



Next Generation Positioning On Board Unit

European Global Navigation Satellite System Agency (GSA)
Fundamental Elements

Grant Agreement GSA/GRANT/03/2018

Project and Quality Management Plan

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Executive Summary

The aim of this project is to develop a high precision positioning OBU, that can be integrated in systems required by any Car, Truck or Bus OEM, based on tight heterogenous sensor fusion that will be easily integrable on Automated Driving platforms for any vehicle for reaching SAE L4 and L5 automated driving levels.

ACCURATE will pave the way towards the development of a precise positioning system for high levels of automated driving SAE-L4 and L5 for many vehicle types (e.g. cars, buses, trucks) by the Development of close to production automotive onboard unit (OBU) prototype for EGNSS based positioning which will make use of the accuracy and integrity of the EGNSS components and services in a multi system and multifrequency specially taking advantage of E5a and E5b. Additionally, hybrid implementation of differential GNSS will be used as well as sensor fusion to enhance the capabilities of the positioning systems in adverse conditions. Safety-critical approach from design: certification in accordance with the automotive industry functional-safety standard ISO 26262 will be taken into account from the design phase .

As part of the ACCURATE project, WP1 has the objective of organising the management of the project. The project contains contributions from a number of partners and individual activities that will require close coordination to ensure that project milestones are satisfactorily achieved. The activities related to the management of the project will ensure the timely execution of the work plan, the proper communication between participants, the data management plan for the project, the creation of reporting and quality control structures and procedures, the representation and communication with external entities, primarily the European Global navigation Satellite Systems Agency, and all financial-related activities concerning funds and budget allocation. In particular, Task 1.1 will ensure the smooth execution of the ACCURATE project as well as that the scientific and technical results of the project have been produced based on high quality standards.

1 Introduction

1.1 Purpose of Document

As part of WP1 within the ACCURATE Project, Task 1.1 (Project Management and Technical Coordination) involves general project leadership and coordination at the scientific and technical levels. It will ensure cohesion against the ultimate events arising during the project and entail a tight working atmosphere with the WP leaders to refine and refocus any activity if necessary. Additionally this task will efficiently monitor market needs and technical evolutions throughout the project's lifetime. It will also make sure that the project work plan is adjusted as needed in order to seek that the final results of the project are implemented in such a way that they best meet the needs of the market with the technologies available at the time. Moreover, this task will not only ensure that the scientific and technical results of the project have been produced but that this is based on high quality standards. Thus, this task includes management procedures and monitoring of the quality of the research and innovation activities carried out and a timely execution of project tasks.

As part of this task, the document D1.2 Project and Quality Management Plan (PQMP) has been delivered to two main objectives. The first one is in definitions and tools for ensuring the correct execution of the project in terms of handbook on project management. And second to ensure the project results meet the established goals. The document will be the guide on quality management for ACCURATE, including a summary of the project structure and the most relevant internal procedures, the quality assurance mechanisms for deliverable preparation, for the achievement of all specific objectives and milestones, and for the measurement of project progress, defining a set of initial key performance indicators. Finally, the critical risks for ACCURATE are also included.

The overall project and quality management plan of the project described in this deliverable is aligned with the information already provided in the Description of Action for ACCURATE.

1.2 Intended Audience

The dissemination level of D1.2 is public. This document is intended to be an internal guideline for the appropriate quality management of the ACCURATE project.

2 Project Structure

2.1 Work Packages

ACCURATE has been organised into seven work packages, four of them dedicated to research and innovation activities, including validation and verification, two WPs gather together business strategy, exploitation and dissemination activities, and finally, WP1 deals with management and coordination of the project. This structure responds to the needs of ACCURATE and assures an efficient coordination of the work and an adequate distribution and organisation of the Consortium expertise.

Table 1 List of Work Packages

WP	Work Package Title	Lead
1	Management and Coordination	1- VICOM
2	User and System Requirements	6 – VALEODE
3	System design	1 – VICOM
4	Development and Integration	6 – VALEODE
5	Validation and Verification	5 – NC
6	Business Strategy Definition and Implementation	6 – VALEODE
7	Dissemination and Stakeholder Engagement	1 - VICOM

The entire work plan is structured in a cyclical approach, consisting of two planned cycles. Each cycle starts with a requirement definition stage (WP2), followed by system design (WP3) and development and integration tasks (WP4). Each cycle ends up with an evaluated prototype (WP5). The obtained results will feed the requirements definition stage of the next cycle (WP2-5), where all stages are revised according to the test reports.

The project will develop a first prototype for quick testing and concept validation. Functionalities and services will gradually be built into this prototype during the final cycle. This methodology, with development oriented toward the end user and marked needs, is designed to swiftly approach the market and ease the exploitation of the solution after the end of the project.

2.2 Reporting

In order to keep track of the progress of the ACCURATE project, internal Periodic Reports will be prepared every six months. These reports will be checked by the Coordinator (VICOM) to check the progress and to detect any potential risk or deviations:

