ASSISTANCE

Adapted situation awareneSS tools and tallored training curricula for increaSing capabiliTies and enhANcing the proteCtion of first respondErs

European Commission

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Deliverable D1.7

Second Management Report

30/04/2021

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[1] PU: Public; PP: Restricted to other programme participants (including the EC services); RE: Restricted to a group specified by the Consortium (including the EC services); CO: Confidential, only for members of the Consortium (including the EC services).

ASSISTANCE

Nowadays different first responder (FR) organizations cooperate together to face large and complex disasters that in some cases can be amplified due to new threats such as climate change in case of natural disasters (e.g. larger and more frequent floods and wild fires, etc) or the increase of radicalization in case of man-made disasters (e.g. arsonists that burn European forests, terrorist attacks coordinated across multiple European cities).

The impact of large disasters like these could have disastrous consequences for the European Member States and affect social well-being on a global level. Each type of FR organization (e.g. medical emergency services, fire and rescue services, law enforcement teams, civil protection professionals, etc.) that mitigate these kinds of events are exposed to unexpected dangers and new threats that can severely affect their personal safety.

ASSISTANCE proposes a holistic solution that will adapt a well-tested situation awareness (SA) application as the core of a wider SA platform. The new ASSISTANCE platform is capable of offering different configuration modes for providing the tailored information needed by each FR organization while they work together to mitigate the disaster (e.g. real time video and resources location for firefighters, evacuation route status for emergency health services and so on).

With this solution ASSISTANCE will enhance the SA of the responding organisations during their mitigation activities through the integration of new paradigms, tools and technologies (e.g. drones/robots equipped with a range of sensors, robust communications capabilities, etc.) with the main objective of increasing both their protection and their efficiency.

ASSISTANCE will also improve the skills and capabilities of the FRs through the establishment of a European advanced training network that will provide tailored training based on new learning approaches (e.g. virtual, mixed and/or augmented reality) adapted to each type of FR organizational need and the possibility of sharing virtual training environments, exchanging experiences and actuation procedures.

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1   Executive Summary

This deliverable encompasses a summary of all the activities performed during the project second year. This document is based on the official template for the periodic reports in order to give a clear idea on what has been done and what activities have been performed by each partner.

The first section is related the objectives of the project and what of the activities performed have contributing to accomplish each of these objectives.

The document has also an individual chapter of each WP which is divided in the following sections:

- A brief description of the WP including the partners involved
- The objectives of the WP
- A description of all tasks active during the reporting period, where all activities performed in each task are summarized. In addition, at the end of each task description, a short summary of the activities performed by individual partners is also stated.
- Finally, a table including the deliverables submitted under each WP during the reporting period is stated along with other table showing the milestones accomplished under each WP.

After the WPs description sections the document have additional chapters showing different potential updates if they are applicable to this reporting period (e.g. Update of the plan for exploitation and dissemination of result (if applicable), Update of the Data Management Plan (if applicable) and Follow-up of recommendations and comments from previous review(s) (if applicable))

The next chapter shows potential Deviations from DoA (if applicable) in terms of manpower and budget and finally a table with all the meetings performed during the reporting period is shown.

List of Authors

Organisation	Authors
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Change control datasheet

Version	Changes	Chapters	Pages	Date
0.1	First draft	All	11	22/03/21
0.2	Internal version updated	All	15	28/03/21
0.3	Internal version updated	All	43	09/04/21
0.4	First Consolidated version	All	46	22/04/21
1.0	First final version	All	57	04/05/21
2.0	Final version	All	58	10/05/21

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List of Tables

Acronyms

ASSISTANCE	Adapted situation awareneSS tools and taIlored training curricula for increaSing capabiliTie and enhANcing the proteCtion of first respondErs
PC	Project Coordinator
D#.#	Deliverable number #.# (D1.1 deliverable 1 of work package 1)
DoA	Description of Action of the project
EC	European Commission
EU	European Union
GA	Grant Agreement
H2020	Horizon 2020 Programme for Research and Innovation
M#	#th month of the project (M1=May 2018)
WP	Work Package
IPR	Intellectual Property Rights
PSC	Project Steering Committee
PIC	Project Implementation Committee
PSB	Project Security Board
AB	Advisory Board
TL	Task Leader
WPL	Work Package Leader

2 Explanation of the work carried out by the beneficiaries and overview of the progress

2.1 Objectives and progress achieved during the reporting period

The main ASSISTANCE objective is twofold, on the one hand the project will **protect and help the different FRs organizations that work together during the mitigation of large disasters (Natural or Man-made)** and on the other hand ASSISTANCE will **improve the FRs capabilities and skills for facing these kinds of events.** This will be achieved by accomplishing the following operational objectives:

O1. To pay attention to the FRs expressed needs and preference during the proposal preparation phase in terms of useful information for increasing their capabilities and new sensors being mounted on unmanned platforms or integrated in their wearable equipment.

O2. To develop a novel SA platform, including the integration of UAV, Robots and drones' swarms and innovative modules that will enhance the FRs SA. These novel SA tools will be integrated in a complete SA platform that will be able to be adapted to the specific information needs of the different types of FRs organizations that cooperates during the mitigations of a big disaster (natural or man-made)

O3. To establish the core of an advanced training network based on virtual reality and/or augmented reality, which includes recognized FRs training institutions that form part of ASSISTANCE consortium along with a set of training curricula tailored to the needs of the different types of first responders (e.g. firefighters, sanitary staff, police, etc.) in order to improve their current capabilities.

O4. To provide robust network infrastructure for ensuring FRs and unmanned platforms connectivity during the mitigation operations. When it is not possible to have correct connectivity, the consortium will provide ad-hoc network performance capabilities based on drones' swarm to ensure the basic sensors and modules connectivity.

O5. To validate the project results in a cost-effective way under real conditions in a controlled environment through 3 pilots' demonstrations which will involve FRs from different organizations

O6. To measure the societal impact of the project and assure compliance with legal, gender and ethical EU principles and requirements, identify lacunae and hurdles and develop concrete recommendations to policy makers and FRs with the aim to improve the current level of protection for the FRs and increase their capabilities in a legal and ethical manner.

During the second year of the project the consortium has worked actively in all project objectives.

In WP3, T3.2 and T3.3 have been accomplished successfully and on time in this second year This WP has been one of the main inputs for accomplishing objective 4. All WP3 deliverables scheduled for the second year have been submitted on time.

In WP4, all tasks have been finished at the end of the second year according to the workplan and its deliverables have been submitted on time, except D4.5 and D4.3 which has been delayed for 6 months due to COVID 19 situation. (See more details in section 12). This WP has contributed to accomplish objective 2.

In WP5, all tasks have been finished at the end of the second year as scheduled and its corresponding deliverables have been submitted on time. This WP has contributed to accomplish objective 2 and objective 4

In WP6, task T6.3 have been accomplished successfully and on time. The project's VR platforms have been set up and the VR scenarios for the training sessions have been described and the theoretical training contents have been also developed in this task and the FRs of the different organizations have been selected and are performing the online training through the Moodle server. All the corresponding deliverables have been submitted. This WP contributes exclusively to accomplish objective 3.

In WP7 the first task (7.1) is ongoing and the validation plan describing all test to be performed during the integrated system test bed will be produced on time.

In WP8, all tasks are active from the very beginning of the project and all the scheduled deliverables have been submitted on time. Different activities on data protection, gender, societal impact and so on are currently on going. This WP will contribute exclusively to accomplish objective 6.

In WP9, the consortium has performed several dissemination and communication activities in T9.2, but the project dissemination objectives have been seriously affected due to the COVID 19, since all live events and congresses have been cancelled. Nevertheless, the consortium has put its efforts in producing scientific papers and articles as is described in the overall WP9 description. Regarding the rest of the WP9 tasks all of them are active now, since even T9.3 starts in M24 the consortium has decided to advance the standardization task activities. All the activities and deliverables of WP9 are under schedule and have been submitted on time.

1.1 Explanation of the work carried out per WP

1.1.1 WP1: Project management

This WP is in charge of the project management activities, which includes project coordination and representation, administrative project management, and coordination among work packages through the implementation of the project management structure and procedures, described in the DoA section

1.1.1.1 *Involved Beneficiaries*

This WP is led by <u>UPV</u> (project coordinator) and the whole consortium is involved in this WP

1.1.1.2 *Objectives for the second year of the project (01/05/2020 – 30/04/2021)*

The WP1 objectives are the following:

Objective 1: To establish efficient operation of all project bodies, including proper decision making and conflict resolution at all levels. This objective is related with T1.1

Objective 2: To organise overall project administration and supervision of financial flows as well as communication with EC and project reporting. This objective is related with T1.2

Objective 3: To ensure required quality of project work and its results as well as to perform self-assessment and corresponding project monitoring, including risk and opportunities management. This objective is related with T1.3

Objective 4: To provide necessary environment for collaboration within the consortium. This objective is related with T1.4

1.1.1.3 *Summary of progress towards objectives and details for each task for the project second year (01/05/20 – 30/04/21))*

Task 1.1: Project Management (M1–M36) - Leader: UPVLC

Contributors: The task is led by UPVLC, but the whole consortium is involved in some way in this task.

Overall Work progress for the task: this task is a horizontal task and therefore the 66% of the task has been performed at the end of the second year. The main activities performed under this task are the following:

Work performed: The coordinator has organized a plenary telco at least every three weeks during the whole second year of the project for having a control on the activities performed in each active task.

In addition, bilateral or sectorial telcos (e.g. WPx Members) have been organized in order to ensure proper accomplishment of the project results in concrete activities.

The coordinator has established a quality control procedure for deliverables in order to ensure the maximum quality of the submitted reports. This procedure has been performed with all deliverables submitted so far.

The coordinator organized the second project review, which was hold the 25th of March 2021.

Partners contribution: All partners have participated in the project teleconferences organized by the coordinator. All partners also have used GIT platform properly and the project deliverables have been submitted on time by the responsible partners.

All partners also participated in second project review and the preparation of the First Periodic Report providing the description of their activities from the very beginning of the project. In addition, the partners selected for the per review of the deliverables have performed their reviews properly and in due time.

Task 1.2: Administrative and Financial Management (M1–M36) - Leader: UPVLC

Contributors: The task is led by UPVLC, but the whole consortium is involved in some way in this task.

