

# The Italian Pathway to SKAO

## Plenary Discussion

G. Brunetti, A. Possenti, I. Prandoni, G. Umana, T. Venturi  
(on behalf of the SOC)

*Fifth National Workshop of the SKA Project*

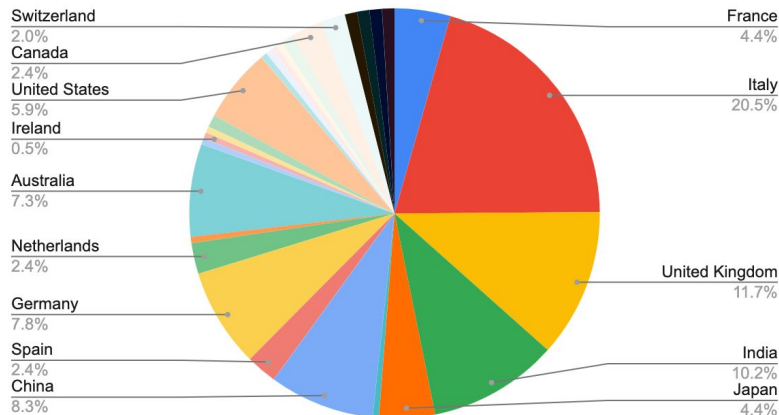
# SKA-IT: Summary & Next steps

## Strengths

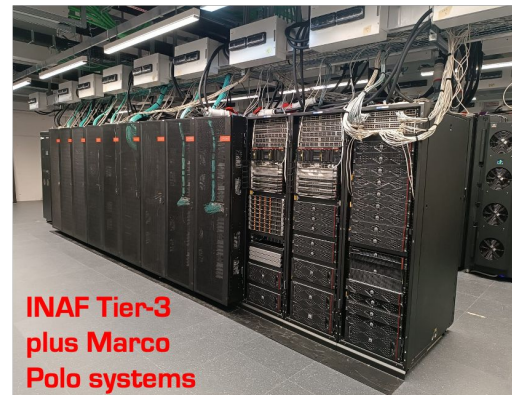
- Recognized leaderships in SKA technology (SKA Tier 1 and Tier 2 contracts)
- Recognized leadership in SKA science (SWG chairs/coordination roles/Piships Science Book chapters)
- PI-ships and leadership roles in both SKA MID and SKA LOW precursors
- Strong expertise in data analysis/observations (radio interferometry) & computational research



## First Authors



## The new Computing HW installed at the Bologna Technopolo



**INAF Tier-3  
plus Marco  
Polo systems**

# SKA-IT: Future steps

---

- Support/promote IT Involvement in SKA Precursors (2026-onward)
  - LOFAR 2.0
  - MK Band 5b/MK+
- Support/promote IT involvement in early SKA obs. (SV, etc.)
  - LOW: 2027-onward
  - MID: 2029-onward
- Establish an IT view on PI/KSP policies to be played at international level
- Establish an IT scientific roadmap towards PI-ships at PI and KSP levels
- Establish national teams that get closely engaged with the SRC IT node
- Maintain/support technology teams towards AA4 constructions and Obs. Development Programme (>2030)
- Maintain/support engagement of industrial partners towards AA4 construction (>2030)

# LOFAR/LOFAR 2.0

---

# MK Band 5b / MK+

---

- Need to run MK until SKA is ready? (cosmology IM HI; pulsar timing)

MK+ and Mk band 5B represent a substantial increase in the scientific capability of MeerKAT  
⇒ a concrete step towards SKA-Mid

Timelines:

**Mk+:** Scientific commissioning immediately after the completion of all engineering activities (by **Q1 2026**)

**Mk band 5B:** Scientific commissioning after integration (**Q1 2027**)

An imminent opportunity to utilize MeerKAT with its enhanced capabilities for high-impact science:

- Train young researchers and engineers in the management and analysis of large radio-astronomy datasets;
- Consolidate expertises essential for the SKA era;
- Secure positions of leadership in future SKA survey programmes.

