Call: HORIZON-SESAR-2025-DES-IR-02
(Digital European Sky Industrial Research 02)

Topic: HORIZON-SESAR-2025-DES-IR-02-WA3-2

Type of Action: HORIZON-JU-RIA
(HORIZON JU Research and Innovation Actions)

Proposal number: 101288550

Proposal acronym: SCAN

Type of Model Grant Agreement: HORIZON Lump Sum Grant

Table of contents

Proposal ID **101288550**

Acronym **SCAN**

1 - General information

Fields marked * are mandatory to fill.

Topic	HORIZON-SESAR-2025-DES-IR-02-WA3-2	Type of Action	HORIZON-JU-RIA
Call	HORIZON-SESAR-2025-DES-IR-02	Type of Model Grant Agreement	HORIZON-AG-LS

Acronym: SCAN

Proposal title: SCAN: Reviewing, Adapting and Developing CNS Infrastructure and Services to Ensure the Safe Integration of HAO And STO Vehicles

Note that for technical reasons, the following characters are not accepted in the Proposal Title and will be removed: < > " &

Duration in months: 36

Free keywords: *Higher Altitude Operations Space Transport Operations CNS equipment performance non-barometric altimetry HAPS integration new entrants*

Abstract *

In the context of integrating Space and Higher Altitude Operations in European ATM, there is a need to evaluate and mitigate the potential performance gap between current CNS and HAO specific requirements. Moreover, it has been established that altimetry solutions based on barometric measurements are not reliable for safe operations above FL 600. It is therefore needed to identify non-barometric altimetry solutions compatible with HAO.

SCAN will build on the outcome of CNS infrastructure studies and flight trials currently ongoing in the ECHO2 project and will move forward with the ambition to:
a. Propose a set of feasible technical components and services to serve the CNS needs for diverse vehicles operating in the higher airspace within Europe and beyond;
b. Engage with airspace users (conventional aviation and HAO operators), ANSPs, industry and aviation authorities to align expectations on benefits and operational acceptability of the proposed CNS solutions or new paradigms for air traffic management.
c. Support a clear path forward for future CNS developments, including standardisation and regulatory framework evolution to support the European pioneer initiatives on HAO.

Remaining characters 804

Has this proposal (or a very similar one) been submitted in the past 2 years in response to a call for proposals under any EU programme, including the current call? ○ Yes ◉ No

Please give the proposal reference or contract number.
Previously submitted proposals should be with either 6 or 9 digits.

Administrative forms

Proposal ID **101288550**

Acronym **SCAN**

Declarations

Field(s) marked * are mandatory to fill.

1) We declare to have the explicit consent of all applicants on their participation and on the content of this proposal. *	☒
2) We confirm that the information contained in this proposal is correct and complete and that none of the project activities have started before the proposal was submitted (unless explicitly authorised in the call conditions). *	☒
3) We declare: - to be fully compliant with the eligibility criteria set out in the call - not to be subject to any exclusion grounds under the EU Financial Regulation 2018/1046 - to have the financial and operational capacity to carry out the proposed project. *	☒
4) We acknowledge that all communication will be made through the Funding & Tenders Portal electronic exchange system and that access and use of this system is subject to the Funding & Tenders Portal Terms and Conditions. *	☒
5) We have read, understood and accepted the Funding & Tenders Portal Terms & Conditions and Privacy Statement that set out the conditions of use of the Portal and the scope, purposes, retention periods, etc. for the processing of personal data of all data subjects whose data we communicate for the purpose of the application, evaluation, award and subsequent management of our grant, prizes and contracts (including financial transactions and audits). *	☒
6) We declare that the proposal complies with ethical principles (including the highest standards of research integrity as set out in the ALLEA European Code of Conduct for Research Integrity, as well as applicable international and national law, including the Charter of Fundamental Rights of the European Union and the European Convention on Human Rights and its Supplementary Protocols. Appropriate procedures, policies and structures are in place to foster responsible research practices, to prevent questionable research practices and research misconduct, and to handle allegations of breaches of the principles and standards in the Code of Conduct. *	☒
7) We declare that the proposal has an exclusive focus on civil applications (activities intended to be used in military application or aiming to serve military purposes cannot be funded). If the project involves dual-use items in the sense of Regulation 2021/821, or other items for which authorisation is required, we confirm that we will comply with the applicable regulatory framework (e.g. obtain export/import licences before these items are used). *	☒
8) We confirm that the activities proposed do not - aim at human cloning for reproductive purposes; - intend to modify the genetic heritage of human beings which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed), or - intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer. - lead to the destruction of human embryos (for example, for obtaining stem cells) These activities are excluded from funding. *	☒
9) We confirm that for activities carried out outside the Union, the same activities would have been allowed in at least one EU Member State. *	☒
10) For Lump Sum Grants with a detailed budget table: We understand and accept that the EU lump sum grants must be reliable proxies for the actual costs of a project and confirm that the detailed budget for the proposal has been established in accordance with our usual cost accounting practices and in compliance with the basic eligibility conditions for EU actual cost grants (see AGA - Annotated Grant Agreement, art 6) and exclude costs that are ineligible under the Programme. Purchases and subcontracting costs must be done taking into account best value for money and must be free of conflict of interest. *	☒

The coordinator is only responsible for the information relating to their own organisation. Each applicant remains responsible for the information declared for their organisation. If the proposal is retained for EU funding, they will all be required to sign a declaration of honour.

False statements or incorrect information may lead to administrative sanctions under the EU Financial Regulation.

2 - Participants

List of participating organisations

#	Participating Organisation Legal Name	Country	Role	Action
1	EUROCONTROL - EUROPEAN ORGANISATION FOR THE SAI	Belgium	Coordinator	
2	DFS DEUTSCHE FLUGSICHERUNG GMBH	DE	Partner	
3	LUFTFARTSVERKET	SE	Partner	
4	EUROPEAN SATELLITE SERVICES PROVIDER SAS	FR	Partner	
5	NATS (EN ROUTE) PUBLIC LIMITED COMPANY	UK	Partner	
6	DIRECTION DES SERVICES DE LA NAVIGATION AERIENNE	FR	Partner	
7	SkyNav Europe	BE	Partner	
8	ECOLE NATIONALE DE L AVIATION CIVILE	France	Partner	
9	LINKOPINGS UNIVERSITET	SE	Partner	
10	C.I.R.A. CENTRO ITALIANO RICERCHE AEROSPAZIALI SCPA	IT	Partner	
11	SCEYE SPAIN S.L.	ES	Partner	
12	SKYDWELLER CANARIAS SL	ES	Partner	
13	SKYDWELLER SL	ES	Affiliated	
14	PARQUE TECNOLOGICO DE FUERTEVENTURASA MP	Spain	Partner	
15	Elson Space España S.L.	ES	Partner	
16	DEUTSCHES ZENTRUM FUR LUFT - UND RAUMFAHRT EV	DE	Partner	
17	PILDO CONSULTING SL	ES	Partner	
18	ENAIRE	ES	Partner	
19	OpenUTM Ltd.	IE	Partner	
20	ANRA TECHNOLOGIES UK LTD	UK	Partner	
21	SKYPUZZLER APS	DK	Partner	

Administrative forms

Proposal ID **101288550**

Acronym **SCAN**

#	Participating Organisation Legal Name	Country	Role	Action
22	HAPS Alliance	United States	Associated	

Organisation data

PIC	Legal name
999483733	*EUROCONTROL - EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION*

Short name: EUROCONTROL

Address

Street	Rue de la Fusée 96
Town	BRUXELLES
Postcode	1130
Country	Belgium
Webpage	www.eurocontrol.int

Specific Legal Statuses

Legal person	yes
Public body	yes
Non-profit	yes
International organisation	yes
Secondary or Higher education establishment	no
Research organisation	yes

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	14/02/2022 - no
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Aviation Transformation Directorate	☐ not applicable
	☒ Same as proposing organisation's address	
Street	Rue de la Fusée 96	
Town	BRUXELLES	
Postcode	1130	
Country	Belgium	

Department 2

Department name	Network Manager Directorate	☐ not applicable
	☒ Same as proposing organisation's address	
Street	Rue de la Fusée 96	
Town	BRUXELLES	
Postcode	1130	
Country	Belgium	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ◯ Woman ◉ Man ◯ Non Binary

First name* **Ovidiu**

Last name* **DUMITRACHE**

E-Mail* **ovidiu.dumitrache@eurocontrol.int**

Position in org. Project Manager

Department Aviation Transformation Directorate

☐ Same as organisation name

☒ Same as proposing organisation's address

Street Rue de la Fusée 96

Town BRUXELLES

Post code 1130

Country Belgium

Website www.eurocontrol.int

Phone +32 2 729 3052

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
CM Team	EUROCONTROL	atd.ppu.cmt@eurocontrol.int	+xxx xxxxxxxxx
Pablo	HARO	pablo.haro@eurocontrol.int	+xxx xxxxxxxxx
Augustin	UDRISTIOIU	augustin.udristioiu@eurocontrol.int	+xxx xxxxxxxxx
Fiona	MULLAN	fiona.mullan@eurocontrol.int	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Mr	Pablo	Haro	Man	Spain	pablo.haro@eurocontrol.int	Category B Senior resea	Team member		
Mr	Ovidiu	Dumitrache	Man	Romania	ovidiu.dumitrache@eurocontrol.int	Category B Senior resea	Leading		
Ms	Marta	Fernandez Castrillo	Woman	Spain	marta.fernandez-castrillo@eurocontrol.int	Category C Recognised	Team member		
Mrs	Fiona	Mullan	Woman	Ireland	fiona.mullan@eurocontrol.int	Category D First stage r	Team member		
Mr	Dragos	Tonea	Man	Romania	dragos.tonea@eurocontrol.int	Category B Senior resea	Team member		
Mr	Augustin	Udristioiu	Man	Romania	augustin.udristioiu@eurocontrol.int	Category C Recognised	Leading		
Mr	Edgar	Reuber	Man	Germany	edgar.reuber@eurocontrol.int	Category C Recognised	Team member		
Mr	Gabor	Fugedi	Man	Hungary	gabor.fugedi@eurocontrol.int	Category C Recognised	Team member		
Mr	Octavian	Fota	Man	Romania	octavian.fota@eurocontrol.int	Category B Senior resea	Team member		
Mrs	Lucia	Sandu	Woman	Moldova	lucia.sandu@eurocontrol.int	Category D First stage r	Team member		
Mr	Stefano	Tiberia	Man	Italy	stefano.tiberia@eurocontrol.int	Category B Senior resea	Team member		
Mrs	Aleksandra	Owoc-Berson	Woman	Poland	aleksandra.owoc-berson@eurocontrol.int	Category D First stage r	Team member		

Administrative forms

Role of participating organisation in the project

Project management	☒
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☒
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Other achievement	*As a founding member of the SESAR Programme and Joint Undertaking, EUROCONTROL has been involved in all the phases (Definition, Development and Deployment) contributing significantly to many of its most important achievements, such as the definition and maintenance of the European ATM Master Plan, the SESAR 3 Strategic Research and Innovation Agenda and a large number of Solutions delivered in the context of the SESAR 1 and SESAR 2020.*
Dataset	*The EUROCONTROL Base of Aircraft Data (BADA) Aircraft Performance Model (APM) is a globally recognized reference database containing aircraft-specific coefficients and theoretical models used to calculate aircraft performance parameters.*
Service	*The EUROCONTROL Network Manager Operations Centre (NMOC) permanently monitors the airspace capacity against traffic load. This allows us to have an accurate picture of the current and expected European ATM network situation. To ensure the transparent and efficient operation of the network, we collect all of the real-time data generated by the network and share it with all operational partners through our Data Collection and Distribution Services (DCS and DDS).*
Service	*At the EUROCONTROL NMOC we measure, investigate and report on operational processes and activities throughout all domains relevant to Air Traffic Flow and Capacity Management. All stakeholders provide feedback on the efficiency of the flight planning and airspace data processing. We compare forecasts with the actual measured outcome in terms of delay and route extension, while taking into account performance targets. This helps us improve the performance of the European ATM Network.*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
ECHO 2 project (Ref 101114697)	*ECHO-2 is building on the deliverables of the ECHO (European Concept of Higher airspace Operations) project, starting from the Concept of Operations, to propose validated solutions paving the way towards the operational integration of HAO in ATM.*
ECHO project (ref. SESARER4-19-2019)	*The ECHO (European Concept of Higher airspace Operations) Project aimed at delivering a comprehensive demand analysis and a comprehensive, innovative and feasible Concept of Operations enabling near term and future Higher Airspace operations in a safe and orderly manner.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)
NMVP	*Validation platform allowing to design and validate solutions for Network Management in a more flexible way. Validations can now be replayed across NM's backend systems (Enhanced Tactical Flow Management System, Integrated Initial Flight Plan Processing System) and the front-end systems.*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
999936820	*DFS DEUTSCHE FLUGSICHERUNG GMBH*

Short name: DFS

Address

Street	AM DFS CAMPUS 10
Town	LANGEN
Postcode	63225
Country	Germany
Webpage	www.dfs.de

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is unknown (small- and medium-sized enterprise) for the call.

SME self-declared status	unknown
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

No department involved

Department name *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street *Please enter street name and number.*

Town *Please enter the name of the town.*

Postcode *Area code.*

Country *Please select a country*

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ○ Woman ◉ Man ○ Non Binary

First name* **Andreas**

Last name* **UDOVIC**

E-Mail* **andreas.udovic@dfs.de**

Position in org. Project Manager

Department Operational Planing

☐ Same as organisation name

☒ Same as proposing organisation's address

Street AM DFS CAMPUS 10

Town LANGEN

Post code 63225

Country Germany

Website www.dfs.de

Phone +49610370705758

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Alexander	SEYBOLD	alexander.seybold@dfs.de	+49610370702034
Oliver	ALBERT	oliver.albert@dfs.de	+4961037072073

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Administrative forms

Role of participating organisation in the project

Project management	☒
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Publication	• *Presentation of „Obelisk“ auf den Kongress „HAPS4ESA Workshop“, 12-14.02.2024, Leiden*
Publication	• *Article: Obelisk - Operationelles Betriebskonzept zur sicheren und effizienten Luftraumintegration von Stratosphärenplattformen, DFS-Zeitschrift „Innovation im Fokus“ publication in preparation for 2025 foreseen*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
OBELISK	• *German national founded projetct „Obelisk Operationelles Betriebskonzept zur sicheren und effizienten Luftraumintegration von Stratosphärenplattformen“ 2019-2024*
ECHO2	• *Participation on „ECHO 2 European Concept für High Altitude Operations 2” 2023-2026*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
942346077	*LUFTFARTSVERKET*

Short name: SWEDISH CIVIL AVIATION ADMINISTRATION

Address

Street	HOSPITALSGATAN 30
Town	NORRKOPING
Postcode	602 27
Country	Sweden
Webpage	http://www.lfv.se

Specific Legal Statuses

Legal person	yes
Public body	yes
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	20/03/2014 - no
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

No department involved

Department name *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street *Please enter street name and number.*

Town *Please enter the name of the town.*

Postcode *Area code.*

Country *Please select a country*

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title: Ms

Gender: (•) Woman ( ) Man ( ) Non Binary

First name*: **Lindsey**

Last name*: **MARTENEZ-HERMOSILLA**

E-Mail*: **lindsey.martenez-hermosilla@lfv.se**

Position in org.: LFV SESAR Programme- and Contribution Manager

Department: LUFTFARTSVERKET ☒ Same as organisation name

☒ Same as proposing organisation's address

Street: HOSPITALSGATAN 30

Town: NORRKOPING

Post code: 602 27

Country: Sweden

Website: www.lfv.se

Phone: +46 721 429 192

Phone 2: *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Stefan	SIGGELIN	stefan.siggelin@lfv.se	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
SESAR IR1 ECHO2	*The SESAR IR1 ECHO2 project was built on the deliverables of the ECHO (European Concept of Higher airspace Operations) project. LFV participated in ECHO2 withc ATCO expertise, both with the Concept of Operations, but also as active participants of the project EXE.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)
LFV Research and Innovation Centre	*Located at ATCC Malmö, the LFV R&D Centre is equipped with lab, simulators, and conference facilities, and is capable of conducting human-in-the-loop simulations and demonstrations. The available simulators include NARSIM (for ACC, APP, and TWR), the SAAB RTS simulator, and the UTM City platform.*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
969294229	*EUROPEAN SATELLITE SERVICES PROVIDER SAS*

Short name: ESSP

Address

Street	3 RUE TARFAYA
Town	TOULOUSE
Postcode	31400
Country	France
Webpage	essp-sas.eu

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	25/09/2008 - no
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Service Provision Unit	☐ not applicable
	☐ Same as proposing organisation's address	
Street	carretera de la base	
Town	TORREJON DE ARDOZ	
Postcode	28850	
Country	Spain	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title: Mr

Gender: ○ Woman ◉ Man ○ Non Binary

First name*: **Alvaro**

Last name*: **MORILLO**

E-Mail*: **alvaro.morillo@essp-sas.eu**

Position in org.: Surveillance key account manager

Department: Strategy and Business Development

☐ Same as organisation name

☐ Same as proposing organisation's address

Street: Carretera de la base km 0,8

Town: Torrejón de Ardoz

Post code: 28850

Country: Spain

Website: www.essp-sas.eu

Phone: +34 672 280 598

Phone 2: *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Peter	LUBRANI	peter.lubrani@essp-sas.eu	+34 (9182) 62176

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☒
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
ECHO2	*Contribution to different deliverables: SPR, OSED, CBA, Standards and regulations*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
997542763	*NATS (EN ROUTE) PUBLIC LIMITED COMPANY*

Short name: NATS

Address

Street	4000 PARKWAY WHITELEY
Town	FAREHAM
Postcode	PO15 7FL
Country	United Kingdom
Webpage	www.nats.aero

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is unknown (small- and medium-sized enterprise) for the call.

SME self-declared status	unknown
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	NATS (En Route) Public Limited Company (CTC)	☐ not applicable
	☒ Same as proposing organisation's address	
Street	4000 PARKWAY WHITELEY	
Town	FAREHAM	
Postcode	PO15 7FL	
Country	United Kingdom	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ○ Woman ◉ Man ○ Non Binary

First name* **Patrick**

Last name* **GILES**

E-Mail* **patrick.giles@nats.co.uk**

Position in org. Manager, ATM Portfolio - D&B Future Concepts

Department NATS (En Route) Public Limited Company (CTC)

☐ Same as organisation name

☒ Same as proposing organisation's address

Street 4000 PARKWAY WHITELEY

Town FAREHAM

Post code PO15 7FL

Country United Kingdom

Website www.nats.aero

Phone *+xxx xxxxxxxxx*

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Alison	ROBERTS	alison.roberts@nats.co.uk	+447917558035
Richard	PUGH	richard.pugh@nats.co.uk	+447827954671
Matthew	GREEN	matthew.green@nats.co.uk	+xxx xxxxxxxxx
Richard	HAYWARD	richard.hayward@nats.co.uk	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Mr	Patrick	Giles	Man	United Kingdom	patrick.giles@nats.co.uk	Category B Senior resea	Leading		
Mr	Richard	Hayward	Man	United Kingdom	richard.hayward@nats.co.uk	Category C Recognised	Team member		

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Other achievement	*Participation in SESAR ECHO 2 project, including leading the development of the OSED document for WP - High AItitude Platform Systems.*
Service	*Operational support to UK Ministry of Defence / US Air Force in Europe with regard to current (military) high altitude operations.*
Service	*Past operational experience of operating very high / very fast commercial airliners (Concorde).*
Service	*NATS provides Communication, Navigation and Surveillance services to commercial, private, and military aircraft within its designated areas of responsibility.*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
SESAR 3 ECHO 2	*The ECHO 2 project is further developing concepts identified in the initial ECHO Concept of Operations document. This work will be a key input to the HAO-SCAN project as it is in the ECHO2 discussions that the need for the HAO-SCAN project was identified.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
928673636	*DIRECTION DES SERVICES DE LA NAVIGATION AERIENNE*

Short name: DSNA

Address

Street	50 RUE HENRY FARMAN
Town	PARIS
Postcode	75720
Country	France
Webpage	https://www.ecologie.gouv.fr/controle-aerien

Specific Legal Statuses

Legal person	yes
Public body	yes
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	15/04/2015 - no
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	DSNA	☐ not applicable
	☒ Same as proposing organisation's address	
Street	50 RUE HENRY FARMAN	
Town	PARIS	
Postcode	75720	
Country	France	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title: Mr

Gender: ○ Woman ◉ Man ○ Non Binary

First name*: **Thierry**

Last name*: **ANDRE**

E-Mail*: **thierry-d.andre@aviation-civile.gouv.fr**

Position in org.: ATC expert

Department: Direction de la Technique et de l'Innovation

☐ Same as organisation name

☐ Same as proposing organisation's address

Street: 1 Av. du Dr Maurice Grynfogel - BP 53584

Town: Toulouse Cedex 1

Post code: 31035

Country: France

Website: *Please enter website*

Phone: +33 660364397

Phone 2: *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Laurence	LAPOTRE	laurence.lapotre@regis-dgac.net	+xxx xxxxxxxxx
Francois-Xavier	PRACH	francois-xavier.prach@aviation-civile.gouv.fr	+33 661711125

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☒
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
ECHO 2	*European concept of higher altitude operations - Phase 2: Towards ATM-HAO integration The objective is integration, management and monitoring of HAPS, super/hyper sonic, and space mission operations.*
ECHO	*European concept of higher altitude operations - Phase 1: Comprehensive demand analysis and basic concept operations (Conops) for higher airspace.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
870906450	*SkyNav Europe*

Short name: SkyNav Europe

Address

Street	Rue Coppens 16
Town	Brussels
Postcode	1000
Country	Belgium
Webpage	www.skynavintl.com

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	27/09/2024	- yes
SME self-assessment	27/09/2024	- yes
SME validation	unknown	

Departments carrying out the proposed work

No department involved

Department name *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street *Please enter street name and number.*

Town *Please enter the name of the town.*

Postcode *Area code.*

Country *Please select a country*

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title: Mr

Gender: ○ Woman ◉ Man ○ Non Binary

First name*: **Ben**

Last name*: **KINGS**

E-Mail*: **ben.kings@skynavintl.com**

Position in org.: Managing Director/Owner

Department: SkyNav Europe

☒ Same as organisation name

☒ Same as proposing organisation's address

Street: Rue Coppens 16

Town: Brussels

Post code: 1000

Country: Belgium

Website: https://skynavintl.com/

Phone: +31615625092

Phone 2: *+xxx xxxxxxxxx*

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier	
Mr	Ben	Kings	Man		ben.kings@skynavintl.com	Category A Top grade re	Leading		Other ID	
Mr	Duncan	Auld	Man		duncan.auld@skynavintl.com	Category A Top grade re	Leading			
Mr	Zheng	Tao	Man		zheng.tao@skynavintl.com	Category B Senior resea	Team member			
Ms	Qina	Diao	Woman		qina.diao@skynavintl.com	Category B Senior resea	Team member			
Ms	Julie	Caraga	Woman		julie.caraga@skynavintl.com	Category D First stage r	Team member			

Administrative forms

Role of participating organisation in the project

Project management	☒
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☒
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☒
Research performer	☒
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Service	*ECHO2 subcontractor* *Participation in the ECHO2 consortium as a contractor focusing on higher airspace and space transport integration. Contributions include operational concept refinement, validation planning, stakeholder mapping, and alignment with ANSP procedures and Network functions. The work informs scalable approaches for trajectory management and airspace reservations. Includes project management and deliverable lead.*
Service	*Operational ATM experience* *Decades of global, operational Air Traffic Control experience across all ATC disciplines (Tower, Approach, Area, Oceanic) and at all function levels. Operational supervision, flow management, training, training management, safety and technical committee representation, operational procedure development, international cross-border negotiations, airspace design, safety risk assessments and environmental impact studies*
Service	*ICAO drafting and representation* *Contributed to drafting and review activities at ICAO in relation to Annex 11, Annex 10 and PANS-ATM material. Work includes requirements structuring, procedure text, and consistency checks across datasets and guidance, supporting globally harmonised ATM provisions relevant to STO and HAO integration. Leading working groups on ATM planning & implementation, development of Global ATM Operational Concept, development of Aviation System Block Upgrades*
Service	*State regulatory drafting and representation* *Several years of regulatory drafting support for a Gulf State authority, updating national civil aviation regulations, AMC/GM-style guidance and implementation procedures across ANS, operations and oversight. Emphasis on practicality, traceability and alignment with ICAO and regional provisions. Leadership of ICAO regional groups and task forces related to integration of space transport activities.*
Service	*Project Management & Leadership Expertise* *Extensive track record in project and organisational leadership, including executive roles within IFATCA (International Federation of Air Traffic Controllers' Associations). Demonstrated ability to manage complex international initiatives, coordinate diverse stakeholders, and oversee multi-million-euro budgets. Proven experience in steering strategic aviation projects, ensuring delivery of innovative outcomes aligned with European policy & industry need*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
SESAR ECHO / ECHO2 – HAO Integration	*Participation in ECHO and ECHO2 on higher airspace and space transport integration. Roles covered operational scenarios, requirements traceability, validation planning, stakeholder engagement and alignment with EUROCONTROL and ICAO practices for cross-border coordination and dynamic, minimal-impact airspace management.*
iNEO – Project Management Plan & Governance Appr.	*Development of a rigorous PMP and governance model for multi-partner R&D, covering schedule baselining, risk and compliance, quality assurance, and reporting. The approach underpins efficient WP coordination and is directly reusable for other HORIZON projects.*
UAE National Regulations Development Programme	*Regulatory drafting support for a Gulf State authority, updating national civil aviation regulations, AMC/GM-style guidance and implementation procedures across ANS, operations and oversight. Emphasis on practicality, traceability and alignment with ICAO and regional provisions.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

