

# Reconfigurable Intelligent Surfaces for B5G/6G

## ETSI ISG RIS Proposal

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# Outline

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# Motivation

An ETSI RIS ISG provides an opportunity for ETSI members to **coordinate their research efforts across various projects and initiatives towards exploring the technology and its applications and investigating its standardization requirements in beyond 5G/6G standards.**

- **Reconfigurable intelligent surfaces (RIS)** correspond to smart radio surfaces of many small antennas or reconfigurable metamaterial elements which enable controlling the propagation environment through tuneable scatterings of electromagnetic waves (EM).
- The RIS ability in terms of **reconfiguring the wireless channel** has motivated **a host of potential new use cases**, including utilising RIS as intelligent repeaters to enhance performance of field deployments and as holographic massive antenna arrays for implementing low-cost and low-complexity multiple-input multiple-output (MIMO) radios.
- RIS has attracted a lot of attention in academia and there are **ongoing industrial R&D projects** dedicated to the study of RIS as a potential B5G/6G technology, including ***AIMM, ARIADNE, RISE-6G, DAEMON, HEXA-X, METAWIRELESS, 5GMARTFACT, PATHFINDER.***

# Key EU Collaborative Projects including RIS



*AI-based Massive MIMO*

<https://celticnext.eu/project-aimm/>



*Artificial Intelligence Aided D-Band  
Network for 5G Long Term Evolution*

<https://www.ict-ariadne.eu/>



*Reconfigurable Intelligent Sustainable  
Environments for 6G Wireless Networks*

<https://rise-6g.eu/>



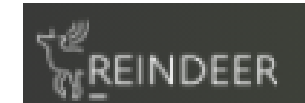
*The joint European initiative to  
shape 6G*

<https://hexa-x.eu/>



*Network intelligence for adaptive  
and self-learning mobile networks*

<https://h2020daemon.eu/>



*REsilient INteractive applications  
through hyper Diversity in Energy  
Efficient RadioWeaves technology*

<https://reindeer-project.eu/>

## 5GSMARTFACT

*Future Wireless Connected and  
Automated Industry enabled by 5G*

<https://5gsmartfact.upc.edu/>

## META WIRELESS

*Future Wireless Communications Empowered  
by Reconfigurable Intelligent Meta-Materials*

<https://h2020-msca-itn-metawireless.cnit.it/>

## PATHFINDER

*Intelligent metasurface  
transformation of wireless networks*

<https://cordis.europa.eu/project/id/89>

# IEEE COMSOC Initiatives on RIS

RISE

SIG on RECONFIGURABLE INTELLIGENT SURFACES FOR SMART RADIO ENVIRONMENTS (RISE)  
<https://sites.google.com/view/ieee-comsoc-wtc-sig-rise>

REFLECTIONS

SIG on REconFigurable Intelligent Surfaces for Signal Processing and CommunicatiONS (REFLECTIONS) <https://spcc.committees.comsoc.org/special-interest-groups/sig-reflections/>

ETI-RIS

Emerging Technology Initiative on Reconfigurable Intelligent Surfaces (ETI-RIS)  
<https://riseti.committees.comsoc.org/>

BEST-READS

Best Readings in RISs: <https://www.comsoc.org/publications/best-readings/reconfigurable-intelligent-surfaces>

# ETSI RIS ISG proposal: Mission and Scope

**Mission:** To explore RIS technology and its applications across the wide spectrum of use cases and deployments, and identify any specification needs that may be required

