AI/ML as a Key Enabler of 6G Networks

Methodology, Approach & AI-Mechanisms in SNS JU

SNS Technology Board White Paper

SNS ICE / SNS TB Webinar

18 March 2025

Welcome

The event is recorded!

Please keep your mic **muted** at all times, if you are not presenting

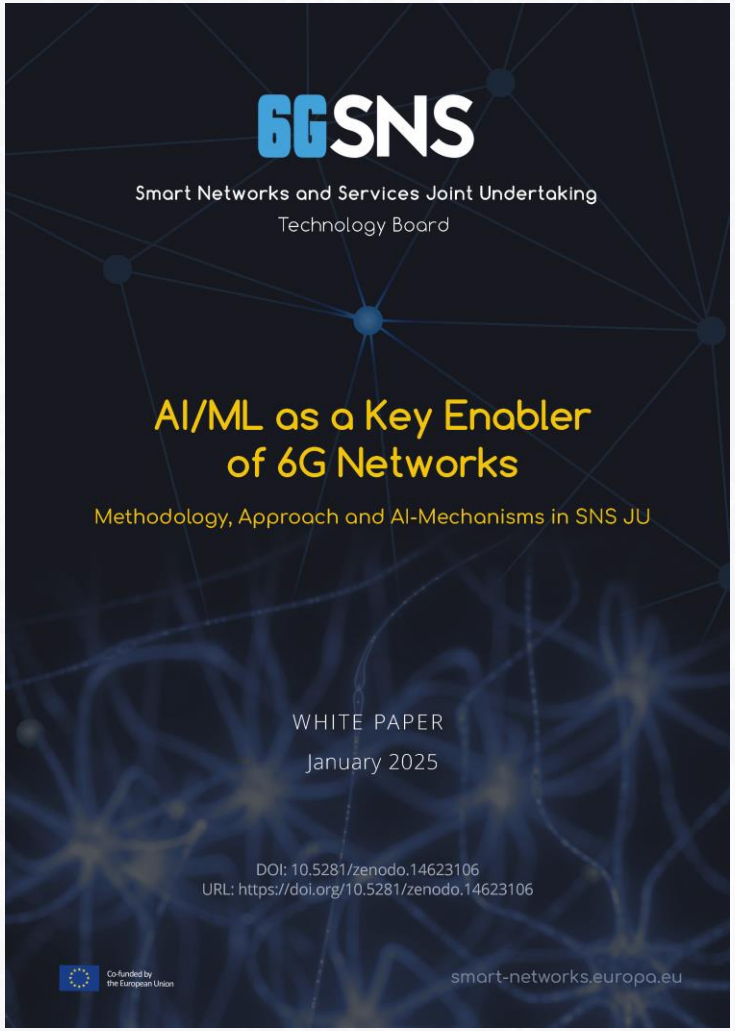
Please use the chat box to ask questions at respective speakers (to be discussed during the Q&A part)

Video & Audio (Podcast) recording will become available after the completion of the event.

ENJOY THE EVENT!

Agenda

	AI/ML White Paper Webinar	
Time (CET)	**Session Title**	**Presenter**
10.00 – 10.05	Intro & Welcome	Kostas Trichias (TB chair, 6G-IA)
10.05 – 10.15	AI/ML use in SNS JU – Statistics & high-level categorization	Kostas Trichias (TB chair, 6G-IA)
10.15 – 10.25	AI/ML Mechanisms & Methodologies In SNS	Pawani Porambage (VTT)
10.25 – 10.35	AI Models in SNS	Chafika Benzaid (UOULU)
10.35 – 10.45	AI/ML Training Data sets & Security/Privacy	Marios Avgeris (UvA)
10.45 – 10.55	AI/ML Input/Output Data & Conclusions	Maria Christopoulou (NCSR “Demokritos”)
10.55 – 11.15	Q&A	Moderator: Kostas Trichias (TB chair, 6G-IA)
End of Webinar		

