

PON-OR8-01-HPC

HPC e sistemi di archiviazione per la raccolta ed uso dati SRT

Evento di consultazione 8 maggio 2020

PON Project

Federica Govoni

Scientific Coordinator of the PON Project

Coordinator of the Division II (Radio Astronomy) of the INAF Scientific Directorate

Researcher at the INAF – Osservatorio Astronomico di Cagliari

Call for proposals for grants aimed to enhance research infrastructures



Ministero dell'Istruzione dell'Università e della Ricerca
Dipartimento per la Formazione Superiore e per la Ricerca
Direzione Generale per il coordinamento, la promozione e la valorizzazione della ricerca
PON Ricerca e Innovazione 2014-2020
(CCI: 2014IT16M2OP005)

National Operative Programme – Research and Innovation 2014-2020

***Enhancement of the Sardinia Radio Telescope for the study
of the Universe at high radio frequencies***

PON Project: Enhancement of the Sardinia Radio Telescope for the study of the Universe at high radio frequencies



SRT site (San Basilio / Gerrei)

Fully steerable 64 m diameter
Alt-azimuth mounting
Gregorian optical configuration
Frequency range: 0.3 - 116 GHz
Active surface
3 main focal positions (14 possible receivers)
Elevation range: 5°-90°
Azimuth range: $\pm 270^\circ$
Azimuth slewing speed: 51°/min
Elevation slewing speed: 30°/min



INAF – Astronomical Observatory of Cagliari (Selargius)

STRUCTURE OF THE PROJECT

INAF - Operating Units directly involved in the project



OR1 OR2 ... OR6 ... OR8 OR9

The project is organized in nine “Obiettivi Realizzativi” (OR)

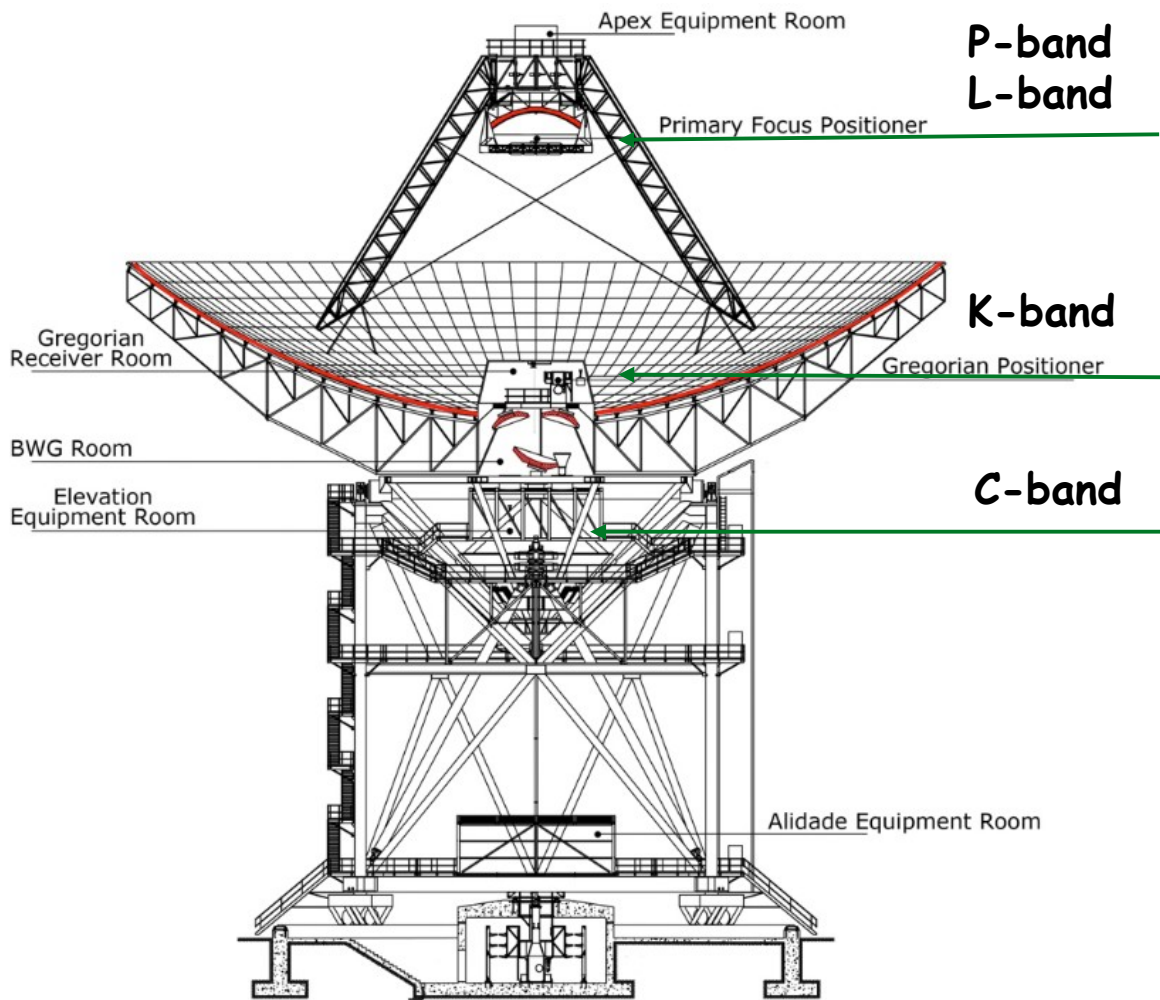
- Legal representative
Prof. Nicolò D'amico
- Scientific coordinator of the project
Dr. Federica Govoni
- Financial officer in charge of the project
Dr. Renata Schirru
- Contact person (Director) of INAF - OA Cagliari
Dr. Emilio Molinari
- INAF Procurement Office
Dr. Ignazio Porceddu
- Project Manager
Dr. Davide Fierro