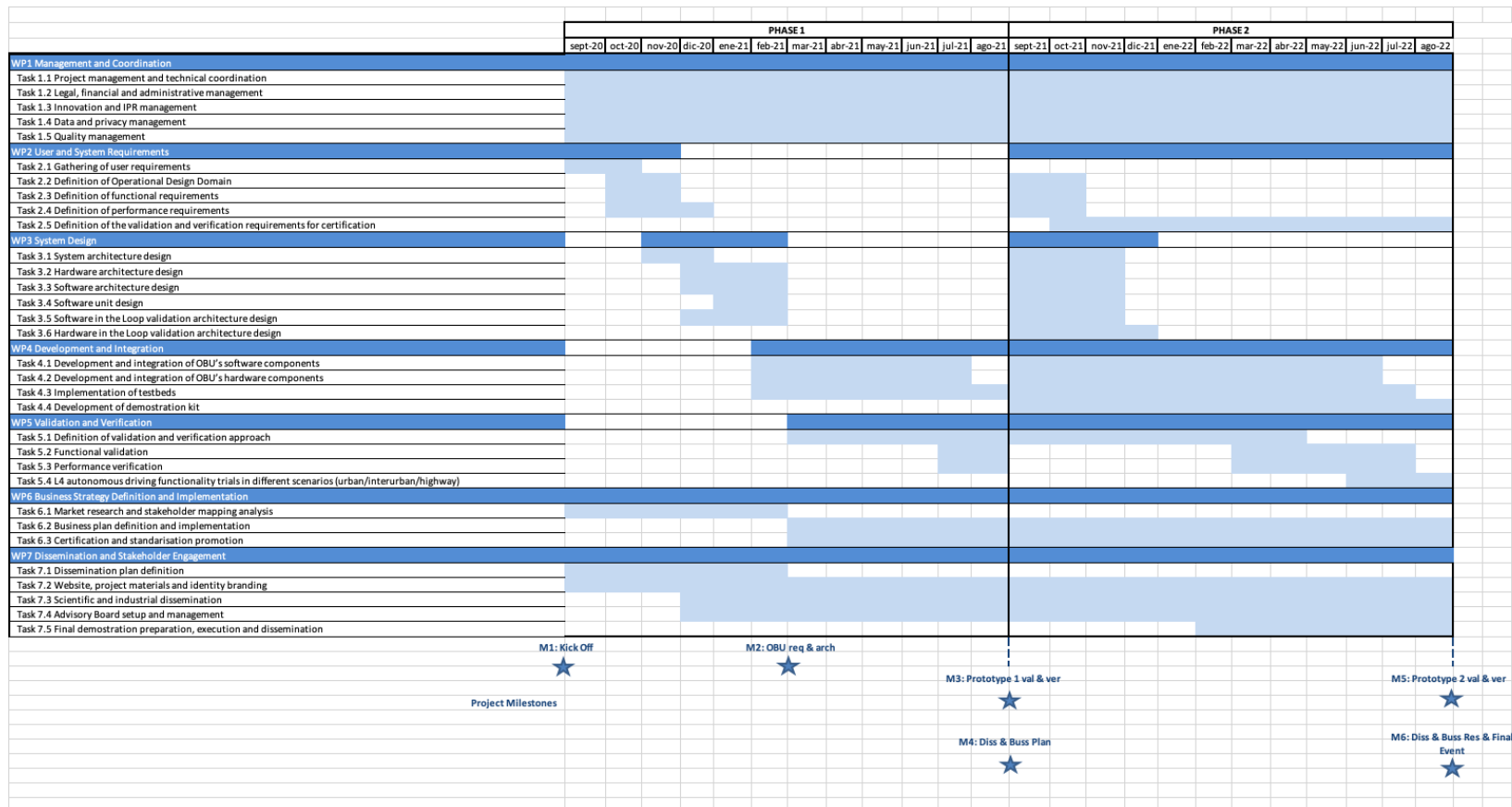
- Interim reports will be prepared by the Consortium for internal checks: M6, M12, M18 and M24
- Two official Periodic Reports will be submitted to the GSA: M12, and M24.

The Periodic Report for each period (including the final one) shall address both the technical and the administrative aspects of the project. It shall consist of sections described as follows:

- Publishable summary
- Core of the report
- Project objectives for the period
- Work progress and achievements during the period
- Project management
- Deliverables and milestones tables
- Explanation of the use of the resources
- Financial statements
- Certificates on financial statements when required

2.3 Duration and Gantt

The ACCURATE project has a duration of 24 months (from the 1st of September 2020 to the 31st of August 2022).



2.4 Project Management, Organisational Structure and Decision-Making

A management structure has been defined to ensure control of the project activities. Partner responsibilities, tasks and expected results have been defined before the start of the project to avoid grey areas and misunderstandings. The proposed project management structure and procedures are designed to provide leadership to enable the project to achieve its objectives, goals and to represent a framework for making structural decisions. It will provide effective co-operation between the various stakeholders and will offer opportunities for supporting innovative initiatives. It will include measures for continuous consultation with external stakeholders to discuss and confirm vision, directions and agree priorities. Provisions will also be made for the management of knowledge, protection of intellectual property rights and other innovation-related activities arising in the project.

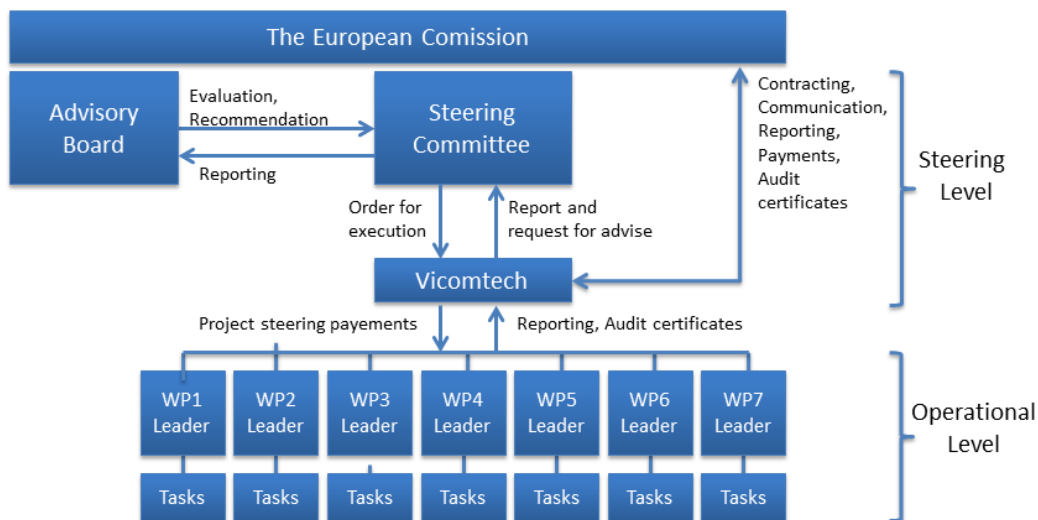


Figure 1 Management structure

2.4.1 Project Coordination

The project coordinator VICOM has the responsibility for the overall coordination of the ACCURATE project. VICOM is in charge of all the administrative, contractual and financial management of the project constituting the direct interface between the project and the GSA. Activities which will be carried by VICOM for the entire duration of the project are the following:

- Interface between the consortium and the GSA.
- Coordinate all technical activities and detect deviations.
- Convene the Grant Agreement.
- Design and application of management tools (processes, communication, task assignment, etc.).
- Organisation of meetings of the various management bodies, preparation of the minutes.
- Chair the Steering Committee (SC).
- Prepare and follow-up all plenary project meetings (notification, agenda, chairing and reporting).

- Monitor project progress, workload consumption and costs related to the budget.
- Technical follow-up, monitoring of project progress and risk assessment (follow up of project indicators such as GANTT chart, milestones and deliverables tables, risk register, as well as quality control through the Steering Committee).
- Checking and approving the documents generated in the project.
- Keep partners informed about project progress.
- Manage reporting to the commission and serve as the administrative liaison to the GSA as project secretary and archive.
- Work on deliverables and submission for ensuring a quality process.
- Management tasks implementation.

VICOM as the leading party within the ACCURATE project will spread the idea of excellence and its wide experience in the field of international cooperation throughout the project and will guide the partners by issuing appropriate rules for team working and assuring quality in the project. Within the Project Management Team, four roles have been defined:

- The Project Manager (PM), who is the ultimate reference for the overall responsibility for the organisation, planning and control monitoring of the quality of the technical achievements. This person acts as the interface with the European Commission. The PM will be Dr. Oihana Otaegui.
- The Technical Manager (TM) will assist the Project Manager in organisation, planning, and control of the project, as well as monitoring technical achievements. The TM oversees all interactions between WPs. The TM will be Dr. Marcos Nieto.
- The Administrative Manager (AM) will assist, support and advise the related to legal, financial and contractual aspects of the project. The AM in ACCURATE will be Seán Gaines.
- The Innovation Manager (IM) will coordinate the work of all partners as well as the Advisory Board to ensure that the project results can be optimally exploited and commercialised. The IM for the project will be Esther Novo.

2.4.2 Steering Committee

The ACCURATE Steering Committee (SC) is comprised of a representative of each partner taking part in the project and chaired by the Project Coordinator. The aim of this committee will be to advise and support the Project Coordinator's decisions on operational and management issues.

Where appropriate, the SC will try to resolve conflicts as they arise, otherwise it will refer the matter to the Coordinator with the necessary recommendations. The board will be responsible for all decisions of general nature within the frame of the EC contract and the Consortium Agreement, including:

- Any expenditure (except those already agreed upon in the budget).
- Any major change in the nature of the project.
- The preparation of the budget and any proposed amendments.
- Any transaction between the consortium and a third party.
- Ownership and access rights of the results.

The decisions within the management board will be taken preferably by consensus. In the case of disagreements, the decision will be put to a unanimous vote of all representatives, being necessary a simple majority.

Table 2 Members of the Steering Committee

No	Beneficiary	SC Representative
1	VICOM	Oihana Otaegui
2	FDC	Alexandre Alien
3	INT	Gwenaël Dunand
4	NC	Martin Grzebellus
5	VALEOFR	Benazouz Bradaï
6	VALEODE	Johannes Petzold

2.4.3 Work Package Leaders

The Work Package Leader (WPL) is responsible for the coordination of the technical work within a WP. In conjunction with the Project Coordinator and the relevant partners for each work package, the work package leader is responsible for the follow up of the work in compliance with the objectives and general scope of work as agreed by the partners. He or she will chair corresponding meetings and is responsible for estimating the resources required for the various work packages/tasks and drawing up suitably detailed programmes for executing the work and for producing the deliverables. These will be agreed with the participating partners and the Project Coordinator. Bi-weekly project follow-up meeting are organized between the Coordinator and each WP leader to check the status of the work.

Table 3 Work Package Leaders

No	WP Leader	Organisation
WP1	Oihana Otaegui	1- VICOM
WP2	Markus Bach	6 – VALEODE
WP3	Marcos Nieto	1 – VICOM
WP4	Markus Bach	6 – VALEODE
WP5	Paulo Mendes	4 – NC
WP6	Ramsundar Kandasamy	6 – VALEODE
WP7	Esther Novo	1 – VICOM

**Tentative at this stage of the project.*

2.4.4 Advisory Board

The Advisory Board (AB) will be setup by VICOM in T7.4. The role of the advisory group is to complement the technical and user requirements and the architecture, and to participate in project dissemination and communication tasks. The Advisory Board will be funded under the Coordinator's budget. The Advisory Board consists of representatives and organisations aligned with the different fields of expertise related to ACCURATE especially end users.

The list of Member of the AB will be updated throughout the lifetime of the project but prior to the stating of the project the following entitles have shown their interest in participating as members of the Advisory Board:

- AUDI AG – Ingolstadt
- PSA, Paris France
- JLR Innovation Centre Ireland
- BMW Group Munich
- PSA DRIA paris
- SEAT- VW Group Spain

Additionally, the ACCURATE project has the following Letters of Interest to monitor the results and achievements of the project. These partners will be invited to some specific activities during the project execution

- CEREMA – Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement (FR)
- Direction Générale de infrastructures de transport (FR)
- Groupe RATP (FR)
- Dirección General de Tráfico, Ministerio del interior (ES)
- STMicroelectronics (UK)
- Valeo – North America (US)
- Valeo – Japan (JP)

2.5 Project Management Procedures

In order to ensure a rapid and efficient launch of the ACCURATE project tasks, dedicated management tools and procedures, fitting all specific management requirements have been proposed from the start. These tools are placed under the responsibility of the Steering Committee and Work Package Leaders.

