INAF
ISTITUTO NAZIONALE
DI ASTROFISICA

April-June 2023

The Central Scientific Unit VIII - "*Computing*"

ANDREA POSSENTI
and the other members of the
Steering Committee of the USC VIII

Summary

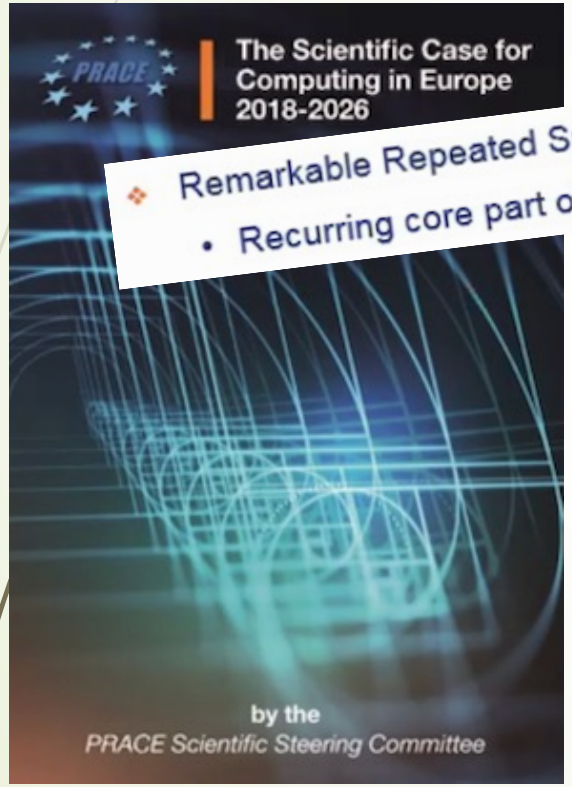
- Why this meeting
- Motivation, starting aims & general aims of the USC VIII
- Organization of the USC VIII
  - Critical Computing
  - Data Curation
  - Synergies in R&D
  - Servicies
- The committee of allocation of Time & Space
- Formation
- Plans

One meeting – many reasons

- **Present the organization, current activities, and goals of USC VIII** (via this presentation and questions that arise)
- **Explain or announce some of USC VIII's upcoming initiatives** (via this presentation)
- **Gather the problems that exist at your site** regarding activities within the scope of USC VIII (during this presentation and offline, primarily during the next few hours in which we will be present at your premises)
- **Catalog of the activities and expertise that exist at your site regarding activities falling within the scope of USC VIII** (during this presentation and offline, primarily during the next few hours in which we will be present at your premises)

Why a USC «*Computing*» in INAF?

The need to process a large amount of data and to have advanced software is becoming **everyday life** even **for astrophysicists**



Simulations and data analysis for the exploitation of modern instruments in **space and on the ground** require increasing computing and data storage capacities (e.g. Gaia, Euclid, CTA, Vera Rubin, etc.)

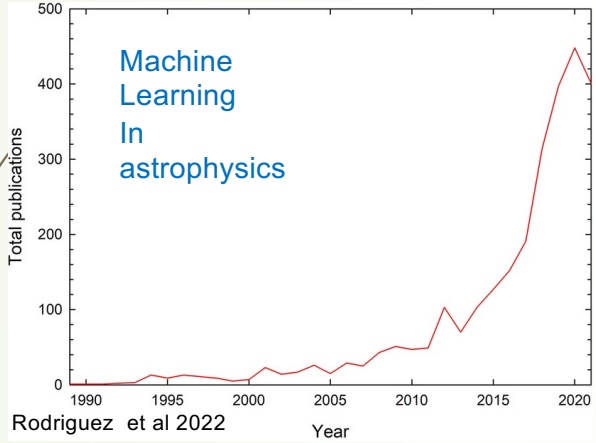
Controlling and monitoring instruments and experiments also requires advanced computation and software developments

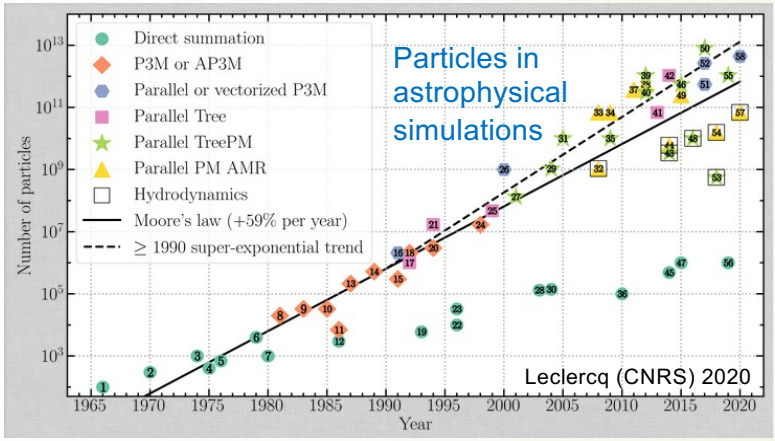
As an extreme case, there is a sector of astrophysics - **radio astronomy** - which requires **calculation capabilities** and **management of large amounts of data** that have always been equal to or **greater** than those of **almost all scientific disciplines**

Why a USC «*Computing*» in INAF?

Simulation & Data screening

Modern astrophysical simulations require several million core hours on large supercomputers, sometimes with 100+ TB of RAM and a few PB of disk space. Machine Learning techniques take advantage of increasingly powerful GPUs and with ever more memory





Future numerical simulations will have to use innovative codes on "**exa-scale**" class infrastructures

Crucial in all areas of **cosmology and astrophysics** to interpret future observations (e.g. with SKA and precursors, CTA, Euclid, Athena, etc.)

