

ANTENNAE Communication, Dissemination and Exploitation (CDE) Plan

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Abstract

This document represents the ANTENNAE project Deliverable 3.2, the intermediate version of the Communication, Dissemination and Exploitation Plan developed under Work Package 3. The plan describes relevant considerations and activities to be carried out by the ANTENNAE partners during the project time and beyond, as seen during the first three months of the project. The document provides details on communication, dissemination, and exploitation (CDE) objectives and strategies, relevant stakeholders, interaction channels and targets – as seen from the current status of the project's development and the documented progress in the CDE actions.

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¹ Representatives of all the beneficiaries involved in the project

² Representatives of the beneficiaries involved in the project.

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ANTENNAE

DATA DRIVEN COST EFFECTIVE 5G INTEGRATED CNS AS A SERVICE

ANTENNAE

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1 Introduction

This document provides details on the ANTENNAE project communication, dissemination and exploitation (CDE) activities. The initial CDE plan established the relevant activities for the first half of the project period. The current document is the intermediate, updated version of the CDE plan, D3.2 (M14). The document reports on the activities that took place and introduces the planned activities for the second half of the project. The final version of the document will be presented as deliverable D3.3 (M28).

Regarding the CDE activities, the document establishes requirements, sets objectives, and defines actions to achieve them. Also, it identifies the high-level messages to communicate, the target audiences, and the channels to reach them. Finally, it lists specific key performance indicators (KPIs) to measure the outcomes.

The primary objectives of the ANTENNAE CDE activities are:

- Maximisation of the communication outreach.
- Maximisation of the knowledge and scientific impact.
- Long-term impact on the knowledge domain.

These objectives are planned to be achieved during the project period through the collaborative efforts of all partners. The presented actions are monitored, and corrective actions will be taken towards reaching the objectives if needed.

1.1 Definitions

Particularities and common principles of the CDE activities are summarised in Figure 1.



Figure 1: Definitions of communication, dissemination and exploitation in the EU framework programmes.

1.2 Applicable reference material

- [1] SESAR 3 Joint Undertaking Multiannual Work Programme 2022-2031 (2022)
- [2] Bi-annual Work Programme (BAWP) 2024-2025 (2023)
- [3] Making Europe the most efficient and environmentally friendly sky to fly in the world – The time is now! (2023)
- [4] European ATM Master Plan 2025 - Benefits and Investment Needs - Companion Document (2024)
- [5] Grant Agreement N°101167288 — ANTENNAE — HORIZON-SESAR-2023-DES-ER2-WA2-1 (2024)
- [6] SESAR JU Project Handbook (2022)

- [7] SESAR 3 JU Programme Library and guidelines (2024)
- [8] U-space CONOPS 4th Edition (2024)
- [9] ANTENNAE PMP - Project Management Plan (D1.1) (2024)
- [10] ANTENNAE DMP - Data Management Plan (D1.2) (2024)

2 Project introduction

2.1 ANTENNAE project

Emerging U-Space and UAM concepts envisage a new generation of small, highly manoeuvrable, and highly automated aircraft operating at low altitude, alongside existing helicopters and general aviation users. Coordination & deconfliction of large numbers of such aircraft operating in primarily urban environments requires new Communications, Navigation, and Surveillance (CNS) infrastructure to ensure the safety of passengers, the public, and other stakeholders while supporting complex low-altitude operations. Leveraging the scalable waveforms of 5G New Radio (NR), modern IP-based software-defined networking, and distributed computing capabilities, ANTENNAE (dAta driveN cost-Effective 5G iNtegrated CommuNication, Navigation, and Surveillance (CNS)-as-A-Service) proposes a flexible and resilient integrated CNS-as-a-Service model supporting both low-altitude piloted and U-Space operations and builds upon the mature and growing family of 3GPP 5G standards including system architecture, deployment models, and commercial implementations.

ANTENNAE will apply advanced modelling to validate the applicability of 3GPP standards to deliver low-altitude CNS functions, including the full range of aeronautical data services (through 5G eMBB & URLLC), navigation (through 5G-based A-PNT), and surveillance (through emerging A-SUR and joint communication & sensing (JCS) concepts). ANTENNAE will examine the architectural benefits of established 5G deployment models for providing distributed data services, network resilience, and scalability. ANTENNAE will also look to the future of the 3GPP standards by examining technologies under development in the 3GPP working groups for beyond 5G ("6G") services.

Finally, ANTENNAE will conduct a rigorous quantitative techno-economic analysis based on these engineering models to assess the financial feasibility of deploying a scalable integrated CNS-as-a-Service through a 5G access network, comparing it to alternative technological approaches.

2.2 Project high-level messages

ANTENNAE project high-level messages are the following:

1. ANTENNAE explores the growing connectivity needs of emerging aviation operating in low airspace and develops new cost-effective technological solutions to advance the future of CNS to support U-space and ATM integration.
2. ANTENNAE builds on existing aviation and 3GPP telecommunication standards by leveraging 5G technology and integrating terrestrial and non-terrestrial networks to enable integrated CNS services, aiming to support the needs of the European Digital Sky vision.
3. ANTENNAE designs an Integrated CNS network architecture based on existing and foreseeing standards and evaluates the performance in different scenarios to determine the resilience of this new concept

| # Key message id | Communication | Dissemination |
|------------------|---|---|
| 1 | All target groups are to be reached through all channels described in this document | Knowledgeable audience, to be reached out through all channels described in this document |
| 2 | All target groups are to be reached through all channels described in this document | Knowledgeable audience, to be reached out through all channels described in this document |
| 3 | All target groups are to be reached through all channels described in this document | Knowledgeable audience, to be reached out through all channels described in this document |

Table 1: Key message handling

All three messages aim to achieve socio-economic impact and contribute to the implementation of U-spaces and its convergency with ATM systems to achieve safe and secure operations of existing aircrafts as well as new entrants and emerging technology aircraft (ETA).

2.3 Keywords

| Key Word | Definition |
|--|--|
| Aerial Operations (AO) | An aerial service which includes transportation and delivery, observation and monitoring, mapping and imaging, surveillance and inspection, and many other application purposes. |
| Aircraft | Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface. Aircraft refers to either an unmanned aircraft that is part of an Unmanned Aircraft System (UAS), also known as a drone, or Vertical Take Off and Landing (VTOL) Capable Aircraft (VCA), piloted or without a pilot onboard. |
| Air Traffic Management (ATM) | The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions. |
| Command and Control (C2) | The data link between the remotely-piloted aircraft and the remote pilot station for the purposes of managing the flight. |
| Digital European Sky | The digital European sky leverages the latest digital technologies to transform Europe's aviation infrastructure enabling it to handle the future growth and diversity of air traffic safely and efficiently, while minimising environmental impact. |
| Electric Vertical Take-Off and Landing (eVTOL) | A type of manned or unmanned aircraft that uses electric power to hover, take off and land vertically without the use or need for a runway |

| | |
|---|---|
| Innovative Air Mobility (IAM) | Is a concept that accommodates operations with novel aircraft designs that are conceived to offer new air mobility of people and cargo, in particular in congested (urban) areas, based on integrated air and ground-based infrastructure. |
| UAS | An unmanned aircraft and the equipment to control it remotely |
| Unmanned Aircraft | Any aircraft operating or designed to operate autonomously or to be piloted remotely without a pilot on board |
| Urban Air Mobility (UAM) | A new safe, secure and more sustainable air transportation system for passengers and cargo in urban environments, enabled by new technologies and integrated into multimodal transportation systems. |
| U-space | <ul style="list-style-type: none"> - U-space airspace means a UAS geographical zone designated by Member States, where UAS operations are only allowed to take place with the support of U-space services. - U-space service means a service relying on digital services and automation of functions designed to support safe, secure and efficient access to U-space airspace for a large number of UAS. |
| Vertical Take Off and Landing (VTOL) Capable Aircraft (VCA) | A power-driven, heavier-than-air aircraft, other than aeroplane or rotorcraft, capable of performing vertical take-off and landing by means of lift and thrust units used to provide lift during take-off and landing |

