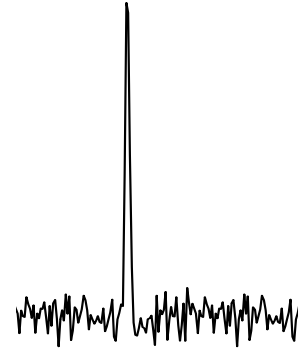
We're making discoveries!



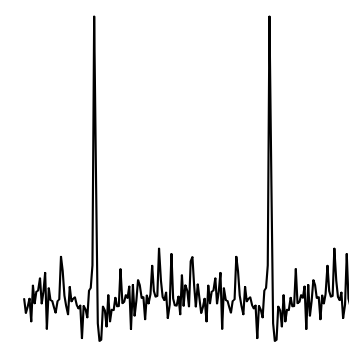
J0305+11



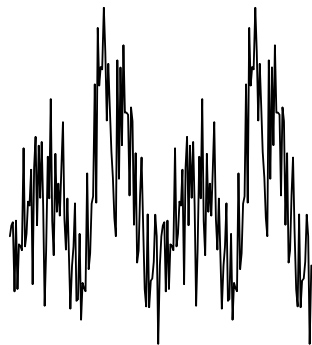
J0935+33



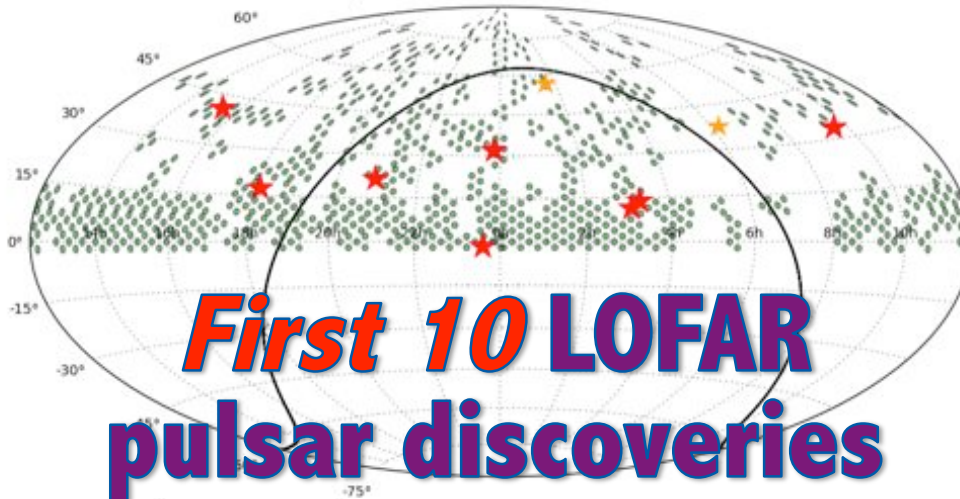
J2350+31



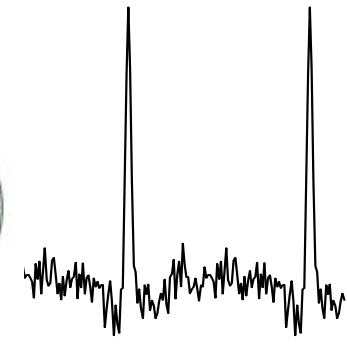
J0317+13



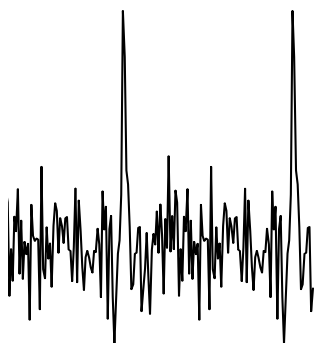
J1529+40



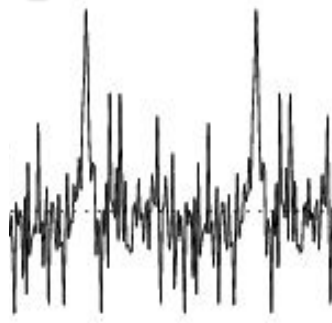
**First 10 LOFAR
pulsar discoveries**



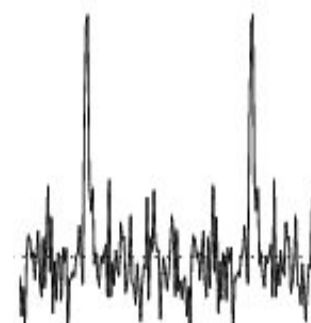
J2336-01



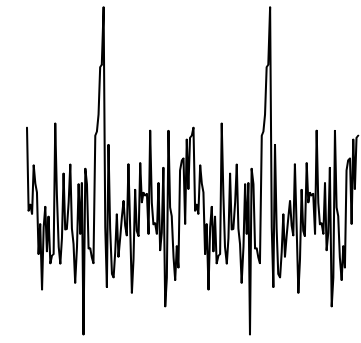
J1809+17



J0613+37



J0140+56



J2057+21



LOFAR

(Now COBALT)