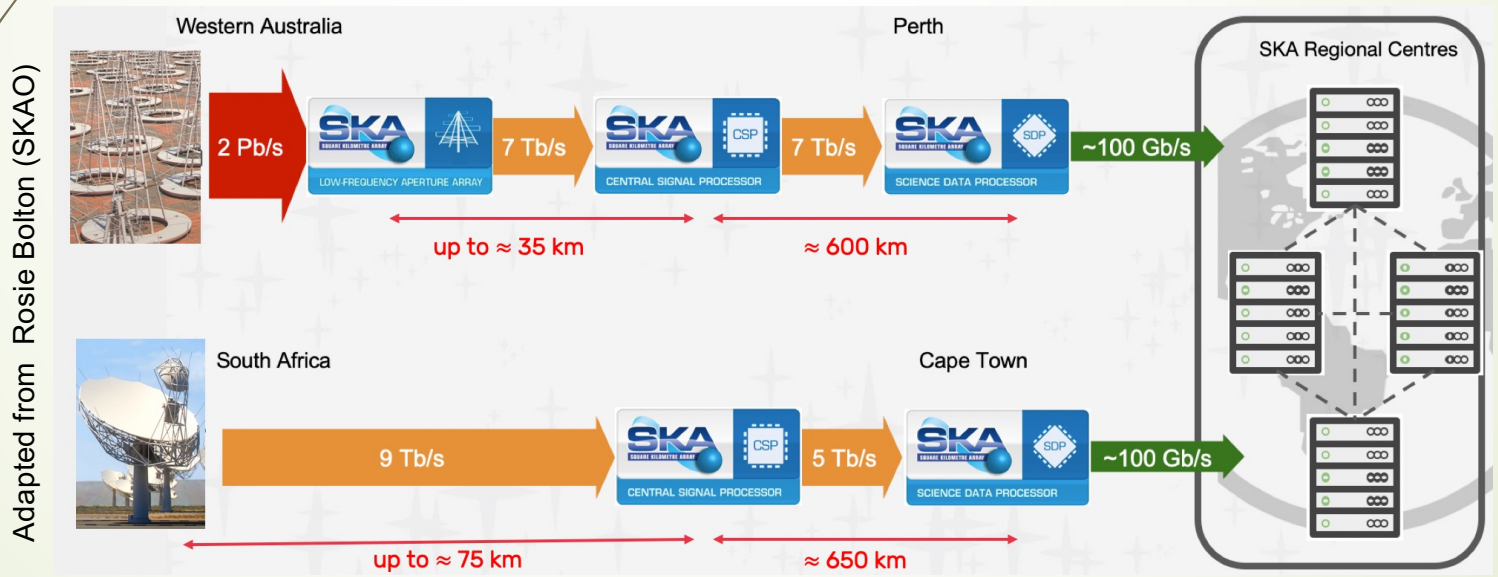
Center of Excellence in HPC for Astrophysics and Cosmology **SPACE** (https://www.space-coe.eu/)

Why a USC «*Computing*» in INAF?

Data reduction & analisys

LOFAR already generates an **internal data flow of about 200 Gb/s,** with **datasets of 1-100 TB each** and about **300 TB/year** with Italian PI

Other radio telescopes (e.g. **ALMA, LOFAR-2.0, MeerKAT/+**), Cherenkov telescopes (e.g. **ASTRI Mini-Array** and **CTA**), optical-NIR observatories (e.g. **Gaia, E-ELT** and instrumentation) or synoptics for surveys and transients (e.g. **Vera Rubin-LSST**), as well as large orbiting instruments (e.g. **Euclid**) are **changing the order of magnitude of the computing and archiving structures** needed



SKAO will take it one step further by generating an **outbound data flow of approximately 200 Gb/s**, with **10+/100+ TB datasets** each to calibrate and analyze, and a total of approximately **700 PB of data per year** (from 10s PB to 100 PB for each SRC node)

Why a USC «*Computing*» in INAF?

USC VIII

Drawing, Simulation, Control & Monitoring of instrumentation

The success of so many experiments depends on the ability to have **good Twin software**, to have **adequate control software systems** and **monitoring software** for the instrumentation and the surrounding environment

Why a USC «*Computing*» in INAF?

INAF is involved in many of the largest international observing programs (plus many others that require moderate to intermediate computing and archiving capabilities), **is very active in the field of theoretical modeling**, and often has **leading roles in the design, control and instrumentation monitoring**

Along many years, this has progressively increased awareness among INAF personnel of the need to:

- **national coordination of activities** related to calculation, data archiving and software, with particular emphasis on major projects
- **a significant investment in human capital** to reach a critical mass of researchers with strong skills in computer science, development of innovative software, "porting" of codes on complex infrastructures
- **an investment in** (and management of) **a centralized infrastructure** that can grow over time
- **accompaniment in the growth of local skills** also through support to existing medium or medium-small infrastructures

INAF has picked up and accompanied this need in a **bottom-up process** that has included the acquisition of **opinions** both **from within INAF,** and from an **international commission** of external experts (through an official "report" available to all)

Creation of the USC VIII-*Computing*

In this context, USC VIII-Computing was established with Resolution number 50 of the INAF CdA dated 13 June 2022

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Delibera n. 50/2022

Oggetto: Approvazione della modifica all'assetto organizzativo della Direzione Scientifica e costituzione dell'Unità Scientifica Centrale VIII (USC VIII) denominata "COMPUTING".

