Introductory remarks:

The VO in the world, in Europe, in Italy

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VObs.it - 2026 Forum (Bologna, 26-27 Nov 2026)

Pre-VO status

- Non-homogeneous archives + databases
- Data from ground-based and space-based telescopes, sky surveys, simulations and theoretical models distributed across many archives and institutions.
- To take scientific advantage from such data, need to e.g.:
  - Discover and combine data from different observatories and wavelengths
  - Perform multi-wavelength and multi-messenger investigations
  - Access and analyse large datasets without downloading everything locally
  - Enable reproducible, collaborative and data-intensive research

Virtual Observatory: concepts

- Web: all documents inside laptop

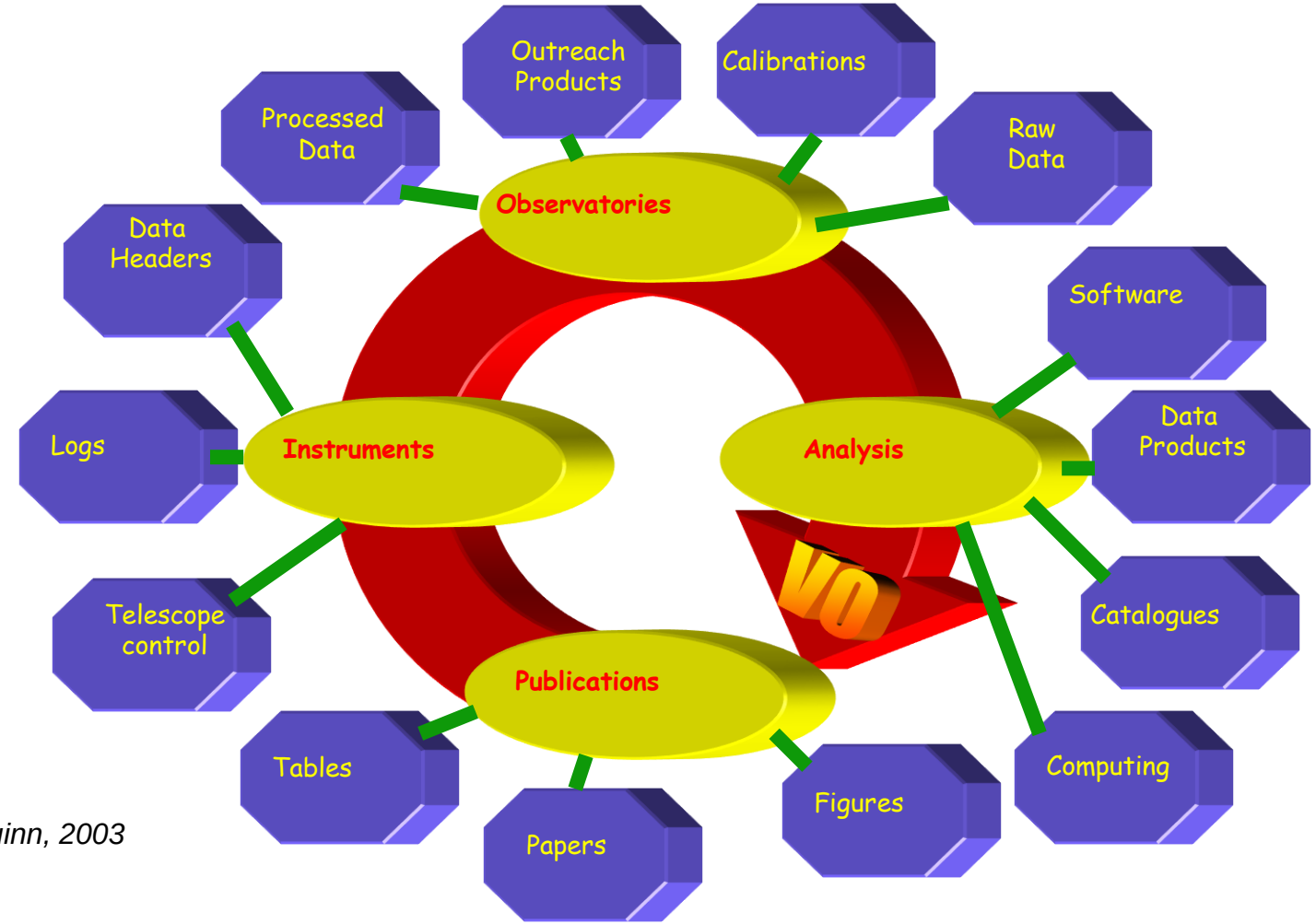
  VO: all astronomical databases+archives inside laptop

