



# CELTIC-NEXT

## Pitch of

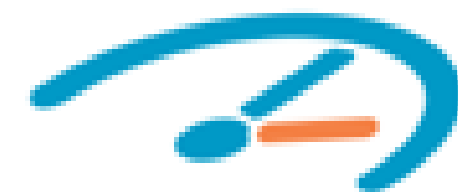
# the Project Proposal

17<sup>th</sup> of March 2023, Paris



## POSCA

# POsitioning Services in Cellular Architectures



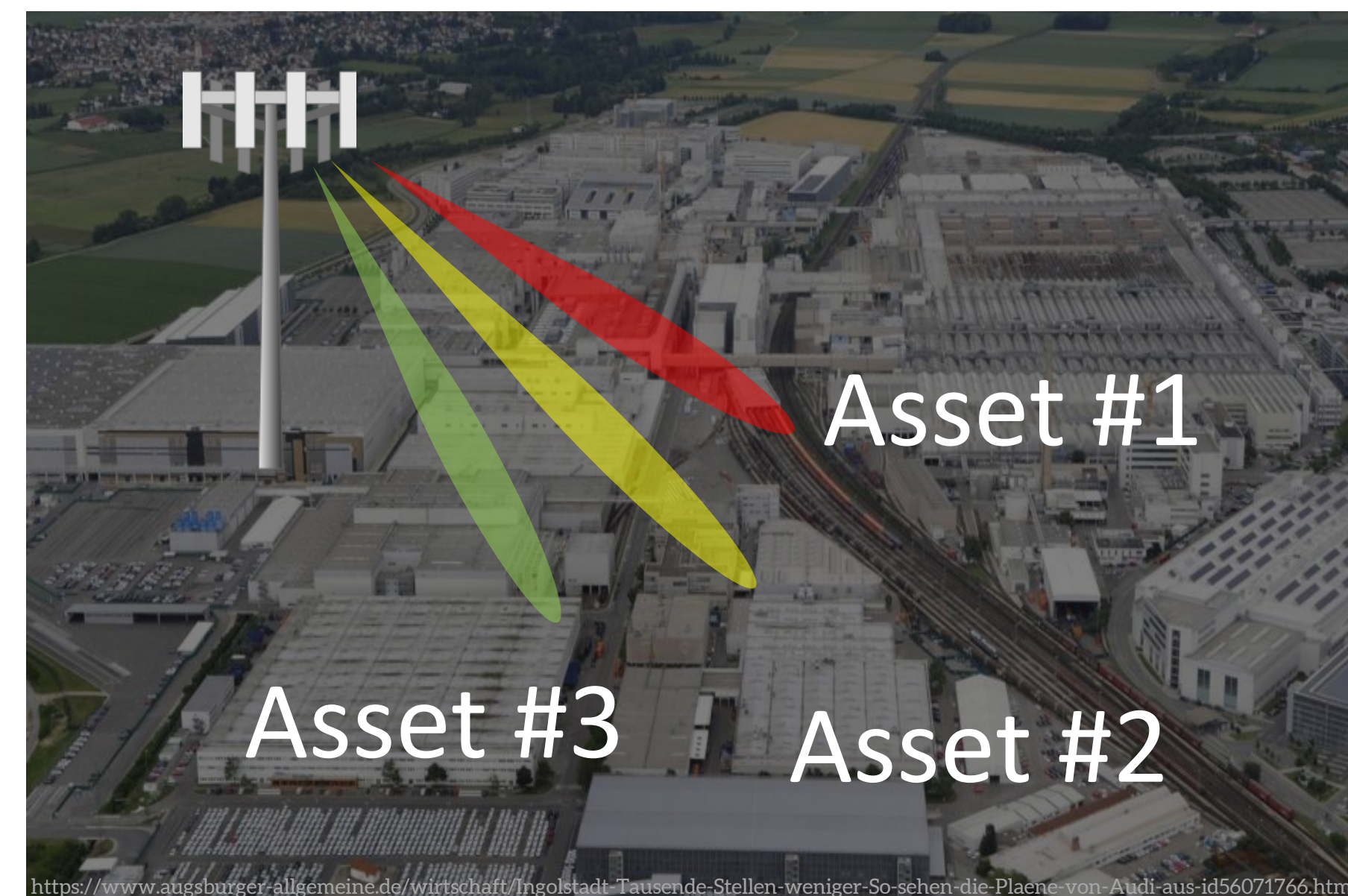
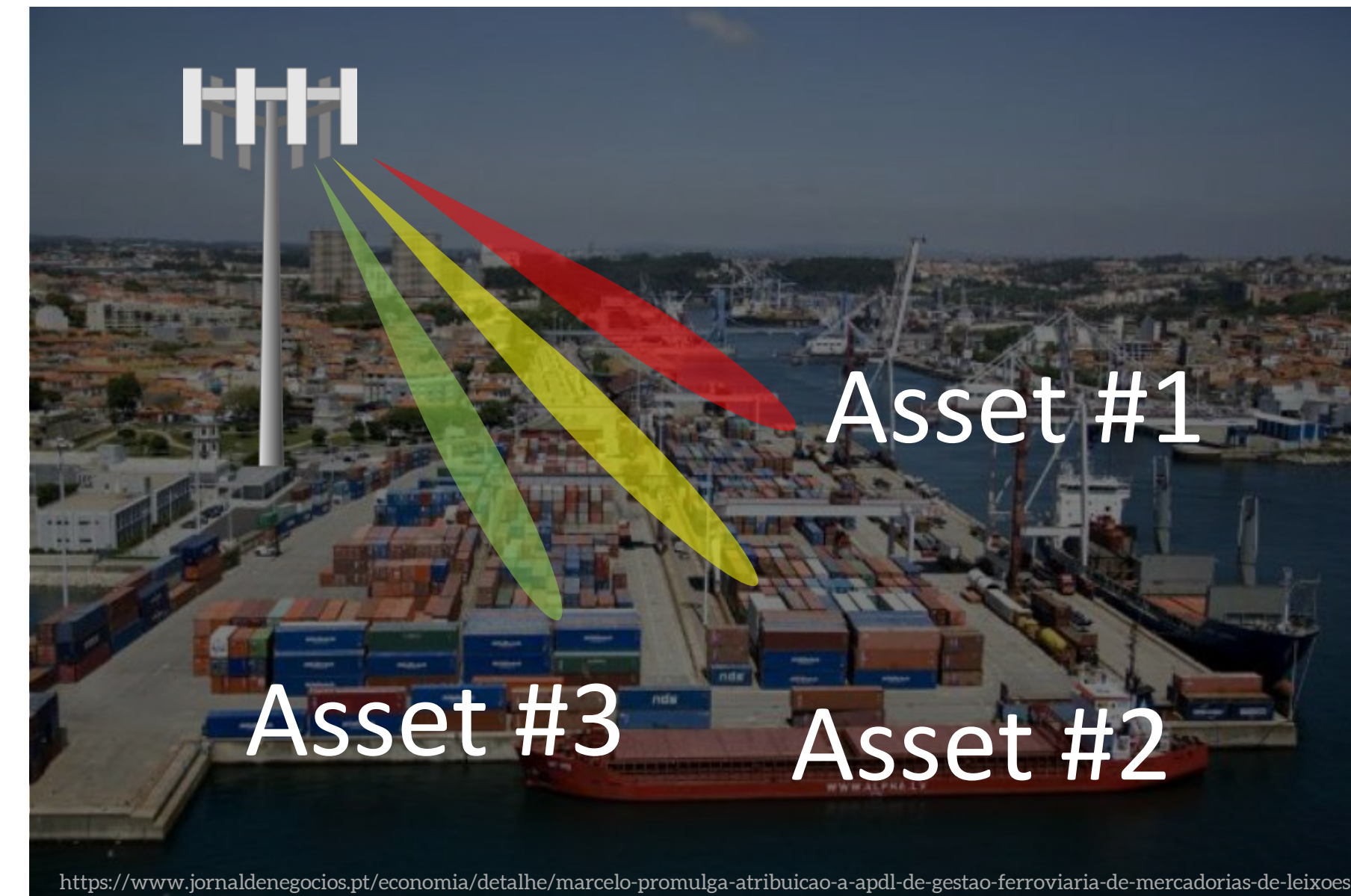
**CISTER** - Research Centre in  
Real-Time & Embedded Computing Systems

