INSTITUTE
OF COMMUNICATION,
INFORMATION
AND PERCEPTION
TECHNOLOGIES

Scuola Superiore
Sant'Anna
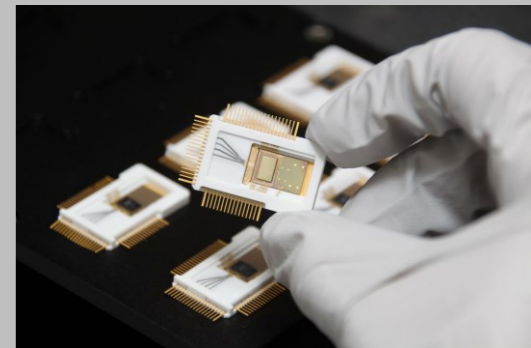
http://tecip.santannapisa.it/en

SANT'ANNA SCHOOL OF ADVANCED STUDIES (SSSA) – PISA is an Italian research public university with 6 Research Institutes operating in social and experimental sciences.

It's ranked among the top 150 University according TIMES HIGHER EDUCATION WORLD UNIVERSITY RANKINGS 2020, 1st place at national level

TeCIP, Institute of Communication, Information, Perceptual and robotics Technologies consists of 5.500 m² in the CNR research Area of Pisa + a 1000m² clean room for PIC manufacturing.

TeCIP is co-located with CNIT PNTLab Lab and Ericsson R&D Lab

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Ongoing Shift2Rail projects

Technical Leader of:

OPTIMA *(GA881777)* **cOmmunication Platform for TraffIc ManAgement demonstrator** – TD2.9 S2R demonstrator

Main research activities, projects and collaborations

- **Participating in several H2020 projects and national projects** (as Coordinator, WP leader or partner) about:
  - **ICT and AI**
  - **IoT, Smart devices, and predictive maintenance**
  - **5G communications**
  - **Perceptual robotics**
  - **Railways communications, signaling and monitoring**

- **Active collaborations with**
  - **RFI,** Italian Infrastructure manager;
  - **TRENITALIA,** main Italian Railway Operator;
  - **main Industrial companies** in railways and communication domains

Dissemination activities

- Publications on related main international Journals and conferences.
  Among them: *WCRR, IEEE Trans. Industrial Informatics, IEEE MT-ITS, IEEE CloudNet, ICREM, etc.*

Research and development activities on ICT for railway domain

- Reliable and performant Train Network communications

- Trackside and backbone communications

- Signalling protocols, as our version of EURORADIO protocol

- Smart and predictive onboard and track side maintenance

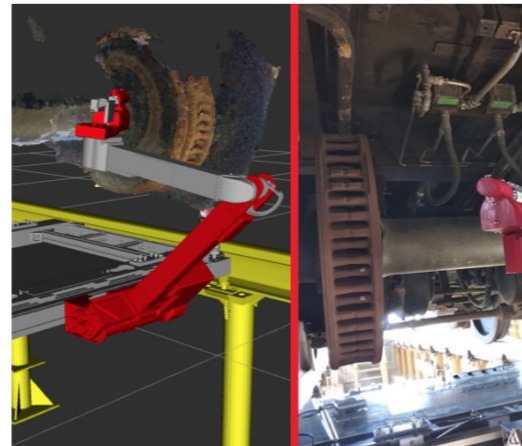- Impairment trackside detection

- Trackside energy harvesting

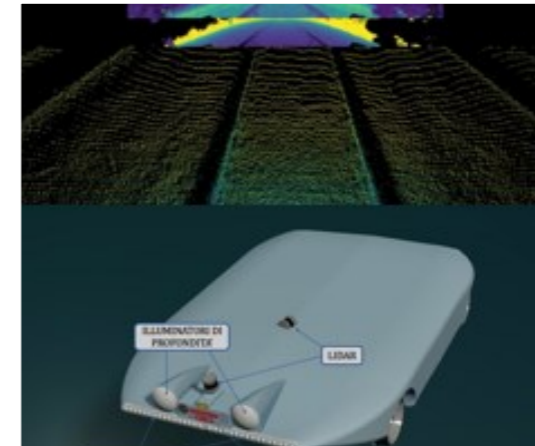# Expertise on Perceptual Robotics
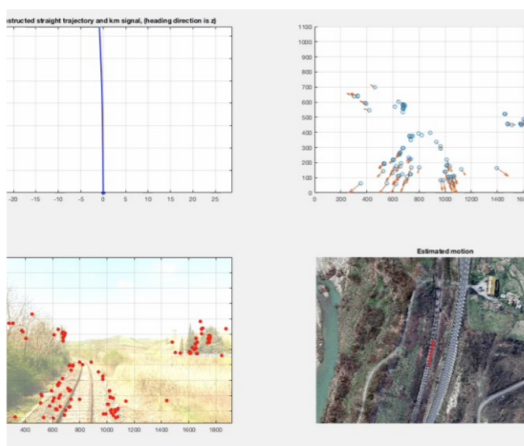

Power Augmentation
Exoskeletons

Robotized Inspection
AR/VR Measurements
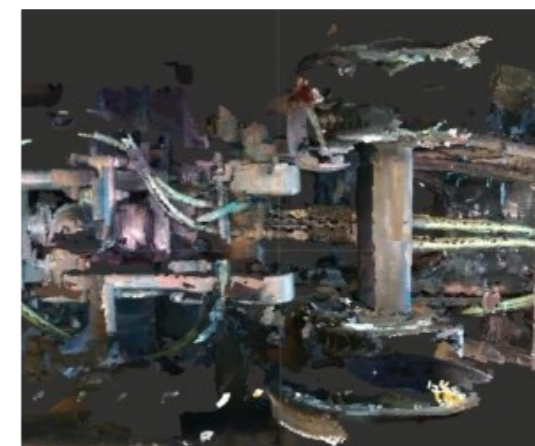

High Speed Track Inspection
DL + Lidar Inspection

Motion Flow
Obstacle Detection

Wearable Controller
For Power Plants

Automated Diagnosis
Digital Twins in 3D

TeCIP Institute main knowledge and experience related to Shift2Rail Open Call 2020

- *IP1-01, IP3-01, IP3-02:* ICT, AI and IoT technologies, Smart and predictive maintenance.

- *IP1-02:* Antenna analysis and design study, specification and installation requirements

- *IP2-02:* Expertise on study, analysis, design and testing of industrial wired and wireless systems and communications protocols as well ass Ethernet Train Backbone, availability analysis and communication systems (as Technical Leader/Coordinator)

- *IP3-03:* Robotics and communications along with design and R&D of exoskeleton (as Technical Leader/Coordinator or WP leader)

- *IP4-01:* Expertise on information and communications systems, as well as AI for ITS