

Italian ALMA Regional Centre

hosted by

INAF – Istituto di Radioastronomia (IRA)

Bologna

Summary & Update

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INAF - Istituto di Radioastronomia, Bologna

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IRA structure: Headquarters in Bologna, sections in Florence, Noto (Sicily), and Cagliari (Sardinia)

Labs and instruments: Medicina (BO), Florence, Noto, Cagliari

IRA operates two 32-m telescopes, the Northern Cross interferometer, and is constructing SRT, 64-m antenna in Sardinia

Formerly a CNR institute, as of 1/1/2005 IRA is one of the largest structures within INAF (Istituto Nazionale di Astrofisica):

Permanent staff: 42 scientists, 31 admin. and technicians

Campus "Area di Ricerca":
8 institutes (6 CNR, 2 INAF)

IRA



Mensa

Conference rooms

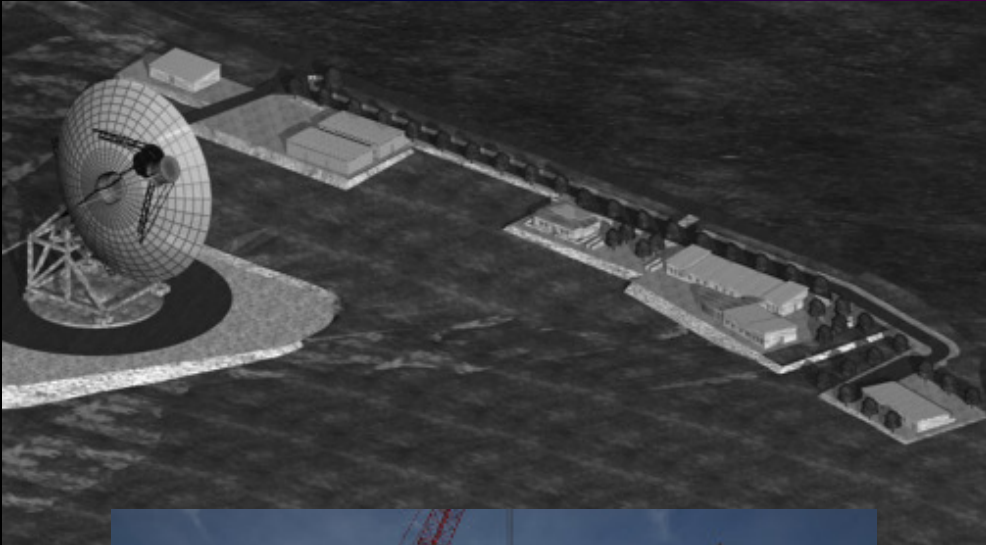
Central Library

Medicina: Northern Cross & 32-m dish



Photo: Roberto Ragazzoni, 2005

Sardinia: 64-m dish



ARC - EUROPE

ESO+Regional nodes

Bonn-Bochum-Cologne (D)

IRAM (Grenoble; F, E)

IRA, Bologna (I)

