Sinisa Durekovic

sinisa@durekovic.com
www.durekovic.com
www.linkedin.com/in/sinisadurekovic

SUMMARY

I am the Software Architect, Engineer and a Team Leader with more than 25 years of experience in design and development of software systems. After 8 years as Principal Engineer in a mid-sized company, and another 3 years as Senior Principal Architect and Chief Engineer at major premium Navigation System supplier, in 2015 I moved to Silicon Valley to work in Apple Special Project Group and Faraday Future.

I'm currently working as Architect in Intel Autonomous Driving Group in San Jose, California.

My main work is in area of Digital Maps, especially its use in Autonomous Driving, Map-Enhanced Advanced Driver Assistance Systems and Car Navigation Systems.

I was Technical and Team Lead in a number of successful commercial projects (ArgoSoft ARGUS, CIS CityGuide, Navigon AutoPilot, NAVTEQ ADASRP, Harman Navigation Engine...), and I have 8 years of experience in consortia & government-funded research projects, including project coordination.

My notable accomplishments are:

- Defined Digital Map Logical Data Model for the Autonomous Driving (2017);

- Complete software Architecture of the Harman ADAS Box (2015);

- Complete software Architecture of the new generation of the Harman Navigation Engine for the BMW MY 2018+ (2014);

- Analysis, Design and Development of the Global Cache – specialized NDS database cache that speed up Harman Navigation Engine by 22% (2013);

- Technical lead, principal architect and developer of the NAVTEQ Advanced Driver Assistance System Research Platform (2004-2012); established ADASRP as the primary tool for Map-Supported ADAS prototyping in the automotive industry;

- Coordinator and one of the main contributors in the design of the ADASIS v2 automotive communication protocol; coordinator of the ADASIS v2 Horizon Reconstructor Implementation Task Force (2008-2010);

- Technical lead and senior developer of one of the first off-board navigation systems (ComROAD, 2001-2002);

- Founded and led Navigon software development; development of one of the first country-wide door-to-door routing systems and one of the first GPS-only map matching algorithms (Navigon, 1994-1999);

- Organized and led one of the first software outsourcing services in Croatia (Microline, 1993);

- Part of the team that developed the world's first Prolog compiler (Zglog, 1990);

- Developer of the Basic Interpreter for Cromemco System III (1982), the UCSD File System Repair Tool (1983) and the Pascal compiler for UNIVAC 1110 (1987).

POSITIONS

- Autonomous Driving Map Subsystem Architect – Intel, 2017-now
- Platform Architect – Faraday Future, 2016-2017
- Employee – Special Project Group, Apple Inc., 2015-2016
- Chief Engineer – ADAS, Harman Automotive, 2015
- Chief Engineer – Navigation, HARMAN Automotive, 2014
- Senior Principal Architect – Navigation, HARMAN Automotive, 2012-2014
- Principal Engineer and Team Lead, *NAVTEQ*, 2003-2012
- Team Lead – Off-Board Navigation, *ComROAD AG*, 2001-2003
- Lead Software Developer, *Moon AG*, 2000-2001
- Director Software Development, *Plato/NAVIGON*, 1994-1999
- Software Developer in different companies, 1986-1999

COMPUTER SKILLS

Languages & Frameworks

- Guru knowledge: C, C++, Windows API, MFC …
- Expert knowledge: MatLab, Java, C, SQL, Pascal, Fortran, XML, WML, UML, Prolog …
- Familiar with: Python, C#, Lisp, Cobol, Visual Basic, Occam, Swift…

Software

- Organization and design: Enterprise Architect, MagicDraw, MS Project, Excel, Numbers, Visio, OmniGraffle, PowerPoint, Pages, …
- Prototyping and development: NAVTEQ ADAS Research Platform, MathWorks MatLab and Simulink, ElektroBit ATDF, Harman MoCCa …
- Development Tools: Visual Studio, XCode, Eclipse, CANalyzer, CANdb++, Subversion, ClearCase, CVS, Jira, DoxyGen, PC-Lint, SoftIce, BoundsChecker, TrueCoverage, TrueTime, Word, Mathematica, Perforce, DOORS, git, Gerrit …
- Databases: FileMaker Pro, Oracle, Microsoft SQL Server, Microsoft Access, SQLite, PostgreSQL …
- Platforms: Microsoft Windows, Mac OS, Linux, QNX, Windows CE, QNX …
- Protocols: CAN, HTTP, WAP/WML, TCP/IP …

