The Third National Workshop on the SKA Project - The Italian Route to the SKAO Revolution

4 October 2021

SKA Regional Centres (SRC): the Italian contribution

SKAO REGIONAL CENTRE NETWORK

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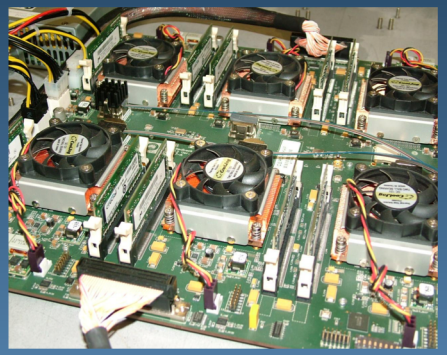
The SKAO data flow

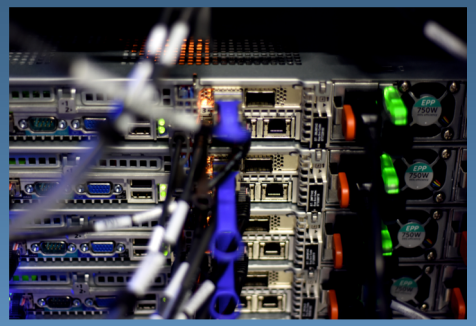
CSP: Central Signal Processor



e.g. FPGAs in the ASKAP correlator

5 Tb/s
data buffer of 2 weeks

SDP: Science Data Processor



e.g. SDP prototype, Cambridge

5 + 9 Tb/s
data
buffer of
2 minutes

600 PB/yr
data persistence

SRC: SKA Regional Centre network

SRC
SRC
SRC
SRC
SRC

SKA portal

Distributed facilities

USERS

Courtesy: Philippa Hartley (SKAO)

The aims of the Ska Regional Centres (SRCs)

July 2016: the SKA Board deliberated:

"**The SKA Observatory will coordinate a network of SKA Regional Centres that will provide the data access, data analysis, data archive and user support interfaces with the user community**"

November 2018: the SKA Board deliberated:

"**The mission of the SRC Steering Committee (SRC-SC) is to define and create a long-term operational partnership between the SKA Observatory and an ensemble of independently-resourced SKA Regional Centres.**

The SRC-SC will be superseded in due course by the operational partnership that is formed as a result of its work"

SKAO REGIONAL CENTRE NETWORK

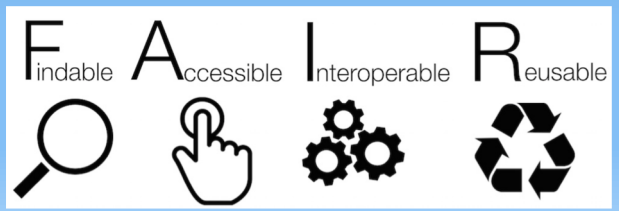
The SRC-Steering Committee (SRCSC)

Peter Quinn	Australia
Severin Gaudet	Canada
An Tao	China
Jean-Pierre Vilotte	France
Hans-Rainer Kloeckner	Germany
Yogesh Wadadekar	India
Andrea Possenti	Italy
Akahori Takuya	Japan (observer)
Hyunwoo Kang	Korea (observer)
Michiel van Haarlem	The Netherlands
Domingo Barbosa	Portugal
Frank Bradley	South Africa
Lourdes Verdes-Montenegro	Spain
John Conway	Sweden
Emma Tolley	Switzerland
Jeremy Yates	United Kingdom
Antonio Chrysostomou	SKA Organisation
Rosie Bolton (secretary)	

The responsibilities of the SKA Observatory and of the Ska Regional Centres (SRCs)

The SKA Observatory and the SRCs will be jointly responsible for:

