A holistic passenger ship evacuation and rescue ecosystem

PALAEMON WP5

PALAEMON on-board mustering tools and services

March 23rd 2023 – Final Review

Presenter: Manuel Ramiro

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Content

- Overall WP main achievements
- Progress of each task and achievements
- Deliverables
- Deviations

WP5 Contributors

Progress of the WP and main achievements (M19-M44)

T5.1

- **Smart Bracelet** HW&SW prototypes (SB-v2, SB-v3)
- Functional **testing** & **integration with PaMEAS** and **PALAEMON core system**

COMPLETED

T5.2

- **AR GUI** final version
- **AR Functionalities** final version
- Integration with the **PALAEMON core system**

COMPLETED

T5.3

- **UAV Inspection Module**
- Task finished
- Inspection of Blue Horizon ship in Chania with ADMES UAV

COMPLETED

T5.4

- **PaMEAS (Passenger Mustering and Evacuation Process Automation System)** final version on-board V2
  - earlier version in lab (V1)
- PaMEAS Software Suite V2 (Aegean)
- Ship Radio Dot System V2 (UAegean, Ericsson, Athonet)
- PaMEAS Harware-Softeare Integration V2 (UAegean, Ericsson, Athonet)

COMPLETED

T5.5

- **Smart Camera** design (HW/SW components)
- **Image processing algorithms** (people detection/counting), UI specification
- Functional **testing** & **integration with PALAEMON core system**

COMPLETED

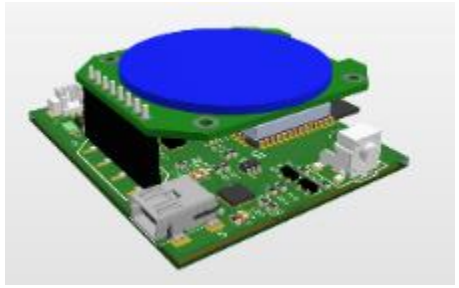
T5.1 – Smart Bracelets

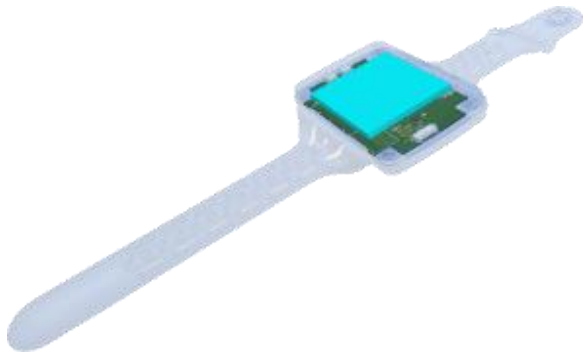
Task leader: **ADV** Contributors: **ATOS, ANEK, OELS**

Accomplishment rate: 100%

Progress (M19-M44)

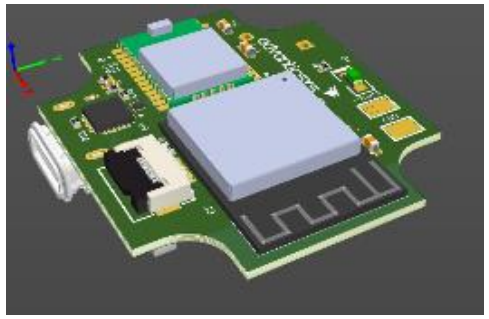
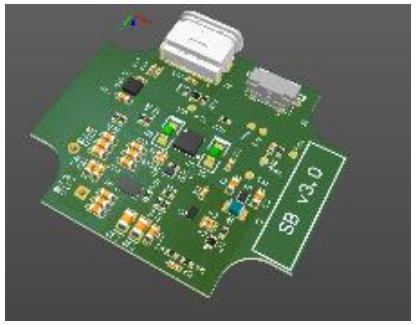
A. Coupling **SB design** with PALAEMON core platform and ship evacuation services/PaMEAS
B. Revision/definition **system requirements that model the behaviour and operation of the SB component** (PALAEMON core & PaMEAS)**.**
C. Definition of the **SB technical specification towards PALAEMON core, messaging layer and PaMEAS final design**
D. **HW & SW prototype** development (SB-v2)

