Artificial Intelligence for Detection of Explosive Devices

AIDED

Grant Agreement PADR-FDDT-EMERGING-03-2019 884866 - AIDED,

Royal Military Academy
Enzo Ghisoni

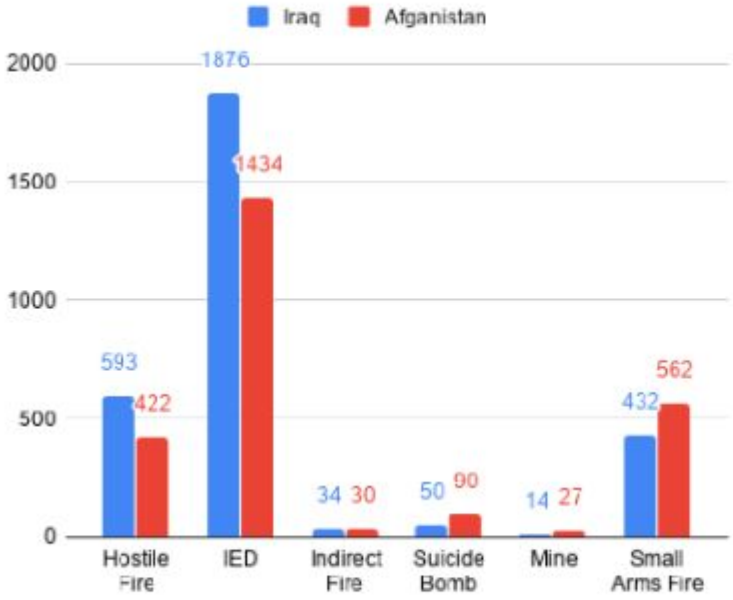
Table of contents

AIDED Background

In modern warfare operations, consistently **50% of all soldier deaths** in action are directly related to **IED**s (**I**mprovised **E**xplosive **D**evice).

- Afghanistan 2872 NATO troops were killed in action in total. 1434 of those were killed by IEDs.
- In Iraq, 3801 soldiers were killed in action and 1876 of those were killed by IEDs.

source: icasualties.org



I. Why AI for demining ?

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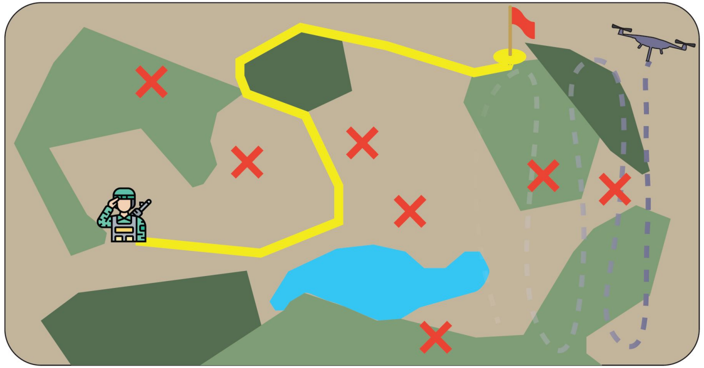
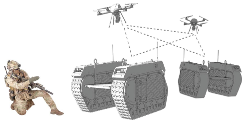
Adaptative to **non-conventional IED's**

Sensor fusion → { **Increased detection probability** / **Reduced false positive rate** }



Automated **multi-agent** path planning and coordination



Optimal use of available **resources**

Multi-agent system

Multi-agent systems are :

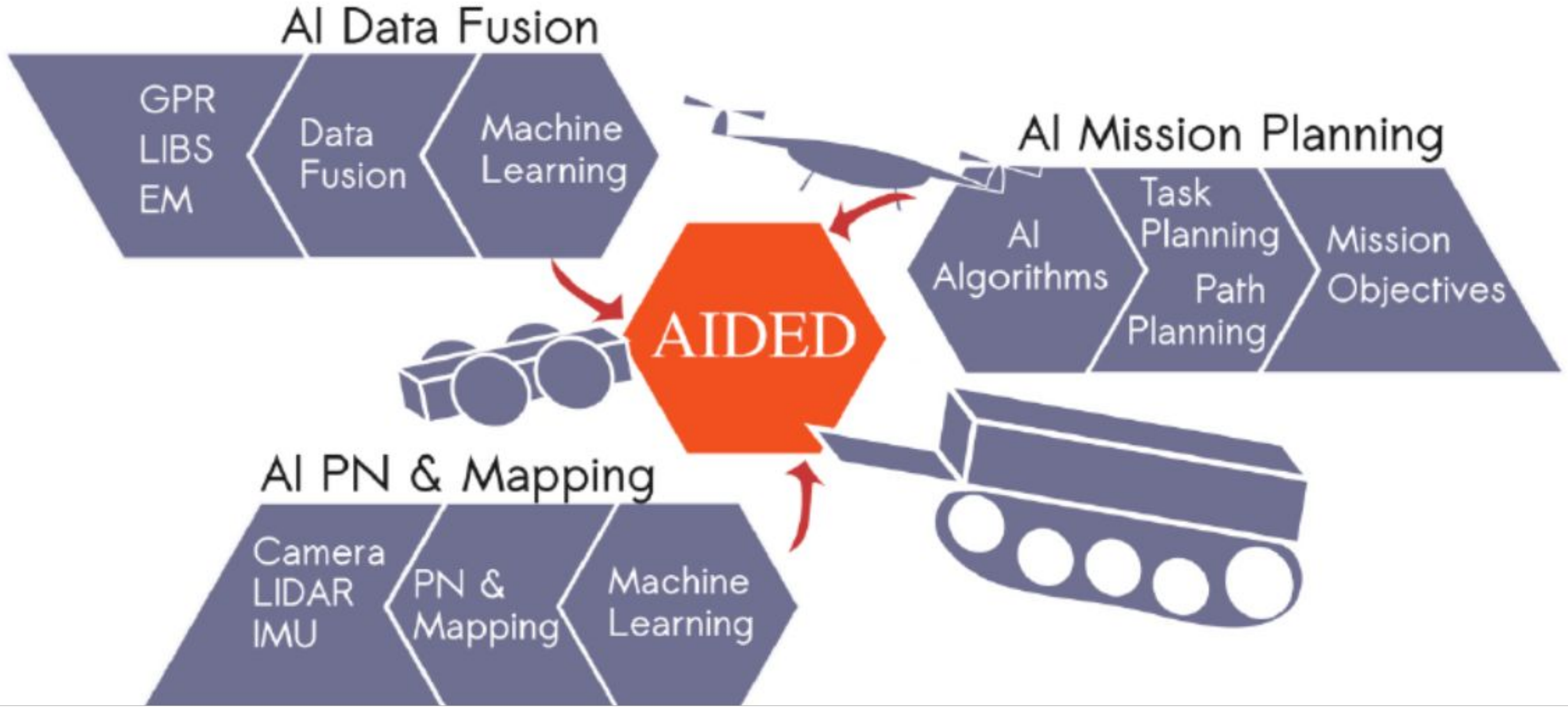
- Adaptable
- More efficient area coverage
- Collective behaviour
- Optimize the capacities of each agent

Added value to AIDED

- Decrease the time of area coverage
- **Reduce the false detection by sensor fusion**
- Challenge the state of art for mapping

II. Objectives

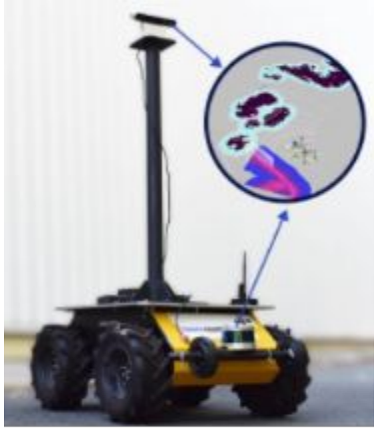
Technical Objective



Robot and Sensor

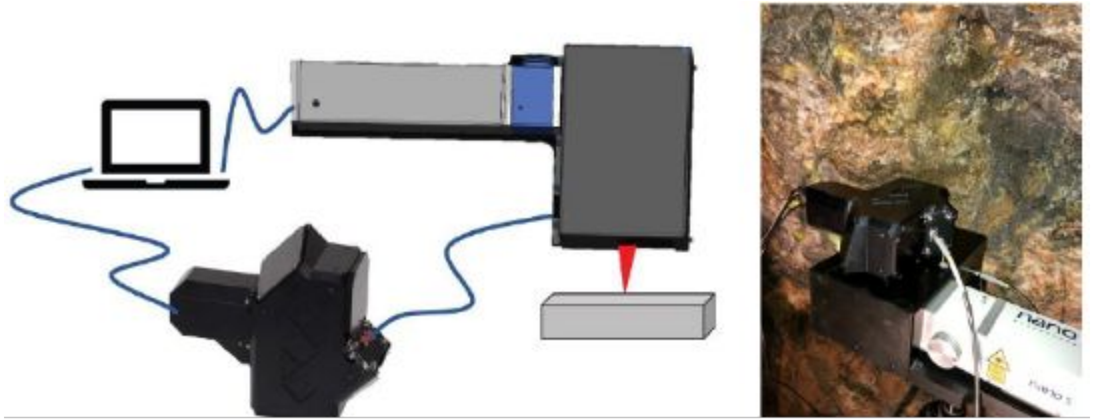
LUGV with EM array (RMA)

SUGV (SPACEAPPS)

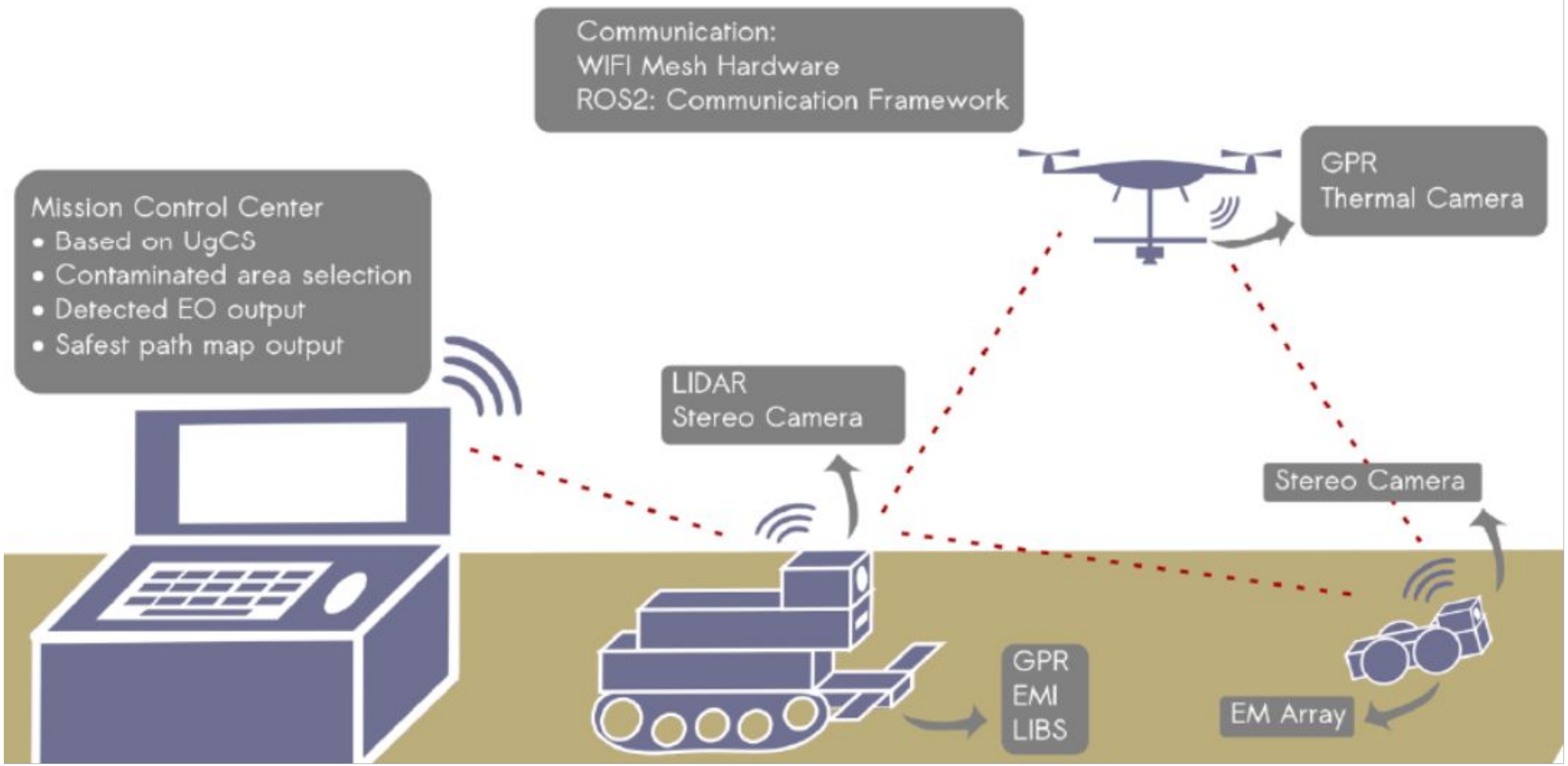


Drone with GPR (SPH)

LIBS (SPECTRAL)



Integration



III. State of play

III. State of play

DOVO Collaboration

DOVO:

- Provide **test fields** and facilities to collect data to **train AI** and **test** the **robots**
- Develop **mock-up** EOD's / IED's
- Fabricated by **experts**
- Chemicals - Extremely low concentrations of TNT or TATP (to be confirmed)
- Soil conditions where the measurement is taken (humid, dry, clay, sandy, hot, cold)

Achievements:

- **Sensor integration** on the robots
- **ROS Architecture** implemented on the different robots
- **Trial campaign** realized with DOVO

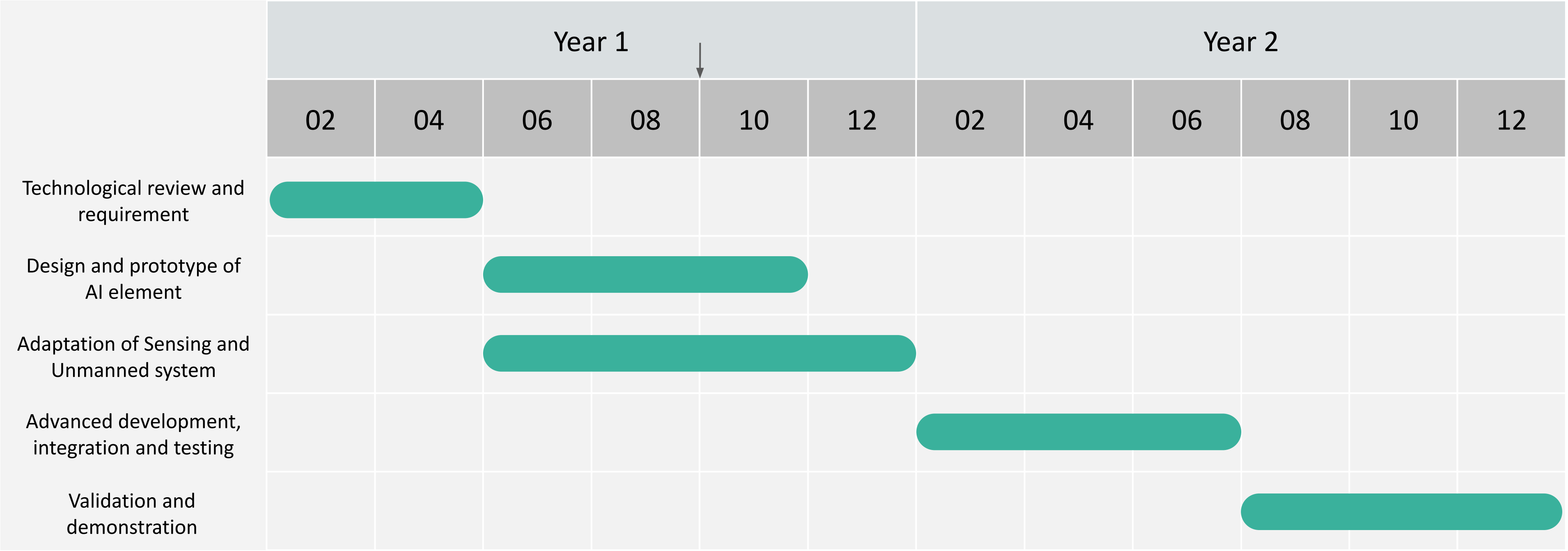
Next subjects of development:

- Clean and process the data collected
- Train AI for each work-packages target:
  - Navigation
  - Multi-agent planning
  - IED detection

IV. Conclusion

III. State of play

Timeline



IV. Conclusion

Objectives:

- Confident detection with a limitation of false positives
- Multi-robot system to clear area faster
- Application of AI to demining field of study

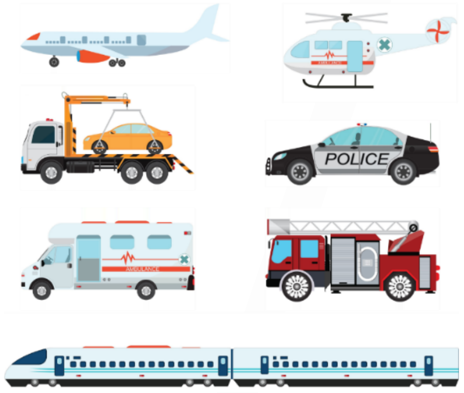
Means:

- AI based:
  - IED detection by sensor fusion
  - Navigation
  - Multi Robot Mission Planning

AIDED

TeamAware

Team Awareness Enhanced with Artificial Intelligence and Augmented Reality



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TC17 – VRISE 2022, ICI, Belgium

Vicent Pastor

Chief Innovation Officer

2022-06-07

TeamAware

Team Awareness Enhanced with Artificial Intelligence and Augmented Reality

Funded under: *Secure societies - Protecting freedom and security of Europe and its citizens*

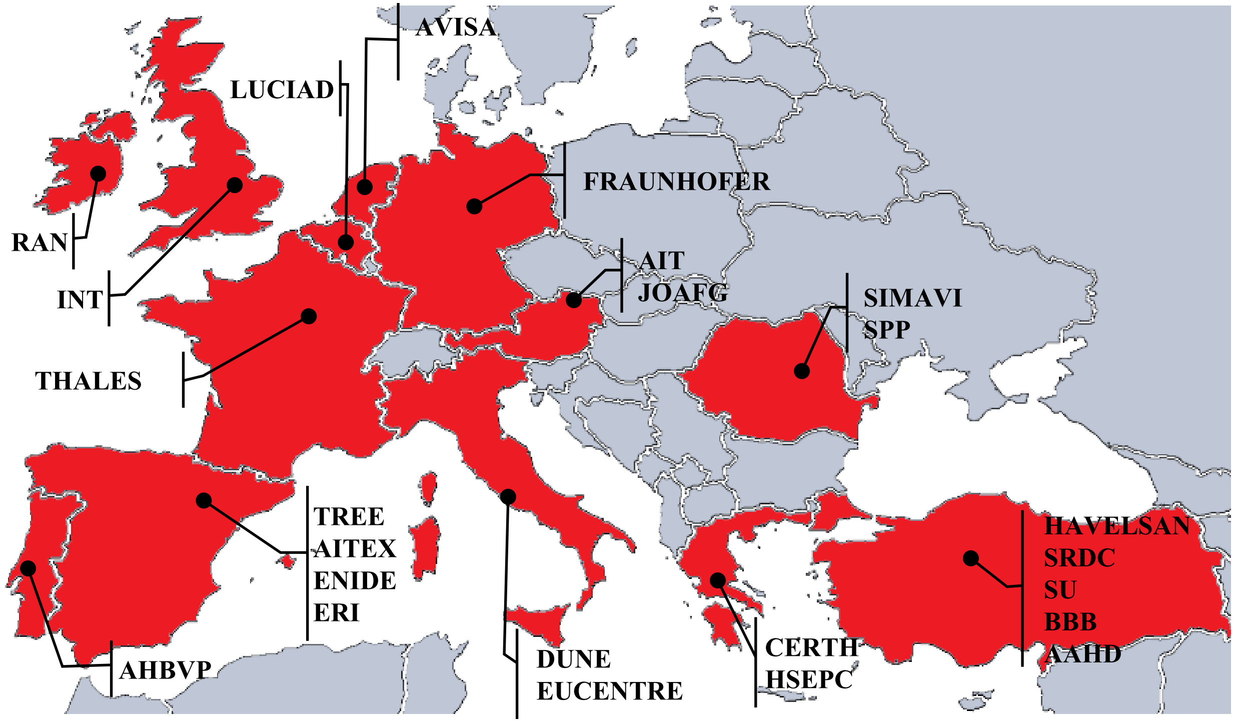
Start Date: *1 May 2021* **End Date:** *30 April 2024 [36 Month]*

Advanced technology to help first responders

First responders are the first to arrive and provide assistance at the scene of an emergency that requires rescue operations and crisis management. First responders often struggle with inefficient and old technologies.

TeamAware will develop an **integrated and cost-efficient situational awareness system** with heterogeneous and interoperable sensor units. *(drone-mounted, wearable and external sensor systems)*

Highly standardised **augmented reality and mobile human–machine interfaces** will increase the flexibility and reaction ability of first responders



13 countries, 24 partners (16 technical partner, 1 ethics partner, 1 advisory network partner and 6 end users)

Consortium

TeamaWare

HAVELSAN A.Ş. (Turkey)	Software Imagination & Vision S.R.L. (Romania)	Tree Technology SA (Spain)	Thales SIX GTS (France)
EUCENTRE Centro Europeo di Formazione e Ricerca in Ingegneria Sismica (Italy)	Asociación de Investigación de la Industria Textil (Spain)	Microflown AVISA (Netherlands)	DUNE SRL (Italy)
INNOVA INTEGRA (UK)	SRDC Software Research & Development and Consultancy Corp. (Turkey)	AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH (Austria)	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Germany)
HEXAGON / LUCIAD (Belgium)	ENIDE Solutions, S.L. (Spain)	Sabanci University (Turkey)	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (Greece)

Consortium (end-users)

TeamAware

Eticas Research and Innovation (Eticas Foundation) (Spain)

Resilience Advisors Network (Ireland)

Bursa Büyükşehir Belediyesi (Turkey)

Ambulance and Emergency Physicians Association (Turkey)

Associação Humanitária Bombeiros Voluntários Peniche (Portugal)

Johanniter Österreich Ausbildung und Forschung gem. GmbH (Austria)

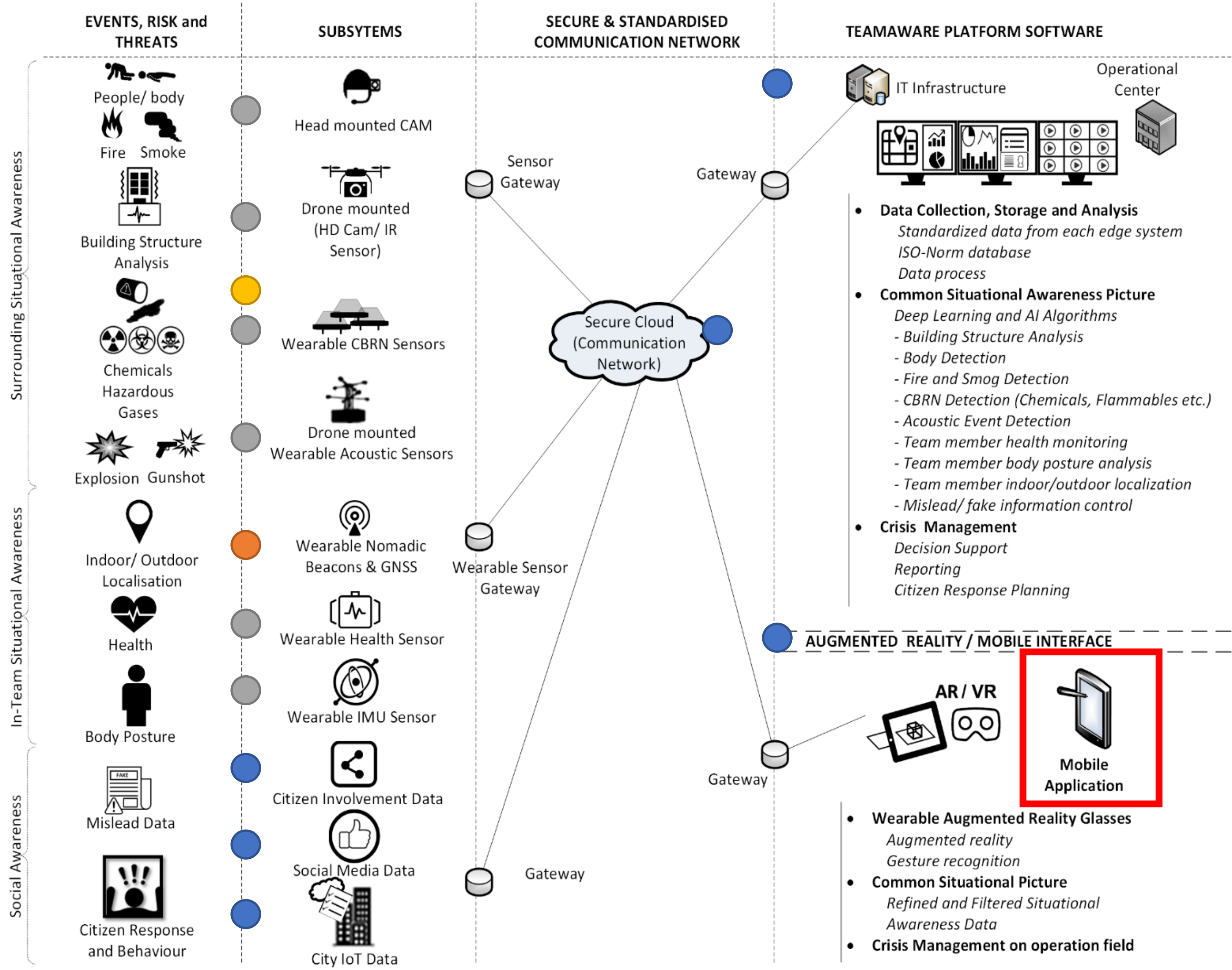
Protection and Guard Service (Romania)

HELLENIC SOCIETY OF EMERGENCY PREHOSPITAL CARE (Greece)

General Requirements of TeamAware

TeamAware provides a solution for IFAFRI "The International Forum to Advance First Responder Innovation" Common Global Capability Gaps

Capability Gap 1	Capability Gap 2	Capability Gap 3	Capability Gap 4
• The ability to know the **location** of responders and **their proximity to risks and hazards** in real time	• The ability to detect, monitor, and analyse **passive and active threats and hazards at incident scenes in real time**	• The ability to **rapidly identify hazardous agents and contaminants**	• The ability to incorporate information from **multiple and non-traditional sources** to the incident command operations



Components of TeamAware Solution

Visual Scene Analysis System (VSAS)
- Victim detection
- Fire/smoke detection
- Guidance to exit

Infrastructure Monitoring System (IMS)
- Damage detection in infrastructure/buildings (cracks etc.)

Chemical Detection System (CDS)
- Detection of hazardous gases {Ammonia (NH3), Sulphur Dioxide (SO2), Carbon Monoxide (CO) etc.)
- Chemical dispersion of the agents in the contamination area

Acoustic Detection System (ADS)
- Gunshot, explosion detection
- Human voice detection

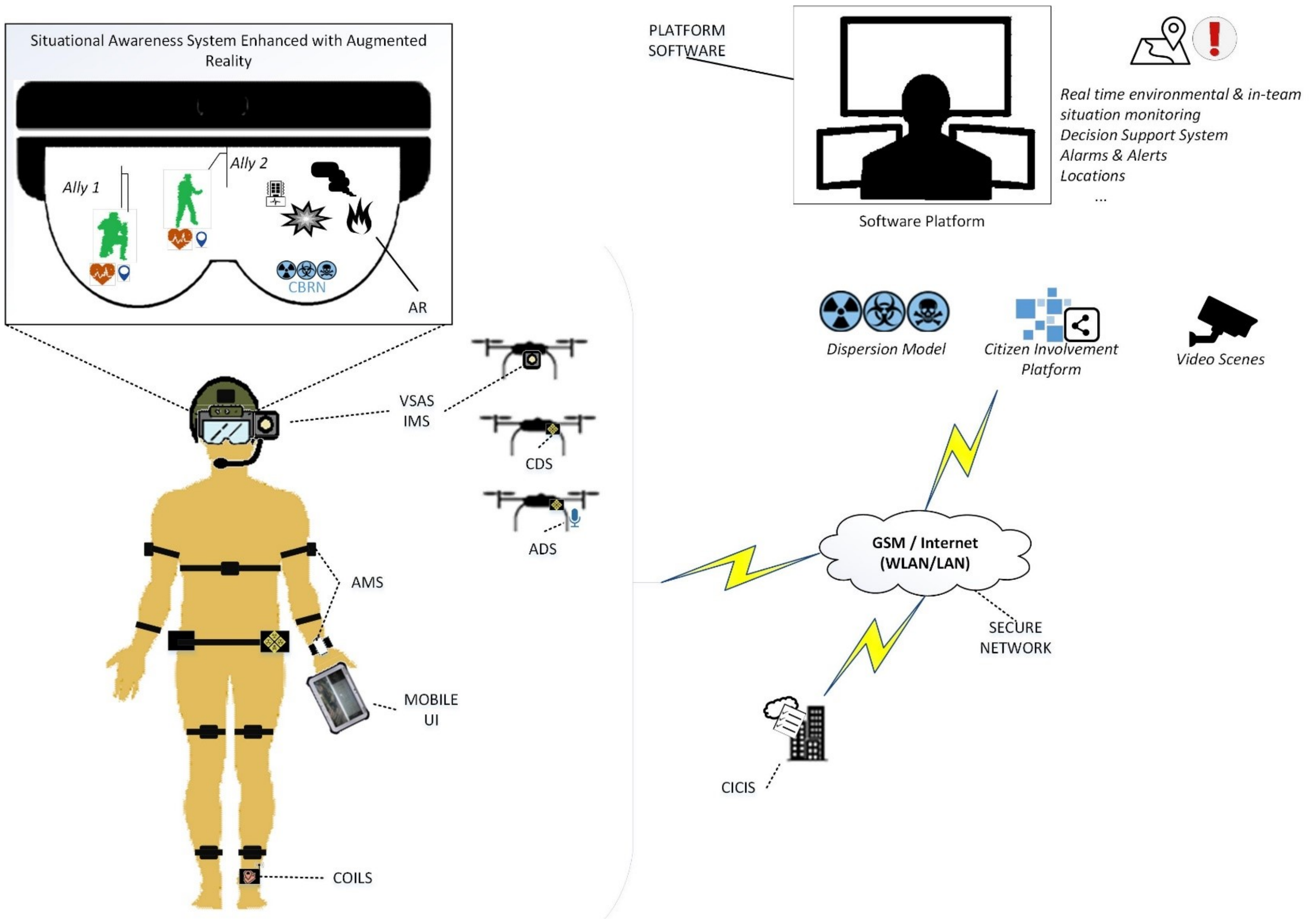
Team Monitoring System
- Continous outdoor indoors localization (COILS)
- Health and activity monitoring system (AMS)

Citizen Involvement and City Integrity System (CICIS)
- Citizen involvement via social media
- City IoT sensor integration

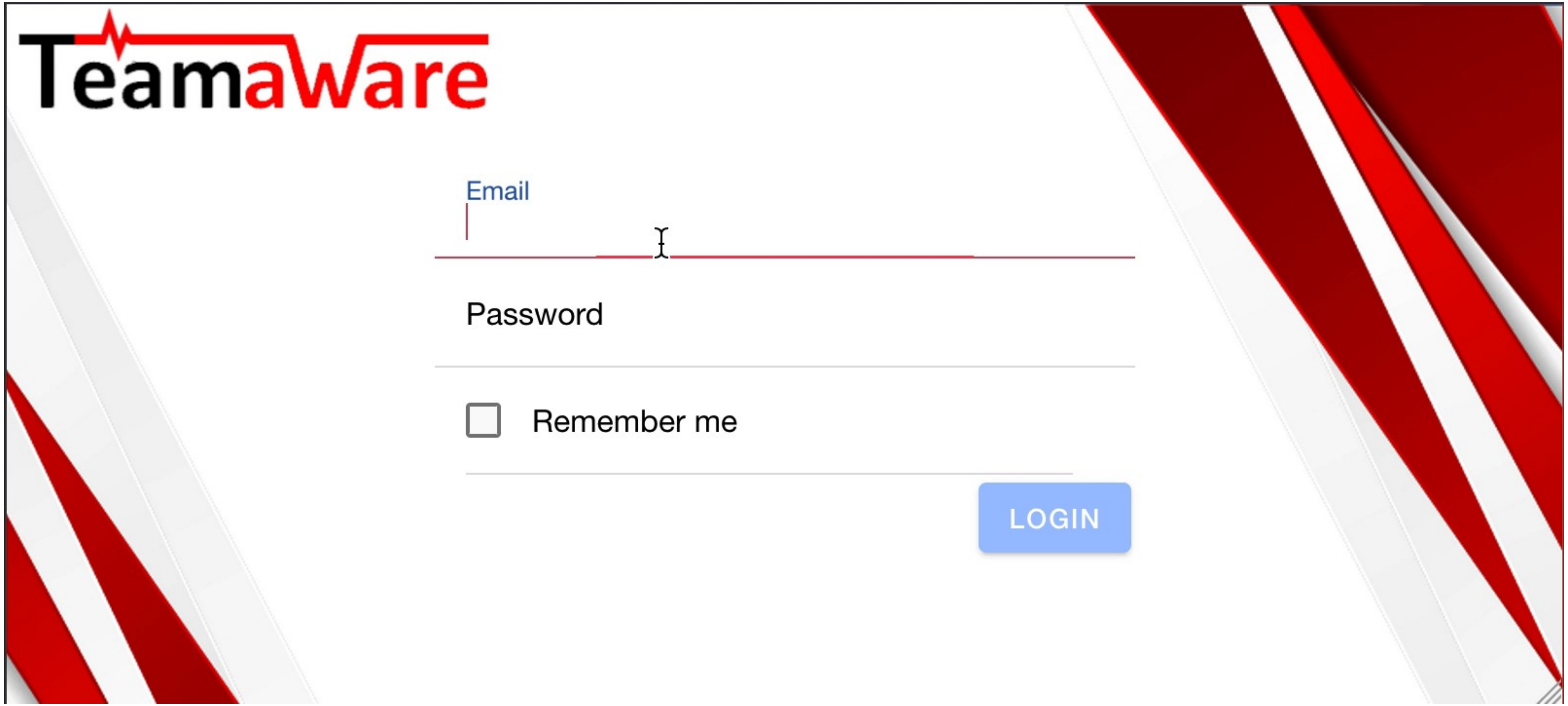
Secure Cloud Communication

TeamAware Software Platform
- Fusion Algoirthms
- AI Algorithms

TeamAware UI
- Mobile Interface
- AR Interface



- Mobile interface beta (vídeo):