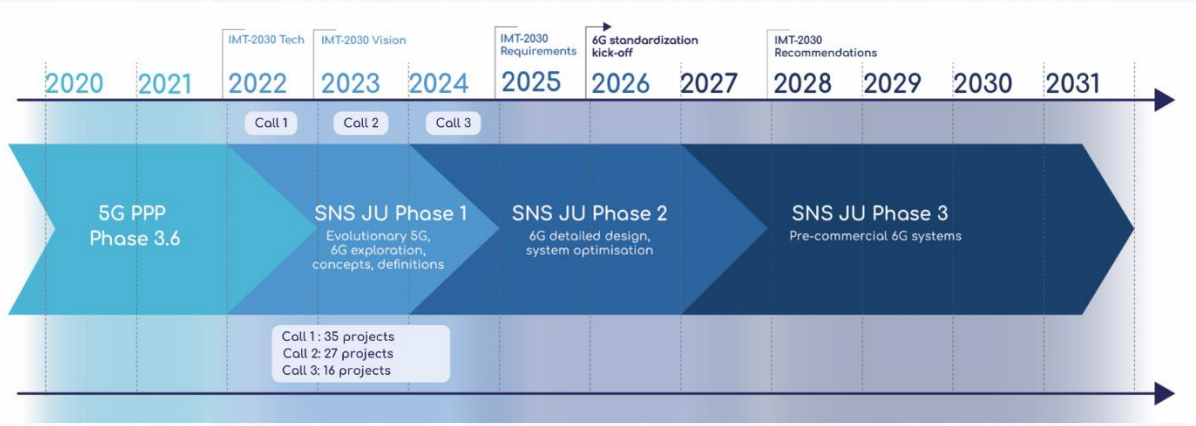


The SNS JU so far….