Administrative forms

PIC	Legal name
996375756	*ECOLE NATIONALE DE L AVIATION CIVILE*

Short name: ENAC

Address

Street	AVENUE EDOUARD BELIN 7
Town	TOULOUSE
Postcode	31400
Country	France
Webpage	www.enac.fr

Specific Legal Statuses

Legal person	yes
Public body	yes
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	yes
Research organisation	yes

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	27/05/2020 - no
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name: ENAC LAB ☐ not applicable

☒ Same as proposing organisation's address

Street: AVENUE EDOUARD BELIN 7

Town: TOULOUSE

Postcode: 31400

Country: France

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ◯ Woman ◉ Man ◯ Non Binary

First name* **Georges**

Last name* **MYKONIATIS**

E-Mail* **georges.mykoniatis@enac.fr**

Position in org. Head of Business Development

Department ENAC LAB

☐ Same as organisation name

☒ Same as proposing organisation's address

Street AVENUE EDOUARD BELIN 7

Town TOULOUSE

Post code 31400

Country France

Website *Please enter website*

Phone *+xxx xxxxxxxxx*

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Aurelie	PEAUD	aurelie.peuaud@enac.fr	+xxx xxxxxxxxx
Florence	LAPORTERIE-DEJEAN	florence.laporterie-dejean@enac.fr	+33562259509

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Dr	Murat	Bronz	Man	France	murat.bronz@enac.fr	Category A Top grade re	Leading	0000-0002-1098-5240	Orcid ID
Dr	Rodolphe	Fremond	Man	France	rodolphe.fremond@enac.fr	Category D First stage r	Team member	0009-0008-1513-9597	Orcid ID
Mr	Georges	Mykoniatis	Man	France	georges.mykoniatis@enac.fr	Category B Senior resea	Leading	0000-0002-5550-579X	Orcid ID

Role of participating organisation in the project

Project management	☒
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☒
Co-definition of research and market needs	☒
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☒
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Publication	*Elmira Fattahzadeh, G Mykoniatis. COOPERATIVE STRATEGIC DECONFLICTION FOR THE HIGHER AIRSPACE USERS. 9th International Conference on Experiments/Process/System Modeling/Simulation/Optimization, Jul 2021, Athens, Greece. ?hal-03320530?*
Publication	*R. Kallaka, J. Zhao, R. Fremond and A. Tsourdos, "Hierarchical Reinforcement Learning for Multi-Objective UAV Routing Considering Operational Complexities," 2025 Integrated Communications, Navigation and Surveillance Conference (ICNS), Brussels, Belgium, 2025, pp. 1-13, doi: 10.1109/ICNS65417.2025.10976917.*
Publication	*Avoni, L., Bronz, M., Condomines, J. P., & Moschetta, J. M. (2025). Enhancing ASWING Flight Dynamics Simulations with Closed-Loop Control for Flexible Aircraft. In AIAA AVIATION FORUM AND ASCEND 2025 (p. 3425).*
Publication	*A. Guitart, C. Demouge, D. Delahaye and E. Feron, "Multi Criteria Methodology for Aircraft Trajectory Planning Algorithm Selection: A Survey," in IEEE Transactions on Intelligent Transportation Systems, vol. 25, no. 10, pp. 12893-12911, Oct. 2024, doi: 10.1109/TITS.2024.3397331.*
Publication	*Hachem, M., Roos, C., Miquel, T., & Bronz, M. (2025). Improving Incremental Nonlinear Dynamic Inversion Robustness Using Robust Control in Aerial Robotics. arXiv preprint arXiv:2501.07223.*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
ECHO	*European Concept of Higher Airspace Operations - SESAR* *A concept of operations (ConOps) for higher airspace* *https://higherairspace.eu/echo-project/*
ECHO2	*Towards the integration between ATM and Higher Altitude Operations - SESAR* *https://higherairspace.eu/echo2-project/*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
999852236	*LINKOPINGS UNIVERSITET*

Short name: LIU

Address

Street	CAMPUS VALLA
Town	LINKOPING
Postcode	581 83
Country	Sweden
Webpage	www.liu.se

Specific Legal Statuses

Legal person	yes
Public body	yes
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	yes
Research organisation	yes

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	17/01/2022	- no
SME self-assessment	unknown	
SME validation	28/10/2008	- no

Departments carrying out the proposed work

Department 1

Department name	Communications and Transport Systems	☐ not applicable
	☐ Same as proposing organisation's address	
Street	ITN	
Town	Norrköping	
Postcode	60374	
Country	Sweden	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Dr

Gender ◯ Woman ◉ Man ◯ Non Binary

First name* **Valentin**

Last name* **POLISHCHUK**

E-Mail* **valentin.polishchuk@liu.se**

Position in org. Associate Professor

Department Communications and Transport Systems

☐ Same as organisation name

☐ Same as proposing organisation's address

Street ITN

Town Norrköping

Post code 60374

Country Sweden

Website http://tiny.cc/valatm

Phone +460736569219

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Billy	JOSEFSSON	billy.josefsson@liu.se	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Mr	Billy	Josefsson	Man	Sweden	billy.josefsson@liu.se	Category B Senior resea	Team member		

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☒
Co-definition of research and market needs	☒
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☒
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Publication	*L. Sedov, V. Polishchuk, V. Bulusu. Ground risk vs. Efficiency in Urban Drone Operations. ATM Seminar'21*
Publication	*L. Sedov, V. Polishchuk, T. Maury, M. Ulloa, D. Lykova. Qualitative and quantitative risk assessment of urban airspace operations. SID'21*
Publication	*J. Nunez-Portillo, T. Polishchuk, V. Polishchuk, H. Hardell. Evaluating Impact of Non-nominal Space Mission Event on Conventional Air Traffic. SID'23*
Publication	*V. Duchamp, L. Sedov, V. Polishchuk. Density-Adapting Layers towards PBN for UTM. ATM Seminar'19*
Software	*GUI for identifying areas subject to risk depending on CNS capabilities https://undefiened.github.io/uav_risk/*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
ECHO2	*EU HAO ConOps Phase 2*
UTMOK	*influence of CNS on VLL airspace capacity*
DAA	*UAV CNS requirements*
QRA	*identifying urban areas subject to risk depending on CNS capabilities*
Space data for CNS	*coordination with the US actors on CNS for rockets*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)
Quantitative Risk Analysis	*GUI for identifying areas subject to risk depending on CNS capabilities https://undefiened.github.io/uav_risk/*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
999789768	*C.I.R.A. CENTRO ITALIANO RICERCHE AEROSPAZIALI SCPA*

Short name: CIRA

Address

Street	VIA MAIORISE
Town	CAPUA
Postcode	81043
Country	Italy
Webpage	www.cira.it

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	no
Research organisation	yes

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	25/01/2022 - no
SME self-assessment	unknown
SME validation	26/06/2008 - no

Departments carrying out the proposed work

Department 1

Department name	Cross-Cutting Research Direction	☐ not applicable
	☒ Same as proposing organisation's address	
Street	VIA MAIORISE	
Town	CAPUA	
Postcode	81043	
Country	Italy	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title: Dr

Gender: ○ Woman ◉ Man ○ Non Binary

First name*: **Domenico**

Last name*: **Pascarella**

E-Mail*: **d.pascarella@cira.it**

Position in org.: Deputy Head of Security Research Unit

Department: Cross-Cutting Research Direction

☐ Same as organisation name

☒ Same as proposing organisation's address

Street: VIA MAIORISE

Town: CAPUA

Post code: 81043

Country: Italy

Website: *Please enter website*

Phone: +390823623105

Phone 2: *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Angela	VOZELLA	a.vozella@cira.it	+xxx xxxxxxxxx
Giovanni	Cuciniello	g.cuciniello@cira.it	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Dr	Domenico	Pascarella	Man	Italy	d.pascarella@cira.it	Category B Senior resea	Leading	0000-0003-1332-4234	Orcid ID
Dr	Angela	Vozella	Woman	Italy	a.vozella@cira.it	Category B Senior resea	Team member	0000-0002-3215-9011	Orcid ID
Dr	Ivan	Iudice	Man	Italy	i.iudice@cira.it	Category B Senior resea	Team member	0000-0001-8504-7075	Orcid ID
Dr	Vittorio Ugo	Castrillo	Man	Italy	v.castrillo@cira.it	Category B Senior resea	Team member	0000-0003-4604-9750	Orcid ID
Dr	Giovanni	Cuciniello	Man	Italy	g.cuciniello@cira.it	Category B Senior resea	Team member	0000-0001-8715-7606	Orcid ID
Dr	Gianfranco	Morani	Man	Italy	g.morani@cira.it	Category B Senior resea	Team member	0000-0002-9390-9736	Orcid ID
Dr	Gianluca	Corraro	Man	Italy	g.corraro@cira.it	Category B Senior resea	Team member	0000-0001-6188-4370	Orcid ID

Administrative forms

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Publication	*Automated Identification and Evaluation of Threat Scenarios for U-Space Solutions (https://doi.org/10.1145/3735978) – This paper provides a preliminary definition of a model-based methodology for the automated security risk assessment of U-space solutions, employing the SESAR Security Risk Assessment Methodology (SecRAM) as a baseline. Results are presented for a case study about drone-based pharmaceutical delivery in U-space environment.*
Publication	*Security Assessment of Drone Teams and Swarms Using an Extended SecRAM Methodology (https://doi.org/10.1109/TechDefense63521.2024.10863721) – The paper provides a security risk assessment approach for multi-drone systems, based on an enhanced version of the SESAR Security Risk Assessment Methodology (SecRAM). A sandwich methodology is proposed, integrating model-based notation and systematic literature review. The approach is tested on a use case involving a drone team and a mobile edge server.*
Publication	*Design of Stacked Intelligent Metasurfaces With Reconfigurable Amplitude and Phase for Multiuser Downlink Beamforming (https://ieeexplore.ieee.org/document/10824842) – The paper proposes a novel technology based on stacked intelligent metasurfaces (SIM) in wireless communication applications for multiuser downlink beamforming.*
Publication	*Navigation Algorithms for Precision Re-Entry of a Launcher First-Stage (http://dx.doi.org/10.2514/6.2025-4094) – Development of Navigation Algorithms for re-entry of re-usable launcher systems.*
Publication	*Dual-Frequency Multi-Constellation Global Navigation Satellite System/Inertial Measurements Unit Tight Hybridization for Urban Air Mobility Applications (https://doi.org/10.3390/aerospace11110955). Development of a tightly coupled sensor fusion between a dual-frequency multi-constellation GNSS receiver, an inertial measurements unit and the barometric altitude from an air data computer. The implemented navigation algorithm is integrated with autonomous fault detection and of GPS/Galileo/BeiDou*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
JARVIS	*SESAR IR Project (2023-2026) - CIRA is the SESAR solution leader of the ATC-DA (SESAR solution 0365) for conflict resolution leveraging Reinforcement Learning. CIRA is also leading the task for providing the security risk assessment of ATC-DA.*
U-ELCOME	*CINEA Project (2022-2025) - Among other things, CIRA led and performed execution of the U-space Security Risk Assessment for the Italian cluster, providing: the specification and design of a model-based automated methodology for the Security Risk Assessment of U-space solutions; the implementation of the methodology to U-space pharmaceutical delivery.*
SMART	*Italian PNRR Project (2024-2025) - Development of smart metasurfaces for advancing radio technologies in smart propagation environments for dual IoT 6G applications. CIRA contributes to the development/prototyping of algorithms for the synthesis of reconfigurable metasurfaces platforms in use cases related to future aerial platforms assisting 6G and beyond future communications.*
SALFGEN	*Development of Avionics for Future Generation Reusable Launchers funded by Italian Space Agency. In this framework CIRA performed the development and numerical verification of the Guidance, Navigation and Control algorithms for the re-entry and precision landing of a Launcher First-Stage and supported the partners in the definition of an Automatic Flight Termination System for Launchers.*

USV-DTFT2	*Development of the GNC system for both ascent and descent phase of the CIRA FTB-2 unmanned Re-entry vehicle which performed an unpropelled re-entry Drop-Test from an altitude of about 25Km carried-up by a stratospheric balloon. GNC algorithms include dedicate Virtual air data sensor aimed to estimate air data measurement without dedicate air data sensors.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	**Short description (Max 300 characters)**

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
870545901	*SCEYE SPAIN S.L.*

Short name: Sceye Spain

Address

Street	Suero de Quiñones 34-36
Town	Madrid
Postcode	28002
Country	Spain
Webpage	www.sceye.com

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	04/09/2025 - yes
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

No department involved

Department name *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street *Please enter street name and number.*

Town *Please enter the name of the town.*

Postcode *Area code.*

Country *Please select a country*

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ◯ Woman ◉ Man ◯ Non Binary

First name* **Alfredo**

Last name* **SERRANO**

E-Mail* **as@sceye.com**

Position in org. Director of EMEA

Department SCEYE SPAIN S.L.

☒ Same as organisation name

☒ Same as proposing organisation's address

Street Suero de Quiñones 34-36

Town Madrid

Post code 28002

Country Spain

Website *Please enter website*

Phone *+xxx xxxxxxxxx*

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Stephanie	LUONGO	sl@sceye.com	+xxx xxxxxxxxx
Leonard	BOYGUES	leonard.bouygues@gmail.com	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Mr	Leonard	Bouygues	Non-binary	France	lb@sceye.com	Category A Top grade re	Leading		

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☒
Co-definition of research and market needs	☒
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☒
Finance provider (public or private)	☐
Education and training	☒
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Other achievement	*Sceye platform is the most capable LTA HAPS currently in operation. Sceye has flown successfully more than 20 missions into the stratosphere, demonstrating day-night endurance using solar power and battery storage, while keeping station over the area of operation. We have flown multiple payloads, including optical and hyperspectral imaging cameras, SAR, 4G telecommunications, infrasonic sensors, and aerosol particle spectrometers, validating the platform's ability to carry diverse instrument*
Other achievement	*Cooperation with NASA Demonstrated cooperative deconfliction capabilities with other HAPS operators through NASA-led CE1.5 simulation*
Publication	*Cooperative, Seamless, and Global Digital Skies for Higher Airspace (2025) - HAPS Alliance Aviation Working Group The Aerospace Industries Association proposes collaborative traffic management for higher airspace to manage exponential growth of UAS, supersonic, HAPS, and commercial space operations. This involves community-based rules (user-formed, CAA-approved) and operators sharing intent via service providers for conflict identification and resolution, ensuring safe and equitable global mnmg*
Publication	*Acceptable Levels of Risks for HAPS (2024) - HAPS Alliance Aviation Working Group For High Altitude Platform Systems, the HAPS Alliance advocates third-party-centric risk metrics, measuring risk to ground populations and manned aircraft. This replaces inadequate platform-centric aviation metrics. The framework sets individual and collective risk limits, aligned with existing infrastructure risks (e.g.UK ALARP), enabling operators to dynamically self-manage risk by controlling operational factor*
Publication	*HAPS Operation Using Attended Autonomous Fleet Systems (2022) - HAPS Alliance Aviation Working Group A proposal for Collaborative Traffic Management for the Stratosphere (CTMS) for Attended Autonomous Fleet Systems. This strategy enables safe, scalable HAPS operations through automation for fleet management and M2M conflict resolution. It uses Community Based Rules (CBR) and is an exception-centric approach, where human supervisory networks manage system anomalies, not individual vehicles*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
Direct-to-Device Connectivity	*In May 2021, Sceye set a long range record in 4G broadband connectivity from the stratosphere connecting directly with smartphones on the ground . For this demonstrator, Sceye used the latest generation OpenRAN equipment and demonstrated true direct-to-device broadband connectivity up to a distance of 140Km with only 5 MHz spectrum.*
MIMO Array Antenna	*In October 2021, Sceye successfully connected a 4G antenna with 3D beamforming from the stratosphere. This was the first time that an active array antenna with 3D beamforming technology connected directly from the stratosphere to a smartphone on the ground, demonstrating that Sceye's HAPS can use its altitude and range to efficiently extend broadband across areas without coverage.*
First Full-Diurnal Flight for LTA	*In August 2024), Sceye achieved a 24+ hour stratospheric flight, demonstrating day-night endurance using solar power and battery storage. Sceye is the first HAPS platform to ever demonstrate closure of power loop while staying over an area of operation. The HAPS maintained position over a target area, carried advanced payloads (optical cameras, infrared sensors, synthetic aperture radar), and enabled wildfire detection, and methane leak monitoring*

NASA and EPA Partnership	*Signed a Space Act Agreement with NASA and a cooperating research and development agreement with the USGS to use HAPS for climate and disaster monitoring (e.g., methane leaks, wildfires, ecosystem surveys). Sceye achieved world's first real-time methane detection from the stratosphere in partnership with U.S EPA & State of New Mexico*
Pre-commercial Telecom Demonstrator	*Engaged with international Telecom operators to fly communication and observation missions in the Americas and East Asia to demonstrate 4G/5G coverage from stratosphere for unserved areas and provide emergency communication and observation support to first responders in case of natural disaster.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	**Short description (Max 300 characters)**
HAPS Platform	*Sceye's High Altitude Platform System (HAPS) is a Lighter-than-Air platform designed, built, and tested to ensure reliable launch, ascent, and transition to float altitude in the stratosphere. Sceye's HAPS can carry and power 200kg+ of diverse payload systems, enabling it as a multi-mission platform*
Stratoport Hangar	*Sceye has established cooperation with Government of Aragon in Spain to set up a Hangar at Teruel Airport facilities spanning across 20ha, for production and operations of Sceye HAPS to support commercial missions across EMEA which will support the creation of highly-skilled employment in the region*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
875470494	*SKYDWELLER CANARIAS SL*

Short name: SKYDWELLER CANARIAS SL

Address

Street	ANTIGUO AEROPUERTO DE LOS ESTANCOS
Town	PUERTO DEL ROSARIO
Postcode	35612
Country	Spain
Webpage	

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	07/11/2024 - yes
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Business Development	☐ not applicable
	☐ Same as proposing organisation's address	
Street	Carretera de Fuencarral 5	
Town	Alcobendas	
Postcode	28108	
Country	Spain	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title: Mr

Gender: ○ Woman ◉ Man ○ Non Binary

First name*: **Sebastien**

Last name*: **RENOUARD**

E-Mail*: **sebastien.renouard@skydweller.aero**

Position in org.: Chief Commercial Officer EMEA

Department: Business Development

☐ Same as organisation name

☐ Same as proposing organisation's address

Street: Calle de Fuencaral 5

Town: Alcobendas

Post code: 28108

Country: Spain

Website: https://www.skydweller.aero/

Phone: +34648235463

Phone 2: *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Antoine	LECA	antoine.leca@skydweller.aero	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Mr	Jose	Vega	Man	Spain	jose.vega@skydweller.aero	Category B Senior resea	Leading		
Mr	Ruben	Moreno	Man	Spain	ruben.moreno@skydweller.aero	Category B Senior resea	Team member		

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☒
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
ECHO 2	*SKYDWELLER participates in this project that will build on research from the ECHO project on developing a concept of operations (CONOPS) for higher airspace. Specifically, the project will focus on introducing to the CONOPS a module on space launch real-time monitoring, and packages covering ground and air-ground operational integration procedures. The integration of High-Altitude Platform Systems (HAPS) is also covered.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)
Skydweller HAPS	*The Skydweller HAPS is based on the Solar Impulse 2 aircraft– the culmination of 14 years of engineering work and over €190 million in research and development*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
892237138	*SKYDWELLER SL*

Short name: SKYDWELLER

Address

Street	AERODROMO MANUEL SANCHEZ VALDEPENAS
Town	CIUDAD REAL
Postcode	13300
Country	Spain
Webpage	skydweller.aero

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is unknown (small- and medium-sized enterprise) for the call.

SME self-declared status	unknown
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Business Development	☐ not applicable
	☐ Same as proposing organisation's address	
Street	Carretera de Fuencarral 5	
Town	Alcobendas	
Postcode	28108	
Country	Spain	

Links with other participants

Type of link	Participant

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☐
Testing/validation of approaches and ideas	☐
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
906263241	*PARQUE TECNOLOGICO DE FUERTEVENTURASA MP*

Short name: PARQUE TECNOLOGICO DE FUERTEVENTURASA MP

Address

Street	LUGAR AEROPUERTO DE LOS ESTANCOS
Town	PUERTO DEL ROSARIO
Postcode	35613
Country	Spain
Webpage	www.ptfue.com

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	14/12/2021 - yes
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Communications and Transport Systems	☐ not applicable
	☐ Same as proposing organisation's address	
Street	ITN	
Town	Norrköping	
Postcode	60374	
Country	Sweden	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ○ Woman ◉ Man ○ Non Binary

First name* **Sergio David**

Last name* **DIAZ MARTINEZ**

E-Mail* **sdiaz@ptfue.com**

Position in org. HEAD OF SPECIAL PROGRAMS AND STRATEGIC PROJECTS AREA

Department SPECIAL PROGRAMS AND STRATEGIC PROJECTS

☐ Same as organisation name

☒ Same as proposing organisation's address

Street LUGAR AEROPUERTO DE LOS ESTANCOS

Town PUERTO DEL ROSARIO

Post code 35613

Country Spain

Website *Please enter website*

Phone *+xxx xxxxxxxxx*

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Ayose Kim	HERNANDEZ	akim@ptfue.com	+xxx xxxxxxxxx
Jorge	FERREIRA GOMEZ	jferreira@ptfue.com	+xxx xxxxxxxxx
Alvaro	LOPEZ	alopez@ptfue.com	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☐
Testing/validation of approaches and ideas	☐
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
875281053	*Elson Space España S.L.*

Short name: Elson Space España

Address

Street	Poligano Industrial PLATEA ZONA LI-1, Num. 5
Town	Teruel
Postcode	44195
Country	Spain
Webpage	https://elsonspace.com/

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	19/11/2024 - yes
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

No department involved

Department name *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street *Please enter street name and number.*

Town *Please enter the name of the town.*

Postcode *Area code.*

Country *Please select a country*

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title: Ms

Gender: (•) Woman ( ) Man ( ) Non Binary

First name*: **Míriam**

Last name*: **Royo Navarro**

E-Mail*: **miriam@elsonspace.com**

Position in org.: Managing Director

Department: Elson Space España S.L.