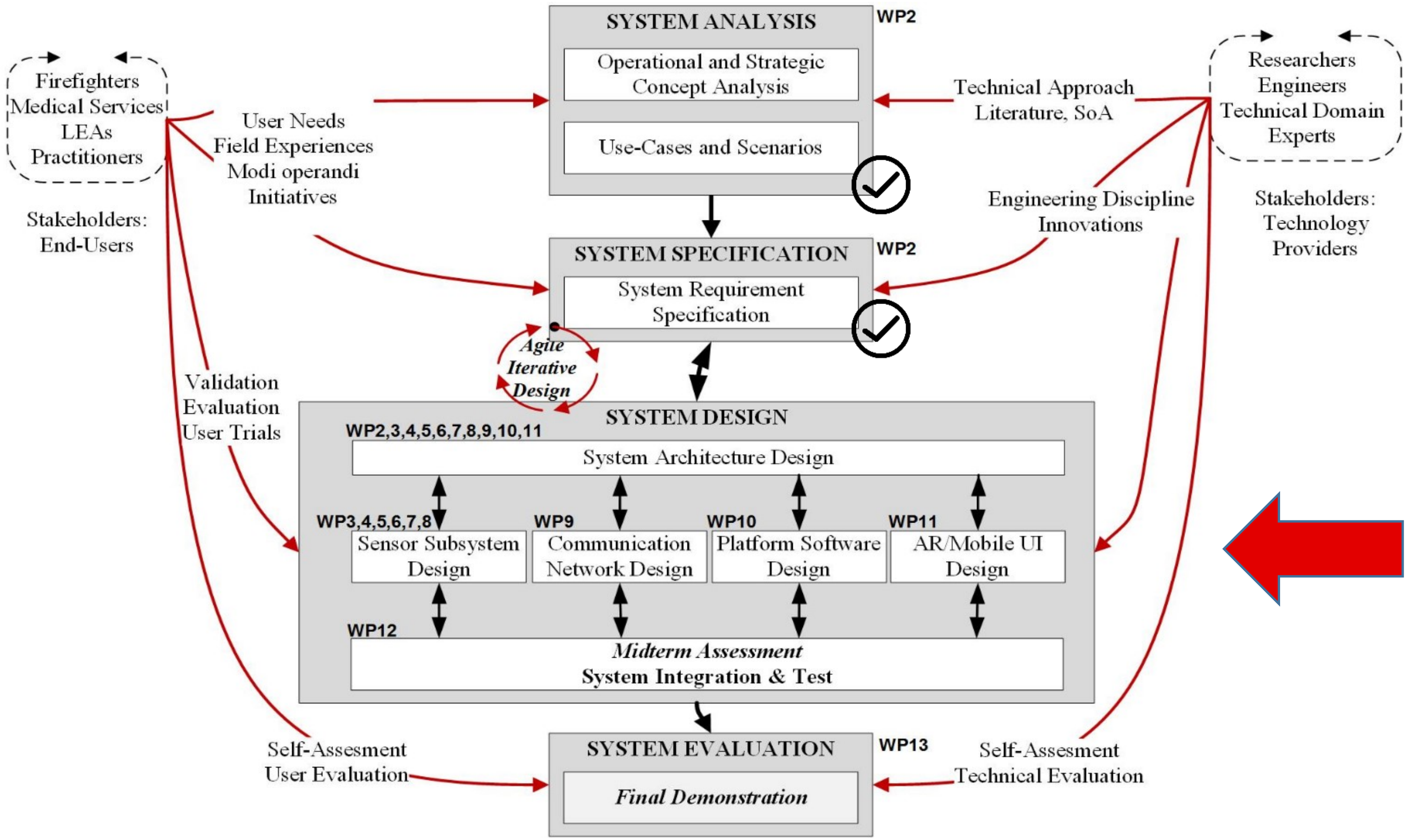
TeamAware Demonstrations

TeamaWare

Turkey DEMO → Natural Disaster → Earthquake, fire in Bursa subway

Romania DEMO → Human-made Disaster → Terrorist attack in Bucharest

DONE! & TO DO! (TeamAware Roadmap)



Subsytem Development & Interim Demonstration

November 2022: *Interim Demonstration [To assess 1st phase of R&D to plan 2nd phase of R&D]*
April 2024: *Final Demonstration*

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Further information:

https://teamaware.eu/

TeamAware

@TeamAware_EU

Thank you!

International CBRNE Institute

The Pandemic Covid : lessons and prospectives

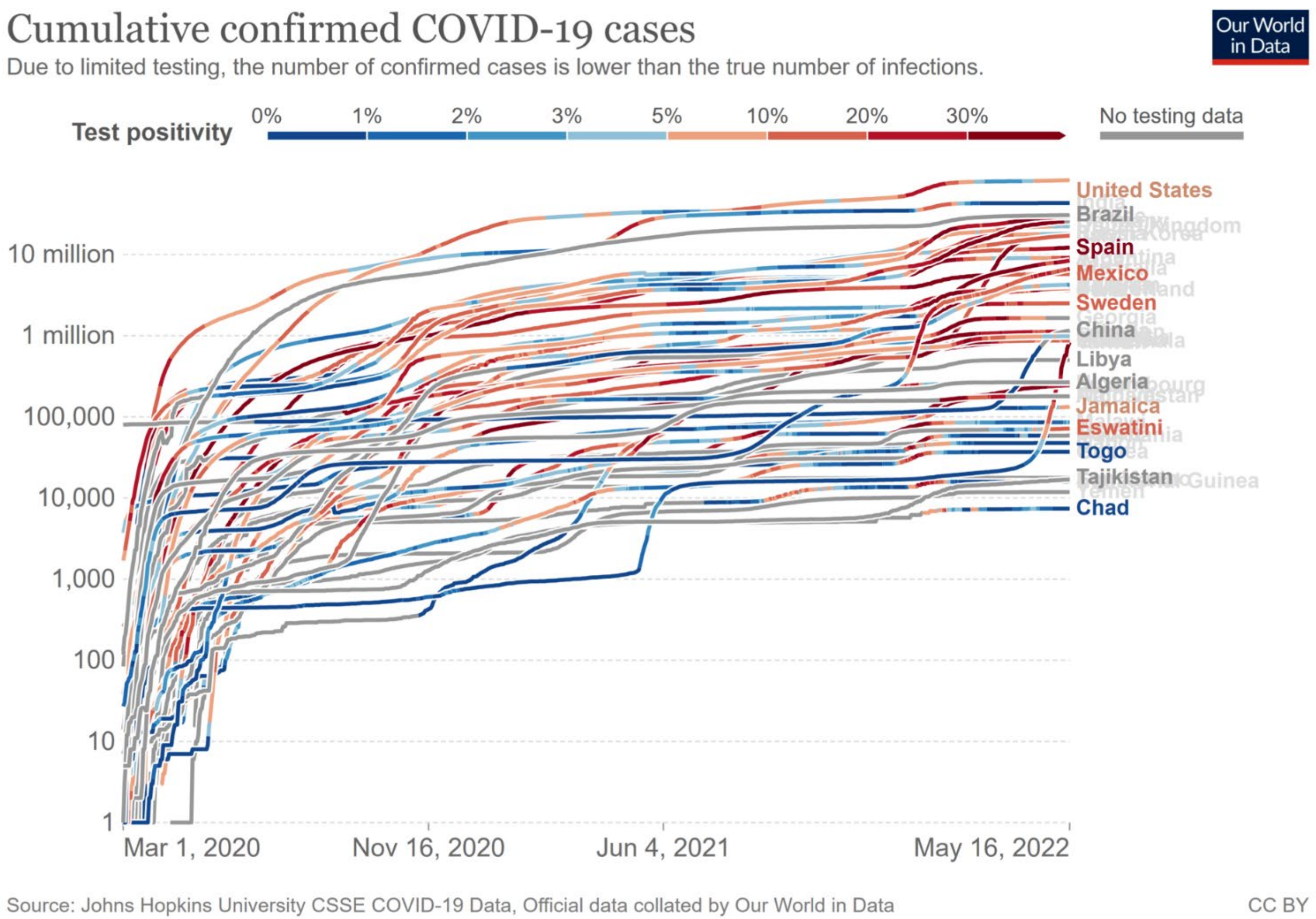
FRANK VAN TRIMPONT MD
HEAD ECDM

European Council of Disaster Medicine

The Pandemic Covid : lessons and prospectives

The first diagnosed patient (estimated at that time as patient zero) was identified on December 1, 2019 in Wuhan in Hubei province, central China. On December 16, 2019, the first patient's hospitalization.

The Pandemic Covid : lessons and prospectives



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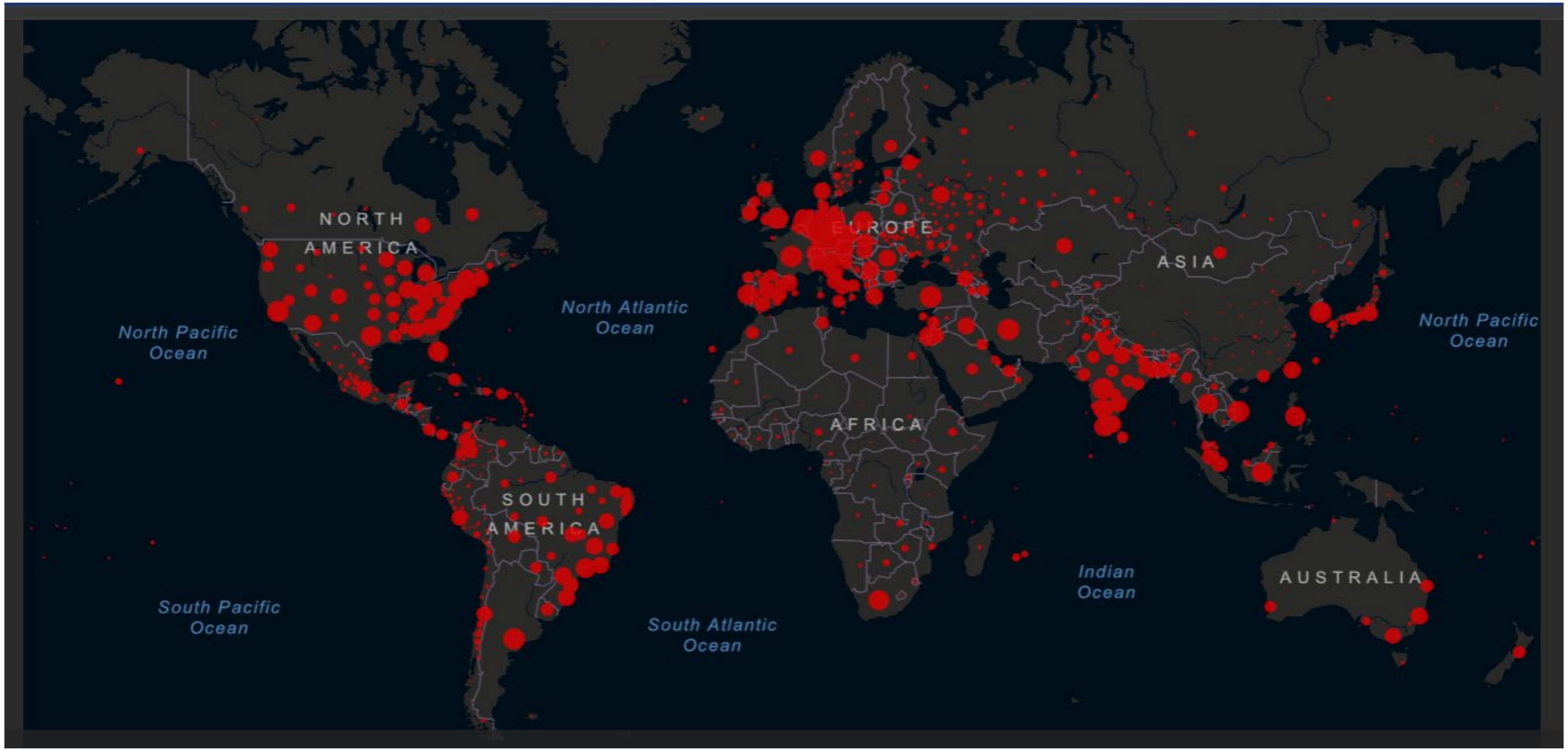
The Pandemic Covid : lessons and prospectives

Total Cases	Total Deaths	Total Vaccine Doses Administered
531 457 754	6 297 757	11 657 763 313
28-Day Cases	28-Day Deaths	28-Day Vaccine Doses Administered
14 684 280	44 646	443 814 296

https://coronavirus.jhu.edu/

The Pandemic Covid : lessons and prospectives



https://coronavirus.jhu.edu/

The Pandemic Covid : lessons and prospectives

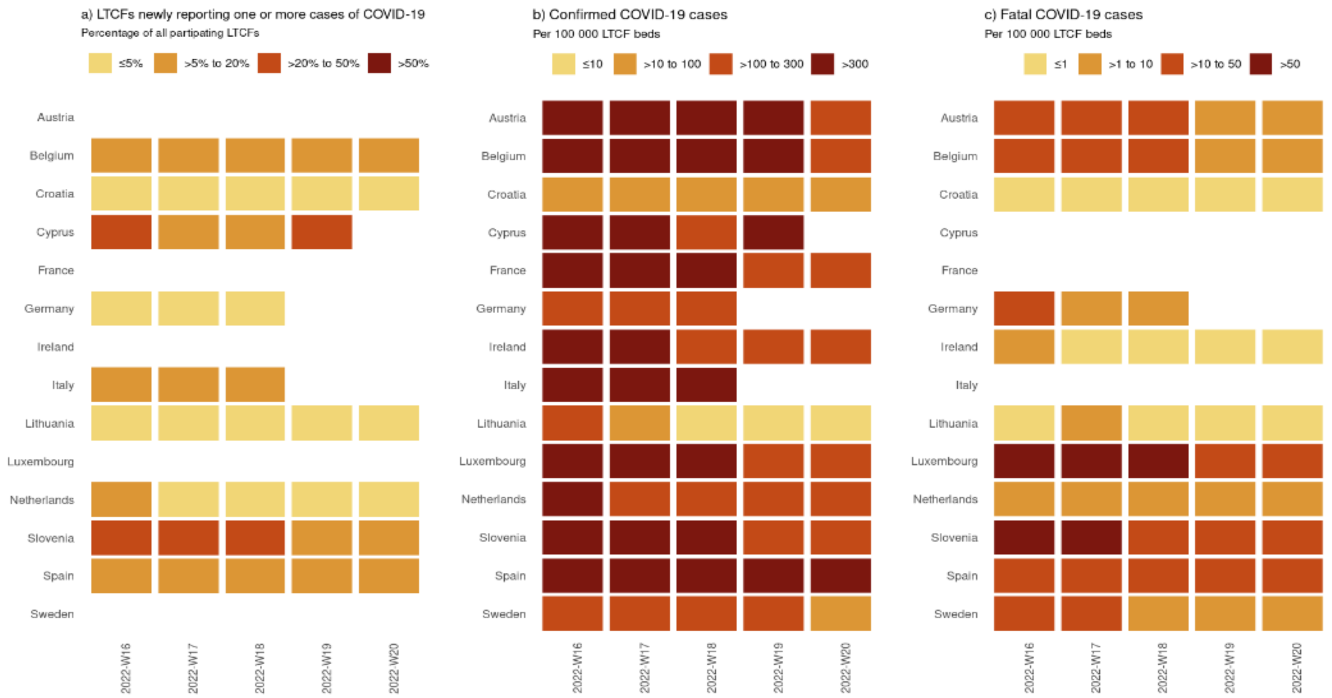
	Tests per 100k	14-day case rate per 100k	Test positivity (%)	14-day case rate per 100k (65+ years)	Hospital admissions per 100k	Hospital occupancy per 100k	ICU admissions per 100k	ICU occupancy per 100k	14-day death rate per million
EU/EEA	1 297 ▼	400 ▼	12.7 ▼	410 ▼	3.4 ▼	11.1	0.3 ▼	0.8	9.4 ▼
Austria	14 563	399 ▼	1.2	377 ▼		5.4 ▼		0.5 ▼	4.4 ▼
Belgium	632 ▼	173 ▼	5.3 ▼	263 ▼	2.0	9.2 ▼		0.7 ▼	7.8 ▼
Bulgaria	465 ▼	45.6 ▼	4.2 ▼			6.6		0.6	12.7 ▼
Croatia	999	123 ▼	5.4 ▼	219 ▼					13.1 ▼
Cyprus	7 913 ▼	379 ▼	2.2	334 ▼	2.0 ▼	3.3 ▼	0.1	0.6 ▲	12.3 ▼
Czechia	338	34.9 ▼	4.3 ▼	50.5 ▼	1.0	1.3	0.1	0.1	1.9
Denmark						4.9 ▼		0.2	0.0 ▼
Estonia	736	133 ▼	8.4	160 ▼	4.7 ▼	7.1	0.1	0.2	9.8 ▲
Finland	534 ▼	351 ▼	30.9 ▲	245 ▼		9.3 ▼		0.3 ▼	21.3 ▼
France	1 075 ▼	405 ▼	13.5 ▼	433 ▼	3.9 ▼	23.8	0.5 ▼	1.5	12.1 ▼
Germany	597 ▼	571 ▼	36.7 ▼	299 ▼				0.9	4.5 ▼
Greece	5 508	490 ▼	4.3	326 ▼	5.8		0.2		21.5 ▼
Hungary	241 ▼	52.9 ▼	8.8 ▼	75.5 ▼					4.9 ▼
Iceland		234 ▼				3.6 ▲			0.0
Ireland	642 ▼	160 ▼	12.2 ▲	189 ▼	4.9	3.9 ▼	0.1	0.5	3.6
Italy	2 286 ▼	515 ▼	8.9 ▼	480 ▼	3.0 ▼				16.0 ▼
Latvia	928	125 ▼	6.9	138 ▼	5.9 ▼		0.6	0.3	12.7 ▼
Liechtenstein	392 ▼	297 ▼	36.6	440 ▲	0.0				0.0
Lithuania	292	60.7	9.9	63.7		2.6			1.8
Luxembourg	993 ▼	573 ▼	22.1	476 ▼	0.9	1.1		0.2	11.0 ▼
Malta	1 515	208 ▼	6.8						15.5
Netherlands	147	82.3 ▼	26.0	71.8 ▼	0.7	2.2 ▼	0.0	0.2	1.1
Norway	223	53.2 ▼	11.0	85.6 ▼	0.9 ▼		0.1 ▲		14.8
Poland	139	9.8 ▼	3.1			1.4			2.7
Portugal	3 139	3 559 ▲	54.4	3 175 ▲	0.0				43.6

https://www.ecdc.europa.eu/en/covid-19

The Pandemic Covid : lessons and prospectives

- For the proportion of LTCFs that reported one or more new COVID-19 case, no countries reported an increase (i.e. a relative increase of at least 10%) and five countries (Belgium, Croatia, Lithuania, the Netherlands and Slovenia) reported a decrease (i.e. a relative decrease of at least 10%).