PERSONAL QUALITIES

- Highly competent, extreme breadth and depth of professional knowledge
- Ambitious, aim to be ahead of the curve and to deal with complex problems
- Analytical, fast to comprehend and find patterns and links between things
- Decisive, able to make clear-cut decisions under pressure
- Imaginative, aim to propose innovative and effective solutions
- Effective leader, skilled at managing for best results

Intel Corp.   **101 Innovation Dr,**
                                                                                                   San Jose, CA 95134
Map Architect, Autonomous Driving Group   **May 2017-now**

About the company:

Intel Corp. engages in the design, manufacture, and sale of computer products and technologies. It delivers computer, networking, and communications platforms. The company was founded by Robert Norton Noyce and Gordon Earle Moore on July 18, 1968 and is headquartered in Santa Clara, CA.

About the role:

Enable SAE J3016 Level 4 and Level 5 Autonomous Driving by providing up-to-date and accurate Digital Map data. Define requirements, content, accuracy and Digital Map data model; architect and develop mechanisms for provision of digital map data to Autonomous Vehicles including back-end services, over-the-air communication channels as well as distributed on-board architecture and APIs. Work on map-related Autonomous Driving algorithms including Localization, Map-Matching, interfacing with Navigation System as well as Environmental Model.

Work with partners on Digital Maps provision, but also define and develop small-scale AD Map Production pipeline to be used for research purposes.

Faraday Future   **Santa Clara, CA**
                                                                                                   HQ: 18455 S Figueroa St.,
                                                                                                   Los Angeles, CA 90248.
Platform Architect   **Oct 2016-May 2017**

About the company:

Faraday Future is a start-up technology company focused on the development of intelligent electric vehicles. Faraday Future was established in April 2014 and is headquartered in Los Angeles, California. Since its inception in 2014, the company grew to 1000 employees by January 2016.

The company debuted its first concept vehicle, the single-seat sports car, FF ZERO1, at the January 2016 Consumer Electronics.

About the role:

As Platform Architect in domain of Digital Maps for Autonomous Driving I was responsible for all aspects of the sub-system.

In particular, during my work at that position I

- Defined Map Model that satisfies complete set of Autonomous Driving use cases including Freeway Autopilot, Urban Driving with complex intersections as well as Valet Parking,
- Specified detailed requirements focused on Autonomous Valet Parking,
- Worked with AD Map providers on sample data production,
- Designed AD Map Sub-system and lead first implementation phase.

About the company:

Apple Inc. is an American multinational technology company headquartered in Cupertino, California, that designs, develops, and sells consumer electronics, computer software, and online services. Its hardware products include the iPhone smartphone, the iPad tablet computer, the Mac personal computer, the iPod portable media player, and the Apple Watch smartwatch. Apple's consumer software includes the macOS and iOS operating systems, the iTunes media player, the Safari web browser, and the iLife and iWork creativity and productivity suites. Its online services include the iTunes Store, the iOS App Store and Mac App Store, and iCloud.

About the role:

In the Special Projects Group, I worked on project where I fully applied my existing domain know-how, and extended and deepen my expertise in applications of Digital Maps. Unfortunately, at this time I cannot share more details about my achievements at that position.

About the company:

HARMAN designs, manufactures and markets premier audio, visual, infotainment and integrated control solutions for the automotive, consumer and professional markets. HARMAN has a global workforce of approximately 15,200 people.

HARMAN Automotive GmbH, CoC Navigation, develops and maintains Navigation Engine that powers premium Navigation Systems of BMW, Daimler, Audi and other major OEMs.

About the role:

Besides general responsibility for the overall Architecture of the Harman Navigation Engine, my activities included:

- Complete software Architecture of HARMAN ADAS Box. System is designed to take input from multiple hardware and software sensors (Digital ADAS Map, Electronic Horizon) and fusing available information into Perception Horizon that provides complete information about ego-vehicle environment to various ADAS applications. Sensor suite includes:
  - Digital ADAS Map,
  - Positioning/Map Matching Module (GNSS, Gyroscope, Odometer),
  - Electronic Horizon Module,
  - Vehicle-to-X subsystem with focus on V2V and V2I,
  - Camera/Radar/Lidar inputs.
- Complete software Architecture of the new generation of the Harman Navigation Engine for the BMW MY 2018+;
- Analysis, Design and Development of the Global Cache – specialized NDS database cache that speed up Harman Navigation Engine by 22%;
- Analysis of RAM use and re-deployment of the Navigation Engine sub-systems that reduced RAM use by 20%;
- Design and Development of the Reference Navigation System used in internal research and pre-development projects;
- Special technical and team responsibility for development of Navigation System for China for major OEM;
- Technical responsibility for analysis of customer RFQs and preparation of the related Quotations;
- Navigation and ADAS expert and point-of-contact in different internal cross-domain projects and activities such as Augmented Navigation.