IL CONSIGLIO DI AMMINISTRAZIONE

VISTA la Legge 7 agosto 1990, numero 241, e successive modifiche ed integrazioni, che contiene "*Nuove norme in materia di procedimento amministrativo e di diritto di accesso ai documenti amministrativi*";

VISTO il Decreto Legislativo del 23 luglio 1999, numero 296, pubblicato nella Gazzetta Ufficiale della Repubblica Italiana, Serie Generale, del 26 agosto 1999, numero 200, di "*Istituzione dell'Istituto Nazionale di Astrofisica - INAF, a norma dell'articolo 11 della legge 15 marzo 1997, numero 59*";

VISTO il Decreto Legislativo 30 marzo 2001, numero 165, e successive modificazioni ed integrazioni, che contiene "*Norme generali sull'ordinamento del lavoro alle dipendenze delle amministrazioni pubbliche*";

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ISTITUTO NAZIONALE DI ASTROFISICA

Determinazione n. 131/2022

Oggetto: **Nomina del Responsabile *dell'Unità Scientifica Centrale VIII (USC VIII) denominata "COMPUTING" della Direzione Scientifica* dell'Istituto Nazionale di Astrofisica.**

IL DIRETTORE SCIENTIFICO

VISTA la Legge 7 agosto 1990, numero 241, e successive modifiche ed integrazioni, che contiene "*Nuove norme in materia di procedimento amministrativo e di diritto di accesso ai documenti amministrativi*";

VISTO il Decreto Legislativo del 23 luglio 1999, numero 296, pubblicato nella Gazzetta Ufficiale della Repubblica Italiana, Serie Generale, del 26 agosto 1999, numero 200, che istituisce l'*Istituto Nazionale di Astrofisica (INAF)*;

VISTO in particolare, l'articolo 1, comma 1 del predetto Decreto Legislativo del 23 luglio 1999, numero 296, il quale definisce l'*Istituto Nazionale di Astrofisica (INAF)* come "*…Ente di Ricerca non strumentale ad ordinamento speciale, con sede in Roma e con strutture operative distribuite sul territorio, nel quale confluiscono gli osservatori astronomici ed astrofisici…*";

Following an investigation initiated by the DS on July 25, 2022, Andrea Possenti was appointed by the Scientific Director as Head of USC VIII-Computing with Resolution dated September 28, 2022, number 131

Main Aims of USC VIII-*Computing*

In light of the above, the main medium-long term objective of USC VIII-Computing is the creation of a computing ecosystem for INAF, capable of supporting, for the next few decades, the current very high competitiveness of the members of INAF in the international arena

This can be progressively achieved through:

The coordination and synergy of the work of the excellent skills in the field already present in the various INAF Structures, **as well as the existing computing and archiving infrastructures** (distributed and centralized)

The planning and implementation of adequate (mainly, but not exclusively, centralized) **investments in hardware**, both available to the community in general and optimized to support the large international projects in which INAF is involved

The preparation of **actions for the training of personnel** already in INAF and for the inclusion of new personnel distributed among the Structures, but operating in a way aimed at the needs of the overall ecosystem

USC VIII: What it will not do/what it will do

It is **not intended to coordinate** the work **within large projects**, whose structure, hardware and organization will remain at the complete discretion/ availability of the projects themselves

We will **not enter into the micro-management** of the computing activities of the individual or small groups of researchers, **based on one or a few** computing and/or storage **servers** and on specific **in-house** developed **software**

We will **not deal with the administrative calculation** and/or related to **personnel databases**, which remains under the jurisdiction of the General Director

Activities not included In the USC VIII

An attempt will be made to **create synergies between the various major projects**, with **coordination** of work on specific **"transversal" aspects**, as well as, on recurring problems, through the reuse of expertise already gained elsewhere

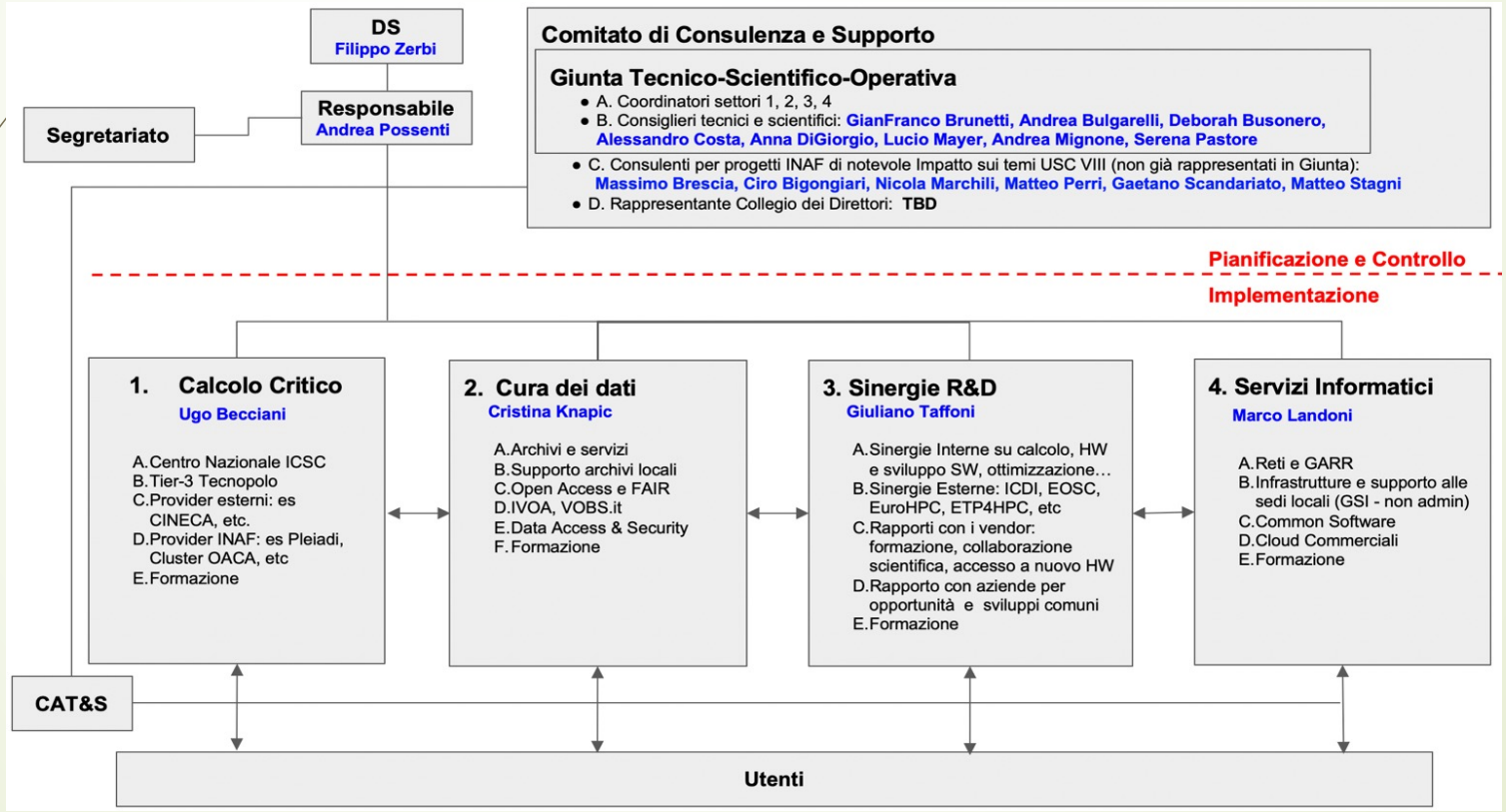
The **IT bases will be provided**, through courses/schools/events, so that the individual or **small group of researchers** can **deal with their own problems** in almost complete autonomy