To ensure the project maintains rhythms and a team dynamic, a modified Scrum model will be used and oriented around team meetings. The following meeting types and intervals will be used:

- Plenary Meetings – Bi-Weekly one hour meetings by Video-Conference (every second Thursday at 11:00 CET).
- Work Package Meetings – Weekly/Bi-Weekly one hour meetings by Web-Conference for those work packages and tasks in focus and for those project participants active in the tasks.
- Internal reporting – Quarterly 360 degree reviews of project.
- Face-to-face Meetings – Plenary and/or technical meetings to be hosted by the Consortium Members at least every six months. Due to the current COVID-19 pandemic situation, these might be substituted by online workshops.

All these meetings and conference calls will be used to track technical, financial and managerial progress against plan, identify and assess issues and risks, refresh forthcoming deadlines and milestones. The agreed team meetings setting along with fluent email, telephone and Teams communications has proven satisfactory and it is intended to be maintained until the end of the project. Ad-hoc meetings will also be scheduled as needed to tackle specific topics.

During these meetings next objectives until next meeting and the sprint will be defined. The meeting will start with the check of the previously defined objectives and a report on how this have been achieved or not.

These two-week sprints are the most distinguishing feature of the proposed Scrum. Each sprint begins with sprint planning, during which the team meets to collaboratively create a backlog—a list of tasks they intend to accomplish during the sprint.

Over the course of each sprint, the teams report within the TEAMS collaboration platform the status of the work (no daily meetings)

At the end of the two weeks, the team holds a sprint review. Team members look back on the sprint, identifying things that worked well and things that need improvement.

2.5.1 Management Tools

To provide an adequate level of internal communication, the following measures have been adopted:

- VICOM has produced a partner mailing list of the consortium (including technical, financial and contractual contact points) accessible with the mail address fundamental_elements2019@vicomtech.org, and will keep it updated.
- A project management tool platform has been set up, Microsoft Teams, for regular communication and document sharing and Work Package interaction taking advantage of the complete set of

tooling provided by the platform including a built-in teleconference application.

- Microsoft Teams in a cloud base collaboration platform with a complete set of tooling and applications for project management
- Objective:
 - Team communication
 - WP level communication
 - Business processes
 - Data and content in project management workspaces
 - Multi-platform / multi-device access
- Main features and advantages
 - Document repository: deliverables, etc.
 - Meetings: Teleconference platform, agenda, minutes etc.
 - Good place for discussion thanks to the chatting application incorporated
 - Flexible and adaptable
 - Dynamic
 - Suitable for monitoring
 - Scrum board incorporated

2.5.2 Information Management

In order to document project results in the most efficient way, the following steps will be followed. Each partner will be required to formally report to the WP Leader on progress and achievement of specific deliverables in compliance with the work programme every three months (Partner Technical Progress Reports). These shall include, but not be limited to, the following:

- WP objectives for the period.
- Work progress towards objectives over the time period covered (including meetings and teleconferences).
- Milestones/deliverables achieved in the period.
- Risk analysis
- Explanation of the gaps and their impact on other tasks.
- Reasons for failing to achieve critical objectives and/or not being on schedule, and impact on other tasks as well as on available resources and planning.
- Corrective actions planned or taken.

The Work Package Leaders will be responsible for compiling such reports in the WP Progress Report also every three months. The Project Coordinator will receive this document from each WP Leader and document the Project Technical Progress Report. This document will be evaluated by the Steering Committee in order to monitor the status of the project and to take appropriate corrective actions and

taken into account to complete the quarterly reports.

Regarding cost reporting and other financial aspects, every partner will provide the project coordinator with the economic reports. The Coordinator will require all the necessary financial information from the partners.

2.6 Project Internal Procedures

In order to ensure a rapid and efficient launch of the project tasks, dedicated management tools and procedures, fitting all specific management requirements have been proposed, (see next section) These tools will be placed under the responsibility of the Steering Committee and Work Package Leaders.

2.6.1 Conflict Resolution

The Steering Committee will be in charge of the resolution of the conflicts that may arise during the execution of the project. Those decisions may be classified as follows: on-going management of project, review or amendment of the work-plan defined in this document, together with the allocation of the funding provided by the GSA under the FE (Fundamental Elements) contract between the parties and review or amendment of the terms of the FE contract; the cost and time schedules under the FE contract, the termination date of the FE contract.

Certain decisions will require approval by the GSA. If partners do not fulfill their obligations within the project, they will be cautioned by the consortium. All means will be taken to resolve any conflicts that might occur during the project by unanimous decision of the Consortium. However, if a unanimous decision cannot be reached within an appropriate time frame, a decision process with a qualified majority vote will be applied via WP leaders. Details of the necessary majority and the competencies to make decisions are specified in the Consortium Agreement.

Regarding amendments to the GA, significant project changes and deviations must be dealt with in writing. The participant or Work Package Leader proposing the change should forward a written explanation to the Project Coordinator, indicating the reasons behind the proposed amendment and the consequences in terms of budget, work programme, etc. As a general rule, all participants should act as fast as possible when a need for a project change is observed. The amendment request will be forwarded on behalf of the Consortium by the Project Coordinator to the GSA. Minor changes such as insignificant deviations from time schedule will be dealt with in the periodic reporting.

