R I M A

ROBOTICS FOR INSPECTION
AND MAINTENANCE

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LAB • CC • DIH

European Commission

WHAT IS RIMA?

Robotics for Inspection & Maintenance -
4-year EU-funded project (2019-2022)

8M€ for small and medium-sized companies (SMEs)
and slightly bigger for technology experiments

Connecting and sharing **best practices with Network
of 15 European Digital Innovation Hubs** (DIH) on
robotics.

Marketplace offering services to **facilitate the uptake**
of robotics among SMEs & industry
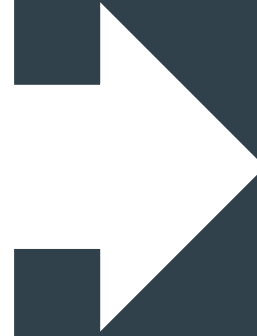
OUR GOAL IS TO…

Connect research, technology & service providers,
industry sectors, investors and certification bodies
under one roof

Fund 50 technology experimentations among
European small and medium-sized companies (SMEs)

Support SMEs to **commercialize** their solutions during
the project

Provide **education and training** on robotics for SMEs

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WHY IS RIMA IMPORTANT?

450 BILLION EURO

Inspection and Maintenance (I&M) represents a large economic activity – **global market estimated at 450 Billion Euro** – spanning across multiple sectors such as transport, oil, water management and infrastructure

EU IS A GLOBAL LEADER!

Currently **EU is a global leader** in this rapidly growing field with more than half of all manufacturers of I&M robots based in Europe

BOTTLENECK! INDUSTRY & SMEs

EU holds over **50%** of the Inspection & Maintenance robotics offer but there is a bottleneck **connecting this to the market needs and high potential applications!**

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SOLUTIONS?

RIMA Network aims to close this gap through 15 Digital Innovation Hubs, all dedicated to create connections between industry, robotics and I&M service providers.

- **Two Open Calls** (2019/2020) to select 50 Technology Transfer & Technology Demonstrator Experiments for startups, small and medium-sized companies (SMEs) or slightly bigger companies

- Provide **training & education on robotics at rimanetwork.eu**

- A network of 15 DIHs all dedicated to help the commercialization process of new I&M robotics solutions in Europe

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RIMA NETWORK
WHO WE ARE

Current Digital Innovation Hubs (15)

- CEA (FR)
- CATEC (SP)
- CREATE (IT)
- CUT (CY)
- DFKI (DE)

- DLR (DE),
- DTI (DK)
- LMS (GR)
- PIAP (PL)
- SINTEF (NO)

- TUKE (SK)
- TNO (NL)
- VTT (FI)
- U Seville (ES)
- U Twente (NL)