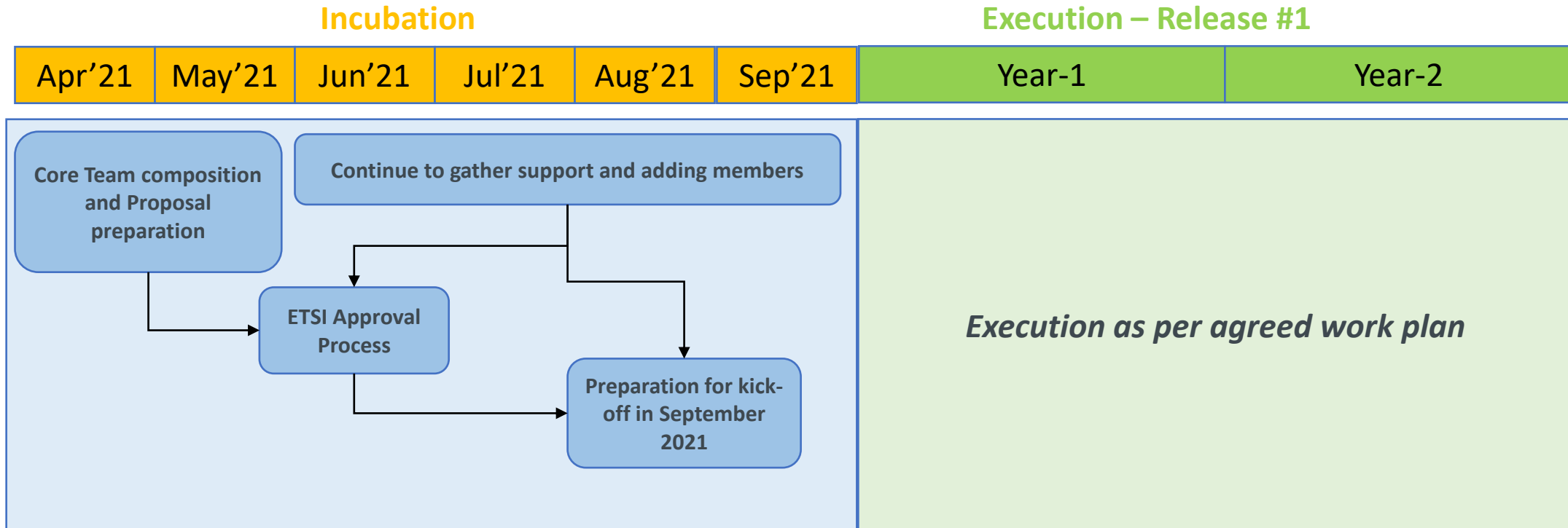
## **Tentative Scope:**

- Use case definitions and requirements (including RIS as intelligent repeaters, holographic surfaces, and dual functionality)
- Deployment scenarios (e.g., frequency bands, antenna design, RF parameters, backhauling etc.)
- Architecture framework (Functional architecture)
- Link level design mechanisms and protocols
- System and network level design mechanisms and protocols
- Evaluation methodology
- Performance evaluation (Link and System levels)
- Proof-of-concepting (Prototyping)

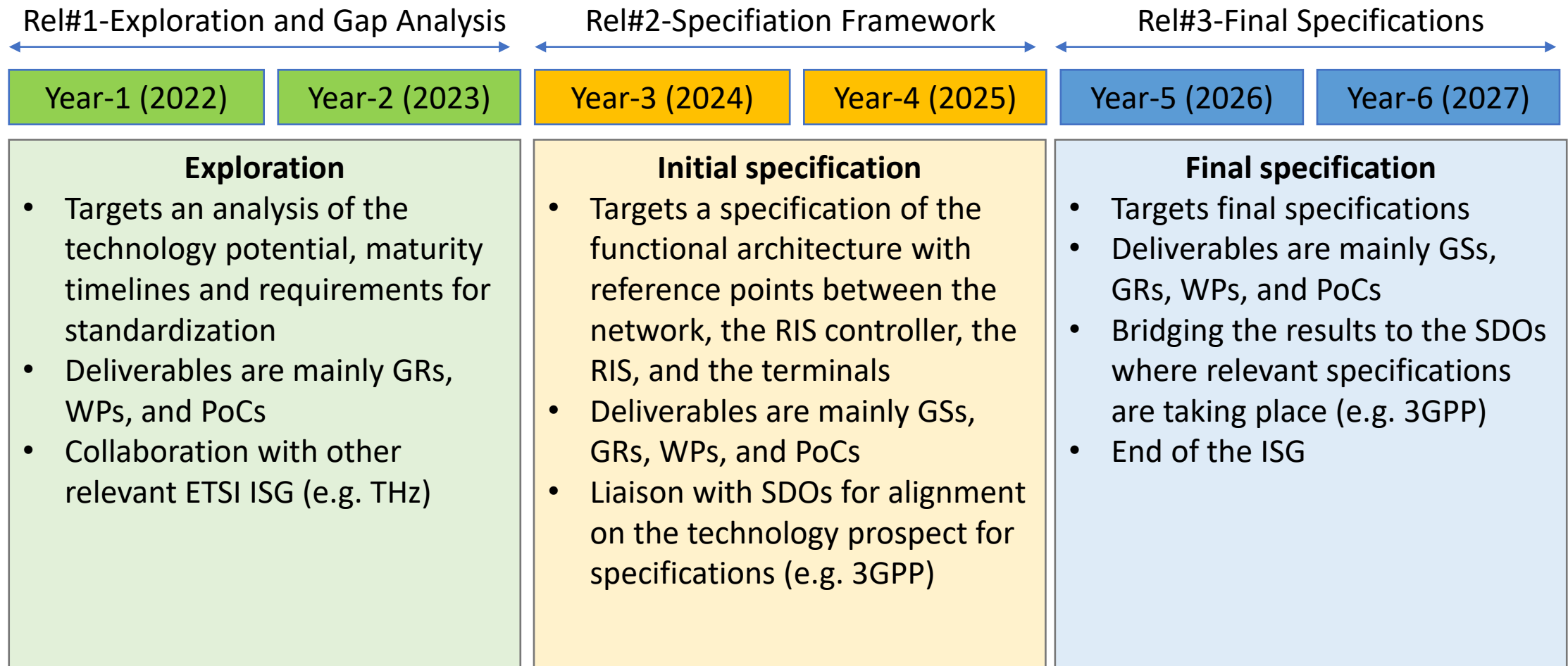
# Timeline and Deliverables

**Deliverables:** Technical Reports (TR/GR), White Papers and Proof-of-Concepts

## **Timeline:**



# Longer Term Roadmap





# Current Founding Members (Confirmed)

No	Organization	Country	Type	ETSI Member	ETSI Board Member	Contact Points
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12						

# Observers (Confirmed)

**Observer definition:** Keen interest in following the preparation of the ISG creation with serious consideration in joining the ISG after it has been approved by ETSI

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