

WELCOME TO THE INSTITUTE MIHAILO PUPIN

Research and Development Powerhouse

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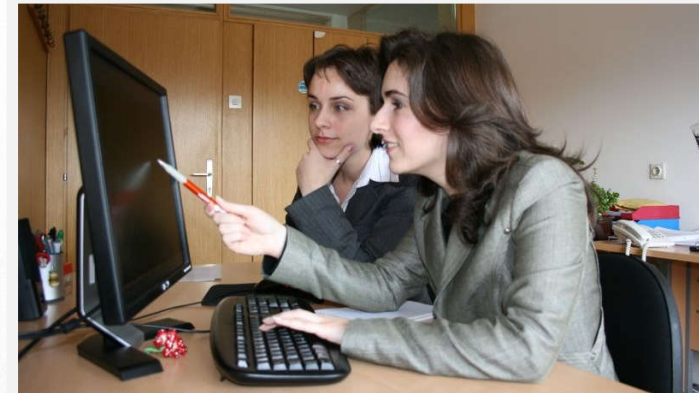


- ▣ Leading Serbian R&D institution in information and communication technologies (ICT)
- ▣ The biggest and oldest (1946) R&D Institute in ICT area in whole Southeastern Europe
- ▣ World Bank SEE Knowledge Economy report (2011, 2016): “Internationally competitive Institute”
- ▣ EU Commissionaire – “Pupin as the best practice example for bridging academia and industry”
- ▣ 90% of turnover via Technology Transfer

KEY RESEARCH AND DEVELOPMENT PERSONNEL

PEOPLE

- 514 employees (350 researchers and engineers)
- Affiliated to the University of Belgrade
- Recruitment directly from University through internships/diploma/master work
- Personnel of various ethnic origin and creed (11 languages spoken)



JOINING FORCES WITH EU-BASED R&D PARTNERS

107 International Research Projects, over 500 partners

- ✓ **6 HORIZON EUROPE projects** (ECHO, FEDECOM, R2D2, IntelliLung, POLICY ANSWERS, OMEGA-X)
- ✓ **21 H2020 projects** (NEON, AI-PROFICIENT, HESTIA, SINERGY, TRAPEZE, BorderUAS, PLATOON, TRINITY, IDEAS, REACT, LAMBDA, FeelAgain, RESPOND, InBETWEEN, SlideWIKI, FLIRT, EEN INNO, FS4SMIH, EENSerbia, EENClientInnoJourney, EENInnoSJourney)
- ✓ **22 FP7 projects** (REFLECT, AgroSENSE, META-NET, WBC-INCO-NET, HydroWEEE, ICT-WEB-PROMS, HELENA, EMILI, ENERGY WARDEN, PROCEED, LOD2, CASCADE, H-WEEE-DEMO, EPIC-HUB, SPARTACUS, GenderTIME, ResearchersNight, GeoKNOW, Danube INCO.NET, NoSQL-NET, Trafoon)
- ✓ **7 CIP/EIP projects** (CESAR, EIIRC, GREEN, WEEEN, ICIP, IMAGEEN, Share PSI 2.0)
- ✓ **1 IPA ADRIATIC project** (PACCINO)
- ✓ **1 ERASMUS+ project** (BEST)
- ✓ **4 SEE projects** (Intervalue, FORSEE, WBINNO, TV-Web)
- ✓ **3 TEMPUS projects** (CARE, HUTON, INCOMING)
- ✓ **8 COST ACTIONS projects** (IC1004, IC1304, CA16116, CA15104, NexusLinguarum, Distributed Knowledge Graphs, VOICES, INTERACT)
- ✓ **1 RSEDP2 project** (EMC)
- ✓ **1 UNDP projects** (Smart Land)
- ✓ **3 FP6 projects** (SARIB, PROMETEA, Web4Web)
- ✓ **3 INTERREG DANUBE projects** (MOVECO, NewGenerationSkills, EDU-LAB)
- ✓ **2 EC INTERREG/CADSES projects** (I2E, STRIM)
- ✓ **6 IPA projects** (EPS, Tax, Justice, Agro, POM, APML)
- ✓ **18 Bilateral projects** (2 Switz., 3 France, 5 Germany, 1 Cyprus, 1 Greece, 1 Norway, 1 Portugal, 1 Slovenia, 3 China)