Facilitators and networks

- FundingBox (PL)
- Sprint Robotics (NL)
- University of YORK (UK)
- FORATOM (BE)
- FERHL (BE)
- EFNDT (BE)
- Water Europe (BE)
- SYSTEMATIC (FR)
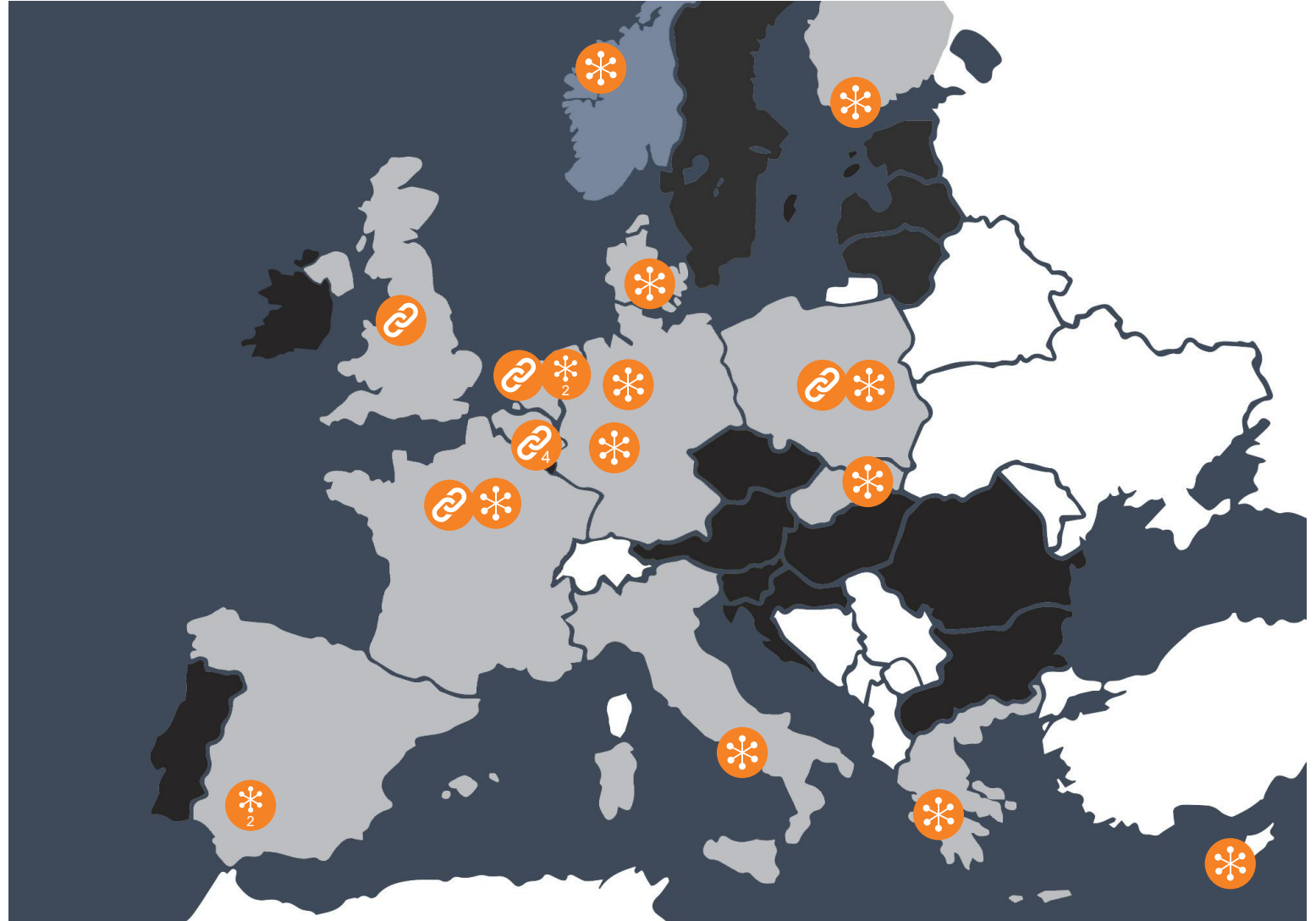
RIMA network is consisted of 15 European Digital Innovation Hubs (DIH) with a vast experience in the field of robotics. Our consortium is consisted of Universities, Industry associations and research institutes all dedicated to help

INDUSTRY SECTORS COVERED IN RIMA

Energy generation and distribution
Includes wind, solar, hydro, coal, and power distribution, covering both off-shore and on-shore infrastructure

ENERGY

Oil and gas
Refining and distribution infrastructure, including off-shore infrastructure and decommissioning.

OIL & GAS

Nuclear
Including decommissioning, waste disposal, maintenance and life extension

NUCLEAR

Transport hubs
Includes large transport hubs like ports, airports and interchanges.

HUBS

Water supply and sanitation
Sustainable, safe water infrastructures include clean water, wastewater and storm water infrastructures

WATER

Road, rail and infrastructure connected with cities
Local transport systems such as trams, track and trackside equipment, bridges, tunnels and roads rolling stock and geo-physical maintenance

TRANSPORT

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ENERGY GENERATION AND DISTRIBUTION

Energy generation and distribution includes wind, solar, hydro, marine power, power lines and substations.