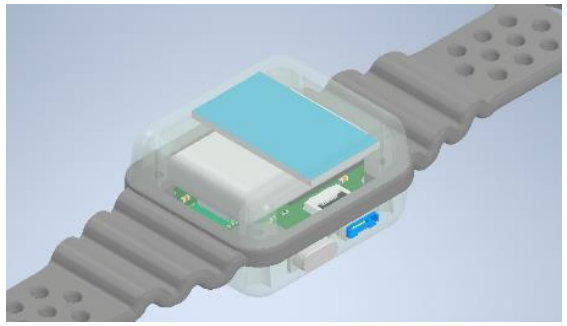




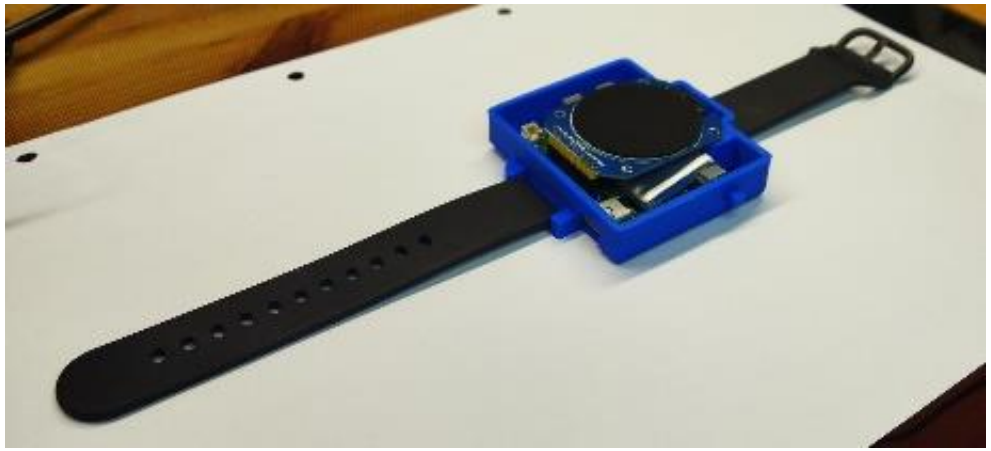
T5.1 – Smart Bracelets

E. **HW & SW prototype** development (SB-v3)



F. **Assembled prototypes** SB-v2 & SB-v3



T5.1 – Smart Bracelets

E. Testing and integration between SB and PALAEMON core /PaMEAS

Connectivity to the messaging layer (DFB) to rely synchronous information, definition and test of dedicated topics (MQTT) to rely/consume information to/from PaMEAS. Definition of the bilateral notification stack, messages and graphs (evacuation instructions), asynchronous messages (assistance/help request, fall detection).

Video SB-v2 (evac. sequence)

Video SB-v3 (evac.sequence)

Video SB-v3 (help request)

T5.2 – Augmented Reality Glasses for Ship Crew

Task leader: **SIMAVI** Contributors: **RNA, DANAOS, DNV GL, ANEK, OELSR, ATOS** Accomplishment rate: **100%**

SIMAVI
Software Imagination & Vision

Objectives

- Develop AR system which will:
  - Provide real-time guidance to crew members
  - Provide environmental information in real-time
  - Provide evacuation tactics
  - Provide real-time communication between crew members

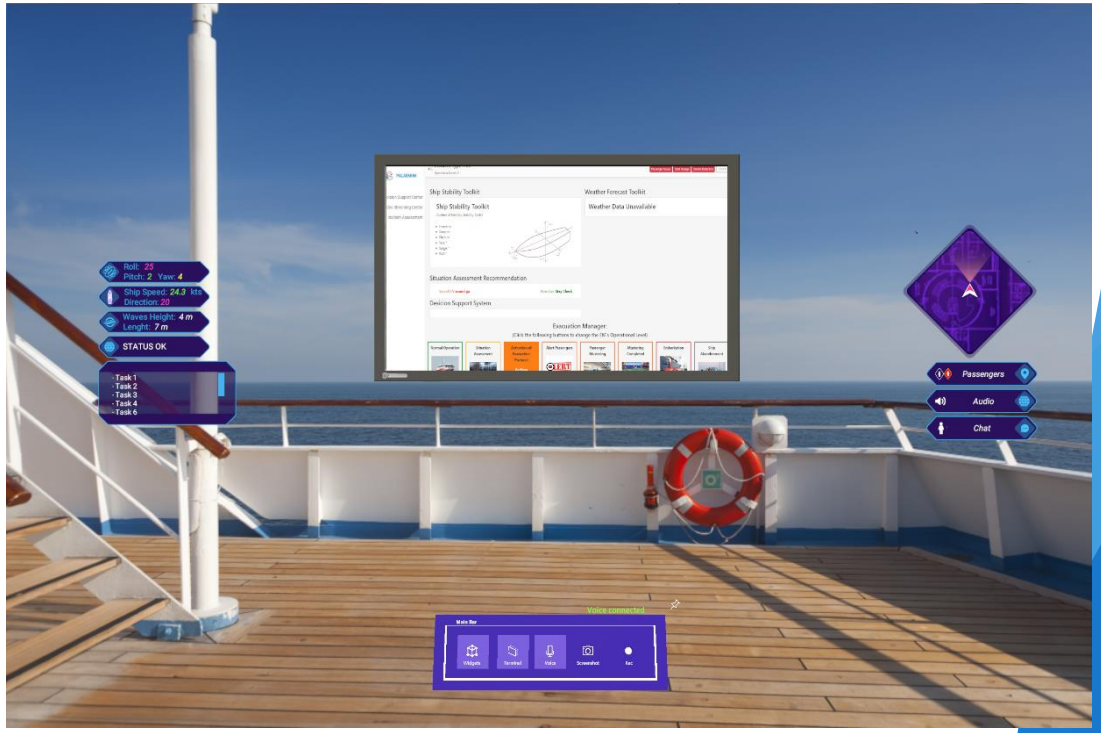
Achievements

- Developed the UI/UX for the headsets
- Developed the MR mobile system for Microsoft Hololens HMD
- Added audio communication within MR app
- Added snapshot functionality
- Added video recording
- Added a backup system that uploads the recordings and snapshots to the server