Meetings and refresher courses will be organized for the personnel assigned to these roles, e.g. Information Systems Coordination Group (GCSI)

Activities included In the USC VIII

Initial organizational structure

The appointed manager, Andrea Possenti, in agreement with the Scientific Director, defined, on Dec 7, 2022, the "**governance**" structure of USC VIII-Computing according to the required principles (decree 50/2022 of the CdA) of ***scientific leadership and solid technical skills, community representation, adaptation to changings of the field, and focus on major infrastructures and major projects***



Always reviewable with experience and with a not too long turn-over

Sector 1: Critical Computation

The Critical Computation sector, which concerns the computational aspects related to HPC, HTC, Big Data, proposes and organizes activities in projects of a general nature, to offer infrastructure, innovative implementations and create skills for the challenges of the near future, in the most important projects of our institution

The sector is divided into 2 main axes: PNRR - HPC National Center and Computing Infrastructures for Research.

AXES 1: PNRR: Centro Nazionale HPC

It involves most of the structures of our institution

Promotes the training of the new class of technologists and researchers in the field of HPC computing towards Exascale, and Big Data management and analysis

AXES 2: Computation Infrastructure for the research

External Provider: MoU INAF-Cineca ➔ Marconi 100, Leonardo and new **Tier 1** at Technopolo

Internal Provider: PLEIADI, Tier 3 INAF at Technopolo and OACA: Empowering the Sardinia Radio Telescope (infrastructure reserved to PON-SRT)

Sector 1: Axes 1 = Critical Computation

Nazional Research Center in «High Performance Computing, Big Data and Quantum Computing»

ICSC : Italian Center on SuperComputing

Sector 1: Axes 1 = Critical Computation

INAF at the National Centre ICSC

INAF Spoke Leader: Astrophysics and Cosmos Observations
Co-leader of Spoke 2 Fundamental *Research and Space Economy*
Partecipation on Spokes «Future Computing and Big Data» and «Quantum Computing»

Main Objectives

- **Calculation and co-design**: Development of software solutions for simulation data analysis in the perspective of the Exa-scale era
- **Processing and visualization of big data**, through the adoption of innovative approaches (e.g. Artificial Intelligence, inference through Bayesian statistics)
- **High Performance storage, Big Data management and archiving by applying the principles of Open Science and implementing** them in the Big Data Archives sector
- **Innovative algorithms for data reconstruction**, analysis and simulations of astro-particle experiments
- Application of **Quantum Computing in Astrophysics**

Sector 1: Axes 1 = Critical Computation

The CN in the context of INAF – Involvement of the Structures

Full time Researchers and Technologists in the structures involved in the Expressions of Interest

Annualità Assegnate TD e PhD			
NORD	TD	PhD	FUNDS (kEuro)
OA Brera	1	3	
IASF MI	2	0	
OATO	6	0	
OATS	6	6	
OAS	2	3	
IRA	2	3	
OAPD	0	0	
TOTALE	19	15	1467.5
CENTRO	TD	PhD	
IAPS	2	0	
OARM	2	3	
OAAb	0	0	
OA Arcetri	0	0	
Sede TBD	3	0	
TOTALE	7	3	381.5

			FUNDS
SUD	TD	PhD	(kEuro)
OAPA	0	0	
OACT	8	6	
IASF PA	2	0	
OAC	2	0	
OACA	6	3	
TOTALE	18	9	1060

New Recruitment Researchers/Technologists (TD) and PhD in INAF structures

40% of the resources destined for the SOUTH

Sector 1: Axes 1 = Critical Computation

Total budget for INAF: 8.1 MEuro

Personnel 4.6 MEuro. ➔ 56%

Open Call 1.6 MEuro ➔ 20%

Innovators 1.0 MEuro ➔ 13%

Training 0.9 MEuro ➔ 11%

A. ➔ Strong investment in Personnel and Training

- More than **74 FTEs** of new enrolments:
  - *52 FTEs Technologists / Researchers*
  - *22 FTEs PhD students*
- About **32 FTEs** Staff

B. ➔ Strong investment for collaboration with companies

CONSTRAINTS: Budget for Southern Regions >= 40%

Sector 1: Axes 2 = Critical Computation

Already available Computing Infrastructures for Research

PLEIADI e-infra

Calculation system **distributed over three locations** (Bologna, Catania, Trieste). Centralized management and nation-wide management. Technical board: F. Vitello (coordinator), F. Bedosti, G. Maggio. HPC/HTC computing resources are available to the scientific community for a total of almost 60 million cores/hour on over 7000 cores, with 128 or 256 GB ram nodes and 12 GPU nodes.

