Ph: G. Gardenghi

The INAF Radio Data Archive: recent developments and future perspectives

A. Zanichelli, V. Galluzzi, F. Bedosti, L. Bruno, M. Burgay, G. Coran, A. Fara, C. Knapic, M. Molinaro, M. Nanni, A. Orlati, D. Perrodin, S. Poppi, A. Possenti, S. Righini, M. Sponza, M. Stagni

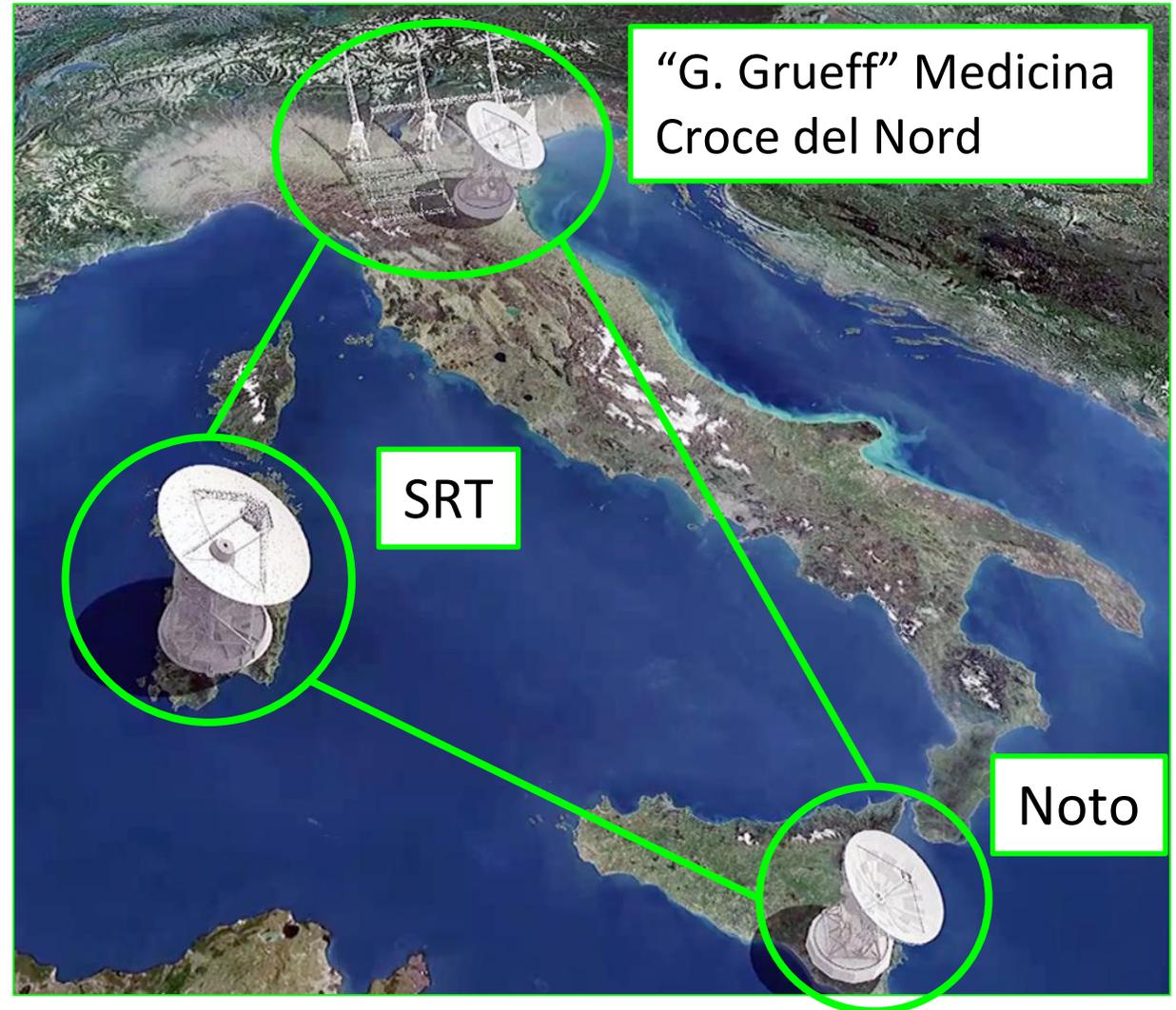# INAF Radio Telescopes

Observing modes:

- Single dish

- VLBI (EVN, IVS, EAVN)

- VITA - VLBI ITalian Array
  (+software correlator)

(Next Generation) Croce del Nord

300 MHz – 116 GHz
Total intensity
Spectropolarimetry
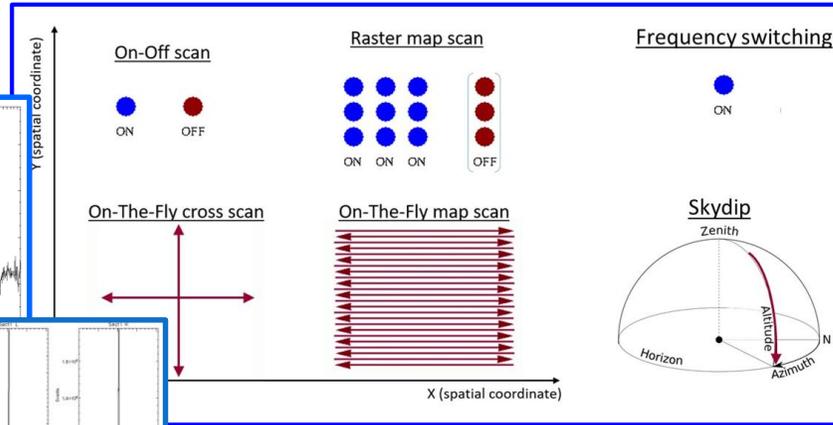

"G. Grueff" Medicina
Croce del Nord

SRT

Noto

Observing with the INAF radio telescopes

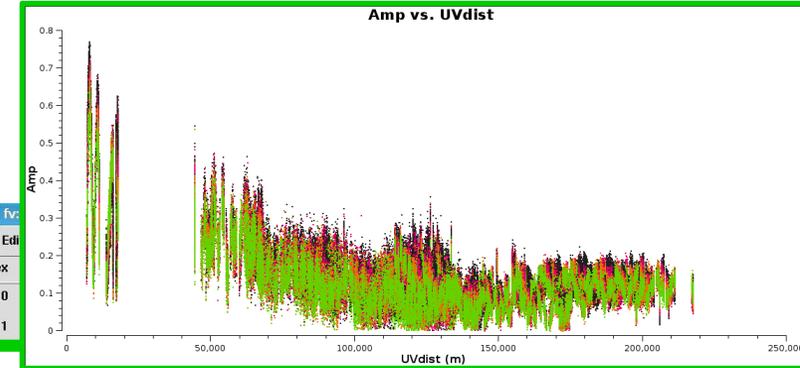Twice-a-year INAF Call for Proposals. Offered instrumentation, information and access to the Data Archive at https://www.radiotelescopes.inaf.it/

Plus, three EVN call for proposals whose observational data are available through the EVN archive
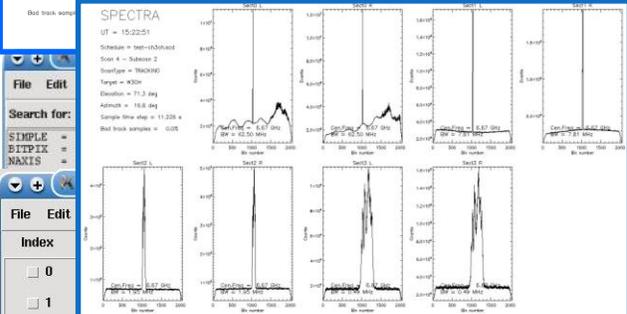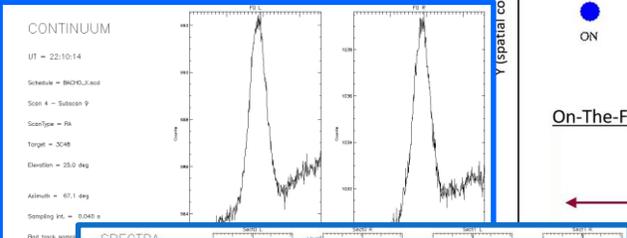
Observational data products

VLBI

Single-dish

Time domain (Single Dish / VLBI)

The INAF Radio Archive Working Group

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Luca Bruno
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Marco Molinaro
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Matteo Stagni