Principal Engineer and Team Lead, NAVTEQ Customer
Engineering

About the company:

NAVTEQ is the leading global provider of location content in the form of maps, traffic and places data to enable navigation, ADAS, location-based services and mobile advertising around the world.
NAVTEQ is headquartered in Chicago, IL, USA, with more than 5,800 employees worldwide located in 200 offices in 54 countries.

About the role:

As a Principal Engineer and a Team Leader Customer Engineering/In-Vehicle, I am responsible for the realization of Customer Projects and similar activities related to Map-Supported (Car) Advanced Driver Assistance Systems. I am also the primary technical contact for external customers with regard to ADAS maps and algorithms as well as being the in-house expert for ADAS systems.

Customer Projects and Responsibilities:

ADAS Research Platform (product, 2004-2012)

- ADASRP is a software framework for prototyping Map-Supported ADAS applications. The main components of this framework are Core Navigation (Map Display, Vehicle Positioning, Geocoding & Routing) and Road-Ahead Prediction (Electronic Horizon). As well as supporting ADAS, ADASRP is widely used in the development of specialized routing algorithms (e.g. Green Routing, Traffic-based Routing, etc.). My team has been responsible for the development and maintenance of ADASRP since 2004. Priced at 25,000 EUR per year, ADASRP is (as of 2011) is licensed to Audi/VW, BMW, Bosch, Chrysler, Daimler, Denso, Ford, GM/Opel, Hyundai, Jaguar, Nissan, MAN, Renault, TRW, PSA, Valeo, Volvo and TRW. ADASRP is also used in a large number of public research projects such as InteractIVe, EcoMove, SimTD, FeedMap, CoVeL and LIST.

BMW Intelligent Active Cruise Control (prototype, 2009-2012)

- Intelligent ACC (IACC) is a system that automatically controls the speed of the car depending upon the road ahead (Curves, Speed Limits, and Crossings), current traffic and weather conditions and also takes into account the dynamics of the car and various driving styles. Based upon the commercial BMW ACC Stop+Go system, I developed IACC together with two engineers from BMW. As such IACC represents the longitudinal component of Automated Driving.

BMW Active Speed Recommendation (prototype + pre-series development, 2007-2010)

- The predecessor of BMW IACC, ASR is a combination of predictive Curve, Legal Speed Limit and Crossing Warning. Based upon the road ahead, car dynamics and driving style the system warns the driver about excessive speed.

BMW Dynamic Pass Predictor (prototype, 2005-2008)

- Developed by myself and an engineer from BMW. DPP is a system that informs the driver about overtaking opportunities ahead. To perform that function the system uses standard ACC radar, knowledge about the car dynamics and driver style, as well as a full set of digital map data attributes.

BMW Ghost Driver Warning (prototype, 2008)

- GDW uses the map to recognize a situation when the vehicle is moving in the wrong direction on one-way roads (e.g. highways). The driver is warned acoustically, as well as visually on the Head-up Display and the Central Information display. In addition, the position of the ego-vehicle is sent via a Vehicle-to-Vehicle communication channel to other cars in the vicinity, informing other drivers about the presence and exact location of this danger. Using Vehicle-to-Infrastructure communication the location of the Ghost Driver is sent to a Service Centre, which in turn can alert the authorities, as well as other entities who are able to distribute warnings in the wider area.
  I developed GDW together with an engineer from BMW.

Automated Green Driving (pre-series implementation; 2011-2012, major tier-1 system vendor)

- Since 2011 my team has been responsible for the Digital Map and Driving Path Prediction (Electronic Horizon) components in the development of an Automated Green Driving system. This is a joint project between NAVTEQ and a major tier-1 System Vendor.