3 Calls

79 Funded Projects

501 € Million invested



1244 Total entities funded

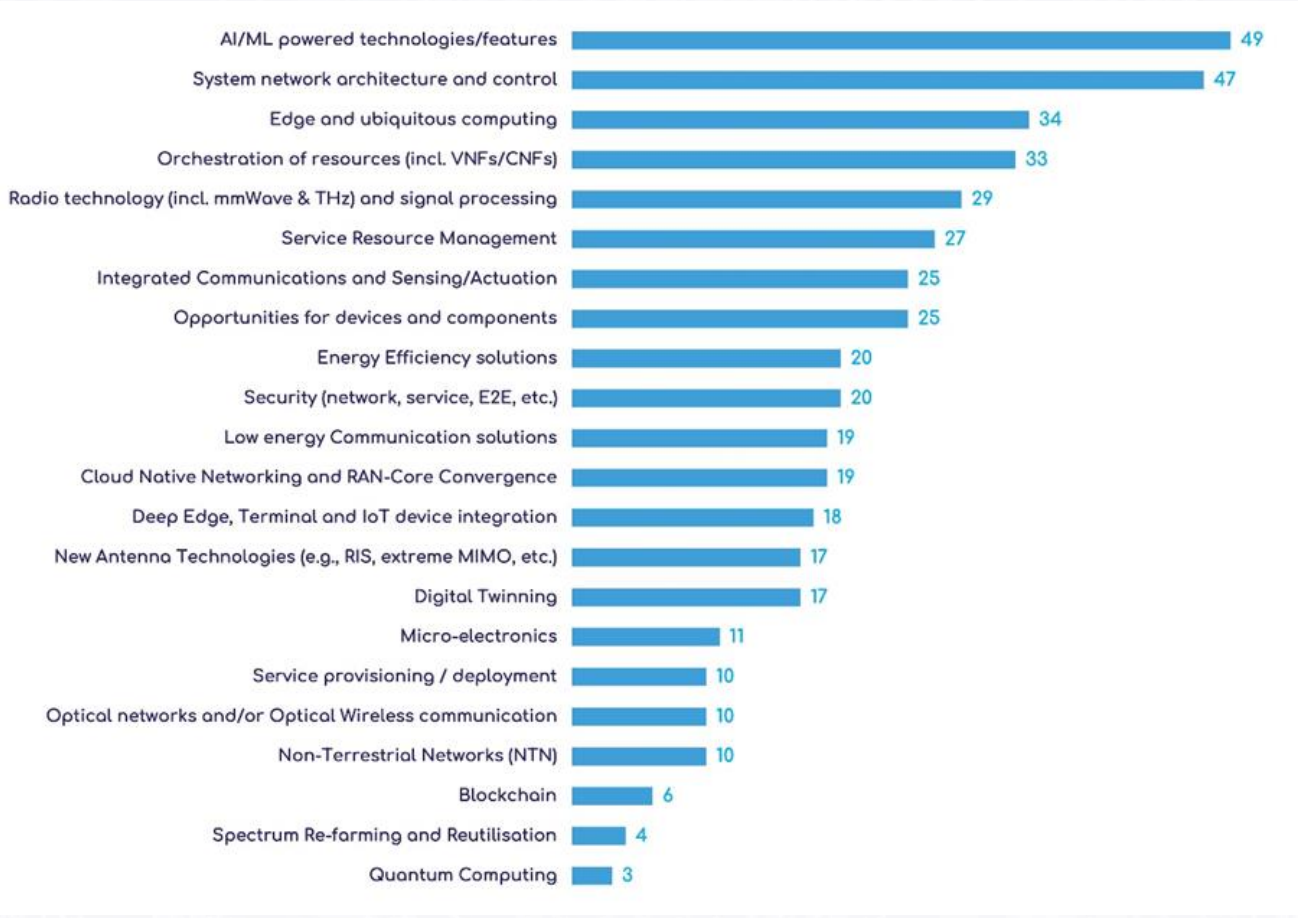
505 Unique entities funded

26% SME participants, claiming 24% of EU funding

33 participating countries

AI/ML use in SNS JU

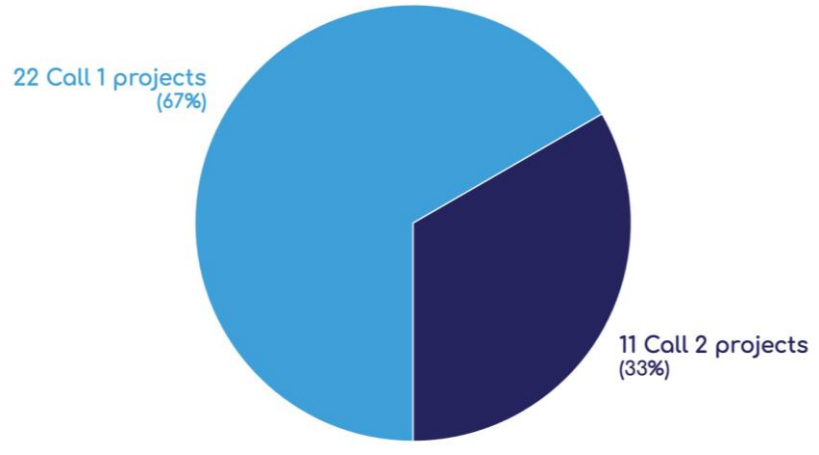
- 6G Networks are set to be the first **AI-native** networks deployed
- A survey among the **63 Call 1 & Call 2 SNS JU projects** revealed that AI/ML mechanisms are by far the most addressed aspect in SNS research
- The collaborative body of SNS project Technical Managers (Technology Board) launched a large-scale survey to investigate (among others)
  - The AI models used
  - The methodology and approach followed
  - The type, target & characteristics of the AI mechanisms developed
  - The AI data (input & output) of the mechanisms
- Insightful outcomes and conclusions produced based on the input of **33 SNS JU projects** and presented in the recent TB White Paper[1]
  - The publications also touches upon AI regulatory framework, International AI research landscape & AI architectural implications



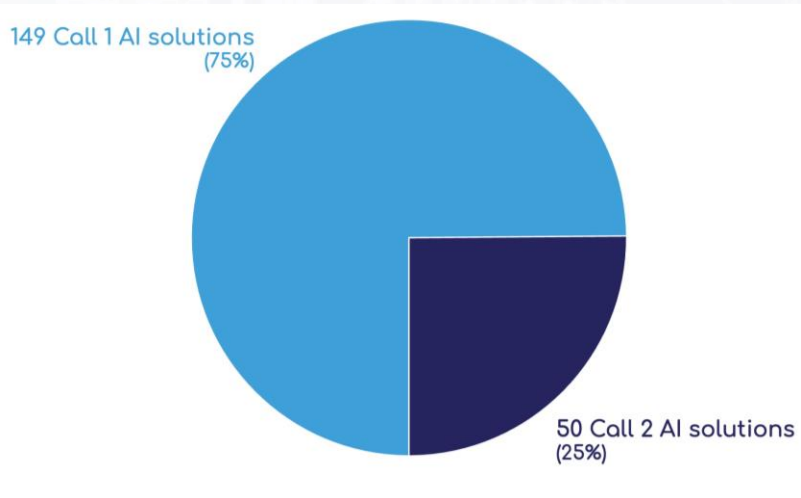
[1] https://smart-networks.europa.eu/sns-publications/