OUR CERTIFICATES



■ ISO 14001:2015

EMS - Environmental Management System
(SRPS ISO 14001:2015)

■ OHSAS 18001:2007

Occupational Health & Safety Advisory Services
(SRPS OHSAS 18001:2008)

■ IQNet SR10:2015

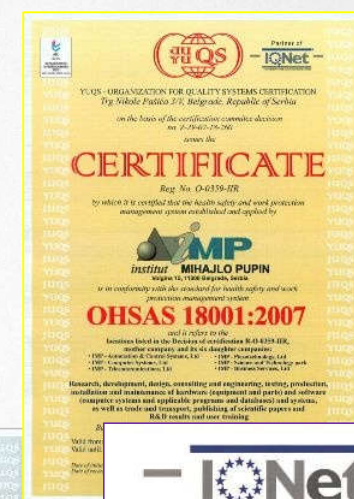
Social Responsibility Management System

■ ISO 9001:2015

Quality management systems

■ ISO 27001

Information security management



KEY RESEARCH AND DEVELOPMENT AREAS



OUR SOLUTIONS

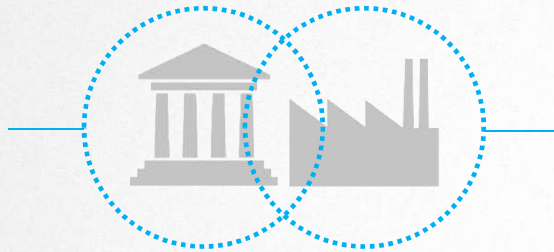
MAIN PROGRAMS

- ▣ **Information Systems:** E-government solutions, Document Management Systems, Decision Support Systems, AI based systems
- ▣ **Process Control Systems:** Power Production, Transmission and Dispatching Control and Supervision Systems, Water Supply and Management Systems
- ▣ **Traffic Management Systems:** Urban Traffic Control, Tunnel Management, Highway Pay-Toll Systems, Access control system
- ▣ **Railway Program:** Axle Counter, LED signals, HMI solutions,
- ▣ **Defense Program:** Simulation and Training Systems, Air War Gaming Systems, Radar signal processing systems, Electronic Surveillance Systems, Ballistic Analyzer
- ▣ **Other Programs and Activities:** Robotics, Security, Embedded Systems, Surveillance, Alert & Warning Systems, etc.