☒ Same as organisation name

☒ Same as proposing organisation's address

Street: Poligano Industrial PLATEA ZONA LI-1, Num. 5

Town: Teruel

Post code: 44195

Country: Spain

Website: https://elsonspace.com/elson-space-espana/

Phone: +34639277383

Phone 2: *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Chris	Hall	chris.h@elsonspace.com	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☒
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

Administrative forms

PIC	Legal name
999981731	*DEUTSCHES ZENTRUM FUR LUFT - UND RAUMFAHRT EV*

Short name: DLR

Address

Street	LINDER HOHE
Town	KOLN
Postcode	51147
Country	Germany
Webpage	www.dlr.de

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	no
Research organisation	yes

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	03/01/2022 - no
SME self-assessment	unknown
SME validation	28/10/2008 - no

Departments carrying out the proposed work

Department 1

Department name	Institut of Flight Guidance	☐ not applicable
	☐ Same as proposing organisation's address	
Street	Lilienthalplatz 7	
Town	Braunschweig	
Postcode	38108	
Country	Germany	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ○ Woman ◉ Man ○ Non Binary

First name* **Sven**

Last name* **Kaltenhaeuser**

E-Mail* **sven.kaltenhaeuser@dlr.de**

Position in org. Head of Department ATM-SIM

Department Institut of Flight Guidance ☐ Same as organisation name

☐ Same as proposing organisation's address

Street Lilienthalplatz 7

Town Braunschweig Post code 38108

Country Germany

Website dlr.de/fl

Phone +49 531 295 2560 *Phone 2* *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Lorenz	Losensky	lorenz.losensky@dlr.de	+49 531 295 1155
Dirk-Roger	Schmitt	dirk-roger.schmitt@dlr.de	+49 172 295 4416
Andreas	Hasselberg	andreas.hasselberg@dlr.de	+49 531 295 2427
fl	controlling	fl-controlling@dlr.de	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Mr	Richard	Hörder	Man	Germany	richard.hoerder@dlr.de	Category D First stage r	Team member		Orcid ID
Mr	Jens	Hampe	Man	Germany	Jens.Hampe@dlr.de	Category B Senior resea	Team member	0000-0003-3105-1516	Orcid ID
Mr	Frank	Morlang	Man	Germany	Frank.Morlang@dlr.de	Category B Senior resea	Team member	0000-0003-3636-5215	Orcid ID
Mr	Maximilian	Neumann	Man	Germany	Maximilian.Neumann@dlr.de	Category D First stage r	Team member		Orcid ID
Mr	Tobias	Rabus	Man	Germany	tobias.rabus@dlr.de	Category D First stage r	Team member	0000-0003-1947-5447	Orcid ID
Mr	Lorenz	Losensky	Man	Germany	lorenz.losensky@dlr.de	Category D First stage r	Team member	0000-0003-2085-7979	Orcid ID
Mr	Sven	Kaltenhäuser	Man	Germany	sven.kaltenhaeuser@dlr.de	Category B Senior resea	Leading	0000-0002-8762-1971	Orcid ID

Administrative forms

Role of participating organisation in the project

Project management	☒
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☒
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Publication	*Kaltenhäuser, Sven und Klünker, Carmo und Schmitt, Dirk-Roger (2022) Interoperable data exchange for safe and efficient launch and re-entry operations in an international environment, In: Proceedings of the International Astronautical Congress, IAC. 73rd International Astronautical Congress (IAC), 18.-22. Okt. 2022, Paris, France*
Publication	*Stahnke, Anouk und Rabus, Tobias und Kaltenhäuser, Sven (2022) Supporting the safety and efficiency of airspace transition for launch and re-entry operations in Europe, 2nd International Conference on Flight Vehicles, Aerothermodynamics and Re-entry Missions & Engineering (FAR), 19 - 23 June 2022. Heilbronn, Germany*
Other achievement	*MAPHEUS is DLR's annual sounding rocket programme, reaching ~260 km altitude and ~6 minutes of microgravity. Since 2009, 15 missions enabled high-impact experiments in materials science, life sciences, and technology testing. Achievements include rapid payload turnaround, safe recovery, and results published in international journals, strengthening Europe's leadership in microgravity research.*
Publication	*Kaltenhäuser, Sven und Hampe, Jens und Rabus, Tobias und Morlang, Frank und Losensky, Lorenz (2024) The SpaceTracks approach for an efficient Integration of Launch Operations in European Airspace. In: 1st International Symposium on Small Launchers and Spaceports. 1st International Symposium on Small Launchers and Spaceports, 2024-10-28 - 2024-10-30, Harwell, Vereinigtes Königreich. Volltext nicht online.*
Publication	*Kaltenhäuser, Sven und Hampe, Jens und Rabus, Tobias und Morlang, Frank und Losensky, Lorenz (2024) Towards Efficient Integration of Rocket Launches and Re-entry Operations in European Airspace: Development and Testing of a Launch Coordination Center. In: Proceedings of the International Astronautical Congress, IAC. 75th International Astronautical Congres, 2024-10-14 - 2024-10-18, Mailand, Italien. ISSN 0074-1795.*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
ECHO Project	*European Concept of Higher Airspace Operations.* *https://higherairspace.eu/echo-project/* *Project led by EUROCONTROL with major DLR participation delivering a comprehensive demand analysis and the concept of operations (ConOps) for higher airspace to allow safe, efficient and scalable operations.The ConOps also provide the basis to identify future infrastructure needs that is required to support Higher Airspace Operations (HAO).*
DLR/FAA DEP	*DLR - FAA Data Exchange Project.* *https://www.dlr.de/content/en/articles/news/2019/04/20191025_dlr-and-us-federal-aviationadministration-are-cooperating.html* *DLR and the Office of Commercial Space Transportation of the US Federal Aviation Administration (FAA) identified the data that need to be exchanged between United States and European Air Navigation Service Providers (ANSPs) prior to, during and after a launch.*
ECHO2	*https://higherairspace.eu/echo2-project/* *The ECHO 2 Project is dedicated to enhancing air traffic management by integrating space mission monitoring for launches and re-entries within the EUROCONTROL Network Manager area. It focuses on creating operational frameworks to manage space operations, including orbital and sub-orbital trajectories, ensuring they harmonize with existing air traffic.*
MAPHEUS	*MAPHEUS is a DLR rocket programme providing a proven platform for interdisciplinary microgravity research, managed end-to-end by DLR institutes and partners. Activities include payload development, qualification, campaign execution, and post-flight analysis. With 15 successful launches, MAPHEUS demonstrates strong capacity for complex, multi-partner missions, directly relevant to space access, technology validation, and ESA cooperation*

DLR Launch Coordination Center (LCC) Development -	*https://www.dlr.de/en/latest/news/2021/03/20210923_dlr-is-developing-a-launch-coordination-center* *DLR's LCC integrates software-based procedures for safe, efficient space launch coordination through airspace. System includes automated planning components, real-time mission monitoring via Space Operations Dashboard, and enhanced air traffic controller interfaces.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	**Short description (Max 300 characters)**
Air Traffic Validation Center	*https://www.dlr.de/fl/en/desktopdefault.aspx/tabid-1140/* *DLR facilities for the validation of concepts, technologies and procedures in air traffic management. Together, these facilities are known as the Air Traffic Validation Center and are unique in Europe.*
MAPHEUS	*https://www.dlr.de/en/research-and-transfer/projects-and-missions/mapheus* *MAPHEUS DLR rocket programme providing a proven platform for interdisciplinary research with sounding rockets.*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
998162690	*PILDO CONSULTING SL*

Short name: PILDOLABS

Address

Street	c/ Bac de Roda 120 (Local 2)
Town	BARCELONA
Postcode	08019
Country	Spain
Webpage	http://www.pildo.com

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	31/12/2021	- yes
SME self-assessment	31/12/2021	- yes
SME validation	17/02/2009	- yes

Departments carrying out the proposed work

Department 1

Department name	Engineering Business Unit	☐ not applicable
	☒ Same as proposing organisation's address	
Street	c/ Bac de Roda 120 (Local 2)	
Town	BARCELONA	
Postcode	08019	
Country	Spain	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ◯ Woman ◉ Man ◯ Non Binary

First name* **Santiago**

Last name* **Soley**

E-Mail* **santiago.soley@pildo.com**

Position in org. CEO

Department PILDO CONSULTING SL

☒ Same as organisation name

☒ Same as proposing organisation's address

Street c/ Bac de Roda 120 (Local 2)

Town BARCELONA

Post code 08019

Country Spain

Website https://pildo.com/

Phone +34 931828840

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Daniel	Garcia	daniel.garcia@pildo.com	+34 931828840

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Software	*The OWL: Software tool aimed at monitoring GNSS and SBAS performances and detect RF interferences at airports, heliports, and vertiports, ensuring the signal is compliant with ICAO requirements.*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
SBAS Altimetry	*Project funded by EUROCONTROL to validate the use of SBAS as in support to altimetry and speed determination in current helicopter GNSS-based operations.*
SAMVA	*Led by PildoLabs, the project aimed to foster the adoption of EGNOS technology in rotorcraft service provision, laying the groundwork for the seamless integration of autonomous VTOL aircraft.*
DELOREAN	*Led by PildoLabs, the project aimed to develop EGNSS requirements for the integration of urban air mobility operations. The project was underpinned by operational cases, engaging two main commercial service operators. The project was based on the use of COTS drones, and experimental avionics with advanced EGNSS receivers.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)
PildoBox	*Compact custom-designed device that integrates a MCMF GNSS receiver, an ADS-B receiver, and a small-form computer. Designed for 24/7 operation, with support for remote configuration and diagnostics.*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
997701843	*ENAIRE*

Short name: ENAIRE

Address

Street	AVENIDA DE ARAGON S/N BLOQUE 330, PORTAL
Town	MADRID
Postcode	28022
Country	Spain
Webpage	http://www.enaire.es

Specific Legal Statuses

Legal person	yes
Public body	yes
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	14/06/1991 - no
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Innovation Division	☐ not applicable
	☒ Same as proposing organisation's address	
Street	AVENIDA DE ARAGON S/N BLOQUE 330, PORTAL	
Town	MADRID	
Postcode	28022	
Country	Spain	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ◯ Woman ◉ Man ◯ Non Binary

First name* **Francisco Jose**

Last name* **JIMENEZ RONCERO**

E-Mail* **fjroncero@enaire.es**

Position in org. Innovation Manager

Department Innvoation Division

☐ Same as organisation name

☒ Same as proposing organisation's address

Street AVENIDA DE ARAGON S/N BLOQUE 330, PORTAL 2 PARQUE EMPRESARIAL LAS

Town MADRID

Post code 28022

Country Spain

Website www.enaire.es

Phone +34 634 880 079

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Daniel	Dominguez Perez	ddoperez@enaire.es	+xxx xxxxxxxxx
Javier	Garcia Moreno	jgmoreno@enaire.es	+xxx xxxxxxxxx
Francisco Manuel	Tortosa Lopez	fmtortosa@enaire.es	+xxx xxxxxxxxx
Alberto	Blanch Romero	abromero@enaire.es	+xxx xxxxxxxxx
Jorge	Vellon Benito	jvellon@e-externas.enaire.es	+xxx xxxxxxxxx
Jesus Mario	GARCIA CANO	jmgcano@enaire.es	+xxx xxxxxxxxx
Fernando	DIAZ GARCIA	fdigarcia@enaire.es	+xxx xxxxxxxxx
Mohammed	SHIPON	mshipon@enaire.es	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☒
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☐
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
ECHO 2	*The main objective of this project is the modernisation and adaptation of the European ATM system that allows the integration of the so-called high-altitude operations or Higher Airspace Operations (HAO). These types of operations occur above flight level FL550, that is, operations above 17,000 meters, while flights usually take place around 10,000 meters.*
EUSTM	*EUSTM is an end-to end activity towards the definition of a future STM capability:* *· Defining the needs in terms of organisation and responsibilities, technology, policy, laws, guidelines, best practices and standards* *· Elaborating detailed specs, a preliminary design, a reference roadmap and a ROM cost analysis* *· Developing an innovative collaborative platform for exchange of information inside the team and with external stakeholders* *· Creating a community of interest on STM*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
873172467	*OpenUTM Ltd.*

Short name: OpenUTM

Address

Street	Mespil Business Center, Mespil House, Sussex Ho
Town	Dublin
Postcode	D04 T4A6
Country	Ireland
Webpage	https://openutm.net

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	14/02/2025 - yes
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Communications and Transport Systems	☐ not applicable
	☒ Same as proposing organisation's address	
Street	Mespil Business Center, Mespil House, Su	
Town	Dublin	
Postcode	D04 T4A6	
Country	Ireland	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ○ Woman ◉ Man ○ Non Binary

First name* **Hrishikesh**

Last name* **Ballal**

E-Mail* **hb@openutm.net**

Position in org. Managing Director

Department OpenUTM Ltd.

☒ Same as organisation name

☒ Same as proposing organisation's address

Street Mespil Business Center, Mespil House, Sussex House

Town Dublin

Post code D04 T4A6

Country Ireland

Website *Please enter website*

Phone *+xxx xxxxxxxxx*

Phone 2 *+xxx xxxxxxxxx*

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Dr	Hrishikesh	Ballal	Man	Ireland	hb@openutm.net	Category B Senior resea	Leading		

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☒
Testing/validation of approaches and ideas	☐
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Software	*OpenUTM is an open-source, standards-compliant stack for Unmanned Traffic Management (UTM), designed to help organizations build and deploy regulation-ready systems for managing drone and unmanned aircraft traffic. Its architecture is built around two core components: Flight Blender, a backend service handling Remote ID, air traffic data, geofencing, and strategic deconfliction, and Flight Spotlight, a frontend interface providing maps, timelines, flight noticeboards, and 3D visualizations.*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
894907645	*ANRA TECHNOLOGIES UK LTD*

Short name: ANRA TECHNOLOGIES UK LTD

Address

Street	114 HIGH STREET
Town	CRANFIELD, BEDS
Postcode	MK43 0DG
Country	United Kingdom
Webpage	www.flyanra.com

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	09/09/2025 - yes
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Communications and Transport Systems	☐ not applicable
	☒ Same as proposing organisation's address	
Street	114 HIGH STREET	
Town	CRANFIELD, BEDS	
Postcode	MK43 0DG	
Country	United Kingdom	

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title _____ Gender ◯ Woman ◉ Man ◯ Non Binary

First name* **Amit** Last name* **Ganjoo**

E-Mail* **aganjoo@flyanra.com**

Position in org. CEO

Department ANRA TECHNOLOGIES UK LTD ☒ Same as organisation name

☒ Same as proposing organisation's address

Street 114 HIGH STREET

Town CRANFIELD, BEDS Post code MK43 0DG

Country United Kingdom

Website *Please enter website*

Phone *+xxx xxxxxxxxx* *Phone 2* *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Brent	Klavon	bklavon@flyanra.com	+xxx xxxxxxxxx
Ajay	Modha	amodha@flyanra.com	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Dr	Ajay	Modha	Man	United Kingdom	amodha@flyanra.com	Category A Top grade re	Leading		
Mr	David	Murphy	Man	United Kingdom	dmurphy@flyanra.com	Category B Senior resea	Team member		

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☒
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Software	*ANRA NOON: ANRA is an EASA certified U-space Service Provider, and ANRA NOON is an airspace management software platform for uncrewed aircraft. U-space services support the management of uncrewed aircraft operations in U-space airspace.*
Software	*ANRA's AWARE tool: Provides supplemental data for flight safety and business intelligence. The service facilitates geospatial data layers such as network infrastructure or weather to be included into UTM services such as flight authorisation and monitoring services during flight.*
Software	*ANRA's SIM tool: Provides the engine to drive a Digital Twin experience for virtual drone operations*
Software	*ANRA AAM Traffic Management tool: airspace management for Advanced Air Mobility aircraft*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
Corus five (2025-2028)	*Corus five aims to facilitate full airspace integration of UAS systems alongside existing airspace users providing a reference architecture, addressing air traffic management service gaps in flight rules and airspace management and informing both regulatory gaps and future R&D requirements*
Managing Shared Airspace (2025 - 2026)	*The project aims to implement and validate a UK Concept of Operations for UTM supported UAS operations. It seeks to operationalise an industry-driven approach for UTM services that support multiple overlapping Beyond Visual Line of Sight (BVLOS) operations within shared airspace.*
U-ELCOME (2022-2025)	*The U-ELCOME project is designed to support Europe-wide U-space implementation off the ground by fostering a fully scalable market uptake of U1 and U2 U-space services through a set of tests and demonstrations in various operational environments across 15 locations, including includes integrations with national ATC providers, in Spain, Italy, and France.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)
Cloud-based service	*Cloud service access in line with commercially deployed ones*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
- **Data collection and monitoring:** sex/gender disaggregated data on personnel (and students for establishments concerned) and annual reporting based on indicators.
- **Training:** Awareness raising/trainings on gender equality and unconscious gender biases for staff and decision-makers.
- **Content-wise, recommended areas** to be **covered** and addressed via concrete measures and targets are:
    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
881888402	*SKYPUZZLER APS*

Short name: Skypuzzler

Address

Street	OSTERGADE 16 4
Town	COPENHAGEN
Postcode	1100
Country	Denmark
Webpage	www.skypuzzler.com

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	no
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	20/07/2023	- yes
SME self-assessment	unknown	
SME validation	31/12/2023	- yes

Departments carrying out the proposed work

No department involved

Department name *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street *Please enter street name and number.*

Town *Please enter the name of the town.*

Postcode *Area code.*

Country *Please select a country*

Links with other participants

Type of link	Participant

Main contact person

This will be the person the EU services will contact concerning this proposal (e.g. for additional information, invitation to hearings, sending of evaluation results, convocation to start grant preparation). The data in blue is read-only. Details (name, first name and e-mail) of Main Contact persons should be edited in the step "Participants" of the submission wizard.

Title Mr

Gender ◯ Woman ◉ Man ◯ Non Binary

First name* **Sebastian**

Last name* **Babiarz**

E-Mail* **sebastian.babiarz@skypuzzler.com**

Position in org. Director Business Development

Department SKYPUZZLER APS

☒ Same as organisation name

☒ Same as proposing organisation's address

Street OSTERGADE 16 4

Town COPENHAGEN

Post code 1100

Country Denmark

Website https://www.skypuzzler.com/

Phone +48882404111

Phone 2 *+xxx xxxxxxxxx*

Other contact persons

First Name	Last Name	E-mail	Phone
Ronni	Winkler Østergaard	ronni.ostergaard@skypuzzler.com	+4524422752
Jacob	Løfdahl	jacob.loefdahl@skypuzzler.com	+xxx xxxxxxxxx

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier
Dr	Elgiz	Baskaya	Woman	France	elgiz.baskaya@skypuzzler.com	Category B Senior resea	Team member		

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☒
Provision of research and technology infrastructure	☒
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☐
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☒
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Service	*Nordic Patent Service: Skypuzzler patent for Tactical Deconfliction of Unmanned Aerial Vehicles European Patent Application no. 23179563.4*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)
CONDUCT	*The project aimed to develop a breakthrough solution for automated tactical drone deconfliction. This will enable safe and efficient flight route adjustments in real-time when multiple drones are flying in the same airspace beyond visual line of sight.*
EIC: SKYPUZZLER	*Project: 101188110 — Skypuzzler — HORIZON-EIC-2024-ACCELERATOR-02 Skypuzzler is a novel Digital Air Traffic Control (ATC) software project aimed at empowering the global commercial drone market through its autonomous tactical deconfliction service to solve a rising problem of drone safety. By using a sophisticated mathematical algorithm, Skypuzzler integrates seamlessly into Unmanned Traffic Management (UTM) systems enabling drones to avoid collisions*
Autonomous deConfliction of Drone-Congested areas	*The Skypuzzler AC-DC (Autonomous deConfliction of Drone-Congested areas) Kick-Start Project, under the ESA ARTES programme, focuses on the objective of enabling our integrated Digital Air Traffic Control (iDATC) product to deconflict drones at higher levels of precision by using our software-to-software approach, integrating with the drone's SatNav capabilities, thereby removing the need for installing extra cost or energy-consuming equipment on the drone.*

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)
iDATC as a Service	*Integrated Digital ATC system provides Conflict Resolution Service, an advanced deterministic algorithm that can be incorporated as a software-to-software module to UTM and drone operator systems.*

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? (•) Yes ( ) No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
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    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

PIC	Legal name
869703941	*HAPS Alliance*

Short name: High Altitude Platform Station Alliance Inc.

Address

Street	401 Edgewater Place, Suite 600
Town	Wakefield
Postcode	01880
Country	United States
Webpage	www.hapsalliance.org

Specific Legal Statuses

Legal person	yes
Public body	no
Non-profit	yes
International organisation	no
Secondary or Higher education establishment	no
Research organisation	no

SME Data

Based on the below details from the Participant Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

SME self-declared status	30/08/2025 - yes
SME self-assessment	unknown
SME validation	unknown

Departments carrying out the proposed work

Department 1

Department name	Communications and Transport Systems	☐ not applicable
	☐ Same as proposing organisation's address	
Street	ITN	
Town	Norrköping	
Postcode	60374	
Country	Sweden	

Links with other participants

Type of link	Participant

Researchers involved in the proposal

Title	First Name	Last Name	Gender	Nationality	E-mail	Career Stage	Role of researcher (in the project)	Reference Identifier	Type of identifier

Role of participating organisation in the project

Project management	☐
Communication, dissemination and engagement	☐
Provision of research and technology infrastructure	☐
Co-definition of research and market needs	☐
Civil society representative	☐
Policy maker or regulator, incl. standardisation body	☐
Research performer	☒
Technology developer	☒
Testing/validation of approaches and ideas	☒
Prototyping and demonstration	☐
IPR management incl. technology transfer	☐
Public procurer of results	☐
Private buyer of results	☐
Finance provider (public or private)	☐
Education and training	☐
Contributions from the social sciences or/and the humanities	☐
Other If yes, please specify: (Maximum number of characters allowed: 50)	☐

List of up to 5 publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content.

Type of achievement	Short description (Max 500 characters)
Publication	*Cooperative, Seamless, and Global Digital Skies for Higher Airspace : The purpose of the paper is to assist the aviation and aerospace global communities in understanding an industry perspective and vision for a global harmonized, cross-border, and integrated Higher Airspace Operations Traffic Management, which supports the seamless integration of highly automated operations.*
Publication	*HAPS Certification Pathways: The purpose of this document is to identify the key challenges faced by the High Altitude Platform System (HAPS) community in getting regulatory approval to start commercial operations and recommended actions that the HAPS Alliance can take to address these challenges. Operational challenges are covered only from the perspective of the potential impact they have on air vehicle performance.*
Publication	*Acceptable Levels of Risk for HAPS : This paper discusses setting acceptable levels of risk for High Altitude Platform System (HAPS). It discusses the safety metrics traditionally used in aviation are not adequate to establish target levels of safety for HAPS. Then it proposes to set acceptable levels of risk to be consistent with the risk already accepted by the exposed parties. Then it proposes a framework by which an operator self-manages the collective risk it generates.*

List of up to 5 most relevant previous projects or activities, connected to the subject of this proposal.

Name of Project or Activity	Short description (Max 500 characters)

Description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Name of infrastructure of equipment	Short description (Max 300 characters)

Gender Equality Plan

Does the organization have a Gender Equality Plan (GEP) covering the elements listed below? ○ Yes ◉ No

Minimum process-related requirements (building blocks) for a GEP

- **Publication:** formal document published on the institution's website and signed by the top management
- **Dedicated resources:** commitment of human resources and gender expertise to implement it.
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    - work-life balance and organisational culture;
    - gender balance in leadership and decision-making;
    - gender equality in recruitment and career progression;
    - integration of the gender dimension into research and teaching content;
    - measures against gender-based violence including sexual harassment.

Proposal ID **101288550**

Acronym **SCAN**

3 - Budget

No	Name of Beneficiary	Country	Role	Requested grant amount	Income generated by the action	Financial contributions	Own resources	Total estimated income
1	Eurocontrol - European Organisation For The Safety Of Air Navigation	BE	Coordinator	0.00	0	0	1 972 168	1 972 168.00
2	Dfs Deutsche Flugsicherung Gmbh	DE	Partner	137 681.25	0	59 006	0	196 687.25
3	Luftfartsverket	SE	Partner	254 709.88	0	0	109 161	363 870.88
4	European Satellite Services Provider Sas	FR	Partner	95 988.20	0	0	41 138	137 126.20
5	Nats (En Route) Public Limited Company	UK	Partner	56 147.79	0	0	24 064	80 211.79
6	Direction Des Services De La Navigation Aerienne	FR	Partner	182 656.25	0	78 281	0	260 937.25
7	Skynav Europe	BE	Partner	561 397.73	0	0	240 569	801 966.73
8	Ecole Nationale De L Aviation Civile	FR	Partner	124 162.50	0	0	53 213	177 375.50
9	Linkopings Universitet	SE	Partner	99 225.00	0	0	42 525	141 750.00
10	C.i.r.a. Centro Italiano Ricerche Aerospaziali Scpa	IT	Partner	178 190.46	0	0	76 367	254 557.46
11	Sceye Spain S.I.	ES	Partner	3 586 975.00	0	0	1 537 275	5 124 250.00
12	Skydweller Canarias Sl	ES	Partner	1 339 800.00	0	0	574 200	1 914 000.00
13	Skydweller Sl	ES	Affiliated	0.00	0	0	0	0.00
14	Parque Tecnologico De Fuerteventurasa Mp	ES	Partner	164 281.25	0	0	70 406	234 687.25

15	Elson Space España S.l.	ES	Partner	911 562.75	0	0	390 670	1 302 232.75
16	Deutsches Zentrum Fur Luft - Und Raumfahrt Ev	DE	Partner	687 225.88	0	0	294 525	981 750.88
17	Pildo Consulting Sl	ES	Partner	233 187.50	0	0	99 938	333 125.50
18	Enaire	ES	Partner	322 866.25	0	0	138 371	461 237.25
19	Openutm Ltd.	IE	Partner	81 279.63	0	0	34 834	116 113.63
20	Anra Technologies Uk Ltd	UK	Partner	193 909.63	0	0	83 104	277 013.63
21	Skypuzzler Aps	DK	Partner	475 343.75	0	0	203 719	679 062.75
22	Haps Alliance	US	Associated	0.00	0	0	0	0.00
	Total			9 686 590.70		137 287	5 986 247	

4 - Ethics & security

Ethics Issues Table

1. Human Embryonic Stem Cells and Human Embryos			Page
Does this activity involve Human Embryonic Stem Cells (hESCs)?	○ Yes	◉ No	
Does this activity involve the use of human embryos?	○ Yes	◉ No	
2. Humans			**Page**
Does this activity involve human participants?	○ Yes	◉ No	
Does this activity involve interventions (physical also including imaging technology, behavioural treatments, etc.) on the study participants?	○ Yes	◉ No	
Does this activity involve conducting a clinical study as defined by the Clinical Trial Regulation (EU 536/2014)? (using pharmaceuticals, biologicals, radiopharmaceuticals, or advanced therapy medicinal products)	○ Yes	◉ No	
3. Human Cells / Tissues (not covered by section 1)			**Page**
Does this activity involve the use of human cells or tissues?	○ Yes	◉ No	
4. Personal Data			**Page**
Does this activity involve processing of personal data?	○ Yes	◉ No	
Does this activity involve further processing of previously collected personal data (including use of preexisting data sets or sources, merging existing data sets)?	○ Yes	◉ No	
Is it planned to export personal data from the EU to non-EU countries?	○ Yes	◉ No	
Is it planned to import personal data from non-EU countries into the EU or from a non-EU country to another non-EU country?	○ Yes	◉ No	
Does this activity involve the processing of personal data related to criminal convictions or offences?	○ Yes	◉ No	
5. Animals			**Page**
Does this activity involve animals?	○ Yes	◉ No	
6. Non-EU Countries			**Page**
Will some of the activities be carried out in non-EU countries?	○ Yes	◉ No	
In case non-EU countries are involved, do the activities undertaken in these countries raise potential ethics issues?	○ Yes	◉ No	
It is planned to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	○ Yes	◉ No	
Is it planned to import any material (other than data) from non-EU countries into the EU or from a non-EU country to another non-EU country? For data imports, see section 4.	○ Yes	◉ No	
Is it planned to export any material (other than data) from the EU to non-EU countries? For data exports, see section 4.	○ Yes	◉ No	
Does this activity involve low and/or lower middle income countries, (if yes, detail the benefit-sharing actions planned in the self-assessment)	○ Yes	◉ No	
Could the situation in the country put the individuals taking part in the activity at risk?	○ Yes	◉ No	
7. Environment, Health and Safety			**Page**

Proposal ID **101288550**

Acronym **SCAN**

Does this activity involve the use of substances or processes that may cause harm to the environment, to animals or plants.(during the implementation of the activity or further to the use of the results, as a possible impact) ?	◯ Yes	◉ No	
Does this activity deal with endangered fauna and/or flora / protected areas?	◯ Yes	◉ No	
Does this activity involve the use of substances or processes that may cause harm to humans, including those performing the activity.(during the implementation of the activity or further to the use of the results, as a possible impact) ?	◯ Yes	◉ No	

8. Artificial Intelligence			Page
Does this activity involve the development, deployment and/or use of Artificial Intelligence-based systems?	◯ Yes	◉ No	

9. Other Ethics Issues			Page
Are there any other ethics issues that should be taken into consideration?	◯ Yes	◉ No	

I confirm that I have taken into account all ethics issues above and that, if any ethics issues apply, I will complete the ethics self-assessment as described in the guidelines How to Complete your Ethics Self-Assessment ☒

Administrative forms

Proposal ID **101288550**

Acronym **SCAN**

Ethics Self-Assessment

Ethical dimension of the objectives, methodology and likely impact

Explain in detail the identified issues in relation to:
- objectives of the activities (e.g. study of vulnerable populations, etc.)
- methodology (e.g. clinical trials, involvement of children, protection of personal data, etc.)
- the potential impact of the activities (e.g. environmental damage, stigmatisation of particular social groups, political or financial adverse consequences, misuse, etc.)