- VO → democratization of astronomy!
- The key word is interoperation
- All of this requires the various players to speak the same language

  standards and protocols to be defined and adopted



1st Interoperability WG meeting : Strasbourg, France, 28-29 Jan 2002


Outreach Products
Calibrations
Processed Data
Raw Data
Observatories
Data Headers
Software
Logs
Instruments
Analysis
Data Products
VO
Telescope control
Catalogues
Publications
Tables
Computing
Figures
Papers

P. Quinn, 2003

IVOA foundation

- In ~ 2000, several funded national VO initiatives were active, e.g.
  - NVO in the USA
  - AstroGrid in the UK
  - AVO in Europe (funded by EU-FP5, with ESO, ESA, CNRS/CDS, AstroGrid, UMan, UEdi)
  - …
- A VO conference (“Toward an International Virtual Observatory”) was co-organized by **ESO, ESA, NASA, and NSF** and held in Garching, Germany, from 10 to 14 June 2002
- During the conference, the agreement was reached to establish the International Virtual Observatory Alliance (IVOA)

IVOA (https://ivoa.net) :

- **Mission:** *"To facilitate the international coordination and collaboration necessary for the development and deployment of the tools, systems and organizational structures necessary to enable the international utilization of astronomical archives as an integrated and interoperating virtual observatory"*
- **Composition:** funded national or super-national VO initiatives
- **Tasks:** standardization of data/metadata/sw, data interoperability methods, and list of available data and computing services (provided by projects)

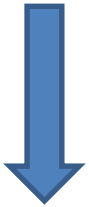
Virtual Observatory
(scientific vision)





IVOA
(global coordination)

- One global vision
- Common international standards
- Based on nationally-supported projects