Long-term care facilities newly reporting one or more COVID-19 cases (%), confirmed and fatal cases per 100 000 beds, weeks 16 2022 to 20 2022



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https://www.ecdc.europa.eu/en/covid-19

The Pandemic Covid : lessons and prospectives

- At the end of week 21, 2022 (week ending 29 May), overall transmission continues to decline in most countries, as shown by both overall case notification rates among people aged 65 years and above while decreasing overall, transmission in the 65 years and above age group is increasing in two countries. While this may reflect targeted testing practices in some countries, it is important to continue monitoring the disease transmission in older age groups.
- Of 28 countries with data on hospital or ICU admissions/occupancy up to week 21, four reported an increasing trend in at least one of these indicators compared with the previous week. The 14-day COVID-19 death rate has been decreasing for six weeks (9.4 deaths per million population, compared with 13.1 deaths the previous week). An increasing trend in the COVID-19 death rate (duration in weeks) was observed in one country - Estonia (one).

https://www.ecdc.europa.eu/en/covid-19

The Pandemic Covid : lessons and prospectives

- **Forecasts for the period (week 23 compared to week 21) for the EU/EEA**
- Decreasing trends in cases (based on data from 30 countries), reaching a 7-day case notification rate of 145.0 cases per 100 000 population.
- Decreasing trends in hospital admissions (data from 10 countries), reaching 3.3 new admissions due to COVID-19 per 100 000 population.
- Decreasing trends in deaths (data from 30 countries), reaching a 7-day death rate of 4.8 deaths due to COVID-19 per million population.

https://www.ecdc.europa.eu/en/covid-19

The Pandemic Covid : lessons and prospectives

Target group	Indicator	Cumulative uptake (%)	Country range (%)	Number of countries
The total population	Cumulative uptake of at least one vaccine dose	75.3	30.2 - 94.4	30
The total population	Cumulative uptake of the primary course	72.6	29.8 - 86.1	30
The total population	Cumulative uptake of a booster/additional dose	52.0	9.1 - 67.8	30
18+yr	Cumulative uptake of at least one vaccine dose	85.8	36.0 - 100.0	30
18+yr	Cumulative uptake of the primary course	83.3	35.5 - 94.4	30
18+yr	Cumulative uptake of a booster/additional dose	62.7	11.1 - 85.7	30
<18yr	Cumulative uptake of at least one vaccine dose	26.2	2.3 - 58.2	29
<18yr	Cumulative uptake of the primary course	23.8	2.2 - 45.5	29
60+yr	Cumulative uptake of at least one vaccine dose	91.7	38.7 - 100.0	29
60+yr	Cumulative uptake of the primary course	90.8	38.2 - 100.0	29
60+yr	Cumulative uptake of a booster/additional dose	82.5	13.2 - 97.0	29
Healthcare workers	Cumulative uptake of at least one vaccine dose	93.0	29.3 - 100.0	17
Healthcare workers	Cumulative uptake of the primary course	90.0	28.8 - 100.0	17
Healthcare workers	Cumulative uptake of a booster/additional dose	55.0	6.0 - 100.0	14
Residents in long-term care facilities	Cumulative uptake of at least one vaccine dose	88.5	44.6 - 100.0	13
Residents in long-term care facilities	Cumulative uptake of the primary course	89.2	41.5 - 100.0	13

https://www.ecdc.europa.eu/en/covid-19

The Pandemic Covid : lessons and prospectives

- “Between 80 000 and 180 000 health and care workers could have died from COVID-19 in the period between January 2020 to May 2021, converging to a medium scenario of 115 500 deaths”

Source : WHO

- Use of protective equipment and masks

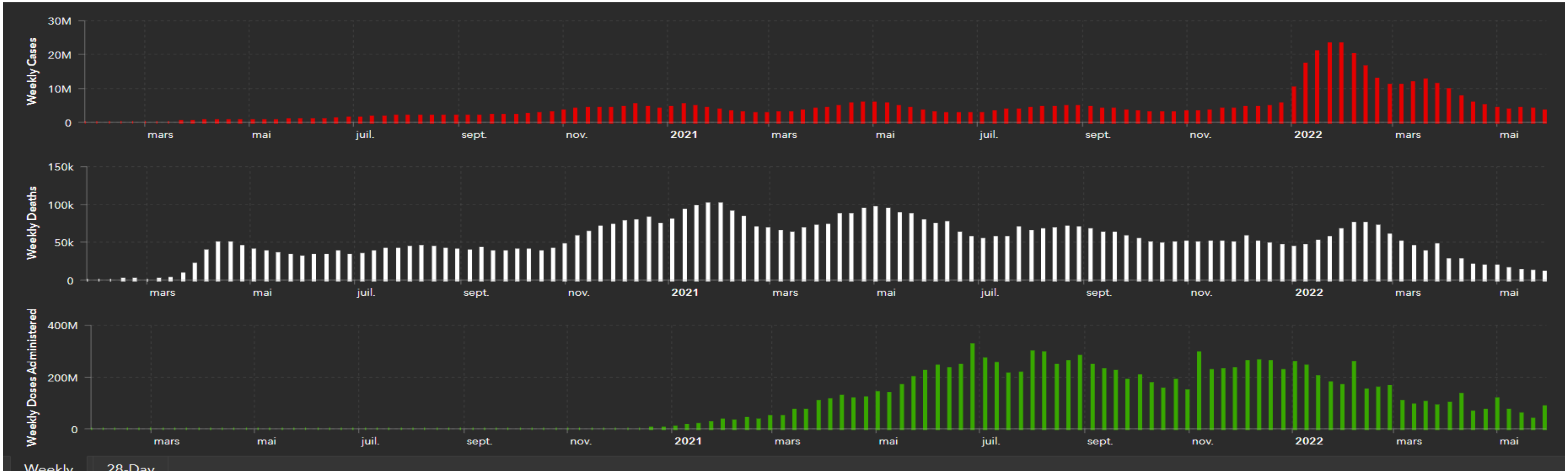
The Pandemic Covid : lessons and prospectives

- Less known and studied impacts
  - Mental health
  - Suicide rate
  - Cancer
  - Cardiovascular and metabolic diseases
  - Couple relationships
  - Education
  - Economy

The Pandemic Covid : lessons and prospectives

- Lesser known and studied impacts
  - Firm performance
  - Children and adolescent' lifestyle behavior
  - Clinical research
  - Flu vaccination
  - Radiology practice
  - E commerce

The Pandemic Covid : lessons and prospectives



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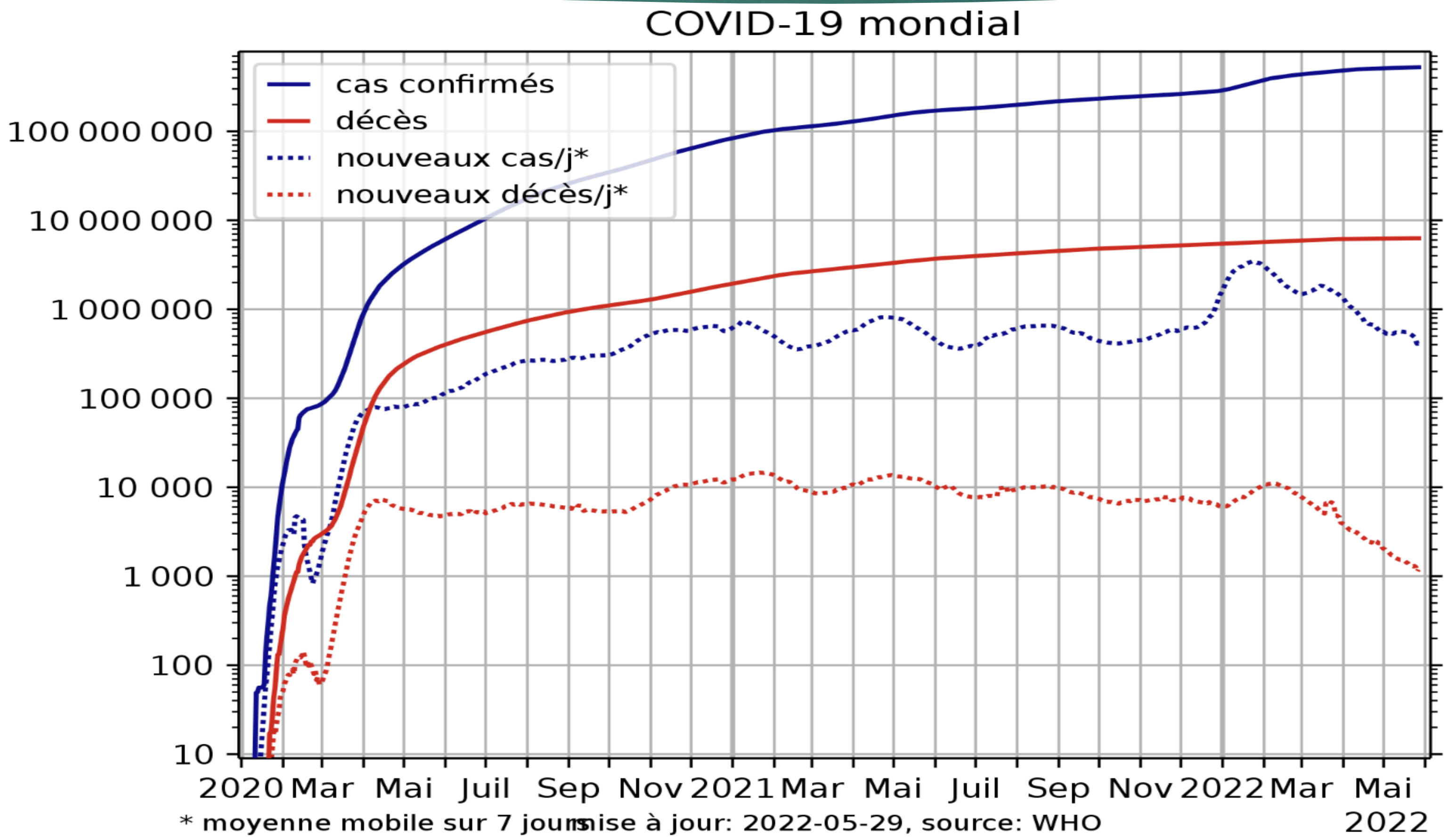
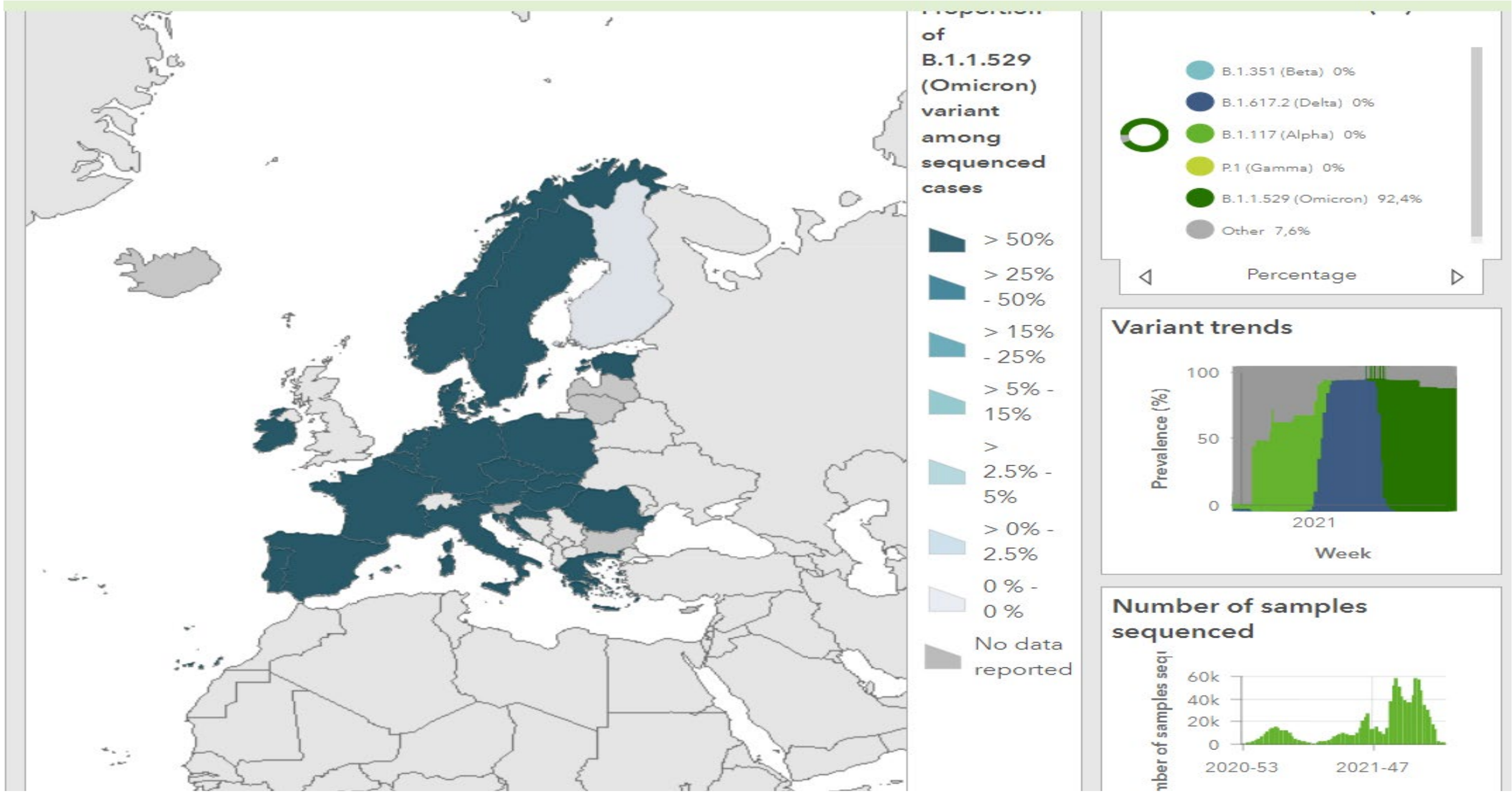
The Pandemic Covid : lessons and prospectives



The Pandemic Covid : lessons and prospectives

- Difficulty of long-term management of a crisis situation
- It is not over!!
- The number of cases is above the level of November 2021!
- No defined criteria for the goal to be achieved in terms of public health!
- Importance of the media and political influence
- Other news, other goals

The Pandemic Covid : lessons and prospectives



https://www.ecdc.europa.eu/en/covid-19

The Pandemic Covid : lessons and prospectives

- It is not known whether the reproduction rate, the percentage of symptomatic cases, severe cases and fatal cases is homogeneous or not according to the regions of the world or according to the mode of contamination (primary, secondary or tertiary) nor according to the rate documented coverage or effectiveness of the vaccine.
- The duration of convalescence according to clinical pictures or patient typologies remains undocumented actually.
- The beginning of the contaminating viral excretion phase in the asymptomatic phase and beyond the clinical phase, during convalescence is still not fully established.
- The threshold viral load predictive of severe symptoms has not been identified if it exists.
- The viral load in excreta that may be responsible for contamination in asymptomatic patients has not been determined, although we already know that it plays a significant role.

