

Road Sounder

DEVELOPMENT OF A SMART NETWORK FOR AN ENHANCED ROAD MAINTENANCE SERVICE

NAVISP-EL2-115

ESA AO/1-10516/20/NL/MP/MK

Arpssoft Mission is to provide High Quality Consultancy Services for **Space** and **Industry**



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Arpssoft boasts a long-standing experience in deep space navigation and TT&C systems, consolidated in prestigious Italian and foreign institutions like NASA Jet Propulsion Laboratory, Sapienza University of Rome and INAF.



Delta-DOR system

Telemetry & Command

OL Signal Processing

Antenna Arraying



RFI Analysis

FSS, MSS, EESS

FS, MS, Radars, Sensors

N-GSO Constellation



High Precision Mech. Equip.

Radio Astronomy Automation

Custom Tech. Dev.

Smart Industry & IoT

Front End and Back End for Web and mobile
(Applications with custom APIs and visualization tools)

Distributed systems management, cloud and private
server deployment

Wide programming languages background (e.g.: c++,
Fortran, Python, Javascript, VB.net, LabVIEW, Matlab)

7+ years of activity

5+ ESA ITTs completed

From 2017 - ESOC SWs maintenance (RFIATnet, Delta-DOR, LBTe)

From 2019 - RFI support activity to Radio Frequency Management Team in ESOC

1 SW marketed (RFIATnet)

Custom development for Service 4.0 applications (IoT, web app, mobile app, etc)