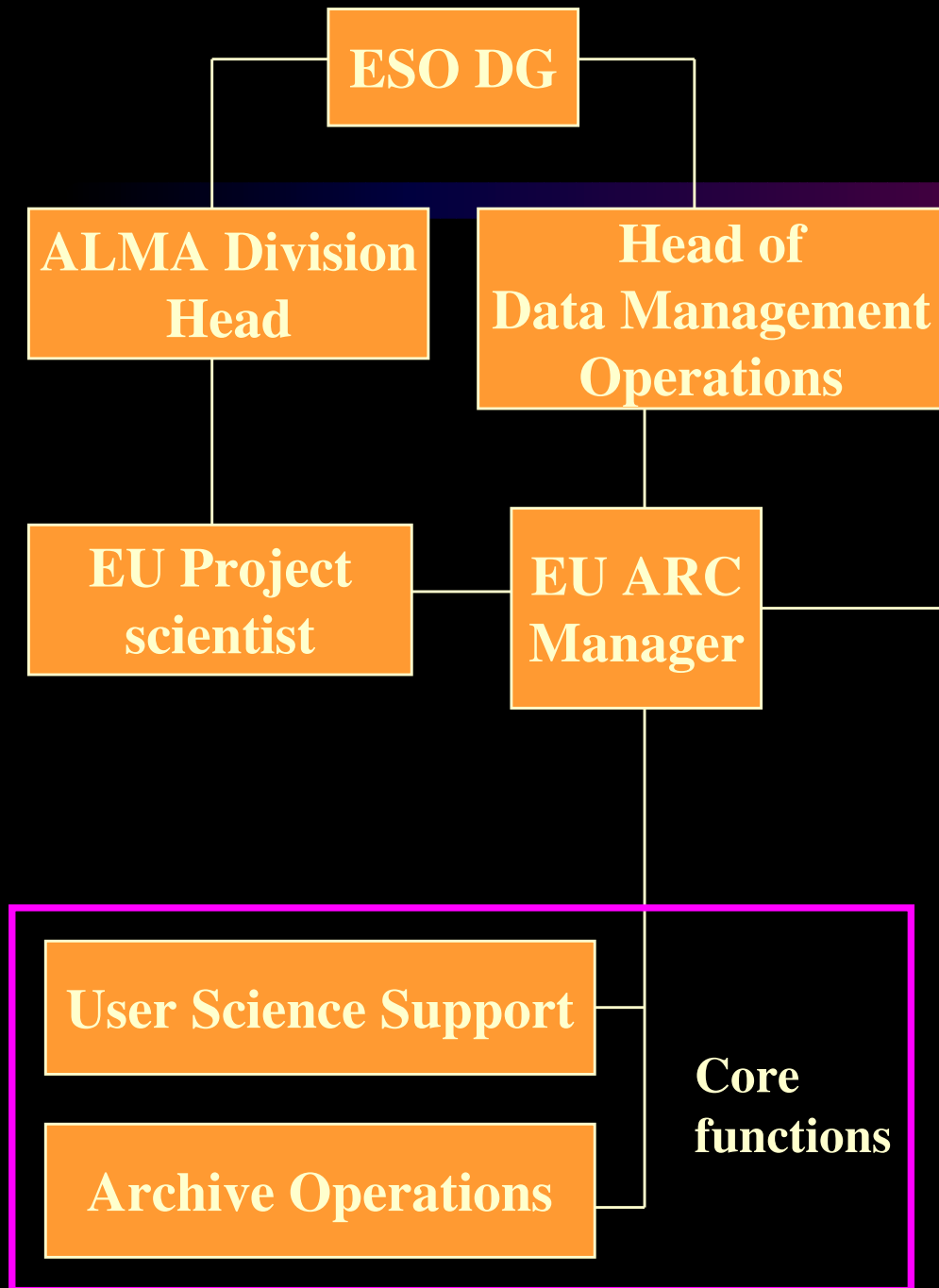
Leiden (NL)

Nordic (Onsala; DK, S, SU)

Manchester (UK)

Lisbon (P); Geneva (CH); Prague (CZ);
Belgium

MoU to be signed shortly



Italy & ALMA

National ALMA Commission established in June 2004.

Report recommended:

IRA to host ALMA Regional Centre

Primarily based on IRA's extensive experience with (radio) interferometrical instruments, observing techniques, software packages and development, and managing large data sets.

ROLE of the ARC-nodes

Provide face-to-face user support (post-obs.)

Offer help with specific expertises

Provide user feedback

Build a community

Be involved with software development

manuals, cookbooks (e.g. CASA-testing: Rossetti @ Socorro, ESO)

Share with the other ARCs/ARC-nodes

**+ e.g., be involved in commissioning/science verification phase;
ALMA Observation Preparation software-test**

Community-building

Coordinate and develop Italian activities (presently Bologna, Florence and Trieste). Key-programmes, future instrument developments. Keep community informed via ALMA/ARC-days.

Create expertise in radio/mm-interferometry; instruct young (*and* “mature”) scientists (schools, tutorials, post-docs, Marie Curie Fellowships, PhD-positions).

first step:

National project “Preparation for ALMA” (P.I. Walmsley) funded by INAF (74 researchers from 6 institutes) 2005-07

Italian ARC activities

Dec. 2004: ALMA Science day @ Rome.

80 scientists from almost all Observatories and many University Departments (talks on web page).

June 2005: ALMA Extragalactic Meeting @ Bologna

Co-organized by Prandoni (ARC; talks on web page)

March 2007: 1st ALMA/ARC-day: See next slide

March & July 2007: CASA-test sessions @ Socorro, ESO

Rossetti (ARC) participated on behalf of EU (reports on web page)

April 2008: CASA tutorial @ Bonn.

Rossetti (ARC) co-instructed potential users in workings of CASA.

Late 2008/early 2009: similar workshop for Italian users.