Overall Work progress for the task: this task is a horizontal task and therefore 66% of the task has been performed at the end of the second year. The main activities performed under this task are the following:

Work performed: The coordinator has managed the administration and supervision of the project financial flows. This includes collection and submission of all Financial Statements required at the end of the first reporting period.

The coordinator also has asked all partners financial quarterly reports in order to have an updated knowledge of the resources spent by each partner and detect whatever potential deviation in terms of effort spent. In addition, under this task, the coordinator has produced in the second year of the project D1.10 Second Cumulative report with the estimation of the costs per partner from 01/01/20 to 31/12/20.

Partners contribution: All partners have sent their quarterly reports information on time during the second year and have provided the necessary contributions for completing D1.10. All financial statements have been also received and submitted to the EC.

Task 1.3 End Users Group Coordination. (M1-M36) - Leader: AAHD

Contributors: The task is led by AAHD and internal and external end users participate also in this task.

Overall Work progress for the task: this task has three dimensions; communicating with previously formed Advisory Board, coordinating the project end users and formation of external End Users Group. Task 1.3 is related to other tasks explained below. Therefore; the work is not evenly distributed for every project year, 75% of the task has been performed at the end of the second year.

Work performed: 4 Members of AB contacted and invited to an online meeting through email before the second review. All of them accepted to participate in different time intervals; therefore 3 online meetings were executed. The online meeting program includes; a presentation of the Project overview and current status, afterwards discussions on;

- Human Factors
- Mitigation of risks stemming from COVID
- Expectations management
- Product commercialization

The AB Members were very interested and gave valuable feedbacks and they all declared that they would like to be informed about the upcoming improvements and demonstration pilots of the Project.

The ASSISTANCE Project Letter of Intent (LoI) were prepared for inviting external End Users (institutional or individual level) during the first year. Distribution of LoI has continued during the second year. So far 10 LoI has been collected.

The ASSISTANCE Project end user (first responder) partners were invited to Clustering Webinar on New Technologies for First Responders at 3rd of December 2020. This meeting brought an opportunity to cluster for all end user (first responder) partners to collaborate under granted DRS02 projects.

Partners contribution:

- RISE collected LoIs.
- Project End user were informed on task 1.3 activities and some of them provide feedback and questions for improving the task results. Also, external end users' organization such as the Dutch female firefighters' organization have been contacted and are participating in some of the project activities (e.g. online training, filling in project surveys).

Task 1.4 – Risk and opportunities management and quality assurance (M1 – M36) - Leader: RISE

Contributors: UPV, ETRA, TNO, PIAP, IFV, UC, AAHD and VAS

Overall Work progress for the task: This is a horizontal task and therefore approximately 67% of the task has been performed at the end of year 2. The main activities performed under this task are the following:

Work performed: The Risk and Opportunities Management Plan (ROMP) was reviewed to determine whether there was a need for modifications during the second year of the project.

No questions or challenges that could require changes to the ROMP have occurred during the past year, therefore there is no reason to make improvements or changes to it.

The R&O register has been kept up to date and is regularly reviewed to encourage the partners to be vigilant for new risks and opportunities and to understand the status of existing risks and opportunities. There have been six new risks and 8 new opportunities registered since D1.3 was submitted in M6.

The ROMP and the risks and opportunities register together form D1.4. Since there were no changes to the ROMP, only the updated R&O register was submitted (on time) as D1.4.

Partners contribution: All partners were given the opportunity to provide input and feedback for the ROMP and the risks and opportunities register. D1.4 was reviewed and the comments received were helpful.

Task 1.5 – Innovation Management (M1 – M35) - Leader: ETRA

Contributors: UPVLC

Overall Work progress for the task: This is a horizontal task and therefore approximately 66% of the task has been performed at the end of the second year. The main activities performed under this task are the following:

Work performed: Work on identification of several market opportunities. The Innovation Manager, and task leader, launched a technology watch workshop with representatives from each partner, coordinated with T9.1. To perform the technology and market surveillance, each partner provided the main topics of interest, such as Evacuation management software and Wearable sensors for FRs. The description and sources provided were used to define the hypothesis of surveillance and setup ETRA's in-house tool to automatically conduct periodic searches. This will be a core input to refine the innovation strategy and optimise the exploitation plan.

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Partners contribution: All partners were given the opportunity to provide their contribution to the technology watch activity.

1.1.1.4 *Deliverables and milestones planned for the period*

Deliverable number/name	S2R TD/WA addressed	Link to Exploitation Plan
D1.4 Risk & Opportunities Register 2	T1.4	NA
D1.9 First Cumulative Expenditure Report	T1.2	NA
D1.10 Second Cumulative Expenditure Report	T1.1	NA

Table 1 Deliverables submitted in WP1 during the second year of the project

1.1.2 WP3: Sensor abstraction service (SAS)

The main objective of this WP3 is to design and develop a Sensor Abstraction Service (SAS) whose main function is to meet the communication and data integration needs of ASSISTANCE project. SAS will provide the means to interface each one of the modules and the information exchange technologies specifications to achieve full interoperability among all ASSISTANCE modules.

1.1.2.1 Involved Beneficiaries

ETRA, UPVLC, THALES, PIAP, FADA-CATEC, TNO, VIASAT CH

1.1.2.2 Objectives of this WP for the second year of the project (01/05/2020 – 30/04/2021)

- Objective 1: Implement the interfaces defined in task 3.1 (Task 3.2).
- Objective 2: Designing a telecommunication architecture (Task 3.3).

1.1.2.3 Summary of progress towards objectives and details for each task for second year of the project (01/05/2020 – 30/04/2021)

Task 3.2 Sensor Abstraction Service Adapted Interfaces Implementation. (M10-M17) Leader: ETRA.

Contributors: UPVLC, TNO, PIAP, CATEC

Overall Work progress for the task: 100%. This task is finalized and the associated deliverable was submitted at due time on M17. A common data model has been implemented, enabling data exchanges between all pairs of Situation Awareness components. The protocols and technologies implemented allow for flexible data structures.

This key feature will enable in the future fast adjustment to the data exchange needs of each partner responsible for each SA module, thus accelerating the integration. Main developments and functional testing were reported in D3.2. Main achievements include:

- Updates in the data model to improve mission definition, sensor data definition, historical registry of sensors and telemetry, mapping and toxic plume definition.
- MQTT, API Rest, NATS and DDP technologies detailed definition and examples
- Definition of technologies needed by each module pair to perform data exchanges

Specific contribution from ETRA- Leadership of task 3.2, writing of deliverable D3.1 and major contribution implementing all mechanisms for the exchange of information within the ASSISTANCE platform.

Specific contribution from UPVLC, TNO, PIAP, CATEC- Support to task leader and maintain regular telcos for achieving a consistent data model based on the needs of each technical partner in charge of the SA modules development.

Specific contribution from MIR-PN and AVSRE- Reviewers of the deliverable.

Task 3.3 Robust Mobile Communications. (M10-M17) Leader: <u>VAS</u>.

Contributors: UPVLC

Overall Work progress for the task: This task has been finished successfully according to the schedule M17. This task has provided the design of a telecommunication architecture based primarily on information security, data privacy and cybercrime risk reduction, identifying proper telecommunication equipment that respond to the security needs identified in the project, defining the procurement plan for network equipment and implementing the solution as identified by the project.

The work has been completed and reported in D3.3. Between other minor activities the main achievements are:

- Design of the communication architecture aligned to assistance program requirements (few iterations and presentations to the consortium until we got what was needed)
- Design of Ka band mechanical steering horn array antenna updates for land communication on the move
- Design of Fail Over System Ka – LTE for communication disruption avoidance
- Design of L2-L3 communication infrastructure
- Design of cloud infrastructure and fusion hub
- Design of Last Mile manet solution for broad band communications on the field
- Design of LAN access Ethernet – WiFi for integration with Assistance Partners
- Design of Helikite system for obstacle avoidance
- Design of L3 Security Infrastructure between the Communication Hub and the C2 Center
- Design of a nomadic set up version for demo purposes with self-deployable and fix Ka band antennas
- Preliminary Lab Set Up and Testing

Specific contribution from UPV: to maintain different telcos with the task leader for ensuring that the communication solution provided accomplish the end user requirements and also checking that the D3.3 content was in line with the expected and stated in the DoA.

1.1.2.4 Deliverables and milestones planned for the period in this WP

Deliverable number/name	S2R TD/WA addressed	Link to Exploitation Plan
D3.2 Sensor Abstraction Service Implementation	Task 3.2	This deliverable is based on the interfaces' definition provided in D3.1. The Sensor Abstraction Service (SAS) is a key development that enables communications between all SA modules, therefore it is an exploitable result with high potential.
D3.3 Robust Mobile Communications	Task 3.3	The proposed communication solution included in D3.3 could be one key exploitation result (KER) for VAS as an innovative and robust communication solution for being used by the FRs during real emergency operations.

Table 2 Deliverables submitted in WP3 during the second year of the project

Milestone number/name	Submission date vs planned	2 lines Milestone description / and reasons for delay (if applicable)
MS3 SAS ready for testing	Submitted M17 Planned M17	The SAS has been completely developed and it is ready for starting the integration tests among the different ASSISTANCE modules and devices.

Table 3 Milestones accomplished in WP3 during the second year

1.1.3 WP4: Unmanned platforms & wearable sensors

WP4 focuses on unmanned platforms management and adaptation. These innovative platforms will replace humans for accessing the dangerous zones and will provide valuable information through the sensors integrated for increasing the SA and further planning.

1.1.3.1 Involved Beneficiaries

PIAP, UPVLC, THALES, AVSRE, FADA-CATEC, TNO, VIASAT CH, CNBOP-PIB

1.1.3.2 Objectives of this WP for the second year of the project (01/05/2020 – 30/04/2021)

- Objective 1: to select and adapt the most suitable platforms to meet the requirements and be ready to host additional devices, e.g. chosen sensors.
- Objective 2: to design means for platforms' control devices to provide the pass-through for the information necessary for the SA.
- Objective 3: to propose solution considering a modular approach and interoperability of payload

1.1.3.3 Summary of progress towards objectives and details for each task for the second year of the project (01/05/2020 – 30/04/2021)

Task 4.1 Unmanned Platforms Selection & Adaptation (M7-M13)

Contributors: *CATEC, PIAP, VAS, CNBOP*

Overall Work progress for the task: This task has finished on time and all of its objectives has been accomplished. During this task the selection and adaptation of aerial unmanned platform (CATEC) and the ground unmanned platforms (PIAP), according to the selected sensors that will be integrated, has been performed.