NAVTEQ Map-and-Positioning Engine (product, 2009-2010)

- NAVTEQ MPE is a specialized ECU to be used by multiple Map-Supported ADAS functions. In a credit-card size format, MPE incorporates the ADAS Digital Map, Vehicle Positioning and Electronic Horizon modules. I defined the general system architecture of MPE and my team and I were responsible for the design and development of the Electronic Horizon as well as the communication protocol components (ADASIS v2).

Besides the projects listed above, my team and I have worked on several other Customer projects for BMW, Jaguar/Land-Rover, Renault and Magneti Marelli.

Consortia projects and activities

ADAS Interface Specification v2 (specification and pre-series implementation, 2008-2010)

- Between late 2009 and April 2010 I led a group of automotive OEMs and SVs (Bosch, BMW, Continental, Daimler, Ford, Opel, PSA, TeleAtlas) in the design and development of the CAN and C API interface between Digital Maps and ADAS applications (Electronic Horizon). After its release in 2010 the ADASIS v2 Specification, backed by the ADASIS Forum, is now accepted as the de-facto standard.

EU FeedMAP Project (research, 2006-2008)

- Together with partners from BMW, Daimler, Fiat, Volvo, Tom-Tom and others, my team and I worked on the definition and implementation of the "FeedMAP loop" which consists of the automatic detection of map deviations in the car (using camera, radar, heuristic algorithms, etc.); reporting and statistical processing of those map errors to the service center; automatic incremental digital map correction and the update and distribution of changes back to the client cars. FeedMAP was successfully demonstrated in 2008 and serves as the basic technology used in Tom-Tom map production.

EU interactIVe Project (research, 2010-2012)

- Fusion of different hardware sensors with a digital map (Electronic Horizon) is at the core of the EU project InteractIVe. My team and I are working on the definition, design and implementation of the core concept ("Perception Horizon") together with partners from Delphi, Fiat, Volvo, Daimler and others. Within the scope of this project and based on the Perception Horizon, I also implemented the Enhanced Dynamic Pass Predictor, in cooperation with BMW.

EU EcoMove Project (research, 2010-2012)

- I actively participated in the preparations for the EcoMove project which researches algorithms and methods required for more efficient driving. This includes "Green Routing", "Green Driving", "Cooperative Green Driving", "Coaching" and similar concepts. Among the 33 project partners are BMW, Bosch, Continental, Fiat, DAF, Ford, NEC, PTV and Volvo. Members of my team are working on the definition, design and implementation of the algorithms targeted at reducing overall fuel consumption.

Other consortia projects under the responsibility of my team and myself are:

- Genivi (2010-2011)
- SimTD (2009-2011)
- LIST (2010-2011)
- CoVeL (2011)

OTHER POSITIONS

Team Leader – Off-Board Navigation   2001-2003
ComROAD

- Technical Lead: ComROAD StreetGuard; SMS-based Off-Board Navigation System
    - Responsible for a complete vertical solution from Data Compilation, Navigation Servers to Windows CE Navigation Clients.
    - Design and implementation of various system components (Address/POI Lookup Server, Routing Server, Traffic & Weather Information Server, WinCE Navigation Client)
- Leader of team of 5 developers
- Software development under Linux, Windows and Windows CE.

Lead Software Developer   2000-2001
Moon

- Development of WAP services for GSM cellular phones
- Programming in Java (Oracle JDeveloper), Visual Basic, Oracle
- Administration of Nokia WAP Server, Apache WEB Server etc.

Director Software Development   1994-1999
Plato/Navigon

- Lead Architect and Developer of all Navigon Products (Routing and In-Car navigation systems).
- Developed first country-wide door-to-door routing algorithm
- Developed first GPS-only map-matching module

Software Developer   1986-1993
Freelancer, Zglog, Argosoft, Croatian Army, Microline

- ZGLOG: work on first PROLOG compiler for x86 based systems.
- ARGUS: design and development of accounting software.
- Croatian Army: Work on solutions in area of Computer Security and Cryptography.
- Microline: Software Development Team Lead, Accounting Software.