Need for INAF strategic support to ensure that the Italian community can exploit the investment on MK+ and MK Band 5b

# SKAO Scientific Timeline / obs. modes rollout

2026:

- Call for SV ideas for AA2 (LoW)

2028:

- Call for SV ideas for AA2 (Mid)
- Call for SV ideas for AA\* (Low)

2029

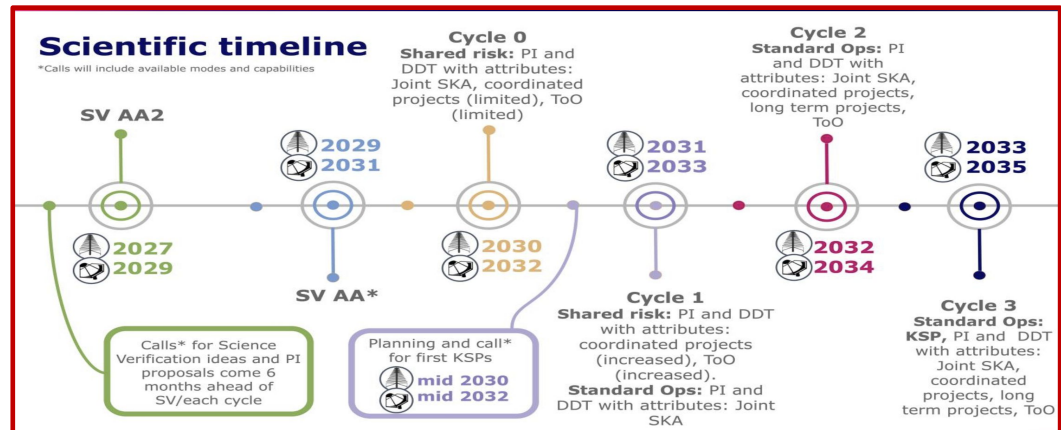
- Call for PI proposals (Cycle 0 Low)

2030

- Call for SV ideas for AA\* (Mid)
- Call for first KSPs (Low)

2031

- Call for PI proposals (Cycle 0 Mid)



## Maximising IT scientific return from earliest calls

- Is the planned rollout timeline affecting your science? How? Should we push for some modifications? Cosmology HI IM: wide-area scans (2034) / Transients: fast imaging (2032)
- 
- Do you want to be involved in commissioning / SV data processing? How? Abs. polarization calibration strategy and tests; data quality tests; development of data analysis pipelines

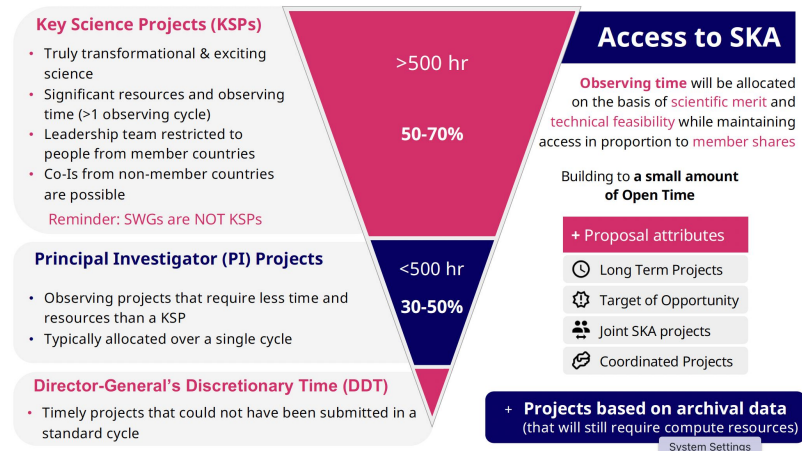
# SKAO PI/KSP Policies

**KSP scope:** just large projects? How large? Are teams involved in data processing/pipeline testing ?

**Coordination of the KSP:** single coordinator/PI for each KSP ? many co-coordinators/coPIs ? a rotation among the coordinators/Pis?