Description of adaptations and modifications performed in the unmanned platforms to fulfil the requirements defined in WP2 are stated in D4.1.

- **Specific contribution from CATEC**: Selection and adaptation of aerial unmanned platform. Leading and coordination of the task and the deliverable D4.1
- **Specific contribution from PIAP**: Selection and adaptation of ground unmanned platform.
- **Specific contribution from CNBOP:** Selection of own sensors (Atmosphere quality sensors) for being installed in the unmanned platforms.
- **Specific contribution from VAS:** Discussing the network characteristics for transmitting the information from sensors integrated in unmanned platforms

Task 4.2 UAV Management and sensors integration (M13-M21) Leader: <u>CATEC</u>

Contributors: UPVLC, AVSRE, VAS, CNBOP

Overall Work progress for the task: 100% completed, during this task the aerial unmanned platforms from CATEC are adapted to the ASSISTANCE architecture regarding software integration and GCS. The main achievement is that the sensors have been integrated in the drones and are able to send data to the SAS, as long as the flight data telemetry. Apart from that, the GCS is adapted to receive missions from the SAS.

In the last month of this task (M21), the deliverable D4.2 where these integrations and modifications to drones and GCS have been described is compiled and submitted on time.

- **Specific contribution from CATEC**: Leading and coordination of the task and the deliverable D4.2 UAVs integrated into the system
- **Specific contribution from UPVLC**: UPVLC has collaborated by requesting to receive certain telemetry data necessary for advanced functionalities, having verified the reception of said data through the SAS.
- **Specific contribution from AVSRE:** TBC
- **Specific contribution from VAS:** VAS has collaborated sending missions from the MMM in order to be received by the GCS and then to the drone.
- **Specific contribution from CNBOP:** As part of this task, CNBOP-PIB acted as a supporting partner with knowledge of the use of UxVs. Moreover, CNBOP-PIB gathered information and help in the integration of the ATMOL FL sensor with various UxV.

Task 4.3 Robots Management and sensors integration (M13-M27) Leader: <u>PIAP</u>

Contributors: UPVLC

Overall Work progress for the task: This task should be finished in M21, but it has been delayed for 6 months until the end of July 2021 (M27) due to problems with PIAP supply chain and various delays and restrictions resulting from the COVID 19 pandemic. The main developments that were achieved until M21:

- Development of thermal camera based on KTL
- Design and creation of thermal camera communication electronics and low-level software
- Design and creation of thermal multi-variant power electronics
- Integration of gas laboratory sensor provided by CNBOP-PIB
- Design and creation of digital electromagnetic field sensor with additional electronics
- Design of electronics for MG811 gas sensor
- Started integration of created/adapted sensors
- Development and adaptation for UGV video server

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- JAUS interoperability standard upgrade
- Implementation of JAUS-SAS adapter software
- Development of GCS project specific modules – relay and context manager

Specific contributions from UPV: Participation in research discussions and review of the scope of enhanced task developments

Task 4.4: Wearable Sensors Integration. (M10-M21)

Contributors: <u>UPVLC</u>, TNO, VAS

Overall Work progress for the task: This task has been successfully finished in M21 as scheduled. All the necessary wearable sensors for covering the end users' requirements in this topic have been selected and integrated in the overall ASSISTANCE system through the SAS. All the work performed in this task is described in detail in D4.4, which has been submitted on time.

Specific contribution from UPVLC: UPV has led and coordinated the task. In addition, UPV has selected the wearable sensors for providing FRs vital signs and the wearable cameras. All these sensors have been integrated in the SAP through the SAS in order to provide information from the FRs deployed on field such as; vital signs, temperature and video flows.

Specific contribution from TNO: TNO has selected and implemented the more suitable approach for providing GPS location of the FRs deployed on field. This solution is very flexible in terms of different GPS sensors integration including the use of the GPS location provided by the FRs smart phones.

Specific contribution from VAS: VAS has reviewed the connectivity characteristics of the wearable sensors and also has provided a deep review of the deliverable 4.4.

Task 4.5: Drones' advanced capabilities (M10-M27)
Contributors: *CATEC*

Overall Work progress for the task: This task should be finished in M21, but it has been delayed for 6 months until the end of July 2021 (M27) due to problems in the CATEC suppliers and mobility in Spain for the COVID 19 pandemic. The current status of the task is as follows: 55% of the task has been completed so far. This task is split in two subtasks:

- Subtask 4.5.1: Captor UAVs/Drones for malevolent drones' neutralization: FADA-CATEC is working in simulation environment for the development of efficient aerial neutralization trajectories. Advanced guidance algorithms for efficient aerial interception trajectories is being developed. Apart from that, detection and identification algorithms for drones based on vision camera data are being investigated.

- Ad-hoc network coverage using drones' swarm: working in simulation environment in an efficient solution of network coverage using a swarm of drones and preparing an experimental setup for practical tests. Provision of a continuous coverage strategy that rotates the swarm's drones based on their autonomy.

Specific contribution from CATEC: Leading, coordination and development of the solution of the task.

Task 4.6 Mission management (M10-M21). Leader: VAS Participants: THALES, PIAP, CATEC, CNBOP

Overall Work progress for the task: This task started in M10 and concluded in M21. The work has been completed and reported in D4.6. Between other minor activities the main achievements are:

- Requirements for mission definition regarding mission area, drone restrictions and maneuverability
- Architecture design of all modules that we have to develop in Mission Management Modules
- Design review with THALES
- Definition of messages exchanged inside this task
- Definition of messages exchanged with SAS
- Development of the module "Mission Planner Management"
- Unit tests for the module "Mission Planner Management"
- Development of the module "Optimized Mission Computation":
- Bibliography on centralized multi agent task allocation algorithms
- Development of centralized multi agent task allocation algorithm
- Development of a path planning algorithm based on fast marching
- Unit tests for the module "Optimized Mission Computation" on 3 scenario
- Tests with THALES between our modules "Mission Planner Management" and "Optimized Mission Computation"
- Preliminary integration tests with SAS
- Review of deliverable D4.6

Deliverable number/name	S2R TD/WA addressed	Link to Exploitation Plan
D4.1 Adapted unmanned platforms	Task 4.1	This deliverable utilizes inputs from T2.2 and T2.3 to decide which aerial and ground platforms are selected, which will be used in the pilot demonstrations in WP7

D4.2 UAVs integrated into the system	Task 4.2	This deliverable utilizes inputs from T4.1 regarding the autopilots and sensors selected for the project. It is the base of the integration of drones within the rest of ASSISTANCE system
D4.3 Robots integrated into the system (DELAYED 6 MONTHS)	Task 4.3	Delayed for 6 months till the end of July 2021.
D4.4 Wearable Sensors integrated into the system	T4.4	The results described in this deliverable are one of the main key exploitation results stated in the updated exploitation plan.
D4.5 Advanced UAVs capabilities (DELAYED 6 MONTHS)	T5.4	Delayed for 6 months till end July 2021.
D4.6 Mission planner	T4.6	This deliverable provides the description of the Mission Management Module and is an important piece of ASSISTANCE, which could be commercialized as stand-alone or as part of the overall system.

Table 4 Deliverables submitted in WP4 during the second year of the project

Milestone number/name	Submission date vs planned	2 lines Milestone description / and reasons for delay (if applicable)
MS4 Unmanned platforms and control devices integrated	Submitted M21 Planned M21	All ASSISTANCE unmanned platforms (Drones and Robots) have been completely and successfully integrated into the overall ASSISTANCE system providing to the FRs different kind of information. (e.g. video flows, measurements from sensors, platforms location, etc).

Table 5 Milestones accomplished in WP4 during the second year

1.1.4 WP5: Adapted Situation awareness & communications

1.1.4.1 *Involved Beneficiaries*

UPVLC, ETRA, THALES, PIAP, TNO, UC, VAS

1.1.4.2 *Objectives of this WP for the second year of the project (01/05/2020 – 30/04/2021)*

The main objectives of this work package will be the following:

- Objective 1: To develop innovative SA capabilities/modules that could be integrated in the selected SA platform in order to provide FRs new tools for performing their work in a more secure and efficient manner according to their needs expressed during the proposal preparation.
- Objective 2: To integrate all the new capabilities/modules developed in a complete SA platform adjusted to the information needs of each type of FRs' organization.
- Objective 3: To integrate and visualize, according to the profile of each FRs organization, the information provided by all sensors deployed on field (mounted on unmanned platforms or on the FR personal equipment) through the SAS.
- Objective 4: To provide robust network infrastructure based on innovative mobile and SAT on the move technologies to all FRs organization that cooperate during the mitigation of a big disaster.

1.1.4.3 *Summary of progress towards objectives and details for each task for the second year of the project (01/05/2020 – 30/04/2021)*

Task 5.1 ASSISTANCE SA platform adaptation. (M8-M16) Leader: UPVLC

Contributors: ETRA, PIAP

Overall Work progress for the task: The task finished in M16 as scheduled. All developments were performed according to the task description stated in the DoA. The GESTOP system core and its pre-existing modules were adapted for providing new services and different information visualization to the FR units connected. In addition, new capabilities such us the information visualization filtering, the inclusion of areas and polygons, etc.) were developed for completing all SAP features stated. On the other hand, different kind of interfaces were developed by different partners for finishing the adaptation of the final Situation Awareness Platforms (SAP).

- **Specific contribution from UPV:** UPV has performing all development tasks for adapting the GESTOP core, the pre-existing modules and providing different visualizations modes. In addition, UPV has developed new features for completing the SAP according to the requirements stated in D2.2.

- **Specific contribution from ETRA:** ETRA has prepared the necessary interfaces with the SAP in order to integrate correctly all new modules and sensors. This interface preparation is in line with T3.1 and T3.2 where the final interfaces were designed and developed.
- **Specific contribution from PIAP:** PIAP has developed the necessary interfaces for integrating the UGV and its mounted sensors in the SAP environment.

Task 5.2 SA advanced modules development. (M8-M21) Leader: ETRA

Contributors: UPVLC, TNO, PIAP, UC.

Overall Work progress for the task: The task has finished in M21 as scheduled and all developments have been accomplished according to the DoA description.