Remaining characters 5000

Compliance with ethical principles and relevant legislations

Describe how the issue(s) identified in the ethics issues table above will be addressed in order to adhere to the ethical principles and what will be done to ensure that the activities are compliant with the EU/national legal and ethical requirements of the country or countries where the tasks are to be carried out. It is reminded that for activities performed in a non-EU countries, they should also be allowed in at least one EU Member State.

Remaining characters 5000

Administrative forms

Proposal ID **101288550**

Acronym **SCAN**

Security issues table

1. EU Classified Information (EUCI)[2]			Page
Does this activity involve information and/or materials requiring protection against unauthorised disclosure (EUCI)?	○ Yes	◉ No	
Does this activity involve non-EU countries which need to have access to EUCI?	○ Yes	◉ No	
2. Misuse			**Page**
Does this activity have the potential for misuse of results?	○ Yes	◉ No	
3. Other Security Issues			**Page**
Does this activity involve information and/or materials subject to national security restrictions? If yes, please specify: (Maximum number of characters allowed: 1000)	○ Yes	◉ No	
Are there any other security issues that should be taken into consideration? If yes, please specify: (Maximum number of characters allowed: 1000)	○ Yes	◉ No	

Security self-assessment

Please specify: (Maximum number of characters allowed: 5000)

Remaining characters 5000

[2]According to the Commission Decision (EU, Euratom) 2015/444 of 13 March 2015 on the security rules for protecting EU classified information, "European Union classified information (EUCI) means any information or material designated by an EU security classification, the unauthorised disclosure of which could cause varying degrees of prejudice to the interests of the European Union or of one or more of the Member States".

[3]Classified background information is information that is already classified by a country and/or international organisation and/or the EU and is going to be used by the project. In this case, the project must have in advance the authorisation from the originator of the classified information, which is the entity (EU institution, EU Member State, third state or international organisation) under whose authority the classified information has been generated.

[4]EU classified foreground information is information (documents/deliverables/materials) planned to be generated by the project and that needs to be protected from unauthorised disclosure. The originator of the EUCI generated by the project is the European Commission.

Proposal template Part B: technical description

SCAN: REVIEWING, ADAPTING AND DEVELOPING CNS INFRASTRUCTURE AND SERVICES TO ENSURE THE SAFE INTEGRATION OF HAO AND STO VEHICLES

[This document is tagged. Do not delete the tags; they are needed for processing.] #@APP-FORM-HERIAIA@#

List of participants

Participant No. *	Participant organisation name	Country
1 (Coordinator)	EUROCONTROL	Belgium (BE)
2	DFS Deutsche Flugsicherung GmbH	Germany (DE)
3	Swedish Civil Aviation Administration	Sweden (SE)
4	European Satellite Services Provider	France (FR)
5	NATS	United Kingdom (UK)
6	Direction des Services de la Navigation Aérienne	France (FR)
7	SkyNav Europe	Belgium (BE)
8	Ecole Nationale de l'Aviation Civile	France (FR)
9	Linkopings Universitet	Sweden (SE)
10	C.I.R.A. Centro Italiano di Ricerche Aerospaziali	Italy (IT)
11	Sceye Spain SL	Spain (ES)
12	Skydweller Canarias SL	Spain (ES)
12-AE13	Skydweller SL	Spain (ES)
14	Parque Tecnologico de Fuerteventura SA	Spain (ES)
15	Elson Space Espana SL	Spain (ES)
16	Deutsches Zentrum fur Luft - und Raumfahrt	Germany (GE)
17	Pildo Consulting SL	Spain (ES)
18	ENAIRE	Spain (ES)
19	OpenUTM Ltd.	Ireland (IE)
20	ANRA Technologies	United Kingdom (UK)
21	Skypuzzler APS	Denmark (DK)
22 (Associated partner)	HAPS Alliance	United States (USA)

1. Excellence #@REL-EVA-RE@#

1.1 Objectives and ambition #@PRJ-OBJ-PO@#

Recent technological breakthroughs have enabled the development of new vehicles with new mission profiles, ranging from low-speed High-Altitude Platform Systems (HAPS) to very high-speed operations, notably supersonic and hypersonic transport, plus commercial space transport activities transiting from and to European States. These new Higher Airspace Operations (HAO) will need to be integrated with traditional and new airspace users (drones, RPAS, U-space) as they will temporarily transit the current ATM environment and will be generally conducted above most General Air Traffic (GAT) and Operational Air Traffic (OAT) on a global scale. Moreover, some of their mission profiles consider extended durations of operations up to several months.

Communications, Navigation and Surveillance (CNS) infrastructure, and the radio spectrum they require, are the foundation of the aviation operational performance, enabling ever-increasing airspace capacity. Without them, air transport could not be safely and expeditiously performed. To safely accommodate this growth in current areas of operation, it is essential to appropriately manage scarce resources like radio frequency bands, secondary surveillance radar (SSR) codes and Mode S interrogator codes sustainably. However, many of these elements may not be usable within higher airspace, for example, due to reach and coverage limitations, and therefore new and innovative CNS capabilities need to be considered. The appropriate elements of the CNS infrastructure will be technical enablers for the effective integration of HAO. While very limited HAO missions are supported today by existing ATM processes and systems in segregated airspace, the number of operations is expected to grow substantially in the coming years due to swiftly developing innovation in HAO and airspace management technologies appropriate for use within the higher airspace. This will involve different geographical distributions and types of vehicles.

New entrants will provide new challenges in terms of flight-performance envelopes, operating at altitudes sparsely used today and where their operational behaviour and performance may generate additional complexity regarding traffic management. Due to the wide range of trajectories of these vehicles and the lack of accuracy in altimetry at high levels (reportedly up to 3000 ft difference between barometric altimetry and geometric altimetry due to very low air density), using current ATM methods in higher airspace operations and space launches often results in a requirement for segregation of large areas. It is therefore imperative that such operations take place safely, efficiently and without a disproportional impact on more conventional air traffic operations. Change is needed to evolve from how we work today for these operations to fully achieve their economical, national security, and societal benefits in Europe, and ensure equitable access to airspace to all users, including civil and military operators.

Therefore, a major challenge is to assess the behaviour of current CNS systems and research new CNS solutions in the higher airspace needed for a safe, fair and effective integration of these vehicles. By providing validated flight trajectories that would better characterize these new operational profiles, procedural packages, real time CNS capabilities and potentially other types of services, e.g. space weather forecast, catering for the unconventional operational needs of HAO and STO, Europe would position itself at the forefront through the SCAN project.

Specific Objectives

The objectives of the SCAN project are directly derived from the scope of the topic HORIZON-SESAR-2025-DES-IR-02-WA3-2: *Enhanced CNS capabilities*, addressing more specifically R&I needs for:

- IR-3-01 regarding *resilient integrated CNS/MET as a service* accommodating the specific needs of higher airspace operations (HAO), and
- IR-3-09 on *CNS capabilities to increase ATM system robustness*.

The project aims to build further on the work delivered in the ECHO *"European Concept of Operations for Higher Airspace Operations"* and the ongoing ECHO2 Horizon 2020 SESAR funded projects. https://higherairspace.eu/

The SCAN project will deliver one **SESAR Solution *"CNS means to serve HAO"***, with the following objectives:

a. Assess the current Communication, Navigation and Surveillance (CNS) capabilities and limitations for HAO (including HAPS, supersonic-hypersonic and space launch and re-entry) at altitudes higher than FL500;

b. Perform flight trials (with multiple diverse HAPS platforms and sounding rockets) to collect CNS data and assess their actual performances in the higher airspace;

c. To gather CNS user needs for HAO, considering the need for resilience, e.g. in GNSS denied scenarios, and cost-effectiveness;

d. Perform a gap analysis to assess whether the user needs are met by the available or innovative CNS capabilities;

e. Investigate the use of geometric altimetry in the higher airspace to deal with current limitations of barometric altimetry due to very low air density; Define procedures for transition between barometric and geometric;

f. Explore new business model for CNS as a Service (CNSaaS) to enhance resilience of current CNS infrastructure using and interfacing space-based assets;

g. Explore the feasibility of new CNS technologies and new paradigms for supporting future air traffic management methods, such as Cooperative Operating Environments, for HAO integration;

h. Define and validate a set of at least 5 quantitative KPIs (e.g., for accuracy, availability, latency) to benchmark new CNS technologies against the state-of-the-art;

i. Improve telemetry for airspace management of space launches;

j. Investigate the potential to use cryptographically verified identity and 4D position of HAO vehicles;

k. Provide recommendations for standardisation and regulation with respect to CNS provision and HAO vehicle requirements equipage;

Ambition

SCAN will build on the outcome of CNS infrastructure studies and flight trials currently ongoing in the ECHO2 project and will move forward with the ambition to:

a. Propose a set of feasible technical components and services to serve the CNS needs for diverse vehicles operating in the higher airspace within Europe and beyond;

b. Engage with airspace users (conventional aviation and HAO operators), ANSPs, industry and aviation authorities to align expectations on benefits and operational acceptability of the proposed CNS solutions or new paradigms for air traffic management.

c. Support a clear path forward for future CNS developments, including standardisation and regulatory framework evolution to support the European pioneer initiatives on HAO.

Initial TRL: 2-6, functional prototype and early validation in ECHO2.

Target TRL: 6, pre-deployment validation in operationally representative environment with wider scope than ECHO2 since **SCAN** is a **large-scale initiative** to **flight-validate a multi-layered, resilient CNS architecture using diverse HAPS platforms and a sounding rocket.**

#§PRJ-OBJ-PO§#

1.2 Methodology #@CON-MET-CM@# #@COM-PLE-CP@#

The activities to be performed to accomplish the objectives of the **SESAR solution *"CNS means to serve HAO"*** will largely follow a waterfall type methodology, with various phases aiming at delivering the mandatory SESAR solution data pack for Industrial Research activities, as identified within the SESAR 3 JU Project Handbook, edition 02.00, released in December 2024 by the SJU. The solution target output is at TRL6 maturity level, so it requires validation in a relevant environment close to operations.

The work will be carried out in six work packages. **WP1 "Project Management"** and **WP2 "Communication, Dissemination & Exploitation"** run for the whole duration of the project. The core of the studies on CNS for HAO on deriving user needs and CNS capabilities for HAO is done in **WP3 "CNS means to serve HAO – Part 1"** whereas **WP "4 Validation Trials – Part 1"** is where CNS features will be tested in flight with diverse HAPS platforms and a sounding rocket in the first half of the project. Likewise, in the second half of the project, **WP5 "CNS means to serve HAO – Part 2"** will assess to which extent the CNS user needs are met with current or innovative CNS services, complemented with additional HAO flight trials in **WP6 "Validation Trials – Part 2"**.

The solution will align to the following phases:

Phase 1 – scope definition will delineate the operational and technological envelope of the solution, starting from the relevant elements on CNS and user needs assessed in the ECHO2 project and other national initiatives. The main deliverable of Phase 1 is a preliminary version of the **Contextual Note** for the solution, in terms of scope, main operational and performance benefits, relevant system impacts as well as recommendations regarding additional activities to be conducted during the industrialization or as part of deployment. Phase 1 – scope definition will be developed in WP3 "CNS means to serve HAO – Part 1" (M01 – M18).

Phase 2 – Operational requirements definition will address the safety and performance requirements, and interoperability requirements related to CNS for HAO. Phase 2 will be developed in WP3 "CNS means to serve HAO – Part 1", that will collect CNS user needs for HAO and perform a theoretical assessment of CNS technological solutions and will deliver the **initial SPR-INTEROP/OSED** (M01-M18) followed by WP5 "CNS means to serve HAO – Part 2" that will perform gaps and risks analysis for the CNS solutions, resulting in the delivery of the **final SPR-INTEROP/OSED** (M19-M36).

Phase 3 – System/procedure design and development will focus on describing the functional, non-functional and interface requirements related to the CNS for HAO solution. The main deliverable of Phase 3 is the technical specifications/interface requirements (**TS/IRS**) that will be developed in WP5 "CNS means to serve HAO – Part 2" (M19-M36).

Phase 4 – Validation will address validation planning, execution and reporting. Validation planning will identify how many and what type of validation exercises, mostly based on actual flight trials with HAPS and sounding rockets, are required and sufficient to ensure that the solution CNS for HAO achieve its objectives. For each of these exercises, scenarios derived from the operational and functional requirements will be developed, including the description of the validation objectives and associated KPIs, and of all related CNS features to be assessed in flight. Based on these scenarios, the foreseen validation activities will be executed and, upon their completion, the results against defined KPIs, findings and lessons learned will be documented in comprehensive reports.

The main deliverables of Phase 4 are the actual validation exercises, together with the corresponding validation plans (VALP) and validation reports (VALR). WP4 "Validation trials – Part 1" will produce the **initial VALP** and **initial VALR** (M01-M18) whereas WP6 "Validation trials – Part 2" will result in the **final VALP** and **final VALR** (M19-M36).

Phase 5 – Cost-Benefit Analysis will illustrate the potential benefits of the proposed CNS solutions to serve operations in the higher airspace, and whether they are expected to exceed the incurred costs over a given time horizon. The main deliverable of Phase 5 is the Cost-benefit analysis (**CBA**) to be developed in WP5 "CNS means to serve HAO – Part 2" (M19-M36). The CBA assumptions will be discussed and validated during workshops and communication events as well as with the Advisory Board.

Phase 6 – Standardisation and Regulation will perform gap analyses and proposals for updating the pertinent standardisation (**STAND**) e.g. via EUROCAE, as well as the applicable regulation (**REG**) including Acceptable Means of Compliance (AMC) and Guidance Material (GM) for HAO. These deliverables will be developed in WP3 (M01-M18) and WP5 (M19-M36). This activity will work on the outcomes of ECHO2 and collaborate with relevant activities in the frame of EUROCAE WG-105 UAS, EASA (e.g. guidance material on the "regulatory sandbox" for HAO), and JARUS (e.g. HAO use case – to define changes needed to SORA to assess the risk of HAO with UAS,

and JARUS CS-HAPS, Airworthiness recommendations for HAPS, http://jarus-rpas.org/publications/) as well as with national initiatives such as the "national HAO WG" led by AESA in Spain.

CNS technological components will be considered for evaluation in the higher airspace, as described below.

Communications. SCAN aims to examine the suitability of current and innovative solutions for communication service provision in the higher airspace, such as, but not limited to:

- VHF/UHF/HF
- VHF/HF Datalink
- SATCOM (including highly directional phased array terminals), e.g. Iris
- E-band and 5G backhauling
- Free Space Optic Communication (FSOC)
- Ground-ground communication
- Innovative means e.g. connected aircraft technologies (between HAPS and their operators via diverse commercial link providers).

The current communication infrastructure for conventional aviation is not always suited for higher airspace operations. Technologies such as VHF, UHF, and HF are limited by line-of-sight and signal strength at high altitudes. SATCOM offers global coverage but can suffer from latency issues and bandwidth limitations for high-data-rate applications, and highly directional phased array terminals are needed to support specific mission profiles. The project will assess the performance and limitations of these technologies for various HAO and STO use cases. The project will also explore emerging communication technologies like 5G backhauling, Free Space Optic Communication (FSOC), and connected aircraft concepts to support resilient and high-bandwidth data links. An overview of each system's advantages, disadvantages, current levels of support for HAO and STO, and costs will be performed, including proof-of-concept with flight tests (with HAPS and sounding rockets).

Navigation (positioning). The project aims to examine the suitability of current and innovative solutions for Positioning, Navigation and Timing (PNT) service provision in the higher airspace:

- Multi-frequency multi-constellation (MFMC) GNSS receivers, including augmentations such as ABAS and SBAS(EGNOS), leveraging Galileo differentiators e.g. authentication schemes enabled by OSNMA.
- Pressure/geometric altimetry sensors, as input to the navigation and position reporting (SUR) functions.
- SATCOM Multilateration
- Inertial Navigation System (INS)
- Magnetometer
- Celestial navigation (star trackers)
- VHF Omni-Directional Range (VOR), Distance Measuring Equipment (DME), TACAN (Tactical Air Navigation Systems), provided the Size, Weight and Power-Cost (SWaP-C) constraints are met.
- 6G
- Ground-based navigation support by new technologies, e.g. Mode N (a ground-based alternative navigation system concept aiming to provide reliable aircraft navigation by passive signal reception from ground stations, enhancing resilience against GNSS outages and spectrum congestion in current systems).
- Other Alternative PNT means
- Multi-sensor fusion with uncertainty estimate.
- Barometric conversion to geometric height estimate using MET data.

Navigation in the higher airspace presents unique challenges, particularly due to the low air density, which makes traditional barometric altimetry unreliable. The project will conduct a detailed assessment of various navigation technologies to ensure they meet the PNT requirements for HAO and STO. This includes a deep dive into advanced GNSS receivers, particularly those leveraging Galileo's authentication schemes to detect spoofing. The project will

also investigate alternative PNT sources like celestial navigation (star trackers) and magnetometers, which can provide a robust backup in GNSS-denied scenarios. Additionally, the project will explore the use of multi-sensor fusion to combine data from different sources into a single, highly accurate position estimate. A critical part of this work will be the assessment of geometric altimetry and the definition of transition procedures between barometric and geometric altitude, as this is essential for seamless integration with conventional air traffic. An overview of each system's advantages, disadvantages, current levels of support for HAO and STO, and costs will be performed, including proof-of-concept with flight tests (with HAPS and sounding rockets).

Surveillance. SCAN aims to examine the suitability of current and innovative solutions for surveillance service provision in the higher airspace, such as:

- Position reporting over IP networks, e.g. adaptation of Network remote ID, a concept taken from the UAS domain.
- Primary/Secondary Surveillance Radar (PSR/SSR)
- Multi-lateration (MLAT)
- ADS-B, including satellite-based ADS-B, enabling tracking of HAO vehicles over areas without radar coverage.
- ADS-C
- Direct telemetry data from HAO operators

An overview of each system's advantages, disadvantages, current levels of support for HAO and STO and costs will be performed, including proof-of-concept with flight tests (with HAPS and sounding rockets).

Some radar installations are capable of tracking multiple vehicles expected to operate in higher airspace, including HAPS and supersonic aircraft. However, Secondary Surveillance Radars (SSR) are dependent on accurate measurements from pressure altimeters, many of which may not be reliable above FL560 due to lack of testing and certification specifications for this altitude band. Industry development of high-altitude barometric altimeters could potentially support SSR surveillance of traffic above FL600. However, many automation systems with inputs from SSR have software settings that limit coverage ceilings.

Version 2 1090 Extended Squitter ADS-B may be an adequate surveillance source for many HAO participants, both in continental and oceanic airspace. However, as with radar, more accurate altimeters may be necessary to support HAO. Additionally, Version 2 ADS-B would likely be limited to vehicles traveling below Mach 2.03 due to both encoding limitations and ITAR restrictions on GNSS receivers that provide position and velocity data. Version 3 ADS-B messages could potentially support operations up to a geometric altitude of roughly 1,000,000 ft AGL, however ITAR speed restrictions would still apply. SCAN will investigate innovative methods for the tracking of high-speed vehicles which respect international restrictions such as those applied by ITAR.

All systems considered with SCAN will be assessed from a civil/military dual use perspective, so the project will seek to identify feasible ways of monitoring vehicles moving faster than Mach 2.03 with due consideration towards the security sensitivity of those elements. Data concerning accuracy, integrity, availability, continuity and functionality of the current European CNS infrastructure as well as from new innovative solutions will be gathered through flight trials with multiple diverse HAPS performed at flight levels above FL500, complemented with data collected with sounding rockets. This will allow the extension of navaids, communication and surveillance performance models to include the characterization of vertical performance beyond currently used flight level bands, enabling an informed decision-making process to outline optimal CNS solutions for HAO integration.

Cross-cutting methodology elements

SCAN brings together expertise from multiple disciplines to address the full range of technical, operational, and regulatory challenges associated with the CNS infrastructure necessary to successfully integrating HAO and STO into the European network. Air traffic management specialists, CNS experts, spaceflight operations experts, HAPS operators, U-space (or third party) service providers, systems engineers, data scientists, and regulatory authorities will work in close coordination, ensuring that the solutions are grounded in both operational reality and technical feasibility. Additional inputs will come from cybersecurity experts. HAO such as HAPS are highly exposed Cyber-

Physical Systems that, due to the integration of novel technologies, have vulnerabilities that could lead to several threat scenarios. This necessitates a focus on **HAO cyber security** and the adoption of "security-by-design" approaches to ensure that future solutions meet security requirements from the early design stages.

This combination of disciplines ensures that the CNS solution for HAO is not developed in isolation but considers the operational, technical, and environmental factors that affect their use.

The project will maintain an active link with relevant national and international initiatives. Results from the ECHO2 project will be a starting point for SCAN's work, ensuring continuity in concepts, interfaces, and validation assets. Engagement with standardisation bodies such as EUROCAE will enable technical specifications, data models, and operational procedures developed in SCAN to feed into wider industry adoption.

In line with the ***"Do No Significant Harm"*** principle under the EU Taxonomy Regulation, the methodology includes a focus on minimising the environmental footprint of HAO and STO operations. By optimising hazard volumes, improving predictability, and enabling more efficient reroutes, the CNS solution aim to optimise energy consumption. Environmental performance will be monitored as part of the validation process, with adjustments made where necessary to ensure that no significant harm is caused to environmental objectives. SCAN is also aligned with the **EU Green Deal**, as HAPS are enabling elements for green aviation and earth monitoring services. Concerning the **European Strategic Autonomy**, SCAN strengthens Europe's position, e.g. by leveraging Galileo's unique features (like OSNMA) and reducing reliance on non-European CNS solutions.

The project's methodology supports **open science** principles. Non-sensitive datasets, interface definitions, and technical documentation will be made openly available, enabling other research and operational projects to build on SCAN's outputs. Research outputs will follow the FAIR (*Findable, Accessible, Interoperable, Reusable*) principles: they will be stored in trusted repositories with persistent identifiers, published under open licences where possible, and documented to facilitate reuse. SCAN will generate open-source code and technologies that will be in the public domain. Sensitive operational data will be subject to controlled access arrangements, ensuring it can be used for verification without compromising security.

Although the **gender dimension** is not expected to influence the technical design of the solution, human factors will be considered in interface and procedure development to ensure that systems are usable and effective for a diverse operational workforce. The project team will include diverse perspectives in workshops and validation exercises, ensuring that the developed concepts and tools are accessible and intuitive for all users.

These cross-cutting elements are integral to the methodology rather than being treated as separate concerns. By embedding interdisciplinarity, alignment with external initiatives, environmental safeguards, open science practices, and inclusivity into the core of the work, SCAN maximises the likelihood that its solutions will be accepted, standardised, and deployed across the European ATM network and beyond.