T5.2 – Augmented Reality Glasses for Ship Crew

Achievements M18-M44

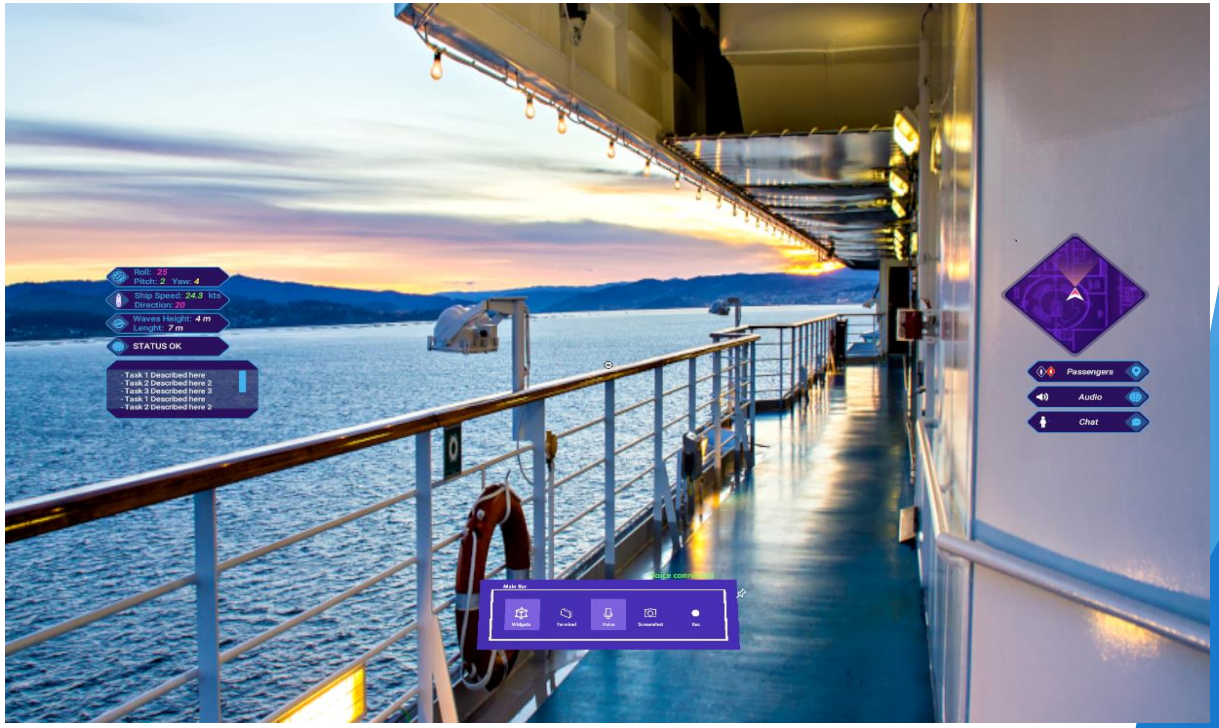
- Added widgets for Ship stability toolkit
- Added widgets for Weather forecast toolkit
- Added widgets for Audio communication
- Added widgets for text communication
- Added widgets for DSS (alerts)
- Added widget for System status
- Added widget for real-time guidance
- Added widget for real-time map with passengers



T5.2 – Augmented Reality Glasses for Ship Crew

Achievements M18-M44

- Added the headset synchronization module to connect to PALAEMON platform system
- Added support for virtual screens + virtual keyboard to access virtually the PALAEMON platform.
- Added upload to server functionality for multimedia resources from the AR Devices
- Updated the interface with specifications received from end users.
- Added toggles for buttons + floating menu



T5.3 – UAV Inspection Module

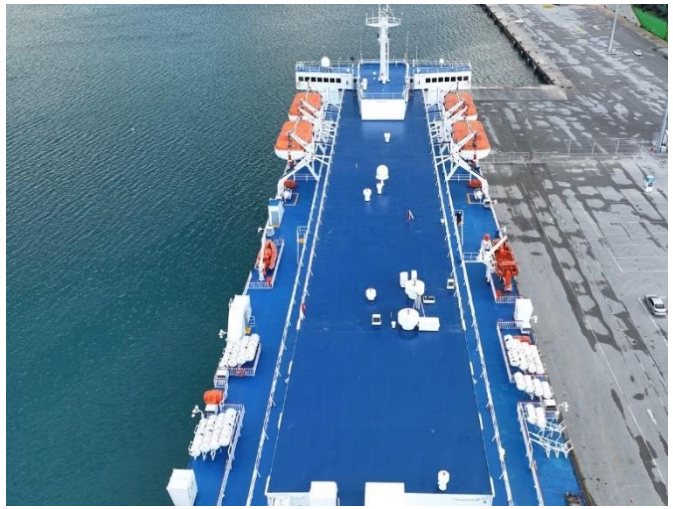
Task leader: **ADS** Contributors: **ADMES, ATOS**

Accomplishment rate: **100%**

AIRBUS

Progress (M19-M44)

A. Mission preparation
B. Inspection of the ANEK ship Blue Horizon in Chania



T5.4 - PaMEAS (Passengers Mustering and Evacuation Process Automation System)

Task leader: **UAEGEAN** Contributors: **ERI GR, Athonet, DNV GL** Accomplishment rate: 100%

Progress (M19-M44) - in parallel with WP8 Smart Evacuation Management Pilot / Trial