Table 2: ANTENNAE Keywords

2.4 Focal point for communications, dissemination and exploitation.

| Name | Role | Email address |
|--------------|--------------|---------------------|
| Vadim Kramar | WP3 CDE Lead | vadim.kramar@vtt.fi |

Table 3: Focal points of contact

2.5 Stakeholders identification

| Stakeholder | Content |
|--|---|
| Stakeholders of the IAM Ecosystem: USSPs, ANSPs, Vertiport Operators, C2CSPs, etc. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Major air vehicle manufacturers and/or operators: Airbus, Lilium, Volocopter, Wisk, AutoFlight, Manta Aircraft, etc. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| European airports/vertiports: Paris, Brussels, Stockholm, Madrid, Dublin, etc. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Air Passengers: customers of IAM fleet operators. | Non-knowledgeable audience, target for communication to raise awareness and improve social acceptance |

| | |
|---|---|
| Telecom Operators: Telefonica, Orange, Vodafone, Deutsche Telekom, BT Group, etc. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Telecom Vendors: Nokia, Ericsson, etc. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| SatCom Operators: Inmarsat, Viasat, Echostar, Intelsat, Eutelsat, etc. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Industry Practitioners: Engineers and business analysts in different industries | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Scientific community: fields of Telecommunications, Aerospace, Signal Processing, Computer Science, Data Science. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Standardisation Bodies: European Organisation for Civil Aviation Equipment (EUROCAE), Radio Technical | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Commission for Aeronautics (RTCA), 3rd Generation Partnership Project (3GPP). | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Regulators: European Union Aviation Safety Agency (EASA), Federal Aviation Agency (FAA), etc. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Policy and decision-makers: Governments at national, regional or district levels. | Knowledgeable audience, target for communication, dissemination, and exploitation. |
| Public: Citizens of different countries | Non-knowledgeable audience, target for communication to raise awareness and improve social acceptance |

Table 4: Stakeholders

| Stakeholder example | Benefits |
|--|--|
| U-Space Service Providers (USSPs) | The USSPs are one of the main stakeholders for the ANTENNAE project, as they are responsible for the safety management of UAS Operations in the VLL. Project results will be shared with them so that they can benefit from the simulations of advanced CNS technologies in the project. |
| IAM Operators | The operators will be another important beneficiary of the ANTENNAE project results. The dissemination message for this target audience will be centred around the ease and safety of operations using the widely deployed cellular networks. The simulation results will also be shared with them in this regard. |
| Telecommunication Operators | These entities would be an important target audience both for the simulation results and for the techno-economic analysis of the different networks. |
| Air Navigation Service Providers (ANSPs) | To facilitate the vision of an integrated airspace, ANSPs have an important role to play and can benefit highly from the features of an integrated CNS system that increases real-time awareness about airspace traffic, thereby improving the safety and efficiency of the VLL airspace. |

| | |
|--|--|
| European and National Aviation Authorities | The authorities will be able to use the results of the ANTENNAE project as input for developing future regulations for IAM |
| Standardisation Bodies | The CNS requirements defined and tested within the ANTENNAE will be shared as input with the Working Group (WG) at the national and international standardisation groups, such as EUSCG, EUROCAE, RTCA and JARUS. Airbus Urban Mobility (AUM) is an active member of the joint activity between RTCA Special Committee-228 (SC-228) and EUROCAE Working Group-105 (WG-105) on C2 Communications for UAS. AUM is also an active member in all Working Tasks (WTs) of the Aerial Connectivity Joint Activity (ACJA) that facilitates engagement between aviation and telecom industries through the Global UTM Association (GUTMA) and GSM Association (GSMA). The recommendations from ACJA are directly submitted as an input to both aviation and telecom standardisation bodies |
| Researchers and Industry Professionals | ANTENNAE will disseminate the project outcomes by means of peer-reviewed publications in journals and magazines. IEEE Communications Magazine, which facilitates the publication of concepts in a universally accessible way, typically in tutorial style, and journals such as IEEE Transactions on Wireless Communications, which enable a more detailed and specialised presentation of the concepts and outcomes are potential targets, will be targeted. The publications will be open access. Additionally, conference articles will be submitted for publication in relevant fora, such as the technical symposia on Aerial Communications at the IEEE International Conference on Communications (ICC) and the IEEE Global Communications Conference (Globecom), held annually in May and December, respectively |
| Young professionals and students | On-line and/or physical courses and seminars will be developed related to ANTENNAE topics at academic institutions that work in close collaboration with the partners. Technical tutorials at conferences will also be targeted, and several invited seminars and keynotes are expected to be delivered by some of the partners throughout the project, thereby disseminating its main findings |
| General Population | Social acceptance of air transport is also an important pillar of the European ATM Master Plan. The ANTENNAE project will support SJU activities in disseminating the benefits of the associated SRIA to the public |

Table 5: Stakeholder examples and benefits

3 Communication

3.1 Communications objectives and strategy

Going beyond the specialised target audience considered in the dissemination activities, ANTENNAE has also devised a strategy of communicating its concept and results to a wide non-specialised audience, targeting civil society and the mass media. Communication will ensure that the findings emanating from ANTENNAE will also create an impact at the societal level. Different communication activities are carried out during the project. This communication plan is created in close collaboration with the SJU communications team to ensure that the activities are in line with the SESAR and Horizon Europe brand. During the communication phase, the SESAR-JU funding will be clearly acknowledged in all the print and digital means of communication and dissemination.

The **main objective of the communications** of the ANTENNAE project is to maximise of the communication outreach.

The project results are communicated to identified target groups using various channels tailored for the different target groups: Classic press releases, continuous social media activities, the involvement of the Advisory Board and their respective networks and strong coordination with SJU to maximise the impact of the communication and dissemination efforts also via the means that SJU makes available for that purpose. The following list indicates the minimum CDE activities the project plans to undertake. This list considers inputs or suggestions from SJU3:

- Promote the project visibly in the **webpage** fine-tuned for this purpose. The target is to get at least 50 visits to the website per month.
- **Press releases, newsletters and social media** posts will be released during the project. At least 2 press releases will be published, and the target is to get at least 300 followers for the project and 200 items shared on social media.
- Promote the project with various **promotional materials**. The target is to distribute at least 300 copies of the digital and printed material.
- During the various **stakeholder workshop** activities, the project will collect multimedia material which can be used for communication and dissemination purposes.
- Participate in several **conferences** and spread project results among the research and industrial communities. The target is to present the project at least at three conferences, including a flagship conference such as the EEE Communications Society.

3.2 Communication target audiences

The following stakeholders with respective communication and dissemination goals have been identified as the target audience:

| Target | Channel | Message | Activities |
|--------|---------|---------|------------|
|--------|---------|---------|------------|

| | | | |
|---|--|---|--|
| U-Space Service Providers (USSPs) | Peer-reviewed publications, internal and external events website and media, social media. | Raise awareness about the project activities, promote achievements, generate understanding, and engage. | Webpage, press releases, newsletters, promotional material, publications, workshops and conferences. |
| IAM Operators | Peer-reviewed publications, internal and external events website and media, social media. | Raise awareness about the project activities, promote achievements, generate understanding, and engage. | Webpage, press releases, newsletters, promotional material, publications, workshops and conferences. |
| Telecommunication Operators | Collaborative actions, peer-reviewed publications, internal and external events website and media, social media. | Raise awareness about the project activities, promote achievements, generate understanding, and engage. | Webpage, press releases, newsletters, promotional material, publications, workshops and conferences. |
| Air Navigation Service Providers (ANSPs) | Peer-reviewed publications, internal and external events website and media, social media. | Raise awareness about the project activities, promote achievements, generate understanding, and engage. | Webpage, press releases, newsletters, promotional material, publications, workshops and conferences. |
| European and National Aviation Authorities | Peer-reviewed publications, internal and external events, website and media. | Raise awareness about the project activities, promote achievements, generate understanding, and engage. | Webpage, press releases, newsletters, promotional material, publications, workshops and conferences. |
| Standardisation Bodies | Internal and external events, standardisation WGs. | Raise awareness about the project activities, promote achievements, generate understanding, and engage. | Webpage, press releases, newsletters, promotional material, publications, workshops and conferences. |
| Researchers and Industry Professionals | Peer-reviewed publications, internal and external events website and media, social media, standardisation WGs. | Raise awareness about the project activities, promote achievements, generate understanding, and engage. | Webpage, press releases, newsletters, promotional material, publications, workshops and conferences. |
| Young professionals and students | Peer-reviewed publications, internal and external events | Raise awareness about the project activities, promote achievements, generate understanding, and engage. | Webpage, press releases, newsletters, promotional material and publications. |

| | | | |
|---------------------------|----------------------------------|---|--|
| | website and media, social media. | | |
| General Population | Website and media, social media. | Raise awareness about the project and the research area as a whole. | Webpage, press releases, newsletters and promotional material. |

Table 6: Communications target audiences

3.3 Branding and Acknowledgements

Visual identity is the first key aspect of a clear, attractive, coherent, and effective communication structure.