<https://www.arpsoft.it>

<https://www.rfiat.net>

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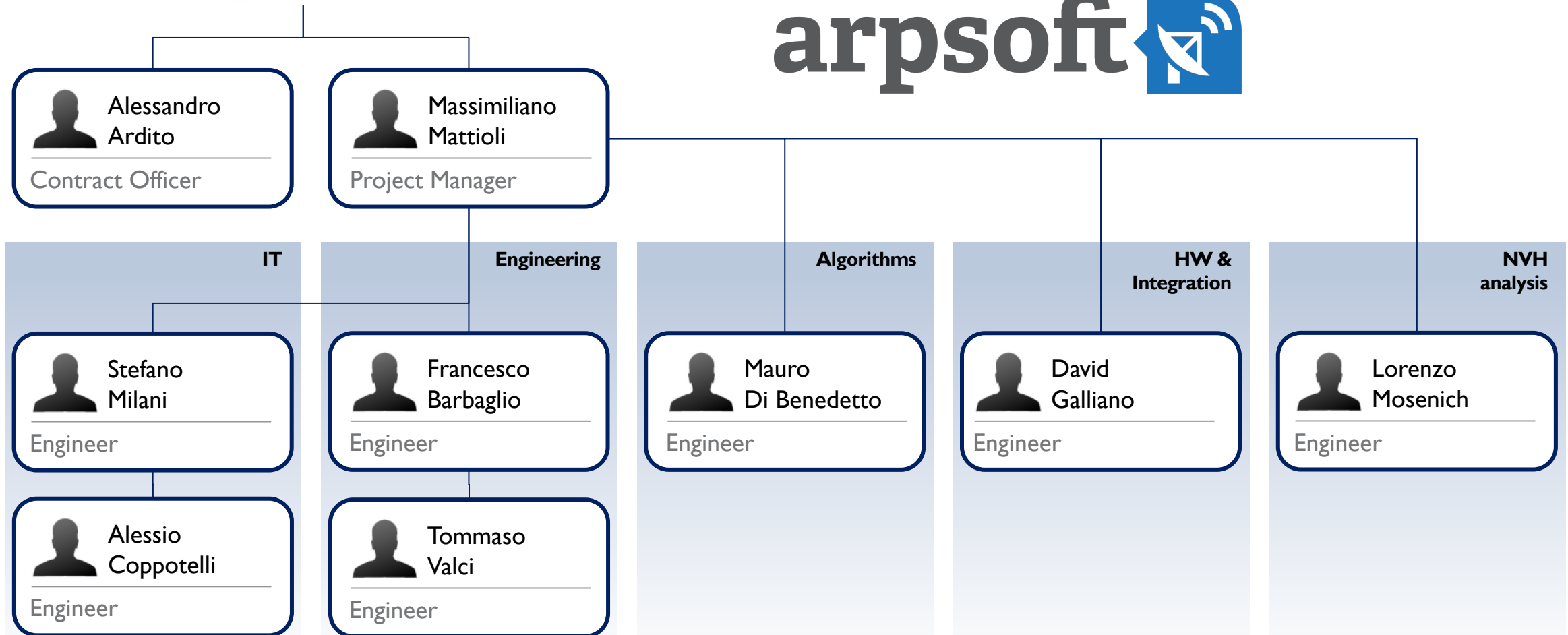
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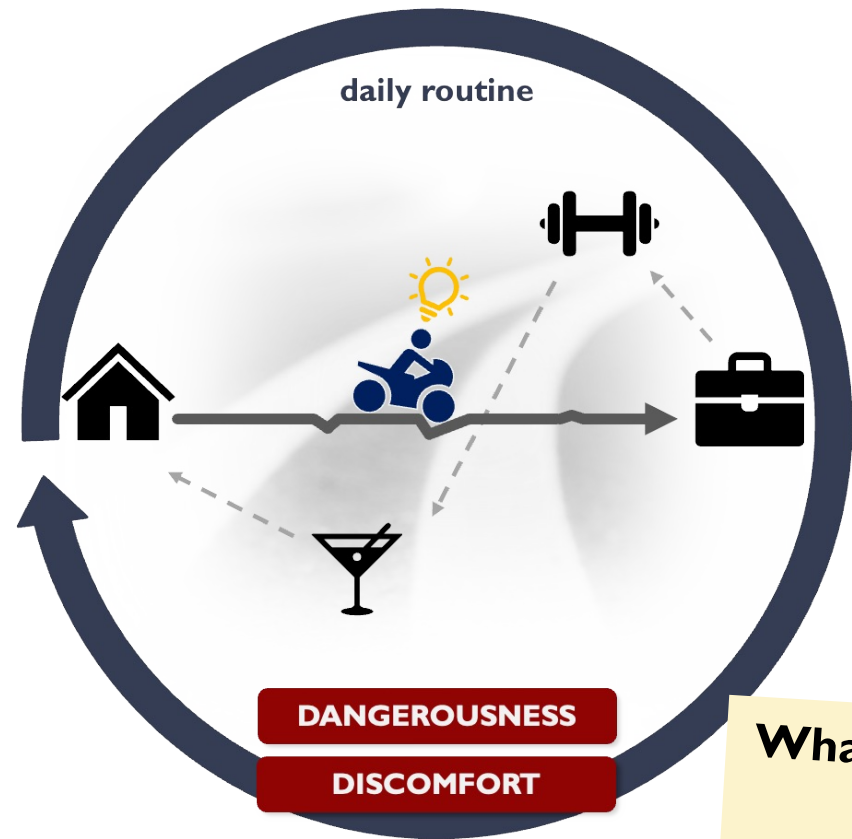
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THE IDEA