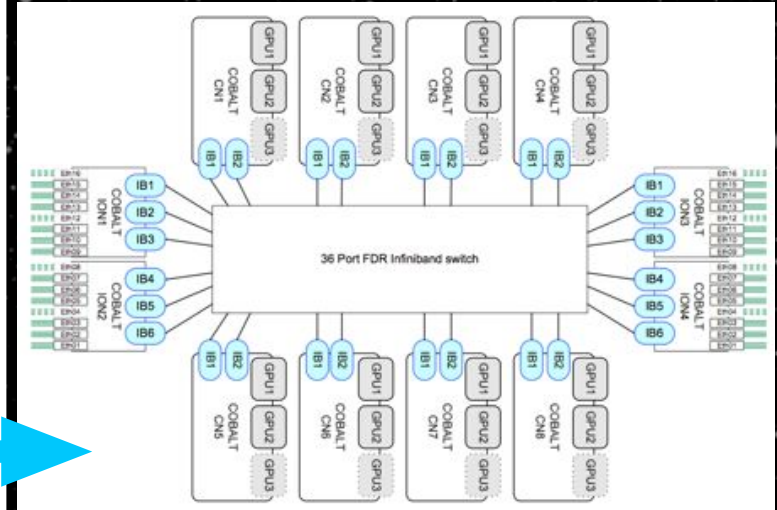


**Raw data
1 - 72
stations**

**100 Fields-of-view
Offline processing
10hr / week
observing**

DRAGNET

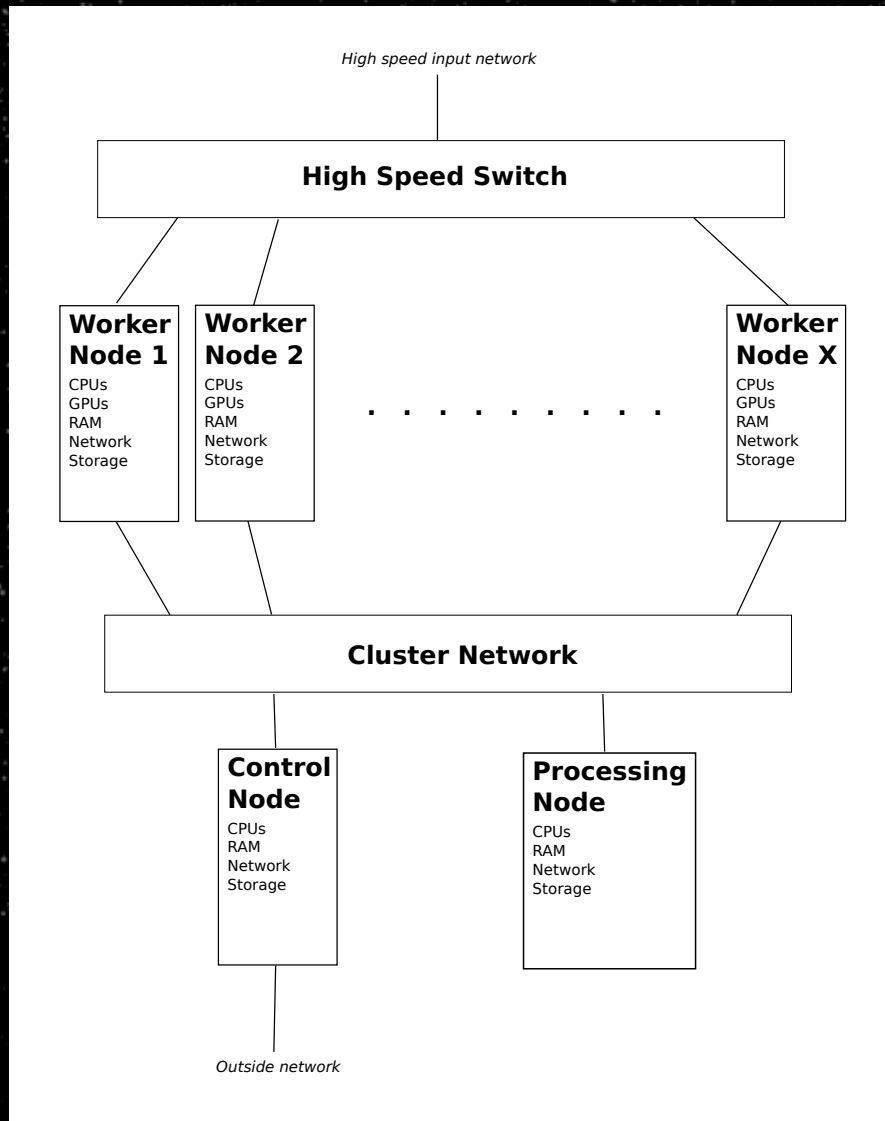
**Budget for GPU
cluster**



**Sub-arraying
80x400 Fields-of-view**

**Realtime processing
Observe 24/7
Localize events**

DRAGNET Cluster



- ~40Gb/s (max) into DRAGNET from COBALT.
- ~10-20 worker nodes.
- ~40-80 GPUs.
- DRAGNET output is very small compared with input.
- EU call for tender soon to be submitted.