The ANTENNAE visual identity has been shaped following the SESAR 3 JU Visual Charter that specifically aims to:

1. Build brand recognition and, thereby brand value;
2. Improve the efficiency of both internal and external communications;
3. Produce a professional and consistent visual identity across all media.

The ANTENNAE logo in Figure 2 has been designed carefully following the SESAR 3 JU Visual Charter, which provides the key elements for the logo branding, including the font (Titillium Web) and the dark blue colour (HEX: #00306F) identified within SESAR 3 JU visual identity rules.

ANTENNAE

Figure 2: Project logo.

Any communication and dissemination activity related to the project will acknowledge EU funding by displaying the European flag and funding statement (Figure 2, left), as per Grant Agreement, chapter 4, section 2, article 17.2. Moreover, to ensure consistent communication and build brand recognition, project will use the SESAR 3 JU logo (Figure 2, right), funding acknowledgement (*This project is funded by the SESAR 3 Joint Undertaking under the European Union’s Horizon Europe research and innovation programme under Grant Agreement N° 101167288*) in all communications material promoting its project activities.



Figure 3. European emblem and funding statement (left), SESAR 3 Joint Undertaking logo (right)

3.4 Communication channels

The communication means will consist of the following:

- **Visual and Corporate Identity** was created with the support of the SJU communications team to ensure that the project gets a professional and consistent look for the different communication and dissemination activities.

- **Project website** was created and maintained to create awareness about the project and to provide a consistent platform for sharing information about the project scope and goal, work plan, involved partners and public deliverables.
- **Workshops** – one workshop was organised with relevant stakeholders during the entire course of the project and the others are planned. These workshops will have two benefits: on the one hand, to collect the inputs and requirements from the different stakeholders and, on the other hand, to disseminate and communicate the findings and results of the project.
- **Mass Media** presence will be maintained through press releases in different countries.
- **Social media presence is ensured by publishing key project updates** on the social media accounts of the different partners.
- **CORDIS website** has 7 million visitors annually. We will leverage it to share the research results, and it will show the successful European collaboration.

3.4.1 Website

The ANTENNAE website is one of the main elements of the project's CDE plan. It will display general information about the project and its objectives, as well as its activities and results. The website will also offer a range of functionalities, including information on news and events, downloadable dissemination materials, and relevant external links. It will provide updated information about the progress, status of the activities, and any other relevant communication related to ANTENNAE. The ANTENNAE website is updated whenever needed to follow the project's progress. Website KPIs are listed in Chapter 3.5.

Two domain names were purchased for the project:

<https://antennae.eu/> - this is a formal project URL that the partners agreed. All the HTTP requests to this domain are forwarded to the IntegratedCNS.eu URL.

<https://IntegratedCNS.eu/> - this is the dedicated URL that is intended to host a website for the Integrated CNS domain activities that partners agreed to continue not only through the ANTENNAE project.

Both domains are hosted on a server located in Europe. Both domains and the project website will be operational at least three years after the completion of the project. A temporary landing page is set created until the final website is ready in order to present the project information briefly and concisely. The fully operational website is currently under development.

Integrated CNS

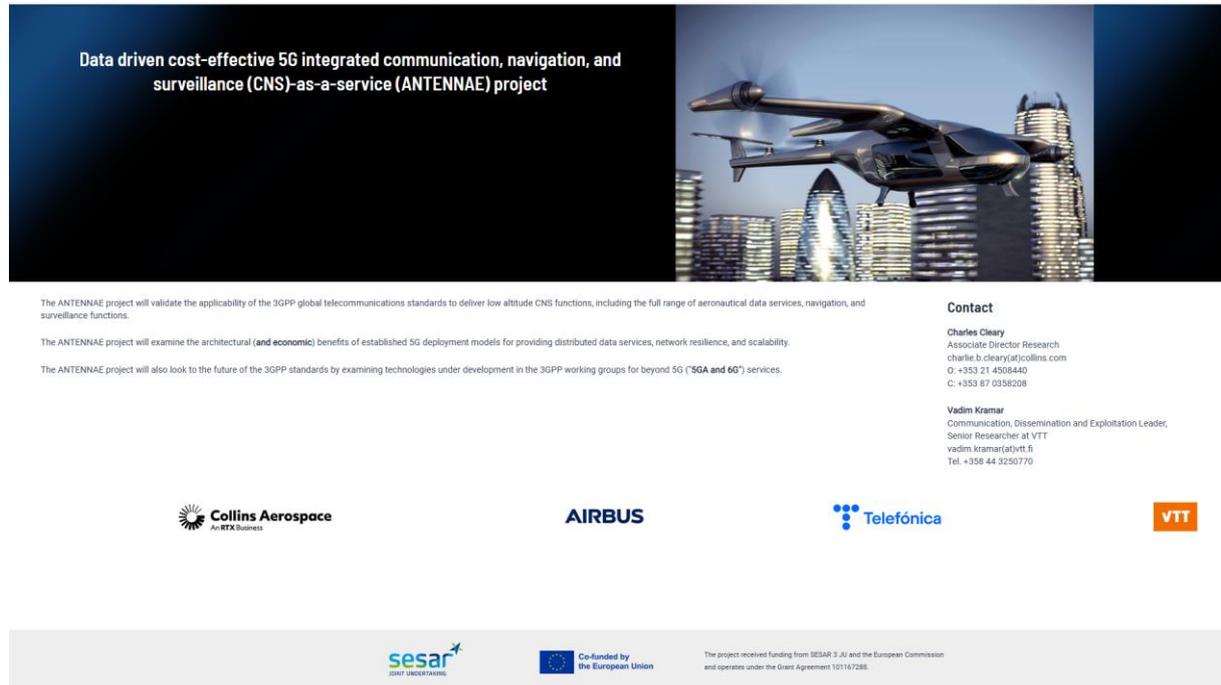


Figure 4: ANTENNAE website from page.

Hereafter, the ANTENNAE Website Table of Content is yet to be provided.

| Page | Content |
|-----------------|---|
| Landing page | Header with logo and menu Banner with title and picture Project description Project objectives Footer with funding acknowledgements, contacts, and social media links |
| About page | Context Objectives and methodology Expected outcomes Advisory Board members |
| Consortium | Logos and partner descriptions |
| Results | Public deliverables Scientific publications Communication and dissemination of material Solution |
| News and Events | News and events |

Table 7: ANTENNAE website planned content.

3.4.2 Press and media

Press releases are official statements that are sent to targeted members of the news media to announce something newsworthy so that it can be publicised. A press release is a short, compelling news story, whose goal is to catch the interest of a journalist or publication. The press release structure will respect the guidelines provided by SESAR in the *DES HE CDE Plan - Annex I - Press releases*.

The project results will be published in selected journals and magazines in order to inform the specialists, the aviation community and the broader public about the project. Media relations will also be produced to reach the general public as well as the elaboration of media material, such as interviews or videos, will be considered.

With this strategy, the expectation is to increase the visibility of the project in order to reach a wider community and emphasise the project's impact.

Past and forecasted contributions to external media are provided in the following table. Expected press and media KPIs are provided in Chapter 3.5.

| Media activity | Date | Link |
|--------------------------------|---|------|
| Contribution M1-M12 | | |
| Forecasted contribution | | |
| Press media and newsletter | When needed, e.g. when the project results are available. | |

Table 8: Contribution to external media.