Call #1 June 2022, made available ***10 Mcore/h***. Requested ~8 M core/h, split in 23 approved projects. Additional 5 requests on-demand for ~ 150 kcore/h

Call #2 May 2023 is making available ***15 Mcore/h + 5 Mcore/h*** for extension

Special supported projects (**35 Mcore/h**): SKA Data Challenge 3, LOFAR, VST, EUCLID, AlmaGal

MoU INAF-Cineca 2022-2023. *9.4 Mcore/hours* available on Marconi 100

Cluster OACa
Infrastructure devoted to the PON-SRT project

- **14 computing nodes 32 cores, 512 GB ram** (**6 nodes with 2 GPU NVIDIA A40** with 48 GB ram) Infiniband network
- 2 nodes of **storage scratch: 1 PB** of disks (among which 48 TB of SSD)
- 2 nodes of **long term storage: 7 PB** of disks **HDD**

Sector 1: Axes 2 = Critical Computation

Infrastructures available in the short/medium term at Technopolo-Bologna

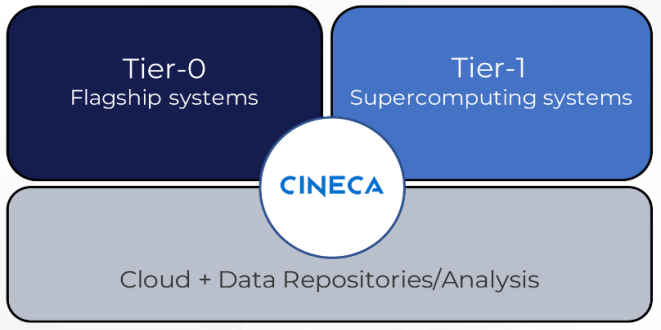
TIER-3 sized storage+computational system

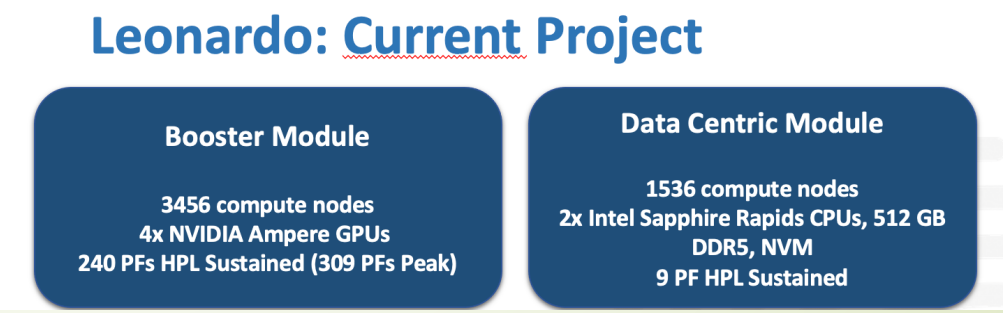
In the process of defining the call for tenders: Cineca – INAF joint action. System aimed at putting *storage and hardware associated* with it into operation for use in SKA-precursors, Pathfinders and relative development environments. **STORAGE LONG TERM**: Tape Library with LTO tapes ≈ **6 PB** expandable up to 100 PB

- ➔ **Slow-medium speed STORAGE** on disks: ≈ **4-5 PB**
- ➔ **High speed STORAGE scratch** on disks: ≈ **2 PB**
- ➔ **Computational nodes**. *40 FAT nodes*: 2 CPU x86 (>= 48 cores) and 1TB RAM; *14 Accelerated nodes*: 2 CPU x 86 (>=48 cores) and 512 GB RAM, 2 GPU x node with 80 GB memory, CUDA compatible

TIER-2 sized system integrated in a TIER-1 sized system

Investment of the CN-PNRR for the needs of INAF and CNR: 7 million euros in total purchase. Owned by CINECA, use guaranteed (although not exclusive) for INAF. Expected capabilities for INAF: about **4 Pflops** (Data Centric Nodes and Booster Nodes) and **about 2 PB** high speed storage





Sector 2: Data curation

The areas within which Sector 2 «Data Care» will operate will mainly be the archiving, care, preservation and usability of astronomical data and products of astrophysics science, in synergy with the computational, services and development part.

- **Archives and services**
  - Distributed storage for telescopes, instruments, satellites or collaborations
  - https://www.ia2.inaf.it/;
- **Storage of science products and preservation**
  - http://vospace.ia2.inaf.it/ui/ ;
  - https://www.ia2.inaf.it/index.php/ia2-services/data-sharing-preservation
- **Support services** (Workflow management Systems, Twiki, DOI, preservation, user home access);
- **Science gateway** (connection of analysis tools to archives and vice versa - Data Flow - Connection with Services);
- **Local Archives support**
  - Support for the definition of Data Models and Data Management Plans;
- **Open** Access (**Data**) and **FAIR**
  - Implementation of Open Data policies;
  - Implementation of Findable Accessible Interoperable Reusable principles;

Sector 2: Data curation

- **Virtual Observatory**
  - Support for the development of interoperability systems of services and databases;
  - Activity support Vobs.it. http://www.vobs.it/en/;
- Data access and data **secure access**
  - Development of Web interfaces;
  - Development of Authentication & Authorization;
  - Studies for the Data transfer optimization;
- **Training**
  - Data Management (how to write a Data Management Plan);
    - Courses about metadata ;
    - Courses about data organization;
    - Courses about data preservation;
    - Courses about the tools for data management and transfer

Sector 2: Data curation

Creation of a work team for the correct implementation of the guidelines, the exchange of expertise, the dissemination of knowledge.