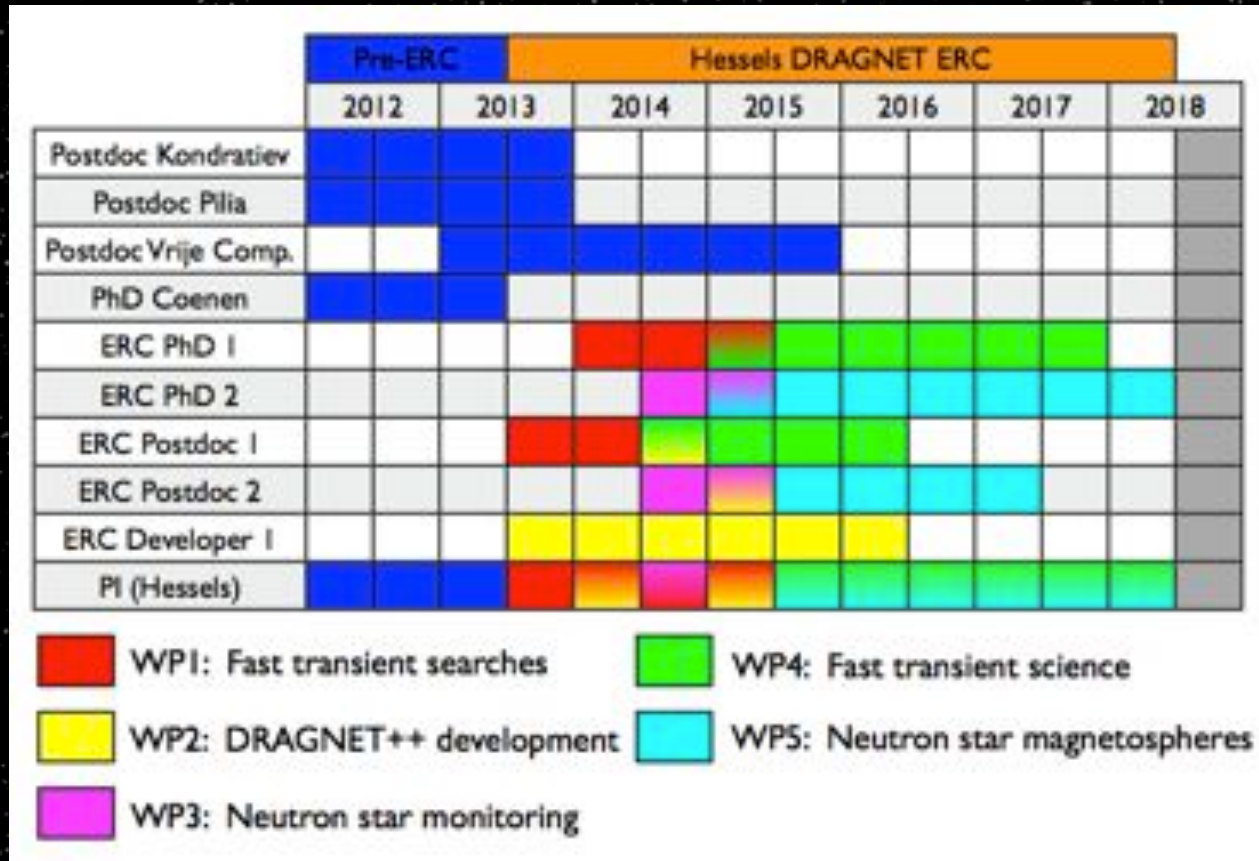
Budget

Table 2: details of equipment request (costs in Euros)

	Components	# of units	Price/comp.	Tot. price	Description
GPU cluster	NVIDIA GTX690 or similar + Housing machine	120 + 30	1,000 + 4,000	120,000 + 120,000	GPU cluster that will do the real-time processing described above.
Disk buffer	1TB solid state disks	60	1,000	60,000	Disks that will store full-res. data when triggered.
Switch / network	Infiniband switch + cabling	1 + 30	7,000 + 600	7,000 + 18,000	Extra necessary infrastructure to feed data from the LOFAR correlator to the GPU cluster.
Database and data server	Server-quality 4TB disks (or equiv.) with enclosures + 2 64-core servers	125 + 1	420 + 5,000	52,500 + 10,000	Database and data server for the DRAGNET project.

- 387.5kEur + 20% overhead = 465.0kEur.
- Above budget is a rough example and deviates from the detailed design in progress.

Timeline



- Timeline shifted ~6-12 months compared with above.
- (Almost) all of the DRAGNET team has now started.
- Want to have a basically operational DRAGNET cluster in Groningen by Spring 2015.

Groningen role

- Help with practical aspect of installing DRAGNET cluster.
- Incorporate DRAGNET into LOFAR network.
- Maintain basic functionality.