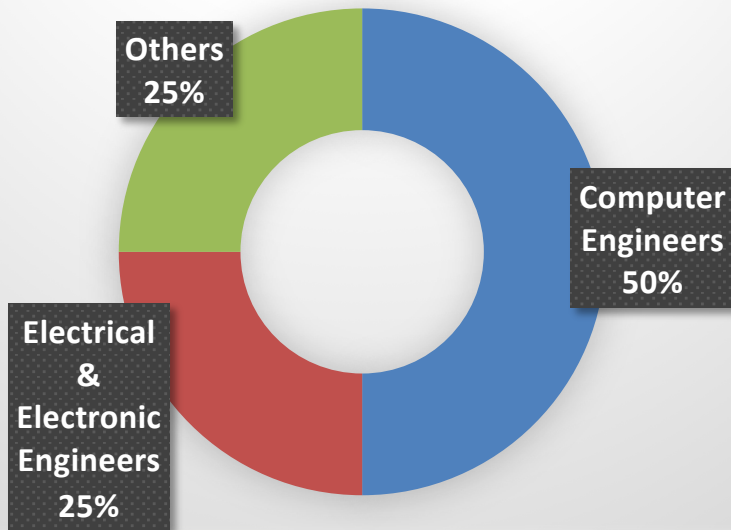Technical Assistance for
Turkey in Horizon 2020 Phase II

International Study Visit to CERTH, Thessaloniki: H2020 Secure Societies

Dr. Tolga Sönmez
Havelsan

Thessaloniki- Greece, 2019

Havelsan Key Facts

PERSONNEL~1800

- Computer Engineers 50%
- Electrical & Electronic Engineers 25%
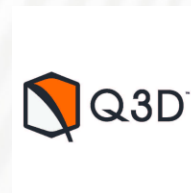- Others 25%

