

## CURRICULUM VITAE

Proposed role in the project: - **Key Expert for railway signalling and telecommunications**

1. **Family name:** KAKARIGI
2. **First Name(s):** LUKA
3. **Date of birth:** 10.11.1939
4. **Nationality:** Croatian
5. **Civil status:** Married
6. **Education:**

Institution [ Date from - Date to ]	Degree(s) or Diploma(s) obtained:
University Zagreb, Faculty for Electrical Engineering (1958 -1964), nine (9) semesters	B.Sc. El. Eng. / M Eng EE (speciality telecommunication and automatics)

7. **Language skills:** Indicate competence on a scale of 1 to 5 (1 - excellent; 5 - basic)

Language	Reading	Speaking	Writing
English	2	2	2
Croatian	1	1	1
Bosnian	1	1	1

8. **Membership of professional bodies:**

- None

9. **Other skills:** MS Office

10. **Present position:** .....

11. **Key qualifications:**

**Licensed electrical engineer for designing and supervision of railway signalling and telecommunication systems**

**The Licence for designing, installing and supervision of electrical facilities issued by Ministry of Spatial Planning, Civil Engineering and Ecology of Republic of Srpska dated on 22.09.2010.**

Luka Kakarigi has more than 50 years of railway experience. His main fields of experience are design, supervision and maintenance of: **Signalling and telecoms for railways.**

**Large experience in:**

- Station interlocking systems
- ABS Automatic block systems
- CTC Centralized Traffic Control
- LCI Level Crossing interlocking systems

12. **Specific experience in the region:**

Country	Date from – date to
Bosnia & Herzegovina	09/1984 to 10/1994, 05/2002 to 10/2005, 12/2010 to 12/2011 and 05/2013 to 07/2015
Croatia	12/1994 to 11/2000 and 12/2005 – 06/2009