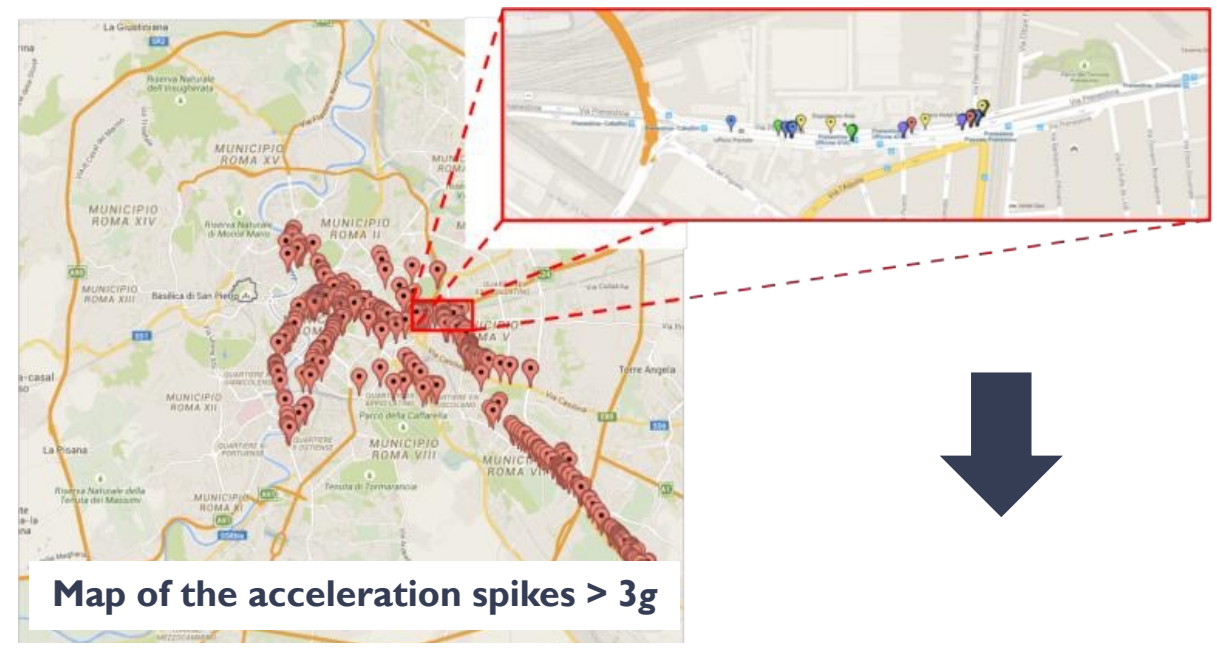
↑
SAFETY

↓
COST

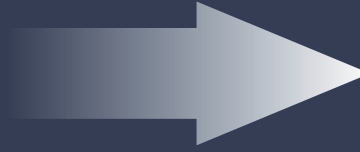
What if? 

Daily routine

+ Automated Autonomous device
for 365 days/year
for N vehicles on the roads



Road Condition Monitoring Service



Road Maintenance Service

Road Maintenance is a specific responsibility of all local public administrations
(art. 14 of “Decreto Legislativo n.285 del 30 aprile 1992”)

Road Maintenance is typically not structured nor systematic

Road Maintenance budgets are typically limited, especially for large districts (e.g. cities)

Poor maintenance and late interventions cause costs to greatly increase

~ 100k€/km on reconstruction case

Rome’s municipality recently allocated 10M€ for the cataloguing and the repair activity of the pot holes located on city’s roads (~800km)



RS Offer

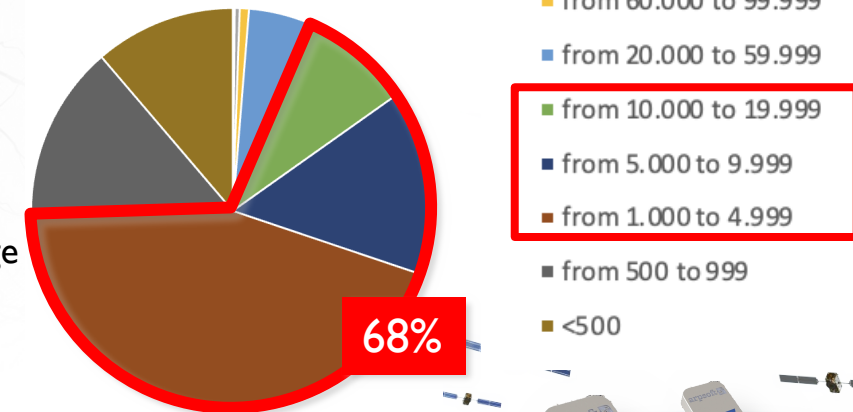
- Road condition monitoring in highly populated, wide area environments.
- Optimization of road maintenance intervention and cost reduction
- Service continuity
- System modularity and scalability

RS Market

■ We have an agreement with a partner/potential customer for the implementation of RS on its fleet, that is already used in the maintenance service for the Public Administration of a big city (Rome).