2.6.2 Self-Assessment Audits

The ACCURATE consortium will implement a system of self-assessment audits in the project. These audits will be based on feedback assessment mainly by project partners, but also by the Advisory Board and other key project stakeholders not identified at time of writing. The purpose of the audits will be team development and appraisal of project goals. They shall also facilitate communication and team development within the consortium by providing feedback on partner performance. This technique will underpin a strategy of management by objectives during the project. Furthermore, the process will enable the partners to participate in goal setting and ensure they are married to the project goals, provide

motivation to the consortium by demonstrating the participative nature of the project management process, provide clarity on the definition of project goals and most importantly make the communication and coordination processes of the project more effective and agile. The audits will coincide with project meetings at M6, M12, M18 and M24. The last will take the form of a project post-mortem. The kick-off meeting was used to start the process and familiarise the consortium with the process. It also served to allow the consortium to reflect on the proposal preparation and grant agreement preparation phase of the project and ensure that the kick-off began with all pertinent issues addressed.

The audits should be simple and avoid the issue of complexity with the process, foster open and frank discussion on the progress of the project and performance of partners and project principals. The expected benefit of the processes is to formalise periods of reflection after distinct phases of the project lifecycle so that inefficiencies and conflict can be identified and the appropriate measures adopted. The purpose of this review style is not intended to drive or maximise performance in the project, but rather to ensure the expectations of partners and other stakeholders are reasonable and achievable so to meet project goals. Prior to each project meeting a brief questionnaire (see Annex I) will be circulated to Project Principals requesting a self-assessment on the execution of their project tasks and of those partners with whom they have worked during the period. The Advisory Board will be asked to provide feedback on the consortium and the project as a whole. The questionnaire will be structured around the goals of the project period and the core values and ambitions of the project purpose. The coordinator will prepare equivalent assessments. As an aside to the project consortium meetings, the SC will hold a review meeting where the assessments will be contrasted and agreed. The output of the process and meetings will be a plan of action for the following project period that addresses corrective actions, objectives to leverage the strengths shown by the partner in the previous project period and tackle any identified needs of the partner to achieve its project goals.

3 Quality Assurance

A Quality Assurance methodology has been adopted for all the project activities in order to ensure several important aspects. There is a standard format used for each type of document. This has been done by creating templates for every type of document.

The aim of the Quality Assurance Plan (QAP) is to monitor the accomplishment of the objectives defined in the ACCURATE project, to evaluate the achievement of the different phases and to ensure the quality of all the Deliverables and results of the project. Quality assurance is based on the evaluation of the overall project performance on a regular basis to provide confidence that the project satisfies the relevant quality standards.

The specific objectives of the QAP are the following:

- Adopt a quality assurance methodology for all the project activities, according to the project internal procedures defined;
- Define standard formats to be used for each type of document;
- Define the project's brand guidelines for consistency and integrity (WP7);
- Define preparation rules and an internal quality revision plan for the deliverables;
- Establish the specific objectives for ACCURATE, as well as the links to the related WPs, milestones, and means of verification; and
- Define some Key Performance Indicators (KPI) to measure the progress of the execution of the project.

The Quality Management lies in the hands of the Project Coordinator and Work Package Leaders. The Project Coordinator will ensure that the work performed within the project meets functional and quality requirements. Work Package Leaders have also the responsibility of ensuring that the work performed within the Package meets functional and quality requirements.

3.1 Deliverable Preparation Rules

The deliverable preparation planning starts as soon as the related tasks start. Work package leaders are specifically dedicated to monitoring and reminding due dates to the deliverable responsible or editor; the internal quality revision plan for deliverables will be done by assigning two members of the consortium, not directly involved with the deliverable, who will revise the document according to the quality plan. The main steps for the deliverable preparation are as follows:

- Partner responsible of the deliverable generates the first table of content and sends it to the corresponding reviewers and contributors.
- The deliverable responsible partner sends the draft version to the reviewers, 14 days before the deadline set in the GA.
- Reviewers and involved contributors verify the quality of the deliverable, make any possible suggestion for its improvement following the Quality Review Form (see Annex II), and send it to the deliverable responsible partner, one week before the deadline.
- Deliverable responsible partners integrate the improvements in the document and send it to the Coordinator before the deadline.
- The Coordinator uploads the deliverable to the European Commission's Portal within the deadline set in the GA.

The Quality Review Form will provide answers to the general questions outlined next:

- Content of the document (coverage of the main topics, correctness of the index).
- Explanation of the topics (understanding of the document, correctness of the technical content).
- General comments (any relevant aspects to be highlighted).

3.2 Project Objectives and Milestones

The aim of this project is to develop a high precision positioning OBU, that can be integrated in systems required by any Car, Truck or Bus OEM, based on tight heterogenous sensor fusion that will be easily integrable on Automated Driving platforms for any vehicle for reaching SAE L4 and L5 automated driving levels.

ACCURATE will pave the way towards the development of a precise positioning system for high levels of automated driving SAE-L4 and L5 for many vehicle types (e.g. cars, buses, trucks) by the Development of close to production automotive onboard unit (OBU) prototype for EGNSS based positioning which will make use of the accuracy and integrity of the EGNSS components and services in a multi system and multifrequency specially taking advantage of E5a and E5b. Additionally, hybrid implementation of differential GNSS will be used as well as sensor fusion to enhance the capabilities of the positioning systems in adverse conditions. Safety-critical approach from design: certification in accordance with the automotive industry functional-safety standard ISO 26262 will be taken into account from the design phase.