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# Teaser

- Trend towards deploying 5G networks in private premises
  - **Non-Public Networks**
  - 5G as a **single communication solution to serve an entire campus** (instead of WiFi+ walkies+Ethernet...)
  - Where: Ports, production facilities, warehouses, etc.
  - Relevant applications: **asset tracking**.
- Technology-wise: MIMO solutions (and others) allow for positioning in cellular context
- How to integrate positioning services in cellular architectures?
- And: how to make positioning a possible cellular service?





# Organisation Profile

- CISTER – Academic R&D Organization
  - Research Center in **Real-Time & Embedded Computing Systems**
  - Part of **University of Porto + Polytechnical Institute of Porto, Portugal**
  - Strong ties to major engineering schools and industrial ecosystem, both national and international
  - 25 Ph.D. researchers, 20 Ph.D. students, encompassing 20 nationalities
- Long record of participation in European projects & cooperation with companies
  - KDT JU (*ADACORSA, VALU3S, ...*)
  - Eureka ITEA4 (*MIRAI, Smart-PDM, ...*)



The screenshot shows the 'Projects Overview' page of the CISTER website. It features a navigation menu on the left, a main header with 'Projects Overview', and a central banner for the 'VALU3S' project. Below the banner is a grid of project cards and a table listing various projects.

Run	Funding	Global	CISTER
LEADER ADANET-Autonomous Drones Assisted Internet of Things Networks May 2022 - May 2025 POCI   PTDC/EEI-COM/3362/2021		242KEUR	179KEUR PE: Kai Li
PARTNER IBEX-Quantitative methods for cyber-physical programming Jan 2022 - Dec 2024 POCI   PTDC/CCI-COM/4280/2021		250KEUR	74.9KEUR CISTER Coordinator: José Proença
PARTNER VALU3S-Verification and Validation of Automated Systems' Safety and Security May 2020 - Jul 2023	FCT, European Union	26.1MEUR	240KEUR CISTER Coordinator: David Pereira
PARTNER FLOYD-5G/SDN Intelligent Systems For Low latency V2X communications in cross-Domain mobility applications Jan 2021 - Jul 2023 AAC n° 04/50/2019 - Grant nr 0459912   POCI-01-0247-FEDER-045912	ANI, European Union - Structural Funds, FCT, FCT, CMU	1.21MEUR	280KEUR CISTER Coordinator: Eduardo Tovar
LEADER RETINA-Real-Time support Infrastructure and Energy management for Intelligent carbon-Neutral smart cities Jan 2021 - Jul 2023 NORTE-01-0145-FEDER-000062	Norte 2020	499KEUR	243KEUR PE: Eduardo Tovar
PARTNER AMPERE-A Model-driven development framework for highly Parallel and Energy-Efficient computation supporting multi-criteria optimisation Jan 2020 - Jul 2023 ICT-01-2019-RIA   grant nr: 871469	European Union	5MEUR	326KEUR CISTER Coordinator: Luis Miguel Pinho
PARTNER FLY-PT-Mobilizar a indústria aeronáutica nacional para a disrupção no transporte aéreo urbano do futuro Jul 2020 - Jun 2023 Aviso 14/SI/2019, Mobilizador nr. 46079   POCI-01-0247-FEDER-046079	ANI, COMPETE 2020, European Union - Structural Funds	8.19MEUR	195KEUR CISTER Coordinator: Eduardo Tovar
PARTNER MIRAI-Machine Intelligence techniques for smart and sustainable planning and operation IoT and Edge computing applications Dec 2020 - Jun 2023 N° 069522		692KEUR	132KEUR CISTER Coordinator: Pedro Miguel Santos
PARTNER InSecTT-Intelligent Secure Trustable Things Jun 2020 - May 2023 H2020-ECSEL-2019-1-IA, Grant nr 876038   ECSEL/0002/2019	FCT, European Union	44.8MEUR	240KEUR CISTER Coordinator: Ramiro Robles
LEADER ADACORSA-Airborne data collection on resilient system architectures May 2020 - Apr 2023 H2020-ECSEL-2019-2-RIA, Grant Nr 876019   ECSEL/0010/2019	FCT, European Union	42.1MEUR	230KEUR PE: Eduardo Tovar