A. Bignamini – Ground based optical telescopes
D. Busonero - Space
S. Gallozzi – High energy
M. Molinaro – Virtual Observatory
M. Perri – Space (SSDC)
R. Politi - Planetology
L. Tornatore - Simulation
A. Zanichelli – Radio
S.Cavuoti/G.Riccio – Astro-Informatics

Services currently available:

Structured data storage;
Storage space;
DOI;
Services Support (Sector 4);
Long preservation;
Open Science support;
Project support

Available Hardware:

@ IA2 (at OATs, IRA Bo, OACa, OAPd - Asiago)
Tape: 2 PB expandable up to 16 PB + 70 TB front end
Online: 1.6 PB + 400 TB + 270 TB + 280 TB + 60 TB + 100 TB
Transfer-node : 100 TB
Virtualization : 110 TB cluster comprising 3 «new» servers with (26 - 16 CPU) 1TB RAM + 3 «older» servesr da 512 GB RAM
@ Tier 3 (at Cineca**)**:
Tape : 10 PB
Online : TBD ~ 400TB

Sector 3: Synergies in R & D

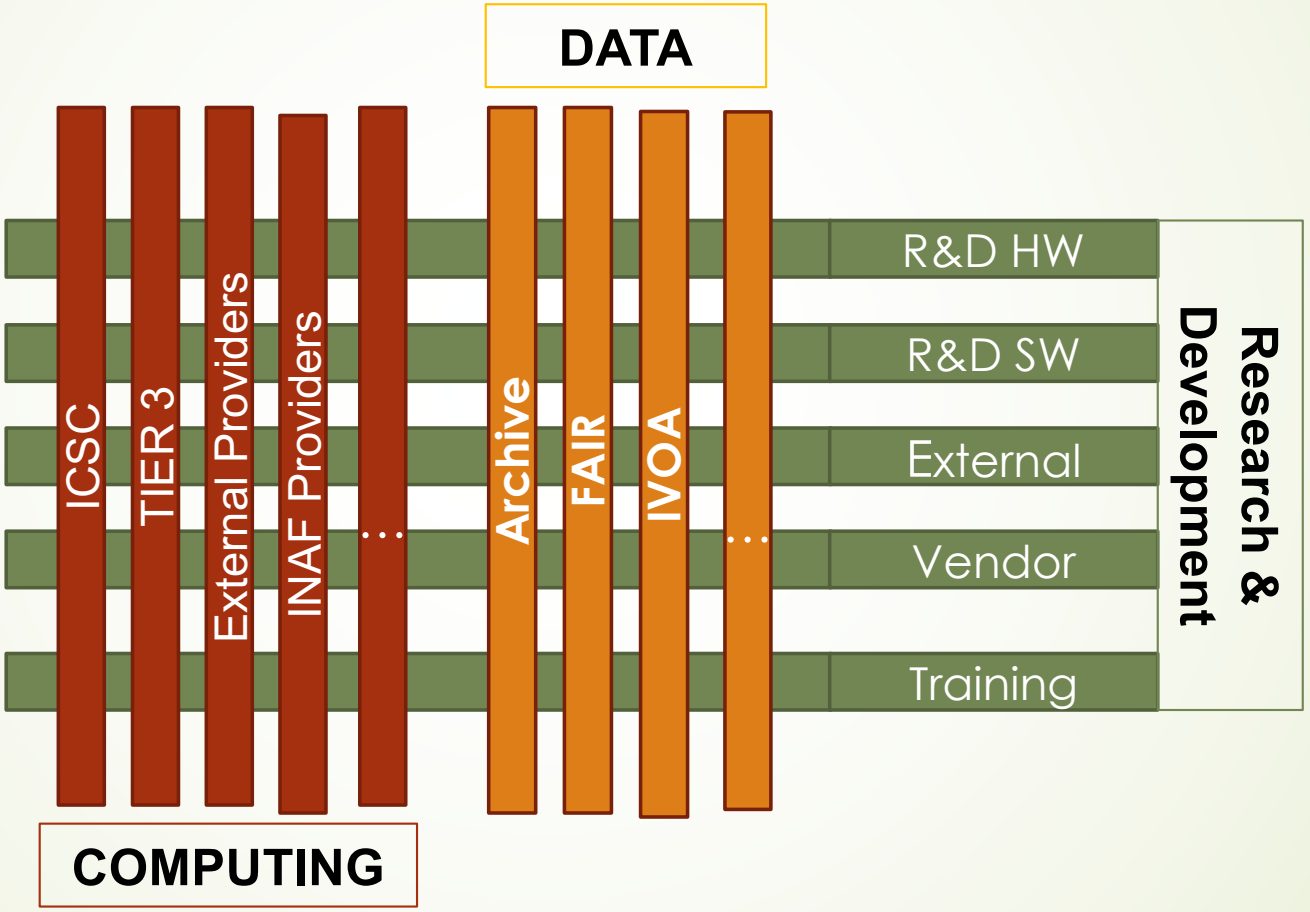
Promote and facilitate research activities in the scientific "computing" field covering aspects ranging from HPC calculation to data management, from artificial intelligence to controls, and more.

Helping to strengthen interactions with the main national and international industries or entities in the scientific "computing" field (e.g. IBM, NVIDIA, E4Company, ExaCTLab) has the purpose of allowing researchers to access innovative infrastructures, tools, libraries.

Actively participate in international contexts to contribute to the definition of standards, requirements, needs.

Contribute to the training of INAF staff (but also of **Postdocs and PhD students**) through schools, masters, initiatives in various fields (e.g. SISSA HPC masters, collaborations with departments). Promote an ecosystem that allows the training of new personnel starting from higher education.

Sector 3: Synergies in R & D



Sector 3: Synergies in R & D

Bottom-up approach

Building an environment that facilitates the aggregation between RIC/TEC INAF who work on similar issues, for example by helping the establishment of distributed working groups, on the model of those that have already been formed (e.g. control software).

Enhance INAF's rich heritage of knowledge in the field of "scientific computing" by giving visibility to the groups and RIC/TECs working in the various fields.

The aim is to facilitate the identification of skills to be spent in different areas (e.g. European projects, large INAF projects, etc.)

Make sure that RIC/TEC have a point of reference on issues related to "calculus" to which they can refer.