In order to do so, the following specific objectives have been defined:

Table 4 List of specific objectives for ACCURATE

#	Objective	Success Indicator
1	Develop a high precision positioning system integrated in the AD platforms	
1.1	Developing EGNSS based precise positioning On Board Unit (OBU)	<p>The precise positioning OBU will comprise of multi-band multi-constellation EGNSS module from STMicroelectronics (TeseoAPP), MEMS IMU (Inertial Measurement Unit), and dead reckoning (DR) software that fuses EGNSS and IMU measurements with vehicle data (including speed and direction). An EGNSS chip which is ASIL compliant with ST Automotive Grade qualification which includes in addition to AEC-Q100 requirements and designed to meet automotive safety standard (ISO 26262).</p> <p>EGNSS raw measurements together with IMU measurements are processed by a SWPE (Software Positioning Engine) that runs inside the OBU's processor.</p> <p>The software positioning engine supports standard and PPP</p>

		<p>(Precise Point Positioning) based and RTK differential GNSS techniques and produces accurate position, velocity and attitude solutions for a vehicle or feature control.</p> <p>The OBU sends its output position information to the AD platform for fusion with other sensors. OBU also communicates with built-in or external telematics control units (TCU) of the vehicle for downloading GNSS correction data or other position related information, for example mapping data.</p>
1.2	<p>Support of PPP based differential GNSS and RTK and hybrid approach to correct and enhance the positioning accuracy</p>	<p>PPP is one of the main differential EGNSS techniques that enable a EGNSS receiver to achieve decimetre and centimetre positioning accuracy. Galileo E6 signal is going to include some PPP based correction data that will be derived from a network of ground based EGNSS base stations across Europe.</p> <p>The PPP approach will be combined with RTK corrections provided by Hexagon and supports the Hexagon TerraStar-X correction data which includes correction data for both GPS and Galileo signals. Use of Galileo E6 correction data may be investigated as an alternative correction source if information is made available under this programme.</p>
1.3	<p>Development of a tight multisensory fusion to meet the position requirements for enabling SAE-L4 and L5 automation levels</p>	<p>Position outputs of the OBU are tightly coupled with the inputs of other visual sensors to enhance the reliability, accuracy, precision and availability of the position solution. Thus, the project proposes to fuse with Valeo Scala Lidar based SLAM solution and if necessary, with a Radar based SLAM and also camera inputs, if required.</p> <p>The selection of the Scala Lidar has been made with the final objective of developing a real product to be deployed in any vehicle, since the Scala Lidar is the first laser scanner for the automotive volume production. The use of other LIDARs would be valid from the research point of view but difficult to evolve into a real deployable product.</p>

1.4	Integration with the Telematics and Control Units	<p>The Positioning Solution will be fused with perception and Cartography (HD Maps) to generate a Local Dynamic Map that will be feeding the Telematics and Vehicle Control Unit.</p> <p>The integration with the Control Unit is crucial to test and validate the solution as well as to demonstrate the capability of the proposed solution to be integrated in different vehicles.</p>
2	Inclusion of GNSS technologies in L4 and L5 validation and certification pipelines	
2.1	Inclusion of GNSS and positioning technologies in the process of L4 and L5 automated functions validation and certification	<p>Connected and Automated Driving (CAD) is foreseen to be one of the major technological challenges in the coming years. the increased complexity to validate emerging technologies implemented in CAD vehicles is one of the biggest barriers for its market introduction. The actual validation is based on specific scenes and manoeuvres related to aiding driving functionalities where only relative positioning was required.</p> <p>This project will study how to include the EGNSS and positioning technology in the validation channel by making used of the most advance simulation and scenario generation tools where not only the scene and vehicles dynamic are simulated generating a digital twin but also the constellation and the EGNSS signal's impact related to the specific scenario are taken into account.</p>
2.2	Impacts and parameters required from the positioning system and how data fusion and other kind of positioning system will ensure the localization level required to enable L4 and L5 levels	<p>The generation of a digital twin of the 3 main segments required on a L4 and L5 validation process: vehicle (dynamics and sensors), the driving scenario and the GNSS constellation will enable the study of the impact of specific parameters and situations in each of the digitalised segments.</p>
2.3	Extract scenario definition, requirements and testing protocols	<p>The generated digital twin will enable the requirements for scenario definition process and generate testing and validation protocols.</p>

3	<p>To implement testing and dissemination phases that will be crucial for assessing and validating functionality of the solution on the one hand and for end-user acceptance on the other hand.</p>	<p>Two development and testing cycles are planned with outputs in M12 and M24.</p>
4	<p>To implement a trial tests campaign in real environment conditions to test the system in its final configuration under the expected Operational Design Domains.</p>	<p>The project is designed following a cyclical approach where the consortium plans to start testing at the end of the first year. This approach will help the consortium to have a fast first prototype that can be used for two main purposes, first and most importantly to allow for quick redesign and enable new functionalities and testing, and second for supporting dissemination activities with a year-1 demonstrator.</p>
5	<p>To disseminate the project results to both the scientific community and the end-users (European drivers) and confirm the conditions for a successful business model. The main focus will be to develop a marketing plan for rapid target market penetration.</p>	<p>A viable business plan will be created during the project. The project will be disseminated in a number of papers and events. Section 2 includes a draft communication, dissemination and exploitation plan, which are all linked to the tasks in the work plan.</p>

The milestones of the ACCURATE can be defined around the incremental development workflow. In that sense, three main technical achievements are the integration and testing of the three defined prototypes. Additional milestones consider the completion of definition and RTD tasks required to face each integration stage:

Table 5 List of milestones defined from ACCURATE

#	Milestone	WP	Date	Means of verification
MS1	Kick-off meeting	WP1	M1	Kick-off meeting minutes
MS2	Definition of OBU requirements and architecture	WP2, WP3	M6	D2.1 and D3.1 delivered
MS3	Prototype 1 validated and verified	WP4, WP5	M12	D4.1, D5.1 and D5.2 delivered
MS4	Definition of Dissemination and Business plans	WP6, WP7	M12	D6.2 and D7.2 delivered
MS5	Prototype 2 validated and verified	WP4, WP5	M24	D4.2 and D5.3 delivered
MS6	Dissemination and exploitation actions completed including final event with public demonstration	WP6, WP7	M24	D6.4, D6.5, D7.3, D7.4 delivered

3.3 Project Progress Measurement

The performance of the project will be measured against a set of key performance indicators set by the Management Team and agreed by the SC. The performance will be appreciated according to several Quality Indicators agreed by the SC.