IA2 Italian Center for Astronomical Archives
Centro Italiano Archivi Astronomici

INAF IRA

INAF ISTITUTO NAZIONALE DI ASTROFISICA

OAC Osservatorio Astronomico di Cagliari

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- progettazione, realizzazione e gestione delle componenti dell'archivio
- archiviazione dei dati e loro pubblicazione/distribuzione su web;
- long term preservation;
- compatibilità dell'archivio con gli standard promossi dall'International Virtual Observatory Alliance;
- sfruttamento scientifico dei dati
- realizzazione di un Science Gateway
- data citation

Internal data model example: SD (no-time domain) and VLBI
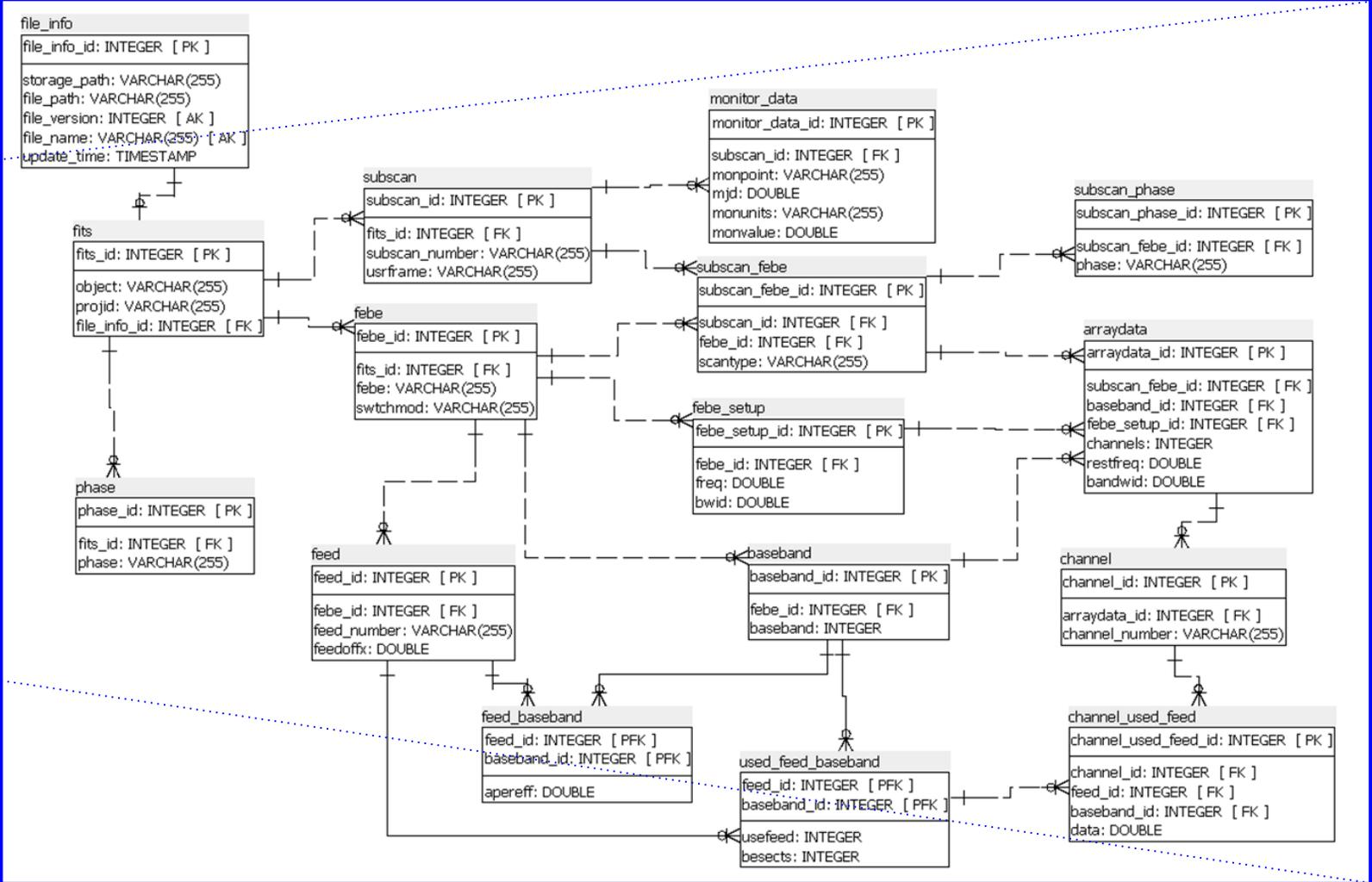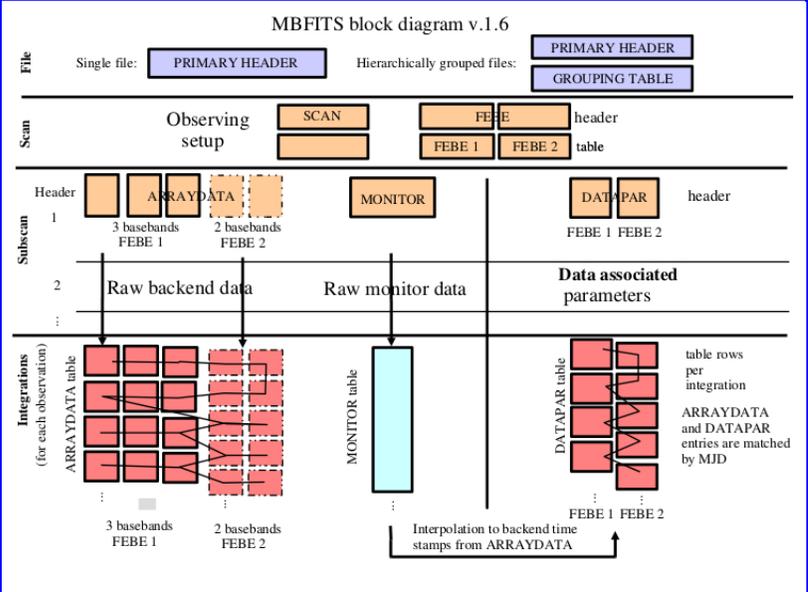
The archival system