During this task, the new modules to be integrated with the SAP have been developed and/or adapted for forming part of the overall ASSISTANCE system and provide new capabilities for the FRs. Each of these new modules have been developed under a single sub-task. The subtasks that compose T5.2 are the following:

Sub-Task 5.2.1 Augmented Video Fusion. Leader UPVLC

UPVLC has finished the necessary developments of this module as scheduled. Nevertheless, the initial test with real data from the UAVs needed for testing the module correct performance could not be performed on time due to the COVID-19 situation in Spain. CATEC could perform flight tests with some weeks of delay with its UAVs, since the company facilities was closed and therefore the necessary data for testing the module capabilities could not be obtained until the situation was normalized. UPVLC and CATEC are currently finishing the testing process during the integration phase in order to avoid any delay in this subtask. The detail description of the video fusion module development is stated in D5.2.

Sub-Task 5.2.2 CBRN Hazard Evolution. Leader TNO

TNO has finished the developments of this module as scheduled. The work was carried out in a stepwise approach, with first an initial implementation of a basic dispersion hazard model for hazard prediction, and incrementally refining of the model. After implementing the initial dispersion hazard model, it was improved by adding a scenario module (which takes the uncertainty of inputs into account) and the data fusion module (which reduces uncertainty by dynamically integrating the measurements of the environment). Furthermore, real-time weather (wind) information has been added to the model. The model has been linked to a new web-based GUI. End-users were regularly involved in the design of the system by means of workshops, interviews, and usability tests. Communication with the SAS has been implemented and integration tests have been conducted to ensure proper communication with the SAP (Situational Awareness Platform).

Furthermore, a literature research has been conducted regarding the visualization of uncertainty for cloud prediction. Different visualization types have been prototyped and evaluated to determine which kind of visualization best supports users in understanding the implications of the spread of the gas. In addition, information sharing and task allocation mechanisms for the CBRN team have been modelled, focusing on the first responders, to establish actionable situation awareness (e.g., adjustable work agreements on informing and advising first responders on the hazard). The detailed description of the module is given in D5.2.

Sub-Task 5.2.3 Damaged Assets Location. Leader ETRA, participant UC

All necessary developments have been completed as scheduled. ETRA and UC developed a Damaged Assets Location and Routing (DALR) module that leverages real-time images provided by cameras and drones/UAVs to support decision making processes of first responders. ETRA and UC performed autonomous developments that interact with each other through the exchange of information regarding the status and location of damaged assets and routes. All key features, including identification of damaged assets, route calculation for intervention and evacuation purposes, evacuation algorithms and re-routing mechanisms were accomplished and are included in detail in D5.2 (M21).

Sub-Task 5.2.4 Portable SA platform. Leader UPVLC, participant PIAP

UPVLC performed the necessary developments for the adaptation of the main SAP for being run in mobile devices like rugged tablets. This adaptation implies to review some of the interfaces and PIAP has adapted the UGV interfaces to the mobile device. This subtask was finished on time in M21 and all its activities were described in detail in D5.2.

Specific Contributions:

- UPVLC performed all necessary developments for implementing both augmented video fusion module and the portable SA platform as described above.
- ETRA led the whole task and developed the damaged assets location and routing module as described previously
- PIAP adapted the necessary interfaces for integrating the UGV in the mobile SAP environment.
- UC worked along with ETRA in the developments of the damaged assets location and routing module as described in the DoA. UC developed a tool for managing mass evacuations including the calculation of evacuation routes, the optimal location of shelters and the evacuation time process. UC developed different pedestrian and vehicular evacuation models integrated in the tool and also traffic models to manage transit time and routing interactions.

- TNO has developed the CBRN hazard evolution module as described above and under the schedule.

Task 5.4 Advanced Modules, SAS & Communications Infrastructure Integration in ASSISTANCE SA Platform (M19-M24) Leader: UPVLC

Contributors: ETRA, THALES, TNO, PIAP, UC, VAS

Overall Work progress for the task: The task has finished at the end of the second year of the project. In this task UPV has coordinated the integration tasks programing bilateral technical meeting with different partners for testing modules integration. The different interfaces developed in D3.2 has been used for exchanging the real or synthetic information for fine tuning each bilateral integration process. At the end of the second year all ASSISTANCE modules have been tested several time and the overall integration is finished.

- **Specific contribution from UPV:** Coordinate the integration activities and perform its own integration test for its modules.
- **Specific contribution from ETRA:** Integration tests of the SAS data model are being performed in order to find gaps in the data exchange compatibility with the SA modules. These tests will continue in T7.2 Integrated System Test Bed and finally reported in D7.2.
- **Specific contribution from TNO:** Perform different integration test with different partners for finishing the CHT integration into the ASSISTANCE system.
- **Specific contribution from VIASAT and THALES:** Perform different integration test with different partners for finishing the MMM integration with the GCS of the UxVs.

Deliverable number/name	S2R TD/WA addressed	Link to Exploitation Plan
D5.1 ASSISTANCE SA platform adaptation	T5.1	ASSISTANCE SAP is one of the main key exploitable results (KER) stated in D9.2.
D5.2 ASSISTANCE SA advanced modules development	T5.2	All ASSISTANCE advanced modules: Video Fusion, CHM, DAL&R and Mobile SAP are also importamt KERs stated in D9.2
D5.3 Robust Land Mobile Communications Infrastructure Development	T5.3	The overall hardware and software configuration for providing connectivity to the FRs in hostile environments during the emergency operations is an important KER of ASSISTANCE.

D5.4 Final SA Platform Integration	T5.4	In this deliverable the whole integration process of the ASSISTANCE SA platform different elements has been finished and the first ASSISTANCE prototype is ready.

Table 6 Deliverables submitted in WP5 during the second year of the project

Milestone number/name	Submission date vs planned	2 lines Milestone description / and reasons for delay (if applicable)
MS5 ASSISTANCE communication network ready	Submitted M21 Planned M21	The ASSISTANCE communication network has been completely and successfully tested and is ready for providing connectivity to the FRs during the project pilots.

Table 7 Milestones accomplished in WP5 during the second year

1.1.5   WP6: Advanced training network based on virtual and augmented reality

This WP is in charge of establishing a training network between the ASSISTANCE partners based on virtual and mixed reality tools

1.1.5.1   *Involved Beneficiaries*

<u>IFV</u>, UPVLC, RISE,CNBOP,AAHD

1.1.5.2   *Objectives of this WP for the second year of the project (01/05/2020 – 30/04/2021)*

The objective of WP6 is to establish the core of an advanced training network based on virtual reality and/or mixed reality, which includes recognized FRs training institutions that form part of ASSISTANCE consortium along with a set of training curricula tailored to the needs of the different types of first responders.

In order to achieve this objective WP6 has the following operational objectives:

- Objective 1: To develop training scenarios and setup of VR platforms (WP 6.3 M12-M23)
- Objective 2: To establish the training network and pilot's evaluation (M23-M34)

1.1.5.3   *Summary of progress towards objectives and details for each task for the second year of the project (01/05/2020 – 30/04/2021)*

Task 6.3 Training scenarios selection and platform set up (M12-M23) Leader UPVLC,

Contributors: RISE, IFV, OSPOM, CNBOP.

Overall Work progress for the task: This task finished in M23 and during the task the main VR scenarios to be performed during the project pilots and also the ones that will be performed on line during subject 5 have been described in detail and published in subject 4 for being learned. Different Mentors have been selected for helping the FRs during their training process in the Moodle server. Also, during this task, the 3 different VR platforms have been set up and will be ready for starting the practical part of the training (Subjects 5 to 8). Finally, in this task has been stated the training schedule for the selected FRs, which are performing the training. All activities performed during the task will be included in D6.3, which will be submitted at the end of March 2021.

Specific contribution from UPV: UPV has led the task and coordinated all its activities. In addition, UPV has prepared their VR platform in order to be ready for the practical training. In addition, UPV members have performed mentoring activities in different subjects through the Moodle server

Specific contribution from RISE: RISE has contributed with input to the theoretical training subjects 1 to 4 and mentoring activities for students conducting subject 1 and 2. RISE has also contributed to the evaluations of the training methodology, e.g. by questionnaires. RISE based this work on literature reviews on the topics of AI training and validation of web-based training and education.

RISE has been part of pre-tests of user tests and contribute with insight from research regarding human factors and usability

Specific contribution from SBFF: SBFF have successfully started or completed VR online training on Moodle server. SBFF provided 10 firefighters (6 male and 4 female) for performing this online training.

Specific contribution from MIR-PN: MIR-PN have successfully started or completed VR online training on Moodle server. MIR-PN provided 3 firefighters (3 male) for performing this online training.

Specific contribution from IFV: IFV has contributed with input on how to achieve the best results for this task. During this period IFV has been working on the production of training content, mainly for the courses 1,2,3,4,5. We also used the time to adapt our virtual reality platform to the specific needs for achieving the ASSISTANCE goals. These activities are based on the analyses and conclusions taken from work packages 6.1 and 6.2. In addition, IFV members have performed mentoring activities in different subjects through the Moodle server.

Specific contribution from OSPOM: OSPOM have successfully started or completed VR online training on Moodle server. OSPOM provided 4 firefighters (4 male) for performing this online training. **Specific contribution from CNBOP:** In task T6.3, the work during this period focused on adapting SimPro (subcontractor) platform to the needs of the ASSISTANCE project and improving training content. Additionally, theoretical training was conducted on the Moodle platform. Some CNBOP people participated also in the role of teachers by answering the questions asked in the forum and correcting some of the questions that tested the knowledge of the learners and provide support for users in learning how to use the VR platform. CNBOP provided 2 additional firefighters (2 male) for performing this online training.

Specific contribution from GB: GB have successfully started or completed VR online training on Moodle server. GB provided 9 firefighters (9 male) for performing this online training.

Specific contribution from AVSRE: AVSRE have successfully started or completed VR online training on Moodle server. AVSRE provided 3 members (2 male and 1 female) for performing this online training.

Specific contribution from AAHD: AAHD has contributed with input to the Subject/Course 1 Background Knowledge mentoring activities for students. AAHD have successfully started and completed VR online training on Moodle server. AAHD provided 4 medical staff (2 physician, 2 paramedics) 2 female and 2 males for performing online training.