TIME SCALE OF THE PROJECT

32 months (25 June 2019 – 25 February 2022)

BUDGET OF THE PROJECT

- Total budget **18.7 Meuro** (the total amount must be spent within 32 months)
- INAF cannot use the budget to hire personnel
- Possible call for tender open to all contractors interested in bidding for the design and delivery of HPC and archiving system for the SRT.



Acquire, install, and bring in the operational phase high frequency radio astronomical receivers.

OR1 - Multi-beam cryogenic receiver in W Band for SRT
Coordinator: Alessandro Navarrini

OR2 - Multi-beam cryogenic receiver in Q Band for SRT
Coordinator: Alessandro Orfei

OR3 - Millimetre camera for SRT
Coordinator: Matteo Murgia

OR4 - Simultaneous microwave compact triple-Band receiving system for the three Italian radio telescopes
Coordinator: Pietro Bolli

FREQUENCY

P-band
305-410 MHz

L-band
1.3-1.8 GHz

S-band
3.0-4.5 GHz

Clow-band
4.2-5.6 GHz

C-band
5.7-7.7 GHz

K/Q/W band
VLBI

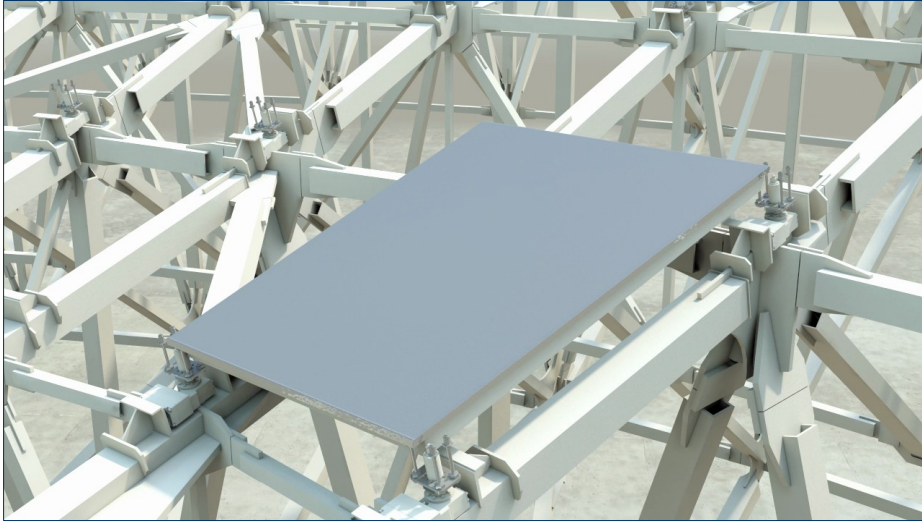
K-band multibeam
18-26.5 GHz

Q-band
multibeam
33-50 GHz

W-band
Camera
80-116 GHz

W-band
multibeam
75-116 GHz

ACTIVE SURFACE OF THE SRT



OR5 - Upgrade the SRT with a Metrological System

Coordinator: Sergio Poppi

- Pointing performances
- Aperture efficiency and the gain of the antenna at all elevations
- Wind induced structural effects

OR9 – Upgrade of laboratories for the development of microwave technologies

Coordinator: Tonino Pisanu

Upgrade of the instrumenta equipment of the three laboratories (mechanical, electronics, and microwaves) at the Astronomical Observatory of Cagliari.