The **archival system** is based on the *New Archiving Distributed InfrastructuRe (NADIR)*, explicitly designed to be **flexible** in order to cope with **evolving data models**, **formats**, **publication policies**, **versions and metadata contents**, **keeping consistencies** among different sites.
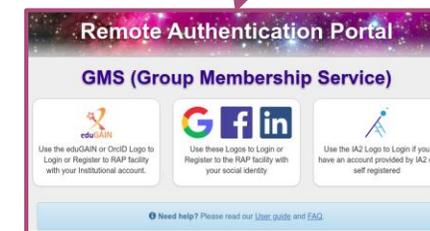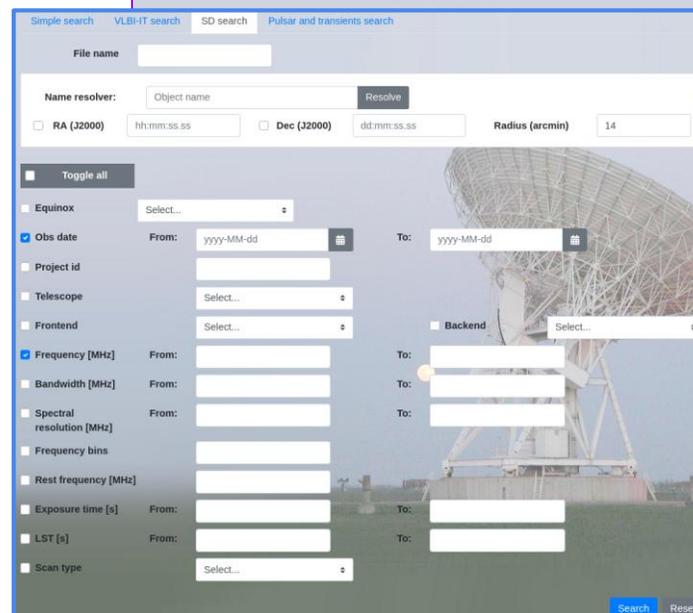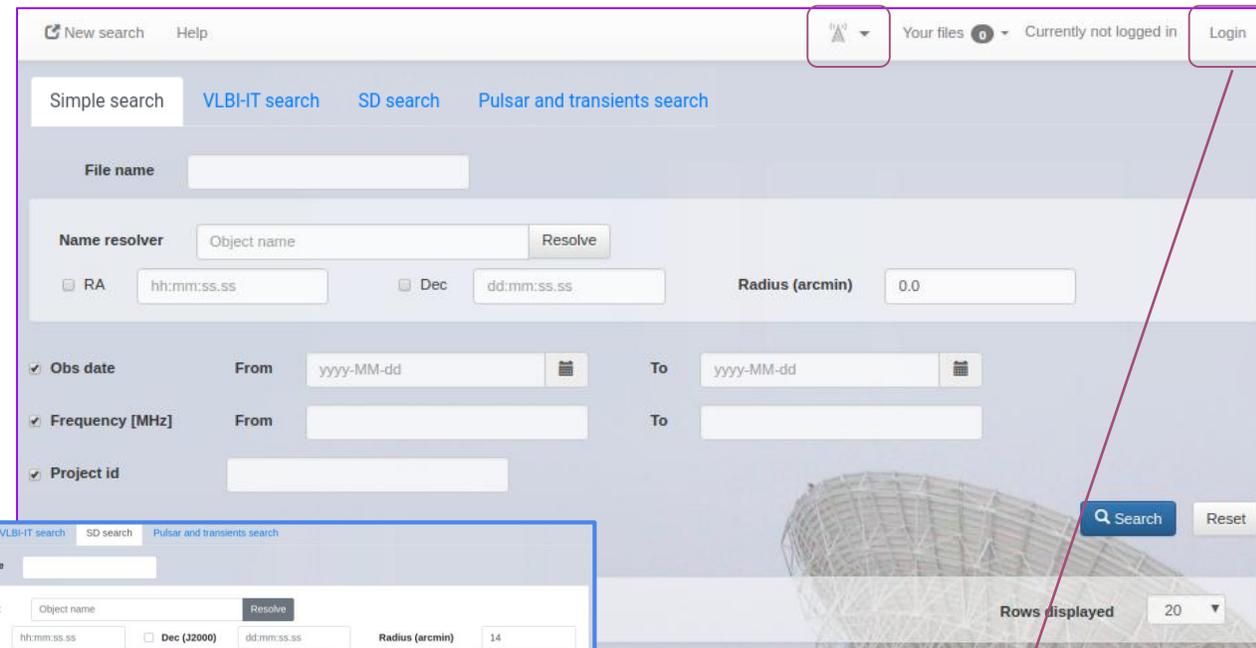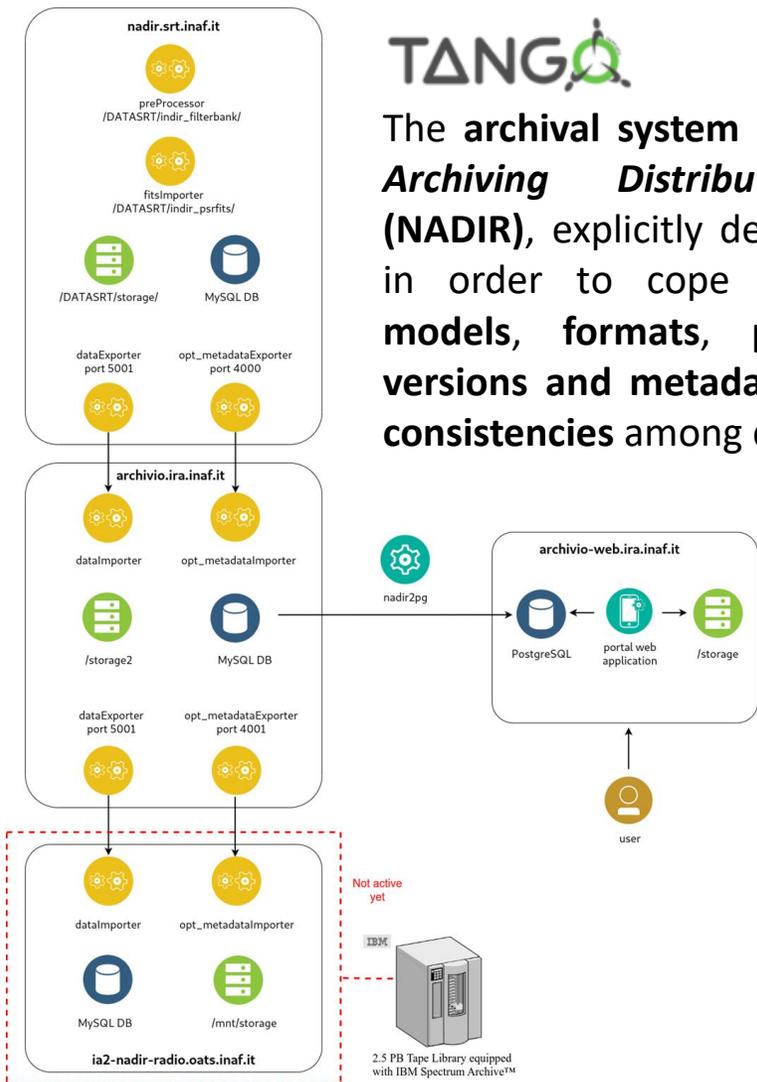
Time domain data - Next Generation Croce del Nord