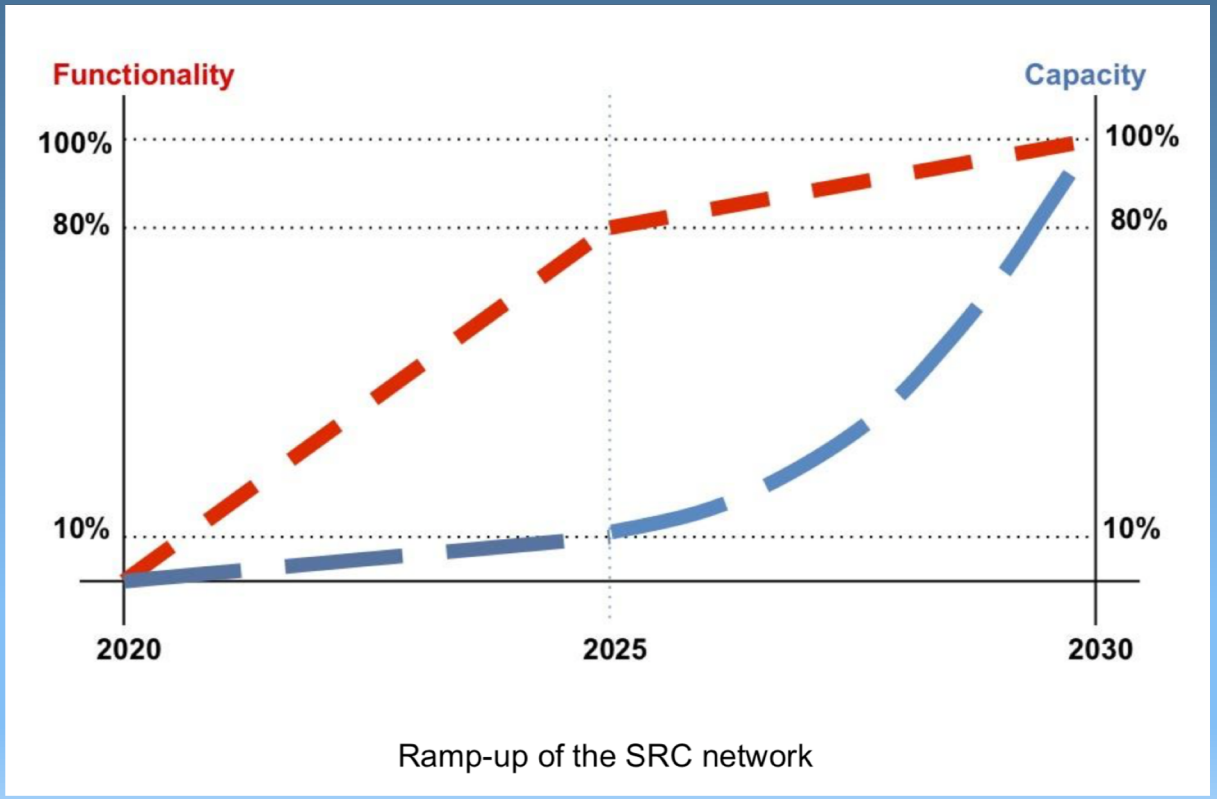
a) maximizing the quality of SKA data delivered to users;
b) the production of Advanced Data Products;
c) storing, archiving and curation of the primary SKA output data and of the Advanced Data Products;
d) ensuring that the approved science program can be accommodated within available resources;
e) ensuring the availability of a platform of distributed services across computational and data infrastructures to support the user community to deliver SKA science, under the FAIR principles.



SKAO REGIONAL CENTRE NETWORK

The White Book… subjects under discussion

- Governance and Operations
- National Partecipation
- Baseline Functionalities



Ramp-up of the SRC network

The White Book…

Some reference specifics for the whole SRC network at regime ≈ 2029

Data Flow PB/yr	Processing PFlop/s	Network mean speed Gb/s
710	22	100

Some reference costs for the whole SRC network at regime ≈ 2029

Data (M€/yr)	Processing (M€/yr)	Network (M€/yr)	Personnel (M€/yr)
18	2.4	5	10

Allowing for the current uncertainties in the design the likely cost for the whole international SRC network at regime will be in the 20-40 M€/year range …