3.3.1 Key Performance Indicators

Besides the measurement of the technical progress and objective fulfilment, other key performance indicators have been selected to measure other aspects of the project. The KPIs will be calculated on a six-monthly basis and discussed during each SC. This means that each six-monthly a check point will be set. During the checkpoint in depth analysis will be conducted by analyzing and matching the KPIs with their respective associated WPs and Task generating a pondered value of expected fulfillment rate for the period. As this pondered value is only an approximation, in case of not fulfilling the expected value during the period a follow-up monitoring task will be set for the following period to ensure the correct evolution of the KPI.

These Quality Indicators will follow in particular the respect of internal procedures (Technical reporting, Financial reporting), the mobilisation of resources and budget consumption (Financial assessment),

communication and dissemination activities, production of knowledge, intraconsortium communication, project communication, cooperation and integration, risk management and gender equality.

Table 6 Indicators about the progress of the work

Number	Indicator	Expected value at the end of the project
PW1	Work of the Deliverable in progress = (Number of Deliverables submitted / total number of Deliverables)*100	100%
PW2	Work of the milestone in progress = (Number of milestones achieved / total number of foreseen milestones)*100	100%
PW3	Reports work in progress = (Number of reports completed / total number of foreseen reports)*100	100%
PW4	Time work in progress = (Months from the start of the project / 36 months duration)*100	100%
PW5	Budget consumption = (Costs incurred from the start of the project / Total budget)*100	100%

Table 7 Indicators about procedures

Number	Indicator	Expected value at the end of the project
P1	Number of consortium meetings performed	4
P2	Number of workshops organised	2
P3	Number of self-assessment audits performed	4
P4	Number of tools provided to facilitate project management	2
P5	Number of templates distributed	3

Table 8 Indicators about knowledge

Number	Indicator	Expected value at the end of the project
K1	Development of GNSS based positioning solution	100%
K2	Development of computer vision algorithms for positioning	100%
K3	Development of sensor fusion	100%
K4	Number of prototypes implemented	3
K5	Number of patents generated/IP	2
K6	Number of contributions to the existing standards	1
K7	Number of new R&D projects as consequence of the project or derivatives from the acquired expertise and knowledge	4
K8	Number of reusable modules that could be introduced in the market	1
K9	Average time to market for the different components	12 Month after project ends
K10	Expected time to market of the final prototype	12 Month after project ends

Table 9 Indicators about technology readiness level

Number	Indicator	Expected value at the end of the project
TR1	GNSS Positioning System	TRL7
TR2	Video/Image/point Cloud analysis for positioning	TRL7
TR4	GNSS and Vision hybridisation	TRL7
TR5	ACCURATE on-board Unit	TRL7

Table 10 Indicators about communication and dissemination

Number	Indicator	Expected value at the end of the project
CD1	Number of conferences in which the partners of the ACCURATE project participate	6
CD2	Number of scientific publications accepted	4
CD3	Number of dissemination tools implemented (website, posters, leaflets, etc.)	10
CD4	Number of visits to the webpage	3000
CD5	Number of contacts received throughout all the communication channels	15

Table 11 Indicators related to gender issues

Number	Indicator	Expected value at the end of the project
G1	Gender balance in the Management Team	50%
G2	Gender balance of the key role in the project (Work Package Leaders, principal researchers, etc.)	30%

4 Critical Risks

Risk is defined as any event potentially precluding the achievement of the objectives of a certain activity or task. Risk management is a balance of judgement so that the risks are minimised without over-emphasising the potential problems. Controlling the risks will help to manage the project to properly achieve the objectives on time and in budget. WP leaders will identify the risks relevant to their activities or tasks and shall be requested to properly and promptly document them to the SC. Risk management requires identification, control and recording of risks, highlighting the consequences and taking the adequate management actions.

To ensure a successful development process, a risk management process has been adopted, intended to enhance the likelihood of success by identifying risk areas early in the cycle, adopting mitigation plans, and planning for escape routes which preserve the essence of ACCURATE in cases of major changes. The process will involve a risk register which will be regularly reviewed by the SC and which will be forwarded to the GSA as part of the regular reporting process (Reports).

In order to guarantee the highest quality risk management in ACCURATE, Project Management Institute's Risk management model¹ and best practices will be adapted to the specific needs of the project. The risk management process that will be followed includes the following steps:

- I. Identification of risks: using prior experiences, participation of the right people, using appropriate methods (e.g., brainstorming, interviews, root-cause analysis, Delphi technique), and registering of the identified risks in a risk log.
- II. Qualitative risk analysis: analyse and assess the probability and the impact or consequences of the identified risks in areas such as cost, schedule, or performance. Calculate and rank risks (e.g., using weighted ranking techniques).
- III. Quantitative risks analysis: use of quantitative models (e.g., Monte Carlo analysis, expected monetary value); only for important risks that can be quantified.
- IV. Plan risk responses: firstly, deciding if the strategy will be to avoid, transfer, mitigate (actions to reduce the probability), or accept (consider adding a contingency reserve).
- V. Monitor and control risks: this involves periodic re-assessments on the already identified risks and new risks identification exercises. Audits of the planned risk responses implementation, definition and planning of corrective actions if needed, and analysis of trends.

As a first step towards following the appropriate risk policy, the table 12 summarises the critical risks identified during the proposal and grant agreement preparation, related to project implementation, which will be updated during the project. Possible risk mitigation measures are also included. Moreover, the state of the play regarding reference reporting period, mitigation measures applied, risk materialised and actions will be continuously updated for the foreseen risks, and also unforeseen risks will be reported in necessary.