13. Professional experience:

Date from - Date to	Location	Company&reference person (name and contact details)	Position	Description
11/2015 – until mid of 03/2017	Zagreb, Croatia and Sarajevo, B&H	SYSTRA-SOTECNI S.p.Ā. Dott. Amedeo AITA MARI <i>Managing Director</i>	<b>Expert for railway signalling and coordinator for telecommunications and electric traction power facilities</b>	<ul style="list-style-type: none"> <li>- <i>Collecting available information, existing maps, drawings, reports, necessary to his task.</i></li> <li>- <i>Assuming the role of Deputy of the Key Expert 2 (Expert for railway SS/telecommunication/electric traction powering facilities), coordinating the local experts in electrification and telecommunication and verifying that their contribute fulfil what required by the Contract and the ToR, with its Annexes B-C-D.</i></li> <li>- <i>Preparation of Conceptual design/ preliminary solution of the signalling system, in the terms foreseen in the ToR and Annex B, concerning Signalling, including financial evaluation necessary to MCA.</i></li> <li>- <i>Conducting the communication &amp; relations with the Client, all the stakeholders, subcontractors and local consultants, in the matters concerning railway SS/telecommunication/electric traction powering facilities, as specified in the ToR and Annexes B-C-D.</i></li> </ul>
11/2013 – until mid of 07/2015	Sarajevo, B&H	AECOM d.o.o., Sarajevo <i>Mr Carlos Sierra</i> carlos.sierra@aecom.com	<b>Senior Supervision Electrical Engineer</b>	Consultancy Services for the Supervision of Works on Motorway on Corridor Vc, Section Svilaj - Odzak
05/2013 – 05/2015	Sarajevo, B&H	AECOM d.o.o., Sarajevo <i>Mr Carlos Sierra</i> carlos.sierra@aecom.com	<b>Expert in Procurement and Installation of Facilities and Equipment</b>	<p>Expert in Procurement and Installation of Facilities and Equipment within the project “Bosnia and Herzegovina Regional Railways Project II – Implementation Consultant Selection - part signaling and telecommunication equipment” on railway line sections: Banja Luka – Doboj (Railways of Republic of Srpska) and Sarajevo – Bradina (Federal Railways of Bosnia and Herzegovina)</p> <p>Sub-consulting services include revision of existing Main designs of signaling and telecommunication and preparing the Tender Dossiers</p> <p><b>Project value is cca 28 M€</b></p>
12/2010 – 12/2011	Sarajevo, B&H	IPSA Institute, Sarajevo <i>Mr Enko Kubanić</i> ipsage@bih.net.ba	<b>Licensed designer electrical – part signaling and telecommunication</b>	<p>Performing of Main designs of station interlocking on railway line Doboj – Banja Luka (Railways of Republic of Srpska), section Jošavka –Banja Luka from km 70+015 to km 103+500 (<b>total 33,5 km of line</b>) including 6 stations (Ostružnja, Snjegotina, Jošavka, Čelinac, Vrbanja and Banja Luka) together with interstation dependence Banja Luka - Snjegotina, Main designs of level crossing protection including 5 level crossings in station area, as well 2 level crossings on the open line and Main design of interstation dependence S.Kostajnica – Rudanka and Banja Luka – Snjegotina.</p> <p>The Main design package of particular station for signalling contains the station interlocking, power supply from PEN as well from catenary, power low voltage network and energetics, electrical point heating as well proposals for adoption of existing station premises necessary for installing of new equipment.</p> <p><b>Project value is cca 18 M€</b></p>
12/2005 – 06/2009	Zagreb (Croatia)	Željezničko projektno društvo d.d., Zagreb <i>Mr Vlatko Sušanj</i> vlatko.susanj@zpd.hr	<b>Chief engineer for design of reconstruction of track and signalization of Railways in BiH – part signaling</b>	<p><b>A)</b> Coordinating and performing of Main designs for reconstruction of track and signalization of Railways in BiH – part signalling</p> <p>(14 station interlocking, 15 LC interlocking, automatic block system (ABS) and interstation dependence on cca <b>105 km of line in total.</b></p> <p>The Main design package contains following parts:</p> <ul style="list-style-type: none"> <li>- the station interlocking (relay and microcomputer supported technology),</li> <li>- power supply from public network and catenary,</li> <li>- point heating system,</li> <li>- proposals for adoption of existing station premises necessary for installing of new equipment</li> <li>- automatic block system (ABS) on line section Šamac- Doboj (centralised electronic ABS Šamac – Vranjak from km 24+118 to km 50+908 and relay ABS Vranjak– Doboj from km 50+908 to km 84+723).</li> </ul>