SUBSIDIARIES

HTR
Maintenance Repair and Operations

STM
Engineering and Consulting

CORNEA AVIATION
Cabin Interior Systems and Internet Services

QUANTUM 3D
Simulation & Training
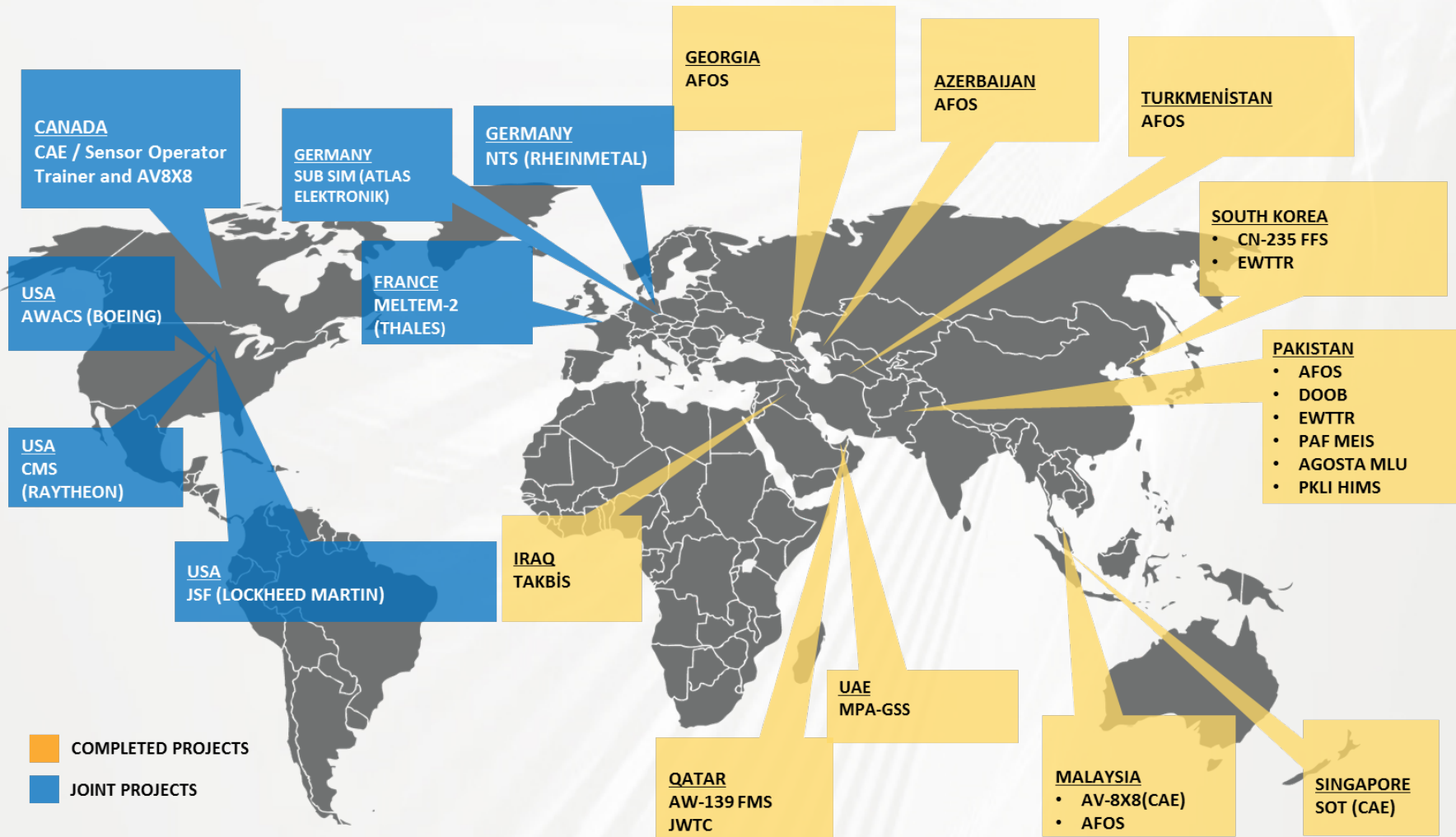
MAIN ACTIVITY AREAS

Command Control Systems

Training, Simulation, Test & Evaluation Systems

Management Information Systems

Security Systems

Global Havelsan

HAVELSAN

TÜBİTAK

GEORGIA
AFOS

AZERBAIJAN
AFOS

TURKMENİSTAN
AFOS

CANADA
CAE / Sensor Operator Trainer and AV8X8

GERMANY
SUB SIM (ATLAS ELEKTRONIK)

GERMANY
NTS (RHEINMETAL)

SOUTH KOREA
- CN-235 FFS
- EWTTR

USA
AWACS (BOEING)

FRANCE
MELTEM-2 (THALES)

PAKISTAN
- AFOS
- DOOB
- EWTTR
- PAF MEIS
- AGOSTA MLU
- PKLI HIMS

USA
CMS (RAYTHEON)

USA
JSF (LOCKHEED MARTIN)

IRAQ
TAKBİS

UAE
MPA-GSS

COMPLETED PROJECTS

JOINT PROJECTS

QATAR
AW-139 FMS
JWTC

MALAYSIA
- AV-8X8(CAE)
- AFOS

SINGAPORE
SOT (CAE)

Technological Interests

- ARTIFICIAL INTELLIGENCE
- Embedded Operating Systems
- BIG DATA
- AUTONOMOUS SYSTEMS
- IMAGE PROCESSING
- FIELDS OF TECHNOLOGICAL INTEREST
- CYBER SECURITY
- 5G
- AUGMENTED REALITY
- DECISON MAKING ANALYSIS/ PLANNING TOOLS

HAVELSAN

TÜBİTAK

Signal processing

- Advanced signal processing applications
- Kalman filters, particle filters, estimation and optimization algorithms
- Modelling, hardware and software simulators

Navigation Systems

- INS/GPS systems
- Indoor localization
- Terrain Aided Navigation Systems
- Integration of MEMS inertial sensors
- Capturing human motion data, classification