The Pandemic Covid : lessons and prospectives

- We do not know how to explain the reasons for the high rate of health workers contaminated by their patients (problems with the effectiveness of personal protective equipment, compliance with prevention and protection instructions, exotic mode of contamination, ….).
- We do not have a projection of the impact of the rate of absenteeism of health workers on the capacities of establishments to deal with an Exceptional Health Situation
- There is no projection on the impact of public health measures on the one hand, on absenteeism linked to the epidemic on the other hand, on the needs for protective equipment, consumables, medical devices and in drugs, on the logistical constraints linked to supply in a context where suppliers are predominantly Chinese

Thank you to Jan-Cedric Hansen, vice-president ECDM for important help in this analysis

The Pandemic Covid : lessons and prospectives

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The Pandemic Covid : lessons and prospectives

Thank you for your attention

Question time!

Workshop VRISE2022
June 7 2022
Risky Interventions and Environmental Surveillance

International CBRNE Institute

SERVICIO DE URGENCIAS MEDICAS DE MADRID SUMMA112

PREHOSPITAL EMERGENCIES MEDICAL SERVICE MADRID REGION

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INTREPID

Citius Altius Fortius

INtelligent Toolkit for Reconnaissance and assessmEnt in Perilous InciDents

HORIZON 2020 CALL:

H2020-SU-SEC-2018-2019-2020 (SECURITY)

TOPIC: SU-DRS02-2018-2019-2020 TYPE OF ACTION:

RIA PROPOSAL NUMBER: 883345

ORGANISATION NAME	SHORT NAME	COUNTRY
Coordinator		
CS GROUP	CS	FRANCE
Research Centres		
Ethniko kentro erevnas kai technologikis anaptyxis	CERTH	GREECE
Tecnical University of Múnich	TUM	GERMANY
Totalförsvarets for Skningsinstitut	FOI	SWEDEN
Ethical Responsible Partner		
Vrije Universiteit Brussel	VUB	BELGIUM
SMEs/ PYMES		
Robotnik	ROB	SPAIN
ETELM	ETELM	FRANCE
ALX Systems	ALX	BELGIUM
CrisisPlan	CPLAN	NETHERLANDS
Inconito (Comunication)	INC	FRANCE
End-user representatives		
Belgian Federal Pólice- Directorate of Especial Units	DSU	BELGIUM
Ville de Marseille, Batallion de Marins-Pompiers de Marseille	BMPM	FRANCE
Greater Stckholm Fire Brigade	SSBF	SWEDEN
Madrid Police	ADMPOL	SPAIN
Servicio Madrileño de Salud- Servicio de Urgencias	SUMMA	SPAIN
Escuela Española de Salvamento y Detección de Perros	ESDP	SPAIN
Hellenic Rescue Team	HRTA	GREECE

CS GROUP

FOI Swedish Defence Research Agency

Technische Universität München TUM

CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

VUB VRIJE UNIVERSITEIT BRUSSEL

CRISISplan

telm

ALX SYSTEMS

Robotnik

inconito creative agency

DSU POLICE FEDERALE POLITIE

MARINS-POMPIERS DE MARSEILLE

Storstockholms brandförsvar

POLICÍA MUNICIPAL MADRID

SaludMadrid SUMMA 112

ESCUELA E.S.D.P. SALVAMENTO Y DETECCION CON PERROS

HELLENIC RESCUE TEAM ATTICA

WHAT IS INTREPID ABOUT?

A better reconnaissance for a safer action

First responders need to decide quickly for the right course of action even though information is scarce, unconfirmed and difficult to obtain.

In order to provide a fast and secure intervention for maximal life saving, information needs to be as reliable and accurate as possible.

WHAT IS INTREPID ABOUT?

A better reconnaissance for a safer action

In the earliest phases of a natural or man-made disaster, chances to save lives are at the highest but so are unknowns, risks and threats faced by first responders.

THEY NEED TO:

- Understand the terrain and the nature of the incident
- Enter the zone and safely reach the right places
- Localize and identify threats, obstacles and victims

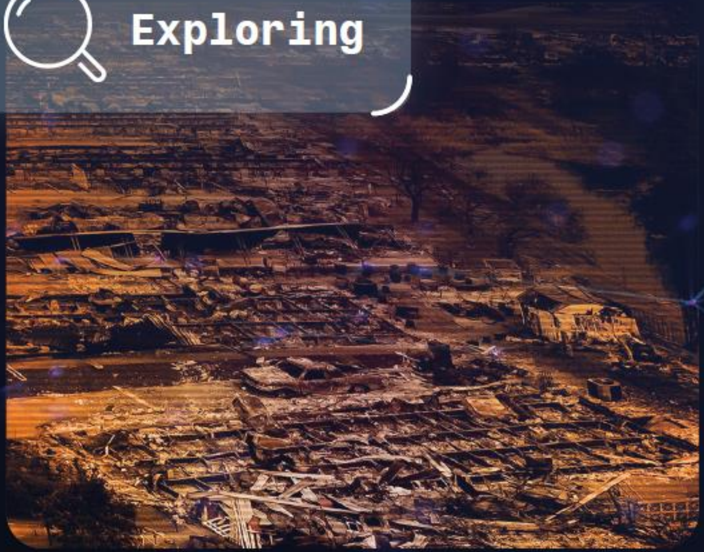
WHAT DOES INTREPID WANT TO ACHIEVE?

A ground-breaking integrated solution to support 3 objectives

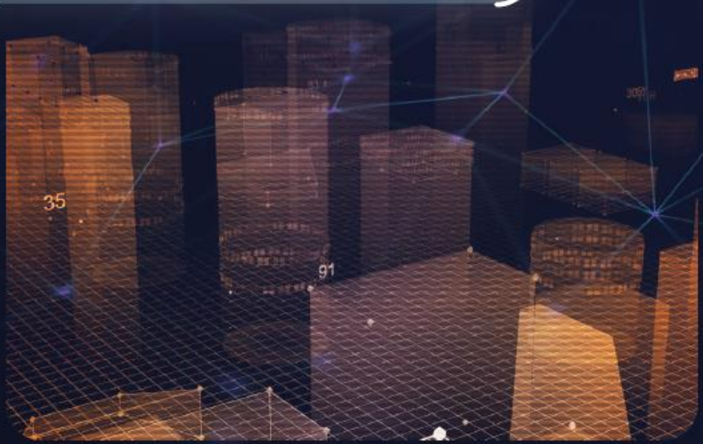
INTREPID develops and validates an **easy-to-deploy and secured platform** to **enhance the speed, range,** and **safety** of **complex and hazardous zones exploration and assessment.**

INTREPID WILL IMPROVE OPERATIONS IN 3 MAIN DIRECTIONS:

Exploring



Understanding



Deciding

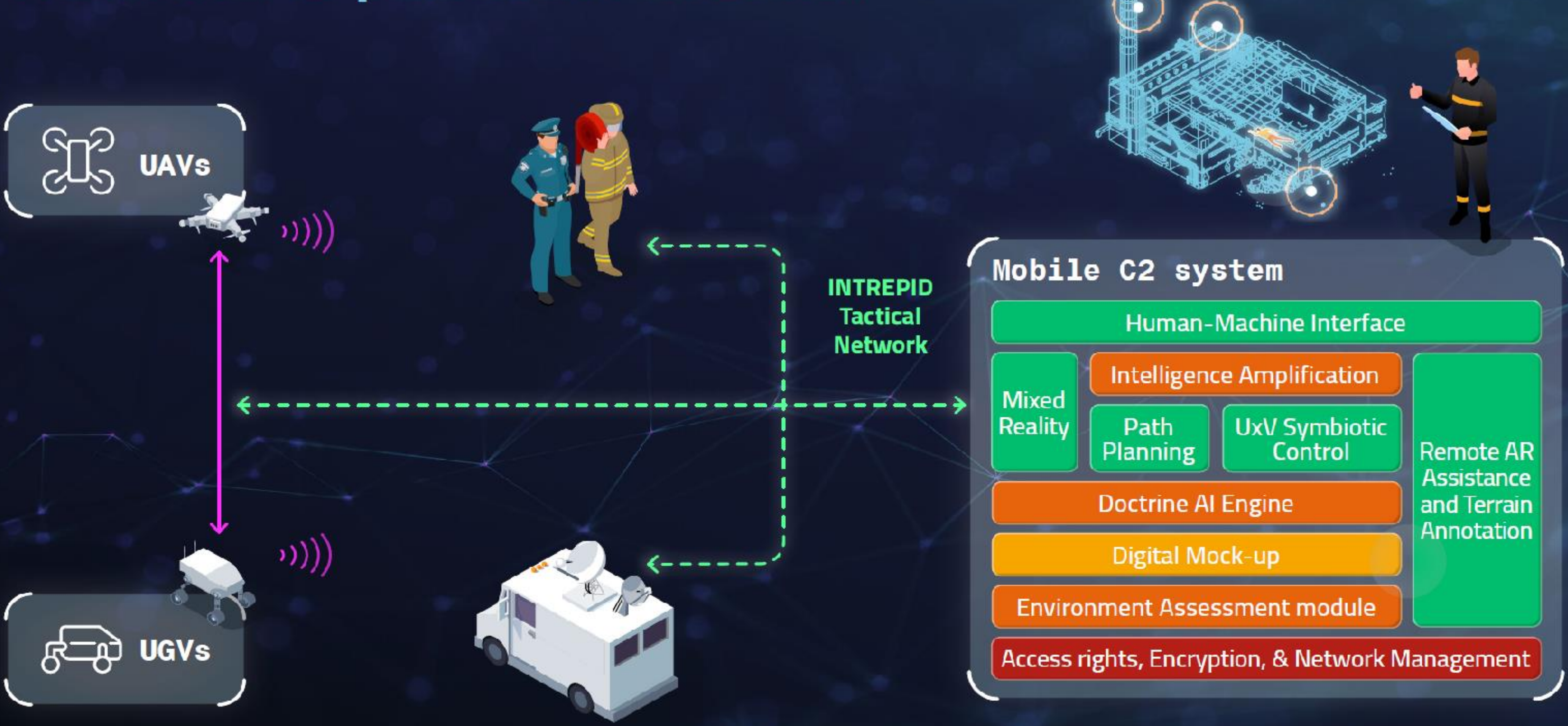
Cybernetics assistants (drones, robots)

eXtended Reality and Artificial

Intelligence Amplification

WHAT DOES INTREPID WANT TO ACHIEVE?

The INTREPID platform in a nutshell



HOW IS INTREPID PROGRESSING?

INTREPID innovation potentials and life-size pilots

INTREPID'S RESEARCH AND INNOVATION ACTIVITIES ADDRESS 4 MAIN INNOVATION FIELDS:

1 / Cybernetic assistance by drones and robots

2 / Situational Awareness and operation management

3 / Intelligence Amplification

4 / Tactical Network

RESULTS ARE TESTED THROUGH 3 IRL PILOTS:

MAJOR NATURAL DISASTER

- Flooding in a metro station in Stockholm
- Assessment of the technical choices

INDUSTRIAL ACCIDENT

- Industrial accident at a SEVESO site in Marseille
- Multiple risks (fire, smoke, gas, toxic leaks, structural damages ...)

MAN-MADE INCIDENT IN A PUBLIC BUILDING

- Major explosion in a public building in Madrid
- Unidentified threats, police/FR cooperation

WHAT WILL INTREPID CREATE?

INTREPID Cybernetic Assistants

INTREPID implements a new generation of drones and robots tailored for synergetic operations for improved exploration and scanning capabilities in cluttered disaster sites.

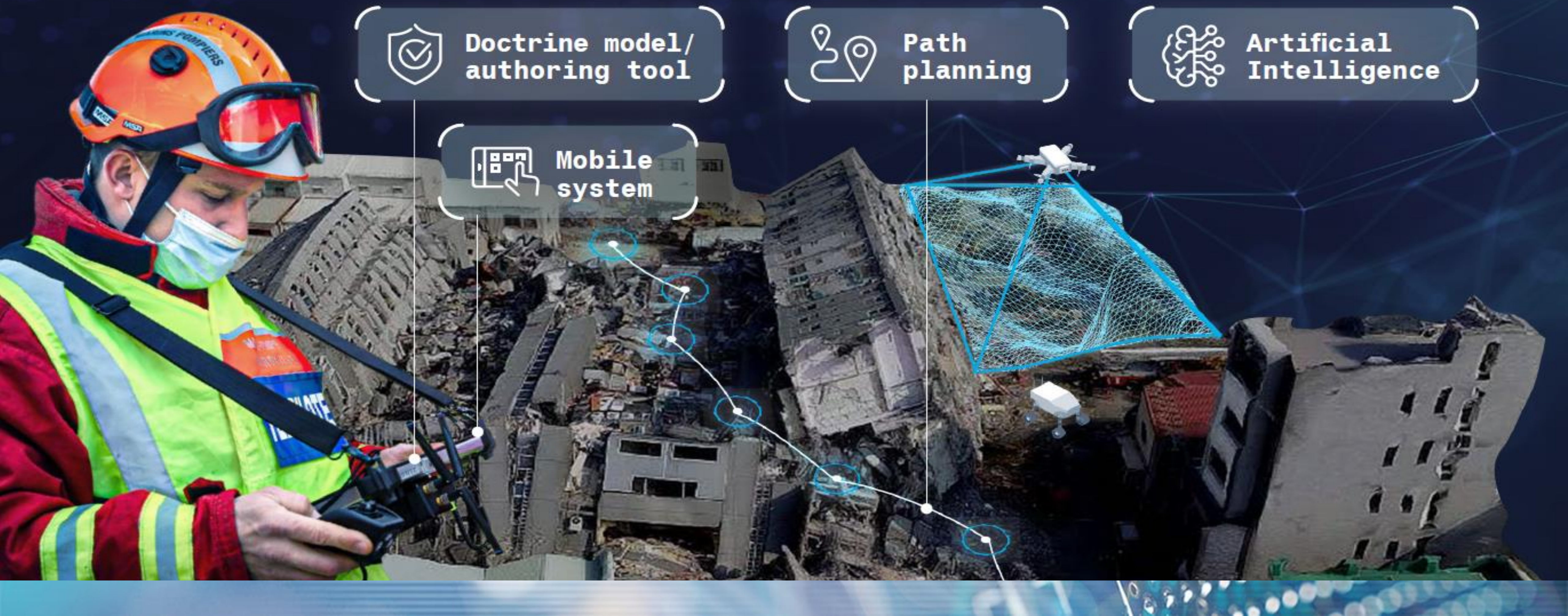
WHAT WILL INTREPID CREATE?

INTREPID Situational Awareness and Operation Management

INTREPID implements the first fully integrated digital-twin and eXtended Reality based mobile platform for orchestrating rapid scanning and disaster zone assessment operations involving multiple UxVs and first responders.

INTREPID Intelligence Amplification Capabilities

INTREPID develops an intelligence amplification system that supports decision-making capabilities, assisting, guiding and alerting the responder with special focus on the optimisation of both the exploration and assessment of the site.