Date from - Date to	Location	Company&reference person (name and contact details)	Position	Description
				<ul style="list-style-type: none"> <li>- interstation dependence Slav.Šamac (Croatia) – Šamac from km 19+000 to km 24+118 and Sarajevo - Bradina from km 0+000 to km 41+300</li> <li>- Technical bases for international tender dossier separated for each Lot.</li> </ul> <p><b>Client:</b> EC delegation to BH</p> <p><b>Contractor:</b> C. Lotti &amp; Associati, ŽPD Zagreb &amp; IPSA joint venture</p> <p><b>Scope of contracted services:</b> Performing of Main designs for Reconstruction of Railway section on the Pan European Corridor Vc – part signalling (Lot1: Section State border to Croatia – Šamac - Doboj from km 21+746 to km 84+723 - <b>total 63km</b> and Lot2: Section Sarajevo –Bradina from km 0+000 to km 41+300 – <b>total 41km</b>)</p> <p><b>B)</b> Coordinating and performing of Main designs for Reconstruction of Track and Signalization of Railways in BiH – part signalling (17 station interlocking, 9 LC interlocking, interstation dependence on <b>cca 170 km of line in total.</b></p> <p>The Main design package contains following parts:</p> <ul style="list-style-type: none"> <li>- the station interlocking (relay and microcomputer supported technology),</li> <li>- power supply from public network and catenary,</li> <li>- point heating system,</li> <li>- proposals for adoption of existing station premises necessary for installing of new equipment</li> <li>- interstation dependence Konjic – Čapljina from km 67+063 to km 170+390 on Section A as well Rudanka – Stanovi from km 9+571 to km 14+443 and Stanari - Ukrina from km 26+676 to km 52+381 on Section B</li> <li>- Technical bases for international tender dossier separated for each Section.</li> </ul> <p><b>Client:</b> EC delegation to BH</p> <p><b>Contractor:</b> ŽPD Zagreb &amp; IPSA joint venture</p> <p><b>Scope of contracted services:</b> Performing of Main designs for the Reconstruction Track and Signaling of Railways at Bosnia and Herzegovina – part signalling(Section A: Konjic-Čapljina from km 67+063 to km 170+390 – <b>total 103km</b> and Section B: S.Kostajnica - Jošavka from km 6+438 to km 70+009 – <b>total 64km</b>)</p> <p><b>Project value 140 M€. Design services value 2 M€</b></p>
05/2002-10/2005	Sarajevo, B&H	IPSA Institute, Sarajevo <i>Mr Enko Kubanić ipsage@bih.net.ba</i>	<b>Head of signaling and telecommunication designing, tendering and supervision division</b>	<p><b>A. DESIGNING:</b></p> <p>Rehabilitation of B&amp;H railways (EIB loan)</p> <p>Performing of Main designs on railway signaling and telecommunication (2 station interlocking on line section Doboj - Banja Luka, 11 LCI-es on line section Zenica - Sarajevo from km 179+664 to km 257+085 – cca 78km, 200 km of line cable on line section Doboj – Banja Luka – Dobrljin (State border to Croatia) and 1 PABX in station Zenica of up to date (electronic, microcomputer supported technology)</p> <p>Rehabilitation of railway signalling of BiH Railways (EBRD loan)</p> <p>Performing of Main designs on BiH Railways signalling and telecommunication (6 station interlockings for stations Šamac, Modriča, Koprivna Gornja on section Šamac - Doboj, Alipašin Most, Mostar Putnička and Bačevići on section Sarajevo – Čapljina as well 6 LCI-es on section Šamac - Doboj all mentioned on railway corridor Vc and based on up to date electronic microcomputer supported technology)</p>