1.3 State of the art

Within European airspace, traffic density varies across Europe. In the ATM context, traffic complexity refers to the number of simultaneous or near-simultaneous interactions of trajectories in a given volume of airspace that generates additional workload for the Air Traffic Controller (ATCO) to resolve before a conflict would occur. Trajectories refer to the flight paths of individual aircraft, and interactions occur when these trajectories come into proximity or conflict with each other. Complexity of the traffic and flows have a major impact on the definition, scoping and execution of Air Traffic Service (ATS) provided in today's airspace environment.

In the ECHO1 project, a study was conducted to observe the airspace classification of European Civil Aviation Conference FIRs above FL660. ATS is provided by more than 60 Area Control Centres (ACC) and by more than 30 Air Navigation Service Providers (ANSPs) where Class C airspace has been published from FL195 up to FL660. Many States have declared in the national AIPs their airspace above FL660 as G-class airspace. On the other hand, some States have opted for no airspace definition (e.g. UK, Poland, Switzerland, Bulgaria, Romania, Czech Republic, Albania, Armenia and Azerbaijan) or unclassified airspace (as it is the case for Turkey, Ukraine, Croatia, Belgium, and Slovakia).

Consequently, this airspace class declaration (e.g.: G-class above FL660) implies that ATS such as Flight Information Services and Alerting services can be currently provided in the present ATM environment. It should be noted that today there is little, or no surveillance and communication capability provided by ANSPs above FL660. However, it is generally believed that the current CNS capabilities are not adequate for service provision at altitudes above FL600 in terms of antennae signal protection, strength and coverage width. Thus, the provision of CNS with the current systems could only be limited to the lower levels of HAO. Additionally, increases of jamming and spoofing incidents in GNSS frequency bands, due to current geopolitical contexts, are driving calls for a more resilient CNS infrastructure.

The management of the European ATM network has been built on strong cooperation between all stakeholders based on the Collaborative Decision Making (CDM) principle (e.g. airspace users, service providers, regulators, the EU and its agencies, international organizations, etc.). It has been supported and codified by a coherent set of EU regulations which confers clear responsibilities on all actors involved. Hence, the management of the network is an essential component of the European ATM system, and by extension for HAO, which will be an integral part of network operations and where the airspace is seen as a continuum.

How SCAN goes beyond

HAO offers a unique opportunity to promote an operational vision that, from the outset, aims to address some of the structural elements that in the past have required significant time and effort to improve. Perhaps one of the most familiar examples, the airspace organization and structure across the Network Manager area, has been subject to constant developments to reduce fragmentation and improve interoperability. Such improvements have required a bottom-up approach and several decades to be fully implemented across the network. The lessons learned from this experience should be taken into consideration and the development of the higher airspace should start with a new approach. The higher airspace has been utilised almost entirely by military actors and as transit for space vehicles in the past. Challenges posed by new entrants and the underlying conditions of their operations will lead to an increase in interactions among HAO and between HAO and conventional air traffic and STO transits in the airspaces below.

Assessing the demand for HAO is critical for the evaluation of future operational means to ensure a safe and practicable use of airspace. Within the ECHO project, a thorough demand analysis was conducted, including the development of specific demand scenarios and an impact assessment of new entrant's operations.

Within the diversity of vehicles expected to operate in the higher airspace, High Altitude Platform Systems (HAPS) represent a class of low-velocity and economical aerial vehicle, characterized by their constrained manoeuvring capabilities, which can operate in the stratosphere for extensive periods of time spanning days, weeks and months. The viability of these operations derives from using solar irradiation as a primary energy source, keeping the equipment functioning at these elevated altitudes for extended durations. Three types of HAPS emerge based on their construction mechanism: Heavier Than Air (HTA) HAPS category, distinguished by small propulsion systems and large wingspans with gliding capabilities for descent; the motorized Lighter Than Air (LTA) variant, characterized by utilization of fluids lighter than air for controlled elevation changes apart from the motors to control speed and manoeuvrability; and Balloons, which are the group most limited in terms of manoeuvrability, using wind predictions and other fluids to control the position.

While the ECHO project defined the conceptual framework for HAO and ECHO2 is planning early flight trials with HAPS, SCAN moves decisively beyond by being the **first large-scale** initiative to **flight-validate a multi-layered, resilient CNS architecture** using **three distinct HAPS** from leading operators such as Elson Space and Skydweller (with HTA vehicles) as well as Sceye (LTA airship HAPS) and a **sounding rocket**. This will provide empirical data on CNS performance above FL500 in European airspace and beyond, a critical gap ECHO could only address theoretically. Elson Space and Sceye have their operation bases at Teruel airport (LETL) whereas Skydweller is based at the Fuerteventura stratoport in the Canary Islands.

The main applications of HAPS cover domains such as telecommunications, disaster relief, antenna relay, earth observation, ISR, and scientific exploration among others. These remotely controlled or managed platforms can be orchestrated into fleets to facilitate broader application scope and extended coverage. Initial projections made in the

ECHO research project suggested an anticipated deployment of 1000 HAPS in Europe annually before the close of the current decade. Although it now appears that this level of traffic is less likely to be experienced prior to 2030, it is reasonable to consider that traffic numbers will surpass that level within the 2030s. HAPS services can be expected to be utilised predominantly for telecommunications in low to medium densely populated areas. In addition, HAPS can be used, among other things, for maritime surveillance and border security measures. European regions with apparent potential for HAPS deployment are therefore peripheral areas like Scandinavia or the Mediterranean. Unfavourable environmental conditions, e.g. at higher altitudes or during winter season, however, pose significant hurdles for current technology. Due to the limited manoeuvrability and low speeds, the transition through ATS airspace is a critical flight phase for HAPS. Blocking large volumes of highly utilized airspace for a considerable amount of time like in the core area must be assessed and particularly minimized regarding the potential impact on the entire network. Nevertheless, HAPS must address some challenges to achieve their entrance at scale in this new era of aviation. Transition of HAPS from Lower to Higher Airspace is crucial without impacting and ensuring minimal disruption to traditional air traffic flows. Furthermore, operations may cover several Flight Information Regions (FIR) from different countries, thereby standard regulation and flight authorization protocols are required. Lastly, among other challenges, the enhancement of meteorological forecasting assumes a paramount relevance for these types of vehicles.

Currently available CNS services, certified in conformity with Regulation (EU) 2017/373, will not necessarily be capable of supporting HAO operations. The requirements for certain CNS services might be extended to also meet the HAO needs, once defined, although innovative solutions that may include new paradigms of ATM may prove to be more suitable for HAO. The CNS equipment for HAO, meeting the required performance levels, should be established with a technology agnostic approach, independently from existing aviation equipment, taking into account the specificity of HAO in terms of very high altitude, sometimes high-speed, exposure to radiation and space weather effects, as well as SWaP-C requirements considering also the diversity of vehicles.

Current CNS capabilities for STO in higher airspace rely primarily on ground-based radars, space-based tracking networks, and limited ADS-B/MLAT coverage. Traditional SSR/MSSR radars have poor coverage at extreme altitudes and steep trajectories due to beam geometry and radar horizon limitations. Current space surveillance networks and specialized tracking radars can detect fast moving vehicles but often lack the latency and precision required to track diverse vehicle-types in an integrated traffic environment. ADS-B in its current specification and use is ineffective for most launch vehicles due to equipment constraints, antenna orientation, and line-of-sight loss during high-speed ascent or re-entry. Space-based ADS-B constellations have the potential to improve coverage but face latency, bandwidth, and certification challenges for safety-critical operations. Optical and infrared tracking offer high precision but are weather-dependent and limited in real-time integration with ATC systems. Data fusion across disparate surveillance sources is inconsistent, and standardised interfaces for sharing real-time trajectory data with civil ATM are lacking. High-velocity and high-dynamic vehicles challenge existing tracking algorithms, leading to prediction errors. There is currently no globally harmonized surveillance framework for suborbital and orbital re-entry traffic in controlled airspace. A potential solution to addressing these gaps would be robust, low-latency, multi-sensor surveillance networks, including telemetry data provided by an operator, with space-based augmentation and real-time data sharing standards. Modifications of the existing ADS-B standard, extending the maximum transmittable altitude beyond 126.700 ft, may allow purely passive reception of transponders within quasi-optical range from terrestrial locations or from earth orbit on a satellite and potentially covering the whole range of HAO. New approaches can also be developed based on cooperative operating environments in which operators will maintain safe distance using cooperative strategic conflict detection and resolution based on shared intent.

Depending on the air traffic management operations and responsibilities in HAO (which are to be defined in STRATUS project), appropriate CNS technology should be selected. RF interference and performance impacts to existing CNS systems will be studied and considered, including the allocation of exclusive radio frequencies, if needed. In this regard, the EU Space Surveillance and Tracking service, providing today space debris re-entry predictions could provide additional and more general support to civil aviation: it would have to be assessed whether its sensors and assets (radars, telescopes, etc.) could track not only re-entering debris, but also higher airspace operations. Due to the high altitude, HAO will be more exposed to space weather effects. However, while today MET

services provide space weather forecast for conventional aviation, they do not provide forecast for the layer of airspace above FL600.

The Concept of Operations (v1.0, Dec 2022) developed by the ECHO project indicates that during the transiting phase of HAO through the conventional traffic, separation will be ensured by ATC based on established separation criteria. In the Higher Airspace, HAO will be carried out based on the agreed trajectory or 4D operating zone, acting as a dynamic airspace reservation. Assuming that HAO will be made up of cooperating traffic and non-cooperating traffic, (i.e. traffic that can change their flight trajectory and those who cannot), dedicated HAO separation rules will be necessary in addition to Regulation (EU) 923/2012, the Standardised European Rules of the Air (SERA). These rules should reflect the different types of movement, speed and manoeuvring capability. Separation should be ensured also for vertical moving vehicles and any kind of 4D trajectory. The principle of vertical separation measured in barometric altitude might not be applicable in HAO due to very low air pressure which makes a reliable pressure altitude unavailable. SCAN will study altimetry solutions for HAO including tests in flight of geometric and barometric positioning sources as well as transition criteria among them. Airborne collision avoidance, as regulated in Regulation (EU) 1332/2011, might not be feasible in HAO traffic for the same reasons. The capability of current airborne collision avoidance needs to be assessed and potentially amended for HAO usage, complemented with strategic conflict detection tools.

Regarding the value proposition to address the SESAR WA3-2 on *"Enhanced CNS capabilities"*, SCAN will focus on **demonstrating a highly cost-effective, resilient and secure CNS solution for HAO**, that will be **proven in flight** with HAPS platforms and a sounding rocket, and will adapt UTM technologies to HAO, e.g. network remote ID.

SCAN will develop the solution following an **end-to-end layered approach** as illustrated in the following figure:

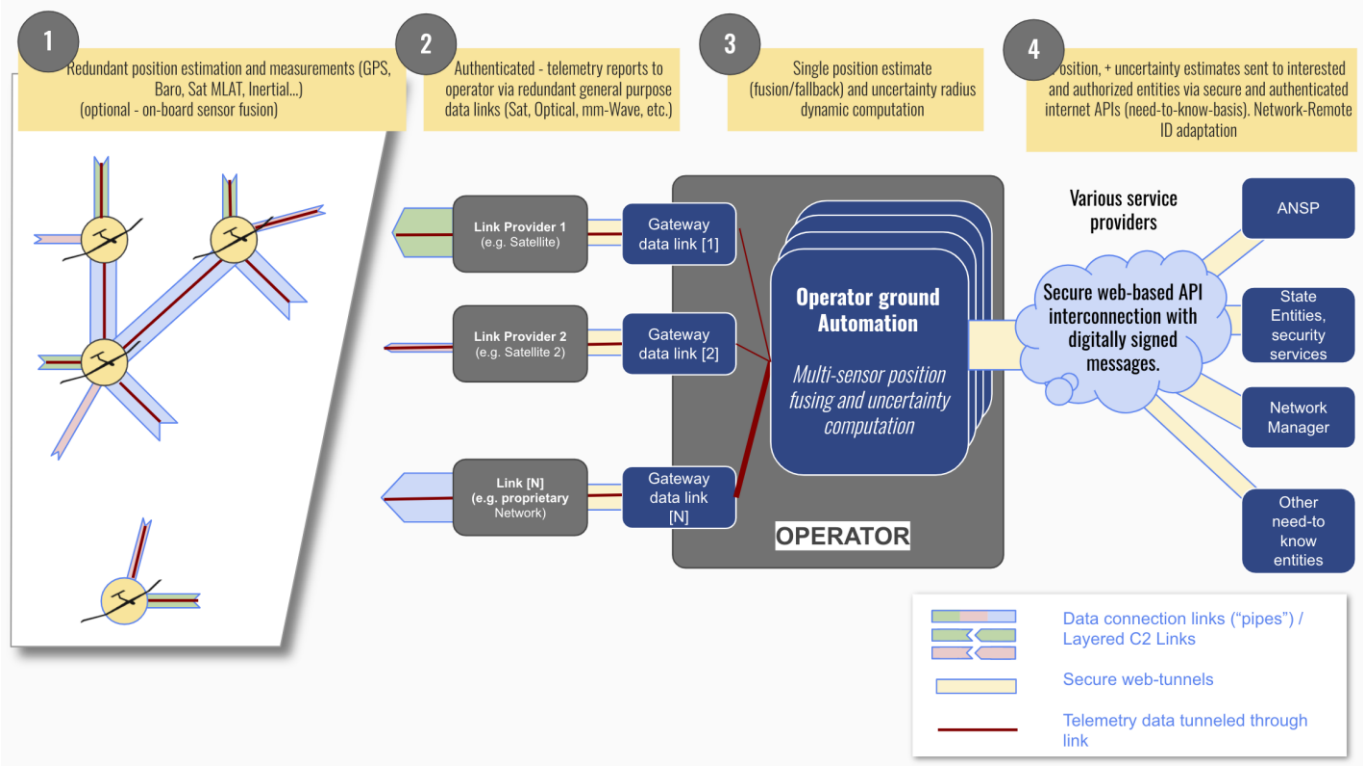


Figure 1: Overall CNS as a modular network architecture

- **Layer #1 – multi-sensor PNT onboard the HAO platforms**. The vehicles determine their 4D position, velocity and time with multiple diverse sensors with dissimilar modes of failure, such as MFMC GNSS, inertial, satellite-based MLAT. Each positioning source provides an independent PNT solution and quality indicators that can be fused onboard or reported for later on assessment.

- **Layer #2 – secure telemetry via redundant, dissimilar and asynchronous general-purpose data links** (satellite links, proprietary links, etc.). The aircraft transmits telemetry messages over asynchronous datalinks. The telemetry is prioritized according to the available bandwidth and routed over available data links, enabling the system to gracefully degrade.

- **Layer #3 – real time information available to the HAO operator** on position-velocity-time and uncertainty estimation of HAO vehicles. When not done on the aircraft, the telemetry measures are fused into a single position estimate with uncertainty computation, which can degrade gracefully if sensors are unavailable.

- **Layer #4 – Authenticated aircraft identity, position and uncertainty estimates shared with interested and authorized parties** with need-to-know over secure network via web API (adapted from Network Remote ID).

- **Transversal cyber-security layer** – Modern Zero-Trust cybersecurity framework along the entire chain. This includes GNSS satellite authentication (e.g. Galileo OSNMA), aircraft authentication over telemetry, digital signature of telemetry messages, authentication and authorization framework over API exchanges, and encryption where necessary/desired.

The flow of information through the entire chain from the HAO vehicle to the end-recipient, e.g. an ANSP, is secured by using **authentication** mechanisms guaranteeing that the **position** and **identity** of all vehicles are true. Moreover, multi-sensor and redundancies across the whole chain ensure the **resiliency** of the CNS solution, considering RF interference events, ionospheric activity, failure of individual systems, etc.

This approach on CNS for HAO will be researched in WP 3 and WP5. Those elements that are mature enough will be tested in flight during the planned validation trials with HAPS in WP4 and WP6.

#§CON-MET-CM§# #§COM-PLE-CP§# #§REL-EVA-RE§#

2. Impact #@IMP-ACT-IA@#

2.1 Project's pathways towards impact

The solution "CNS means to serve HAO" addresses the technical, operational, standardisation and regulatory challenges concerning the necessary CNS infrastructure and services, both existing and innovative, that will allow HAO operations into European airspace and beyond.

The SCAN project will provide benefits to internal and external stakeholders, while significantly advancing the definition and validation of CNS systems and services suitable to HAO. Within the project, EUROCONTROL and ANSPs are concerned with obtaining a validated SESAR solution for HAO that is operationally feasible in both continental and remote/oceanic airspace including cross-border missions.

Moreover, the aviation industry and leading HAPS operators are interested in testing and validating in flight different CNS solutions onboard their HAPS vehicles. External to the project, European institutions, aviation authorities, ICAO, standardisation and regulatory bodies will benefit from the project's developments. SCAN will set up an **Advisory Board** to provide visibility to key external stakeholders and gather their views and recommendations to ensure that the project's objectives are met, i.e. to define and demonstrate feasible, cost-effective, resilient and secure CNS means to serve HAO. Relevant stakeholders, e.g. the European Union Aviation Safety Agency (**EASA**) and the Spanish aviation safety agency (**AESA**) have already expressed their willingness to join the SCAN's Advisory Board.

Contribution of the project results to the outcomes in the topic

- Environment; suitable CNS infrastructure and services will allow for a more efficient utilisation of the airspace, allowing for preferred routes of the vehicles, e.g. affected airlines burning less fuel or supersonic vehicles flying low noise profiles. On the other hand, the HAPS vehicles involved in the project enable more widespread use of environmentally sustainable platforms, which could reduce the need for more emitting vehicles.

- Capacity; the availability of suitable and wide-spread CNS services will allow reduced separations resulting in

the possibility to accommodate more vehicles in the concerned volumes of airspace.

- Cost-efficiency, innovative CNS services such as those to be explored in SCAN (e.g. satcom, and network-based telemetry) can significantly reduce the need for ground-based infrastructure investments to support HAO.

- Operational efficiency, as the availability of CNS services tailored to HAO help reduce the need for large airspace reservations, enabling also cooperative operating environments allowing shared airspace use.

- Safety, as a result of proposing and testing in flight onboard performance monitoring and alerting CNS functions as well as redundancies and robust and resilient CNS systems able to cope with RF interference events or ionospheric activity.

Contribution of the project results to the wider impacts in the longer term

- Scientific outcomes and impact, based mainly on the collection and assessment of CNS data in actual flight trials in the higher airspace what will illustrate current performances and identify possible gaps to meet user needs. The results of the SCAN project will provide valuable inputs on standardisation and regulation and will pave the way for future commercial operations of new entrants in the higher airspace.

- Economic/technological impacts, as resilient and secure CNS services tailored to HAO will allow more operators to perform diverse and innovative missions. The potential use of these vehicles to support the CNS infrastructure further strengthens this resilience and provides business opportunities for higher airspace operators. CNS as a Service use cases will be explored within SCAN with a view to promoting economic and technological development within Europe.

- Societal outcomes and impact, improving the efficient integration of HAO and STO transits will support access to the higher airspace in Europe. Moreover, tailored CNS solutions for HAO will enable the minimisation of the impact of HAO on conventional air traffic, contributing to environmentally friendly and cost-efficient air transport for European citizens. Finally, it will also result in job creation for highly skilled positions, as new manufacturing centres for HAO vehicles as well as operation centres and ground infrastructure, e.g. stratoports, start to be deployed in several locations in Europe.

Scale and significance of project's contribution to the expected outcomes and impact

The scale of the project's contribution to the expected outcome will be influenced by the extent to which its SESAR solution is deployed. The adoption of the CNS for HAO solution provides a cornerstone to facilitate safe, efficient and scalable HAO operations and it would position European industry and service providers to compete and win significant portions of the global market for HAO.

In addition, the significance of the SCAN project's contribution can be explained in qualitative terms:

- market access for innovative concepts;

- safeguarding the use of the higher airspace for emerging commercial operators;

- clarity in the CNS requirements and equipage for users;

- enabling new Earth observation and remote sensing services providing persistence and flexibility to complement existing satellite, unmanned and manned aircraft operations in a growing market estimated to be 4bn euro pa by 2026.

- environmental benefits through increased use of solar electric platforms and services to persistently monitor and enable reducing the impact from greenhouse gases, wildfires or certain illegal activities such as oil dumping.

Project's content towards impact

The regulatory and standardisation state of the art for CNS in HAO is currently in rapid development, with several European and international bodies actively working towards the establishment of harmonised frameworks. The SCAN project will help align these efforts to maximise industrialisation impact and ensure safe, efficient integration of new entrants such as HAPS, supersonic, hypersonic, and STO in European higher airspace.

Regulatory State of the Art

EASA is leading a multi-year initiative to develop a regulatory framework for HAO, addressing safety, security, environmental, and cyber risks, with deliverables including technical studies on CNS civil needs and capacities at high altitudes, demand analysis, and draft regulatory amendments. A regulatory roadmap has been published by EASA, highlighting preparatory actions, literature reviews, market analysis, and initial CNS spectrum needs required for developing HAO regulations. Concerning PBN, certain navigation specifications for civil aviation may be considered as starting point to assess their applicability for operations in the higher airspace, e.g. RNP 1, and facilitate compatibility with evolving CNS services. SESAR activities and the ATM Master Plan emphasise scalable, interoperable solutions for emerging HAO traffic, coordinated with institutional partners including EUROCONTROL, EDA, ESA, and EASA, to accelerate regulatory alignment and deployment. A key element for converging towards a proportionate regulatory frame is to implement "regulatory sandboxes", as described in EASA's roadmap on HAO, *"supporting Member States and the industry to conduct the first tests and demonstrations in the EU, exempting these tests from the application of relevant EU regulations".*

Standardisation State of the Art

EUROCAE develops minimum performance specifications and means of compliance for aircraft CNS equipment. Its technical working groups extend activities to airborne and ground-based CNS/ATM systems and collaborate globally with RTCA (US) to promote harmonisation. EUROCAE standards serve as reference means of compliance to EASA and national authorities, underlining their direct influence on regulatory implementation for CNS technologies. Ongoing standardisation efforts include updates for ATM functions, ground systems, and airborne CNS capabilities, with attention to the unique operational and environmental demands at high altitudes.

The strategy for developing and consolidating needs

- Establish a fluent dialogue between the SCAN project and the key stakeholders: EASA, EUROCAE, JARUS, and National Supervisory Authorities to prioritise regulatory and standardisation needs emerging from HAO flight trials and studies.
- Use flight trial findings to identify CNS capability gaps, validate theoretical models, and derive operational requirements, including spectrum management and contingency procedures.
- Derive proposals as candidate standards and regulatory amendments, and submit these to EUROCAE for Working Group development, ensuring they are aligned with EASA regulatory processes and ICAO global initiatives.
- Engage stakeholder consultation (industry, research, service providers) to iteratively refine requirements, with oversight by National Aviation Authorities for certification procedures and operational authorisations.
- Support standardisation by contributing validated evidence and operational concepts from European HAO trials to EUROCAE and JARUS, facilitating recognition as global standards at ICAO level.

2.2 Measures to maximise impact - Dissemination, exploitation and communication #@COM-DIS-VIS-CDV@#

The project will maximise its impact by executing a comprehensive plan for dissemination, exploitation, and communication activities, designed to ensure project results are effectively shared, adopted, and recognised across diverse stakeholder groups. These measures leverage best practice frameworks from SESAR and Horizon Europe, with activities strategically tailored to every segment of the airspace ecosystem.

Dissemination Measures

- Scientific Community: Publication of research results and technical deliverables in open access journals and presentation at international conferences and workshops (e.g., SESAR Innovation Days, ATM and CNS symposia).
- End Users (air navigation service providers, operators): Custom workshops, webinars, and demonstration events showcasing flight trial outcomes and practical CNS solution guidelines.
- Industry: Engagement via SESAR innovation platforms, joint panels with EUROCAE, and technical papers in trade publications to encourage uptake and further R&D investment.
- Dissemination outputs will include technical reports, data sets, standardisation proposals, and policy briefs regularly updated and distributed through the project website, digital repository, and direct mailing.

Exploitation Measures

- Intellectual Property: Early identification and protection of key exploitable results (KERs), including patents where applicable, supported by a confidential results tracking system shared among project partners.
- Technical Standards: Preparation of validated CNS requirements and contributing project outcomes to EUROCAE working groups, JARUS, and EASA for incorporation into new standards and regulatory guidance.
- Commercialisation: Stakeholder mapping and engagement with financial actors, coupled with business architecture workshops to build exploitation capacity among members and industry users.
- Monitoring and feedback mechanisms will be in place to adapt exploitation strategies as project results mature.

Communication Measures

- Targeted stakeholders: Information days, newsletters, and interactive website updates will ensure ongoing accessibility and transparency of project progress towards the benefits of innovative CNS solutions for HAO.
- Proactive use of social media (LinkedIn, X/Twitter), press releases, podcasts, and video explainers to inform and engage the general public.
- Public events and content will be in multiple languages where appropriate to broaden reach across Europe.
- Communication activities are supported by metrics for reach, engagement, and impact, with periodic updates based on analytics.