SNS Projects & AI Solutions Statistics

- Significant effort from SNS JU researchers to develop 6G-related AI/ML Mechanisms
  - ***33 SNS JU projects*** (from Call 1 & Call 2) actively working on developing AI/ML mechanisms
  - **199 AI/ML Mechanisms** developed in total
    - Almost 75% of those from Call 1 projects (more projects and more mature)
- This significant engagement showcases the importance of AI/ML for the development of 6G Networks



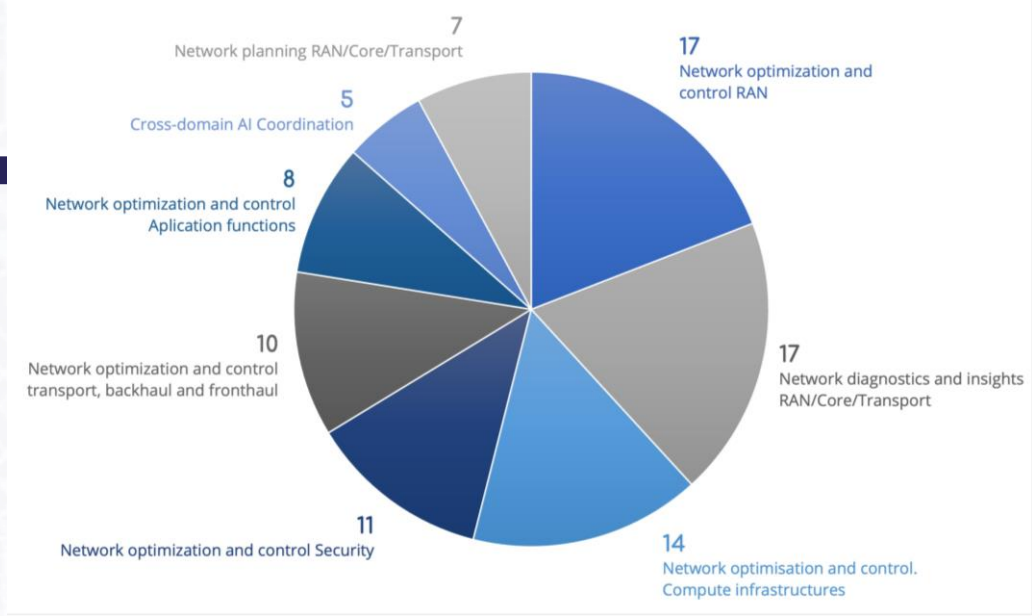
SNS Projects developing AI/ML mechanisms



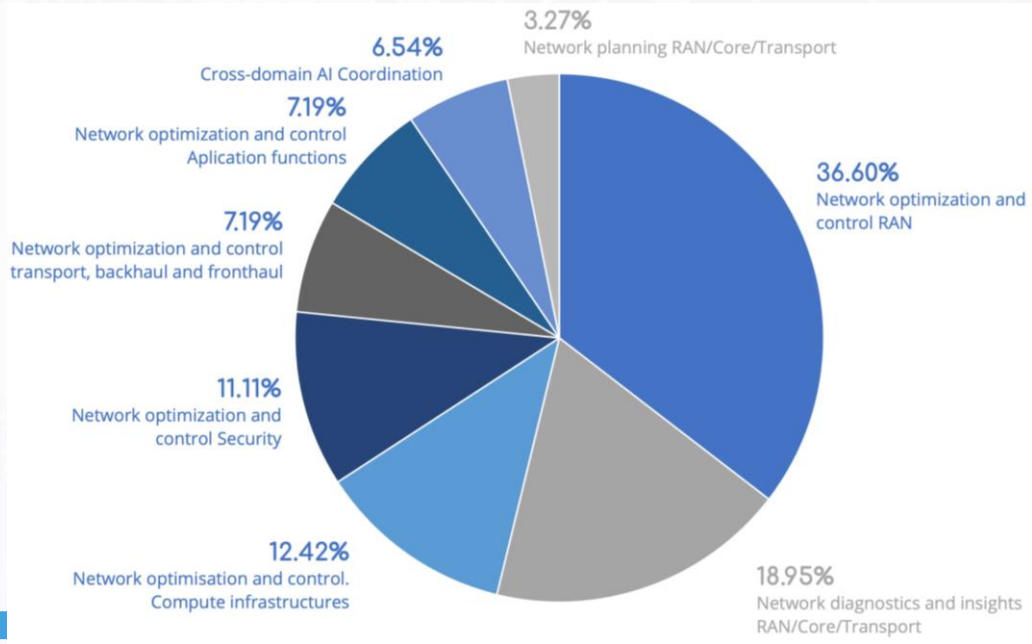
Number of AI/ML solutions being developed