A. **Development of PaMEAS Software Suite (PaMEAS-A) – evacuation functional flow and verification**

B. **Development of PaMEAS Software Suite (PaMEAS-A) – microservices architecture optimization**

- 8 major components: C1 People Management System, C2 PALAEMON Mobile Apps, C3 PaMEAS Access Manager, C4 PaMEAS Evacuation Enabler, C5 PALAEMON Emergency Messaging Service, C6 PaMEAS Incident Manager, C7 PaMEAS-SRAP Integrator, C8 PaMEAS Passenger Location Simulator

C. **Testing of PaMEAS Software Suite (PaMEAS-A)**

- TRL 4 | Oct 2022. TRL 5 | Jan 2023

D. **Deployment of Ship Tracking Network (PaMEAS-W)**

- Beacons and Wi-Fi 6 Access Points

E. **Deployment of Ship Emergency Communications Network – 5G (PaMEAS-Cell)**

- Ship Radio Dots Network

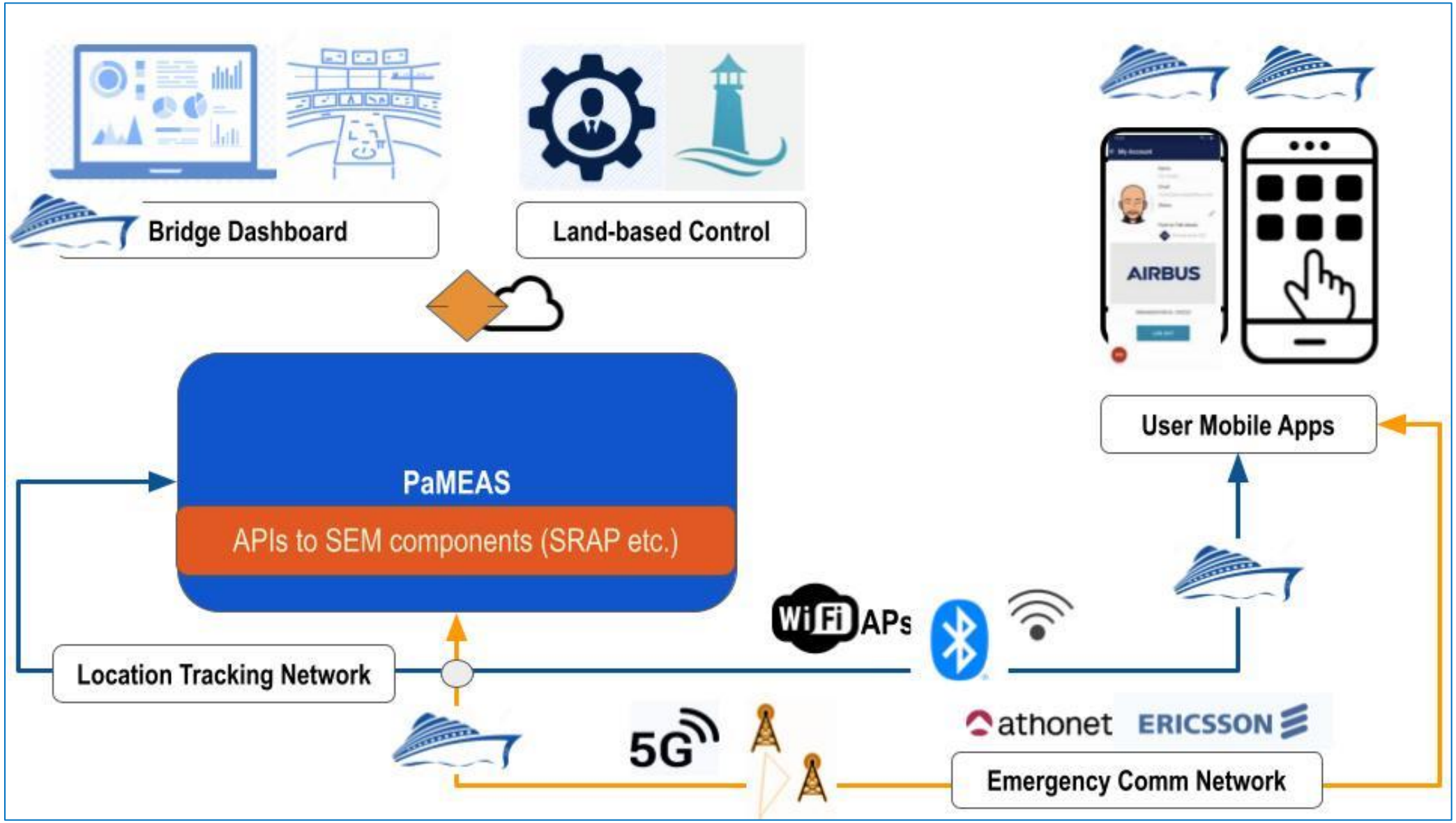
F. **WP5 System Integration (Software/Hardware Integration)**