OUR CLIENTS

Public
sector



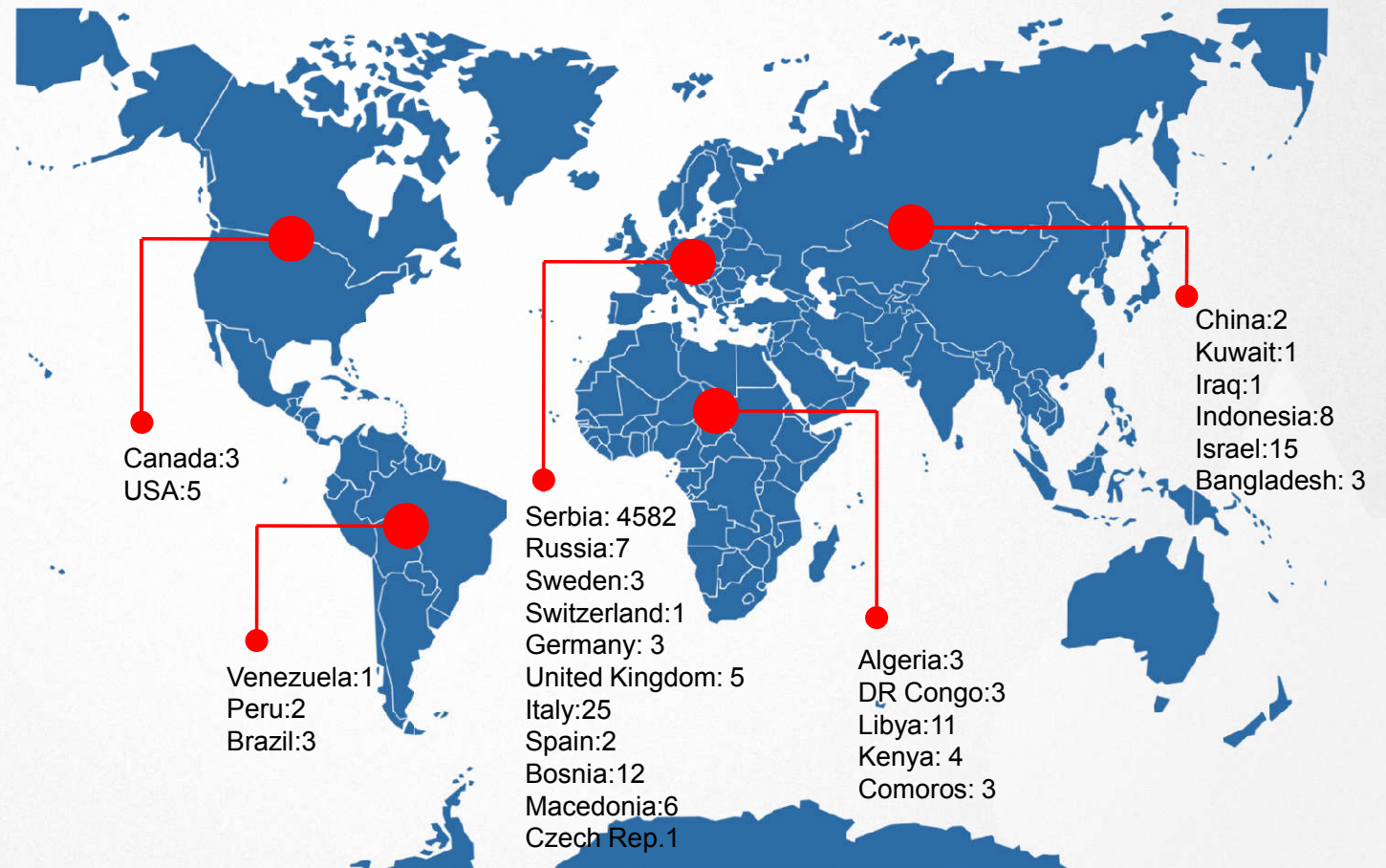
Industrial
sector

- ▣ Serbian Power Utility
- ▣ Water Utility
- ▣ Road, railway and air traffic authorities
- ▣ Public administration (eGovernment)
- ▣ Oil, gas and mining companies
- ▣ Process industries
- ▣ Ministry of Justice, Ministry of Interior
- ▣ Serbian Armed Forces, etc.



INTERNATIONAL COOPERATION

PUPIN'S WORLD WIDE PRESENCE



RAILWAY PROGRAM

PRODUCTS

- ▣ Universal Train-wheel Detector – **UTD**
- ▣ Train Axle Counter – **BROS**
- ▣ Universal LED module – **LL-000**
- ▣ Main, Shunting, Limit Track LED signals
- ▣ Railway LED indicator signals
- ▣ Railway safety HMI – **MMI10**
- ▣ Signal Control Device – **m2SCD**
- ▣ Wayside Radio Dispatching System - **DRDC**
- ▣ Points Heating System – **GS20**



UNIVERSAL TRAIN-WHEEL DETECTOR – UTD

- Reliable and accurate train wheel detection
- Internal system integrity monitoring
- Designed for simple installation and maintenance
- Installation time under 15 minutes
- Uses existing wiring / infrastructure
- Self adjusting upon start-up
- Virtually maintenance free
- Maximal wheel detection speed – 300km/h