AI Category of Solution

- The High-level category of solutions that projects apply AI/ML mechanisms on, was investigated
  - ***Network optimization & Control*** is by far the most addressed category covering different layers/levels (*RAN, Compute Infrastructure, Security, Transport/backhaul, Application*)
  - ***Network Diagnostics and insights*** on multiple levels are also very popular among SNS projects
  - Half of the projects address one or two categories, whereas the other half address between three and seven categories.



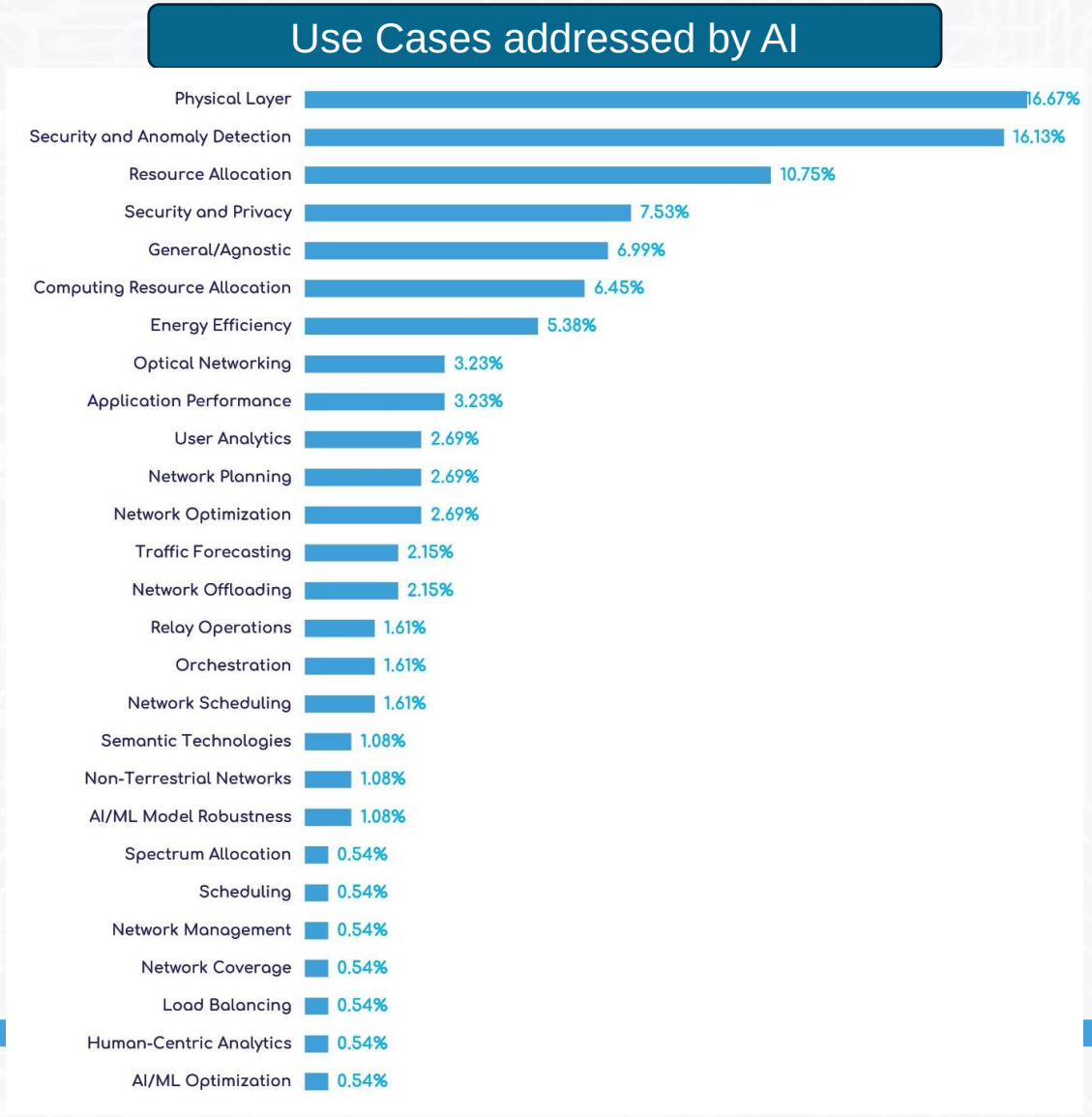
Number of Projects Dealing with Each Category