For each risk identified, the assessment will be undertaken according to the following criteria:

Description of the risk	Description of the type of risk according (related to Technical, Management/Human, Procedural, Legal, etc.)
Effect	Assessment of the potential impact of the risk in terms of either schedule, cost or performance (High, Medium, Low)
Probability	Assessment of the probability of risk occurrence (High, Medium, Low)
Status	Processing status of each identified risk (Open, Closed, Mitigated)

Each risk shall be analysed to determine its severity and a suitable reporting procedure followed according to the severity.

Severity	Monitoring and reporting actions
High	Unacceptable risk, which includes immediate detailed reporting to the Project Coordinator and immediate action initiation for risk mitigation. High frequency follow-up.
Medium	Unacceptable risk with immediate synthetic reporting to the Project Coordinator and action proposal for risk mitigation. Medium frequency follow-up.
Low	Acceptable risk, with no reporting and potentially action proposal for risk mitigation. Low frequency follow-up.

The following table describes the most critical project implementation risks identified so far (the status criterion will be added during the project).

Table 12 Foreseen Risks (as per GA)

Risk	Description	Probability	Effect	WP	Risk Mitigation Measures
1	Discrepancies in the technical visions: Project delays, adjustment of contributions	Low	Medium	WP2, WP3, WP4, WP5	Frequent communication within WP will solve minor points that may be raised
2	Technical development diverges from project initial goals: Core technical items not adequately addressed to meet the project objectives	Low	Medium	WP4	WP2 and WP3 will issue global specifications and thanks to the phase incremental work plan this risk will be minimised
3	The objectives in terms of precision and availability of the positioning information are not reached: The service is not as efficient as expected.	Medium	Medium	WP4, WP5	Other techniques (higher precision sensors) will be implemented to improve the prototype
4	Theoretical results not achieved	Low	Low	WP5	Special effort during the requirements definition so that the specifications of the system cover all the functional and performance needs
5	Demo trials are not successful: The quality of the AD functionality will not be approved by end users	Low	Low	WP5	An iterative process (2 testing phases) will be implemented to improve the outputs of WP4 in accordance to the test reports of WP5
6	External competition impacts on ACCURATE business case.	Low	Medium	WP6	To the consortium knowledge, such positioning engine is not in the market yet. Valeo is a leader TIER1 in this sector. Even if such systems would be close to entering the market, the short duration of the project should enable ACCURATE to be among the pioneers on this market
7	Dissemination and exploitation of the product not successful	Medium	Medium	WP7	Special effort during the marketing and dissemination tasks will be carried out. Extra events and acts will be planned with stakeholders.
8	Conflicts of interest between partners on commercial model	Low	High	WP6	All partners involved in ACCURATE are complementary; bringing in the project a specific expertise that none of the others could claim to have. There are very few overlaps in the core business activities of the consortium partners, reducing the risk of conflicts of interest.

Additional note the actual COVID-19 pandemic situation may affect the possibility of organizing physical meetings. If this is the case Teleconference and webinars will be organized to palliate the effect. However, for the next 6 month the effect of the pandemic situation is neglectable in terms of impact to scheduled activities.

5 Conclusions

This document presents two main topics regarding the project management activities. On the one hand this document presents the internal guidelines that will be followed for the appropriate management of the ACCURATE project. This deliverable contains the handbook on project management for ACCURATE describing the project structure, the management structure and main procedures.

On the other hand, this document also presents the internal guidelines that will be followed for the appropriate quality management of the ACCURATE project. This document can be considered as the handbook on project quality assessment for ACCURATE, including links to the project structure (Work Packages, timing, management structure and internal procedures). This deliverable presents the quality assurance plan, with a description of the deliverable preparation rules and the objectives and progress measurement through Key Performance Indicators. Finally, the list of critical risk and mitigation strategies are also described.

Some of the sections in this document (e.g. Risks) will be updated throughout the lifetime of the project, as previously indicated, in order to keep track and measure project progress, undertake corrective actions if needed to meet the ACCURATE plan, identify and manage technical risks, assuring the highest level of quality.

6 Annexes

6.1 Annex I: Self-Assessment Audit Questionnaire

	Partner Evaluation 1-5	Coordinator Evaluation 1-5
Q1 Coordination		
Administrative, Technical, Financial, etc. An overall rough evaluation of the performance so far.		
Q2 Communication		
Please evaluate the communication between partners and from the coordinator to date.		
Q3 Conflict		
How well has conflict been managed so far?		
Q4 Key Roles		
Please Rate the performance of the following Project Principals.		
Project Manager		
Technical Manager		
Administrative Manager		
Innovation Manager		
Q5 Work Package Leaders		
Please rate the performance of the following WP leaders. Only if you have had interaction and a dependence on their WPs		
Q6 Partners		
Please rate the performance of the partners (excluding the coordinator). Only if you have had interaction and a dependence on their WPs.		
Q7 Progress against objectives - Period		
How would you rate our progress against objectives for the period?		

6.2 Annex II: Quality Review Form

Document Title:		
Description:		
Document Reference:	Reviewer name:	Deliverable leader:
Review:	Review Sheet issue date:	Peer Review Date:
Dated:		
Files enclosed:		

Id.	Page	Chapter	Severity	Reviewer remark and proposed change	Decision	Deliverable leader comments
1			High/Low		Deferred / Yes / No	
2			High/Low		Deferred / Yes / No	
3			High/Low		Deferred / Yes / No	
4			High/Low		Deferred / Yes / No	
5			High/Low		Deferred / Yes / No	
6			High/Low		Deferred / Yes / No	
7			High/Low		Deferred / Yes / No	

Decision: YES (remark taken in account) / NO (remark not taken in account) / Deferred (Remark not taken in account, additional action/investigation required)