Target Groups

- Scientific community: publications, conferences, workshops for increased research uptake towards materialising highly-cost effective, resilient and secure CNS as a service solution for HAO
- ANSPs: workshops, webinars, technical briefs, in order to accelerate awareness on the role and limitations of current CNS for HAO as well as innovative CNS means for HAO.
- HAO operators: to discuss and consolidate the CNS user needs identified in the project and to disseminate the outcomes on the role and limitations of current and innovative CNS means for HAO.
- EASA: to ensure the project's findings on CNS are fed into the regulatory activities, e.g. sandbox to facilitate early flight trials.
- National Supervisory Authorities, to provide them with visibility on the CNS user needs and feasible means of compliance, as well as to address the flight authorisation of the proposed HAPS flight trials in European airspace.

- ICAO: to ensure regional developments on CNS for HAO are harmonised and integrated into their global vision on HAO.
- Standardisation bodies, notably EUROCAE and the relevant WGs such as WG-105 UAS.
- Military authorities, NATO and EDA, to ensure that needs of military operations in the higher airspace and civil-military convergence requirements on CNS are properly addressed.
- Industry: trade events, standardisation panels, to foster innovation transfer.
- Financial actors: Business workshops, investor guide, to enable commercialisation.
- Public at large: social media, press, info events, aiming at boosting awareness and engagement.

All activities will be reviewed and updated regularly, with the initial plan delivered in month 3 and major revisions at project milestones, ensuring focus and alignment with the evolving airspace landscape.

Intellectual property rights (IPR) and results ownership

SCAN will generate a range of results, including technical specifications on CNS for HAO, software prototypes, validation methodologies, operational procedures, acceptable means of compliance and guidance material on airborne and ground CNS equipment suitable for HAO. The consortium will manage intellectual property in a way that protects individual contributions while ensuring the widest possible uptake of the results.

An IPR framework will be agreed in the Consortium Agreement before the project start. This will define ownership rules, access rights, and conditions for both internal use and external exploitation. Results created by a single partner will remain the property of that partner. Results developed jointly will be owned collectively, with clear arrangements for use and decision-making agreed in advance.

The project will distinguish between outputs intended for open publication and those requiring controlled access. Public deliverables such as non-sensitive specifications, operational guidance, and performance assessments will be released under open licences to support adoption and interoperability. For results containing commercially sensitive or security-critical information, access will be restricted to authorised stakeholders under agreed conditions. In such cases, the consortium will determine the most appropriate protection mechanism, which may include copyright, design rights, or, where relevant, patent applications.

#§COM-DIS-VIS-CDV§#

2.3 Summary

KEY ELEMENT OF THE IMPACT SECTION

SPECIFIC NEEDS	EXPECTED RESULTS	D & E & C MEASURES
What are the specific needs that triggered this project?	*What do you expect to generate by the end of the project?*	*What dissemination, exploitation and communication measures will you apply to the results?*
Need to gather CNS needs for HAO missions performed by diverse vehicles, such as HAPS and supersonic/hypersonic. Cyber-security and aircraft authentication for infrastructure supporting highly automated operations. Cost-effectiveness of infrastructure supporting HAO operations, enabling scaled, low-margin HAO applications such as connectivity provision. Need to assess the behaviour in the higher airspace of current CNS systems and services, which is mostly unknown. Need to study suitability of barometric/geometric altimetry for HAO. Need for establishing CNS means of compliance for HAO missions.	Validated solution data pack at target TRL 6, based on flight trials to assess CNS means, for the SESAR solution "CNS means to serve HAO" that would facilitate the integration of HAO missions in European airspace and beyond. Contributions of suitable elements to enable HAO as input to the standardisation and regulatory bodies, mainly EUROCAE, EASA, JARUS. Communication, dissemination and exploitation measures with target stakeholders in the HAO domain.	Dissemination, organising workshops, webinars, and demonstration events showcasing flight trial outcomes and practical CNS solution guidelines. Engagement of industry via SESAR innovation platforms, joint panels with EUROCAE, and technical papers in trade publications to encourage uptake and further R&D investment. Scientific Community: Publication of research results in open access journals and presentation at international conferences and workshops (e.g., SESAR Innovation Days, ATM and CNS symposia). Exploitation. Technical Standards: Preparation of validated CNS requirements and contributing project outcomes to EUROCAE working groups, JARUS, and EASA for incorporation into new standards and regulatory guidance. Intellectual Property: Early identification and protection of key exploitable results (KERs), including patents where applicable, supported by a confidential results tracking system shared among project partners. Commercialisation: Stakeholder mapping and engagement with financial actors (venture capital, strategic investors), coupled with business architecture workshops to build exploitation capacity among members and industry users. Communication. Public Awareness: proactive use of social media (LinkedIn, X/Twitter), press releases, podcasts, and

		video explainers to inform and engage the general public about HAO and the benefits of innovative CNS solutions. Broader Stakeholders: Information days, targeted newsletters, and interactive website updates will ensure ongoing accessibility and transparency of project progress. Public events and content will be in multiple languages where appropriate to broaden reach across Europe.
TARGET GROUPS	**OUTCOMES**	**IMPACTS**
Who will use or further up-take the results of the project? Who will benefit from the results of the project? HAO operators: to gather their CNS user needs and evaluate available current and innovative CNS solutions. EASA: to ensure the project's findings on CNS are fed into the regulatory activities, e.g. sandbox to facilitate early flight trials. HAO Service providers: appropriate and suitable infrastructure is required for the safe and efficient operation of traffic within HAO airspace. ANSPs: to understand the limitations of current CNS, maintain general situational awareness within airspace managed by them (including traffic not managed or separated by ANSPs), as well as awareness and implementation, as required, of new and innovative CNS necessary for HAO vehicles.	*What change do you expect to see after successful dissemination and exploitation of project results to the target group(s)?* Environment; suitable CNS infrastructure and services will allow for more efficient utilisation of the airspace, allowing for preferred routes of the vehicles, e.g. affected airlines burning less fuel or supersonic vehicles flying low noise profiles. Capacity; the availability of suitable and wide-spread CNS services for HAO will enable the wide utilisation of the higher airspace, allowing the accommodation of an increasing number of vehicles as demand evolves. Cost-efficiency, innovative CNS services such as those to be explored in SCAN e.g. ground-ground. Communications, and networked infrastructure leveraging internet-based APIs, can significantly reduce the need for ground-based infrastructure for HAO operations. Operational efficiency, e.g. because of flying user-preferred routes for HAO missions enabled by	*What are the expected wider scientific, economic and societal effects of the project contributing to the expected impacts outlined in the respective destination in the work programme?* Scientific outcomes and impact, based mainly on the collection and assessment of CNS data in actual flight trials in the higher airspace, will illustrate current performances and identify possible gaps to meet user needs. The results of the SCAN project will provide valuable inputs on standardisation and regulation and will pave the way for future commercial operations of new entrants in the higher airspace. Economic/technological impacts, by conducting flight trials with HAPS the potential use of these aircraft can be shown, and possible new business cases may be identified. CNS as a Service use cases will be developed ensuring CNS services are provided in the required volumes of airspace at an affordable cost. Societal outcomes and impact, improving the efficient integration of HAO and STO transits will support access to the higher airspace in Europe. Moreover, tailored CNS solutions for HAO will enable the minimisation of the

Standardisation bodies, notably EUROCAE. National Supervisory Authorities, to provide them with visibility on the CNS user needs and feasible means of compliance, as well as to address the flight authorisation of the proposed HAPS flight trials in European airspace. National security agencies, providing awareness on resiliency and security (particularly for verified aircraft identity) gaps of existing CNS solutions to support highly automated fleet operations, and verify the identity of aircraft. ICAO: to ensure regional developments on CNS for HAO are harmonised and integrated into their global vision on HAO. Military authorities, NATO and EDA, to ensure that needs of military operations in the higher airspace and civil-military convergence requirements on CNS are properly addressed. Other agencies such as FRONTEX, European Environment Agency, etc.	wide-spread CNS services. Safety, as a result of proposing and testing in flight onboard performance monitoring and alerting CNS functions as well as redundancies and robust and resilient CNS systems able to cope with RF interference events or ionospheric activity. Security and Cybersecurity – Gap identification, recommendations and possible solutions to meet the needs of increased airspace automation. Overall ecosystem resilience – A modular infrastructure ecosystem that can gracefully degrade without collapsing, enabling the dynamic adaptation of deconfliction margins. Privacy / Confidentiality – The ability for sensitive operations (e.g. defence operations, or national security sensitive airborne connectivity infrastructure) to report 4D position confidentially to authorized recipients on a need-to-know basis.	impact of HAO on conventional air traffic, contributing to environmentally friendly and cost-efficient air transport for European citizens. Finally, it will also result in job creation for highly skilled positions, as new manufacturing centres for HAO vehicles as well as operation centres and ground infrastructure, e.g. stratoports, start to be deployed in several locations in Europe.

3. Quality and efficiency of the implementation #@QUA-LIT-QL@# #@WRK-PLA-WP@#

3.1 Work plan and resources

The SCAN project includes six work packages, as depicted in Figure 1.

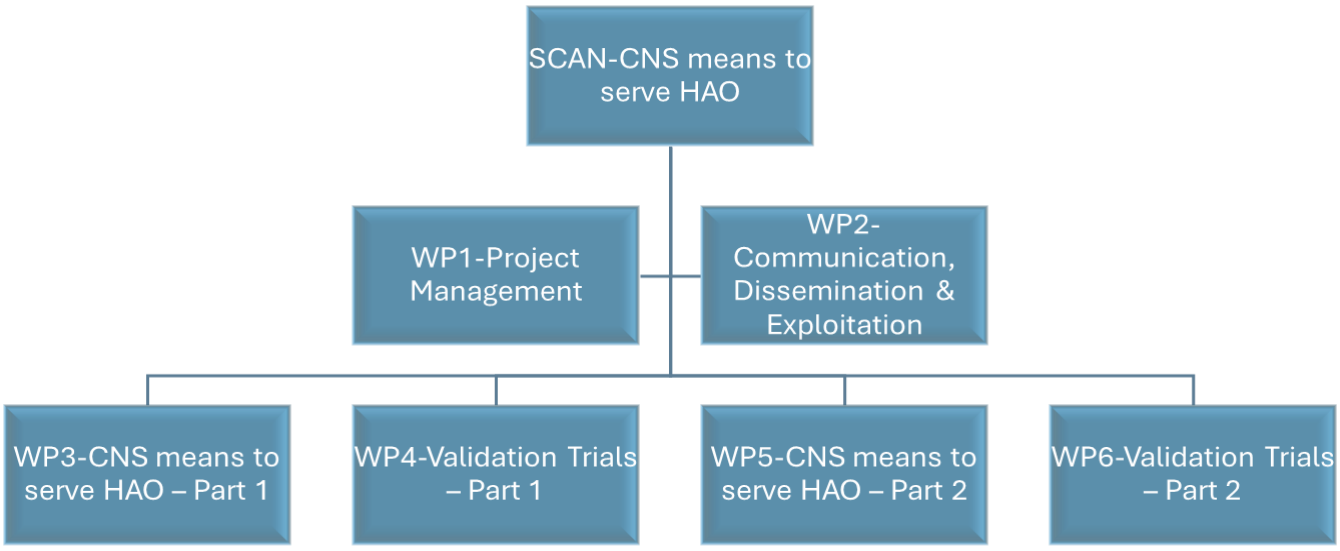


Figure 2: Work Breakdown Structure

WP1 “Project Management”: coordination of all activities, financial and administrative oversight, quality assurance, risk management, and reporting to SESAR 3 JU.

WP2 “Communication, Dissemination & Exploitation”: stakeholder engagement, promotion of results, exploitation planning, communication with specialist and public audiences, and application of the FAIR principles for all project outputs, supported by a managed public and internal repository.

WP3 “CNS means to serve HAO – Part 1” and WP “4 Validation Trials – Part 1" will take place in the first reporting period, followed by a similar scheme for the second one WP5 “CNS means to serve HAO – Part 2” and WP6 “Validation Trials – Part 2”.

Timing and sequencing

The first phase (M1–M6) focuses on requirements gathering, stakeholder engagement, and assessment of CNS capabilities for HAO. After the initial assessment of CNS user needs and CNS capabilities, a gap analysis will be carried out, and a set of specific CNS features will be proposed for testing in-flight with HAPS and a sounding rocket within the Validation Trials work packages. Work on the flight trials will start early in the project regarding the flight authorisation process with the corresponding aviation authorities.

Interdependencies

WP1 provides coordination, governance, and quality control for all other work packages.

WP2 supports WP3–WP6 through communication, data management, and stakeholder engagement.

WP3–WP5 develop the solution "CNS means to serve HAO” as illustrated in Figure 2.

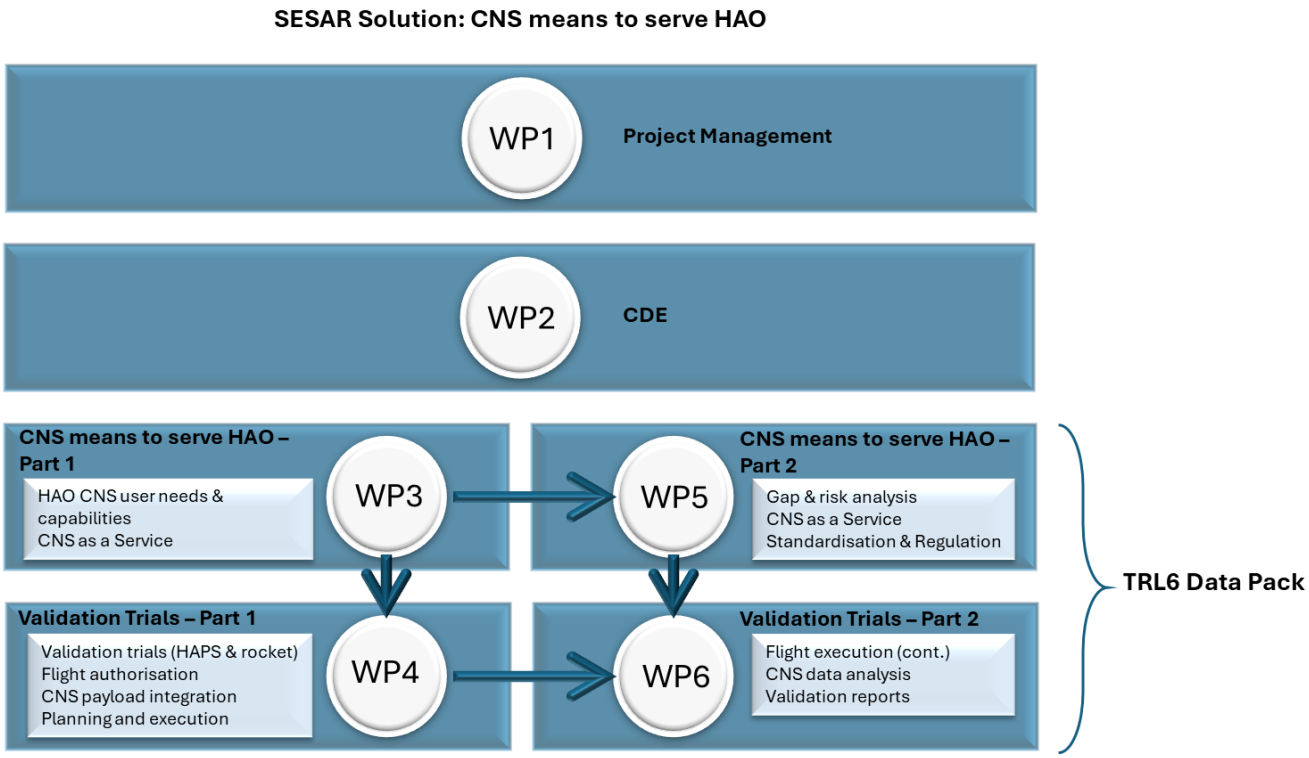
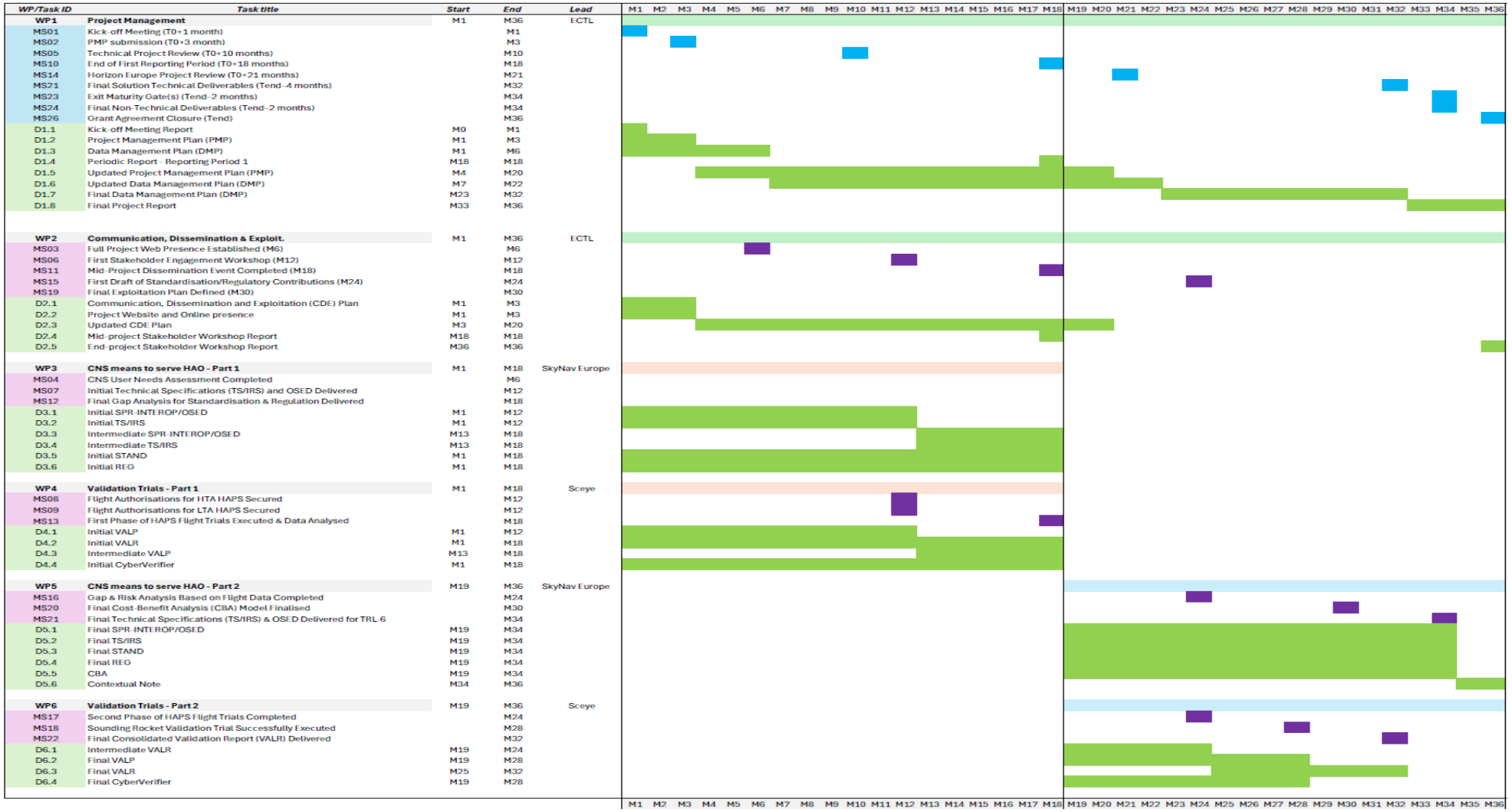


Figure 3: WP interdependencies

The Gantt chart is shown in Figure 4.



WP/Task ID	Task title	Start	End	Lead
WP1	**Project Management**	M1	M36	ECTL
MS01	Kick-off Meeting (T0+1 month)		M1	
MS02	PMP submission (T0+3 month)		M3	
MS05	Technical Project Review (T0+10 months)		M10	
MS10	End of First Reporting Period (T0+18 months)		M18	
MS14	Horizon Europe Project Review (T0+21 months)		M21	
MS21	Final Solution Technical Deliverables (Tend-4 months)		M32	
MS23	Exit Maturity Gate(s) (Tend-2 months)		M34	
MS24	Final Non-Technical Deliverables (Tend-2 months)		M34	
MS26	Grant Agreement Closure (Tend)		M36	
D1.1	Kick-off Meeting Report	M0	M1	
D1.2	Project Management Plan (PMP)	M1	M3	
D1.3	Data Management Plan (DMP)	M1	M6	
D1.4	Periodic Report - Reporting Period 1	M18	M18	
D1.5	Updated Project Management Plan (PMP)	M4	M20	
D1.6	Updated Data Management Plan (DMP)	M7	M22	
D1.7	Final Data Management Plan (DMP)	M23	M32	
D1.8	Final Project Report	M33	M36	
WP2	**Communication, Dissemination & Exploit.**	M1	M36	ECTL
MS03	Full Project Web Presence Established (M6)		M6	
MS06	First Stakeholder Engagement Workshop (M12)		M12	
MS11	Mid-Project Dissemination Event Completed (M18)		M18	
MS15	First Draft of Standardisation/Regulatory Contributions (M24)		M24	
MS19	Final Exploitation Plan Defined (M30)		M30	
D2.1	Communication, Dissemination and Exploitation (CDE) Plan	M1	M3	
D2.2	Project Website and Online presence	M1	M3	
D2.3	Updated CDE Plan	M3	M20	
D2.4	Mid-project Stakeholder Workshop Report	M18	M18	
D2.5	End-project Stakeholder Workshop Report	M36	M36	
WP3	**CNS means to serve HAO - Part 1**	M1	M18	SkyNav Europe
MS04	CNS User Needs Assessment Completed		M6	
MS07	Initial Technical Specifications (TS/IRS) and OSED Delivered		M12	
MS12	Final Gap Analysis for Standardisation & Regulation Delivered		M18	
D3.1	Initial SPR-INTEROP/OSED	M1	M12	
D3.2	Initial TS/IRS	M1	M12	
D3.3	Intermediate SPR-INTEROP/OSED	M13	M18	
D3.4	Intermediate TS/IRS	M13	M18	
D3.5	Initial STAND	M1	M18	
D3.6	Initial REG	M1	M18	
WP4	**Validation Trials - Part 1**	M1	M18	Sceye
MS08	Flight Authorisations for HTA HAPS Secured		M12	
MS09	Flight Authorisations for LTA HAPS Secured		M12	
MS13	First Phase of HAPS Flight Trials Executed & Data Analysed		M18	
D4.1	Initial VALP	M1	M12	
D4.2	Initial VALR	M1	M18	
D4.3	Intermediate VALP	M13	M18	
D4.4	Initial CyberVerifier	M1	M18	
WP5	**CNS means to serve HAO - Part 2**	M19	M36	SkyNav Europe
MS16	Gap & Risk Analysis Based on Flight Data Completed		M24	
MS20	Final Cost-Benefit Analysis (CBA) Model Finalised		M30	
MS21	Final Technical Specifications (TS/IRS) & OSED Delivered for TRL 6		M34	
D5.1	Final SPR-INTEROP/OSED	M19	M34	
D5.2	Final TS/IRS	M19	M34	
D5.3	Final STAND	M19	M34	
D5.4	Final REG	M19	M34	
D5.5	CBA	M19	M34	
D5.6	Contextual Note	M34	M36	
WP6	**Validation Trials - Part 2**	M19	M36	Sceye
MS17	Second Phase of HAPS Flight Trials Completed		M24	
MS18	Sounding Rocket Validation Trial Successfully Executed		M28	
MS22	Final Consolidated Validation Report (VALR) Delivered		M32	
D6.1	Intermediate VALR	M19	M24	
D6.2	Final VALP	M19	M28	
D6.3	Final VALR	M25	M32	
D6.4	Final CyberVerifier	M19	M28	

Figure 4: SCAN's Gantt chart

3.2 Capacity of participants and consortium as a whole #@CON-SOR-CS@# #@PRJ-MGT-PM@#

The SCAN consortium is a robust, multi-disciplinary team uniquely positioned to meet the project's objectives by bringing together Europe's leading actors from across the entire aviation value chain.

A Comprehensive, Pan-European Partnership

The consortium's structure is designed to ensure a holistic approach, blending high-level regulatory and network oversight with hands-on operational experience and specialised technical expertise. This composition ensures that the developed outcomes are not only technologically advanced but also operationally viable, safe, and aligned with future European regulatory frameworks. The partnership includes a representative cross-section of ANSPs, industry, aerospace research organisations, flight testing experts, and major HAPS operators.

Key Partner Capabilities

- **Coordinator and Network Manager (EUROCONTROL)**: As project coordinator, EUROCONTROL provides unparalleled pan-European expertise in air navigation safety, network management, and civil-military coordination. It will ensure the project aligns with the broader European ATM network strategy, provide essential network data for analysis, and act as a crucial bridge to regulatory bodies and the wider ATM community.
- **Operational Validation and Infrastructure (HAPS Operators)**: The direct involvement of three leading HAPS operators, **Elson Space**, **Skydweller** (HTA vehicles), **and Sceye** (LTA airship), is a cornerstone of the project. This provides access to diverse flight platforms for the validation trials in WP4 and WP6, led by Sceye. This diversity is critical for testing the CNS solutions in varied operational environments, ensuring the results are robust and not limited to a single vehicle type. The HAPS Operators are supported by the **HAPS Alliance** as an associated partner. Furthermore, the German Aerospace Center (**DLR**) enables payload integration and flight testing of solution prototypes on a research rocket (suborbital).