G. **DB proxy for all upper layer services and Integration with PALAEMON ICT (WPs 7-8)**

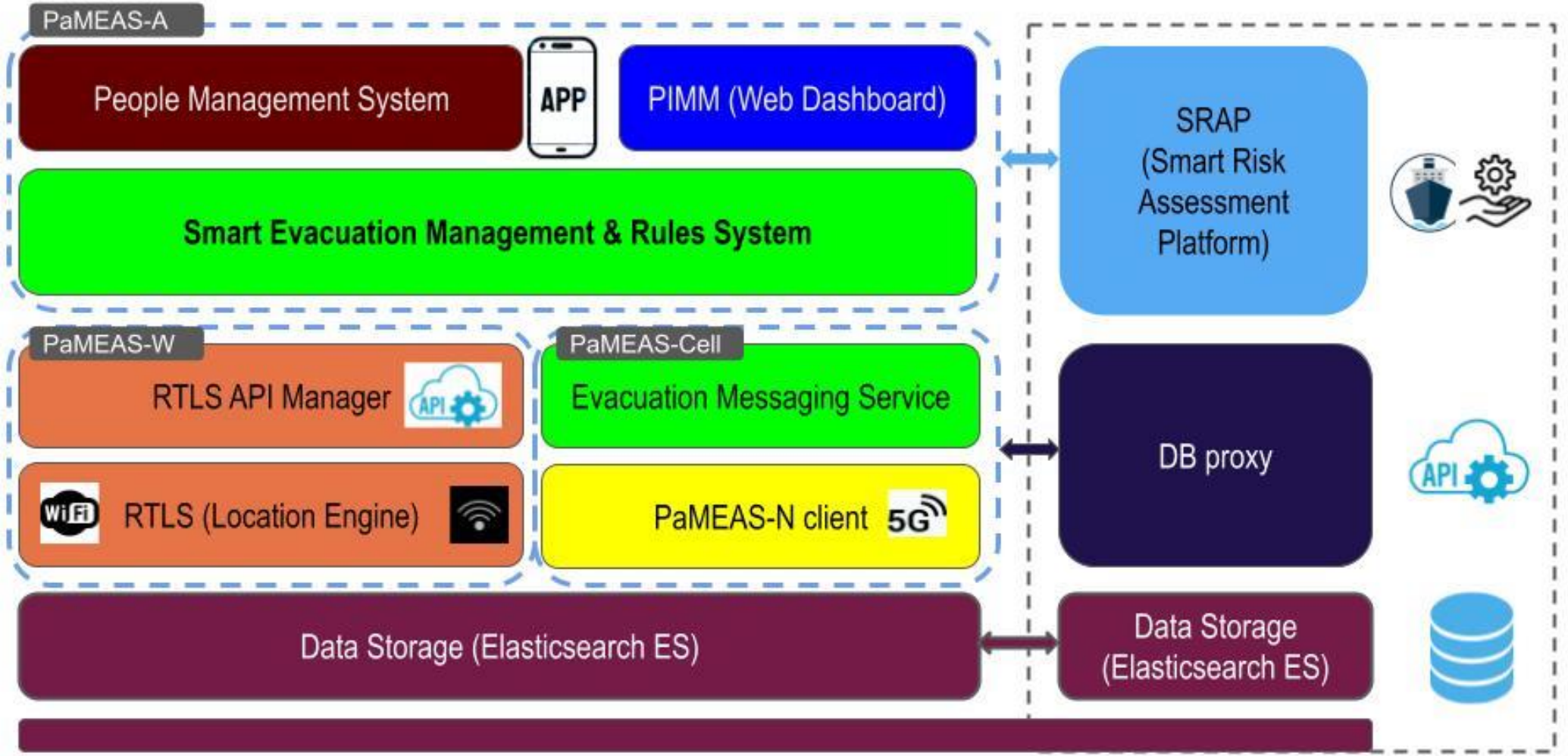
H. **Integration within Smart Management Platform | SEM (WP8)**

- PaMEAS is the core engine of SEM

T5.4 – PaMEAS High Level System Architecture



T5.4 – PaMEAS Software Suite Architecture



T5.5 – Smart Cameras

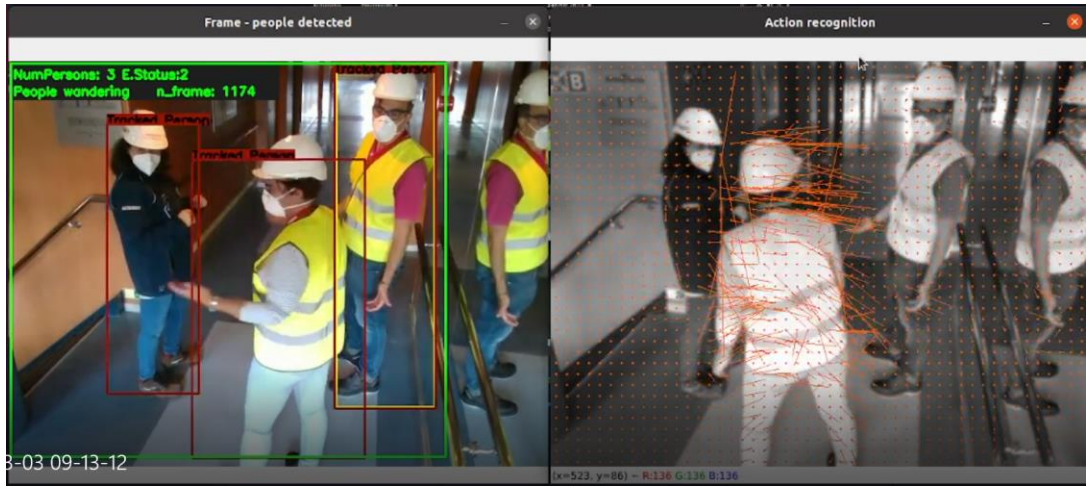
Task leader: **UAH** Contributors: **ADV, DANAOS, ANEK, OELS, ATOS**