… including ≈ 100 FTE of personnel

SKAO REGIONAL CENTRE NETWORK

The SKA Regional Centres Working Groups

WG0: SRC Network Architecture

WG1: Data Logistics Working Group

WG2: Operations Working Group

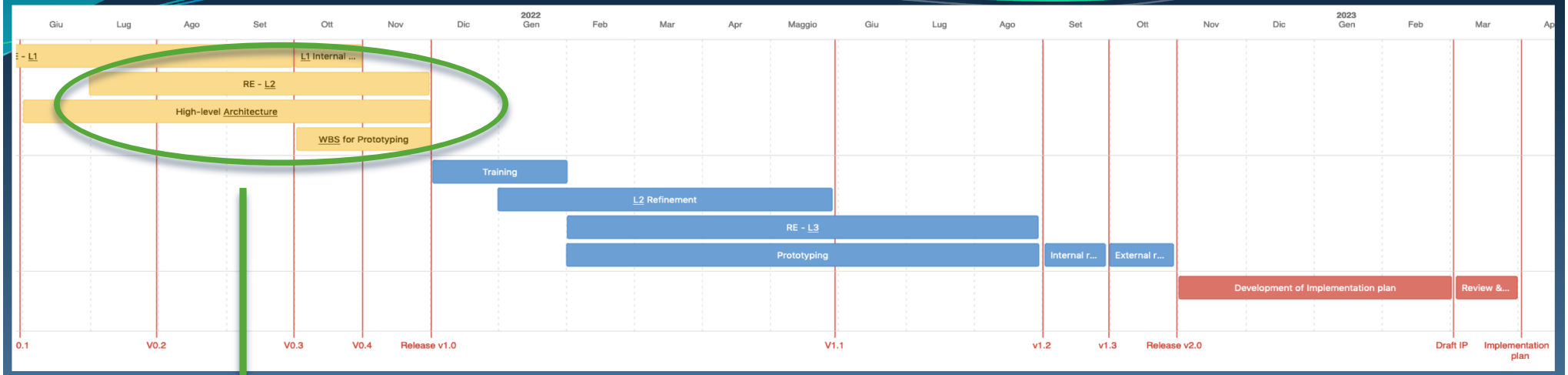
WG3: SW, Federated Computing and Data Software Services