3.4.3 Social media

Social networks such as LinkedIn are used to enlarge its group of followers and ensure a broader dissemination of its findings and results. Social media networks allow for the easy reaching of a wide range of people and ease the creation of a proper community, grouping persons interested in receiving and exchanging information on the topics addressed by the project. Nowadays, LinkedIn is used actively by various professionals and has become an efficient communication platform to reach a wide audience and build a network of professionals. The project will use this channel to disseminate articles and relevant news as well as to promote events. The purpose is to disseminate project findings and results, and to ensure constant connection with the related projects and the wider community.

LinkedIn offers unique advantages as a professional social network, providing access to a broad audience directly aligned with the project's objectives. This platform enables us to engage with industry stakeholders, researchers, policymakers, and professionals across the aviation and urban mobility sectors, fostering meaningful connections and discussions around the topics addressed by the project.

The project consortium has decided not to use the social network X, former Twitter, due to the strange policies and requirements that were recently introduced to the users of that social network.

Expected social media KPIs are provided in Chapter 3.5.

| Social media activity | Date | Link |
|---|------------------------------|---|
| <i>Contribution M1-M12</i> | | |
| LinkedIn message about the project Kick-Off meeting posted on the ANTENNAE project page | 2 nd October 2024 | https://www.linkedin.com/posts/antennae-project_uspace-iam-activity-7247341600358416385-8Cdu |
| The ANTENNAE project 2024 retrospective | 2024 | https://www.linkedin.com/posts/antennae-project_uspace-iam-innovativeairmobility-activity-7287428704471822336-Acpy |
| Invitation to the First ANTENNAE workshop | 2024 | https://www.linkedin.com/posts/antennae-project_uspace-iam-innovativeairmobility-activity-7294779211905421314-9VD7 |
| Invitation to the First ANTENNAE workshop | 2025 | https://www.linkedin.com/posts/antennae-project_uspace-iam-innovativeairmobility-activity-7294794397102063616-05oe |
| Invitation to the First ANTENNAE workshop | 2025 | https://www.linkedin.com/posts/antennae-project_uspace-iam-innovativeairmobility-activity-7295505734966935552-xNnv |
| Announcement about the scientific paper | 2025 | https://www.linkedin.com/posts/antennae-project_5g-integrated-communications-navigation-activity-7297978036467982337-rfd4 |
| Invitation to the First ANTENNAE workshop | 2025 | https://www.linkedin.com/posts/antennae-project_uspace-iam-innovativeairmobility-ugcPost-7300449774002921473-bw2M |
| Invitation to the First ANTENNAE workshop | 2025 | https://www.linkedin.com/posts/antennae-project_uspace-iam-innovativeairmobility-activity-7302290606859472896-0hzU |
| Information about the paper presented at the ICNS Conference | 2025 | https://www.linkedin.com/posts/antennae-project_uspace-iam-innovativeairmobility-activity-7315381004343410688-B24g |

| <i>Forecasted contribution</i> | |
|--------------------------------|---|
| Press media and newsletter | When needed, e.g. when the project results are available. |

Table 9: Contribution to social media.

3.4.4 Project events

ANTENNAE will organise events and has taken part in several external events to promote the work throughout the duration of the project.

The full list of attended and forecasted events is provided in the Table in section 4.2.3 Dissemination events.

| Event | Date | Place | Information to be shared | Importance for the project |
|--|-----------------|-------------------|--|--|
| <i>Past Contribution</i> | | | | |
| On Cruise 6G Workshop | 12.12.24 | | The project details and initial findings | Initial project ideas are shared with telecom stakeholders |
| First Stakeholder Workshop at MWC 2025 | 03.03.25 | Barcelona, Spain | The initial investigations by the project | Discussions with telecom stakeholders |
| Workshop with CNS Team at EUROCONTROL | 08.04.25 | Brussels, Belgium | The initial investigations by the project | Discussions with EUROCONTROL, valuable input |
| <i>Forecasted Contribution</i> | | | | |
| Second Stakeholder Workshop | To be confirmed | To be confirmed | Project definitions and reference architecture | Obtaining valuable input to shape the project vision |
| Communication and dissemination workshop | To be confirmed | To be confirmed | Project definitions and reference architecture | Spreading information about the project vision |

Table 10: Events

3.4.5 Publications and newsletters

| Publications/newsletters /printed material | Description | Date | Link |
|---|--|-------------|------|
| <i>Past Contribution</i> | | | |
| <i>Forecasted Contribution</i> | | | |
| Promotional material (brochures, roll-ups, videos, visual identity) | Create awareness and exploit viral marketing effects | When needed | N/A |
| Press media and newsletter | Raise awareness of the project results | When needed | N/A |

Table 11: Printed material

3.5 Communication key performance indicators (KPIs) and success criteria

| Actions | KPIs and targets |
|---|---|
| Project webpage | >50 webpage visits per month |
| Promotional material (brochures, roll-ups, videos, visual identity) | 300 copies of dissemination material (digital and hardcopy) distributed |
| Social media (LinkedIn, Twitter...) | 300+ followers 200+ items shared (posts, videos) |
| Press media and newsletter | At least 2 press releases |
| Participation in conferences/fairs/initiatives | At minimum 3 conferences and seminars in which the project will be presented, including flagship events of the IEEE Communications Society. Additionally, invited presentations at top-tier academic institutions are envisioned. >100 attendees to ANTENNAE sessions in seminars and conferences |

Table 12: Communication KPIs and success criteria

4 Dissemination

4.1 Dissemination objectives and strategy

Systematic and professional dissemination of the aim and achieved outputs of ANTENNAE is crucial for the successful adoption and implementation of the Solution 0521 ANTENNAE-01. Dissemination activities must therefore, include both internal communication among the project partners and external communication to non-partner stakeholders.

The **primary objective** of the dissemination activity is to **maximise the knowledge and scientific impact**. Dissemination is carried out throughout the whole project lifecycle to allow the community of reference to mature their knowledge along with the evolution of the project.

To ensure the intended impact on the different categories of stakeholders, the dissemination strategy of the ANTENNAE project is executed through:

- **Publications.** The target is to publish at least 3 publications, including IEEE journal publications at appropriate times during the project.
- **Stakeholder Workshops.** The target is to present research methodology and results as well as gather feedback and insights from the stakeholder community, organising at least 2 stakeholder workshops to be held nominally at T0+5 and T0+17.
- **Public and engagement-driven events.** Contribute to building and strengthening the community of stakeholders, spreading the results of the project, and supporting exploitation. The target is to contact at least 7 key stakeholders to get the solution known.
- **Networks and multipliers.** Provide continued visibility, permanent networking and a channel to reach stakeholders. The target is to have at least 3 stakeholder networks, such as GUTMA, U-space Coordination Cell, U-space Stakeholder Network, and Alliance for New Mobility Europe (AME) reached out and get interested in further exploitation of the ANTENNAE achievements.

Advisory Board. ANTENNAE established the Advisory Board (AB) to get academia and industry experts engaged on specific technical topics, get a critical assessment of the project's outcomes at the major milestones. Furthermore, bilateral informal exchanges among consortium members (e.g., WP leaders) and single advisors (or a specific group) are strongly encouraged throughout the whole duration of the project. This approach has been proven to be very beneficial in several previous SESAR and Horizon projects (e.g., CORUS-XUAM, CORUS five, SPATIO 2.0, ETHER), where the members of the AB have been actively involved and made valuable contributions to the outcomes of the action.

The consortium will meet the AB members twice a year on a regular basis. The first meeting is planned to be co-allocated with the first ANTENNAE Stakeholder Workshop at the Mobile World Congress in Barcelona in March 2025.

The consortium has identified and approached several potential AB members and has already received confirmation from people of the following organisations:

- Nokia

- Ericsson
- Finnish National Defence University
- University of Oulu
- Ghent University

Moreover, as already described in section 3.1, project liaising and synergy with SESAR JU will also be at the base of the ANTENNAE dissemination strategy.