Artificial Intelligence

- Deep Neural Networks, CNN, RNN
- AI algorithms applied on motion data, bio mechanics, anomaly detection
- Health applications using motion data

Sensor Fusion

- Multi sensor fusion
- Processing and fusion of radar, electro-optic, AIS, sonar sensors
- Tracking of targets in a single fused picture

Image processing

- Earth observation
- Processing, tracking and classification of images taken from satellites
- Hyperspectral image analysis
- 3D modelling
- Fusion of images with different types

TÜBİTAK

Possible topic/topics you wish to participate in

- **SU-DRS02-2019**
- SU-DRS03-2019
- SU-DRS04-2019
- SU-DRS05-2019
- SU-FCT01-2019
- SU-FCT02-2019
- SU-FCT03-2019
- SU-BES01-2019
- **SU-BES02-2019**
- SU-BES03-2019
- SU-DS03-2019
- SU-DS05-2019

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BorderAware

SU-BES02-2018-2019-2020

Technologies to enhance border and external security

BorderAware
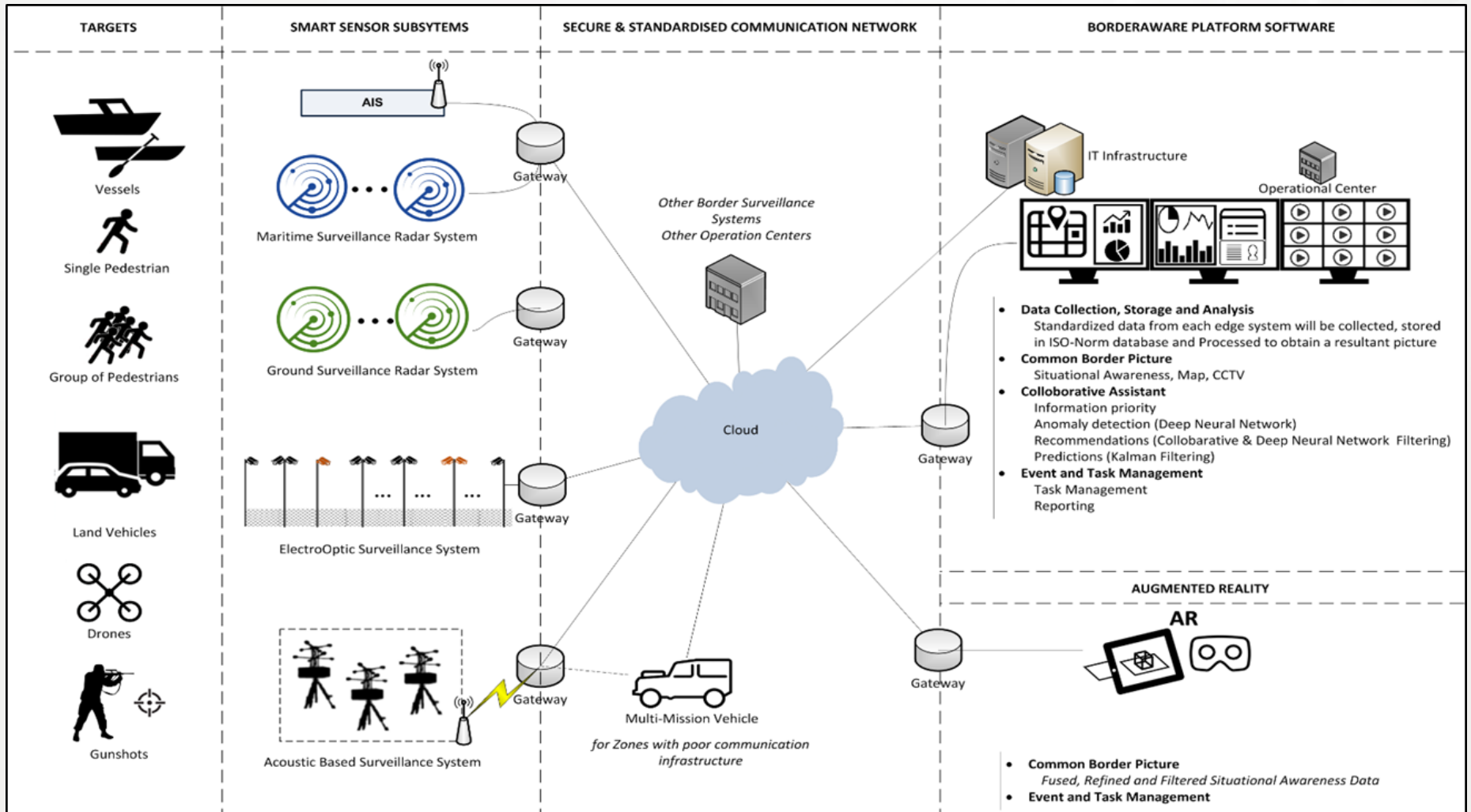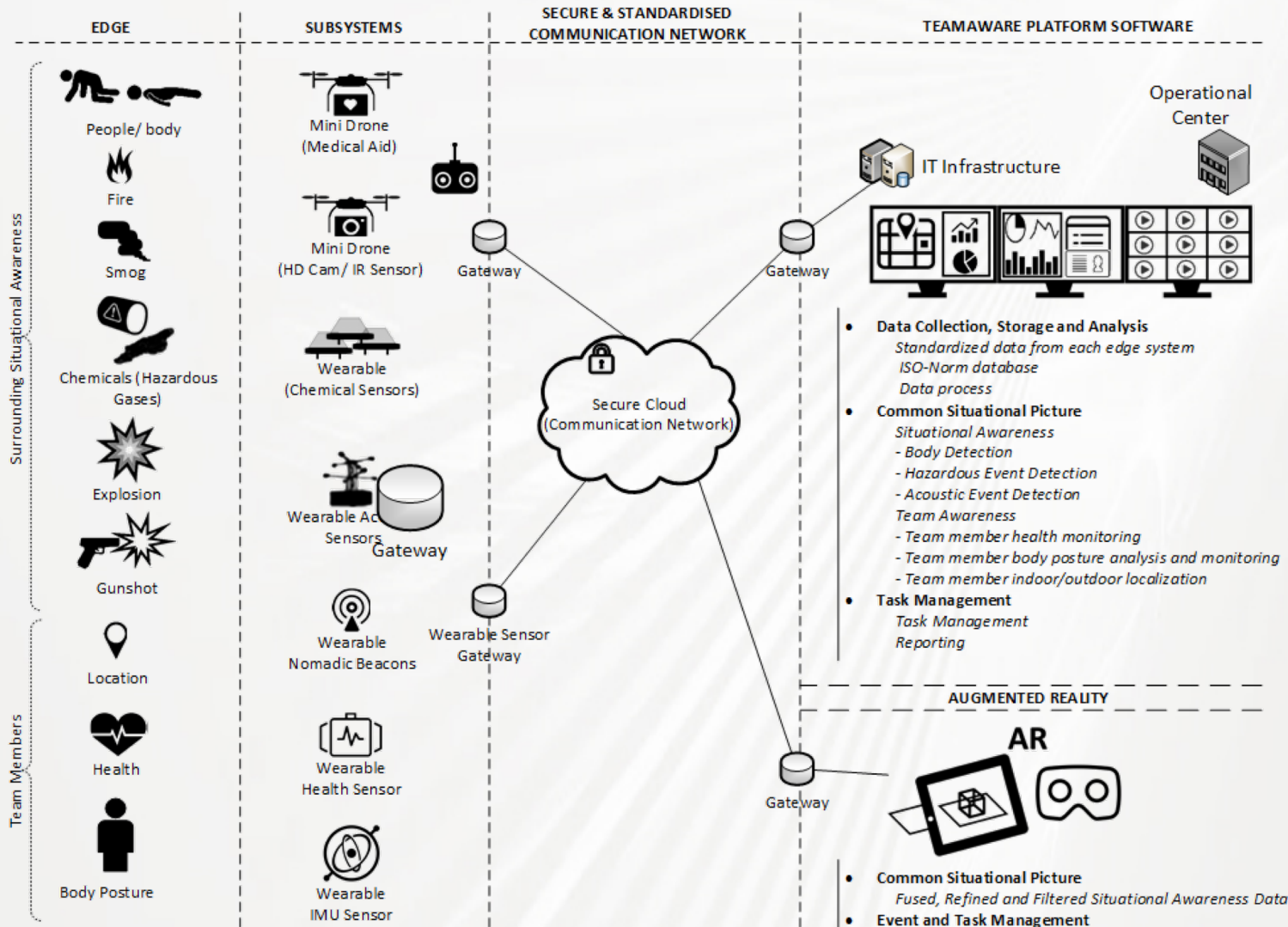
SU-BES02-2018-2019-2020
Technologies to enhance border and external security Sub-topic-Open