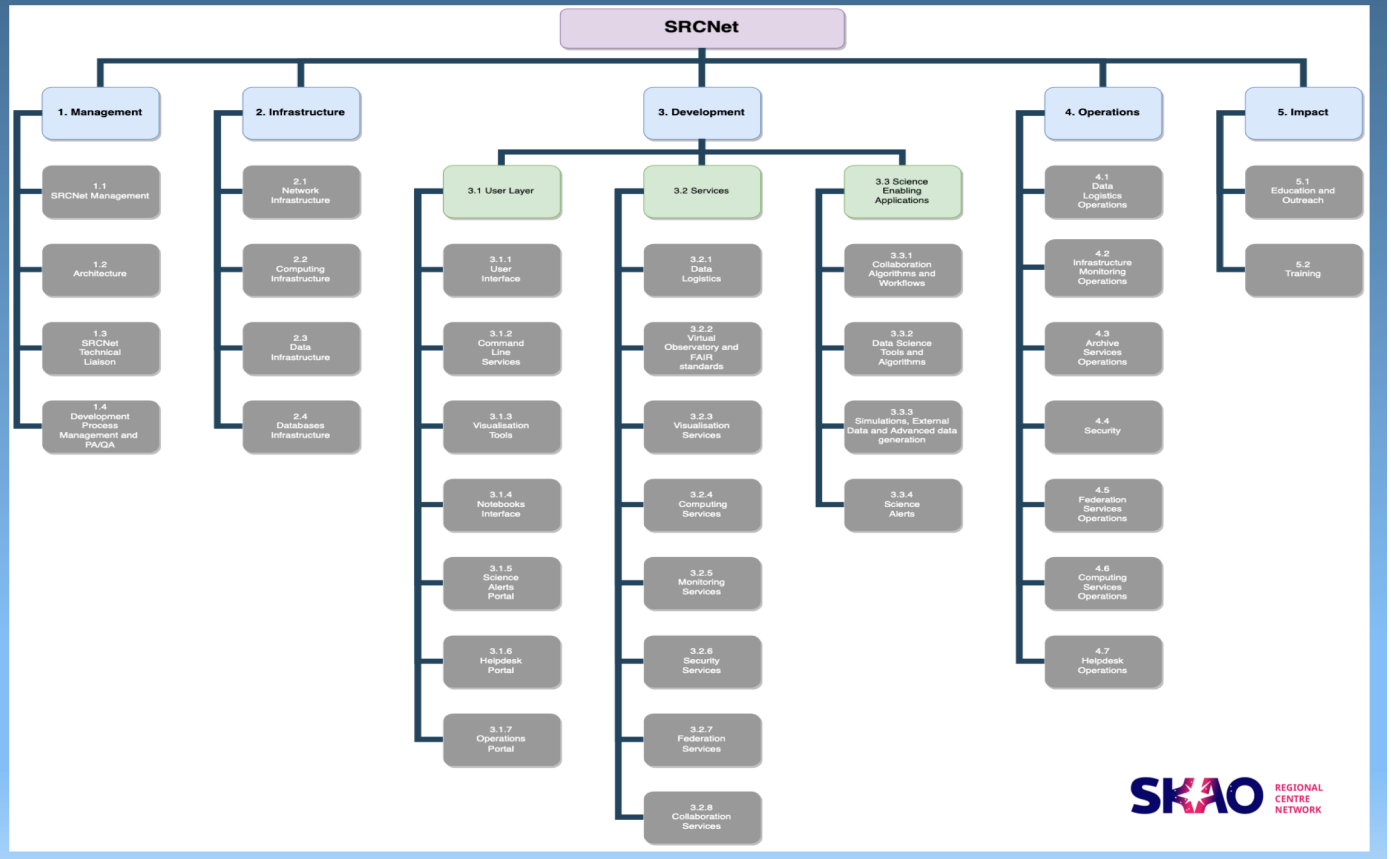
WG4: SW, Science Archive-VO-FAIR

WG5: Compute Working Group

WG6: Science User Engagement

The (drafted) plans of the SRC for the future





Now mostly working on:
* Collection of requirements
* Work Breakdown Structure (WBS)

Expertise in the Working Groups will be distributed in the WBS

Italian expected outcome of the SRC-SC activities

✓ **1. The identification of a kernel of "modi operandi" in the interactions among the various actors to secure an efficient and always developable science-needs driven system**

✓ **2. The possibility for the regional communities to obtain access to the system (and keep a role of management/development of that) at the minimum in proportion to the local investments**

✓ **3. The establishment of a SRC network with a significant pole located in Italy**

Italian involvement in current activities

science

≈ 100 Italian astro-scientists are members of the SKA Science Working Groups!

Develop requests and imagine solutions to the USE CASES for the SRC network

+

Staying at the frontline in ADAPTING to the new way for doing data reduction and computation in the SKA era

SKA Science Regional Centres - SCSRC community input

Survey Flow

Standard: Questionnaire Preamble (2 Questions)
Standard: Section 0 - Some general questions (6 Questions)
Standard: Section 1. Data products and scientific requirements (17 Questions)
Standard: Section 1. Data products and scientific requirements_Loop (66 Questions)
Standard: Section 2. Archive mining and VO Interface (19 Questions)
Standard: Section 3. Post-processing – Analysis – Visualisation (53 Questions)
Standard: Section 4. User support (11 Questions)

The Questionnaire for the SWGs: 174 questions!

Italian involvement in current activities
the SKA Regional Centres Working Groups

Working Group	Theme	Italian participants
WG0	SRC Network Architecture	**1** core member
WG1	Data Logistics Working Group	**1** core member
WG2	Operations Working Group	**1** core member + **3** consultant
WG3	SW, Federated Computing and Data Software Services	**3** core members + **1** consultant
WG4	SW, Science Archive-VO-FAIR	**1** core member + 4 consultant
WG5	Compute Working Group	**1** task leader + **2** core members
WG6	Science User Engagement	**1** chair + **2** task leader + **2** core members + **6** consultant

1 chair + 3 task leaders + 8 core members + 10 consultant members [total FTE ≈ 2]
≈ 15% of the total participants

Perspective needs for the achievement of the INAF aims

hardware

The aim is an Italian SKA Regional Centre (SRC) pole, integrated both in the SRC European network and with the new IT infrastructure of INAF

Start with a Tier-3/Tier-2 protoSRC by 2023 …

… and progressively attain, **by 2029**, a **Tier-1** size infrastructure with capability of **≈ 3+ Pflops** and **≈ 70+ PBy/yr** of storage connected at **100 GB/s** with the other poles

Technopolo - Bologna

A most likely location for the Tier-1 will be the Technopolo in Bologna, where there will be also the Leonardo 270 Pflops system, the ECMWF, the INFN and the CINECA

Perspective needs for the achievement of the INAF aims

personnel

- to match the Italian percentage involvement in the SKAO construction, at least 6 FTE must be devoted to the SRC network at regime
- to run a significant **Italian pole** of the SRC network, **10-12 FTE** are needed at regime

Most FTE possibly in the context of a putative "software division" within INAF and with expertise in:

(a) understanding of the operations of the data acquisition systems,
(b) management and development of the systems that will oversee the data analysis/curation/archiving,
(c) development of scientific software
(d) interaction with the users in the preparation and management of the observing programs

Where to find and how to enrol them ?