New!
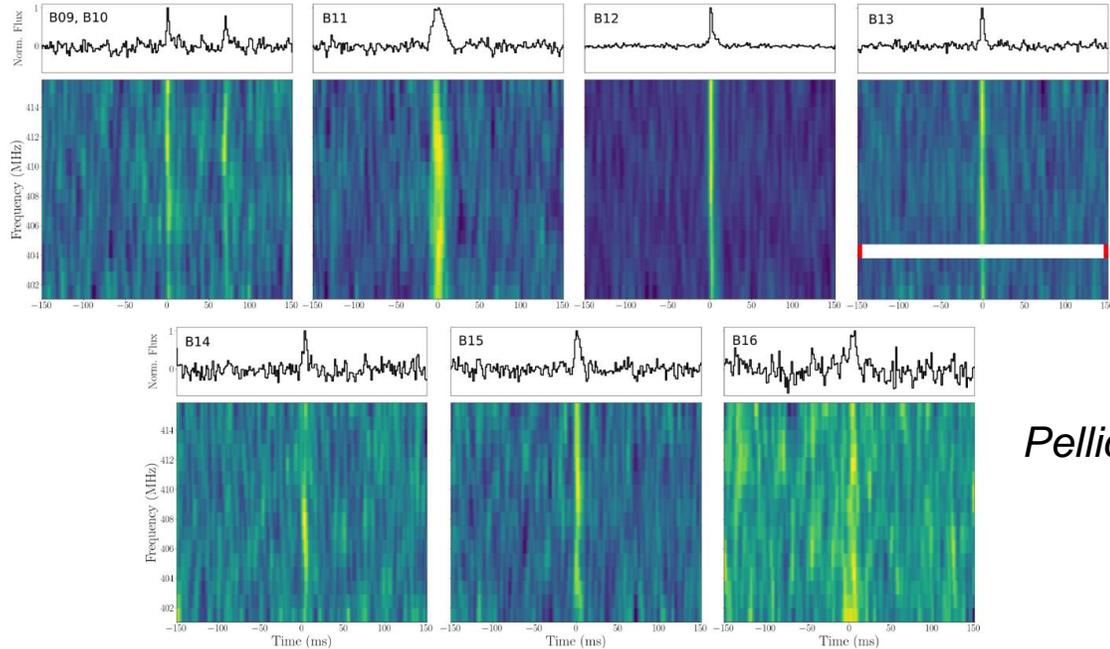
Pelliciari et al. 2024

Fast Radio Burst data observed with the Northern Cross interferometer

Archived products: science-ready cutout (few seconds) datasets around FRB time of arrival
+ metadata

Data curation: preprocessing data before ingestion

Time consuming process, tailored for the various data types/projects. It (slowly) improves with time - more recent observations

Data curation: preprocessing data before ingestion

Time consuming process, tailored for the various data types/projects. It (slowly) improves with time - more recent observations

Correct for discrepancies in metadata: strong dependence on epoch of observation, software version, «degrees of freedom» of the observers, etc…

Inconsistent telescope name

Frontend='Our frontend'

Target name mismatch/missing

Project ID mismatch/missing

Missing observing date
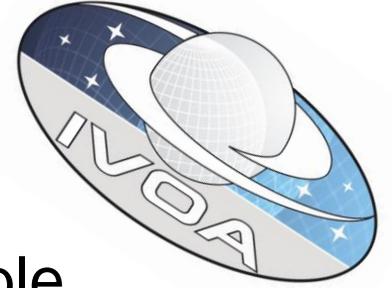
Handling truncated observations

Incomplete spectroscopic information

FAIRness of data and the Virtual Observatory

- INAF radio data ↔ **F**indable, **A**ccessible, **I**nteroperable and **R**eusable