May 2008: 2nd ALMA/ARC-day (talks on web page)

Web page Italian ARC-node

<http://www.ira.inaf.it/alma/alma.html>

First national ALMA/ARC-node meeting, March 2007

- Familiarize community with ARC(nodes)-system
- Identify projects of common scientific interest regarding ALMA
apply for INAF funding for these projects; build expertise;
organize on national basis and be competitive
- Identify which areas of expertise would be required of ARC-node
 - ▶▶ Data handling / GRID technology (Nanni)
 - ▶▶ Mosaicing (Rossetti, Fontani, Prandoni)
 - ▶▶ Coordinating surveys/key-projects (creating and maintaining catalogues etc.)
 - ▶▶ Polarimetry (Rossetti, Mack)

Areas of expertise in EU ARC-nodes

1. Wide-field, high-dynamic range imaging (UK/NL/F)
2. Mosaicing (I)
3. High-frequency observing (NL)
4. Infrastructure for advanced data analysis tools (D/NL/Nordic)
5. Data handling/GRID-technology (I/P)
6. Coordinating surveys/key projects (I)
7. Polarimetry (I/F/D)
8. Astrometry (Nordic/D/UK)
9. Pipeline heuristics (D)
10. Automatic data calibration (D)
11. Data pipelining (UK)
12. Multi-frequency synthesis (Nordic/UK)
13. Array combination imaging (UK)
14. Robust self-cal methods and use of WVR data (Nordic)
15. Data handling and server (P)
16. Instrumental calibration (F)
17. Atmospheric phase calibration (F)
18. ALMA imaging simulations (F)

IRA - Computer Centre



Supports national community > 25 yrs in use of radioastronomical packages (AIPS), managing of databases of catalogues (DIRA2), archives, etc.

Planned for ARC-node:

100 Tbyte storage capacity. Computing power provided by 64-bit CPUs (parallel Beowulf systems of at least 16 stations).

GRID-technology

Present & future situation I

Present:

ARC-working group consisting of:

6 staff-members [Brand, Gregorini, Mack, Nanni, Prandoni, Zanichelli]

2 post-docs:

1 experienced in VLBI (radio, extra-galactic) [Rossetti; ARC]

1 experienced in (sub-) mm (galactic) observations;

preparation for ALMA [Fontani; ARC, ex-INAF]

Rossetti: One of 4 EU **CASA-user support specialists** who will train EU community in its use, and act as interface between the EU-users and developers at NRAO.

Present & future situation II

Immediate Future:

3rd year postdoc for Rossetti

1 new post-doc to be hired 2008 ?

1 system manager to be hired in 2008

Hardware acquisition: \geq 2007/08

(see later slide)

Long-term: \geq 2010:

1 FTE provided by (4-6) IRA-staff; 1 administrator;

1 system manager; 4 post-doc positions.

+ Involve experts from other institutes

Italian ARC; financing

2005:

-Budget for travel and education

2006:

-Budget for 1 postdoc
(hired Alessandra Rossetti)

2007:

-Budget for postdocs
(2nd year for Rossetti,
6 months for Fontani)

- hardware: server

- travel

2008:

-Budget for postdoc(s), hardware,
travel

Travel

- IRAM Interferom. School

- Saas-Fee School

- ALMA Conf. Madrid

- ALMA Comm. Days, ESO

- f2f meetings, ESO

- CASA test sessions

Socorro, München

- Data calibration sessions

IRAM (PdBI), CfA (SMA)

- CASA tutorial Bonn

- ALMA Spain

What is needed for the ARC

-Presently, for financing yearly request required.

Need assignment of long-term (3-5 years) budget

-For efficient operation and compliance with MoU between the EU-nodes, need certain staffing levels. Wish to attract people from outside Italy. Hence:

offer competitive salary and duration of temporary positions, i.e. must be able to offer postdocs for 2+1 year from start.