A scalable, secured, and resilient tactical network

WHATEVER THE ENVIRONMENT, OUTDOOR OR DEEP INDOOR, THE EXISTING TELECOMMUNICATION COVERAGE, INTREPID NETWORK IS TAILORED FOR:

- **High bandwidth interconnection of all different actors:** cyber-assistants, first responders, vehicles
- **Interoperability with 4G/LTE/5G,** on private or public networks
- **Deep indoor and underground penetration and scalability**

ROBOTS/UGV VS DRONES/AGV

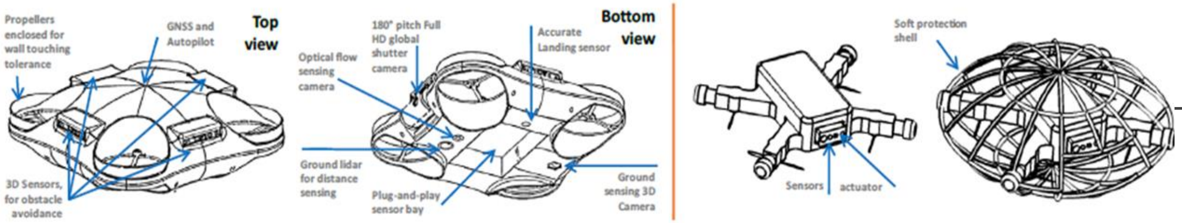


Figure 6: Sketch of the envisaged UAVs (left: for fast explorations, right: for deep indoor and inaccessible zones)

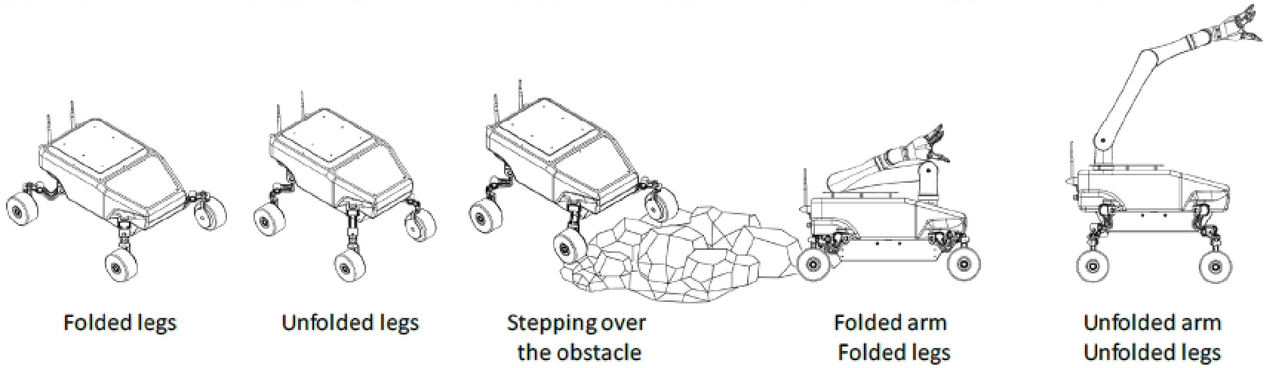


Figure 5: Sketch of the envisaged smart UGV with its robotised wheels and optional robotised arm

> Robotic and Drones in Prehospital Health Emergencies

- **Emergency Medical Services** [MeSH Terms]
- **Robotics** [MeSH Terms]
- **Unmanned Aerial Devices** [MeSH Terms]

Literature search:

- Controlled language (MESH) and free language has been used with truncations and limited to the title/summary field.
- Boolean operators have been used to create relationships, the time period has been limited to 2015-2021

Search:
PUBMED:
("Emergency Medical Services"[MeSH Terms] AND "Robotics"[MeSH Terms]) NOT "General Surgery"[MeSH Terms])
Unmanned Aerial Devices
Web of Science
TS=ambulance AND TS=robotics

Results

- TABLE REPRESENTATION OF SERCH RESULTS FEATURING ROBOTS IN HEALTH EMERGENCIES

P
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Results

- TABLE REPRESENTATION OF SERCH RESULTS FEATURING ROBOTS IN HEALTH EMERGENCIES

WEB

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Title1111 Authors Book Editors Source Title Publication Date

14.- Public Safety Communications above 6 GHz: Challenges and Opportunities
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15.- Preventing COVID-19 Spread Using Information and Communication Technology
Singh, Pranav Kumar; Nandi, Sukumar; Ghafoor, Kayhan Zrar; Ghosh, Uttam; Rawat, Danda B.
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16.- Collaborative Mapping with IoE-based Heterogeneous Vehicles for Enhanced Situational Awareness
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18.- A Data-Driven Simulator for the Strategic Positioning of Aerial Ambulance Drones Reaching Out-of-Hospital Cardiac Arrests: A Genetic Algorithmic Approach
Mackle, Conor; Bond, Raymond; Torney, Hannah; Mcbride, Ronan; Mclaughlin, James; Finlay, Dewar; Biglarbeigi, Pardis; Brisk, Rob; Harvey, Adam; Mceneaney, David
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22.- ****An Interconnected Architecture for an Emergency Medical Response Unmanned Aerial System
Dayananda, Karanam Ravichandran; Gomes, Rahul; Straub, Jeremy
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23.- Designing a robotic welding cell for bus body frame using a sustainable way
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Pellicciari, M; Peruzzini, M
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24.- Investigation of an Ultra Wideband Noise Sensor for Health Monitoring
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25.- Communication Requirements in 5G-Enabled Healthcare Applications: Review and Considerations.
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Results > Drones

- **Emergency Medical Services** [MeSH Terms]
- **Unmanned Aerial Devices** [MeSH Terms]

Literature search:

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Web of Science
TS=ambulance AND TS=Drones

Results

P

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▪ DRONES / UNMANNED AERIAL VEHICLES

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Results DRONES/ UNMANNED AERIAL VEHICLES and AMBULANCES (TS)

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Title	Authors	Source Title	Publication Date	Publication Year	Volume	Issue
36 Public Safety Communications above 6 GHz: Challenges and Opportunities	Mezzavilla, Marco; Polese, Michele; Zanella, Andrea; Dhananjay, Aditya; Rangan, Sundeep; Kessler, Coitt; Rappaport, Theodore S.; Zorzi, Michele	IEEE ACCESS	2018	2018	6	
37 Improving Access to Automated External Defibrillators in Rural and Remote Settings: A Drone Delivery Feasibility Study	Cheskes, Sheldon; McLeod, Shelley L.; Nolan, Michael; Snobelen, Paul; Vaillancourt, Christian; Brooks, Steven C.; Dainty, Katie N.; Chan, Timothy C. Y.; Drennan, Ian R.	JOURNAL OF THE AMERICAN HEART ASSOCIATION	JUL 21 2020	2020	9	14
38 An Advanced First Aid System Based on an Unmanned Aerial Vehicles and a Wireless Body Area Sensor Network for Elderly Persons in Outdoor Environments	Fakhrulddin, Saif Saad; Gharghan, Sadik Kamel; Al-Naji, Ali; Chahl, Javaan	SENSORS	JUL 1 2019	2019	19	13
39 Identifying and overcoming barriers to automated external defibrillator use by GoodSAM volunteer first responders in out-of-hospital cardiac arrest using the Theoretical Domains Framework and Behaviour Change Wheel: a qualitative study	Smith, Christopher M.; Griffiths, Frances; Fothergill, Rachael T.; Vlaev, Ivo; Perkins, Gavin D.	BMJ OPEN	MAR 2020	2020	10	3
39 Optimal allocation of defibrillator drones in mountainous regions	Wankmueller, Christian; Truden, Christian; Korzen, Christopher; Hungerlaender, Philipp; Kolesnik, Ewald; Reiner, Gerald	OR SPECTRUM	SEP 2020	2020	42	3
40 Multi-stage emergency medicine logistics system optimization based on survival probability	Wang, Ke; Liang, Yixin; Zhao, Lindu	FRONTIERS OF ENGINEERING MANAGEMENT	JUL 2017	2017	4	2
41 Preventing COVID-19 Spread Using Information and Communication Technology	Singh, Pranav Kumar; Nandi, Sukumar; Ghafoor, Kayhan Zrar; Ghosh, Uttam; Rawat, Danda B.	IEEE CONSUMER ELECTRONICS MAGAZINE	JUL 2021	2021	10	4
42 Collaborative Mapping with IoE-based Heterogeneous Vehicles for Enhanced Situational Awareness	Queralta, Jorge Pena; Tuan Nguyen Gia; Tenhunen, Hannu; Westerlund, Tomi	2019 IEEE SENSORS APPLICATIONS SYMPOSIUM (SAS)	2019	2019		
43 Automated external defibrillators delivered by drones to patients with suspected out-of-hospital cardiac arrest	Schierbeck, S.; Hollenberg, J.; Nord, A.; Svensson, L.; Nordberg, P.; Ringh, M.; Forsberg, S.; Lundgren, P.; Axelsson, C.; Claesson, A.	EUROPEAN HEART JOURNAL	OCT 2021	2021	42	
44 Simulation and education National coverage of out-of-hospital cardiac arrests using automated external defibrillator-equipped drones-A geographical information system analysis	Schierbeck, S.; Nord, A.; Svensson, L.; Rawshani, A.; Hollenberg, J.; Ringh, M.; Forsberg, S.; Nordberg, P.; Hilding, F.; Claesson, A.	RESUSCITATION	JUN 2021	2021	163	
45 A Data-Driven Simulator for the Strategic Positioning of Aerial Ambulance Drones Reaching Out-of-Hospital Cardiac Arrests: A Genetic Algorithmic Approach	Mackle, Conor; Bond, Raymond; Torney, Hannah; Mcbride, Ronan; Mclaughlin, James; Finlay, Dewar; Biglarbeigi, Pardis; Brisk, Rob; Harvey, Adam; Mceneaney, David	IEEE JOURNAL OF TRANSLATIONAL ENGINEERING IN HEALTH AND MEDICINE	2020	2020	8	
46 Drone Design for First Aid Kit Delivery in Emergency Situation	Sanjana, Parvathi; Prathilothamai, M.	2020 6TH INTERNATIONAL CONFERENCE ON ADVANCED COMPUTING AND COMMUNICATION SYSTEMS (ICACCS)	2020	2020		
47 *** Post-Traumatic Stress Symptoms in United States Air Force Aeromedical Evacuation Nurses and Technicians	Swearingen, Julie M.; Goodman, Tanya M.; Chappelle, Wayne L.; Thompson, William T.	MILITARY MEDICINE	MAR 2017	2017	182	
48 Quadcopter based technology for an emergency healthcare	Dhivya, A. Josephin Arockia; Premkumar, J.	2017 THIRD INTERNATIONAL CONFERENCE ON BIOSIGNALS, IMAGES AND INSTRUMENTATION (ICBSII)	2017	2017		
49 5G and IoT Based Reporting and Accident Detection (RAD) System to Deliver First Aid Box Using Unmanned Aerial Vehicle	Alkinani, Monagi H.; Almazroi, Abdulwahab Ali; Jhanjhi, N. Z.; Khan, Navid Ali	SENSORS	OCT 2021	2021	21	20
50 A Canadian Rural Living Lab Hospital: Implementing solutions for improving rural emergency care.	Fleet, Richard	Future healthcare journal	2020-Feb	2020	7	1
51 Aero Ambulance Quad copter Based Technology for An Emergency Healthcare	Kumar, Ashok R.; Arulselvan, P.; Ashif, A.; Gokul, S.; Kuppusamy, R.	2019 5TH INTERNATIONAL CONFERENCE ON ADVANCED COMPUTING & COMMUNICATION SYSTEMS (ICACCS)	2019	2019		
52 An Interconnected Architecture for an Emergency Medical Response Unmanned Aerial System	Dayananda, Karanam Ravichandran; Gomes, Rahul; Straub, Jeremy	2017 IEEE/AIAA 36TH DIGITAL AVIONICS SYSTEMS CONFERENCE (DASC)	2017	2017		
53 Drone versus ambulance for blood products transportation: an economic evaluation study	Zailani, M. A.; Azma, R. Z.; Aniza, I; Rahana, A. R.; Ismail, M. S.; Shahnaz, I. S.; Chan, K. S.; Jamaludin, M.; Mahdy, Z. A.	BMC HEALTH SERVICES RESEARCH	DEC 5 2021	2021	21	1
54 Machine learning-based dispatch of drone-delivered defibrillators for out-of-hospital cardiac arrest	Chu, Jamal; Leung, K. H. Benjamin; Snobelen, Paul; Nevils, Gordon; Drennan, Ian R.; Cheskes, Sheldon; Chan, Timothy C. Y.	RESUSCITATION	MAY 2021	2021	162	
55 Delay to initiation of out-of-hospital cardiac arrest EMS treatments	Ornato, Joseph P.; Peberdy, Mary Ann; Siegel, Charles R.; Lindfors, Rich; Ludin, Tom; Garrison, Danny	AMERICAN JOURNAL OF EMERGENCY MEDICINE	MAR 2021	2021	41	
56 Drones in Emergency Medical Services: A Systematic Literature Review with Bibliometric Analysis	Pulsiri, Nonthapat; Vatananan-Thesenvitz, Ronald	INTERNATIONAL JOURNAL OF INNOVATION AND TECHNOLOGY MANAGEMENT	JUN 2021	2021	18	4
57 Quadcopter-Based Rapid Response First-Aid Unit with Live Video Monitoring	Rizwan, Raffay; Shehzad, Muhammad Naeem; Awais, Muhammad Naeem	DRONES	JUN 2019	2019	3	2
58 Drone delivery of defibrillators for sudden cardiac arrest could shorten response times	Fernandez-Ruiz, Irene	NATURE REVIEWS CARDIOLOGY	NOV 2021	2021	18	11
59 Robust Multi-Period Maximum Coverage Drone Facility Location Problem Considering Coverage Reliability	Chauhan, Darshan Rajesh; Unnikrishnan, Avinash; Figliozzi, Miguel A.; Boyles, Stephen D.	TRANSPORTATION RESEARCH RECORD		2022		
60 Airframe Design Optimization and Simulation of a Flying Car for Medical Emergencies	Mihara, Yusuke; Nakamura, Tsubasa; Nakamoto, Aki; Nakano, Masaru	INTERNATIONAL JOURNAL OF AUTOMATION TECHNOLOGY	MAR 2022	2022	16	2
61 Use of drones for the rescue service and transport of medicaments Possibilities and risks	Steinhoff, Claudia	UNFALLCHIRURG	DEC 2021	2021	124	12
62 A Machine Learning-based Dispatch Rule for Drone-delivered Defibrillators	Chu, Jamal; Leung, K. H. Benjamin; Cheskes, Sheldon; Snobelen, Paul; Nevils, Gordon; Drennan, Ian; Chan, Timothy	CIRCULATION	NOV 17 2020	2020	142	
63 Design of Deep Learning-Based Automatic Drone Landing Technique Using Google Maps API. 구글맵 API를 이용한 딥러닝 기반의 드론 자동 착륙 기법 설계	Lee, Ji-Eun; Moon, Hyung Jin	Journal of Industrial Convergence. 산업융합연구. Journal of Industrial Convergence산업융합연구	2020	2020	18	1
64 Innovative Sensing and Communication Model to Enhance Disaster Management in Traffic	Sagar, K. S. Sandeep; Kumar, G. Narendra	DATA ENGINEERING AND COMMUNICATION TECHNOLOGY, ICDECT-2K19	2020	2020	1079	
65 AED on the Fly: A Drone Delivery Feasibility Study for Rural and Remote Out-Of-Hospital Cardiac Arrest	Cheskes, Sheldon; Snobelen, Paul; McLeod, Shelley; Brooks, Steven; Vaillancourt, Christian; Chan, Timothy; Dainty, Katie N.; Nolan, Mike	CIRCULATION	NOV 19 2019	2019	140	
66 Design Considerations for UAV-Delivered Opioid Overdose Interventions	Buckland, Daniel M.; Cummings, Mary Missy; Mark, Daniel B.; Banerjee, Ashis G.; Snyder, Kyle; Starks, Monique A.	2019 IEEE AEROSPACE CONFERENCE	2019	2019		
67 DESIGN OF RPV FOR MEDICAL ASSISTANCE	Krishna, Vangara Vamsi; Shastri, Shivang; Kulshrestha, Shubhra	2018 9TH INTERNATIONAL CONFERENCE ON COMPUTING, COMMUNICATION AND NETWORKING TECHNOLOGIES (ICCCNT)	2018	2018		

Drones <>Robots

UTILITIES.

DIFFERENCES AND SIMILARITIES.

SIMILARITIES.

Robots utilities

Telephonic triage
assess the acceptability and feasibility of using a mobile robotic system to facilitate health care tasks.
Support in radiodiagnosis
trial evaluating the effectiveness of telephone consultations for patients with heart failure
humanoid robot-based distraction for venipuncture pain in children
evaluate the feasibility of communicating with orthopedic trauma patients postoperatively, utilizing an automated mobile phone messaging platform
minimise human-to-human contacts and the workload of health care workers
remote robotic hemorrhage control in a hostle environment
evaluate remote presence robotic technology (RPRT) for enhancing pediatric remote assessments, expediting initiation of treatment, refining triaging, and reducing the need for transport.
Social Robot for Emotional Support to Children at a Pediatric Emergency Department
Potencial of 5G with robots: support high-definition video, virtual reality, and other broadband data to large numbers of first responders. Surveillance drones or ambulances could also be provided high-speed connectivity along with machine-Type communication for remotely controlled robotic devices entering dangerous areas
propose an IoE-based architecture consisting of a heterogeneous team of cars and drones for enhancing situational awareness in autonomous cars, especially when dealing with critical cases of natural disasters
deliver the necessary medical package to the place where access is difficult, and estimated arrival time of conventional ambulance is too long
to determine the difference in emergency response times when having aerial ambulance drones available compared to response times on traditional ambulance services.
an intelligent maze solving robot that can determine its shortest path on a line maze based on image processing and artificial intelligence algorithms.
powered robotic surgeriesand dynamic huge data repository are applications of 5G technology in the health sector.
developed a compact and low cost ultra wideband noise sensor for medical diagnostics and vital sign monitoring in pre-hospital settings. detect the heartbeat rate accurately with the developed sensor.
determine the advantages of using a robotic welding cell to produce bus body structures and to follow its implementation in the production process.
identify, describe, and compare the requirements for communication key performance indicators in relevant healthcare use cases, including remote robotic-assisted surgery, connected ambulance, wearable and implantable devices, and service robotics for assisted living with 5G

Drones Utilities

use quadcopter technology to transport blood from distributed blood banks to the hospitals and also from a hospital to another hospital.

Drones can be used to carry blood products to needed hospitals and rural areas.

system that work in coordination to ensure that the drone can achieve safe flight and provide medical aid into a cardiac arrest

Use of a Drone-Delivered Automated External Defibrillator in an Out-of-Hospital Cardiac Arrest.