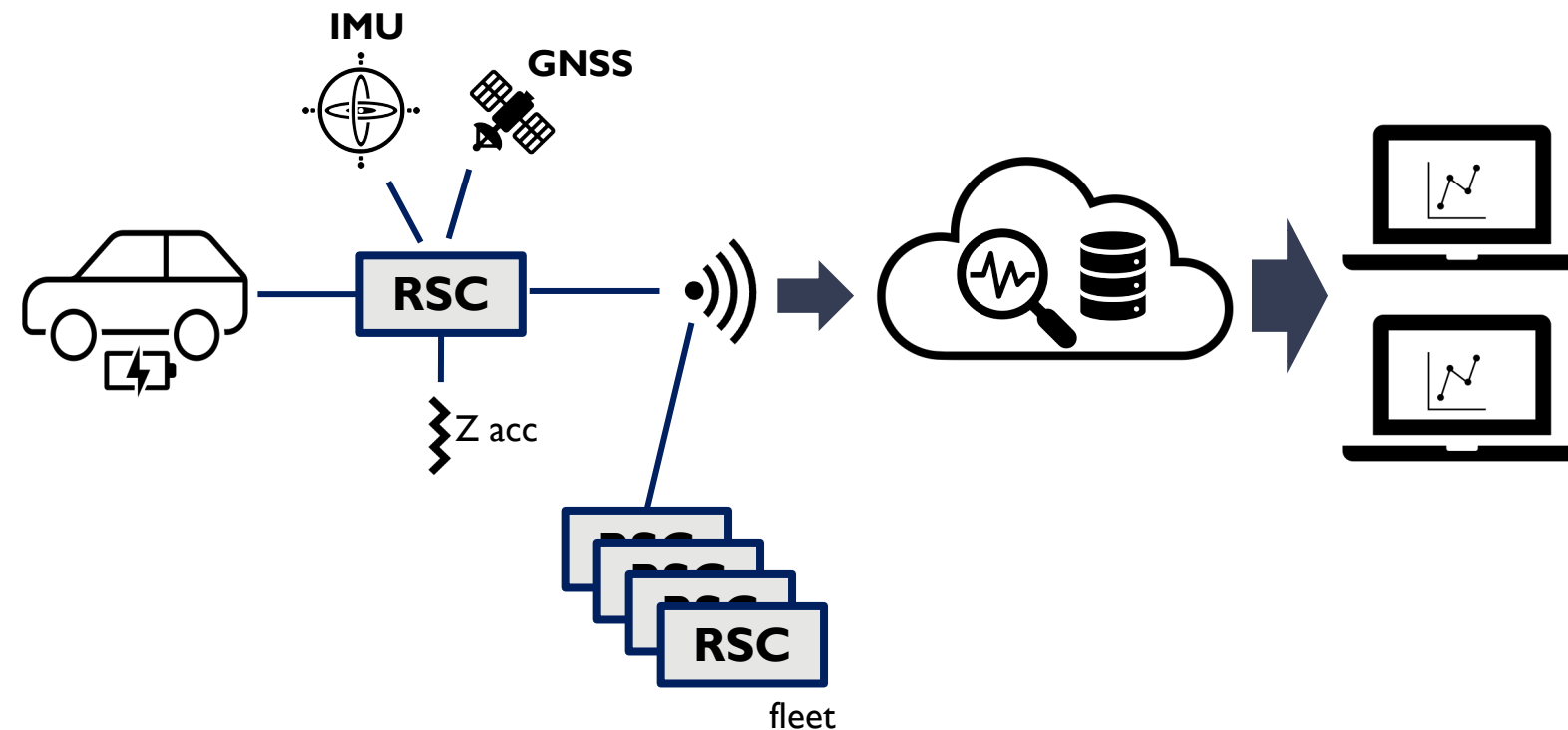
■ It targets mid-small cities with population in the range 1k – 20k and roads length 50 – 150 km to gradually enter the market

