Spanish Contribution to the SRCNet v0.1

Susana Sánchez Expósito on behalf of the Spanish team

SRCNet v0.1 Development Workshop
Shanghai, 22th March 2024

- Spain's involvement in SKA dates back to 1990
- **2011**: Ministry applies for Spain to become a SKA Observer.
- **2018**: Spain became a Member of the SKA *Organisation.*
- **2023**: Spain became a Member of the SKA Observatory.

IAA — INSTITUTO DE ASTROFÍSICA DE ANDALUCÍA

Coordinator of the Spanish scientific and technological participation in SKA **since 2011**

65 Spanish members in the SWGs

SKAO — Cosmology — Cradle of Life — Epoch of Reionisation — Extragalactic Continuum — Extragalactic Spectral Line — Gravitational Waves — HI Galaxy Science — Magnetism — Our Galaxy — Pulsars — Solar, Heliospheric & Ionospheric Physics — Transients — VLBI — High Energy Cosmic Particles

- 2014 - SKA Science Book : 10% of chapters with Spanish contribution
- 2015 - Spanish SKA White Book (120 researchers from 40 centres)

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12 centres and 12 companies in the Design Consortia:

- Disk Antennas
- Central Signal Processor
- Signal and Data Transport
- Telescope Manager
- Science Data Processor
- Infrastructure Australia
- Infrastructure South
- Africa and Phased Array Feeds
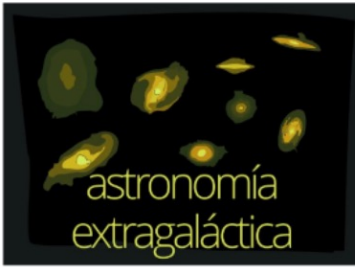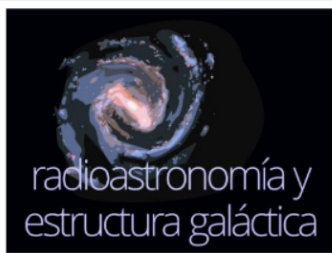
Expertise on Radio Astronomy and Open Science:

→ Member of the SKA Science Data Processor Consortium

→ Spanish partner in AENEAS project

→ SKA Partner in ESCAPE project

IAA in a Nutshell

CSIC – Physical Science and Technologies

Research

sistema solar

física estelar

radioastronomía y estructura galáctica

astronomía extragaláctica

Technology

Space Instrumentation

Ground-based Instrumentation

Observatories

OSN

CAHA

Leading the initiative to develop a Spanish SRC prototype

Supporting:

- Spanish science with precursors and pathfinders and beyond

- SKA Data Challenges

- SRCNet prototyping activities

- 200 CPU cores

- 16 GB Memory per core

- 1.5 PB Raw Storage

- Ceph Storage

- Replica2: ~700TB Capacity

- 100 Gbps internal network

- 10 Gbps shared external link

Supporting:

- Spanish science with precursors and pathfin...
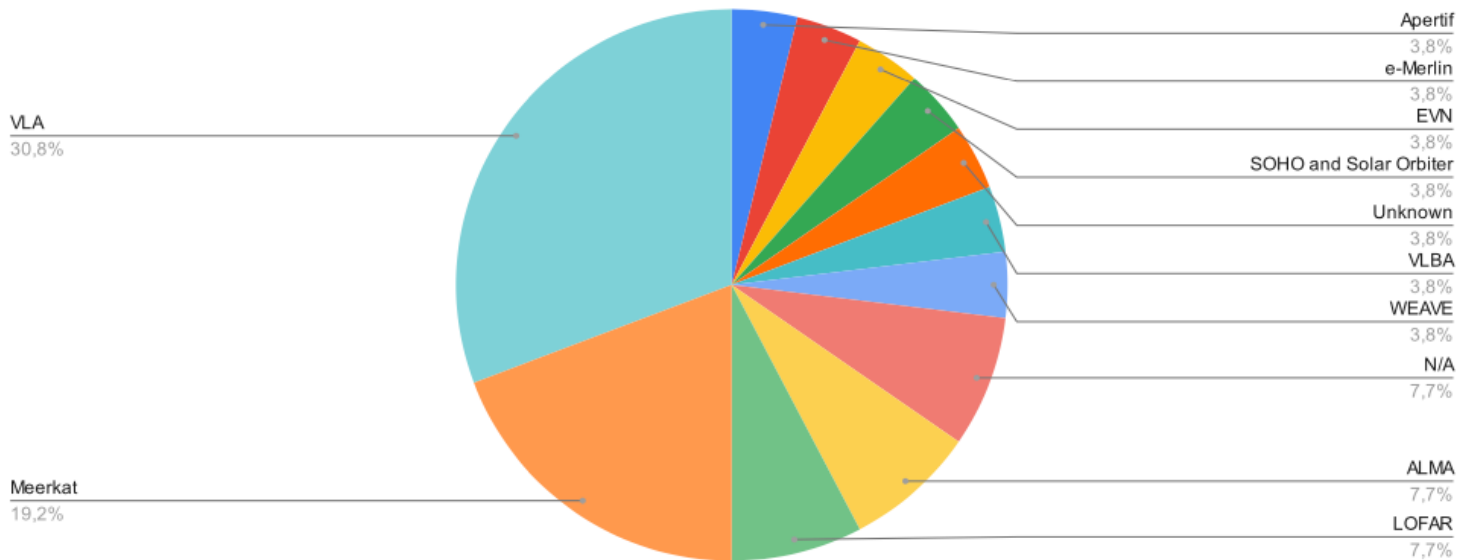
- SKA Data