Patents and Patent applications
- Intersecting Electronic Horizons (US Patent 8,717,192)
- Differential Dynamic Navigation System for Off-Board Car Navigation (EP1387145)

Awards

NAVTEQ Significant Development Awards:
- Speed Profile & Speed Warning (2006)
- Anti Spoofing of GPS (2007)
- Ghost Driver Warning System (2007)
- LKA-based Lane Position Estimator (2007)
- Direction Indicator and Lane Positioning in Electronic Horizon (2008)
- Use of convoluted Drive History in Electronic Horizon and Routing (2008)
- Winding Route (2008)
- Use of Speed Profile Server in Map-Enhanced Green Driving Assistant (2008)
- Intersecting Electronic Horizons (2009)
- Speed-Based Road Preview (2009)
- Native ADASIS v2 Horizon Provider (2010)

Publications
- Dynamic Pass Prediction – A New Driver Assistance System for Superior and Safe Overtaking
  In: Advanced Microsystems for Automotive Applications 2006
- Validating the ADAS Interface using Active Cruise Control
  At: 13th World Congress on ITS, London, 2006
- MAPS&ADAS Interface and Data Entity Specifications
  Brussels, 2006
- Improving Safety and Comfort for In-Vehicle Applications by Map Deviation Detection and Online Map Updating
  At: 7th European Congress on ITS, Geneva, 2008
- Real Time Map Information with Map Deviation Detection for Advanced In-Vehicle Applications
  At: 10th International Conference on AATT, Greece, 2008
- Automatic Detection and incremental updating for Advanced In-Vehicle Applications
  At: 10th International Conference on AATT, Greece, 2008
- The ActMAP – FeedMAP Framework: A Basis for in-vehicle ADAS Application Improvement
  At: IEEE Intelligent Vehicles Symposium (IV'08), Eindhoven, 2008
- Test Results and Validation of the FeedMAP Framework with ADAS Applications
  In: IEEE Intelligent Transportation Systems Society, July 2008
- ADASIS Protocol for Advanced In-Vehicle Applications
  At: 15th World Congress on Intelligent Transport Systems, New York, 2008
- Adaptives Energiemanagement in Hybridfahrzeugen: Situationsgerechte Ladestrategien unter Berücksichtigung von Verkehrs-, Geschwindigkeits- und Höheninformationen
  At: Elektrik/Elektronik in Hybrid- und Elektrofahrzeugen, München, 2008

- Developments on the Electronic Horizon

    In: dSPACE Magazine 2/2010, Paderborn, 2010

- *eCoMove – EfficientDynamics Approach to Sustainable CO2 Reduction*

    In: 17th IST World Congress 2010 Busan, Conference Proceedings

- *High precision maps for sustainable accident reduction with the Enhanced Dynamic Pass Predictor*

    In: 17th IST World Congress 2010 Busan, Conference Proceedings

- *ADASIS v2 Protocol Specification ver. 2.0.0*

    ADASIS Forum, Brussels, April 2010

- *ADASIS v2 API Specification ver. 2.0.0*

    ADASIS Forum, Brussels, August 2010

- *ADASIS v2 API Specification ver. 2.0.1*

    ADASIS Forum, Brussels, 2010

- *Digitale Karten als vorausschauende Sensoren für Fahrerassistenzsysteme*

    At: VDE/VDI AmE, Dortmund, May 2011

- *Architectures of Map-Supported ADAS*

    At: IEEE Intelligent Vehicles Symposium, Baden-Baden, July 2011

EDUCATION

University of Zagreb, Mathematics   1984-1989
Bijenička cesta 30, 10000 Zagreb, Croatia

- Absolvent

High School for Mathematics and Computer Science (XV Gymnasium)   1979-1983
Jordanovac 8, 10000 Zagreb, Croatia

- Graduated with excellent success:

    UCSD File system repair tool.

Additional Education

- CANalyzer praxis workshop
- Software in the Car workshop
- ISO 2001 Awareness
- CMM Awareness
- Introduction to GDF
- Designing Business Solutions
- Analyzing Requirements and Defining Solution Architectures
- Component Development Using ATL 3.0
- 8D/Root Cause Analysis
- Mastering Microsoft Visual Basic 6.0 Development
- Designing and Implementing Desktop Applications with MSVC 6.0
- Designing and Implementing Distributed Applications with MSVC 6.0
- Designing and Implementing Desktop Applications with MSVB 6.0
- AUTOSAR – Technical Concepts
- Management Excellence
- EB Assist ADTF – Basic Training
- MATLAB Fundamentals

PERSONAL INFO

Languages

- Fluent in English, German, Croatian
- German citizen

Interests

- History, classical music, mechanical watches, chess, target shooting, hiking, badminton