4.2 Dissemination channels

The dissemination means will include creating a project-specific website on SJU's official website, publishing in technical journals, mass media, and social media, and presenting at technical conferences and workshops. The dissemination plan is tailored to each project phase. During the project, the activities and results would be shared with the target audience, communicating the evolution of the project solution. Within the dissemination, the consortium will make proactive efforts to share, on a royalty-free basis, in a timely manner and as appropriate, all relevant results of the ANTENNAE project with the other grants awarded under the same call.

| Channel | Objective | Tools | Link | Information to be shared |
|---|---|-------|------|--|
| Publications | <i>Spread project results among the research and industrial communities</i> | N/A | N/A | ANTENNAE will publish scientific papers with its R&D partners |
| Stakeholder Workshops (internal events) | <i>Present research methodology & results and gather feedback and insights from the stakeholder community.</i> | N/A | N/A | Present research methodology & results and gather feedback and insights. |
| Public and engagement-driven events (external events) | <i>Contribute to building and strengthening the community of stakeholders, spread the results of the project and support exploitation</i> | N/A | N/A | Present research methodology & results and gather feedback and insights. |
| Networks and multipliers (internal and | <i>Provide continued visibility,</i> | N/A | N/A | Present research methodology & results and gather |

| | | |
|--|---|------------------------|
| external events and collaborative actions) | <i>permanent networking and a channel to reach stakeholders</i> | feedback and insights. |
|--|---|------------------------|

Table 13: Dissemination channels

4.2.1 Scientific publications

The peer-reviewed publications will give the project an opportunity to get reviewer’s and scientific community feedback. In particular, the feedback of the highly experienced researchers during the journal peer review process is very valuable. Similarly, the conference presentations will expand the engagement with the research communication and receive direct feedback. Furthermore, scientific publications will help industrial and academic researchers, including PhD and master’s degree students, benefit from the ANTENNAE results.

We will submit the manuscript to the journals which fulfil the following criteria:

- Journals that are internationally recognised and have peer-reviewed evaluation criteria.
- Journals that publish research on the relevant topics include the 5G, communications, navigations, and surveillance aspects.
- Journals with good impact factors and a large potential audience.

Similarly, we will select the conferences which meet the following criteria:

- The conference is of a high standard and conducts high-quality peer review.
- Attracts a large audience with experts from the CNS topic, with well-organised sessions and discussions.
- Features keynote speeches and technical presentations on 5G, CNS and satellite communications.
- The conference is accessible, with no restrictions based on geographical location.

4.2.2 Open access to scientific publications

ANTENNAE will follow the European guidelines on the large-scale accessibility of project findings. A Green Open Access standard is adopted. The consortium will make every effort to ensure green open access to these articles within six months from the date of acceptance for publication. The articles produced in the framework of the project are to be archived in an Online Open Access Repository (e.g., ZENODO, arXiv, ResearchGate). All articles resulting from ANTENNAE will also be available on the project website.

The hybrid publishing venues in SESAR programme are the SJU website (www.sesarju.eu) and the eATM portal (www.atmmasterplan.eu). News and updates related to SESAR3 projects are shared by the SESAR 3 JU on their website, while the eATM Portal provides an integrated view of the European ATM System outlining the essential operational and technology changes foreseen to deliver the SESAR contributions to the Single European Sky performance objectives.

In the Table below, the ANTENNAE scientific publications are listed:

| Scientific papers/ presentations | Link | Information to be shared |
|---|---|--|
| <i>Past Contribution</i> | | |
| M. Benzaghta, G. Geraci, D. López-Pérez, and A. Valcarce, "Data-Driven Optimization and Transfer Learning for Cellular Network Antenna Configurations," <i>IEEE Wireless Communications and Networking Conference (WCNC)</i> , 2025 | https://arxiv.org/abs/2504.00825 | We propose a data-driven approach for large-scale cellular network optimization, using a production cellular network in London as a case study and employing Sionna ray tracing for site-specific channel propagation modeling. We optimize base station antenna tilts and half-power beamwidths, resulting in more than double the 10%-worst user rates compared to a 3GPP baseline. In scenarios involving uncrewed aerial systems (UAS) in aerial corridors, we identify configurations that increase their median rates fivefold without compromising ground user performance. We further demonstrate the efficacy of model generalization through transfer learning, leveraging available data from a scenario source to predict the optimal solution for a scenario target within a similar number of iterations, without requiring a new initial dataset, and with a negligible performance loss. |
| M. Benzaghta, G. Geraci, D. López-Pérez, and A. Valcarce, "Cellular network design for UAV corridors via data-driven high-dimensional Bayesian optimization," <i>IEEE Transactions on Wireless Communications</i> , 2025 | https://arxiv.org/abs/2504.05176 | We address the challenge of designing cellular networks for uncrewed aerial systems (UAS) corridors through a novel data-driven approach. We assess multiple state-of-the-art high-dimensional Bayesian optimization (HD-BO) techniques to jointly optimize the cell antenna tilts and half-power beamwidth (HPBW). We find that some of these approaches achieve over 20dB gains in median SINR along UAV corridors, with negligible degradation to ground user performance. Furthermore, we explore the HD-BO's capabilities in terms of model generalization via transfer learning, where data from a previously observed scenario source is leveraged to predict the optimal solution for a new scenario target. |

We provide examples of scenarios where such transfer learning is successful and others where it fails. Moreover, we demonstrate that HD-BO enables multi-objective optimization, identifying optimal design trade-offs between data rates on the ground versus UAS coverage reliability. We observe that aiming to provide UAS coverage across the entire sky can lower the rates for ground users compared to setups specifically optimized for UAS corridors. Finally, we validate our approach through a case study in a real-world cellular network, where HD-BO identifies optimal and non-obvious antenna configurations that result in more than double the rates along 3D UAV corridors with negligible ground performance loss.

Ullah, A., Kramar, V., Alshaer, H., Cleary, C., Brilhante, D., Semkin, V., Kaariaho, V.-A. & Geraci, G., “5G Integrated Communications, Navigation, and Surveillance: A Vision and Future Research Perspectives” 2025, ICNS 2025 - Integrated Communications, Navigation and Surveillance Conference. IEEE Institute of Electrical and Electronic Engineers, 13 p. <https://arxiv.org/pdf/2502.13015>

Communication, Navigation, and Surveillance (CNS) is the backbone of the Air Traffic Management (ATM) and Unmanned Aircraft System (UAS) Traffic Management (UTM) systems, ensuring safe and efficient operations of modern and future aviation. Traditionally, the CNS is considered three independent systems: communications, navigation, and surveillance. The current CNS system is fragmented, with limited integration across its three domains. Integrated CNS (ICNS) is a contemporary concept implying that those systems are provisioned through the same technology stack. ICNS is envisioned to improve service quality, spectrum efficiency, communication capacity, navigation predictability, and surveillance capabilities. The 5G technology stack offers higher throughput, lower latency, and massive connectivity compared to many existing communication technologies. This paper presents our 5G ICNS vision and network architecture and discusses how 5G technology can support integrated CNS services using terrestrial and non-terrestrial

networks. We also discuss key 5G radio access technologies for delivering integrated CNS services at low altitudes for Innovative Air Mobility (IAM) and Advanced Air Mobility (AAM) operations. Finally, we present relevant challenges and potential research directions for further studies.