1.1.5.4 *Deliverables and milestones planned for the second year in this WP*

Deliverable number/name	S2R TD/WA addressed	Link to Exploitation Plan
D6.3	T6.3	All VR platforms are ready for being used during the training sessions by the FRs, which could be another product provided by ASSISTANCE.

Table 8 Deliverables submitted in WP6 during the second year of the project

Milestone number/name	Submission date vs planned	2 lines Milestone description / and reasons for delay (if applicable)
MS6 Training network set up ready	Submitted M23 Planned M23	The ASSISTANCE training network has been completely and successfully set up and is ready for being used by the FRs during training sessions of the project pilots.

Table 9 Milestones accomplished in WP6 during the second year

1.1.6 WP7: System demonstration and validation

This WP is in charge of test and demonstrate the project results with real FRs in controlled environments during the 3 different project pilots. In addition, during this WP all development tested will be validated by the end users.

1.1.6.1 *Involved Beneficiaries*

<u>AAHD</u> and the rest of the consortium

1.1.6.2 *Objectives of this WP for the second year of the project (01/05/2020 – 30/04/2021)*

This work package aims at validating the ASSISTANCE end products (including the SA platform and the training network). In addition, it will be tested in a controlled environment in the project pilots' premises at Turkey, The Netherlands and Spain. The specific objectives of the WP7 for the second year are the following:

- Objective 1: To test and validate the whole ASSISTANCE system implementation against the pilot scenarios specified in WP2.

1.1.6.3 *Summary of progress towards objectives and details for each task for the second year of the project (01/05/2020 – 30/04/2021)*

Task 7.1 Validation Plan. (M18-M25) Leader: CATEC.

Contributors: UPVLC, PIAP, RISE, AAHD, E-LEX,

Overall Work progress for the task: This task has a progress in M24 of 90%. Work has been done on the validation plan approach based on the requirements and use cases defined in WP2. The main components of the ASSISTANCE system have been identified as well as the requirements that affect them and the use cases in which they participate. It is proposed to work on the development of an initial validation plan for the drones that will serve as an example for the rest of the partners to prepare the validation plans associated with the different components of the project architecture.

Specific contribution from CATEC: Leading and coordinating the validation plan and implementing the one related to the drones' component.

Specific contribution from UPV: UPV has performed several telcos with CATEC (Task leader) for stablishing the final approach for performing the validation plan. The ToC of the D7.1 along with a description of the expected contributions from all partners involved will be send before the end of February 2021.

Specific contribution from ETRA: Drafting of the validation plan for the Sensor Abstraction Service (SAS) and the Damaged Assets Location and Routing (DALR) module. The latest was done in close collaboration with UC, considering their inputs on the evacuation component.

Specific contribution from rest of partners: the task has still not required contributions from other partners. In the next month the rest of partners will finish their contributions to the validation plan.

1.1.7 WP8: Gender, ethical, societal and legal issues

1.1.7.1 Involved Beneficiaries

UC, E-Lex, PIAP, RISE, CEL

1.1.7.2 Objectives of this WP for the second year of the project (01/05/2020 – 30/04/2021)

- Objective 1: To provide privacy and data protection recommendations for the project outcomes and monitoring ASSISTANCE tasks through a Privacy Impact Assessment (PIA). Related to Tasks 8.1 and 8.2.
- Objective 2: To analyze legal and ethical aspects related to ASSISTANCE tools and development. Related to Task 8.3.
- Objective 3: To demonstrate the important role that human factors (societal aspects and gender dimension) play in innovation for disaster resilient-societies. Related to Tasks 8.4 and 8.5.

1.1.7.3 Summary of progress towards objectives and details for each task for the second year of the project (01/05/2020 – 30/04/2021)

Task 8.1: Project Ethical Monitoring (M1–M36)

Contributors: E-LEX, UC, PIAP, CEL

Overall Work progress for the task (percentage estimation 65%): The main aim of this task is to investigate and illustrate the procedures and protocols necessary for handling legal and ethical issues during the whole project research process. It will also monitor the impacts of the ASSISTANCE project that will develop on ethical, privacy and data protection aspects, in order to support the project management in ensuring the project quality and the project partners in case of procedures as for the EU data protection legal framework.

During this first period the task also has been directed to provide support and fulfilment to WP10 deliverables concerning personal data protection.

Specific contribution from E-Lex: E-Lex, with the collaboration of CEL, has conceived an original method to conduct an impact assessment process involving, at the same time, the ethical and legal aspect of the project (ALTHEIA) that will be used in the final stage of the project.

CEL has also contributed to define the most significant EU frameworks acting as value-based backgrounds of the ethical analysis and technology evaluation. In D8.1, strengths and weakness of different methods have been shown – Ethical Technology Assessment (ETA); Ethical Impact Assessment (EIA); Technology Assessment (TA); Impact Assessment (IA).

Partners contribution: All partners participated in coordination actions and checking of activities.

Task 8.2: Privacy and Data Protection (M1–M36)

Contributors: <u>E-LEX</u>, UC, CEL

Overall Work progress for the task (percentage estimation 70%): This task, starting from the legal EU framework pointed out in the D.8.1, has the purpose to indicate the best practices, guidelines and processes relevant to the project related to the Fundamental Rights, Privacy and Data Protection. The main aim of the task is to issue some recommendations for software and technology developers, enabling the data protection, privacy and adoption of Privacy by Default and Privacy by Design approaches, as well as technical and organisational measures to protect personal data as defined by the new EU GDPR. In the reporting period, the work of the task is to monitor the developing process of the pilot particularly with regard to the selected technologies and their impact on the personal data process.

- **Specific contribution from E-LEX**: Monitoring the developing process of the pilots to provide and support the partner managing personal data. E-Lex has provided a LOI and a questionnaire regarding the personal data process that will be submitted to each partner with the purpose to monitor the process of personal data during the pilots.
- **Partners contribution**: All partners participated in coordination actions and checking of activities.

Task 8.3: Ethical issues and Fundamental Rights Accomplishment (M1–M36)

Contributors: <u>CEL</u>, E-LEX, UC, PIAP

Overall Work progress for the task (percentage estimation of the task is: 70%): The task aims to analyze the most important human rights involved in the DRS operations and assessing the ethics impact of the project technological platform on the affected community in terms of rights.

After the submission of the D8.1 and WP10 deliverables (2019 - 2020), CEL in 2020 has designed an ethics checklist, a tool that would be adopted with two main functions:

- Self-assessment tool: the checklist is conceived as a sort of *vademecum* for the pilots' responsible partners to make sure that all most important ethics aspects have been appropriately considered during the phases of design and deployment of the pilots.
- Monitoring tool: the answers of the pilots' leaders will constitute a further evidence for the monitoring process that social scientists should perform in WP8.

In a dedicated telco between CEL and UC of March 2020, the two partners have decided to adopt the checklist approach, proposed by CEL, as integrate method called GELS (see D8.3). On ethical side, GELS continues and extends the work done by CEL on ALETHEIA (see T8.1). Indeed, the GELS toolkit is being designed to integrate, monitor and evaluate Gender, Ethical, Legal and Societal aspects for the pilot demonstrations and advance training.

Pilot leaders, host organizers as well as the rest of partners are expected to work together according to this toolkit.

Finally, a white paper, published on social media channels, has been produced by CEL and UC to analyze the role of gender in disaster recovery and the connection between gender and ethics-based approach to rescue management.

- **Specific contribution from CEL:** The definition of a checklist as ethics monitoring tool to be adapted by researchers and pilot leaders to measure the compliance between the deployment of the ASSISTANCE demonstrations and the EU ethics frameworks. The publication of the white paper together with UC to explain, in popular science terms, the role of gender in disaster recovery and the connection between a gender and an ethics-based approach to rescue management. CEL has actively contributed to WP10 deliverables, taking the editing leadership of some of them.
- **Specific contribution from E-LEX**: Collaboration within the revision of the checklist to be delivered to Partners involved in pilots in order to ensure the compliance the GDPR and support in the other legal issue during the task.
- **Specific contribution from UC**: Discussion, documents analysis and contributing the white paper on gender in disasters recovery.
- **Specific contribution from PIAP:** Participation in discussions and documents analysis, inputs to ethics related deliverables (including WP10 deliveries).

Task 8.4: Societal Aspects (M1–M36)

Contributors: <u>UC</u>, PIAP

Overall Work progress for the task (percentage estimation 66%): The work carried out in the reporting period has focused on defining and applying the tailored Societal Impact Assessment approach to address the following perspectives:

- Citizens (perception and attitudes towards safety and security): A Survey study was conducted involving 1.014 participants between 18 and 80 years old from five European countries (Spain, Poland, Sweden, France and Italy). It should be noted that this activity achieved a specific KPI in the DoA (>250 surveyed citizens). The original English version of the questionnaire was reviewed by technical partners (RISE) and FRs (AAHD) and then translated into the target languages: RISE (Swedish version), CEL (Italian version), Thales (French version), PIAP (Polish version) and UC (Spanish version). CEL designed and provided additional questions on preparedness to the questionnaire. The online questionnaire was distributed by a hired company. The questionnaire had in total 44 items (15 items disaster awareness/ 10 items FRs capabilities/ 14 items preparedness/ 5 items risk perception) in addition to sociodemographic information.

Data was processed statistically (descriptive statistics, inferential statistics, and the assessment of internal reliability of the questionnaire).

- Project (needs, potential benefits and negative impacts): A Delphi method of consensus development was conducted, comprising two survey stages and a teleconference workshop involving project partners. The likely impact categories that survived the Delphi process (n=11) were analysed and a list of indicators was defined for planning further actions to measure societal impacts (e.g. identifying benefits and negative impacts).
- First Responders (perspectives when adopting ASSISTANCE technologies): The GELS toolkit to integrate, monitor and evaluate societal aspects during the Pilot Demonstrations (PDs) and advance Training Workshops (TWs) was designed.

Specific contribution from UC:

- D8.3 Progress report on Human Factor in ASSISTANCE impact assessment.
- Designing, conducting and analyzing results of the online questionnaire to EU citizens.
- Conducting and analyzing results of the Delphi process to define societal indicators.
- Designing the GELS toolkit to include gender, ethical and legal aspects for assessing First Responders perspectives when adopting ASSISTANCE developments.
- Coordination with partners.