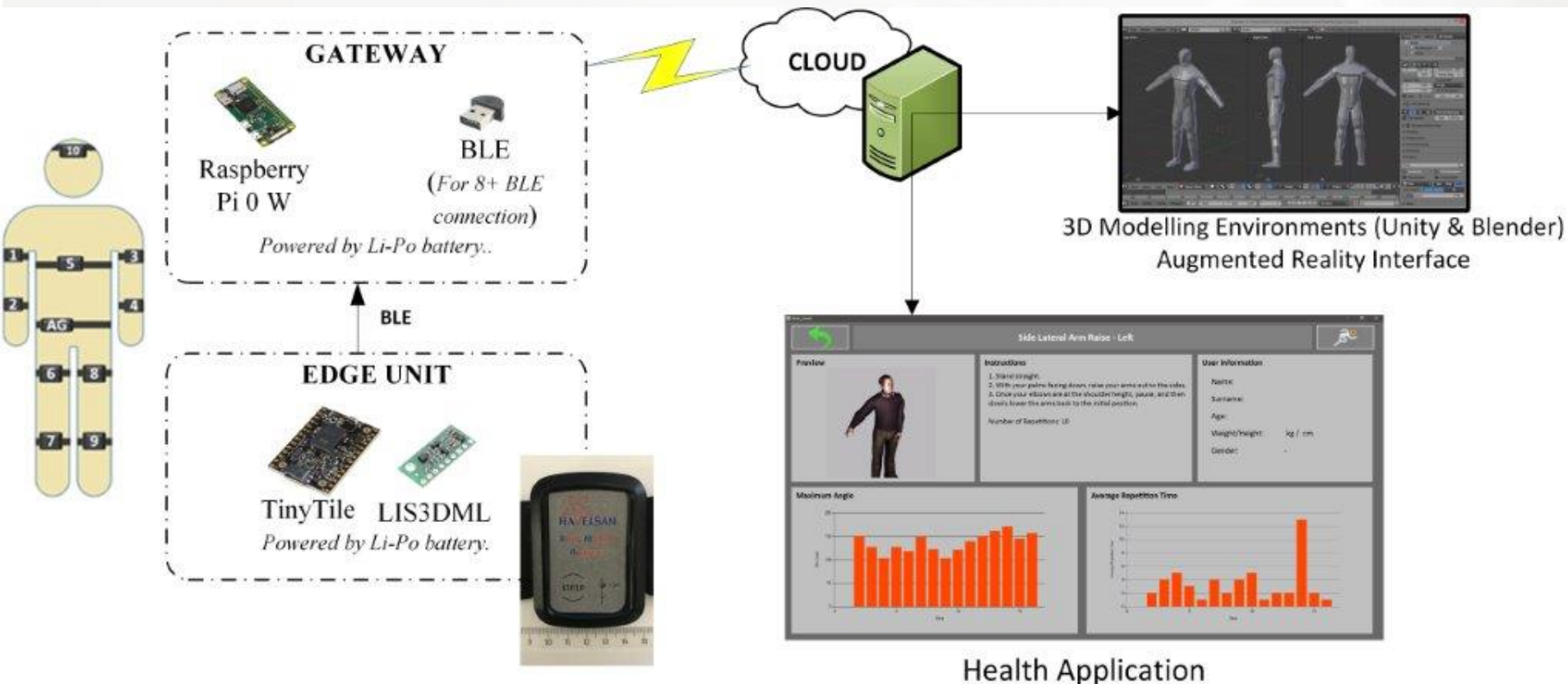- *Objectives:*
    - *To detect vehicle, human movements, gunshots, UAVS*
    - *To visualize the environment using augmented reality*
- *Expected results*
    - *Develop an infrastructure for detection of illegal passing of humans and vehicles*