- **Air Navigation Service Provision (ANSPs)**: The participation of ANSPs including **NATS** (UK), **DFS** (Germany), **DSNA** (France), **LFV** (Sweden) and **ENAIRE** (Spain) grounds the project's solutions in the realities of current and future air traffic service provision. They provide critical input on real-world ATC procedures, safety requirements, and the operational feasibility of integrating HAO traffic, ensuring the project's outcomes are practical for deployment within European airspace. **ESSP** provide CNS focused service delivery experience and, as a multi-service CNS provider, operate complex space-based systems and deliver critical services under strict regulation conditions.
- **Research and Scientific rigour**: The German Aerospace Center (**DLR**), as a leading Research and Technology Organisation, provides the scientific foundation for the project. DLR will contribute its advanced modelling and simulation capabilities, ensure the methodological soundness of the validation activities, and perform independent analysis of CNS performance data, adding a layer of scientific validation to the project's results. This is supported by input from **LIU**, **CIRA**, **ENAC** (France) and other research focused institutions, ensuring that the output of the project is scientifically robust and adheres to Open Scientific Principles. Along with their scientific contributions, ENAC (France) will contribute to the dissemination activity completing the link back into the education of current and future aviation professionals (ATC Officers, Pilots, Air Operations/Engineers).
- **Concept Development and Management**: **SkyNav Europe** provides expertise in ATM operational concept development along with standardisation and regulatory analysis that will be key in leading the core technical work packages WP3 and WP5**.** SkyNav will guide the solution from initial concept to final analysis, overseeing the integration of flight data, consolidating requirements, and formulating contributions to standardisation bodies to ensure the solution is operationally viable. **Sceye** provide management expertise aligned with their operational capabilities within the project's validation Work Packages. This ensures the planning and execution of test flights remains realistic and effective, while utilising their operational flexibility to navigate the regulatory requirements for the validation flights to be conducted.

- **Future-focused, progressive concepts** will be proposed and developed through the inclusion of leading U-space specialists, in the form of **OpenUTM**, **ANRA** and **Skypuzzler**. As higher airspace operations will be dealing with predominantly New Entrants, many in the form of uncrewed vehicles, the expertise that these partners bring to the project is highly valuable. The emerging U-space ecosystem is being built upon progressive technologies and concepts, many of which will likely be similar or parallel to those necessary for HAO. Additionally, Skypuzzler's Conflict Resolution Services (CRS) provide the safety-critical deconfliction layer that complements CNS capabilities for Higher Airspace Operations (HAO). While CNS ensures positioning, navigation, surveillance, and communication, CRS ensures that this information is translated into actionable separation assurance. CRS is therefore essential for enabling cooperative operating environments, minimising segregated airspace, and scaling HAO operations safely.
- **Other supporting participants** include **Parque Tecnologico de Fuerteventura**, who provide access to the Canarias Stratoport, a dedicated and fully equipped European test facility for HAPS and UAS operations. **Pildo Labs** brings world-class expertise in the validation of satellite navigation systems and PBN procedures. They contribute to validation data analysis along with risk analysis of the CNS Framework.

Figure 4: Elson Space HAPS (left), Sceye airship HAPS (centre), Skydweller HAPS (right)

Figure 5: airship HAPS facilities at Teruel airport (left), Fuerteventura stratoport (right)

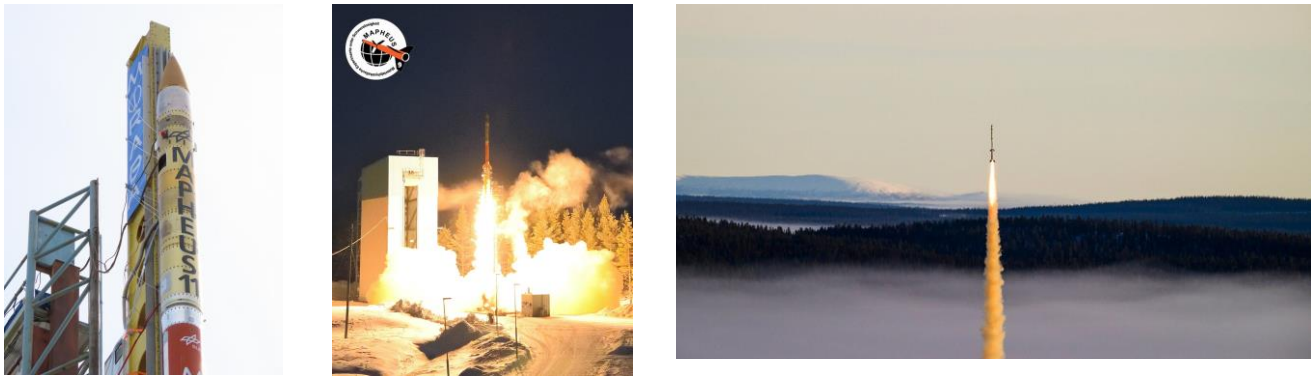


Figure 6: Mapheus rocket (DLR)

Aligned for Success

This consortium structure directly addresses the call's objectives by creating a complete ecosystem capable of advancing the SESAR solution "CNS means to serve HAO" to a pre-deployment maturity level (TRL-6). The blend of regulatory oversight, operational end-users with critical infrastructure, scientific validation, and expert project management ensures a seamless workflow from defining user needs (WP3) to validating performance in live flight trials (WP4, WP6) and delivering a robust data pack for future industrialisation and regulation (WP5).

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Tables for section 3.1

Table 3.1a: List of work packages

Work package No	Work Package Title	Lead Participant No	Lead Participant Short Name	Person-Months	Start Month	End month
WP1	Project Management	1	ECTL	31.50	M01	M36
WP2	Communication, Dissemination and Exploitation	1	ECTL	27.65	M01	M36
WP3	CNS means to serve HAO – Part 1	7	SkyNav Europe	113.54	M01	M18
WP4	Validation Trials – Part 1	11	Sceye	264.28	M01	M18
WP5	CNS means to serve HAO – Part 2	7	SkyNav Europe	117.71	M19	M36
WP6	Validation Trials – Part 2	11	Sceye	281.45	M19	M36

Table 3.1b: Work package description

Work package number	**1**
Work package title	**PROJECT MANAGEMENT**

Objectives

WP1 provides the governance, coordination, and quality assurance framework that ensures SCAN is delivered on time, to scope, and to the maturity levels required for SESAR 3 JU Industrial Research projects. Its objectives are to:

1. Establish and operate a governance structure in line with SESAR 3 JU requirements, ensuring clear decision-making, effective internal communication, and timely conflict resolution.
2. Manage all contractual, administrative, and financial aspects of the Grant Agreement, including all formal reporting to SESAR 3 JU.
3. Monitor progress against the approved Project Management Plan (PMP), work plan, and solution maturity targets, ensuring that corrective action is taken where required.
4. Deliver all mandatory SESAR milestones, reviews, and maturity exit criteria on schedule.
5. Maintain a structured quality assurance process to ensure all outputs meet SESAR evaluation, maturity assessment, and quality standards.

Description of work

WP1 will run for the full duration of SCAN. The governance structure will be centred on a Project Management Board (PMB) and a Technical Coordination Team (TCT).

1. The PMB, chaired by the Project Coordinator, meets quarterly (or more often if required) to make strategic decisions, resolve contractual or resourcing issues, and monitor progress against the Grant Agreement. Membership includes senior representatives from each partner, all WP leaders, and the SESAR 3 JU Programme Manager as an observer. The PMB also approves all major deliverables before submission.
2. The TCT, chaired by the Technical Coordinator, meets monthly to monitor technical progress, manage cross-WP dependencies, and ensure results are consistent across other SESAR Solutions dealing with HAO. WP leaders provide monthly progress updates, risk status, and confirmation of resource utilisation.
3. When specific issues require rapid resolution or specialist input, the Coordinator may establish short-term Task Forces reporting to the TCT or PMB.

SCAN's SESAR Solution will be implemented as work packages aligned to the two SESAR reporting periods: Months 1–18 (initial development, specification, and early validation) and Months 19–36 (refinement, completion of validation, and final TRL 6 deliverables). WP1 will ensure coordination between the "first-half" and "second half" WPs for the SESAR Solution so that dependencies, feedback, and updates are carried forward effectively between reporting periods.

Initial mobilisation (first quarter)

Convene the Kick-off Meeting (T0+1 month) to formally launch the project with all partners and SESAR 3 JU. The meeting will confirm governance arrangements, reporting cycles, dependencies, and integration with SESAR maturity processes.

Finalise and submit the PMP (T0+3 months), defining the final title, description, and scope of each SESAR Solution, confirming initial maturity levels, and setting performance expectations. The PMP will include the Risk Management Plan, Quality Management Plan, internal communication plan, document control procedures, reporting templates, and the updated milestone schedule.

Mandatory SESAR milestones

WP1 will ensure the delivery of all mandatory SESAR milestones with full internal preparation cycles to guarantee readiness:

- Kick-off Meeting (T0+1 month) – Agenda, participant list, and minutes submitted to SESAR 3 JU.
- PMP Submission (T0+3 months) – Drafted by the Coordinator with partner input; internally reviewed one month before submission.
- Technical Project Review (T0+10 months) – Preceded by an internal mock review to verify completeness of technical evidence and early identification of gaps.
- End of First Reporting Period (T0+18 months) – Consolidation of technical and administrative reports, updated maturity self-assessments, and confirmation that lump-sum completion criteria are met.
- Horizon Europe Project Review (T0+21 months) – Readiness check confirming that all technical, financial, and maturity documentation is complete and fully traceable.
- Final Solution Technical Deliverables (Tend–4 months) – Internal technical and compliance reviews prior to submission, ensuring alignment with maturity exit criteria.
- Exit Maturity Gate(s) (Tend–2 months) – Delivery of final maturity self-assessment packages and closure of outstanding review actions.
- Final Non-Technical Deliverables (Tend–2 months) – Includes final CDE reports, updated Data Management Plan, and other administrative outputs.
- Grant Agreement Closure (Tend) – Submission of final technical and financial reports, and complete archiving of project documentation.

Risk management

Risk management will be continuous and proactive. A risk register will be created at project start and

maintained by the TCT, with monthly updates and quarterly PMB reviews. Each risk will be scored for probability and impact, with mitigation actions assigned to specific owners. High-priority risks will be escalated immediately to the PMB. This process will draw on prior project experience, particularly in anticipating potential delays in validation, regulatory changes, or partner resource constraints.

Quality assurance

A two-stage quality review process will be applied to all deliverables: a) Technical review by experts from a partner not responsible for drafting, ensuring accuracy, operational relevance, and technical completeness, and b) Compliance review by the Coordinator, ensuring alignment with SESAR 3 JU submission formats, Horizon Europe rules, and the quality criteria set out in the PMP. Reviews will conclude at least two weeks before submission deadlines to allow for any required corrections.

Administrative and financial management

Management will follow the lump-sum funding model. WP1 will track person-months and deliverable completion status by WP to ensure lump-sum payment criteria are met. The Coordinator will monitor resource allocation to prevent imbalances and prepare financial and technical reports for each reporting period in accordance with Horizon Europe requirements.

Integration with SESAR schedule

The WP1 framework integrates the SESAR 3 JU milestone and review timetable into all project governance and monitoring activities. Internal preparation cycles, risk tracking, and quality assurance processes are scheduled to ensure that deliverables and maturity assessments are complete and ready for submission ahead of formal deadlines. This approach ensures contractual compliance, early identification of risks, and the orderly completion of each reporting period and maturity gate.

Work package number	**2**
Work package title	**COMMUNICATION, DISSEMINATION AND EXPLOITATION**

Objectives

WP2 manages SCAN's external visibility, stakeholder engagement, and exploitation planning to ensure that the project's outputs are widely understood, accessible to relevant stakeholders, and positioned for operational uptake. The objectives are to:

1. Implement a communication strategy that informs and engages the aviation, HAO operators, ANSPs, and research communities, as well as standardisation, regulatory and policy stakeholders, throughout the project.
2. Disseminate results in a structured way, ensuring that relevant technical, operational, and policy communities have access to the outputs in formats they can apply.
3. Develop and maintain an exploitation plan that identifies opportunities for operational deployment, standardisation, and regulatory uptake of the SCAN Solution on CNS to serve HAO.
4. Coordinate messaging across the two reporting periods to ensure continuity between the "first-half" and "second-half" solution WPs.
5. Ensure all dissemination and exploitation activities comply with Horizon Europe requirements, SESAR 3 JU guidelines, and any applicable intellectual property and confidentiality constraints.

Description of work

WP2 runs for the full project duration and works in close coordination with WP1 and all solution WPs to ensure that communication, dissemination, and exploitation (CDE) activities are integrated into the overall work plan. CDE activities will be planned and executed in a way that supports both reporting periods:

In Months 1–18, the focus will be on raising awareness of the project, engaging key stakeholders, and preparing the ground for validation and exploitation activities.

In Months 19–36, the focus shifts to consolidating technical results, promoting validated outcomes, and supporting uptake pathways such as standardisation, regulatory engagement, and operational trials.

Communication

The communication plan will include:

1. Promotion of the SCAN's objectives, activities, and benefits to defined target audiences, including higher airspace operators, ANSPs, avionics industry, state regulators, EASA, the Network Manager, international organizations (ICAO, JARUS), standardisation bodies (EUROCAE, ISO), and the research community.
2. A public project website will be established in the first quarter, providing up-to-date information, public deliverables, news, and event materials.
3. Targeted communication channels will include SESAR events, ICAO EUR/NAT meetings, EUROCAE working groups, specialised industry conferences, and selected journals.
4. Project updates will be shared regularly through SESAR 3 JU channels to maximize reach within the ATM/space operations community.

Dissemination

Dissemination activities will focus on delivering technical results to their intended user communities in formats they can adopt. Outputs will include:

1. Technical deliverables and reports (public and restricted versions as applicable).
2. Conference papers and peer-reviewed journal articles.
3. Presentations to operational forums and technical panels.
4. Workshops and webinars to engage stakeholders in the review of preliminary and final results.

The dissemination plan will ensure alignment with SESAR intellectual property rules, managing the release of restricted or pre-standardisation material appropriately.

Exploitation

The exploitation plan will identify concrete pathways for deploying the SCAN Solution on CNS for HAO into operational environments after the project concludes. This will include:

1. Mapping solution outputs to candidate standardisation and regulatory processes, such as EUROCAE WG activities, EASA rulemaking tasks, and JARUS.
2. Identifying opportunities for integration into the European CNS infrastructure.
3. Assessing the operational, regulatory, and commercial viability of the CNS for HAO solution in consultation with end users.
4. Ensuring exploitation considerations are addressed in both the first and second reporting periods, with early market and regulatory engagement to prepare the ground for implementation.

Coordination across reporting periods

WP2 will ensure that CDE activities for the "first-half" and "second-half" solution WPs are continuous and mutually reinforcing. Early outputs and draft deliverables will be positioned to inform stakeholders during the first reporting period, while finalised deliverables in the second reporting period will be accompanied by targeted exploitation and uptake actions.

IPR and confidentiality

The WP will maintain a register of all project outputs with associated intellectual property rights, access conditions, and confidentiality classifications. This will ensure that dissemination and exploitation activities remain compliant with the Grant Agreement, Horizon Europe rules, and SESAR 3 JU guidance. On the other hand, the project will use open standards and generate open-source code and technologies that will be in the

public domain.

Measurement and reporting

The effectiveness of CDE activities will be monitored through engagement metrics (event participation, website analytics, stakeholder feedback) and reviewed at least quarterly by the PMB. WP2 will produce updated dissemination, and exploitation plans as mandatory project deliverables, with a final version ready at project close to support post-project uptake.

Milestones within WP2:

- **Full Project Web Presence Established (M6)** This includes the launch of the public project website and the finalisation of the initial Communication, Dissemination, and Exploitation (CDE) Plan.
- **First Stakeholder Engagement Workshop (M12)** A workshop held with key stakeholders (e.g., HAO operators, ANSPs) to present initial findings on CNS user needs and gather feedback.
- **Mid-Project Dissemination Event Completed (M18)** A public webinar or event to share the results from the first reporting period, including initial validation findings.
- **First Draft of Standardisation/Regulatory Contributions (M24)** Initial proposals based on project findings are drafted and shared with relevant EUROCAE working groups for preliminary review.
- **Final Exploitation Plan Defined (M30)** The plan for the commercial and operational exploitation of the project's results is finalised, with clear pathways for uptake.

Work package number	**3**
Work package title	**CNS MEANS TO SERVE HAO – PART 1**

Objectives

This work package, titled "CNS means to serve HAO – Part 1" is the initial phase of the project's technical work. Its primary goal is to establish the conceptual and analytical foundations for the CNS solution by assessing both existing and innovative CNS capabilities. The outputs of this work will directly inform the validation activities in WP4 and the detailed analyses in WP5.

The specific objectives for WP3 are to assess and develop:

1. **CNS user needs assessment:** Compile a comprehensive set of CNS user needs for Higher Airspace Operations (HAO), covering civil and military use cases with a specific focus on new entrants like HAPS, supersonic/hypersonic vehicles, and space launch/re-entry operators.
2. **CNS technological solutions:** Conduct a theoretical assessment of current and innovative CNS capabilities and their limitations at altitudes above FL500.
3. **Innovative modular network approach:** Define a layered, technology-agnostic network architecture for CNS provision that is both resilient and secure.
4. **Collaborative cyber security framework:** Build a collaborative security framework using a Zero-Trust architecture to assess and verify cyber security capability and defend against cyber threats and investigate the ICAO Trust Framework.

5. **CNS as a service:** Define and assess the CNS as a Service (CNSaaS) concept, exploring new business models and identifying suitable technologies.

6. **Standardisation and Regulation:** Perform an initial gap analysis of existing standardisation and regulatory frameworks and provide recommendations for updating relevant documentation.

Deliverables

This section outlines the key SESAR deliverables that will be produced by WP3. These deliverables represent the tangible outcomes of the initial research and theoretical work, and they serve as crucial inputs for the subsequent validation trials in WP4 and the detailed analyses in WP5. They document the project's early concepts for services, technical specifications, and regulatory proposals.

- **D3.1 Initial SPR-INTEROP/OSED:** This deliverable will provide the initial operational services and environment description, mapping out the early-stage concepts and stakeholder interactions.

- **D3.2 Initial TS/IRS:** This will define the initial technical specifications and interface requirements for the proposed CNS solution.

- **D3.3 Intermediate SPR-INTEROP/OSED:** This deliverable will be an updated version of the initial OSED, reflecting the refined concepts based on early feedback and research.

- **D3.4 Intermediate TS/IRS:** An updated version of the technical specifications, incorporating new findings from the intermediate phase.

- **D3.5 Initial STAND:** This deliverable will present the initial proposals for standardization.

- **D3.6 Initial REG:** This will contain the initial proposals for regulatory amendments.

Description of Work

This section outlines the work to be performed within Work Package 3, focusing on defining and assessing new CNS capabilities for Higher Airspace Operations (HAO).

WP3.1 CNS user needs assessment

This work package will compile a comprehensive set of CNS user needs for Higher Airspace Operations (HAO), covering both civil and military use cases. The assessment will be based on surveys of HAO operators and service providers, with a specific focus on High-Altitude Platform Systems (HAPS), supersonic and hypersonic vehicles, and space launch and re-entry operators (LRO).

WP3.2 CNS technological solutions (theoretical)

This sub-work package will conduct a theoretical assessment of current and innovative CNS capabilities and their limitations at altitudes higher than FL500.The work will involve a systematic literature analysis of existing research and will also gather relevant results from research conducted by relevant organisations such as NASA and the FAA.

The assessment will cover a range of CNS technologies, including:

- **Communications:** A review of current aviation communications (e.g., VHF, HF, SATCOM) and innovative solutions like connected aircraft technologies.

- **Navigation** (positioning)**:** An examination of advanced PNT systems such as multi-frequency multi-constellation (MFMC) GNSS receivers leveraging Galileo differentiators, inertial systems, celestial navigation, and the potential use of 6G. It will also include conversion of geometrical altitude into barometric altitude algorithms/procedures theoretical assessment.

- **Surveillance:** An assessment of network remote ID, satellite-based ADS-B, ADS-C, SSR radars, modified ADS-B for HAO and the use of direct telemetry data from operators.

- **Conflict Detection and Resolution**: Address the challenge of conflict detection and resolution tailored for HAO.

Particular attention will be paid to the use of geometric altimetry and the potential for a 6G CNS network, including an aerial layer of HAPS acting as relays.

WP3.3 Innovative modular network approach for CNS provision

This work package will focus on developing a modular, technology-agnostic network approach for CNS provision to HAO. The goal is to define a layered architecture that can provide resilient and secure services by using a variety of redundant data links and a central operator-level fusion of multi-sensor data.

This includes defining the following layers (as illustrated in Figure 1 above):

- **Layer 1 (*Onboard*):** Multi-sensor Positioning, Navigation, and Timing (PNT) using diverse sensors.

- **Layer 2 (*Telemetry*):** Secure telemetry via redundant and dissimilar data links.

- **Layer 3 (*Operator*):** Real-time information available to the HAO operator, with multi-sensor data fusion, supporting services (Traffic Management and Conflict Resolution Service) and uncertainty computation.

- **Layer 4 (*Sharing*):** Authenticated position and identity data shared with authorised parties via a secure web API.

It will also include a cross-cutting security layer: a transversal zero-trust cybersecurity framework across the entire chain to ensure resilience and security.

WP3.4 Collaborative cyber security framework for CNS using Zero-Trust architecture

This sub-work package is dedicated to building a collaborative security framework to build resilience and defend against cyber threats in the new aeronautical CNS environment, including the definition of the preliminary plan of the Security Risk Assessment (SecRA) activities, considering the SESAR SecRAM methodology as a reference.

The research will aim to define and validate a global security collaboration framework based on use cases across various CNS domains, considering the entire end-to-end chain. This approach directly addresses the limitations of current siloed security models by promoting an integrated, holistic defence strategy.

The work includes:

- Developing a **HAPS-Specific Cybersecurity Framework** and an **Asset and Vulnerability Analysis** to provide the theoretical basis for the digital verifier tool.

- Researching solutions to **mitigate radio frequency interference**, with a focus on creating aircraft-installed active radio aerials capable of adapting to and mitigating the impact of jamming and spoofing attacks.

- Building a **Cybersecurity Verifier Tool**, a digital artefact that will allow HAPS operators to independently validate CNS data integrity and self-assess compliance.

- Investigating the use of the **ICAO Trust Framework** as a potential basis for authentication and security concepts.

- Defining a preliminary plan to perform the **Security Risk Assessment (SecRA)** of the HAO baseline, tailored to the "Initialise" level of the SESAR SecRAM methodology, and to be finalized in WP5.4.

Note: This research element also covers the monitoring and mitigation of potential cybersecurity risks introduced by new entrants (e.g., HAO) and builds on ongoing work from the FCDI "Collaborative Cyber Security Framework for CNS" project.

The intended reporting sub-deliverables for WP3.4 are the preliminary version of the Security Assessment Plan (SecAP) and an initial documentation for the cyber security verifier tool.

WP3.5 CNS as a service

The work in this sub-work package will focus on defining and assessing a **CNS as a Service (CNSaaS)** concept for Higher Airspace Operations (HAO). This approach aims to decouple the provision of critical CNS functionalities from physical infrastructure, allowing for flexible, subscription-based services delivered by independent organisations.

The work will proceed as follows:

- **CNSaaS Concept Development:** a comprehensive CNSaaS concept will be developed, exploring new business models designed to enhance the resilience of existing CNS infrastructure by leveraging and interfacing with space-based assets.

- **Identification of Suitable Technologies:** The project will identify and assess which CNS technologies and functions are suitable for a CNSaaS model.

- **Business Model Assessment:** on relevant business models for providing these services, ensuring they are cost-effective and align with the needs of HAO operators, Air Navigation Service Providers (ANSPs), and other aviation stakeholders.

- **Technological Demonstrations:** The project will outline possible technological demonstrations of several CNS components that can be tested in flight as part of the validation trials in WP4 and WP6. This will include investigating the potential use of a cryptographically verified vehicle identity.

- **Infrastructure Monitoring Services:** The scope also includes the research and development of CNS infrastructure monitoring services to ensure the ongoing performance and reliability of the CNSaaS solution.

WP3.6 Standardisation and Regulation

This sub-work package will perform a comprehensive gap analysis and develop proposals to update the pertinent standardisation and regulatory frameworks for CNS provision in the higher airspace. Building on the CNS user needs, technological assessments, and flight trial data from WP4, the team will prepare recommendations for new standards and regulatory amendments. SCAN will submit proposals to relevant

working groups at EUROCAE and prepare guidance material for submission to bodies such as EASA and JARUS (Task Force on SORA 3.0 - HAO use case). Collaborative activities with national and international organisations (e.g., ICAO) will ensure that European developments are harmonised with global frameworks.

Milestones for WP3:

- **CNS User Needs Assessment Completed (M6)** A comprehensive report detailing the consolidated CNS requirements from HAPS, supersonic, and space launch operators is delivered.
- **Initial Technical Specifications (TS/IRS) and OSED Delivered (M12)** The first complete draft of the operational concept and technical specifications for the modular CNS architecture is completed and submitted for review.
- **Final Gap Analysis for Standardisation & Regulation Delivered (M18)** The initial analysis identifying gaps in current standards (e.g., EUROCAE) and regulations (e.g., EASA) is finalised and delivered.