Perspective needs for the achievement of the INAF aims

money

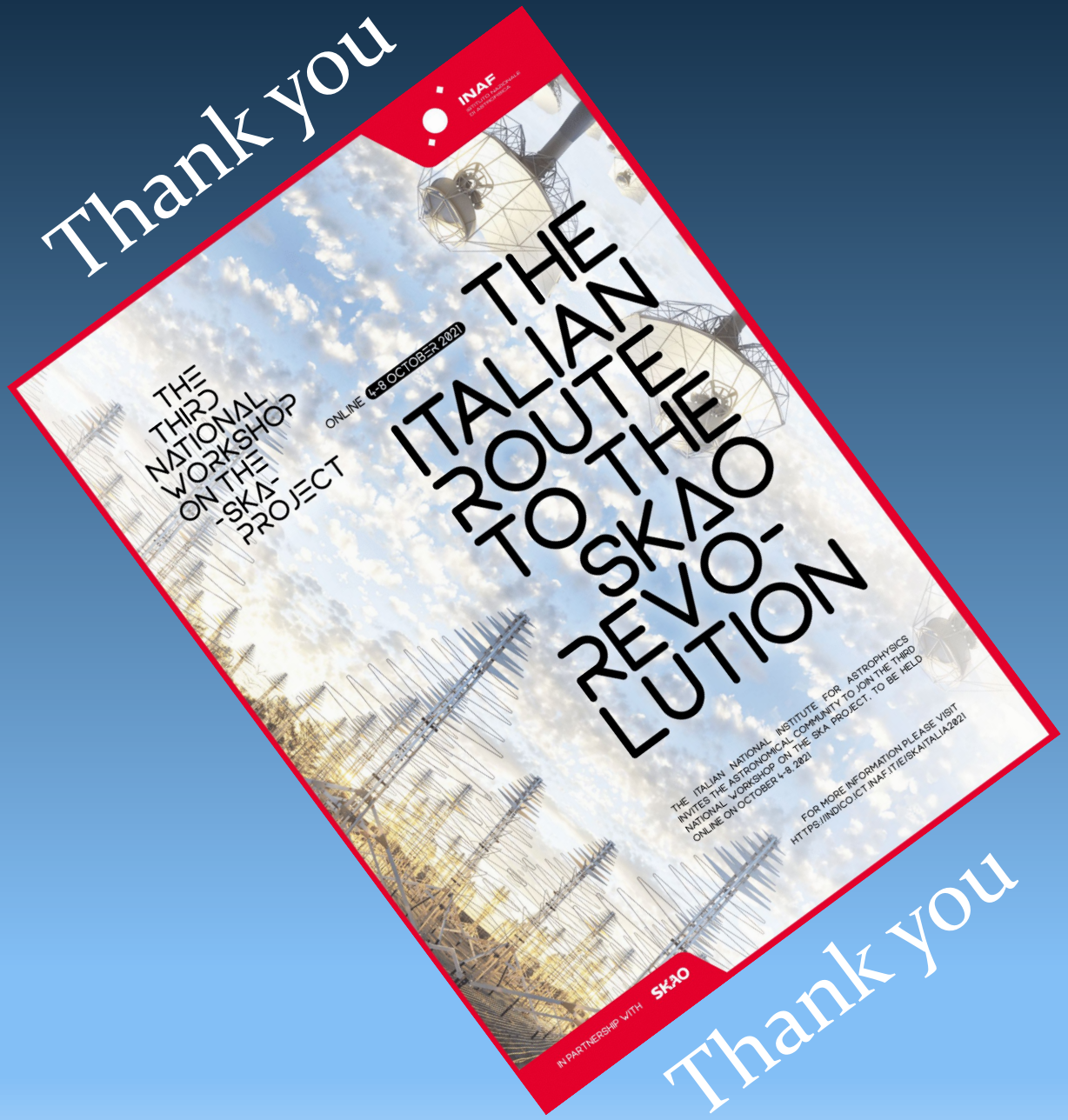
In order to establish and then to run a significant **Italian pole** of the SRC network (i.e. a **Tier-1 infrastructure**), including
* the cost of the personnel,
* the initial acquisition and then periodic upgrade and substitution of the hardware,
* the cost of the network

20-30 M€ needed in the interval 2022-2029 (mostly in 2024-2029)

≈ 3 M€ per year since 2030 onwards

DM 450 and PNRR resources ?

Thank you



Thank you