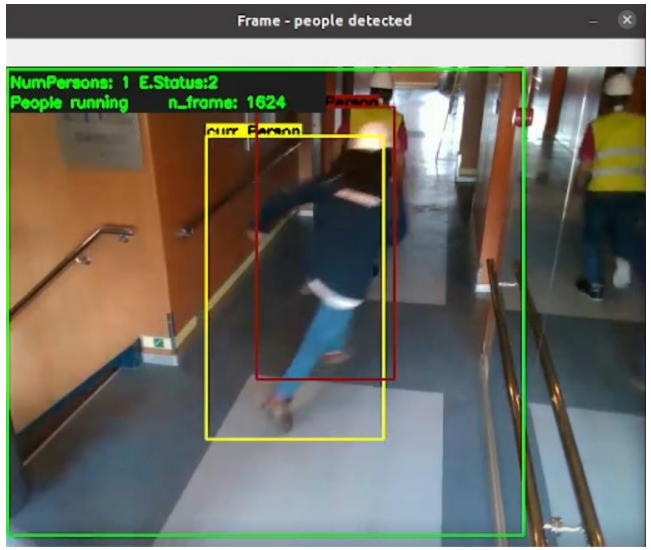
Accomplishment rate: **100%**

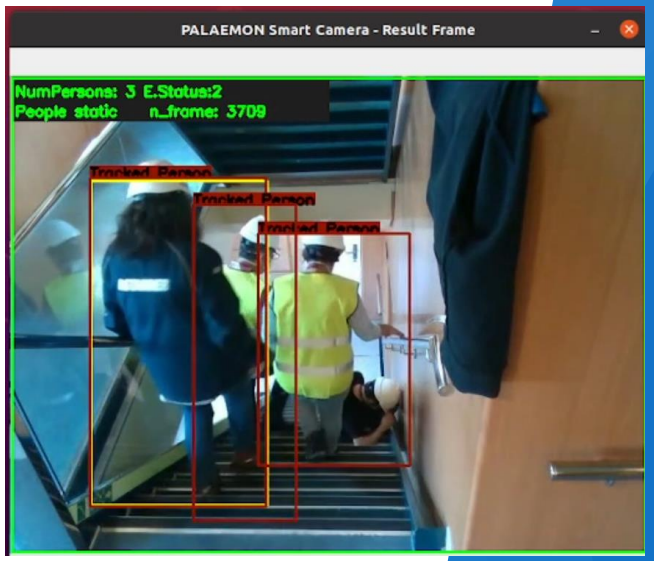
Progress (M19-M44)

A. Deep Learning implementation on the Smart Cameras (SC)

- robust people detection and action recognition using optical flow and people tracking
- real tests on ASTANDER ferry ship



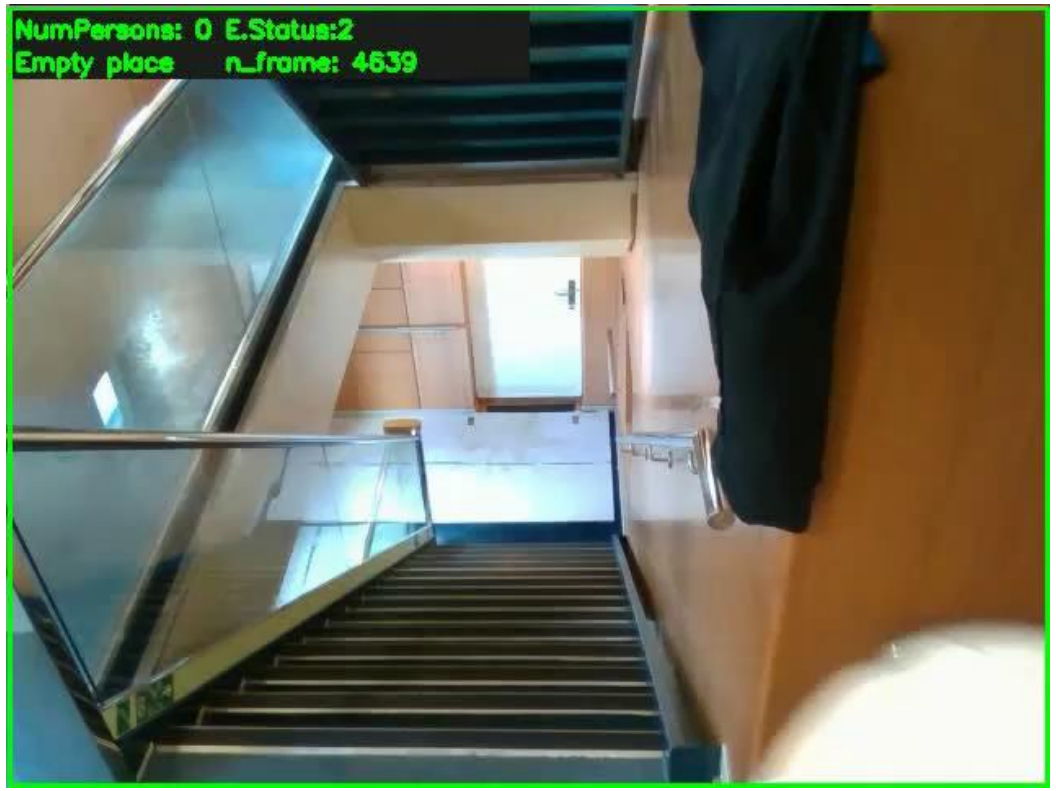




- The algorithm has been published in a peer-review indexed journal and one international conference IPIN21
- Another paper is currently under review https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4283678