Specific contribution from PIAP:

- Participation in research discussions on the application of Societal Impact Assessment.
- Supporting the design and translation process of the online questionnaire.

Task 8.5: Gender Dimension (M1–M36)

Contributors: UC, RISE, PIAP

Overall Work progress for the task (percentage estimation 66%): Once the overall methodology for assessing gender was defined in the previous reporting period (D8.2), the work carried out in this reporting period has mainly focused on conducting case studies to explore gender impact in constraints and opportunities for rapid response. These case studies will be included in D8.4 Report on Gender Dimension Strategy (due in M24).

- Gender impact on citizens perceptions and attitudes towards disasters: Responses of the citizens questionnaire conducted in Task 8.4 were disaggregated by gender (female respondents n=504; male respondents n=510) and statistically analysed to explore gender dimension.
- Risk propensity and resilience of male and female First Responders. Based on the DoA, risk propensity is directly related to the analysis of changes in perception of threats and risks and resilience is related to the gender influence in the selection of coping strategies and also

assessing differences in vulnerabilities. A literature review was conducted on psychological scales and instruments to explore the differences/similarities of male and female FRs.

- Three validated instruments were selected to conduct an online survey: 1) Risk Propensity Scale (RPS), 2) Brief Resilience Scale (BRS) and 3) Brief Resilience Coping Scale (BRCS). The English versions of these instruments were translated into Spanish (UC), Polish (PIAP), Italian (CEL), Turkish (AAHD), Swedish (RISE) and Dutch (IFV), transcribed to google forms and distributed (using social networks and email) to internal and external male and female FRs.

Specific contribution from UC:

- Design and conducting the case study on gender impact on citizens perceptions and attitudes towards disasters.
- Literature review on scales to explore risk propensity and resilience.
- Design and conducting on gender impact on risk propensity and resilience in FRs.
- Coordination with partners.

Specific contribution from RISE:

- Participation in research discussions and gender research activities.
- Design, translations and distribution of FRs questionnaires.
- Analysis of the methodology used in a previous project to collect gender-based data about the physical requirements of fire and rescue personnel in Sweden. This data collection and analysis methodology may prove to be useful for future ASSISTANCE WP8 activities. The data were collected in a semi-randomized manner from fire and rescue personnel located within 15 geographical divisions of Sweden to avoid bias toward urban areas. Interviews were conducted to collect the data, during which a questionnaire was completed by the interviewer.

Specific contribution from PIAP:

- Participation in research discussions and gender research activities.
- Design, translations and distribution of FRs questionnaires.

1.1.7.4 *Deliverables and milestones planned for the period in this WP*

Deliverable number/name	S2R TD/WA addressed	Link to Exploitation Plan
D8.3 Progress report on Human Factor in ASSISTANCE impact assessment	*TD8.3- Task 8.4*	This progress report presents the research strategy and the first results of Societal Impact Assessment applied to the ASSISTANCE project. The strategy focuses on three perspectives: 1) the project itself, 2) the First Responders and 3) the citizens. This

		document is a reference methodology for further assessment of human factors in the project.

Table 10 Deliverables submitted in WP8 during the second year of the project

1.1.8 WP9: Exploitation and dissemination

WP9 is dealing with exploitation and IP management activities, dissemination and communication activities, standardization and potential commercialization of the ASSISTANCE.

1.1.8.1 Involved Beneficiaries

The whole consortium is involved in this WP

1.1.8.2 Objectives of this WP for the second year of the project (01/05/2020 – 30/04/2021)

Objectives of this WP for the second year (01/05/2020 – 31/04/2021)

- Objective 1: Review and update of partner's individual exploitation plans and overall ASSISTANCE platform exploitation plan.
- Objective 2: Development and implementation of a business plan to commercialise the results and take the system concept to market with exploitation partners within 2 years of the project end
- Objective 3: Management of IPR including building on background and the protection of foreground IPR
- Objective 4: Provision of inputs to standards & policy development, together with selection and adoption of appropriate standards to enhance exploitation potential
- Objective 6: Dissemination to the scientific and technical community, the media and the public on advances beyond the state of the art
- Objective 7: Targeted dissemination of key results and prototype demonstrations to policy makers, potential exploitation partners and end-user customers, to encourage partnerships to help take the results to global markets and encourage customer demand for this type of system

1.1.8.3 Summary of progress towards objectives and details for each task for the second year of the project (01/05/2020 – 30/04/2021)

Task 9.1 Exploitation and IP Management (M12-M36) Leader: ETRA.

Contributors: UPVLC, THALES, TNO, PIAP, CATEC, RISE, E-LEX, VAS, CEL

Overall Work progress for the task: 50%. The main actions performed under this task include:

- Review and protect the project's technical advances and IP. Exploring the potential for exploitation with preliminary identification of Key Exploitable Results (KER).
- Liaison with other research initiatives (e.g. joining FASTER project teleconference, 15th meeting of the Community of Users, Clustering Webinar on New Technologies for First Responders). Further details on the status of collaboration agreements are provided in section 1.3.
-

- A screening process has been developed to protect key technical advances and resulting IP produced by the project partners which have potential commercial value, and to also ensure that security requirements are met. Any reports and presentations that might impact on partner IP and commercialisation are screened by other consortium members. The IP management is being co-ordinated with Task T1.5 (Innovation Management).

Specific contribution from ETRA: Used input from T1.5 for setting up the tool for technology watch. Preliminary results have been obtained and the tool setup was refined to get better searches.
Specific contribution from PIAP: Inputs regarding dissemination and communication strategy.
Specific contribution from the rest of the partners participants: Participate in technology watch workshop and related activities, and update IP repository.

Task 9.2: Dissemination and Communication of Project Results (M1-M36) Leader: PIAP.
Participants: ALL partners

Overall Work progress for the task:

The role of this task is to update and implement the dissemination plan for communicating and promoting the project and its findings.
During the period the task 9.2 progressed with the performance of the following actions:
- Updates of the project public website and social media accounts (Twitter, LinkedIn) with the most important news and events related to the project,
- Preparation and release of the project dissemination video (published via the YouTube platform at : https://www.youtube.com/watch?v=_mxQwBx6l0c) - since its publication at the beginning of July 2020 it has reached over 600 views,
- Preparation and release of the 1st issue of the project newsletter containing the introduction to the ASSISTANCE project and summary of the first year of its execution, including accomplishments of the first project milestones and completion of deliverables,
- Preparation and submission of deliverable D9.3 that reports in detail on communication and dissemination efforts of the project until month 18,
- Preparation and submission of deliverable D9.4, which aims at providing an analysis of the main elements of the data management policy that will be used by the ASSISTANCE Consortium regarding the project research data,
- Creation of the ZENODO community for project materials and publications, to enable full Open Access to all publishable project results,
- Management of the Communication & dissemination activities collector sheet that serves for better coordination and reporting of the various communication and dissemination efforts of different partners,
- Numerous communication and dissemination activities performed by project partners, such as:

- Delivery of 2 publications and preparation/submission of another 4 (Journal of Intelligent and Robotic Systems (JINT), Revista Europea de Derecho de la Navegación Marítima y Aeronáutica, Applied Siences, Learning and Instruction),

- Attendance/project presentations at 7 large events (conferences/trade fairs eg. Expodronica 2020, Droniada DroneTech WorldMeeting 2020, 2020; S-moving 2020, 6th Turkish Congress on Emergency Medicine with International Participation (TATKON 2020), IMCIDU 2020 - 2nd International Medical Congress of Izmir Democracy University, 4 International – 22 National Public Health Congress (HASUDER 2020), 1st Emergency Health Services and Covid-19 Symposium for Paramedic Day) ,

- Around 20 Internet/social media activities – Tweets, posts or news items on project website and partners websites/social media accounts, project update contribution to INGENIOUS project Newsletter,

- Organization and/or participation in 11 workshops/seminars/webinars/meetings (Workshops with end-users during DroneTech WorldMeeting 2020 and Droniada 2020; EU Efforts Towards a Full Protection of Personal Data seminar; ERIA - Early Response Innovation Arena workshops, DRS Community of Users (CoU) Workshops, Clustering Webinar on New Technologies for First Responders, CRNS webinar series – Plymouth University, FASTER project teleconference, Community of European Research and Innovation for Security (CERIS) WebEX meeting),

- 3 students reports and 1 master's thesis on non-expert risk assessment using gas cloud visualizations, and the influence of user characteristics.

Specific contribution from the partners participants: All partners contributed to the overall project dissemination and communication activities as described above.

Specific contribution from PIAP: Lead the preparation of D9.3 Mid-term Dissemination Report.

Specific contribution from ETRA: Lead the preparation of D9.4 Research Data Management, Open Data and Open Access strategy, and creation of the ZENODO community for the project.

Task 9.3 – Standardisation (M24 – M36) - Leader: RISE

Contributors: PIAP, UC

Overall Work progress for the task: This task was not officially scheduled to begin until M24 but work started on it during M18 in recognition of the rather long time-frames associated with standardisation processes.

Work performed: The work conducted so far on this task has been to understand the standardisation needs of the project to focus on the most beneficial activities. The two main focuses will be on interoperability with existing end user systems and on identifying gaps or areas in need of improvement in current standards to facilitate better exploitation of the ASSISTANCE results.

An online kick-off meeting was held in M18, in which all partners (especially the end users) were encouraged to provide input regarding the standards their existing situational awareness equipment complies with so that interoperability issues can be avoided.

From a technical perspective, cooperation was initiated with the Task 9.4 leader (ETRA) to identify technologies that could affect the development and exploitation of the systems created by the ASSISTANCE project. Contact was also made with the person responsible for standardisation in the INGENIOUS project.

Partners contribution: Two online meetings have been conducted (the kick-off meeting and a meeting with the task partners). Excellent suggestions were collected during both meetings.

Task 9.4: PCP, PCI preparation and Business Plan application (M12-M36) Leader: <u>ETRA</u>

Contributors: THALES, PIAP, VAS

Overall Work progress for the task: 15%. As the PCP and PPI will be based on the end-users needs post-project, just initial work has been performed on defining the scope of the deliverable D9.6 due to the early stage of the project. During the next reporting period, this task will build on the input from T9.1 and will conduct a workshop to raise awareness among ASSISTANCE end-users about the benefits of the PCP and PPI and how to implement them. A questionnaire will be sent to collect information about their interest and needs post-project. This will be mapped in coordination with the technology providers into one or several business cases.