**Timelines:** over how many cycles KSP will span observations? What is the maximum allocated time?

**International context:** Council not yet involved in PI/KSP and scientific return policies discussions



Courtesy A. Bonaldi

## Need to establish an IT view to be played at international level

- Are we happy with the current KSP concept? Do we prefer the approach implemented for precursors?
- Is the timing of KSP calls appropriate (>2033)? Do we want proto-KSP to be established earlier on? Align SV and KSP science goals
- Do you think KSP teams should provide resources?
- Do we have a preferred model for PI/KSP coordination policies?

# SKA-IT: Fostering KSP leaderships

---

KSP scientific results may require many years of observations and the contribution of researchers from many countries

## **Fertilization and support of the Italian community at large**

**Need to identify and give long term support to an** adequate range of scientific themes where the Italian community can compete at the frontline of the research within the future KSPs

**Need to define a strategy with short / medium / long term science goals** for each theme and resources associated to them

- Any coordination at national level to respond to SV/PI/KSP call ?
- Any form of support to SKA-engaged researchers/teams? Which one? (postdoc, computing resources,...)
- Agreements/MoUs with other facilities?



# Deferrals – to be reinstated >2030

- 1) 50 stations in the core of SKA-Low. The initial delivery will be 257 stations, of which 149 are in the core.
- 2) PSS on SKA-Mid will be limited to 200 beams until *at least* Cycle 0 as advertised
- 3) PSS on SKA-Low will be limited to 50 beams in the early observing cycles
- 4) The SKA-Low CBF will match AA\* (it was previously over-scoped to match AA4)

## Impact on IT science / industrial return

- Is your science affected? How? See pulsars/transients/Galactic science
- Is SKA still transformational after deferrals? need to update SKA tools, need scientific simulations
- Do you have solutions in mind to mitigate adverse effects (to be proposed to SKAO)? custom User supplied backend
- Are the industrial implications of deferrals fully understood? Have alternative solutions to deferrals be considered? For instance a slower roll-out of SKA-Low antennas could distribute the costs over a longer timescale and mitigate the financial risks

# AA\* vs AA4

---

## Bulding a strong IT case for investments into AA4

- Is your science feasible with AA\*?
- Is AA\* going to be transformational for your science case?
- Are there valuable science cases of your interest that cannot be done with AA\*? i.e. need  $b_s > 50$  km (e.g. lensing, ultra-deep fields, sub-arcsec resolution)

# SRC Italian Node

1. Developing a community of **groups of scientists** (each dealing with diverse sectors and thematics of radio astronomy/ astrophysics) **keen to interact with the people working in the context of the IT-SRCnet node**, about pipeline(s), science platform(s), visualization tools etc. How to set up them? One/two spoke-persons (discussing with the IT-SRCnet node and checking results) or everyone?
2. **Experimenting the use of IT-SRC** node on precursors' datafiles
3. Enhancing the IT participation to SKAO data challenges



# SKA-IT Technology & Industry Engagement

---

**Need to Maintain/support IT technology teams** towards AA4 constructions and Obs. Development Programme (>2030)

**Need to Maintain/support engagement of IT industrial partners** towards AA4 construction (>2030)

- how mitigate impact of deferrals / gaps between AA\* and AA4?
- how support R&D towards AA4 / SKA ODP?

# Concluding Remarks

---

# Acknowledgements

- **Funding:** INAF DS and IRA Director



- **SOC:** Nicola Bellomo, Gianni Bernardi, Eleonora Bianchi, Gianfranco Brunetti (co-chair), Stefano Camera, Viviana Casasola, Rossella Cassano, Mauro Dolci, Marcello Giroletti, Federica Govoni, Adriano Ingallinera, Enrica Iodice, Andrei Mesinger, Jader Monari, Tonino Pisanu, Andrea Possenti, (co-chair), Isabella Prandoni (co-chair), Alvis Raccanelli, Paolo Serra, Corrado Trigilio, Grazia Umana (co-chair), Valentina Vacca, Tiziana Venturi (co-chair)

# Acknowledgements

- **Funding:** INAF DS and IRA Director
- **SOC:** Nicola Bellomo, Gianni Bernardi, Elena Camera, Stefano Camera, Viviana Casasola, Rossella Di Stefano, Federica Govoni, Adriano Ingallinera, Enrica Lattanzi, Pisanu, Andrea Possenti, (co-chair), Isabella Pizzetti, Serra, Corrado Trigilio, Grazia Umana(co-chair), ...