Challenges

- Large and remote areas, long endurance missions

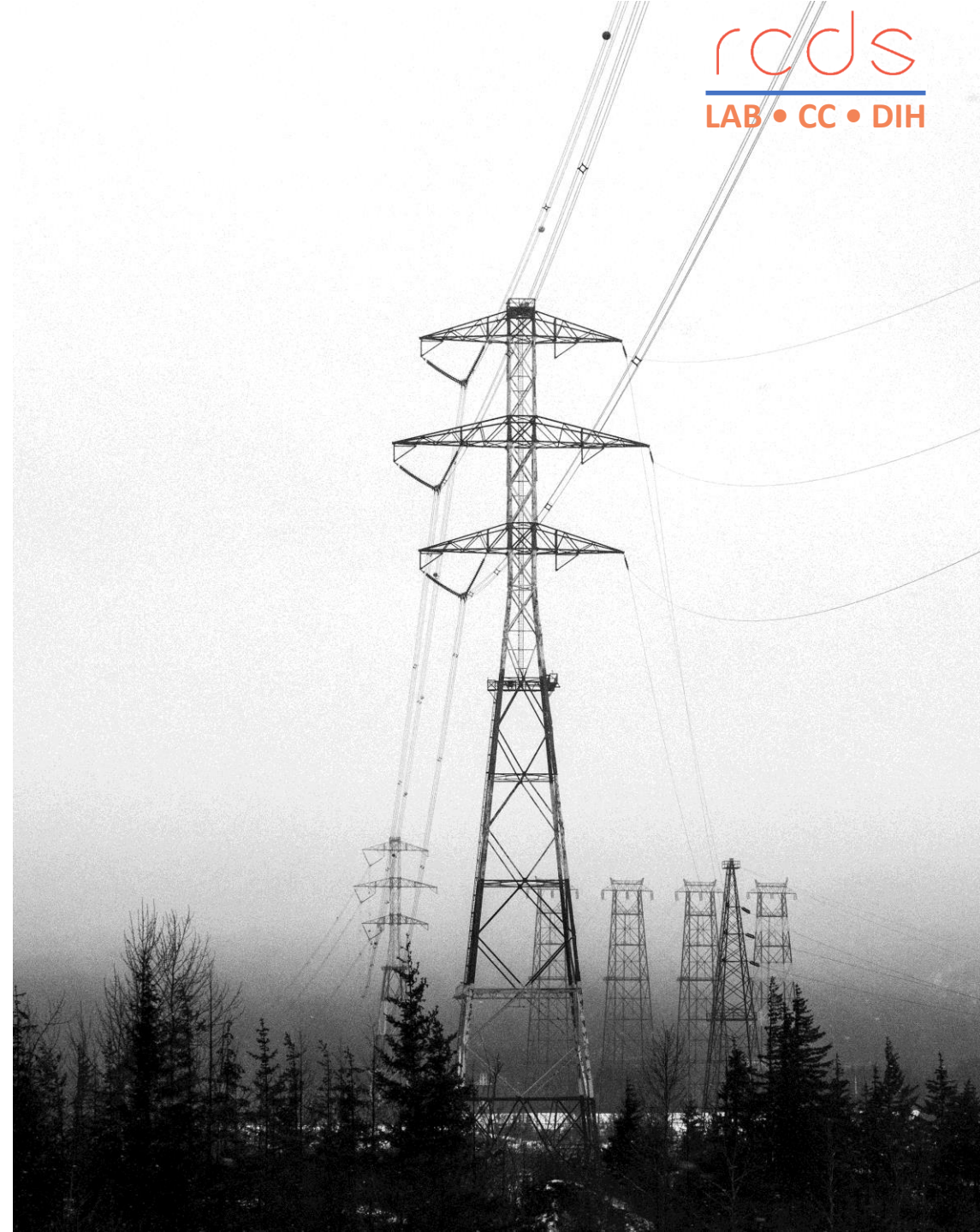- Harsh environments, underwater

- Complex environment

ENERGY GENERATION AND DISTRIBUTION

New solutions from robotics?

- Resident robots, permanently stationed in e.g. an offshore wind park

- Highly mobile and agile robots

- Robust autonomous navigation

- Robots capable of limited maintenance/intervention

OIL AND GAS

Challenges

- Data harvesting and data analysis

- **Above ground storage tank** inspection, cleaning and maintenance

- **Pressure vessel** inspection and **damage classification**

- Process **piping inspection** and maintenance in challenging environments

- **Remote operators**

- **Offshore installation** inspection, maintenance and repair

OIL AND GAS

What could robotics solve?