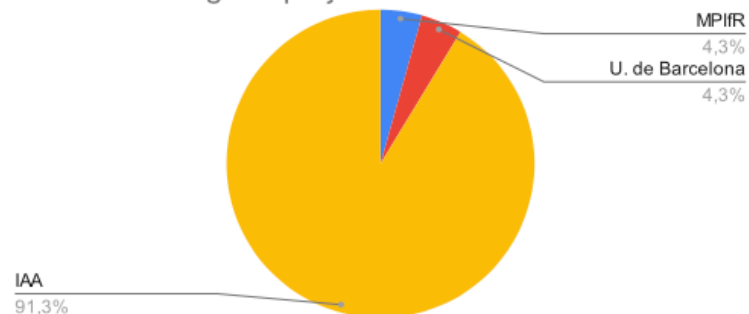- SRCNet pr...

- 200 CPU cores

Science at the SPSRC with SKA Precursor/pathfinder telescopes

60 projects: 23 Research, 25 Development, 12 Training (incl. SKA Data Challenges).
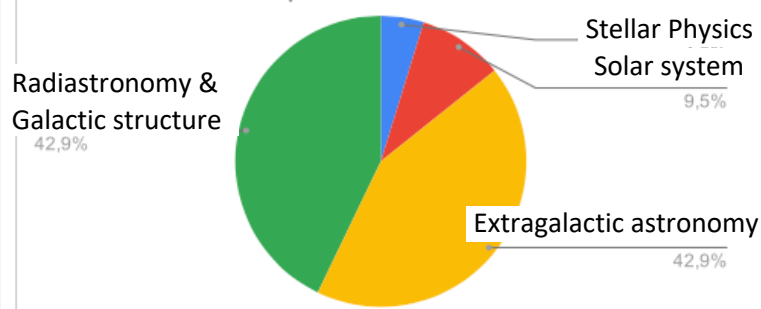

Instrument used

- VLA 30,8%
- Meerkat 19,2%
- Apertif 3,8%
- e-Merlin 3,8%
- EVN 3,8%
- SOHO and Solar Orbiter 3,8%
- Unknown 3,8%
- VLBA 3,8%
- WEAVE 3,8%
- N/A 7,7%
- ALMA 7,7%
- LOFAR 7,7%

Centres leading the project

- IAA 91,3%
- MPIfR 4,3%
- U. de Barcelona 4,3%

Associated IAA department

- Radiastronomy & Galactic structure 42,9%
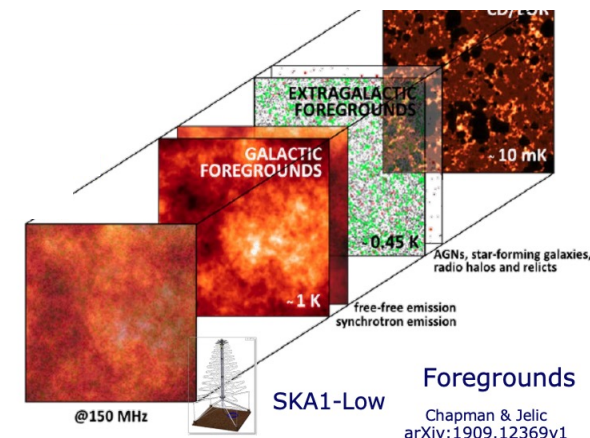- Extragalactic astronomy 42,9%
- Stellar Physics Solar system 9,5%

SKA Data Challenge 2:
Spanish (IAA) team: 5th place +
Gold Medal on Reproducibility

SKA Data Challenge 3: EoR

- 33 teams. Spanish one led by IFCA

- SPSRC & CESGA give support to teams from Spain, South Korea and India

EoR
EXTRAGALACTIC FOREGROUNDS ~10 mK
GALACTIC FOREGROUNDS
AGNs, star-forming galaxies, radio halos and relics
~0.45 K
~1 K
free-free emission synchrotron emission
@150 MHz
SKA1-Low
Foregrounds
Chapman & Jelic
arXiv:1909.12369v1

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SRCCG, SRC Coordination Group (2016-2018)
- LVM invited as external advisor

SRCSC, SRC Steering Committee (2019-)
- LVM designated as Spanish representative

7 SRCSC Working Groups (2020-2022) – Design phase

SRCNet prototyping (Since April 2022)

CORAL TEAM

Coordinated by IAA-CSIC
(Product Owner + Scrum Master)