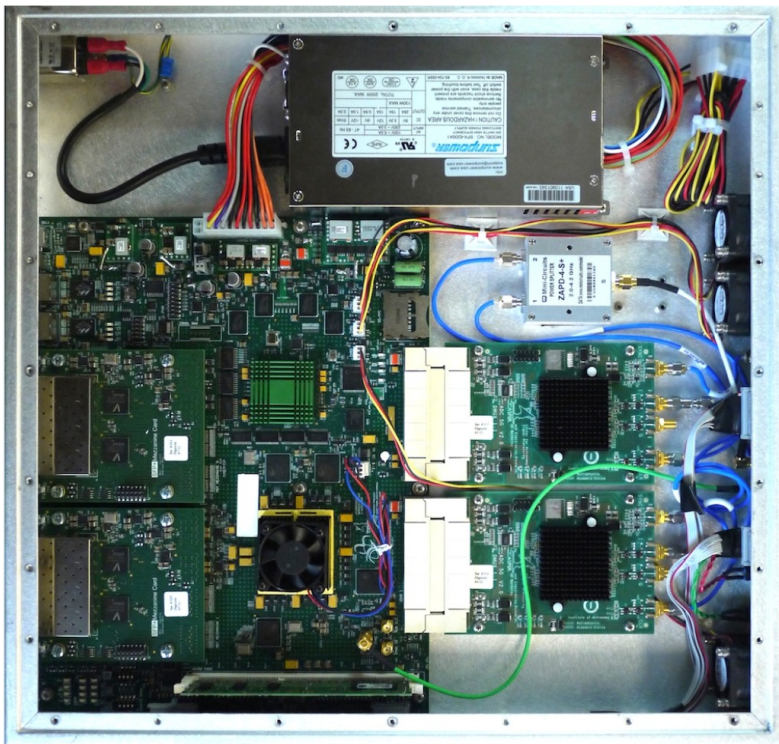
OR7 – Integration of the system

Coordinator: Andrea Orlati

The set of acquired devices that will include new receivers, new backends and the metrology system will be integrated through a "turnkey" supply of electronic and mechanical interfaces, allowing the radio telescope as a whole to operate at high frequencies, optimizing the frequency agility.



LABORATORIES



State of the art Backend: SARDARA Sardinia Roach2-based Digital Architecture for Radio Astronomy up to 2500 MHz and 16k-channels, seven beams

OR6 - Backends

Coordinator: Gianni Comoretto

The new high frequency receivers will be complemented by a backend system with a reconfigurable digital architecture capable of processing the signal for high resolution spectro-polarimetric observations over a wide range of frequencies and in multi beam mode.

OR8 - HPC and storage systems for the archival and the use of the SRT data

Coordinator: Andrea Possenti

Supply of ICT resources, in particular for data storage and processing, necessary for the archiving and analysis of data obtained with SRT. The data, which will become public after one year from the observation, will be archived and in the long term will constitute a mine of information that will allow to produce further science at high level.

↑ **Maggio 2020**

↑ **Marzo-Aprile 2021**

Timeline and Budget of the nine OR of the PON Project

OR1
OR2
OR3
OR4
OR5
OR6
OR7
OR8
OR9

OR / Mese	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Ricevitore criogenico multi-beam in Banda W (3mm) per SRT																																
Ricevitore criogenico multi-beam in Banda Q per SRT																																
Camera millimetrica per SRT																																
Sistema ricevente a microonde compatto e simultaneo a tre-bande per i tre radio telescopi Italiani																																
Sistema metrologico per SRT																																
Backends per SRT																																
Fornitura delle interfacce elettroniche e meccaniche per l'integrazione dei nuovi sistemi																																
HPC e sistemi di archiviazione per raccolta ed uso dati SRT																																
Potenziamento dei laboratori per lo sviluppo di tecnologie a microonde																																

2.850

1.035

2.700

3.000

2.300

1.555

2.498

1.400

1.345

18.683

(MEuro)

HPC

0.170

1.400

1.570
(MEuro)

↓ **Dicembre 2020**