M. Benzaghta, S. Ammar, D. López-Pérez, B. Shihada, G. Geraci, "Data-driven design of 3GPP handover parameters with Bayesian optimization and transfer learning," IEEE PIMRC, 2025. <https://arxiv.org/abs/2504.02633>

We propose a data-driven handover optimization framework for cellular networks based on High-Dimensional Bayesian optimization (HDBO) and enhanced with transfer learning to reduce training time and improve generalization across different user speeds and including UAS in aerial corridors. Simulations on a real-world deployment in London show that HDBO outperforms 3GPP set-1 and set-5 benchmarks, which rely on fixed A3-offset and time-to-trigger (TTT) thresholds. Also, we show that transfer learning enables rapid adaptation without loss in performance. This highlights the potential of data-driven, site-specific mobility management in large-scale networks.

| <i>Forecasted Contribution</i> | | |
|--------------------------------|---|--|
| 26th ICNS Conference | https://i-cns.org/2026/call-2026/ | Technical paper confirming validating ANTENNAE concepts |
| NAVITEC 2026 | https://atpi.eventsair.com/navitec2026/ | Discussions with ESA professionals, academia and industry experts and get valuable feedback. |
| SESAR Innovation Days 2026 | | Technical paper confirming validating ANTENNAE concepts |

Table 14: Scientific papers, publications and presentations

4.2.3 Dissemination events

During its first 3 months, ANTENNAE did not participate in external events. Taking part in the forecasted events and conferences made it possible to disseminate the project objectives, activities, and methodology to the European aviation and telecommunication community as well as to the other EU projects that contributed to the development of the European DES vision.

| Event | Date | Place | Information to be shared | Importance for the project |
|--------------------------------|--------------------------------------|---------------------|---|---|
| Contribution M1-M12 | | | | |
| Mobile World Congress 2025 | 3 to 6 March 2025 | Barcelona, Spain | Organising the first Stakeholder Workshop | Discussion with industry experts and get valuable feedback. |
| 25th ICNS Conference | 8 to 10 April 2025 | Brussels, Belgium | A position paper which presents ANTENNAE vision | Discussion with academia and industry experts and get valuable feedback. The abstract was accepted, and the full-size research paper is proposed to be submitted. |
| Airspace Word 2025 | 12 to 15 May 2025 | Lisbon, Portugal | Participating as attendees and active involvement in the event's session and expert discussions | Discussions with industry experts, promoting the project and getting valuable feedback. |
| IFAR Summit 2025 | 28 to 31 October | Vienna, Austria | The ICNS Concept | Discussions with research and government experts from within and beyond Europe, promoting the project and getting valuable feedback. |
| Forecasted Contribution | | | | |
| SESAR Innovation Days 2025 | 1st to 4 th December 2025 | Ljubljana, Slovenia | Poster about the Integrated CNS-enabling technologies | Opportunity to share and discuss funding with SESAR 3 JU community and receive valuable feedback |
| UCC Meeting | 5 to 7 November | Istanbul, Turkey | The ICNS Concept | Discussions with research and government experts from within and beyond Europe, promoting the project and getting valuable feedback. |

| | | | | |
|---|-------------------------------|--------------------------|---|---|
| Drone Beyond 2025 | 12 to 14 November | Bari, Italy | The ICNS Concept | Sharing and discussing funding with the EU community from the UAM perspective, presenting the concept at the panel, and receiving valuable feedback |
| ICAO AAM Study Group Meeting, Digital Information and Data Management Panel | 8-12.12.25 December | Montreal, Canada | The ICNS Concept and Spectrum Challenges | Discussions with industry and government experts from within and beyond Europe, promoting the project and getting valuable feedback. |
| Winter Satellite Workshop 2026 | 20 - 23 January 2026 | Espoo, Dipoli, Finland | A poster highlighting importance of satellites for ICNS | Discussions with academia and industry experts and get valuable feedback. |
| 26th ICNS Conference | 14-16 April 2026 | Herndon, Virginia, U.S.A | Technical paper confirming validating ANTENNAE concepts | Discussions with academia and industry experts and get valuable feedback. |
| NAVITEC 2026 | 14-16 April 2026 | Herndon, Virginia, U.S.A | Technical paper confirming validating ANTENNAE concepts | Discussions with academia and industry experts and get valuable feedback. |
| Second AAM Symposium | 30 November – 4 December 2026 | Bangkok, Thailand | The ICNS Concept and Spectrum Challenges | Discussions with industry and government experts from within and beyond Europe to promote the project results. |
| SESAR Innovation Days 2026 | - | - | Technical paper confirming and validating ANTENNAE concepts | Sharing and discussing funding with the SESAR 3 JU community and receiving valuable feedback |

Table 15: Dissemination conferences and workshops

4.3 Dissemination target audiences

| Target | Channel | Benefits from the project | Expected feedback |
|---|---|---|---|
| U-Space Service Providers (USSPs) | Peer-reviewed publications, internal and external events website and media, social media | Project achievements, knowledge base | Knowledgeable input to the project knowledge base |
| IAM Operators | Peer-reviewed publications, internal and external events website and media, social media | Project achievements, knowledge base | Knowledgeable input to the project knowledge base |
| Telecommunication Operators and telecom industry | Collaborative actions, peer-reviewed publications, internal and external events website and media, social media | Project achievements | Knowledgeable input to the project knowledge base |
| Air Navigation Service Providers (ANSPs) | Peer-reviewed publications, internal and external events website and media, social media | Project achievements, knowledge base | Knowledgeable input to the project knowledge base |
| European and National Aviation Authorities | Peer-reviewed publications, internal and external events website and media | Project input to a regulatory effort | Knowledgeable input to the project knowledge base |
| Standardisation Bodies | Internal and external events, standardisation WGs | Project input to a standardisation effort | Knowledgeable input to the project knowledge base |
| Researchers and Industry Professionals | Peer-reviewed publications, internal and external events website and media, social media, | Project achievements, knowledge base | Knowledgeable input to the project knowledge base |

| | standardisation WGs | | |
|---|--|--|---|
| Young professionals and students | Peer-reviewed publications, internal and external events website and media, social media | Project achievements, knowledge base | Knowledgeable input to the project knowledge base |
| General Public | Website and media, social media | Project impact on the sustainable development goals (SDG)-associated matters | Perception of project results towards the SDG matters and acceptance of those |

Table 16: Dissemination target audiences

4.4 Dissemination KPIs and success criteria

| Action | KPIs | Success criteria | Currently achieved | Last update | Annual growth |
|-------------------------------------|--|--|--------------------|--------------|---------------|
| Publications | Spread project results among the research and industrial communities | At least 3 publications released, including IEEE journal publications whenever suitable. | 4 | October 2025 | 3 |
| Stakeholder Workshops | Present research methodology & results and gather feedback and insights from the stakeholder community. | 2 stakeholder workshops to be held, nominally at T0+5 and T0+17 | 1 | October 2025 | 1 |
| Public and engagement-driven events | Contribute to building and strengthening the community of stakeholders, spread the results of the project and support exploitation | At least 7 Key Stakeholders contacted to make the solution known | 13 | October 2025 | 13 |
| Networks and multipliers | Provide continued visibility, permanent networking and a | At least 3 stakeholder networks (such as GUTMA, U- | 2 | October 2025 | 2 |

| | |
|-------------------------------|---|
| channel to reach stakeholders | space Stakeholder Network, Alliance for New Mobility Europe (AME)) are reached out and are interested in further exploitation of the ANTENNAE achievements. |
|-------------------------------|---|

Table 17: Dissemination KPIs and success criteria

5 Exploitation

5.1 Project exploitable results

As defined in the Grant Agreement (GA) of the ANTENNAE project, the project's objectives are the following:

- SO.1 The concept of operation and requirements for an integrated CNS as a service for low altitude operations, including aircraft with pilot on board, remotely piloted, and fully autonomous aircraft.
- SO.2 Verified compliance with 3GPP 5G communication standards, KPIs, and available spectrum to satisfy CaaS requirements.
- SO.3 Low altitude-specific network configuration & management policies to deliver cost-effective CNS-as-a-service in low altitude operations across all stakeholders.
- SO.4 Hybrid network architectures comprising terrestrial & non-terrestrial network segments for increased availability & resilience.
- SO.5 RAN optimisation solutions for antenna power and antenna beamforming configurations and spatial-domain interference mitigation to achieve coexistence.
- SO.6 A-PNT and A-SUR system performance validated, and positioning & integrity algorithms specified for low-altitude operations.
- SO.7 Validation of identified KPIs for a 3GPP 5G-aligned network for CNS-as-a-Service for low altitude operations.
- SO.8 A technic-economic comparative analysis for the regional deployment of CNS using shared or dedicated 5G networks to achieve performance, coverage, and network planning requirements for low altitude operations.

5.2 Exploitation strategy and objectives

The primary objective of the ANTENNAE exploitation activities is a long-term impact on the knowledge domain. The project partners identified their exploitation perspective, which is listed below.