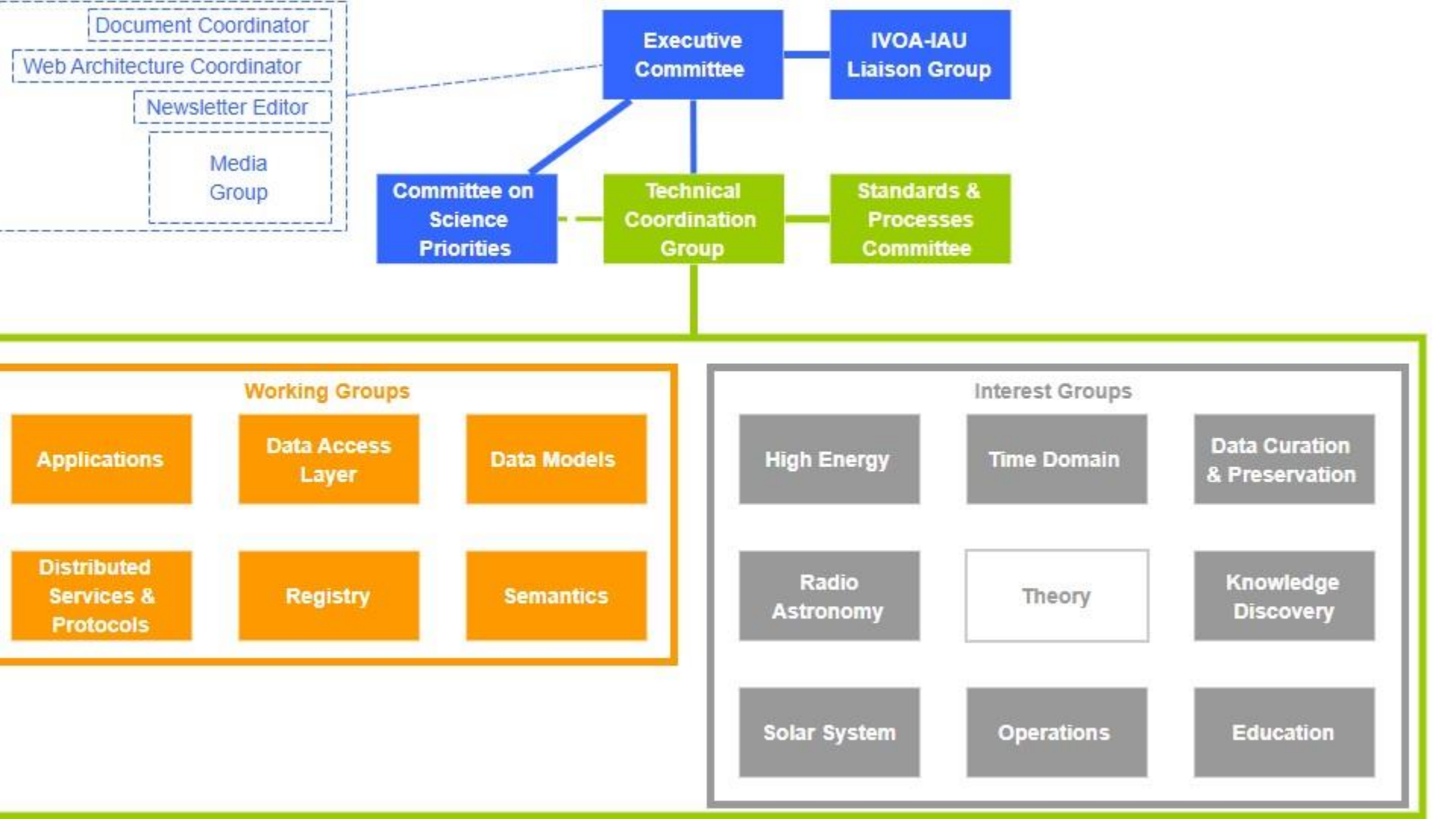


National initiatives
(implementation)

The IVOA organisation

- Collaboration tools: mailing lists, telecons, “TWiki” pages, GitHub, and bi-annual meetings (last one in Perth)
- Structure:
  - IVOA Executive Board
  - Working and Interest Groups
- Executive Board
  - Works by consensus
  - One Exec member from each project




Document Coordinator
Web Architecture Coordinator
Newsletter Editor
Media Group
Executive Committee
IVOA-IAU Liaison Group
Committee on Science Priorities
Technical Coordination Group
Standards & Processes Committee
Working Groups
Applications
Data Access Layer
Data Models
Distributed Services & Protocols
Registry
Semantics
Interest Groups
High Energy
Time Domain
Data Curation & Preservation
Radio Astronomy
Theory
Knowledge Discovery
Solar System
Operations
Education

The IVOA organisation (cont'd)

- Collaboration tools: telecons, mailing lists, "TWiki" pages, GitHub, and bi-annual meetings (last one in Perth)
- Structure:
  - IVOA Executive Board
  - Working and Interest Groups
- **Slow convergence on standards**
  1. strive to reach consensus
  2. there is no direct IVOA funding

In Europe : Euro-VO

- The AVO project conducted a research and demonstration programme on the scientific requirements and technologies necessary to build a virtual observatory for European astronomy
- At the end of the AVO project, new EU-funded projects to implement the virtual observatory for European astronomy



- **Euro-VO** (the European Virtual Observatory) is the European initiative that builds and maintains interoperable astronomical data, archives, and analysis tools following IVOA standards → FAIR principles

EU-funded projects related to Euro-VO







- VO-TECH
- Euro-VO DCA
- Euro-VO AIDA
- Euro-VO ICE
- CoSADIE
- ASTERICS
- EOSCPilot
- ESCAPE
- Europlanet
- Astro-CC