- Resident robot performing regular in-service inspections

- Inspection of space between vessel wall and insulation (possibly using nanobots)

- Development of NDE methods to enable high-coverage wall thickness measurements using robotics

- In service (i.e. partially full tank) robotic cleaning

- Automated data analysis techniques

- Robots with the ability to climb over obstacles

- Robotic removal and re-mounting of insulation

- Autonomous surveillance, anomaly detection and facility mapping

- On-site robotic operator, teleoperated with autonomous capabilities

- Resident Unmanned Aerial Vehicle (UAV) to provide autonomous monitoring of the state of the installation

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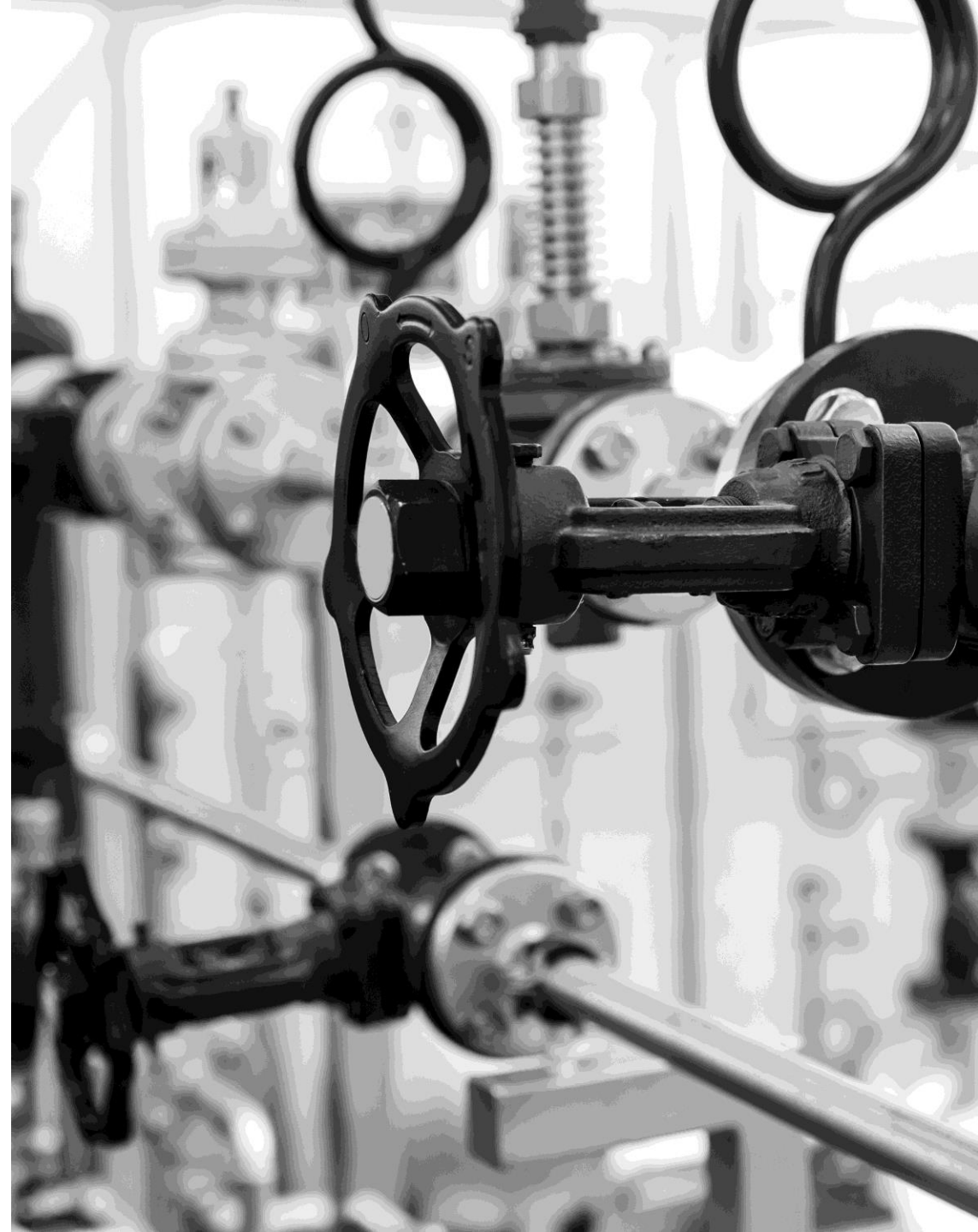
NUCLEAR

Nuclear Power Plants, Reprocessing facilities, Facilities for mining & processing of radioactive ore

Challenges

- **Mapping of site** infrastructure

- **Health monitoring** of components during lifetime

- Inspect / support **repair of equipment**

- **Clean** robustly (parts of) **nuclear infrastructure**

- Waste disposal / **decommissioning**
  - Clean / reduce sizes of (irradiated) waste
  - Dismantle components
  - (Re)move waste items within working areas

NUCLEAR

New solutions from robotics?