COLLINS expects some exploitation of research results captured in the ANTENNAE project deliverables to help support the development of customised Integrated CNS (I-CNS) service offerings or deployment models, reduce the cost of communications in the I-CNS, further develop the proposed mechanisms and methods to support data-driven I-CNS operations and provide cost-effective I-CNS services with Alternative Positioning (A-PNT) and Assured Surveillance (A-SUR) supported via Multilateration (M-LAT) provided on 5G Radio Access Networks (RANs).

TID aims to leverage the outcomes of the ANTENNAE project to enhance its capabilities in providing connectivity solutions for aerial users. By addressing the challenges of traditional 2D-optimized cellular networks, **TID** will acquire critical expertise to optimise its RAN for low-altitude operations and support

emerging verticals. As a mobile operator, the project results will put TID in a better position to validate the compliance of its networks with relevant key performance indicators and evaluate available spectrum to meet the unique requirements of aerial connectivity. This knowledge will inform strategic decisions for future network deployment and operational planning, ensuring TID remains at the forefront of innovation in this growing domain.

AUM is an active member of EASA's LTE Task Force, EUROCAE, RTCA, ICAO, 3GPP and ACJA (Aerial Connectivity Joint Activity). The project results will be leveraged to contribute to ongoing standardisation and regulatory efforts in the aviation and telecommunications sectors, ensuring alignment with global frameworks. ANTENNAE technologies will be transformed into market-ready technical solutions and business models, enabling the deployment of cutting-edge I-CNS technologies for U-space operations and Integrated Airspace Management (IAM). Exploitation strategies will highlight the significant environmental and economic benefits, including reduced CO₂ emissions and optimised use of scarce radio spectrum, paving the way for sustainable innovations in low-altitude operations and digital airspace management. These strategies collectively aim to maximise the project's impact and deliver lasting benefits across industries. Due to the withdrawal from the project, AUM had not been actively engaged in the CDE activities.

VTT would like to maintain and enhance its knowledge of and experience with U-space elements, technologies, solutions, use cases and scenarios, including the matters associated with CNS and security towards low-level and very low-level aircraft operations. That will help VTT to proceed well with ongoing and future national, international, and customer projects relevant to U-space and Urban/Advanced/Innovative Air Mobility. Establishing the first UAM in Finland is one of the VTT's efforts that will benefit from the ANTENNAE outcomes. VTT is not only an active contributor to the AAM(IAM development in Finland but also carries out a lot of relevant activities in Europe and the rest of the world. Scientific knowledge generated by the ANTENNAE project will be enriched through other activities and disseminated through international conferences, workshops and other events as well as the International Forum for Aviation Research (IFAR) and recently established by ICAO Vision and Explore Working Groups to create impact and speed up the development of U-spaces/UTM in Europe and globally.

| Network/Organisation | Role | ANTENNAE Partner |
|--|---------------|------------------|
| <i>GSM Association (GSMA)</i> | <i>Member</i> | <i>AUM</i> |
| <i>Global UTM Association (GUTMA)</i> | <i>Member</i> | <i>AUM</i> |
| <i>Aerial Connectivity Joint Activity (ACJA)</i> | <i>Member</i> | <i>AUM</i> |
| European Organisation for Civil Aviation Equipment (EUROCAE) | Member | COLLINS |
| Radio Technical Commission for Aeronautics (RTCA) | Member | AUM, COLLINS |
| 3rd Generation Partnership Project (3GPP) | Member | AUM, COLLINS |
| IEEE ComSoc Communications Theory Technical Committee | Member | TID |

| | | |
|--|--|-----|
| IEEE ComSoc Aerial Communications Emerging Technology Initiative | Member | TID |
| International Forum for Aviation Research (IFAR) | Steering Committee and AAM Work Group Member | VTT |
| ICAO Vision Work Group | Work Group Member | VTT |
| ICAO Explore Work Group | Work Group Member | VTT |
| European UAS Test Centre Alliance | Elected Member of the Initiative Team | VTT |
| U-space Coordination Cell | Member | VTT |

Table 18: The ANTENNAE partner’s abilities to reach out to networks and multipliers.

The ANTENNAE consortium unites its effort to maximise the long-term impact together by revising and improving the means and objectives that ANTENNAE foresees to implement within its exploitation strategy:

- The ANTENNAE partners, under the steering of the Coordinator, commit to the development of the project, exploit the project results and maximise its impact according to the GA and CA documents and even beyond – by exploring new ways to maximise the impact.
- The ANTENNAE partners explore long-term collaboration opportunities and joint development of the knowledge domain through SESAR 3 JU-funded projects, other available funding instruments, and even direct contracts.
- The ANTENNAE partners continuously explore the opportunities to get use of results and thus maximise the project impact not only within the consortium but also through their activities within this and other relevant knowledge domains.

The ANTENNAE partners agreed to establish the Integrated CNS Work Group under the U-space Coordination Cell as an important envisioned action. This way, the project will lead the discussion on the technical, organisational, and economic matters with European stakeholders involved in SESAR 4 JU-funded projects and receive their input.

5.3 Exploitation of results

| Project outputs | Area impacted | Action | Outcomes | When |
|--|------------------------------|--|---|-------|
| Understanding the Integrated CNS concept | Any aircraft operations | Further research; training | Discussed with academia and industry members and agreed Integrated CNS definition | 2026+ |
| Concept of operations | Low level and very low level | Implementation, further research and training, | Discussed with academia and industry members | 2026+ |

| | | | | |
|---|-------------------------|--|---|-------|
| | aircraft operations | consultancy and customer projects | and agreed on the operational concept | |
| Integrated CNS architecture | Any aircraft operations | Implementation, further research and training, consultancy and customer projects | Discussed with academia and industry members and agreed on Integrated CNS architecture | 2027+ |
| Understanding the economic implications of the Integrated CNS concept | Any aircraft operations | Implementation, further research and training, consultancy and customer projects | Initial economic efficiency estimate of the Integrated CNS concept | 2027+ |
| SESAR 3 JU solution: Cost-Effective 5G Integrated CNS-as-a-Service | Any aircraft operations | Implementation, further research and training, consultancy and customer projects | Discussed with academia and industry members and finalised with a pack of technical documents S3JU solution | 2027+ |

Table 19: Project internal exploitation of results

| Project outputs | Area impacted | Action | Outcomes | When |
|--|--|--|--|-------|
| Understanding the Integrated CNS concept | Any aircraft operations | Implementation; standardisation; regulation update; further research and development; training | Implementation may affect several industry sectors, primarily telecom and aviation, with relevance to capacity, cost-efficiency, environment, safety, and security | 2027+ |
| Concept of operations | Low-level and very low-level aircraft operations | Implementation; standardisation; regulation update; further research and development; training | Implementation may affect several industry sectors, primarily telecom and aviation, with relevance to capacity, cost-efficiency, environment, safety, and security | 2027+ |
| Integrated CNS architecture | Any aircraft operations | Implementation; standardisation; regulation update; | Implementation may affect several industry sectors, | 2028+ |

| | | | | |
|---|-------------------------|--|--|-------|
| | | further research and development; training | primarily telecom and aviation, with relevance to capacity, cost-efficiency, environment, safety, and security | |
| Understanding the economic implications of the Integrated CNS concept | Any aircraft operations | Implementation; standardisation; regulation update; further research and development; training | Implementation may affect several industry sectors, primarily telecom and aviation, with relevance to capacity, cost-efficiency, environment, safety, and security | 2028+ |
| SESAR 3 JU solution: Cost-Effective 5G Integrated CNS-as-a-Service | Any aircraft operations | Implementation; standardisation; regulation update; further research and development; training | Implementation may affect several industry sectors, primarily telecom and aviation, with relevance to capacity, cost-efficiency, environment, safety, and security | 2028+ |

Table 20: Project external exploitation of results

5.4 Data Protection Strategy

Personal data and security-protected data is stored in accordance with the security policy that was defined in the ANTENNAE Grant Agreement and in the DMP.

Images and videos of project participants might be collected for communication and dissemination purposes. The possible images and video collection and publication are the subject to the involved participants' approval in the consent form.

More detailed information on the ANTENNAE data protection strategy has been provided in the Data Management Plan (DMP) delivered at M6, M14 and M28.