TRAIN AXLE COUNTER – BROS

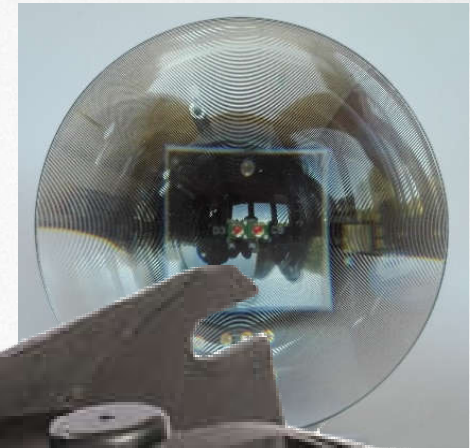
- ▣ Control of up to 8 railway sections
- ▣ Up to 12 sensor pairs can be connected directly to the BROS
- ▣ Modem communication with up to two remote axle counters
- ▣ Adjustable power supply: 18V - 72V DC or 220V AC
- ▣ Operating temperature range: - 40 °C to + 70 °C
- ▣ Reliable detection for train speed up to 300 km/h
- ▣ 19" standard board rack, 3 U height 84 pitch units width
- ▣ Interfaces to relay or electronic interlocking



RAILWAY PROGRAM

RAILWAY LED SIGNAL MODULE - LL-000

- Fully compatible as a replacement for two-filament incandescent light bulbs
- Adjustable operating current
- Day / night-time operation
- Blinking operation
- Early warning (in single-filament setup)
- Auxiliary filament operation and cold testing (in two-filament setup)
- Easy adjustable for both relay and electronic interlocking environments



RAILWAY PROGRAM

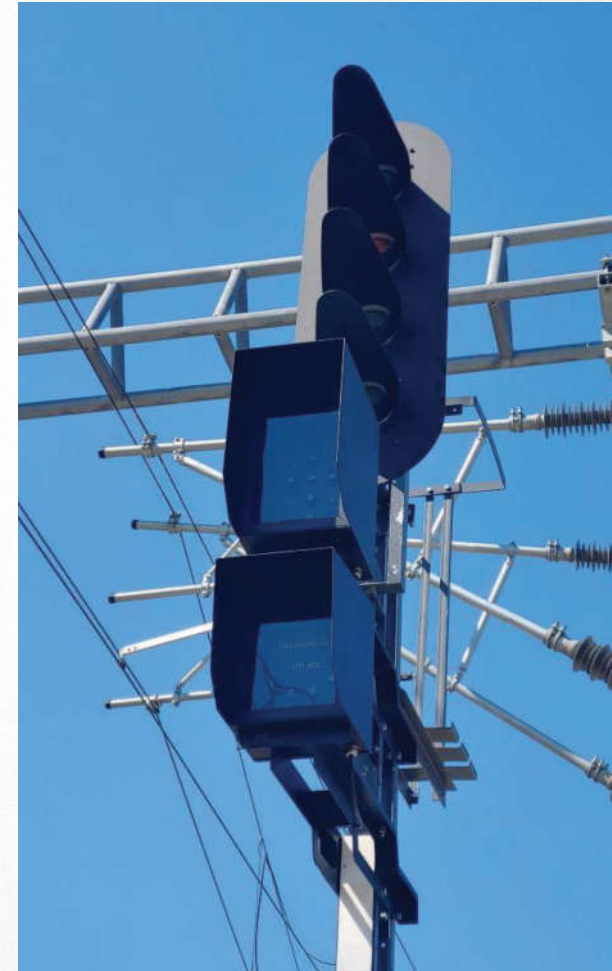
MAIN, SHUNTING, LIMIT TRACK LED SIGNALS

- ▣ Based on LED module LL-000
- ▣ Colours chromatic coordinates in accordance with JŽS S2.003
- ▣ Projected service life 10 years
- ▣ Relay and electronic interlocking environments are supported
- ▣ 1000+ already installed