Date from - Date to	Location	Company&reference person (name and contact details)	Position	Description
				<p><b>B. PROVISION OF TENDER DOCUMENTATION</b>  - for supply, installation and commissioning of new ten (10) electronic LCI-es on the single track railway line Sarajevo-Zenica  - for supply, installation and commissioning of new electronic station interlocking on single track railway line Doboј to Banja Luka (stations Prisoje and Stanari)  - for revitalization of line combined Signaling and Telecommunication cable on international railway corridor parallel to corridor X, section S.Kostajnica – Dobrljin - border to Croatia (approximately 200 km of line)</p> <p><b>Projects summary value is cca 4,5 M€.</b>  <b>Design and Tendering services value is cca 0,8 M€.</b></p> <p><b>C. TECHNICAL INSPECTION AND TAKING OVER CERTIFICATION</b>  Supervision engineer for low voltage installation on border crossing Orašje</p> <p><b>Technical inspection services value is cca 0,6 M€.</b></p>
07/1999- 11/2000	Zagreb (Croatia)	Signal servis Ltd., Zagreb <i>Mr Zdravko Žuža</i> phone: +385 1 2361722	<b>Sales manager</b>	Production and services of interlocking devices for necessities of Croatians' Railways
12/1994- 06/1999	Zagreb (Croatia)	Croatians Railways Infrastructure Management of electrotechnical infrastructure subsystems phone: +385 1 3783 105	<b>Engineer for stations and interlocking devices and systems SpDrL Iskra-Lorenz- Alcatel</b>	Electro-technical works <ul style="list-style-type: none"> <li>Rehabilitation of interlocking devices on railway lines of HZ: railway section Metković-Ploče, Vrpolje-Slavonski Šamac, Novska-Okučani-Nova Gradiška, Ogulin-Knin-Split</li> </ul>
07/1992- 10/1994	Sarajevo, B&H	Railways of B&H, sector for rehabilitation and development and investments  <i>Mr Fikret Nukica</i> phone: +387 61 158 963	<b>Engineer for investments and interlocking devices and telecommunications</b>	Planning and proposals of rehabilitation of signalling equipment affected by war
05/1989- 06/1992	Sarajevo, B&H	ŽTP Sarajevo, Work unit for common affairs and investments	<b>Chief engineer for investments and for interlocking devices,</b>	Planning and proposals of modernisation and upgrading of signalling equipment on ŽTP Sarajevo network (now Bosnia and Herzegovina Railway Public Corporation)
03/1976- 04/1989	Sarajevo, B&H	Institute for traffic (IPSA)	<b>Leading designer for interlocking devices and automatization, bureau chief for designing of</b>	<p><b>A. DESIGNING</b>  Coordinating and performing of Conceptual/preliminary and Main designs for equipping of railway sections with interlocking devices (<b>approx. 2000 km of tracks and approx. 150 stations</b>):</p> <ul style="list-style-type: none"> <li>Double track Doboј-Zenica (approx. 90 km, 7 stations),</li> <li>Doboј-Bos. Novi (stations facilities, ABS and CTC) approx. 190 km, 25 stations,</li> </ul>

Date from - Date to	Location	Company&reference person (name and contact details)	Position	Description
			<b>interlocking devices, automatization and telecommunication.</b>	<ul style="list-style-type: none"> <li>- Bos. Novi-Knin (Station facilities, ABS and CTC) approx. 180 km. 25 stations,</li> <li>- Doboj-Tuzla (stations facilities, ABS and CTC approx. 50 km. 4 stations,</li> <li>- Tuzla-Živinice-Zvornik (stations facilities LCI, ABS and CTC) approx. 180 km. 25 stations,</li> <li>- Podlugovi-Droškovac (stations facilities) approx. 30 km, 4 stations</li> <li>- Lešak-Đeneral Janković- Kosovo approx. 19 stations and approx. 180 km with ABS and 15 LCI</li> <li>- Jesenice-Ljubljana (station facilities and ABS) approx. 8 stations and approx. 60 km track</li> <li>- Ljubljana-Sežana-Pivka (station facilities, ABS and CTC approx. 120 km and 15 stations)</li> <li>- Misurata-Brak-Sebha (station facilities ABS and LCI approx, 900 km, 20 stations</li>   <li>- Performing of Main designs for railway junctions with interlocking devices: <ul style="list-style-type: none"> <li>• Junction Sežana (Slovenia) 40 switches</li> <li>• Junction Sarajevo - 3 stations approx. 120 switches</li> <li>• Junction Bos. Novi - 2 stations approx. 50 switches</li> <li>• Junction Kutina and Kutina Petrokemija (Croatia) 40 switches</li> <li>• Junction Kosovo Polje 110 switches</li> </ul> </li> <li>- Performing of Main designs for installing of automatic stop devices for regional railway lines in Croatia</li> <li>- Performing of Main designs for Adapting of interlocking devices to the conditions of electrical traction on railway line Sunja (Croatia) - Bos. Novi</li> <li>- Performing of Conceptual designs for points heating from catenary 3 kV DC (Slovenian Railways)</li> <li>- Performing of Conceptual designs for station interlocking on line sections Kosovo Polje – Peć - Prizren (approx. 200 km with 20 stations) and LCI-es</li>   <li>- Performing of Main designs for supplementation of interlocking devices at stations due to connections of industrial tracks (stations Bos. Šamac, Bos. Poljana, Blažuj, Hadžići, Čelebić, Jablanica, Mostar teretna, Čapljina, Bačevići, Metković and Ploče)</li>   <li><b>B. CONSULTING</b> <ul style="list-style-type: none"> <li>• Consultant-expert for company Energoinvest, subject: railway signaling</li> </ul> </li>   <li><b>C. STUDIES AND FEASIBILITY STUDIES</b> Performing of the following studies: <ul style="list-style-type: none"> <li>- Selecting of heating system for stations for railway lines TP Sarajevo</li> <li>- Selecting of break system for trains in station Sežana (Slovenia)</li> <li>- Studies of defining of technical parameters for high train speed (part interlocking devices and information transfer train-track) for 150 km/h and to 250km/h</li> <li>- Performing of Conceptual designs for Feasibility study of modernization or for construction of new tracks-part interlocking devices and control: <ul style="list-style-type: none"> <li>• Doboj-Zenica II track</li> <li>• Doboj-Bos. Novi-Knin</li> <li>• Tuzla-Živinice-Zvornik</li> </ul> </li> </ul> </li>   <li><b>D. TENDER DOCUMENTATION-Interlocking devices and CTC</b> <ul style="list-style-type: none"> <li>- Doboj-Zenica II track</li> <li>- Bos. Novi-Knin</li> <li>- Doboj-Bos. Novi</li> <li>- Tuzla-Živinice-Zvornik</li> <li>- Misurata-Brak-Sebha (Libya 900 km)</li> </ul> </li> </ul>