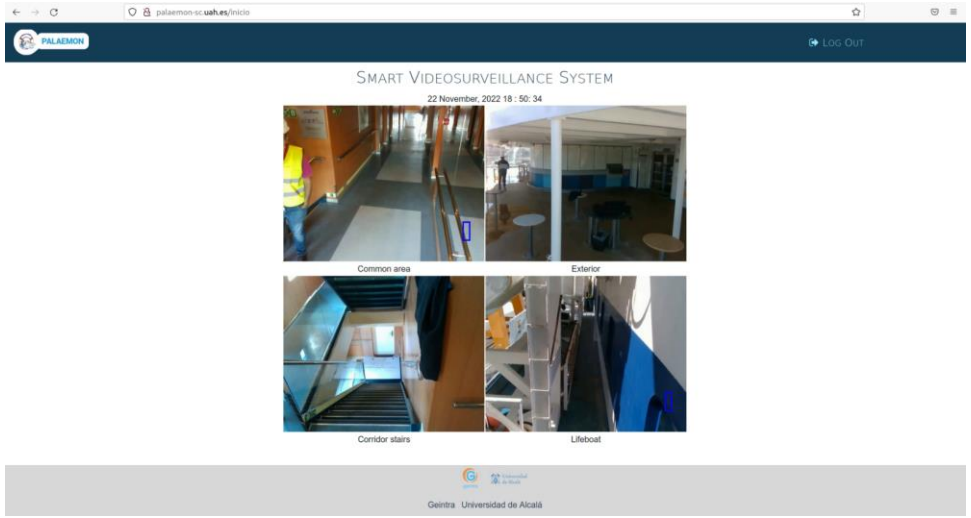
T5.5 – Smart Cameras

Video results

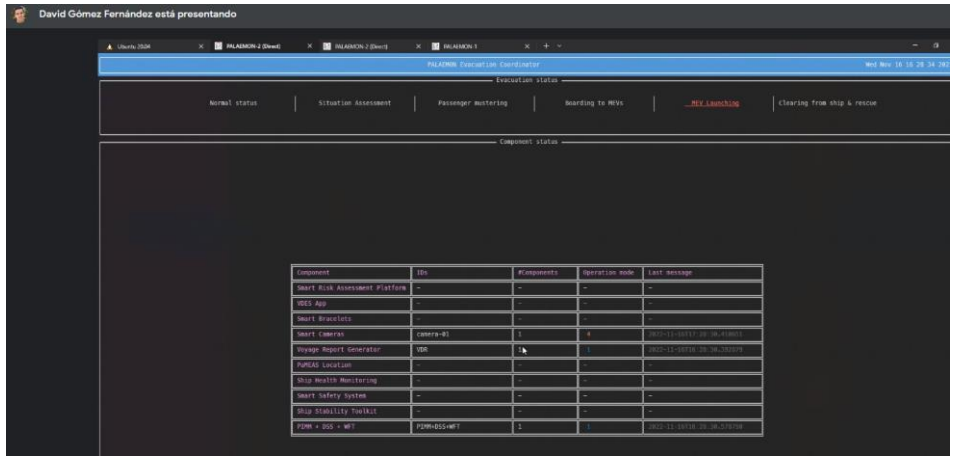


T5.5 – Smart Cameras

B. GUI web for remote configuration and setup. WebSocket for p2p video communication



C. Communication/integration with other PALAEMON modules such as Kafka, PIMM, etc. has been fully developed and successfully tested on WP7. Besides video clips are sent to the Voyage Data Recorder.