RAILWAY LED INDICATOR SIGNALS

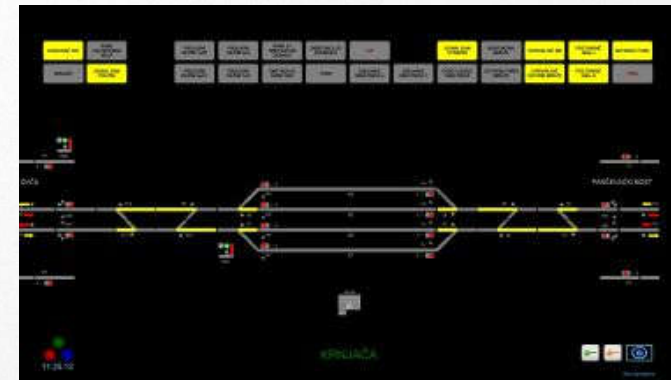
- ▣ Addition to main railway signals (provides alphanumeric characters and symbolic drawings)
- ▣ IND-01 for route indications and speed limit, IND-02 for allowance of train pass
- ▣ No changes necessary in the interlocking system
- ▣ Long service life
- ▣ Different applications: railway, metro, tram
- ▣ Possible adaption according to customer requirements



RAILWAY PROGRAM

RAILWAY SAFETY HMI – MMI10

- Convenient for upgrading of relay interlocking environment
- System for administrating, monitoring and controlling one or more railroad interlocking devices
- Provides a graphics-based visualization that makes railroad standards compliant with user interface, safe and easy to use at the same time
- Highly customizable and available in different languages



SIGNAL CONTROL DEVICE – m2SCD

- ▣ Mobile signal control device for signal control during reconstruction
- ▣ Signal control for small station with manual switch control
- ▣ Four entrances – typical configuration
- ▣ From 2 to 6 entrances on demand
- ▣ Safety control during establishing the routes
- ▣ Automatic and manual canceling of routes
- ▣ Integrated counters for routes and special commands
- ▣ High battery capacity



RAILWAY PROGRAM

WAYSIDE RADIO DISPATCHING SYSTEM - DRDC

- Consists of several elements, all of which are interconnected in a LAN
- The main elements are:
 - Dispatch control panel** - control panel through which calls are initiated, commands are given, information and calls are received
 - Server** - the main control and central part of the D-RDC system, allows logical connection of all devices, manages calls and telegrams and forwards them to the appropriate system entities
 - Media converter** - a device that supports communication according to the UIC 751-3 standard, on one side has an analog interface that allows connection to a four-wire modulation line, while on the other side has a LAN interface for connection with the server



DEONICA BEOGRAD - LAPOVO											
ISTORIJA POSLATIH TELEGRAMA						ISTORIJA PRIMLJENIH TELEGRAMA					
ID	Datum i vreme	Broj voza	Komanda	Sluša	Sluša	ID	Datum i vreme	Broj voza	Komanda	Sluša	Sluša
1	18-Apr-21 18:47:02	1	Pozivno naređenje	✓	✓	1	18-Mar-21 23:24:01	1	ZAT	ZAT	✓
2	18-Mar-21 23:40:24	1	Test	✓	✓	2	18-Mar-21 23:23:55	1	Prijava netu	✓	✓
3	18-Mar-21 23:23:40	1	Pozivno naređenje	✓	✓	3	18-Mar-21 23:23:49	1	Zelim da govorim	✓	✓
4	18-Mar-21 23:04:26	1	Test	✓	✓	4	18-Mar-21 10:17:08	1	Zauzeto sve vreme	✓	✓
5	18-Mar-21 23:04:10	1	Pozivno naređenje	✓	✓	5	18-Mar-21 10:17:02	1	Otvoriti na voz	✓	✓
6	18-Mar-21 23:04:07	1	Zavi broj potisak	✓	✓	6	18-Mar-21 10:16:55	1	Uložena nepravilnost	✓	✓
7	18-Mar-21 23:04:00	1	Zavi broj potisak	✓	✓	7	18-Mar-21 10:16:48	1	Potrebite u sali	✓	✓
8	18-Mar-21 23:03:54	1	Pozivno naređenje	✓	✓	8	18-Mar-21 10:16:44	1	Stojni pred signalom	✓	✓
9	18-Mar-21 23:03:48	1	Test	✓	✓	9	18-Mar-21 10:16:38	1	ZAT	ZAT	✓
10	18-Mar-21 23:03:41	1	Otvoriti u kabinu	✓	✓	10	18-Mar-21 10:16:32	1	Test	✓	✓
BROJ VOZA						KOMANDA					
1	2	3	4	5	6	POZIV ZA SVE	✓	✓	✓	✓	✓
7	8	9	0	<	<<	✓	✓	✓	✓	✓	✓
TESTIRANJE PRST						TEST					
1	2	3	4	5	6	1	2	3	4	5	6
Nastavak testiranja						Nastavak testiranja					
Nastavak testiranja						Nastavak testiranja					