Check our Projects webpage:  
<http://cister.isep.ipp.pt/projects/>





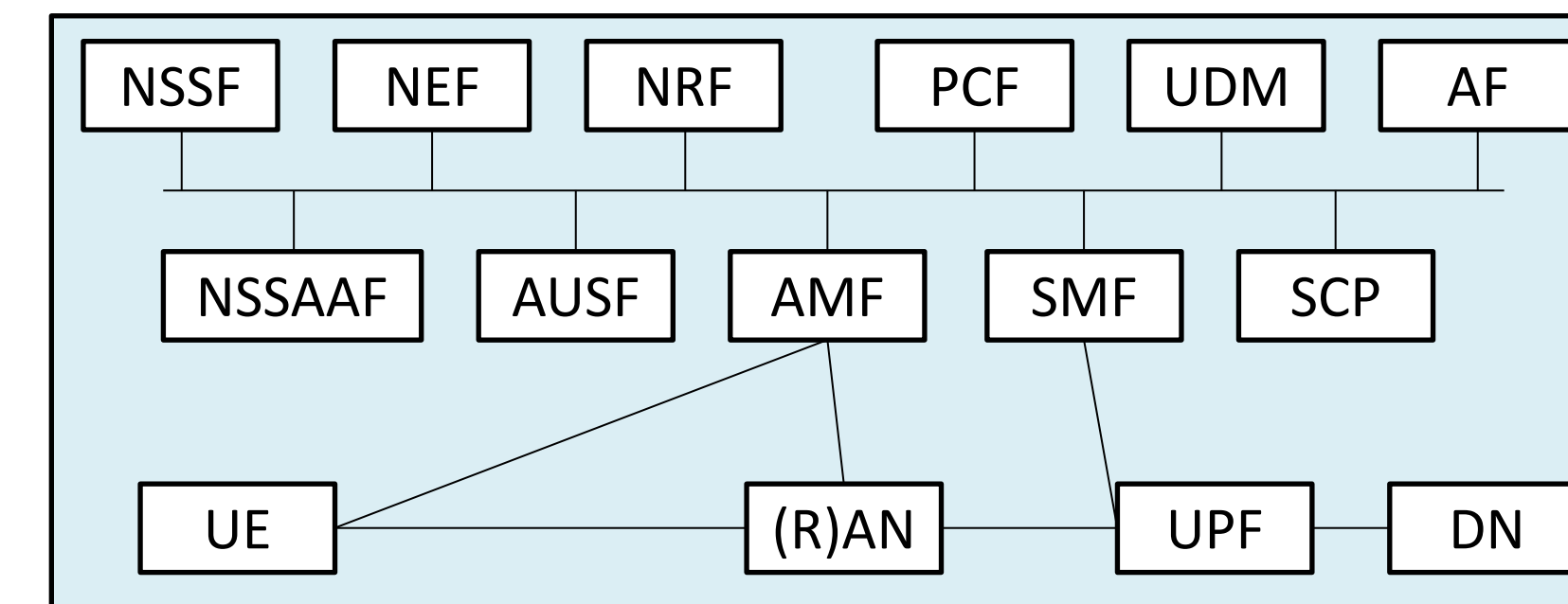
# Project Proposal POSCA

- **POsitioning Services in Cellular Architectures – POSCA**

- To make positioning a service in cellular networks

- Open questions:

- Q1: how good can positioning get in cellular contexts?
- Q2: how to integrate the positioning service in the system architecture of 5G/xG?



5G System Architecture

(adapted from ETSI TS 123 501 V16.6.0)

- **In outdoor scenarios, what about GPS?**

- Traditional solutions require GPS + cellular radio

- **Having 5G/6G/xG offer positioning removes the GPS**, reducing power usage & price

- In the future, energy harvesting solutions could discard battery altogether

# About POSCA



## Outcomes

- Investigation of **current positioning accuracy in cellular technology (5G, 6G, xG)**; possibly proposal of new techniques
- **Retrieval of positioning data from RAN components** (or their implementation)
- Propose a solution to **integrate positioning data & services in 5G (6G, xG) architecture**

## Impact

- **Positioning-as-a-Service** – interesting for the entire value chain in communications: Telcos, RAN OEMs, Core providers and, of course, end-users