1.1.8.4   *Deliverables and milestones planned for the period in this WP*

Deliverable number/name	S2R TD/WA addressed	Link to Exploitation Plan
D9.3 Mid-term Dissemination Report	T9.2	NA
D9.4 Research data management, Open Data and Open Access strategy	T9.2	The Open Access strategy is fundamental to guarantee that dissemination activities are carried out according to the obligations of the Grant Agreement, while keeping a strong focus on avoiding IPR conflicts of interest.

Table 11 Deliverables submitted in WP9 during the second year of the project

1.2 Impact

The expected impacts stated in the DoA are currently absolutely valid and they are being accomplished according the schedule. The major impact stated in the proposal, which can be seen below is also the main project objective and it has not to be updated at all.

- ***The major impact of ASSISTANCE will be to help and protect different FRs organizations and training them in order to <u>increase their capabilities and efficiency for facing large disasters (natural or man-made) in a more secure manner</u>***

With respect to the specific impacts stated in the call:

- **Novel tools, technologies, guidelines and methods aimed at facilitating their operations.**
- **New knowledge about field-validation of different tools, technologies and approaches involving first responders in (real-life) scenarios**

The project developments, including the advanced training scheduled, and the three project pilots' demonstrations already cover completely these impacts and therefore the information included in section 2.1 regarding these expected impacts is still valid and does not need to be updated.

1.3 Status Collaboration Agreement/s

ASSISTANCE project is included in a DRS02 projects cluster composed mainly by the DRS02 projects funded in the 2018 call. INGENIOUS, CURSOR, ASSISTANCE, RESPONDRONE and FASTER. Other DRS02 projects for other calls are also joining to this cluster.

Several meetings were held at the end of 2019 in Crete and Porto Heli for presenting all projects in front of the rest of the consortiums and start discussions on collaboration areas, especially in the involvement of the end users of the different projects. Nevertheless, again the COVID 19 pandemic has stopped these regular cluster meetings during the major part of 2020., however on the 3rd of December 2020 the Clustering Webinar on New Technologies for First Responders took place initiating again the clustering activities in a virtual manner.

Finally, last 27 of January a new virtual meeting among the cluster project coordinators took place for stablishing a official cluster mailing list and exchange experiences and future plans. Especial focus was put on how the pandemic is affecting the projects developments and how each project foreseen the final demonstrations.

2. Update of the plan for exploitation and dissemination of result (if applicable)

The dissemination and exploitation plans were updated in M12 through the D9.2. On the other hand, due to COVID 19 pandemic the consortium has discussed on the modification of the dissemination strategy to on-line events and the papers submission.

3. Update of the Data Management Plan (if applicable)

The data management plan has been updated in M18 through the D9.4.

4. Deviations from DoA (if applicable)

Deviation 1

University of Cantabria proposed the change of a budget amount (around 5000 €) for performing a survey to assess the "Citizens' attitudes towards disasters/emergencies" as an important part of Task 8.4 Societal Aspects and Task 8.5 Gender Dimension Strategy. The project coordinator informed the PO on this fact and the budget change was approved.

Explanation

In PR1, UC had to develop a survey to assess the "Citizens' attitudes towards disasters/emergencies" as an important part of Task 8.4 Societal Aspects and Task 8.5 Gender Dimension Strategy. It was intended to get 200 responses per EU country (Spain, Italy, Sweden, Poland and France) to sum around 1.000 responses or more for an appropriate analysis. After starting with the Spanish survey, collecting complete and valid responses was harder and more time consuming than initially expected. Not to delay WP8 and other related tasks of the project, a specialized service has been employed to achieve the goal of 1.000 responses among EU countries (Spain, Italy, Sweden, Poland and France). This survey cost represents 4,575.00€ from the declared Other Direct Costs that was not initially foreseen in the DoA. It was transferred from the unused travel budget after previous email approval of the Project Officer in August 2020.

Deviation 2

CATEC asked for an extension of 6 months in T4.5. In is important to note that CATEC is the only participant of this task (there are not more partners involved in it), so this extension will not affect the progress of the project. The project coordinator informed the PO on this fact and the extension was approved.

Explanation

The main reasons for asking about the extension are:

- The delivery time of certain products has been highly increased.
- CATEC is experiencing significant technical work delays. We usually perform several development and integration cycles during the whole project in order to achieve a reliable system. This typically involves purchases. As the delivery times are longer, our cycles times are proportionally increasing.
- The experimentation has been affected, and we expect more delays due to restrictions and safety measures of the consortium companies and countries.
- We do not know yet if more problems could arise soon and when it is expected to reach a real normality in Europe and the rest of the world.

These are some of the reasons to ask for this extension. We are doing this in other EU projects and e.g. some of them are asking for 6 months even if it is expected to finish before that. In those cases, the main reason for asking for more than expected is the uncertainty of the development of the pandemic. One of those projects programmed the experimentation with an extension of 4 months, but the extension requested now is 6 months in order to be sure that all activities were accomplished.

Deviation 3

CATEC asked for a manpower reallocation (8 PM) from WP4 to WP7. The project coordinator informed the PO on this fact and the manpower change was approved.

Explanation

FADA-CATEC would like to move 8PM from WP4 (Unmanned Platforms and Wearable sensors) to WP7 (System Demonstration and Validation). The reason is that, due to COVID-19 situation in Europe and the important mobility restrictions that we are facing in 2019 in Spain, it is very difficult to perform experimental validation with unmanned aerial vehicles (taking also into account that FADA-CATEC's test flight centre is more than 300 Km from our main offices). We expect that after mid-2021, mobility restrictions will decrease, and then it will be much easier to perform validation flight experiments of the algorithms developed in Task 4.5 (Drones' advanced capabilities (Swarm management & Captor drones). Then, and in order not to delay more the execution of this task, we think that a good solution could be to perform the validation of the developed algorithms in WP4 within WP7 activities (just before the integration and overall project validation experiments). This is why we are asking to move 8PM from WP4 to WP7.

Deviation 4

PIAP asked for an extension of T4.3 (M13-M21) by 6 months (M13-M27) and change to deadline for D4.3 to M27 and also to increase of PMs in WP4 that we would report from planned 32PM to 44PM (Without increasing the stated PIAP budget). The project coordinator informed the PO on these changes and they were approved.

Explanation

Rationale for first part:

- PIAP has identified issues with current workflow and this is due to bottlenecks related to hardware availability, most work that we perform requires us to design and order some electronics or mechanical parts - our standard workflows are inclusive of this fact and take in consideration times of delivery between 2 and 4 weeks.

As you might be aware, during COVID-19 pandemic this has changed dramatically with sometimes an increase to 2-3 months while in other cases whole supply chains are being disrupted with no projected dates.

This has created an issue of not being able to perform enough work, since required hardware is not available on-site on time and with no integrated hardware we cannot do following steps such as testing, identifying software issues with new hardware and coding software optimizations.

- Since start of October Poland has entered second-wave (although looking at severity, first wave looks almost non-existent on graphs) of COVID-19. What this means for us is that while right now delayed hardware is finally being delivered we are unable to efficiently work on it due to restrictions - much more people are on sick leave for safety as well as having a sizeable portion of staff performing their work remotely. This leads us to second part of rationale for T4.3 deadline extension: engineers working at home are unable to work on hardware except very specific cases.

- Important to note: deadline extension and PM increase are not directly related: on current track we believe we will not be able to finish T4.3 until M21, regardless of quality increase that we propose in second part.

Rationale for second part:

- During working at T4.3 we have encountered 3 issues that we would like to address but they will also require us to report slightly more PM. Issues concern 2 sensors that are being integrated: "EMF detector" and "gas analyzer" and difficulties in localization of UGV inside buildings.

- Regarding EMF, it is required for use-case SC2-UC6 and in general sense it is used to detect AC voltage at range. Main complication is that there does not exist COTS AC voltage detector with digital communication interface. Therefore, an option to purchase one and integrate it is not available. We have communicated regarding this issue with firefighter end-users and all of them use analogic AC voltage detectors such as https://www.willburt.com/media/videos/hotstick . Such detectors are being used, because of availability and simplicity. Due to fully analogic mechanics they are not possible to integrate easily into robots. From comments that we have received from end-users, those devices despite being based on technology from 80s are fulfilling current needs. Some end-users have suggested that with predicted increase of this time of hazards related to energy-transition a modernization of this technology would be interesting.

- Based mainly on need for a device with real-time digital communication interface and also above information regarding AC voltage detectors we have undertaken a task to develop such sensor. Based on comments from FRs and from project coordinator we also want to

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look into possibility of developing additional functionalities, such as ability to use it not only when connected to robot, but also as a wearable sensor.

- In regards to "gas analyzer": in D4.1 two possible sensors were presented as option for integration for UxVs, one being advanced gas analyzer laboratory and a simple CO detector as a fallback. Gas analyzer was offered by one of project partners CNBOP, since they do have such device. They are located very close (20 km) from L-PIAP and therefore, we were able to borrow this sensor on short notice and integrate it. CATEC who is integrating sensors into UAVs, due to logistics was unable to acquire this sensor for integration and they decided the integration another sensor MG811. Based on request from TNO who is main recipient of data from gas sensors for use in Chemical Hazard Prediction Tool (CHT) that it would be beneficial for both aerial as well as ground platforms provide same type of data, we want to integrate 2nd gas sensor MG811 into UGV. This will result in 2 sensors being used during demonstration.

- Last point being problems with robot localization inside buildings is very important to address, since some use-cases will take place inside buildings. Original plan was to take technology that we have already been developing that uses multiple UWB radios for positioning and optimize and test it so that it would work with as little as 2 radios. However development of that technology has suffered the same issues as already mentioned through this e-mail, and is both delayed and less capable than was originally planned. This means that to address this problem within ASSISTANCE we will have to use increased effort to bring it to originally planned capabilities.

We believe that all of the above, while extending slightly T4.3 serve to fulfil requirements and will be of benefit to project. Most importantly inclusion of additional supporting personnel will allow us to continue working smoothly. We also want to note that this would not carry a change to payments - due to greater inclusion of supporting staff, we will be able to perform all of necessary work within already agreed budget. And finally, while we are behind projected work amount as of Q3, we believe that change to workflow and extension end of task and D4.3, will allow us to finish everything within proposed PMs.