Sector 3: Synergies in R & D

- ✓ **Working groups identified since a first phase of Sector 3:**
  - ✓ Algorithms and methodologies for the scientific computing… for the moment HPC (…)
  - ✓ Machine Learning (…)
  - ✓ Pipeline for data analysis (…core business for INAF…)
  - ✓ Controls (es Tetis)
  - ✓ Design of instrumentation, monitoring, controls and quasi-realtime computing (…)
  - ✓ Storage and Network (…)
- ✓ **National and international projects :**
  - ✓ European Open Science Cloud (https://eosc-portal.eu/)
  - ✓ Italian Computing and Data Infrastructure (https://www.icdi.it/en/about)
  - ✓ The European Technology Platform for High-Performance Computing (ETP4HPC)
  - ✓ Research Data Alliance (…)
- ✓ **Collaborations with Companies:**
  - ✓ IBM OpenPower (…)
  - ✓ E4 Company (…)
  - ✓ ENGINSOFT (…)
  - ✓ ….
- ✓ **Collaborations with the Universities:**
  - ✓ Master in HPC (SISSA)

It is a bottom-up process for which we expect proposals also, and above all, from you!

Sector 4: IT services

The USC-VIII within the IT Services Implementation Sector will provide all the general research support services previously included within the ICT

- **Network and GARR** will take care of the maintenance and good governance of GARR connectivity within INAF by managing new requests for access/upgrades and GARR services, upon request from the offices.
- **Common Software** Maintenance of current SW licenses, recognition of any new software of common interest (always in floating mode).
- **Common Servicies** Provision of common research services (GitLab, ownCloud, Easyredmine, Indico,…) and possible activation of new ones based on community input (CI/CD Jenkins, Dockerhub,…)
- **Commercial Cloud Computing** On-demand access to high-performance computing (sporadic and HTC-type) via commercial Cloud Computing platforms.

Sector 4: IT services

Current Common Software (https://ict.inaf.it/index.php/ict-inaf/software)

Software
IDL
Software Microsoft
Labview
Antivirus comune ESET
Matlab
ANSYS
Gsuite
Overleaf
Visual Paradigm
Intel Compilers (oneAPI, vecchie versioni per compatibilità)
Mathematica
OriginPro
VMWare
RedHat Licenza Campus 2
Easy Redmine
Tango
Vari SW, piccole attività

Common general servicies for the Research

- **GitLab, ownCloud, Easyredmine, indico, Virtual Machines hosted**
- **New services can be provided upon request and upon evaluation of merit/impact at INAF level (e.g. Dockerhub, Jenkins,…).**

Sector 4: IT services

Commercial Cloud Computing

The USC-VIII will maintain within its perimeter the Access Service to computational resources based on Cloud Computing (currently Amazon) which, **starting from 1 June 2023**, will continue to be offered on demand by completing a request (to be submitted to review) at the following link

https://forms.gle/VQJgrv929rDu96iH6

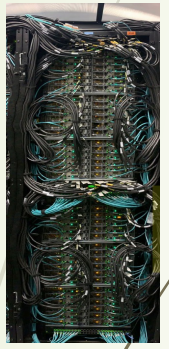
This type of access to Computing will allow researchers to respond to small/medium-sized computing needs, typically HTC and embarassingly parallel, without the need to purchase dedicated hardware.

The use of these resources is optimal in the context of projects that require **sporadic and immediately available access to small/medium-sized computing resources** (e.g. 512 cores for two or three days for an analysis necessary for the conclusion of an instrument PDR).

Available opportunities

and the Committee for the Assignment of Time of Computation & Space for long-term data preservation

Already available opportunities for the INAF people



- ✓ "Pleaidi" system: 20-25 Million cores/hour on over 7000 cores. Intel Broadwell board 2x Intel Xeon E5- 2697 @2.3GHz, 18 cores/socket (36 cores x node), 128/256 GB Ram
- ✓ resources linked to the agreement between INAF and CINECA: 4.7 million cores/hour
- ✓ Cloud resources acquired by INAF: 1 million cores/hour
- ✓ Space allocation for the "long-term" preservation of scientific data

Resources will be allocated after evaluation by the **CAT&S,** which comprises **7 members** nominated by the Head of the USC VIII:
Claudio Gheller (chair), *Elena Amato* (deputy chair), *Andrea Bignamini, Elena Rasia, Serena Pastore, Paolo Serra, Alberto Vecchiato*

The **six-monthly calls** will be issued by the Head of USC VIII: **the first** was **released on April 27** with an **expiration on May 31, 2023.** The beginning of the use of the resources is set at **1 August 2023**

A **small fraction of the resources** will be allocatable at any time, through **on demand requests** (**starting from 1 June 2023**) evaluated by USC VIII.

The plan: Training

It is an activity **transversal to all 4 implementation sectors**

It will be based on a series of initiatives

- ✓ **Schools** for students, contractors and structured on individual specific topics: eg. porting of codes to HPC, methodologies for Machine Learning, exploitation of GPUs, use of containerization, continuous integration etc…
- ✓ Certified **refresher courses** for structured staff (on institutional funds for training)
- ✓ **Scholarships for existing Masters** at other Organizations and Institutions, and **for Doctorates at Universities** (to be confirmed)