Euro-VO implementation, development, coordination

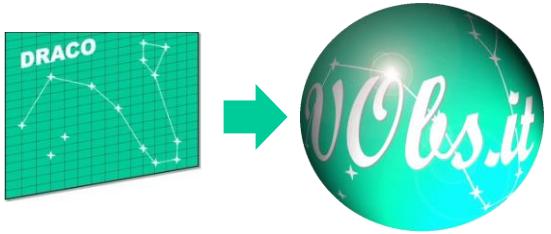
Coordination of Euro-VO with other scientific disciplines

Open Science and FAIR with VO stds

Towards the implementation of a thematic node within EOSC

In Italy …

- The «hot» research topic in 2002 was Grid (induced by HEP)
- In 2003, a project called DRACO (Datagrid for Research in Astronomy and Coordination with the virtual Observatory) was funded by PRIN
- Being a VO-related funded project, DRACO joined IVOA as Italian representative
- INAF signed Euro-VO agreement
- At the end of DRACO, VObs.it funded by INAF
- Informal participation of other institutions
  - (ASI/SSDC, Universities, INFN)



Virtual Observatory
(scientific vision)





IVOA
(global coordination)





Euro-VO
(regional networking)





VObs.it
(national initiative)

- One global vision
- Common international standards
- Coordinated regional implementation
- Based on nationally-supported projects

VObs.it participation in IVOA

- Activity in IVOA in WGs and IGs
- Several Chair positions
  (Currently Chair of TCG, Vice-chair of Distributed Services and Protocols WG)
- IVOA documents coordination
- Support to the IVOA Newsletter
- Organisation of 5 F2F Interops (+6 fully virtual Interops)
- Support to on-line access to Interops

VObs.it supports (on INAF-provided servers and resources) the following IVOA services:

- web pages
- wiki
- mail and lists
- documents repository
- vocabulary maintenance

It also manages the

- registration of IVOA domains
- the related DNS service
- resolving the other IVOA provided services:
  - rofr.ivoa.net (currently hosted at CADC)
  - mail.ivoa.net/search (provided by CNRS/CDS)

Thank you for your patience!

Fabio Pasian

fabio.pasian@inaf.it

VObs.it tasks within IVOA

Role	from	to	Who	Affiliation
VObs.it Exec representative	2002	2023	Fabio Pasian	INAF
VObs.it Exec representative	2023	in office	Marco Molinaro	INAF
IVOA Exec vice-chair	2007-08	2008-10	Fabio Pasian	INAF
IVOA Exec chair	2008-10	2010-05	Fabio Pasian	INAF
IVOA TCG vice-chair	2021-05	2024-05	Marco Molinaro	INAF
IVOA TCG chair	2024-05	in office	Marco Molinaro	INAF
IVOA Document Coordinator	2014-09	in office	Giulia Iafrate	INAF
IVOA Document Coordinator	proposed		Kalyani Pedamkar	INAF
Semantics WG chair	2005-10	2008-01	Andrea Preite-Martinez	INAF
Theory IG vice-chair	2008-05	2011-05	Claudio Gheller	CINECA
Theory IG vice-chair	2023-05	2024-05	Giuliano Taffoni	INAF
KDD IG chair	2010-09	2012-10	Giuseppe Longo	Uni Napoli Federico II
Edu IG chair	2012-12	2016-12	Massimo Ramella	INAF
Edu IG vice-chair	2021-05	2024-05	Giulia Iafrate	INAF
DAL WG vice-chair	2014-05	2018-05	Marco Molinaro	INAF
DAL WG chair	2018-05	2021-05	Marco Molinaro	INAF
GWS WG vice-chair	2015-05	2019-05	Giuliano Taffoni	INAF
GWS WG chair	2019-05	2023-05	Giuliano Taffoni	INAF
GWS/DSP WG vice-chair	2023-05	in office	Sara Bertocco	INAF