- Mapping complex structures, HVAC, stacks etc.

- Autonomous health monitoring resulting in maintenance recommendations, warnings etc. in hazardous or confined areas

- Unmanned or remote controlled sample takings, inspections or repairs

- Cleaning of surfaces; long-term storage pools, access restricted area's

- Decontamination of irradiated items

- Automated waste size reduction in accordance with safety requirements of site

TRANSPORT HUBS

Challenges

- Inspection and Maintenance activities in the following:
  - Perimeter infrastructure
  - Waterways
  - Quay walls and locks
  - Runways
  - Vegetation around the hubs

TRANSPORT HUBS

What could robotics solve?

- Robotized inspection, repair and maintenance of the perimeter infrastructure

- Increasing safety for the proper operation of transport hubs

- Underwater robotic solution for I&M activities below water level

- Visible and under surface condition, debris, ice and snow removal technologies

- Detecting, monitoring and removing vegetation by robotized systems

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WATER SUPPLY AND SANITATION

Challenges

• **Confined spaces** with GPS-denied environments

• Presence of **debris**

• Risks of highly **hazardous and corrosive chemicals**

• Presence of **pressurized water**

The accessibility to these underground areas for I&M operations is important considering the impact it has on surrounding environment (traffic disruption, noise)

WATER SUPPLY AND SANITATION

New solutions from robotics?

Technologies need to be safe, efficient, robust, easy to use and low cost to operate difficult environments – also aerial robots can be considered. **Solutions** that can produce

- CCTV, 3D reconstructions or defect profiling with ground penetrating radars

- Laser sensors or sonars potentially adapted to pipes with different sizes, shapes and materials enabling accuracy for end-of-life estimations

- Multi-sensing and autonomous robots to navigate in GPS-denied environment and adapt to various shapes and sizes of infrastructures,

- Robotic devices that are able to operate in partially / fully water submerged pipes and canals, and able to cover larger distances

- Robotics devices for lifting heavy manhole covers to reduce occupational hazards