# Acknowledgements

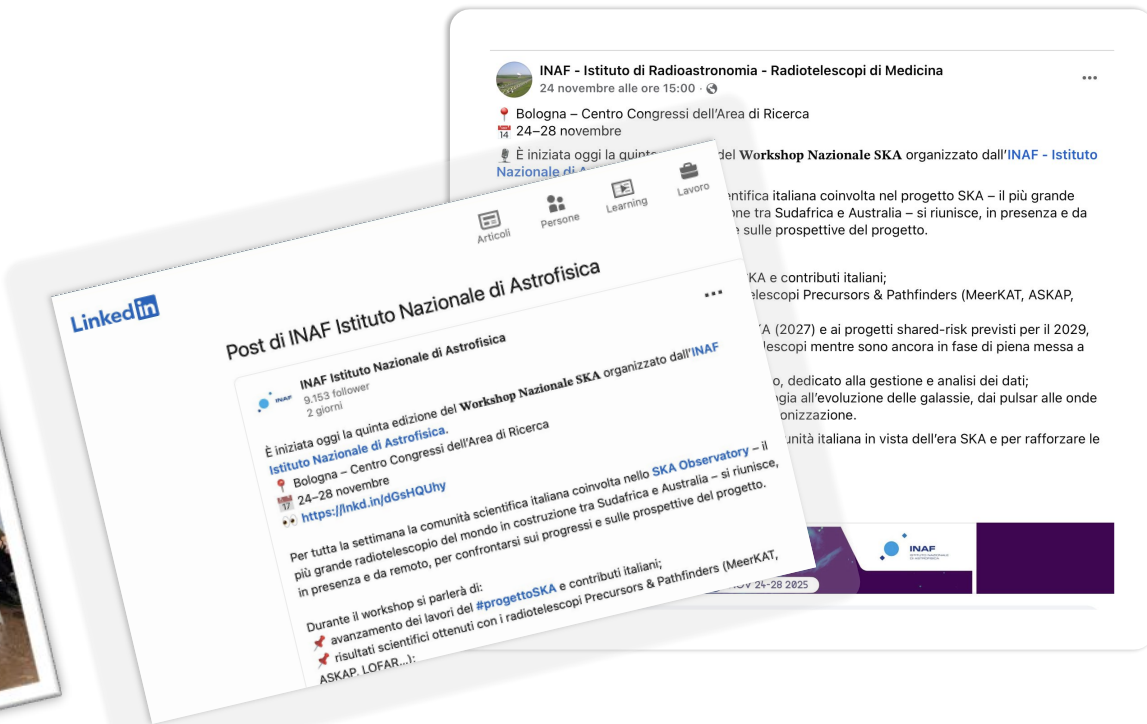
- **LOC:** Gianni Bernardi (chair), Rossella Cassano, Emilio Ceccotti, Eleonora Ferroni, Matteo Gandolfi, Elia Gasperini, Marika Giulietti, Dario Govoni, Davide Pelliciari, Isabella Prandoni, Paolo Serra
- **Admin:** Dario Govoni and the IRA staff
- **Technical support:** Matteo Gandolfi, Elia Gasperini, Matteo Stagni, Francesco Bedosti
- **Microphones:** Luca Beduzzi, Jort Boxelaar, Emilio Ceccotti, Maicol Della Chiesa, Ettore Delpogetto, Amin Ghasemi Azar, Davide Redana, Davide Pelliciari, Koushika Sri Lakshmi Srikanth, Gayathri Santhosh





# Acknowledgements

- **Media/Socials:** Eleonora Ferroni, Marta de Mitri, Daria Guidetti, Marco Malaspina, Rossella Spiga



# Acknowledgements

- All Speakers & Participants

Thanks!