- ***Evaluated in 2018 : above threshold (12.5/15.0)***
    - ***Proposal will be updated for 2019***
    - ***Border authorities are needed as partners***

TeamAware

SU-DRS02-2018-2019-2020 Technologies for first responders

EDGE

SUBSYSTEMS

SECURE & STANDARDISED COMMUNICATION NETWORK

TEAMAWARE PLATFORM SOFTWARE

Surrounding Situational Awareness

- People/ body
- Fire
- Smog
- Chemicals (Hazardous Gases)
- Explosion
- Gunshot

Team Members

- Location
- Health
- Body Posture

Mini Drone (Medical Aid)

Mini Drone (HD Cam/ IR Sensor)

Wearable (Chemical Sensors)

Wearable Acoustic Sensors

Wearable Nomadic Beacons

Wearable Health Sensor

Wearable IMU Sensor

Gateway

Gateway

Wearable Sensor Gateway

Secure Cloud (Communication Network)

Operational Center

IT Infrastructure

Gateway

- **Data Collection, Storage and Analysis**
  Standardized data from each edge system
  ISO-Norm database
  Data process
- **Common Situational Picture**
  Situational Awareness
  - Body Detection
  - Hazardous Event Detection
  - Acoustic Event Detection
  Team Awareness
  - Team member health monitoring
  - Team member body posture analysis and monitoring
  - Team member indoor/outdoor localization
- **Task Management**
  Task Management
  Reporting

AUGMENTED REALITY

AR

Gateway

- **Common Situational Picture**
  Fused, Refined and Filtered Situational Awareness Data
- **Event and Task Management**

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Body Posture Tracking

- Bio-analytics
- Body posture classifier: walking, lying, climbing, running, coughing etc.

TeamAware

SU-DRS02-2018-2019-2020 Technologies for first responders

- **Coordinator:** Havelsan
- **Partners:** Consortium has been finalized.
  - *Image processing / deep Learning*
  - *Indoor localization & navigation*
  - *Wearable technologies*
  - *Sensor and Data fusion*
  - *Internet of things*
  - *Power management/ optimization*
  - *Communication and network systems, cloud technologies*
  - *Drone Operator*
  - *End Users: First responders, firefighters, security forces, disaster management authorities*

Contact

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tsonmez@havelsan.com.tr

Havelsan: Large company in Turkey
Proposal Coordinator, WP leader

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- Tolga Sönmez has been graduated from Bilkent University electrical engineering department in 1995.

- He completed his M.S. and Ph.D. studies in University of Maryland College Park in electrical engineering in 1998 and 2003.

- During his Ph.D. Study he has worked on optimal sensor scheduling and tracking algorithms in sonar applications.

- After that, he worked in Advanced Acoustic concepts in USA

- Then he continued to work in Tübitak Sage in Ankara to develop integrated navigation systems.

- He recently joined Havelsan Inc. R&D team to work on sensor fusion projects. He is leading Modelling and Sensor Technologies team.

- He is interested in sensor fusion, sensor networks and integrated navigation systems.

Thank you for your attention

Questions & Answers?

Dr. Tolga Sonmez

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