Road, rail & infrastructure in cities

Challenges

- **Increase efficiency** in the I&M activities of civil infrastructure

- **Reduce risk for workers** during I&M activities on civil infrastructures

- Ensure that **civil infrastructure is operational** and safe

- Worker – machine on **jobsite cooperation**

- **Open** (facilitating technologies development)
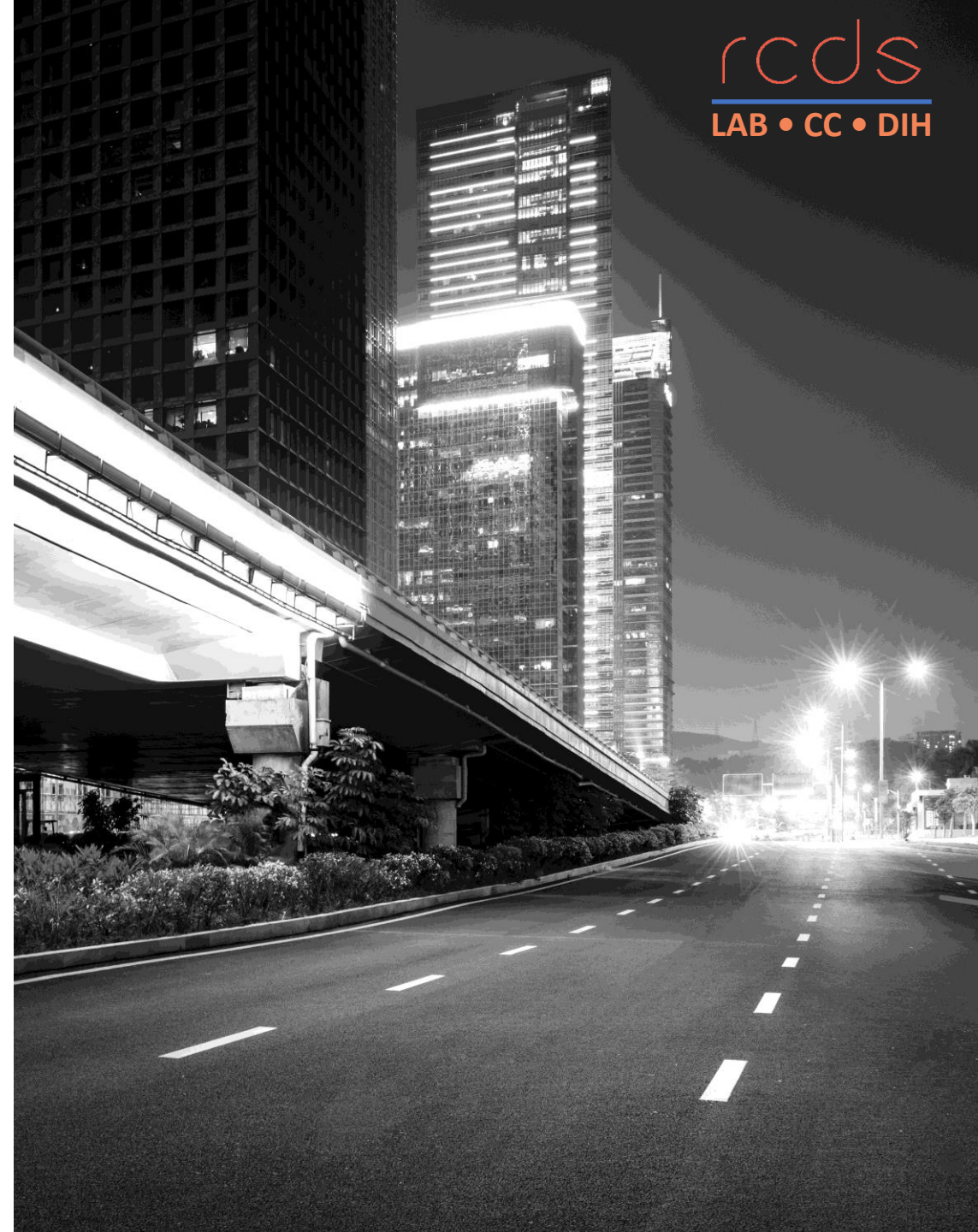
Road, rail & infrastructure in cities

What could robotics solve?

- Minimize the time that facilities are not available due to I&M activities

- Increase cost-efficiency in the accomplishment of I&M activities

- Use multi-sensing inspection robots in order to detect defects in different infrastructures

- Robotic solutions for approaching unreachable places and performing I&M operations

- A combination of methods and tools that can support the aforementioned resources to resist to difficult environmental conditions (night conditions, windy areas, etc.)

- Increase supporting tools for the operators during the execution of I&M activities.

- Introduce safety resources that will supervise operators' activity.

- Provide robotic solution that improve safety conditions for operators when performing I&M activities.

- Safety approved devices and methods that will increase the operators' safety during the execution of I&M activities.

REQUIREMENTS

WHO CAN APPLY?