Cities per population range



THE PRODUCT

Road Sounder is a smart network for an automated monitoring of the road pavement status to enable the implementation of an effective, enhanced, Pavement Management System (PMS)



Road Sounder Data

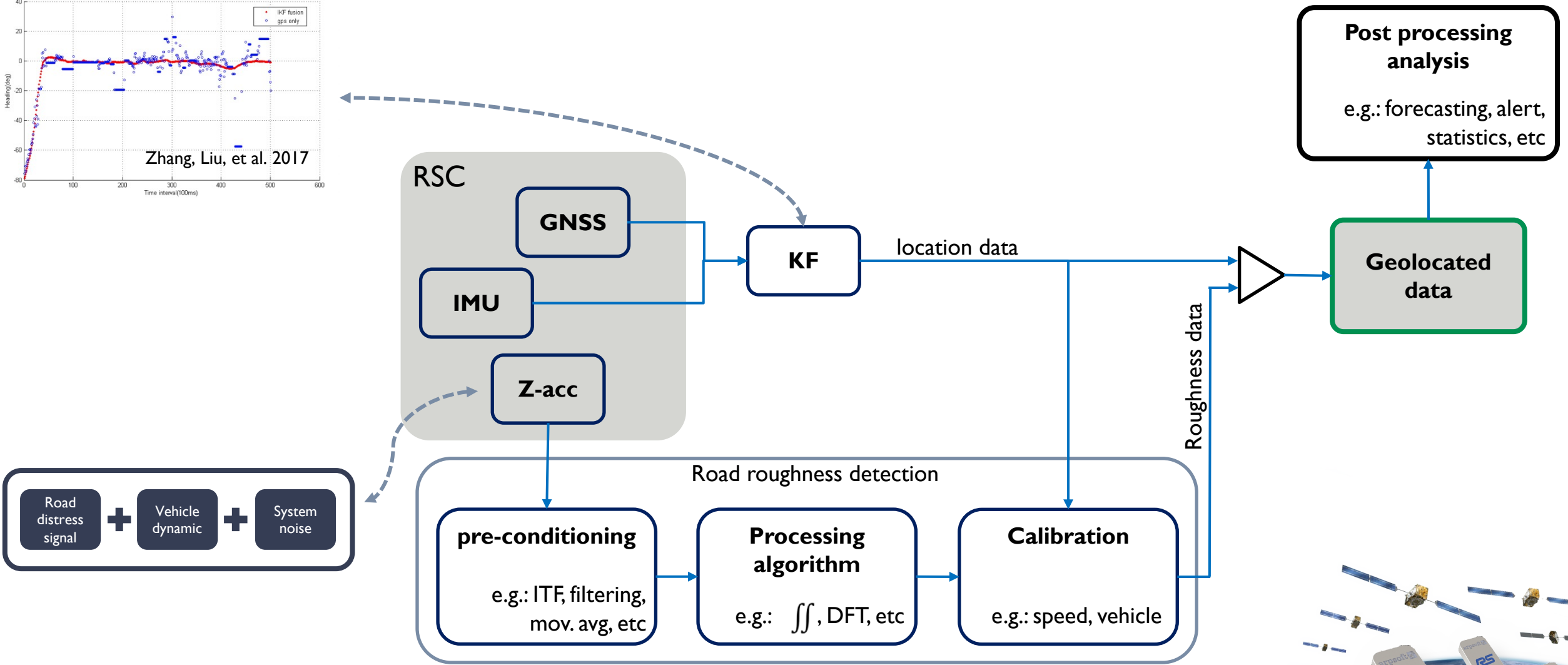
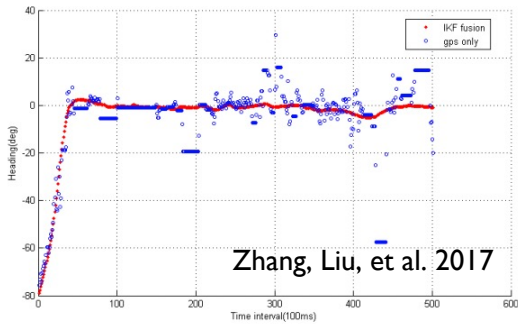
What → Road roughness
Pavement Condition event trigger
(e.g IRI, PCI, custom index, etc)