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				<p><b>E. TECHNICAL INSPECTION AND TAKING OVER CERTIFICATION</b> As a member of internal and Republic commissions for inspection and taking over certification of interlocking devices, traffic remote control and stable facilities for electrical traction, as well as security measures of electrical protection 25kv 50HZ I participated on next objects: Sarajevo-Ploče, Sarajevo-Vrpolje, Bos. Novi-Knin, Bos. Novi-Doboj for area TP Sarajevo</p> <p><b>F. JŽ RAILWAYS COMMUNITY BOARD TECHNICAL SPECIFICATION (APPENDIX TO CODE 411 - DRAFT)</b></p> <ul style="list-style-type: none"> <li>• Signalling and safety parameters for train speed up to 160 km/h (draft)</li> <li>• Signalling and safety parameters for high speed trains up to 250 km/h (draft)</li> </ul>
01/1973-02/1976	Sarajevo, B&H	ZTP Sarajevo, Sector for electro-technical facilities	<b>Chief of department for interlocking devices</b>	Responsible for signaling equipment on cca 1400 km lines - whole railway network of ZTP Sarajevo
11/1969-12/1972	Sarajevo, B&H	ZTP Sarajevo Electrotechnical facilities Divison Sarajevo	<b>Chief engineer for signalling equipment maintenance</b>	Responsible for approx. 700 km railroad network
10/1967-10/1969	Sarajevo, B&H	ZTP Sarajevo Division for electro-technical facilities	<b>Signalling engineer – Senior</b>	Electrical works and engineer for station interlocking devices
04/1967-09/1967	Sarajevo, B&H	ZTP Sarajevo Signalling and telecoms workshop for repairing and construction Sarajevo	<b>Manager</b>	Management of works for repairing and construction of signalling and telecoms equipment covering of whole ZTP Sarajevo network
07/1964-03/1967	Sarajevo, B&H	ZTP Sarajevo Section for electro-technical facilities and telecommunications	<b>Signalling engineer - junior</b>	Two years of training for signaling engineer

#### 14. Publications:

1. Technical parameters for railway line safety Misurata-Brak-Sebha (association code JUREMA 1985)
2. Technical parameters for high speed trains (railway magazine JŽ).

#### Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications and my experience.

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Signatures of staff member  
Full name of staff member: Luka Kakarigi

Date: 9<sup>th</sup> May 2019.