POINTS HEATING SYSTEM – GS20

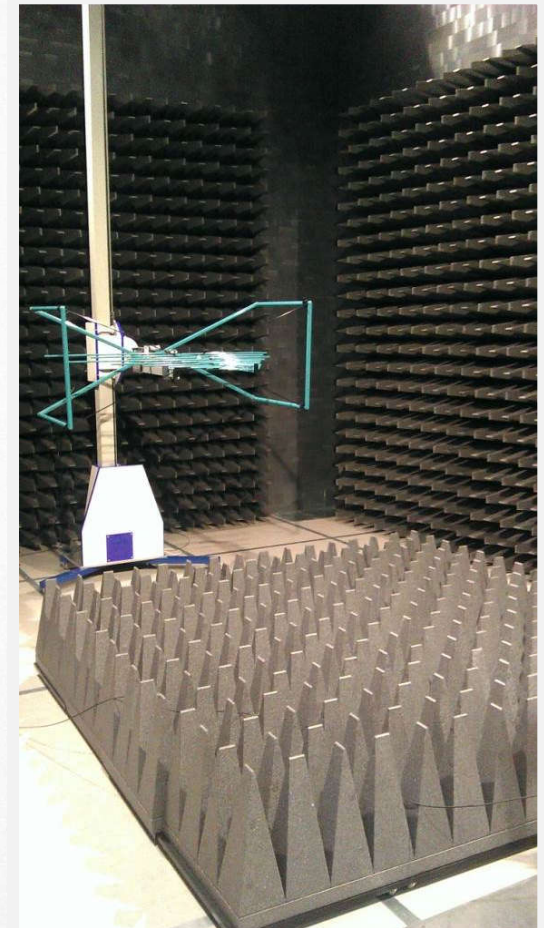
- GS20 is the railway switch-points heating system
- Main parts of the GS20 system are distribution points that are controlling heaters
- GS20 system supports both centralized and distributed control architecture
- GS20 system supports both local and remote control
- User can generate commands for heating on different levels: station, region, distribution point, switch point and heater level
- System supports various types of heaters
- GS20 supports both automatic and manual mode of operation
- Support for automatic periodical testing of the heating system operation
- Support for connection with various interlocking systems
- Possibility to use dedicated MMI for GS20 system or connect to existing station MMI



OTHER ACTIVITIES

ELECTRO-MAGNETIC COMPATIBILITY LABORATORY

- Harmonic emission (EN 61000-3-2)
- Flicker emission (EN 61000-3-3)
- Electric Fast Transients / Bursts immunity
- Surge immunity up to 6 kV (EN 61000-4-5)
- Dips, short interruptions and voltage variation immunity (EN 61000-4-11)
- Ring wave immunity up to 6 kV (EN 61000-4-12),
- Power frequency magnetic field immunity up to 40 A/m Pulse magnetic field immunity up to do 1000 Electro Static Discharge up to 30 kV (EN 61000-4-2),
- Conducted RF emission in the range 150kHz – 30 MHz Radiated RF emission in the range 30MHz – 2,7GHz Conducted RF immunity in the range 150kHz–80MHz
- Radiated RF immunity in the range 80kHz–2,7GHz
- Power disturbance in the range 30MHz – 1GHz



THANK YOU FOR YOUR ATTENTION!