Deviation 5

Some mistakes/inconsistences were detected in WP7 (DoA), the project coordinator discussed with the main partners affected by these mistakes and they agreed a solution, which was proposed to the PO. After checking the DoA the PO agreed on the solution proposed without the need of performing an amendment, since the mistakes were basically typos.

Explanation

In T7.1 DoA description it is stated that this task starts in M23 and finish in M28, but in the Gannt this task starts in M17 (as the whole WP7) and finish in M25.

After discussion the situation with AAHD (WP7 leader) and CATEC (Task 7.1 leader) we decided that T7.1 should start in M17 as the WP7 and finish in M25. The deadline for D7.1 would be now end of M25 (end of May 2021) instead M28 as stated in the DoA.

In 7.2 description it is stated that this task starts in M25 and finish in M35, but in the Gannt this task starts in M22 and finish in M30.

After discussion the situation with AAHD (WP7 leader) and UPV (Task 7.2 leader) we decided that T7.2 should start in M25 as stated currently in the task description and finish in M30 just before the pilots, which is completely coherent. This way D7.2 deadline would be M30 and not M35 as currently stated.

Deviation 6

CATEC manpower has already a significant deviation with respect to the expected manpower. Reported 39,74 and expected 57,1 PM.

It is important to note that T4.5 has been delayed 6 months, but expected manpower figure encompass all WP4 manpower.

Explanation

The difference between the planned and executed effort from CATEC is mainly because of:

- Covid-19 impacted in our project activities and we have been forced to delay part of them (as it has been already communicated and stated above)

- Also, covid-19 has delayed hiring of new personnel. For example, we selected a Post-Doc candidate for a new vacancy in July 2020 from Mexico that has performed its PHD in France. Even though he already was in France, it took us until February 2021 to complete all the paperwork to hire him due to the restrictions in the government agencies (due to COVID-19) that manage the work permits. This usually takes less than two months and it took us more than 6 months. Similar delays have also applied to other recruitment processes due to the difficulty of performing the interviews and moving to Seville.

However, we have a mitigation plan with two new people already incorporated and we have also adjusted our working habits to the new situation (with covid19), so we do not expect any further deviations in the required effort to perform the activities of the project.

Deviation 7

During the review of D4.6 by the coordinator was detected that a semantic capability that was stated in the DoA has not been implemented by VIASAT. The coordinator has several bilateral meetings with VIASAT for managing this issue and finally both agree to inform the PO on this fact including

the VIASAT explanations. These explanations along with the opinions of all end users on this capability are summarized below.

Explanation

1. **The development and the "semantic definition"**

The development of the Mission Management Module for Assistance was made in continuous collaboration and communication with the rest of the partners and always to fulfill the requirements that were defined in 2019. VIASAT understanding is that any program has to be driven to generate as much value as possible, and understanding value is understanding end users and customer's needs. This is the way we set up the bases of any technological program and we reflect it in the project requirements documentation as we well did in Assistance, because the requirements define what is valuable for the end users, customers and markets. At the end, we are trying to create a solution to give an answer to a real problem or a real market, not to a proposal written by ourselves.

We have given and answer to each of the requirements and we have developed and tested a Mission Management Module with advance features as:

- Mission context definition (target, areas, operation theater, etc)
- Web user interface for mission context definition
- Computation management workflow to build the whole mission (all UxV involved)
- SAS detailed information collection about UxV in the mission areas
- Information collection about sensors of the UxV from SAS
- Mission messages submission to the Ground Control Station

We did not develop the "semantic definition", because in any of the cases was a functionality that was requested by any of our partners or by any of the end users we have in Assistance program. Our criterion was to focus on the main risks that could put the program in danger and we tried to give an answer to all the requirements and functionalities that were understood as critical and important by us and the rest of the partners.

2. **What now?**

As stated at the beginning, we don't understand this situation as a major problem because it doesn't impact, in any way, the success of the program. The only thing we are compromising here is the "semantic definition" itself, but we can perfectly define the Missions with the advanced interface we have developed. We are now entering the integration phase of the program and we are in very active discussions in the current days with the dependent partners to make sure we complete integration on time. Going back to the development phase to try to develop this functionality at this moment, would have a great impact for Viasat SW team, and all the partners that need to get involved. In addition, and as declared to you in the last QR, Viasat has already spent all the budget

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of WP4 even exceeding the maximal refunded amount (at our own cost). This would not only require Viasat manpower but also manpower from many other partners.

To conclude, "semantic definition" was included 3 years ago in the proposal as an intended feature of the Mission Management, but during the program execution this feature was not highlighted as bringing added value by any partner nor stakeholders. In our opinion this shows the fact that perhaps something that we considered relevant in the proposal phase, was in fact not as relevant during the program execution phase as many other critical features that were clearly identified by user/stakeholders' requirements.

In addition, after asking directly to all project end users on this issue all of them agree that not only the "Semantic Request" is not an important feature to develop (consistent with the requirements), but also, they think that is risky and not appropriate for this system. End users' e-mails are available to the reviewers' team.

Deviation 8

CEL owner not receiving a salary has participated to some project meetings. Consequently, unit costs have been declared, despite they were not foreseen at the project

Explanation

Temporary resources unavailability in some specific circumstances and the need for specific expertise, have requested a little the support of the SME owner for the accomplishment of the project activity.

4.1 Tasks

Deviation ref. number	WP & Task Nb	Description	Reason	Impact on the use of resources, allocation of PM etc.	Impact on the planning	Impact on other tasks	Impact on S2R TD/WA addressed	Mitigation action and deadline
1	T4.5	CATEC asked for an extension of 6 months in T4.5. In is important to note that CATEC is the only participant of this task (there are not more partners involved in it), so this extension will not affect the progress of the project.	COVID-19 pandemic (Check section 5 for more details)	Reallocation (8 PM) from WP4 to WP7	Delay in the D4.5 delivery	None. This is an stand alone task that just develop new drones capabilities	NA	New deadline agreed for D4.5 M27 (July 21).
2	T4.3	Extension of T4.3 (M13-M21) by 6 months (M13-M27) and change to deadline for D4.3 to M27	COVID-19 pandemic	Increasing of manpower without extra	Delay in the D4.3 delivery	None since the Robots integration will continue	NA	New deadline agreed for D4.3 M27 (July 21).

			(Check section 5 for more details)	costs for the project (Check section 5 for more details)		during the integration tasks (T5.4)		
3	T4.6	VIASAT has not developed a semantic capability stated in the DoA (T4.6)	Was not included in the user requirements. (Check section 5 for more details)	None	None	None	NA	NA

Table 12 Deviations detected that affect concrete tasks

4.2 Use of resources

See section 5 for checking explanations on deviations of the use of resources between actual and planned use of resources in Annex 1, especially related to person-months per work package.

According to the PO instructions in the following table can be seen the PM declared till 31 of March 2021 and the expected manpower for each partner. It is important to note that the calculation of the expected manpower is not exact, since some partner have their manpower in different tasks inside the same WP and these tasks have different durations and end dates.

Partner name	PM expected	PM reported till March 21*	Significant deviation found
1 UPV	81,1	75,97	
2 ETRA	71,8	70,47	
3 THALES	31,62	28,15	
4 AVSRE	9,84	8,94	
5 PIAP	64,9	64,65	
6 CATEC	57,1	39,74	(See deviation 6)
7 TNO	23,58	22,97	
8 RISE	25,37	26,78	
9 IFV	17,64	15,88	
10 UC	37,62	34,97	
11 GB	18,96	17,80	
12 AAHD	21,96	20,27	
13 MIR-PN	12,71	8,15	
14 VAS	32,03	32,87	
15 e-LEX	12,81	11,72	
16 SBFF	16,90	12,90	

17 OSPOM	20,96	15,7	
18 CNBOP	26,56	25,91	
19 CEL	11,49	17,06	

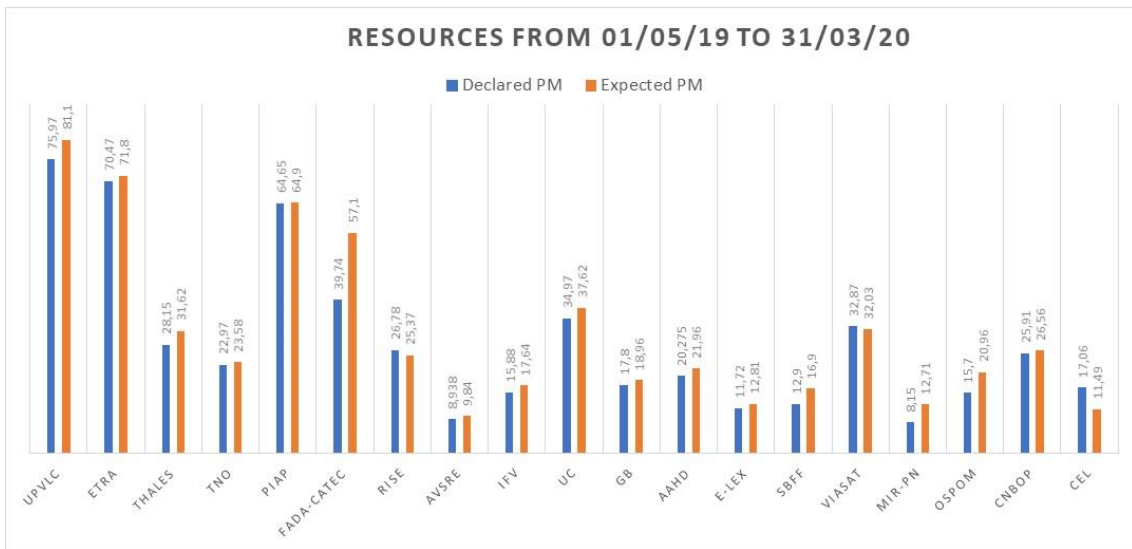*Table 13 Updated effort of the partners till end of March 21*

Figure 1 Graphical representation of the use of resources per partner.

4.2.1 Unforeseen subcontracting (if applicable)

Not unforeseen subcontracting has been performed during the second year

4.2.2 Unforeseen use of in kind contribution from third party against payment or free of charges (if applicable)

Not unforeseen use of in-kind contribution has been performed during the second year

5. Meetings organised and attendance

Note: No travels or meetings have been organized during the second year of the project due to the COVID-19 pandemic.