Builder of **testbeds** for technologies

Spanish FTE Contribution to the SRCNet in PI22

- 3.9 FTE in total
- Contributed by 6 people
- 5 members contribution > 0.5 FTE

As part of the CORAL team, it has contributed to (among others):
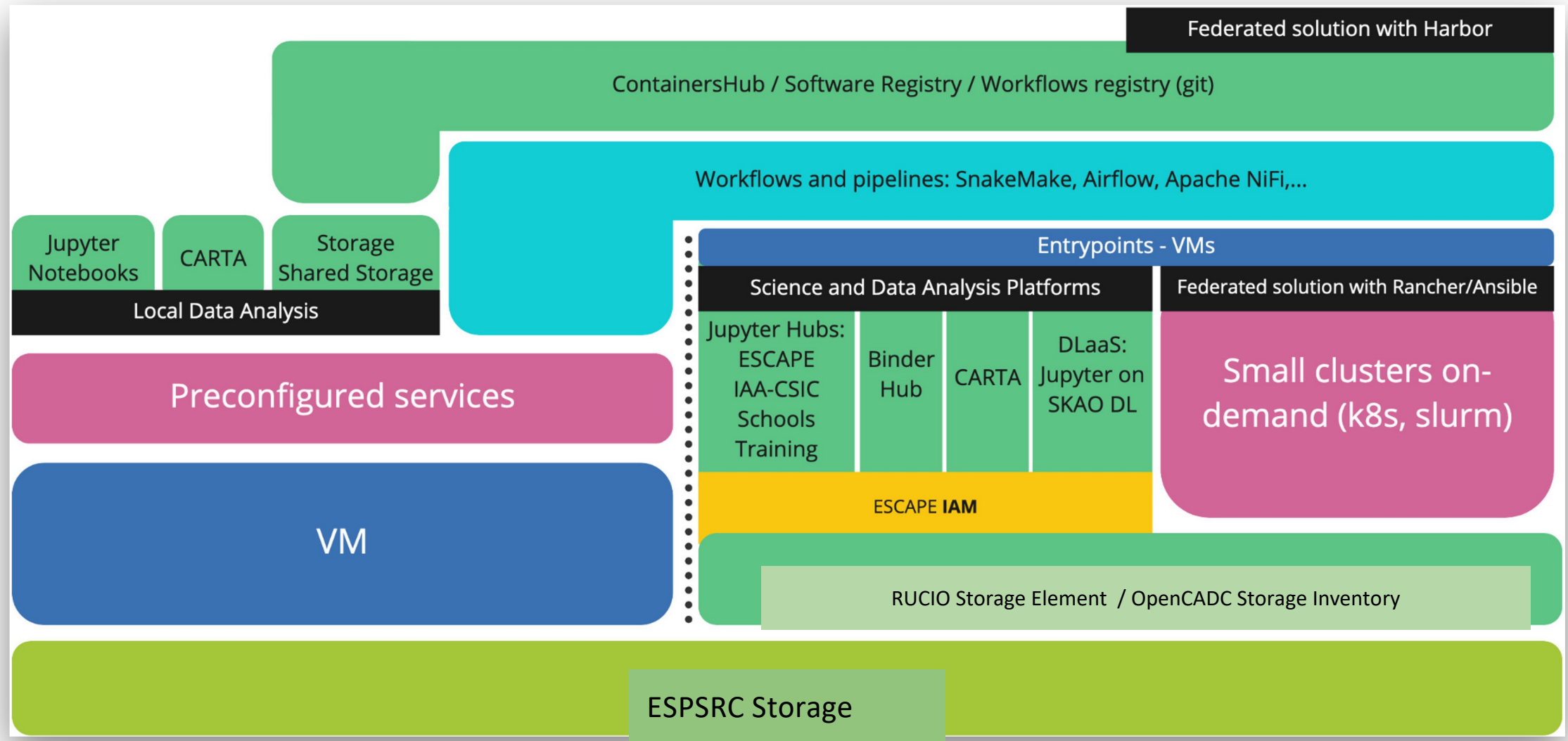
- The Mini-SRCNet Demonstrator
- The Rucio Data Lake
- The SRCNet Public repository in gitLab
- Prototype of the Federated orchestration of Containers (with Karmada and Linkerd)

It has provided computing resources to other teams

The **esp**SRC: Computing services and resources

Schema by M. Parra

EOI ANSWER

Requirement	Spanish Response
Software Stack	Compliance demonstrated during prototyping activities
Personnel contribution	Able to provide 1 FTE and respond in < 3 working days
Network	Shared 10Gbps link to RedIris-NOVA IPv6 is still not implemented 100Gbps internal network
Storage and computing resources	Procurement process to extend our platform and provide resources according to the Roadmap (0.42 PB storage capacity, 0.01 PFLOPS) • Funding is secured • End of procurement process (expected) : October 2024
SRCNet Node Validation Tests	Ability to run validation tests

Willingness to collaborate with other countries to define a common SRCNet deployment node.

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Thanks!