Percentage of Solutions in each Category

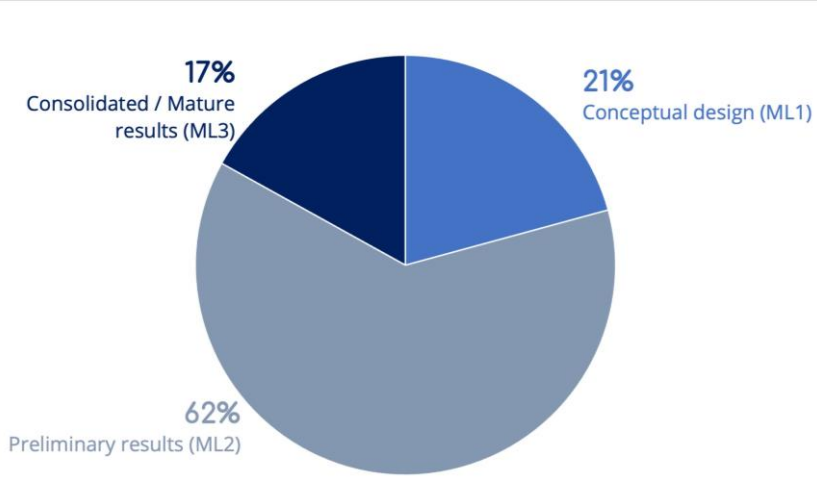
Use Cases addressed by AI mechanisms

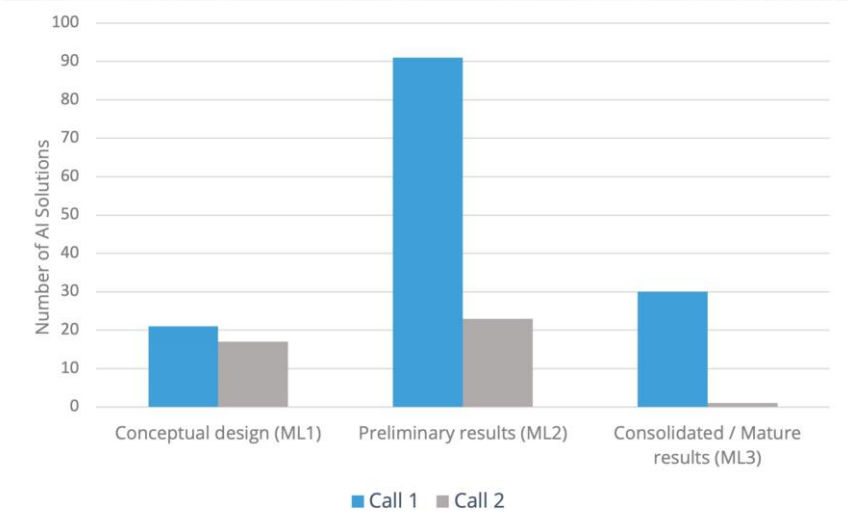
- The exact functionality of each mechanisms was investigated based on the addressed use case
- Use cases that relate to ***Radio aspects at the Physical layer*** are the most prevalent
- Use cases related to ***Security & Anomaly detection*** are a close second
- ***Resource Allocation*** in the network and ***Security and Privacy*** are also popular applications
- Large variety of use cases addressed (more than 27 different use cases)



Maturity of AI/ML Solutions

- The majority of AI-based solutions developed within SNS, are at a stage where preliminary results of the AI-mechanism are available
- Mechanism at an early development stage and at a mature stage are also available
- Majority of more mature mechanisms (ML2, ML3) are from Call 1 projects as they operate since 2023
- Call 2 projects are catching up and more mature results are expected soon





LEGEND

- ML1: Conceptual design
- ML2: Preliminary results available
- ML3: Consolidated / mature results available

6GSNS

6TH GENERATION SMART NETWORKS & SERVICES

THANK YOU FOR YOUR ATTENTION

smart-networks.europa.eu