Drone versus ambulance for blood products transportation

feasibility of medical unmanned aerial systems in suburban areas

Real-time breath recognition by movies from a small drone landing on victim's bodies

Optimizing the spatial location of medical drones

Improving Access to Automated External Defibrillators in Rural and Remote Settings:

Develop an Advanced First Aid System Based on an Unmanned Aerial Vehicles and a Wireless Body Area Sensor Network for Elderly Persons in Outdoor Environments

drones in mountainous regions: Optimal allocation of defibrillator

maximize the survival rate of sudden diseases by optimizing a multistage pharmaceutical logistics system and establishing a survival distribution model

Drones are a solution to speed up the delivery procedure of first aid kit in situations as Ambulance

getting stuck in traffic, (ii) War torn regions with limited medical supply .It can help reduce the risk of infection or the severity of the injury. Drones can assert timely delivery of essential first aid to people in not

easily accessible regions. If the ambulance is stuck in traffic, Automated drones can deliver personalized first aid kit to the user location so that the victim can be diagnosed by the remedy medicines with assistance of doctor using web app till the ambulance arrives to the victim location .

a drone ambulance which carries a medical kit contains a heartbeat sensor, ECG sensor which reaches the destination earlier than the normal ambulance. The doctor in the ambulance can analyze the real-time health parameters provided by the ECG sensor data .

an android application that collects data related to sound, gravitational force, pressure, speed, and location of the accident from the smartphone. The value of speed helps to improve the accident detection accuracy. The collected information is further processed for accident identification. Additionally, a navigation system is designed to inform the relatives, police station, and the nearest hospital. The hospital dispatches UAV (i.e., drone with first aid box) and ambulance to the accident spot

Security on the way:cybersecurity needs so that it is prepared to deal with potential attackers that may attempt to access locally available route controls and reroute the UAS to satisfy unauthorized objectives. It incorporates strong encryption for passwords and other credentials, a firewall, and a limited intrusion detection system.

taking imagery from on-scene incident and send the information back to an ambu-lance dispatch center and other related parties:

improves the decision-making process with regards to emergency response.

minimizing triage screening errors.

Quadcopter-Based Rapid Response First-Aid Unit with Live Video Monitoring

Robust Multi-Period Maximum Coverage Drone Facility Location Problem Considering Coverage Reliability

treatment for opioid overdoses, which could be significant given the current US opioid crisis

Get different health parameters of the patient: temperature, heart rate and pulse

DIFFERENCES

Drones can be easily deployed and have a relatively low operational cost. As such they could rapidly bring an AED next to the victim, irrespective of most geographical circumstances, give visual feedback and situational awareness to the EMS dispatcher and thus assist a bystander to provide better CPR
The key dimensions and related technologies for **drones** are aerial capacity (propulsion and battery),light control (control unit, artificial intelligence), position control (positioning, visual accuracy, sensor data), and communication (remote control and radio signal)
Drones Regulators are concerned about the safety, security, and privacy, in sensitive areas such as airports.

SIMILARITIES

Potencial of 5G with robots: support high-definition video, virtual reality, and other broadband data to large numbers of first responders. Surveillance drones or ambulances could also be provided high-speed connectivity along with machine-Type communication for remotely controlled robotic devices entering dangerous areas
Unmanned Aerial Vehicles (UAVs)/Drones, and , Robotics/Autonomous ground vehicles, with the Internet of Things (IoT), Big data, Artificial Intelligence (AI), and communication technologies used in screening, testing, contact tracing, spread analysis, sanitization, protocol enforcements can help prevent the COVID-19 spread.
an IoE-based architecture consisting of a heterogeneous team of cars and drones for enhancing situational awareness in autonomous cars, especially when dealing with critical cases of natural disasters.

INTREPID Pilots to test Drones and Robots:

Realistic Disaster Environments for Validation

The INTREPID end-users offer **privileged access to an exceptional set of pilot sites and resources,** to ensure the demonstration and evaluation of the project outcomes in a wide range of realistic disaster [§4]

- **France:** BMPM's CETIS Training Centre offers various structures to test extreme situations, including an industrial zone and a 4-story building with real fire and smoke simulation capabilities.
- **Sweden**: Stockholm metro (unused tunnels and stations at night) is available to SFBF to organise exercises and pilots for INTREPID.
- **Spain**: La Barranca or the National Protection School training sites are available for the project pilots.
- **UK**: Four internationally recognized training locations suitable for International Heavy USAR Teams and used for INSARAG Classifications can be used for the pilots
- **Belgium**: DSU has a dedicated training centre in Etterbeek with modular infrastructures suitable to recreate building settings. DSU can also exploit military or abandoned sites to organise tests and pilots.

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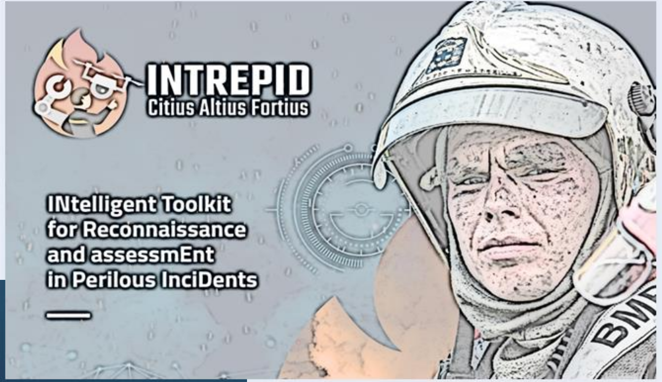
INTREPID

Citius Altius Fortius

Intelligent Toolkit for Reconnaissance and assessmEnt in Perilous Incidents



Thanks
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News technologies that improve the work of first responders in hostile environments:

Cognitive load assessment

MARTA ALVAREZ CALDERON

CLINICAL PSYCHOLOGIST SUMMA 112

Funded by the Horizon 2020 Framework Programme of the European Union

101021836 — RESCUER — H2020-SU-SEC-2018-2019-2020 / H2020-SU-SEC-2020
Project funded by: EUROPEAN COMMISSION - Research Executive Agency (REA)

Safety is a recurring concern for first responders (FR).

RESCUER is a project financed by the European Union (EU), developed within the framework of the European Agenda H2020

RESCUER aims to improve FR security through new technologies as augmented reality to increase sensations, auto-positioning and robust communications.

Cognitive load (CL) will be measured so that RESCUER improves the work of the FR without overloading them.

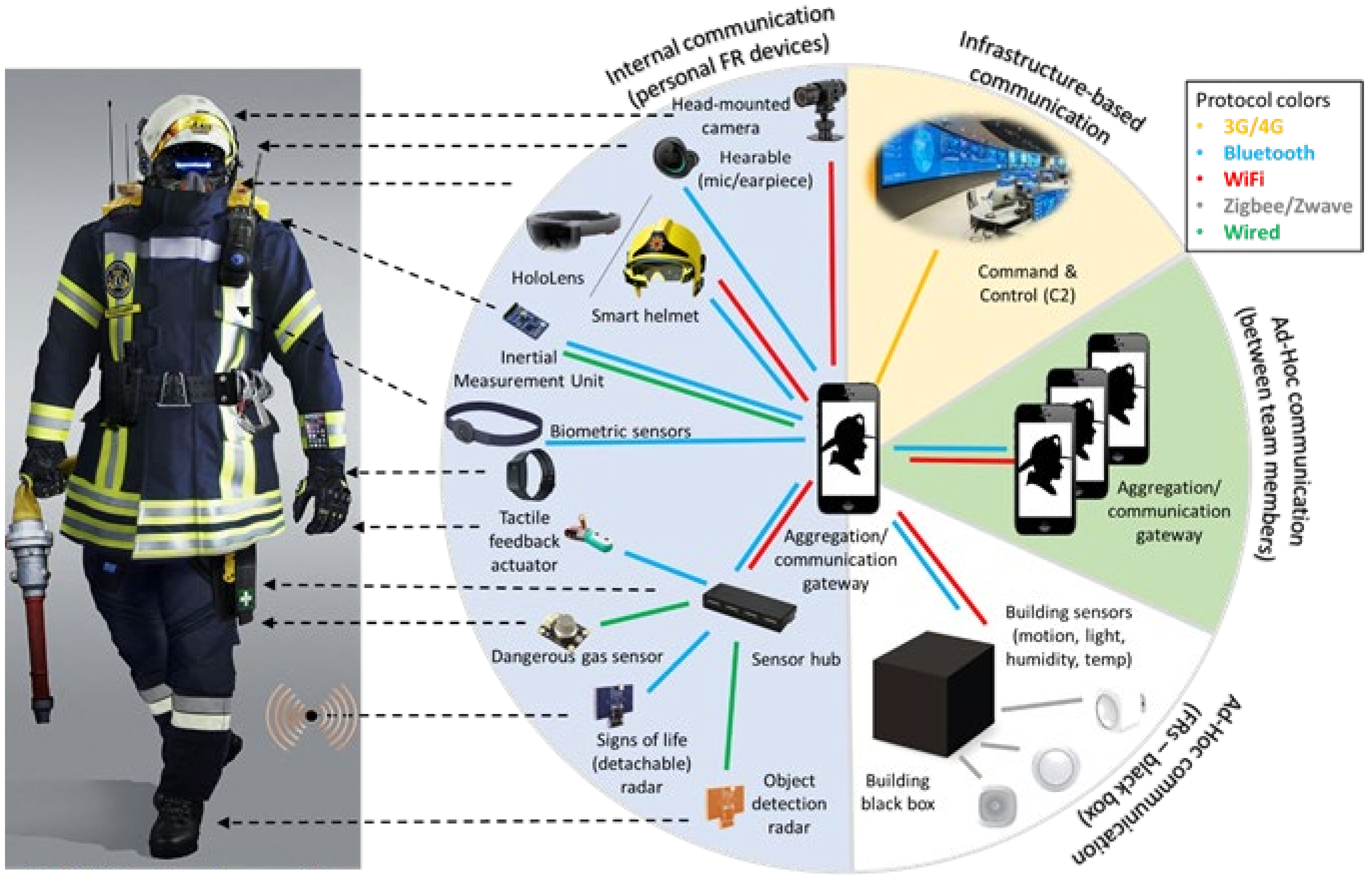

Figure 1: RESCUER's vision of HERO (left) and a concept diagram of devices and communications (right).

Enhancing sensing capabilities. Modules:

Augmented vision	• Cancelling of adverse weather and environmental conditions
Long way - IR camera	• Increase de situational awareness by providing an image of the environment.
Enhanced hearing	• Reduce environment noise while boosting speech or other important sounds
Augmented olfaction	• Identify dangerous gas substances in real-time. Alerts of concentrations of toxic gases in dangerous levels.
Radar sensin and remote touching	• Detect hazardous, moving or approaching, objects that may be either covered with smoke, fog...
Signs of life detection	• Capacity to infer about nearby life, in terms of breathing or light movements

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Project funded by: EUROPEAN COMMISSION - Research Executive Agency (REA)

Positioning and Orientation Capabilities:

Visual based self localization

- identify their location at any type of environment (GNSS / 360º cameras)

Inertial based localization

- inertial sensors: estimate the position (accelerometer) and orientation (gyroscope).

Perception of wireless devices for victim localization

- Discover wireless devices in the disaster zone and through them eventually making contact with victims.

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Project funded by: EUROPEAN COMMISSION - Research Executive Agency (REA)

Autonomous operations:

Ad hoc communication network

- Communication between the several perception tools carried by the FR will constitute a wired and/or Wireless Personal Area Network (PAN)

Data sharing orchestration

- What information is required and at what time.

Seamless communication with C2

- Information generated during an emergency will be also transmitted to a Command and Control (C2) Centre's operations room.

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Perception:

Information prioritization

- Prioritize the incoming information from the augmented sensing, positioning and orientation tools
- Preventing cognitive overload

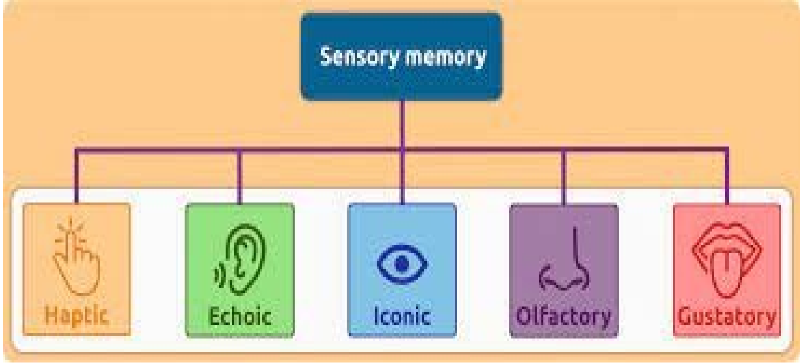
Cognitive load balancing

- Track of their vital signs and constantly assess cognitive load.
- Operate in optimal psychophysical conditions.

Cognitive load

Working memory (Cowan, 2010)

Sensory input



Short term memory

Working memory:

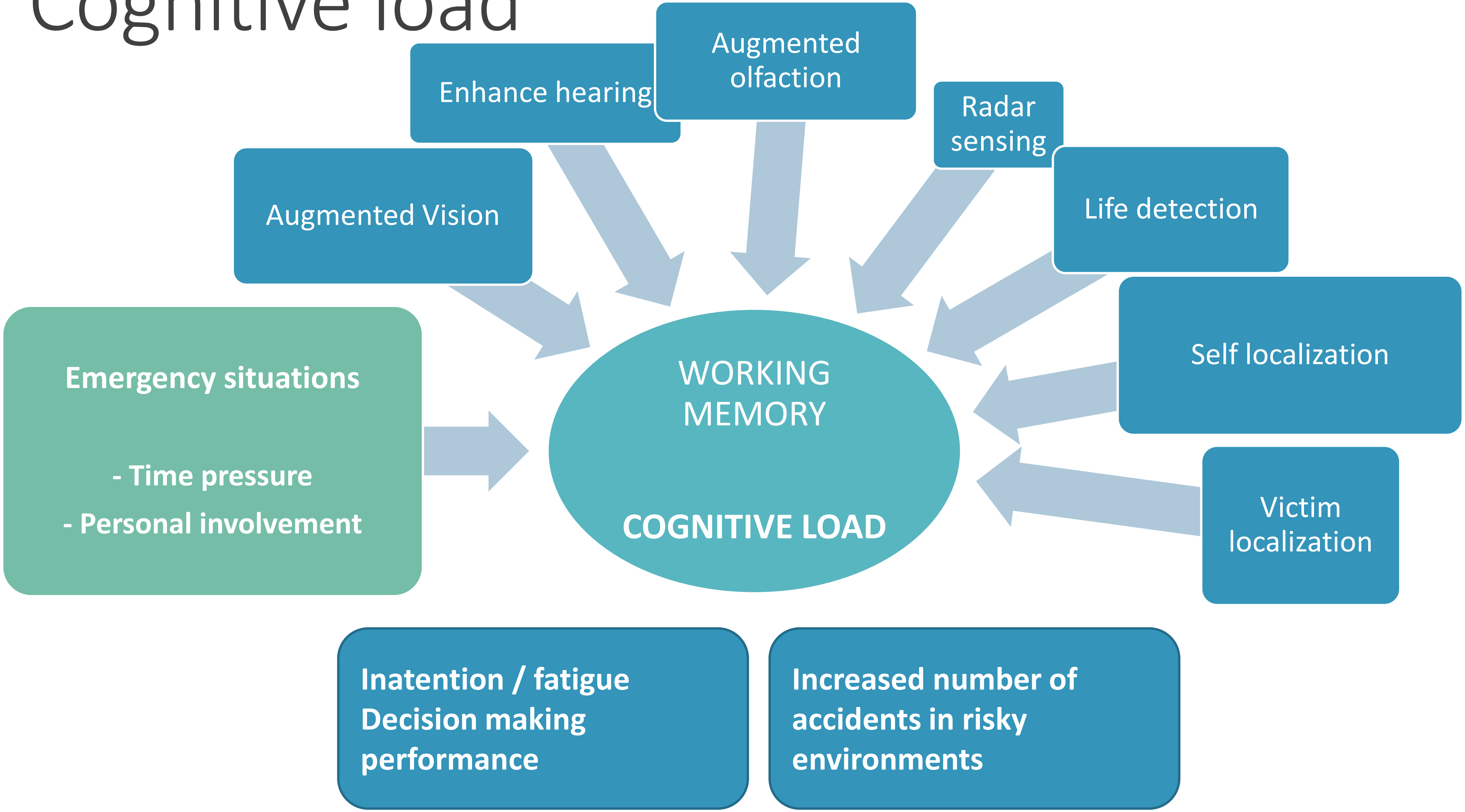
Control Processes

- decision making

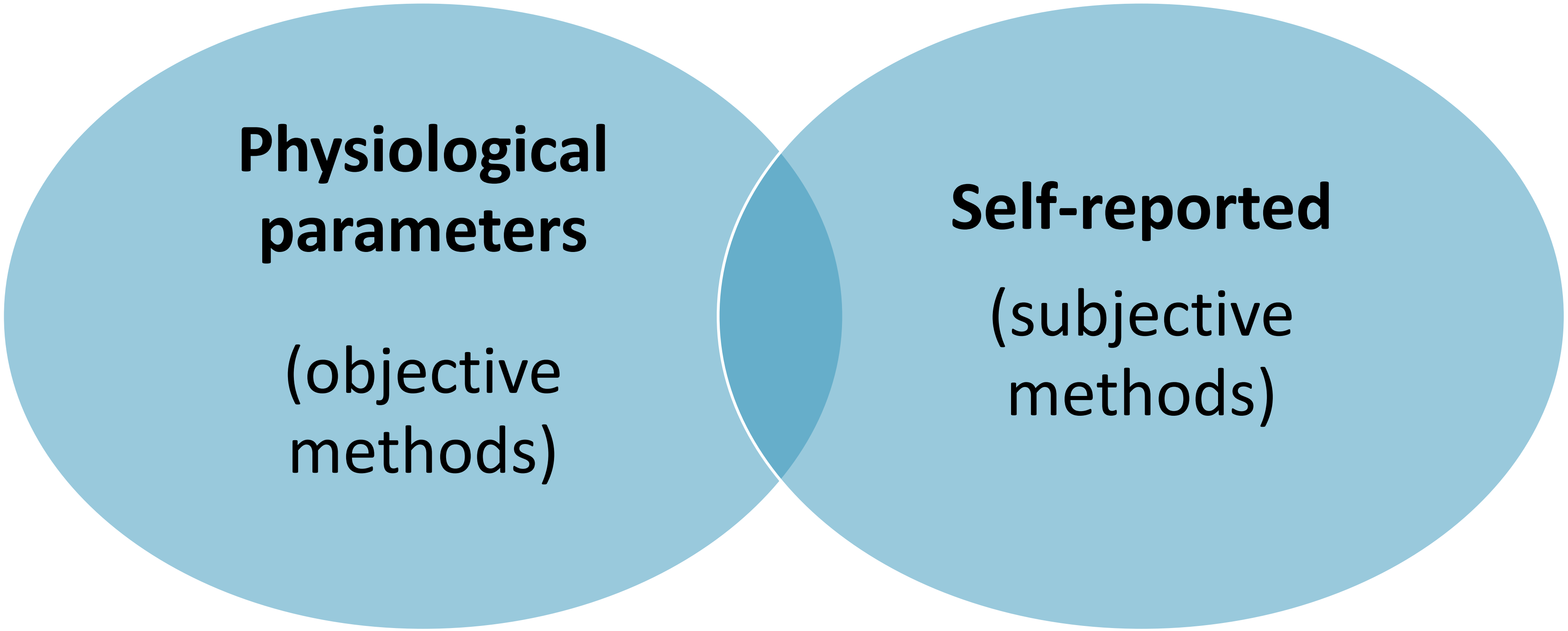
-strategies

Long term memory

Cognitive load



Cognitive load measurement



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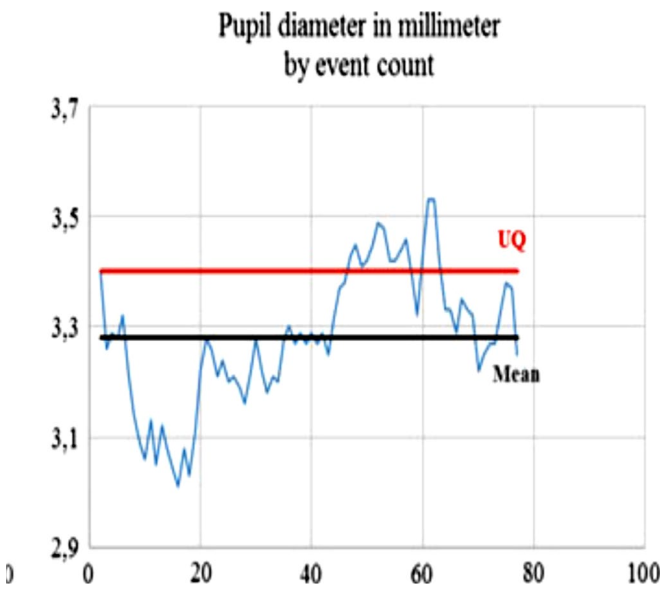
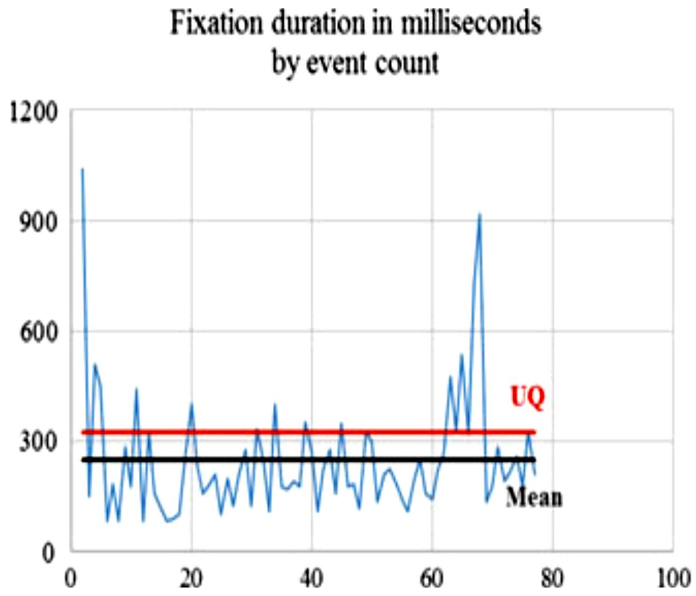
Cognitive load measurement

Physiological parameters

(objective methods)

- Heart rate variability
- Eye-tracking (blink rate)
- Eye-tracking (gaze/fixation)
- Eye-tracking (pupil dilation)
- Electroencephalography
- Functional near-infrared spectroscopy
- Skin conductance response
- Electromyography (masseter tone)
- Heat flux (facial temperature)





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Cognitive load measurement

Self-reported

Subjective (methods)

NASA Task Load Index (NASA-TLX)

Surgery Task Load Index (SURG-TLX)

Subjective Mental Effort Questionnaire (SMEQ)

Multiple Resource Questionnaire (MRQ)

Pass scale

Borg scale

Subjective Workload Assessment Technique (SWAT)

Dias, R. D., Ngo-Howard, M. C., Boskovski, M. T., Zenati, M. A., & Yule, S. J. (2018).

Cognitive load measurement

Physiological parameters

- HEART RATE
- SKIN CONDUCTANCE
- BODY TEMPERATURE

Emphatica E4 – Wristband

- BREATHING

Zephyr strap

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Cognitive load measurement

Physiological parameters

ELECTROMYOGRAPHY (EMG)

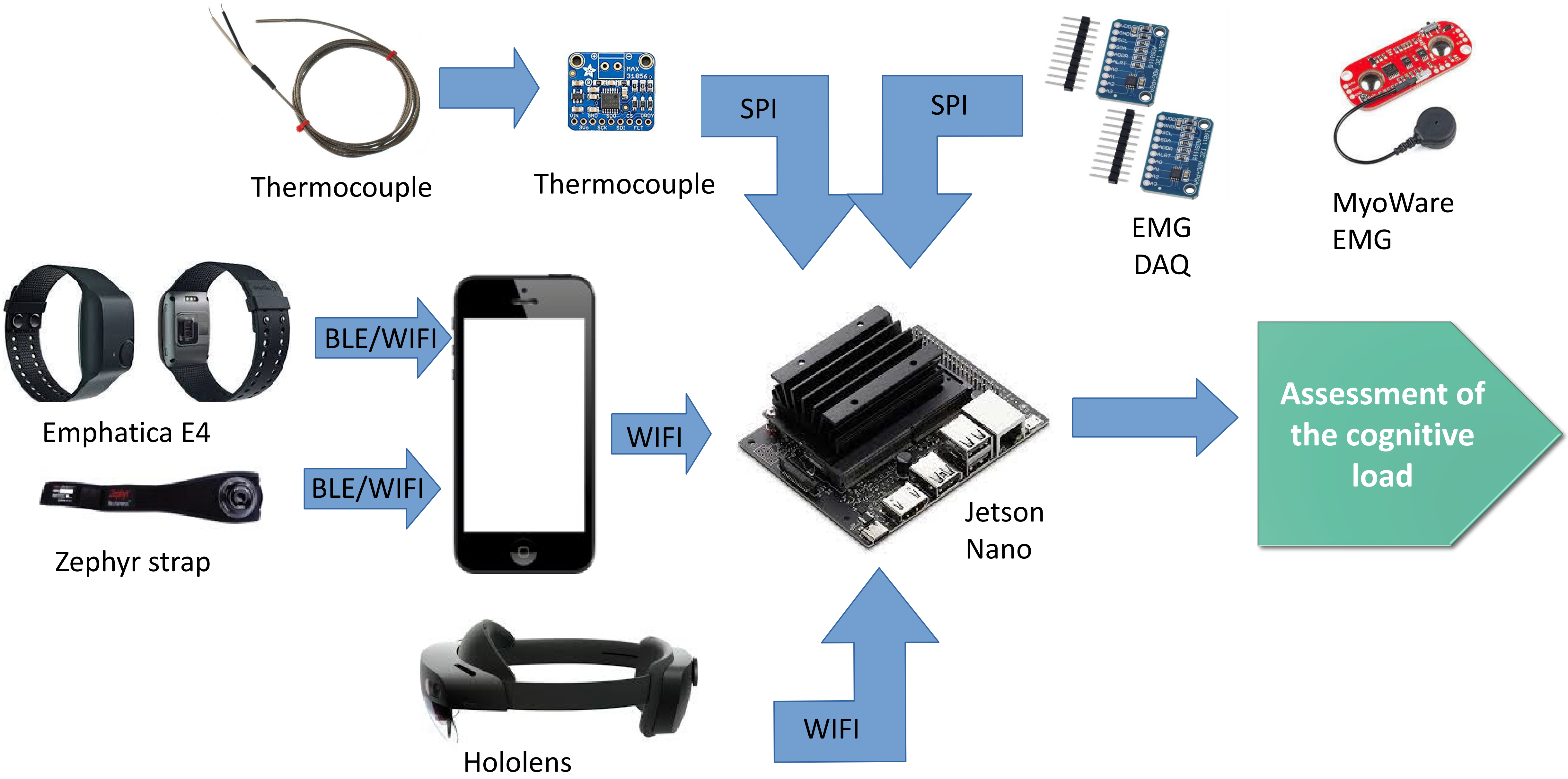
MyoWare Sensor

FACIAL TEMPERATURE

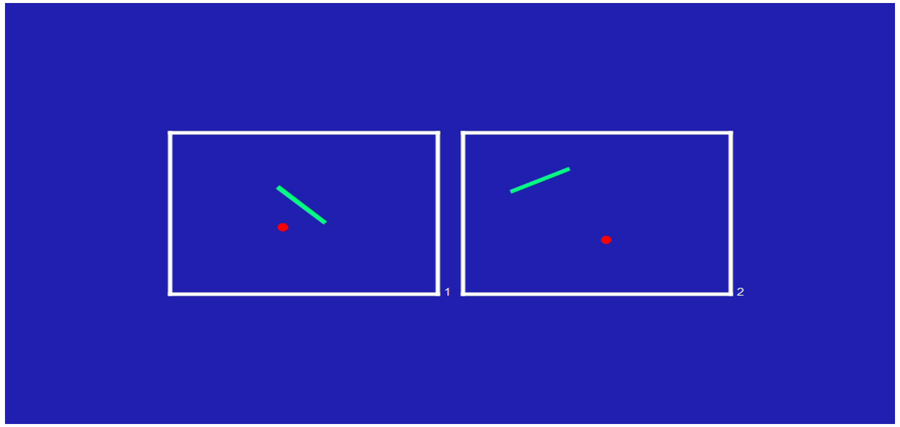
Thermocouple

EYE GAZE

Hololens 2 AR


Thermocouple
Thermocouple
SPI
SPI
EMG
DAQ
MyoWare
EMG
Emphatica E4
BLE/WIFI
Zephyr strap
BLE/WIFI
WIFI
Jetson
Nano
Assessment of
the cognitive
load
Hololens
WIFI

Physiological parameters



SkyTest®

Pilot and air traffic controllers Software

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RESCUER

Cognitive load measurement

Cognitive load measurement

Self-reported

(*post hoc*)

Subjective Rating Scales : NASA - TLX

- Perception of cognitive processes
- Validity in the measurement of perceived workload (Leppink, 2014).

NASA-Task Load Index (NASA-TLX; Hart and Staveland 1988).
Subjective, multidimensional and widely used evaluation

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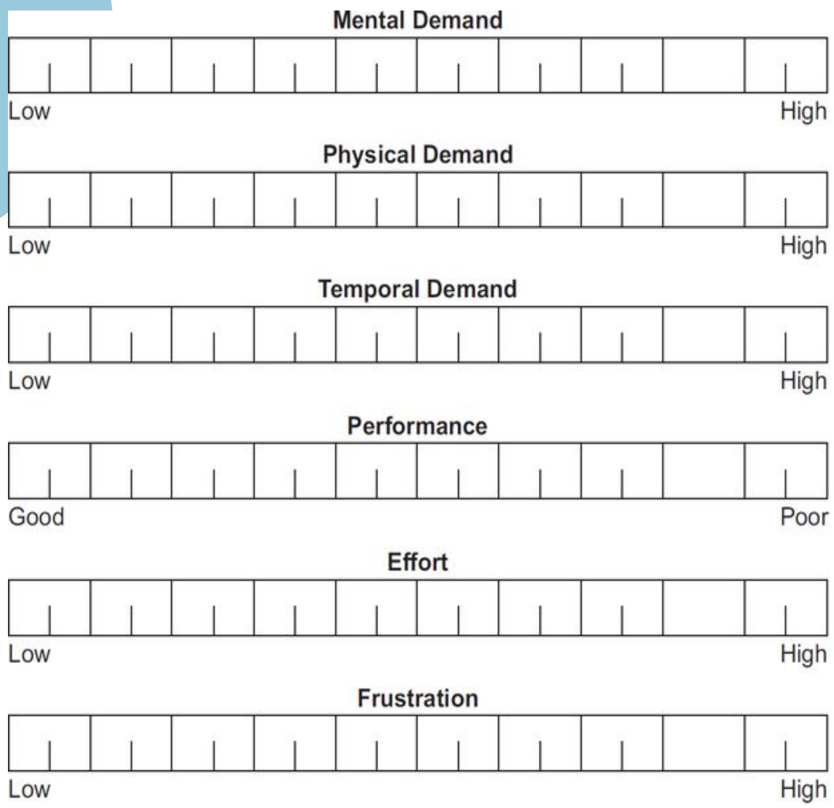
Cognitive load measurement

Self-reported

(*post hoc*)

Subjective Rating Scales : NASA - TLX



Mental Demand — Low / High

How much mental and perceptual activity was required (e.g. thinking, deciding, calculating, remembering, looking, searching, etc)? Was the task easy or demanding, simple or complex, exacting or forgiving?

Physical Demand — Low / High

How much physical activity was required (e.g. pushing, pulling, turning, controlling, activating, etc)? Was the task easy or demanding, slow or brisk, slack or strenuous, restful or laborious?

Temporal Demand — Low / High

How much time pressure did you feel due to the rate of pace at which the tasks or task elements occurred? Was the pace slow and leisurely or rapid and frantic?

Performance — Good / Poor

How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)? How satisfied were you with your performance in accomplishing these goals?

Effort — Low / High

How hard did you have to work (mentally and physically) to accomplish your level of performance?

Frustration — Low / High

How insecure, discouraged, irritated, stressed and annoyed versus secure, gratified, content, relaxed and complacent did you feel during the task?

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RESCUER

Cognitive load measurement

RESCUER

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Sky test. Pilot and air traffic controllers Software

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Commander
Vice-président de la S€D
Workshop VRISE 2022
07 / 06 / 2022

La guerre en Ukraine : opportunité ou menace pour une Défense européenne ?

Guerre en Ukraine : où en sommes-nous ?

- Status quo
- Globalement une défaite pour la Russie
- Pas d'issue prévisible à court terme
- Des conséquences « mondiales » dramatiques
- Un invraisemblable gâchis
- Au niveau stratégique, on rebat les cartes…
- La fin de Poutine et l'émergence d'un pouvoir encore plus radical ?

Défense européenne, une opportunité ?

- Augmentation des budgets de défense
- Harmonisation de la perception des intérêts stratégiques
- Opportunités de coopération militaire
- Emergence d’une conscience européenne ?

Défense européenne vs « armée européenne »

- Le « curseur »
- Ce que l'on peut standardiser
- Ce que l'on NE peut PAS standardiser

Défense européenne, les menaces

- Refus des nations de céder une part de leur souveraineté
- Approche économique variant de pays à pays
- « Concurrence » OTAN – Union européenne et attitude ambigüe des Etats-Unis
- BREXIT
- 27 nations membres : la tour de Babel (en attendant le pire…) To much is to much…

L’Eurocorps, une success story digne d’intérêt

- 6 nations « cadre », 4 nations « associées »
- 30 ans d’existence
- Strasbourg, tout un symbole
- Un remarquable niveau de standardisation
- Un commandement tournant
- Le quartier général de Corps d’armée le mieux équipé en Europe
- Un « palmarès » opérationnel impressionnant

La clé…

- Etats-Unis d’Europe
- Une Constitution européenne
- Une présidence tournante
- Des institutions solides, des processus décisionnels simples, souples (cfr opération « Artemis » - 2003)
- Une « conscience » européenne basée sur :
  - Des valeurs communes
  - Une perception commune des intérêts fondamentaux
  - La certitude que seuls, les pays européens ne pèsent pas dans un monde de plus en plus instable

Pour suite voulue…

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  - Leadership
  - Gestion de crise
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