- Types of Beneficiaries
  - Startups, small & medium-sized, or slightly bigger enterprises can apply
  - At least two candidates form a consortium (one per type)
    - Service or product provider
    - Technology supplier
- Types of activities
  - Technology Transfer Experiments (**TTEs**)
    - Technology development, testing and validation
    - TRL5 - TRL7
    - 300K fund
    - 14M duration
  - Technology Demonstrators in I&M robotics (**TDs**)
    - Technology validation
    - TRL6 - TRL7
    - 100K fund
    - 6M duration
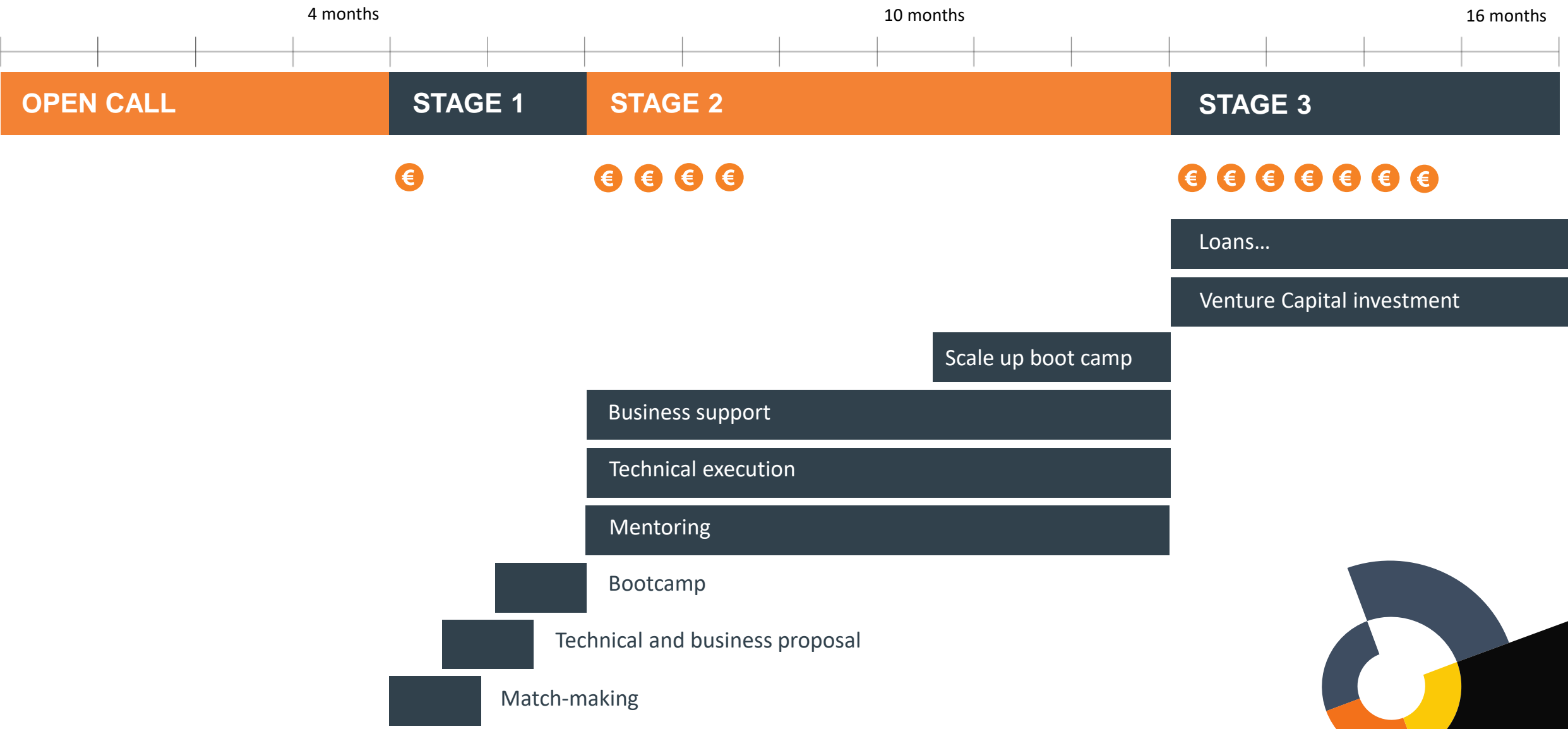
REQUIREMENTS

WHO CAN APPLY?

- Multiple submissions
  - Possibility to **submit multiple applications** - participate in different micro-consortia
  - Multiple funds by RIMA may be received - **Do not exceed 300k** per entity
  - Project execution team might be dedicated to one project only (**one project - one team**).

- At least two candidates form a consortium (one per type)
  - Service or product provider
  - Technology supplier

- Submission system
  - Only proposals submitted through the Open Call submission tool at **https://rima-network.fundingbox.com** and within the call duration will be accepted.

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OPEN CALL – EXAMPLE OF A TIMELINE

4 months   10 months   16 months

OPEN CALL   **STAGE 1**   **STAGE 2**   **STAGE 3**

Loans...

Venture Capital investment

Scale up boot camp

Business support

Technical execution

Mentoring

Bootcamp

Technical and business proposal

Match-making

APPLY TODAY!

Submission of applications starts on
4th of September 2019 at 00:00 (CEST)

Submission deadline:
19th of December 2019, 16:00 (CET).

https://rima-network.fundingbox.com

Contact info:

aneta.galazka@fundingbox.com

THANK YOU
Savvas G. Loizou, Asst. Prof.
Director, Robotics Control and Decision Systems (RCDS) Lab-CC-DIH
savvas.loizou@cut.ac.cy

rimanetwork.eu/