Proposed duration: 36 months

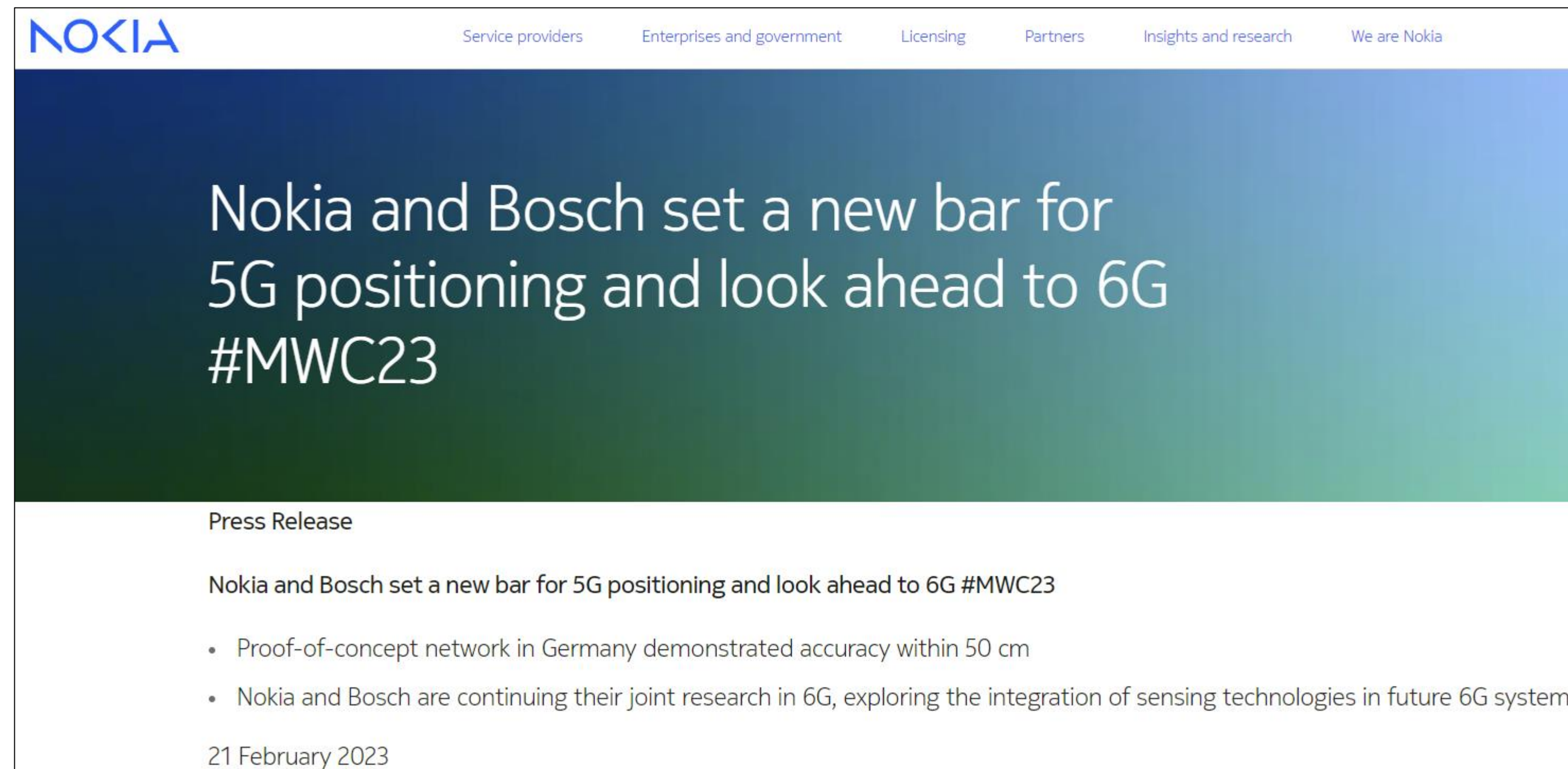


# Where we're at

## 3GPP:

- Rel-17: use cases such as factory automation target 20-30cm location accuracy
- Rel-18: study on expanded and improved NR positioning

## In the news:



The screenshot shows a Nokia press release page. At the top left is the Nokia logo. To its right is a navigation menu with links for 'Service providers', 'Enterprises and government', 'Licensing', 'Partners', 'Insights and research', and 'We are Nokia'. The main content area has a dark blue background with white text that reads: 'Nokia and Bosch set a new bar for 5G positioning and look ahead to 6G #MWC23'. Below this, on a white background, is the text 'Press Release' followed by the title 'Nokia and Bosch set a new bar for 5G positioning and look ahead to 6G #MWC23'. There are two bullet points: '• Proof-of-concept network in Germany demonstrated accuracy within 50 cm' and '• Nokia and Bosch are continuing their joint research in 6G, exploring the integration of sensing technologies in future 6G systems'. At the bottom left of the article is the date '21 February 2023'.



# Looking for

- Partners who are...
  - Users/developers of 5G systems with good knowledge of architecture (e.g., telecom operators, R&D groups)
  - Users/providers of Radio technology (OEMs, telcos)
  - System integrators
  - End-clients (logistic & industrial operators)
- Open to join existing consortiums
- On our end:
  - Can provide 1 or more use-cases, together with national R&D and industrial partners (telcos, SMEs, UNIs)
  - Can act as tech provider of radio modelling (more experienced) or system integrator

# Contact Info

**For more information and for interest to participate please contact:**

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**Presentation available via:**