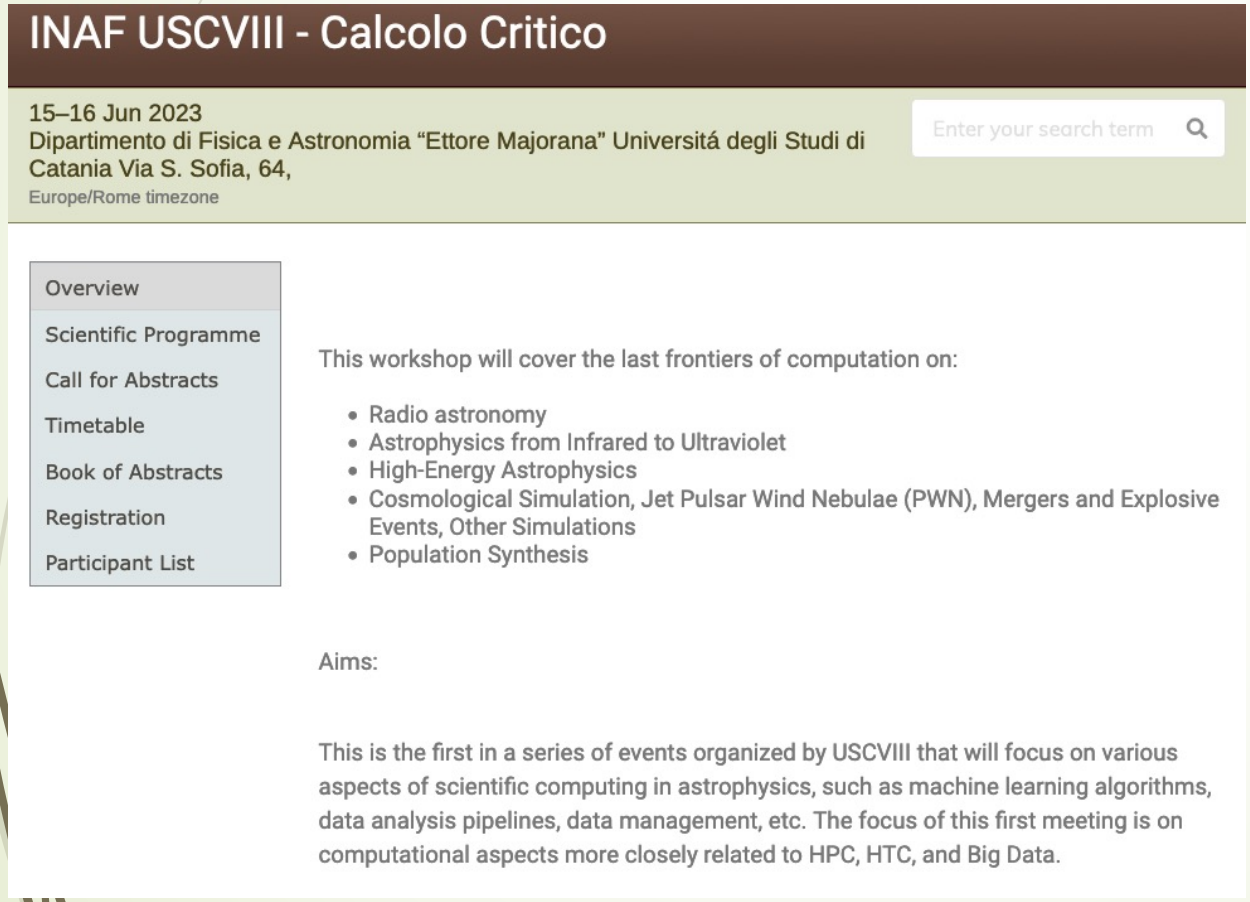
The plan: INAF Events

It is planned to organize:

- ✓ **Recurring National Meetings for INAF (and external) members** on individual specific issues. Objectives: knowledge of reciprocal activities, development of new opportunities for synergy, team-up. Indicatively **at least 2 meetings of this type per year** with a duration of **2-3 days each**

- ✓ **USC VIII General Congress,** taking up the fruitful example of the ICT meetings, interrupted in the pandemic phase. **(Semi-)annual cadence** with a **duration of one week**

First USC VIII event



2 days of meeting of the INAF (and external) community around the problems of **Critical Computation in a wide sense**

At **Catania**
on **15 & 16 June 2023**
at the Physics Dept of the Università di Catania
via Santa Sofia 64

No fee

Web link for registration and details: **https://indico.ict.inaf.it/e/USCVIII-2023**

Support for events

In addition to the events directly organized by USC VIII, an online form will be available from **June 1, 2023**

https://forms.gle/jMbceGveHoeGfn9LA

to request support (economic or practical) at USC VIII in organizing events that have to do with USC activities.

The above link will be a "**channel with multiple deadlines during the year**" with evaluation, and possible approval, of the proposals within 30 days of each deadline.

It can be applied in parallel to the general channel of the Scientific Direction for the support of events, but obviously **double funding will not normally be possible**

The plan: hardware

Acquisition of **≈1.5 PetaFlop/s** (with a combination CPU and GPU) **and ≈11 PBy** (combined between fast disks for computing and disks for long-term preservation) **Tier-3** computing system, to be installed inside of one of the CINECA areas at the Bologna Technopole

The Technopole already hosts the European weather centre ECMWF, the Leonardo super-computer and will host the United Nations University on Climate Change

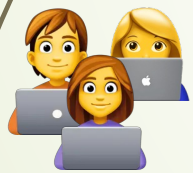
Use of **a Tier-2 sizing system** integrated into a Tier-1 sizing system and becoming the kernel of the Italian node of the SKA Regional Center. Investment of the CN-PNRR for the needs of INAF and CNR (7 million euros), owned by CINECA, with guaranteed (non-exclusive) use for INAF. Expected for INAF: **about 4 PetaFlop/s** (Data Centric Nodes and Booster Nodes) and **≈2 PBy** high speed storage

The plan: catalog of the expertise

There is a lot of know-how in INAF on the issues of computing and archiving

We want to create a catalog of the expertise

- to avoid «reinventing the wheel» when some colleagues have already faced a problem



- to optimize the planning of human resources to be deployed within the projects

- to encourage discussion between colleagues (and the creation of a critical mass) around common themes

The plan: catalog of the expertise

The idea of such a survey had already been carried forward (on more extensive issues) in the context of CSN 5 (2020-2022), with the approval of the CdA, for the study for an interactive map like the one shown here

We invite everyone to tell us about their activities (even not recent ones) related to calculation and archiving (by the end of May)

A form will be distributed soon!

Thank you!

We are looking forward questions & suggestions, info about problems and indication of expertise

write to: usc8_help@inaf.it