- IVOA ObsCore DM is not sufficient to describe radio data

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*"Enhancing interoperable data access to radio data has become a science priority within the International Virtual Observatory Alliance (IVOA). This lead to the foundation of the **IVOA Radio astronomy Interest Group** … Together they are paving the way to a better integration of their services in the virtual observatory (VO) infrastructure and propose extension of IVOA standards to help achieving this goal. " (Louys et al 2020)*

IVOA Obscore Extension for Radio data

Version 1.0

IVOA Proposed Recommendation 2024-06-14

Working Group
    Data Model Working Group
This version
    https://www.ivoa.net/documents/ObsCoreExtensionForRadioData/20240614
Latest version
    https://www.ivoa.net/documents/ObsCoreExtensionForRadioData
Previous versions

Author(s)
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Editor(s)
    François Bonnarel, Mark Kettenis, Mireille Louys

Future developments

- Complete the collection with Medicina, SRT and VITA data

- Next Generation Croce del Nord

- Publish the INAF Radio Data Archive as a VO resource

- Re-engineering of the archive infrastructure

- Big data from Skarab backends/UWB receivers

- Triband receiver & the GMVA collaboration

- Building a Science Gateway

Ph: S. Poppi

1.200 Tempo Indeterminato Vs **650** precari: più di 1 precario ogni 2 persone di ruolo. Tra questi, 300 potrebbero essere assunti a tempo indeterminato con la legge Madia (che scade a fine 2026)
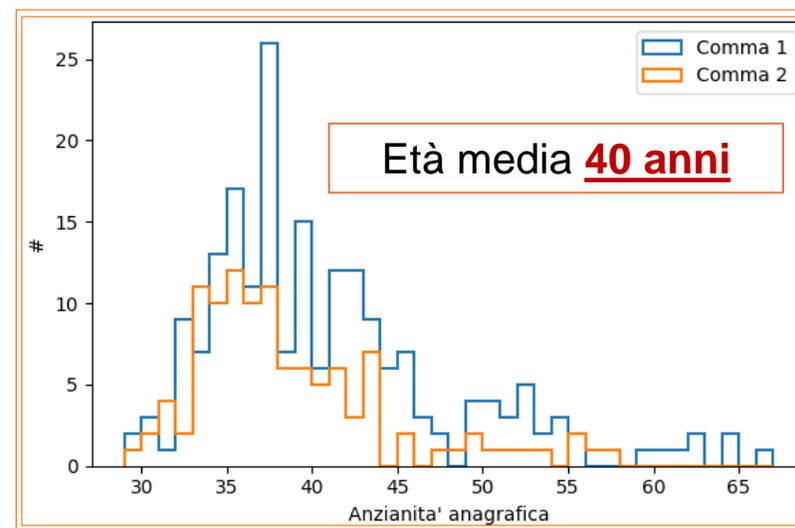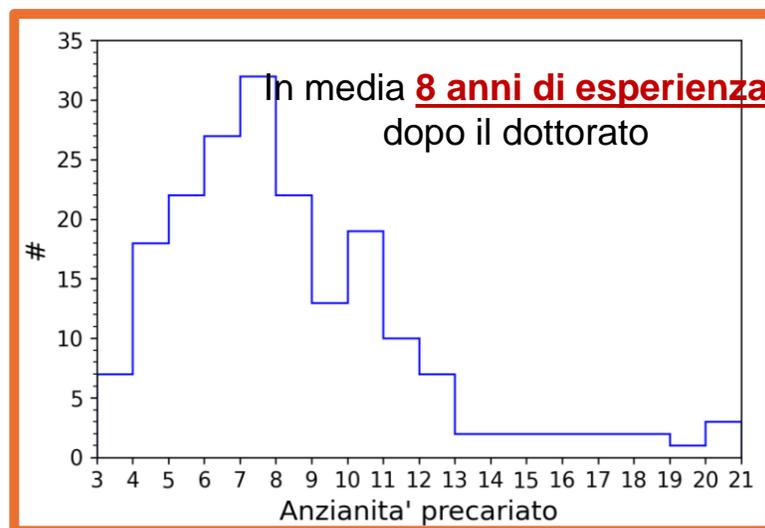
Più 100 precari altamente qualificati e con esperienza decennale rischiano l'esodo da INAF

L'impatto su progetti nazionali e internazionali in cui INAF è coinvolto sarebbe _dirompente_
La raccolta firme a sostegno della Rete Stabilizzandi è ancora aperta

Thank you