Where → Localization
GNSS + IMU triggered by the event

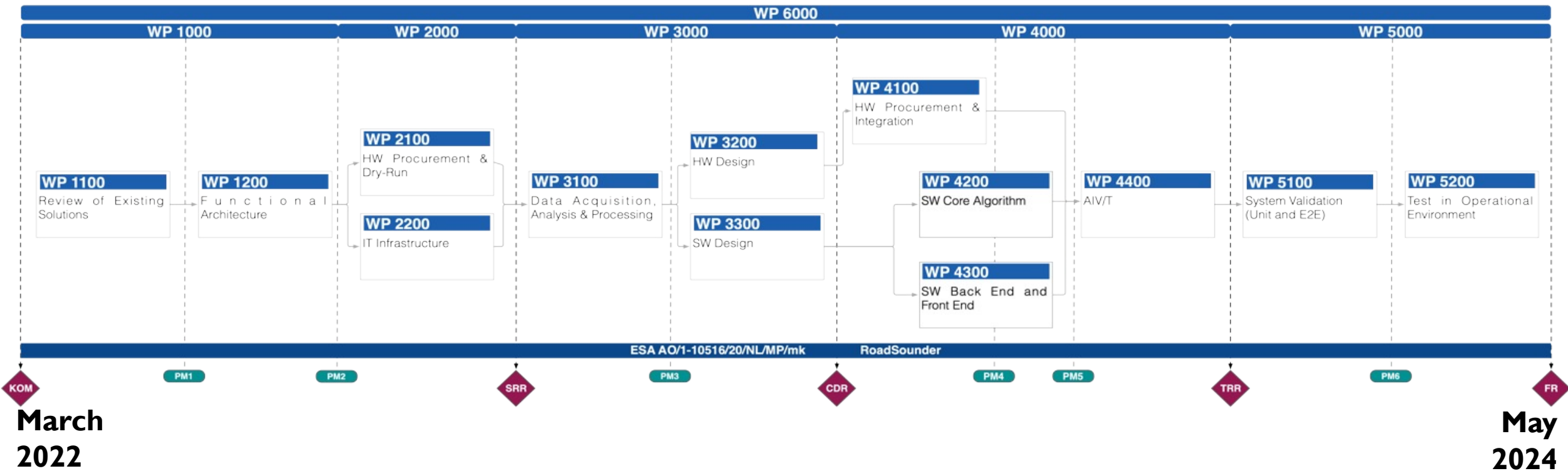
When → Event “epoch”
Time triggered by the event



The data processing



THE STUDY LOGIC



Architecture and Requirements

- Investigation of the existing solutions
- Algorithms investigation
- Preliminary data acquisition

Design

- Acquisition Campaigns
- Architecture trade off
- Algorithm selection
- SW design
- HW design

Implementation

- SW development
- IT infrastructure building
- HW procurement
- HW unit verification
- AIV/T

Test

- E2E test
- Test in operational env.



PROJECT DOCUMENTS +

RS SW AND HW

RSC FIRMWARE
SWD1



RSC – ROAD SOUNDER CELL
HWDI



**CLOUD SERVER BACK
END DATA PACKAGE**
SWD2



END USER INTERFACE
SWD3



READY FOR THE MARKET
JUNE 2024



PNT

Team's Technical competences

Existing background consolidation,
Increasing company competences



Opportunity to bid for new work

Opportunity to apply with new PNT
proposals and RS further development in
the future

BUSINESS OPPORTUNITY

New Market

expanding the IoT company offer with a
new product/service



New Customers

One already signed a Letter of Interest and
will support test phase and early
implementation.



THANK YOU