5.5 IPR Management

According to the GA, a comprehensive Data Management Plan (DMP) will be finalised and delivered to the SJU. Partners producing data will retain the ownership but will share either the raw data or post-treated data with the other partners to fulfil ANTENNAE's objectives. Partners agree, when necessary, to make data available for use by other partners and archive this data for a duration of at least two years after the end of the project. Archiving of the data after this period will be left to the discretion of each partner. Data necessary for the verification of results will be made accessible on a case-by-case

basis. Decisions concerning the publication of data will be made by the ANTENNAE Executive Board. Data of public interest, including public deliverables, will be made accessible via the project website.

IPR and legal issues are managed according to the ANTENNAE Consortium Agreement which is based on the DESCA model updated for the Horizon Europe programme. It covers: 1) Overseeing the exploitation and dissemination plans and knowledge portfolio management (e.g., collecting IPR information, keeping track of licensing, moderating conflicts); 2) Publications policy: a general policy regarding publications and under the control of the Executive Board will be established. The main principles of IPR issues are as follows:

1. Background IP as shall be defined by the Partners for the purposes of the project: access granted to the Partners on a royalty-free basis unless otherwise agreed by the Partners for carrying out the work share. Parties may agree to exclude specific Background IP. Any Background IP shall remain the sole property of its owner, whether it was acquired and/or generated prior to the date of the project or independently.
2. Knowledge generated under the project (“Foreground IP”) will be owned by those who generated such IP. Access to Foreground IP to the Partners will be royalty-free for the execution of the project, preferential or at market conditions for use outside of the scope of the project as shall be agreed by the relevant Partners.

Within the exploitation, the consortium will make available for reuse under fair, reasonable and non-discriminatory conditions all relevant results generated within the ANTENNAE project through a well-defined mechanism using a trusted repository.

In case the purpose of the specifically identified measures to exploit the results of the action is related to standardisation, the consortium will grant a non-exclusive licence to the results royalty-free.

In the case of working on linked actions, the consortium will ensure mutual access to the background to and to the results of ongoing and closed linked actions, should this be necessary to implement tasks under the linked actions or to exploit results generated by the linked actions.

6 Overview of communication and dissemination activities

| Activity | Channel | Tool | Objective | Target audience | KPIs | Success criteria | Frequency/ date |
|---|---|--------------------------------|--|--|-------------------------------|------------------------------|---------------------|
| Website activity | Project webpage | Website updates | Provide a public online showcase of the project, including an overview of the project, up-to-date information on project results, public reports, and publications; events, etc. | Specialised and non-specialised audience | Number of visits | >50 per month | Constant monitoring |
| Promotional material | Printed or digital promotional material | Texts, graphics, media | Create awareness and exploit viral marketing effects | Specialised and non-specialised audience | Number of copies | >300 | Constant monitoring |
| Social media | LinkedIn | Posts | Create interest in the project and involve relevant stakeholders in the project | Specialised and non-specialised audience | Number of followers and items | 300+ followers 200+ items | Constant monitoring |
| Press media and newsletter | Project webpage and media | News | Raise awareness of the project results | Specialised and non-specialised audience | Number of press releases | >2 | Constant monitoring |
| Participation in conferences /fairs/initiatives | Events | Participation | Spread project results among the research and industrial communities | Specialised audience | Number of conferences | >3 | Constant monitoring |
| Publications | Publisher platform | Journals/conferences/workshops | Spread project results among the research and industrial communities | Specialised audience | Number of publications | >3 | Constant monitoring |
| Stakeholder Workshops | Events | Participation and engagement | Present research methodology & results and | Specialised audience | Number of workshops | >2 | Constant monitoring |

| | | | | | | | |
|-------------------------------------|---------------|------------------------------|--|--|-------------------------------|----|---------------------|
| | | | gather feedback and insights from the stakeholder community. | | | | |
| Public and engagement-driven events | Events | Participation and engagement | Contribute to building and strengthening the community of stakeholders, spread the results of the project and support exploitation | Specialised and non-specialised audience | Number of contracted | >7 | Constant monitoring |
| Networks and multipliers | Joint actions | Engagement | Provide continued visibility, permanent networking and a channel to reach stakeholders | Specialised audience | Number of interested networks | >3 | Constant monitoring |

Table 21: Overview of communication and dissemination Activities

7 List of Acronyms

The following acronyms have been used in the document.

| Acronyms | Signification |
|----------|---|
| 3GPP | 3rd Generation Partnership Project |
| 5G | 5 th Generation of Cellular Networks |
| 6G | 6 th Generation of Cellular Networks |
| AB | Advisory Board |
| ACJA | Aerial Connectivity Joint Activity |
| AG | Advisory Group |
| AGL | Above Ground Level |
| ANSP | Air Navigation Service Provider |
| ATM | Air Traffic Management |
| A-SUR | Aircraft-based Alternate Surveillance |
| CA | Consortium Agreement |
| CDE | Communication, Dissemination and Exploitation |
| CIS | Common Information Service |
| CISP | Common Information Service Providers |
| CNS | Communications, Navigation, and Surveillance |
| ConOps | Concept of Operations |
| DMP | Data Management Plan |
| EASA | European Union Aviation Safety Agency |
| EC | European Commission |
| EDA | European Defence Agency |
| EIP-SCC | European Innovation Partnership on Smart Cities and Communities |
| eMBB | Enhanced Mobile Broadband |
| ERA | European Research Area |
| ETA | Emerging Technology Aircraft |

| | |
|---------|---|
| EU | European Union |
| EUROCAE | European Organisation for Civil Aviation Equipment |
| eVTOL | A type of aircraft that uses all-electric and hybrid-electric powered vertical take-off and landing |
| GSM | Global System for Mobile Communications |
| GSMA | GSM Association |
| IAM | Innovative Air Mobility |
| ICAO | International Civil Aviation Organization |
| IFAR | International Forum for Aviation Research (IFAR) |
| IPR | Intellectual Property Rights |
| ISO | International Organisation for Standardisation |
| JCS | Joint Communication & Sensing |
| JU | Joint Undertaking (in reference to SESAR JU) |
| KPI | Key Performance Index |
| OEM | Original Equipment Manufacturer |
| PMP | Project Management Plan |
| R&D | Research & Development |
| RPAS | Remotely Piloted Aircraft Systems |
| RTCA | Radio Technical Commission for Aeronautics |
| SJU | SESAR Joint Undertaking |
| SME | Small or Medium Enterprise |
| UAM | Urban Air Mobility |
| UAS | Unmanned Aircraft Systems |
| URLLC | Ultra Reliable Low Latency Communications |
| USSP | U-space Service Provider |
| UTM | Unmanned Aircraft System Traffic Management |
| VCA | VTOL capable aircraft |
| VLL | Very Low level (airspace) |

| | |
|------|-------------------------------|
| VTOL | Vertical Take-off and Landing |
|------|-------------------------------|

Table 22: List of Acronyms

8 Guidelines

8.1 Indication of funding

In line with the Grant Agreement 101167288 , in communication and dissemination activities, the project will:

- Use the EU emblem (no need for prior approval from the SESAR 3 JU), downloadable from here: https://europa.eu/european-union/about-eu/symbols/flag_en
- Use the “Supported by SESAR 3 Joint Undertaking” logo, downloadable from here: <https://www.sesarju.eu/node/3406#sesar-logos7694>
- Use the following reference in all communications, dissemination and exploitation material: This project has received funding from the SESAR 3 Joint Undertaking (JU) under grant agreement No 101167288. The JU receives support from the European Union’s Horizon Europe research and innovation programme and the SESAR 3 JU members other than the Union.

Indicate that the activity reflects only the author's view and that the SESAR 3 JU is not responsible for any use that may be made of the information it contains.

8.2 Disclaimer excluding SESAR 3 JU responsibility

The communication and dissemination activities will always indicate that it reflects only the author's view, and that the SESAR 3 JU is not responsible for any use that may be made of the information it contains.

When displayed together with another logo (including communications in electronic form, via web, social media, etc.), the SESAR 3 JU logo and the EU emblem will have appropriate prominence and the same size.