-For optimum synergy, IRA needs to provide/create scientific environment that is profitable to ARC-node. Therefore:

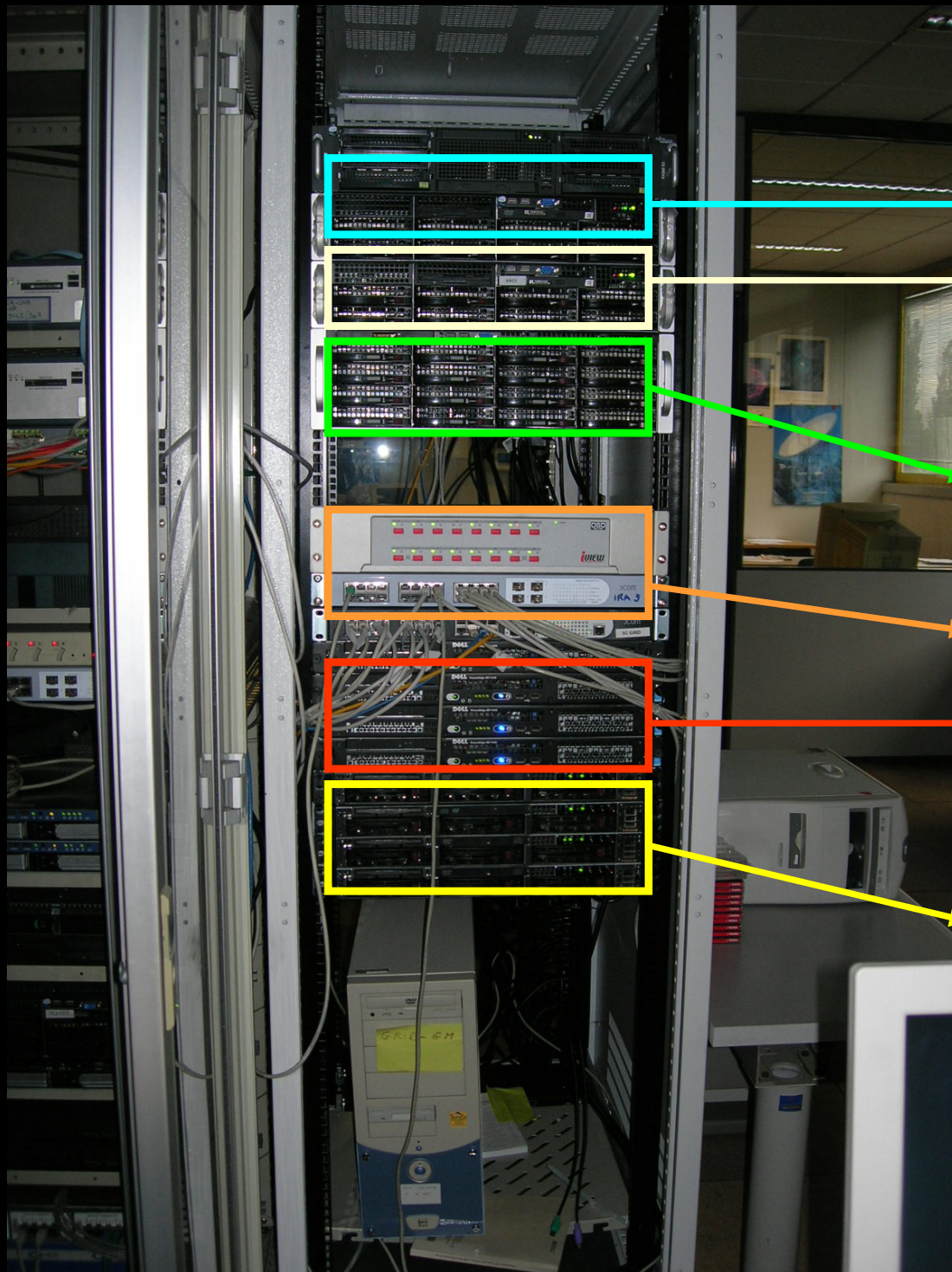
IRA staff should be expanded with (sub-)mm astronomers;

At University: need course(s) in ISM, SF, submm-astronomy (to create pool of potential ALMA users, ARC collaborators).

INAF needs to fund PhD projects in mm-astronomy.

IRA involvement in GRID/Clusters:

- INFN (LHC project; INFN Bol: 4000 CPU)
- INAF (software correlator)
- COSMOLAB consortium: project CYBERSAR
 - GRID test combining various clusters:
 - Sardinia: SRT, Observatory, University, INFN – few 100 CPU each
 - Sicily: 400-500 CPU
- ALMA/ARC (test of virtual machines)



ARC - backup

ARC server; 8 processors (2 Quadcore),
Intel Xeon E5310 1.6GHz.
8 discs. Presently: 4x 1Tb. 4Gby mem.
Virtual

NAS 16-disc storage element
(up to 16 Tb)

Network switch (1 Gbit/sec)

INAF; 4 x 2 separate Intel Xeon 3GHz
processors.

Dual core AMD Opteron 2GHz
(4x4 = 16 core equivalent)