WP5 Deliverables

Deliverables, Ethics, DMP, Other Reports

WP No	Del Rel. I	Del N	Title	Description	Lead Beneficiary	Nature	Dissemination L	Est. Del. Date	Rev. D ▲	Receipt Date	Approval Date	Status
WP5	D5.1	D40	Smart Bracelets component (V1)	The bracelets (V1) are t	ADV	Demon	Confidential,	30 Nov 2020		30 Nov 2020	23 Jun 2021	Approved
WP5	D5.2	D41	Smart Bracelets component (V2)	The bracelets (V2) are t	ADV	Demon	Confidential,	31 May 2022		27 Jan 2023 ⚠		Submitted
WP5	D5.3	D42	PALAEMON AR Glasses component (V1)	Head mounted AR Glasse	SIMAVI	Demon	Confidential,	30 Nov 2020		30 Nov 2020	23 Jun 2021	Approved
WP5	D5.4	D43	PALAEMON AR Glasses component (V2)	Head mounted AR Glasse	SIMAVI	Demon	Confidential,	30 Nov 2021		14 Jan 2022 ⚠		Submitted
WP5	D5.5	D44	UAV Platforms requirements and specifications	The deliverable contains	ADS	Report	Public	30 Nov 2020		30 Nov 2020	23 Jun 2021	Approved
WP5	D5.6	D45	UAV Platforms requirements and specifications	The deliverable contains	ADS	Report	Public	31 May 2022		10 Mar 2023 ⚠		Submitted
WP5	D5.7	D46	UAV Platform prototype (V1)	This deliverable is the p	ADS	Demon	Confidential,	30 Nov 2020		30 Nov 2020	23 Jun 2021	Approved
WP5	D5.8	D47	UAV Platform prototype (V2)	This deliverable is the p	ADS	Demon	Confidential,	31 Jan 2023		16 Mar 2023 ⚠		Submitted
WP5	D5.9	D48	PaMEAS design principles and Technical Archite	The document will descr	UAEGEAN	Report	Confidential,	30 Nov 2020		30 Nov 2020	23 Jun 2021	Approved
WP5	D5.10	D49	PaMEAS design principles and Technical Archite	The document will descr	UAEGEAN	Report	Confidential,	31 May 2022				Pending
WP5	D5.11	D50	Ship Radio Dot System: design and deployment	The deliverable encomp	Ericsson Hellas	Demon	Confidential,	30 Nov 2020		30 Nov 2020	23 Jun 2021	Approved
WP5	D5.12	D51	Ship Radio Dot System: design and deployment	The deliverable encomp	Ericsson Hellas	Demon	Confidential,	31 May 2022				Pending
WP5	D5.13	D52	PaMEAS Software Suite: deployment (V1)	The deliverable corresp	UAEGEAN	Demon	Confidential,	30 Nov 2020		21 May 2021 ⚠	13 Jul 2021	Approved
WP5	D5.14	D53	PaMEAS Software Suite: deployment (V2)	The deliverable corresp	UAEGEAN	Demon	Confidential,	31 May 2022				Pending

WP No	Del Rel. I	Del N	Title	Description	Lead Beneficiary	Nature	Dissemination L	Est. Del. Date	Rev. D ▲	Receipt Date	Approval Date	Status
WP5	D5.15	D54	D5.8 PaMEAS hardware and software componer	The deliverable corresp	Ericsson Hellas	Demon	Confidential,	30 Nov 2020				Pending
WP5	D5.16	D55	D5.8 PaMEAS hardware and software componer	The deliverable corresp	Ericsson Hellas	Demon	Confidential,	31 May 2022				Pending
WP5	D5.17	D56	Smart Cameras component (V1)	The cameras that will be	ADV	Demon	Confidential,	30 Nov 2020		03 Dec 2020 ⚠	23 Jun 2021	Approved
WP5	D5.18	D57	Smart Cameras component (V2)	The cameras that will be	ADV	Demon	Confidential,	30 Nov 2021		14 Jan 2022 ⚠		Submitted

A holistic passenger ship evacuation and rescue ecosystem

Thank you

'This project (PALAEMON) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814962'.

'The opinions expressed in this document reflect only the author's view and reflects in no way the European Commission's opinions. The European Commission is not responsible for any use that may be made of the information it contains.'

Deviations - DoW (GA) / UoR

DoW - adjustments at task level

- D5.4 PALAEMON AR Glasses component delivery was slightly delayed M30→M32
- **AMD-814962-17:** Project extension #1 M36→M42;
  - Amendment includes task duration extension and justification for: T5.1 & T5.4 (strong dependencies) & T5.3 until M42; T5.1 Smart Bracelet, was active until completion of SB-v3 delivery (M42) although SB-v2 was delivered timely by M36 (D5.2). D5.2, Smart Bracelets component V2, extended version (including SB-v3 details) was submitted in M44; D5.8 UAV Platform prototype V2, was postponed M36→M42; Deliverables (V2) corresponding to T5.4 were postponed to M42.
- **AMD-814962-27:** Project extension #2 M42→M44;
  - T5.3 &T5.4 were active up to M44; T5.4 PaMEAS has been running active in parallel with WP8 demo activities until M44; D5.8 and T5.4 deliverables postponed until M44.

Deliverables delayed (PENDING)

- D5.10: PaMEAS design principle and technical architecture V2 (R, CO, M36) - UAEGEAN
- D5.12: Ship Radio Dot system: design and deployment V2 (R&DEM, CO, M36) – Ericsson Hellas
- D5.14: PaMEAS Software Suite: deployment V2 (R&DEM, CO, M36) - UAEGEAN
- D5.15: PaMEAS hardware and software components integration V1 (R&DEM, CO, ~~M18~~ M24) – Ericsson Hellas
- D5.16: PaMEAS hardware and software components integration V2 (R&DEM, CO, M36) – Ericsson Hellas

UoR - Deviations from GA PM figures & ODC

- To be fully reported within WP5 technical report.
- T5.3 (ADS) overuse of resources

  internally flagged & assessed as low risk considering task progress (60%) @M18

  Situation assessed with ADS (TL & PC); WP5 and consortium were reassured by ADS that this overuse of PM will not affect the completion nor planned timing of the work for T5.3. Will be fixed by ADS project effort realloc/transfer or ADS will make use of its own resource (external) if necessary.

- T5.4 (UAEGEAN) underuse of resources

  internally flagged & assessed as low risk considering task progress (30%) @M18

  Situation assessed with UAegean & ADS (TL & PC); WP5 and consortium were reassured by UAegean that this underuse of PM is due to the fact that most P1 work was done in-house, with internal resources.