Work package number	**4**
Work package title	**VALIDATION TRIALS – PART 1**

Objectives To perform flight trials with multiple HAO vehicles flying in Higher Airspace to collect CNS data, and validate CNS technologies for various HAO users, including HAPS and a Sounding Rocket. The flight trials will be carried out with diverse HAPS platforms including both Lighter-than-Air and Heavier-than-Air platforms. The diversity of platforms and the wide-ranging payload lifting capacity will enable validation of technologies suited to diverse needs. Partners will include Elson Space, Sceye and Skydweller as well as sounding rockets.
The validation program will aim to validate several aspects.

1. **Validation of specific CNS technologies and components**, e.g. Directional LEO Satcom with Phased Array, SATCOM MLAT, GNSS, modified ADS-B.
2. **Validation of the connected-aircraft framework** enabling a modular, redundant and technology agnostic architecture that leverages multiple technologies.
3. **Validation of the framework's resiliency and ability to gracefully degrade** – Testing the ability to handle the loss of some data links or positioning sources, and adjusting position uncertainty due to loss of navigation technologies, etc.
4. **Validation of HAO operator supporting systems** – Testing data aggregation and conflict detection and resolution services, to ensure automation and scalability.
5. **Validation of the cyber-security and zero-trust framework across the entire chain**, from satellite authentication for PVT computation (e.g. Galileo OSNMA) to aircraft identity authentication over telemetry, sent to the operator and aircraft identity authentication over position reporting network.

The validation will first identify the specific CNS systems and features for testing in flight and be followed by the preparation of the flight trials, including the authorisation process by the aviation authorities, setting up the CNS payloads, execution of the flights and the analysis of the collected data.

Description of work

The work will be organised in the following sub-work-packages:

WP4.1 Identification of specific CNS systems, features and test scenarios to validate in flight, considering the HAO user needs, potential CNS capabilities (addressed in WP3), and test platform lifting/power capacities.

WP4.2 Technical development / adaptation efforts of necessary technologies.

- **Develop an OpenAPI specification and data exchange mechanism** for HAPS operators to feed telemetry data over secure internet APIs (possible adaptation from Network Remote ID standard) (Layer #4 in Figure 1). This work package will define a standardised, machine-readable format for HAPS operators to communicate position and identity to authorized recipients using the OpenAPI standard. The specification will detail critical data fields, including position, altitude (barometric, geometric), uncertainty estimates, platform/operator identity. Furthermore, this task includes **defining the secure mechanism for data exchange**, specifying API endpoints, communication protocols, and authentication requirements (e.g leveraging ICAO Trust Framework).
- Develop automated cybersecurity verifier (supporting Layer#4) enabling the automated programmatic validation of the integrity and authenticity of position report streams from any compliant HAPS operator.
- Develop position estimation logic (ground based or on the aircraft) fusing multiple position sensors (GNSS, Baro, Satcom MLAT, etc.) into a single position and uncertainty estimates. This work will aim at developing logic which can enable graceful degradation to alternate positioning techniques in case of some solutions being unavailable. It may include the logic enabling the conversion of geometrical altitude into barometric altitude using MET data, enabling the safe separation of aircraft using different altitude technologies and datums, without needing to rely on transition altitudes. (Layer #1 or layer#3)
- **Develop telemetry routing logic for the transmission of telemetry data over multiple asynchronous data links** of different bandwidth capacity and latency, and develop a telemetry prioritization scheme allowing the prioritization of essential position telemetry as connectivity bandwidth degrades. (Layer #2)
- Based on the performed assessment of current ADS-B performance limitations enhancements will be implemented into a prototype transponder capable of operating under the revised specifications. A downward compatible ADS-B transponder message modification for HAO beyond altitudes of 126.700 ft, capable to provide surveillance information throughout the HA including fast and ultrafast vehicle operations, will be developed. This work aims at message modifications and related data processing, to be embedded into a test transponder for validation via a rocket launch experiment, Develop strong authentication and cyber-security logic on the telemetry communication links between the aircraft and operator. (Layer #2)

WP4.3 Preparation of the flight trials for the evaluation of CNS capabilities in the higher airspace (> FL500). A plan for the flight campaigns with HAPS will be developed including:

- Platforms: fixed-wing heavier than air HAPS (Elson Space and Skydweller) and lighter than air HAPS (Sceye).
- Definition of the flight plans: flight trajectory, dates, duration, contingencies, number of flights needed, with due consideration of the overflown areas in continental and oceanic airspace.
- Test planning: CNS features to be logged per HAPS platform, per flight #, and geographical areas (oceanic/over land masses) from ground level up to the higher airspace above FL500.
- Flight authorization: interaction with the pertinent aviation authorities to get the approval of the flights with each HAPS aircraft based on an agreed method (e.g. SORA, permit to fly, others) to substantiate the safety of the flight. This step will build on the outcome of ECHO2 Solution #2 *"Sandbox module and procedural package for the Integration of HAPS operations in European ATM"*. It also has a critical dependency of ongoing work on HAPS by EASA and JARUS:

- EASA: *guidance material on the 'regulatory sandbox' concept supporting Member States and the industry to conduct the first tests and demonstrations in the EU, exempting these tests from the application of relevant EU regulations*. Ref. EASA Proposal for a Roadmap on HAO, March 2023.
- JARUS: ongoing work on the adaptation of SORA for HAO (for HAPS that qualify as UAS) along two work streams: a) probabilistic approach for UAS with very limited propulsion especially LTA, and b) deterministic approach for more controllable configurations.

It is important to note that the HAO flight campaigns herein proposed can be considered as experimental flights, so alleviations should be identified and agreed with the aviation authority (e.g. to reduce the level of SAIL in SORA), until normal commercial HAO operations start.

As an element for consideration in the flight authorization process, the potential impact of the HAO on areas on the ground and on volumes of the airspace below the flight will be evaluated (this can be done interactively, close to real-time, extending the GUI tools https://undefiened.github.io/uav_risk/ for assessment and mitigation of drone flights ground and air impact).

WP4.4 Preparation of the hardware and software elements of the CNS solutions to be tested in flight. This may be based on current airborne/ground systems used by the HAPS, in each case, or be installed as a payload onboard the HAPS.

- Procurement, setting up and installation of the CNS elements for data collection, considering the Size, Weight and Power-Cost (SWaP-C) factor, mass and balance, power consumption and other constraints of the HAPS platform: antennas, receiver/transponder/datalink, power supply, data logging of the CNS features to be collected in flight, etc.
- Key assessment metrics for the CNS features to be assessed:
    - Communications: signal integrity, latency and handover performance, availability;
    - Navigation (positioning): e.g. GNSS and Satcom MLAT horizontal and vertical positioning accuracy, availability, integrity, INS performance; multi-source navigation reliability and graceful degradation; impact of high-altitude conditions, impact of long-duration flight at altitude (months);
    - Surveillance: network-based position reporting (network remote ID), ADS-B transmission/reception reliability, SSR detection coverage, MLAT feasibility, latency in surveillance relays, continuity of situational awareness.
- Ground tests, to ensure correct data logging of CNS data, formats, electromagnetic interference (EMI) compatibility, etc.
- Methodology for the assessment of the collected CNS data.
- Development of threat modelling and cyber-security templates for HAPS flights.

WP 4.5 Validate the Cyber security verifier tool in operational demonstrations.

WP4.6 Execution of flight trials

There will be three sub-WP, one per HAPS vehicle (Elson Space, Sceye and Skydweller).

- Execution of the flight; data will be collected during the whole flight to assess the variation of CNS performances with altitude.
- Analysis of the collected data including the derivation of the true 4D trajectory of the HAPS as well as the assessment of the capabilities and possible limitations of the different CNS features of interest.
- Demonstrate strategic and tactical resolution capabilities using CNS data feeds (ADS-B v2/3, telemetry, geometric altimetry).

Elson Space España will contribute to the in-flight validation activities in WP4 and WP6 with their Heavier-Than-Air (HTA) HAPS platform, providing **up to three flights** in the stratosphere, **each lasting up to two**

weeks, for CNS testing. These flights are expected to take place **over the Teruel region with possible expansion to the Mediterranean and Canary Islands**, pending necessary flight permissions. Additionally, Elson Space will contribute to the physical and networking payload integration activities, developing solutions to integrate the various CNS sensors and facilitating the soak testing of the avionics to minimize the risk of electromagnetic interference (EMI) during flight. The platform's flexible payload bay allows for the straightforward integration of various CNS equipment within a 10kg mass and 200W power budget, enabling comprehensive data collection to address the project's core research questions.

Sceye builds and operates solar-powered, lighter-than-air HAPS for stratospheric infrastructure. Our aerodynamically shaped balloon delivers a large SWaP (Size, Weight and Power) budget, enabling the ability to carry and power multiple payloads of over 200 kg and 2 kW of power consumption while remaining over an operating area for extended periods of time – months to potentially years – enabling multi-service operation. Sceye focuses on universal broadband internet connectivity, climate monitoring, environmental and natural resource management, natural disaster prevention and monitoring, and emergency response support and coordination. The single-use platform operates under Unmanned Free Balloon regulations (FAA's Part 101 and ICAO Annex 2 Appendix over international waters). The platform maintains level flight through buoyancy using a super-pressure envelope and features an Assistive Impulse Device (AID) that can be activated at altitude to counteract moderate winds to stay on station or navigate into more favourable winds. To date, Sceye has successfully completed over 20 stratospheric flights, proving its ability to fly for full diurnal cycles, maintain position in moderate winds, and perform remote sensing and telecommunication demonstrations, including direct-to-device connectivity through a 4G MIMO array antenna with smartphones on the ground. A new hangar is currently being built in Teruel, Spain, which will serve as a base for EMEA operations. The Sceye platform is a digitally connected aircraft with a modular architecture. It can support multiple, independent, and asynchronous data links, such as directional Ku/Ka SATCOM, L-Band SATCOM, E-Band backhaul, and FSOC, which are used to report telemetry and or payload data to ground automation systems.

In this project, Sceye will conduct **a single, multi-month flight from Spain**, leveraging its high SWaP (Size, Weight, and Power) capability. Multi-sensor navigation data will be reported to ground automation systems via multiple asynchronous data links. This data will then be de-duplicated and fused by ground automation and communicated in real-time to authorized recipients through secure, internet-based APIs. This will demonstrate how distributed connectivity networks can provide cost-effective, resilient, and secure surveillance solutions with global reach, facilitating private information sharing with authorized stakeholders (such as Air Navigation Service Providers, operators, and National Security Agencies) on a need-to-know basis.

The **Skydweller** solar-powered medium-altitude pseudo-satellite (HAPS), which operates up to FL500, will conduct **flight trials from the Canary Islands Stratoport in Fuerteventura** (in WP6). These trials will evaluate the performance of current and innovative communications and navigation systems (CNS) in a higher airspace environment. Over **one three-month period**, **a flight** (one or two) will be carried out, depending on project requirements and aircraft availability, **over the Canary Islands and oceanic sectors**, pending flight authorization. Skydweller will provide a 150 kg payload capacity and a 1 kW power budget, which will allow for the integration of a variety of CNS sensors and provide a wide range of testing possibilities. Payload integration and disintegration activities for CNS sensors should take about two months for each work package.

WP4.7 improve telemetry for airspace management of STO launches - preparation of rocket trial [DLR]

In preparation for the validation of the modified transponder functions for HA operation, the payload integration for the planned MAPHEUS sounding rocket launch must be prepared. The work includes the specification of the required interfaces, the adaptation of the flight hardware to the environmental parameters of the installation space in the rocket (payload accommodation) as well as the connection to the power supply, antennas and position data provision. Hardware qualification for the rocket flight must be carried out (e.g. shaker, vacuum tests if necessary, EMC). The integration of the flight hardware into the rocket takes place in direct preparation for the flight.

Milestones for WP4:

- **Flight authorisation for HTA HAPS secured (M12)** Formal authorisations / permits to fly HTA HAPS (Elson Space and Skydweller) have been obtained from all relevant national aviation authorities for the flight trials scheduled in the first reporting period.
- **Flight authorisation for LTA HAPS secured (M12)** Formal authorisations / permits to fly LTA HAPS (Sceye) have been obtained from all relevant national aviation authorities for the flight trials scheduled in the first reporting period.
- **First Phase of HAPS Flight Trials Executed & Data Analysed (M18)** At least one flight trial with a HAPS platform has been successfully completed, and the initial CNS data has been collected, processed, and documented in an initial Validation Report (VALR).

Work package number	**5**
Work package title	**CNS MEANS TO SERVE HAO – PART 2**

Objectives

This work package is a direct continuation of WP3 and directly incorporates the findings of WP4 and WP6 (which will be ongoing, in parallel to WP5). Its primary goal is to perform a detailed gap and risk analysis of the CNS framework, using the theoretical concepts from WP3 and the real-world flight data collected during the initial validation trials in WP4. The work in WP5 will serve as the foundation for the final consolidation of the CNS solution and will prepare the groundwork for the final validation trials in WP6.

WP5 will continue addressing and consolidating:

1. **CNS user needs assessment:** Refine the comprehensive set of CNS user needs identified in WP3 by validating them against the data collected during the in-flight trials.

2. **CNS technological solutions:** Conduct a detailed gap and risk analysis for communications, navigation, and surveillance, applying real-world data from flight trials to the theoretical assessments from WP3.

3. **Innovative modular network approach:** Validate and refine the layered, technology-agnostic architecture for CNS provision to ensure it can provide resilient and secure services, as proven by the flight trial data.

4. **Innovative modular network approach:** Validate and refine the layered, technology-agnostic architecture for CNS provision to ensure it can provide resilient and secure services, as proven by the flight trial data.

5. **Collaborative cyber security framework:** Consolidate and validate the zero-trust cybersecurity framework and develop a **Cybersecurity Verifier Tool** to enable HAPS operators to self-assess compliance and validate CNS data integrity. This tool will be built by creating a **HAPS Asset Classification Module**, implementing a **Threat Modelling and Risk Analysis Engine** to assess vulnerabilities and potential attack vectors against core security principles, and creating a **Standardised Cybersecurity Capability Report Generator** to produce a publicly accessible, evidence-based report.

6. **CNS as a service:** Validate and refine the CNS as a Service (CNSaaS) concept, exploring new business models and technical requirements for providing critical CNS functionalities as flexible, subscription-based services.

7. CRS as an enabler of scalable operations: Validate and refine the CRS as a critical component of scalable operations and part of CNSaaS.

8. **Standardisation and Regulation:** Perform a comprehensive gap analysis of regulatory frameworks and develop proposals for updating relevant standardisation and regulatory documentation based on the project's findings.

Deliverables: This section outlines the key SESAR deliverables that will be produced by WP5. These deliverables represent the tangible outputs of the detailed gap and risk analyses, which serve as crucial inputs for the final validation trials and the overall project's solution pack.

- **D5.1 Final SPR-INTEROP/OSED:** This deliverable provides the final, refined operational services and environment description, incorporating findings from all work packages and flight trials.
- **D5.2 Final TS/IRS:** This will define the final technical specifications and interface requirements for the proposed CNS solution, ready for pre-deployment validation.
- **D5.3 Final STAND:** This deliverable will present the final, consolidated proposals for standardisation, based on the project's technical findings.
- **D5.4 Final REG:** This will contain the final, consolidated proposals for regulatory amendments.
- **D5.5 CBA (Cost Benefit Analysis):** This document will present a structured economic analysis of the proposed CNS solution, assessing its potential benefits against high-level costs.
- **D5.6 Contextual Note:** This deliverable will provide a summary of the project's scope, operational and performance benefits, system impacts, and recommendations for future activities.

Description of Work

This section outlines the work to be performed within Work Package 5, which builds on the initial research and theoretical assessments from WP3. The work focuses on performing detailed gap and risk analyses using the data collected during the flight trials in WP4 and WP6 to ensure the proposed CNS capabilities meet the needs of Higher Airspace Operations (HAO).

WP5.1 CNS user needs assessment

This work package will continue to refine the comprehensive set of CNS user needs for Higher Airspace Operations (HAO), covering both civil and military use cases. It will take the initial needs identified in WP3 and validate them against the data collected during the in-flight trials in WP4 and WP6. The assessment will be based on surveys of HAO operators and service providers, with a specific focus on High-Altitude Platform Systems (HAPS), supersonic and hypersonic vehicles, and space launch and re-entry operators (LRO).

WP5.2 CNS technological solutions (theoretical)

This sub-work package will conduct a gap and risk analysis of the current and innovative CNS capabilities and their limitations at altitudes higher than FL500. Building on the theoretical assessments from WP3, this work will now apply real-world data from the WP4 and WP6 flight trials. The work will involve a systematic literature analysis and will also gather relevant results from research conducted by US organisations like NASA and the FAA. The analysis will cover a range of CNS technologies, including:

- **Communications:** A review of current aviation communications (e.g., VHF, HF, SATCOM) and innovative solutions like connected aircraft technologies.

- **Navigation** (positioning)**:** An examination of advanced PNT systems such as multi-frequency multi-constellation (MFMC) GNSS receivers, inertial systems, celestial navigation, and the potential use of 6G.

- **Surveillance:** A theoretical assessment of network remote ID, satellite-based ADS-B, ADS-C, SSR radars, modified ADS-B for HAO and the use of direct telemetry data from operators.

- Conflict Detection and Resolution: Review, improve and implement CRS technical specification for interface with CNS services

Particular attention will be paid to the use of geometric altimetry and the potential for a 6G CNS network, including an aerial layer of HAPS acting as relays.

WP5.3 Innovative modular network approach for CNS provision

This work package will focus on validating and refining the modular, technology-agnostic network approach for CNS provision to HAO. The goal is to ensure the layered architecture defined in WP3 can provide resilient and secure services by using a variety of redundant data links and a central operator-level fusion of multi-sensor data, as proven by the flight trial data. This includes validating the following layers:

- **Layer 1 (*Onboard*):** Multi-sensor Positioning, Navigation, and Timing (PNT) using diverse sensors.

- **Layer 2 (*Telemetry*):** Secure telemetry via redundant and dissimilar data links.

- **Layer 3 (*Operator*):** Real-time information available to the operator, with multi-sensor data fusion and uncertainty computation.

- **Layer 4 (*Sharing*):** Authenticated position and identity data shared with authorised parties via a secure web API.

It will also validate the cross-cutting security layer: a transversal zero-trust cybersecurity framework across the entire chain to ensure resilience and security.

WP5.4 Collaborative cyber security framework for CNS using Zero-Trust architecture

This sub-work package is dedicated to building a collaborative security framework to defend against cyber threats in the new aeronautical CNS environment. Building on the initial research from WP3, this work will now focus on the practical application of the framework.

From a long-term research and engineering perspective, the project will explore **automated Security Risk Assessment** to manage the complexity of HAO and increase the cost-efficiency of engineering secure systems.

The work will aim to define and validate a global security collaboration framework based on use cases across various CNS domains, considering the entire end-to-end chain. The main outcomes of this work will include:

- Performing a preliminary **Security Risk Assessment (SecRA)** of the HAO baseline, tailored to the "Initialise" level of the SESAR SecRAM methodology.

- Establishing a methodology for the SecRA of HAO and executing it to address the main security risk factors, in order to select the preliminary security controls and security requirements.

- Identifying methodological components and general recommendations for security aspects across HAO solutions, with a particular focus on extending the SecRAM and SecRAM catalogues to include HAO support and automating the assessment process.

- Researching solutions to mitigate radio frequency interference, with a focus on creating aircraft-installed active radio aerials capable of adapting to and mitigating the impact of jamming attacks.

- Building a Cybersecurity Verifier Tool, a digital artefact that will allow HAPS operators to independently validate CNS data integrity and self-assess compliance.

    - Develop a HAPS Asset Classification Module: This task involves creating the core software module that allows operators to define their systems according to the new framework developed in WP4. It will provide a guided interface for identifying and documenting intangible Primary Assets (e.g., communication relay services) and the tangible Supporting Assets (e.g., ground stations, platform hardware, data links) they rely on.

    - Implement a Threat Modelling and Risk Analysis Engine: This involves building the analytical engine of the verifier, which will facilitate a robust threat modelling process for each classified asset. The engine will assess vulnerabilities and potential attack vectors, evaluating risks against the core security principles of Confidentiality, Integrity, and Availability (CIA).
    - Create a Standardised Cybersecurity Capability Report Generator: This final task focuses on creating a publicly accessible, open verifier tool. It will process the asset classification and risk analysis data to generate a standardised, evidence-based cybersecurity capability report. The key objective is to provide a common benchmark that any operator in the HAPS community can use to transparently assess their security posture against the framework. This approach promotes a consistent industry standard for security declarations, helping to streamline regulatory compliance and build trust across the entire HAPS ecosystem.

- Investigating the use of the ICAO Trust Framework as a potential basis for authentication and security concepts.

The intended reporting sub-deliverables for WP5.4 are the final version of the Security Assessment Plan (SecAP) and the specification of the security requirements to be documented in the SPR-INTEROP/OSED and TS/IRS, based on the SecRA results (stored on the member's own systems), in compliance with the rules established in SESAR Project Handbook.

Note: This research element also covers the monitoring and mitigation of potential cybersecurity risks introduced by new entrants (e.g., HAO) and builds on ongoing work from the FCDI "Collaborative Cyber Security Framework for CNS" project.

WP5.5 CNS as a service

The work in this sub-work package will focus on validating and refining the CNS as a Service (CNSaaS) concept for Higher Airspace Operations (HAO). This approach aims to decouple the provision of critical CNS functionalities from physical infrastructure, allowing for flexible, subscription-based services delivered by independent organisations. The work will proceed as follows:

- **CNSaaS Concept Development:** We will validate the comprehensive CNSaaS concept, exploring new business models designed to enhance the resilience of existing CNS infrastructure by leveraging and interfacing with space-based assets.

- **Identification of Suitable Technologies:** The project will validate which CNS technologies and functions are suitable for a CNSaaS model using the data collected in the flight trials.

- **Business Model Assessment:** We will refine relevant business models for providing these services, ensuring they are cost-effective and align with the needs of HAO operators, Air Navigation Service Providers (ANSPs), and other aviation stakeholders. Support Cost-Benefit Analysis (CBA) by quantifying throughput, efficiency,

and safety improvements enabled by CRS.

- **Technological Demonstrations:** The project will outline possible technological demonstrations of several CNS components that can be tested in flight as part of the validation trials in WP4 and WP6. This will include investigating the potential use of a cryptographically verified vehicle identity.

- **Infrastructure Monitoring Services:** The scope also includes the research and development of CNS infrastructure monitoring services to ensure the ongoing performance and reliability of the CNSaaS solution.

WP5.6 Standardisation and Regulation

This sub-work package will perform a comprehensive gap analysis and develop proposals to update the pertinent standardisation and regulatory frameworks for CNS provision in the higher airspace. Building on the CNS user needs, technological assessments, and flight trial data from WP4 and WP6, the team will prepare recommendations for new standards and regulatory amendments. We will submit proposals to relevant working groups at EUROCAE and prepare guidance material for submission to bodies such as EASA and JARUS. Collaborative activities with national and international organisations (e.g., ICAO) will ensure that European developments are harmonised with global frameworks.

Milestones for WP5:

- **Gap & Risk Analysis Based on Flight Data Completed (M24)** A comprehensive report detailing the gap and risk analysis of the proposed CNS solutions, using the empirical data from the initial validation trials, is delivered.

- **Final Cost-Benefit Analysis (CBA) Model Finalised (M30)** The methodology and model for the CBA are complete, and preliminary results based on the consolidated technical solution are available.

- **Final Technical Specifications (TS/IRS) & OSED Delivered for TRL-6 (M34)** The final, pre-deployment versions of the technical specifications and operational concept, incorporating all project findings and ready for the Exit Maturity Gate, are submitted.

Work package number	**6**
Work package title	**VALIDATION TRIALS – PART 2**

Objectives

1. To continue with the execution of the flight trials with HAPS (started in WP4) and to perform the flight test with a sounding rocket.
2. To derive and consolidate the outcome of the assessment of CNS services for HAO as key elements of the final validation documents.

Description of work

WP6.1 Continue the execution of flight trials with HAPS (three HAPS cases: Elson Space, Sceye, Skydweller), including CNS data collection and assessment, data modelling as well as cyber security analysis and validation.

WP6.2 Execution - Test with sounding rocket – surveillance & tracking [DLR]

The prototype ADS-B transponder will be integrated as a payload on a MAPHEUS sounding rocket during a suborbital launch campaign in Kiruna to test real-world performance. Signal reception will be monitored and recorded using ground-based ADS-B receivers positioned along the predicted flight path, and—where feasible—space-based ADS-B platforms to assess extended coverage potential. The collected data will be compared against

performance from existing ADS-B transponders under equivalent conditions to quantify improvements in altitude coverage, track continuity, positional accuracy, and latency. Deploy refined CRS algorithms in second-phase HAPS/rocket trials and validate CRS within cooperative operating environment scenarios (multi-operator HAO + conventional traffic).

WP6.3 Results of the Validation, deriving conclusions on CNS for HAO for the validation report.

Milestones for WP6:

- **Second Phase of HAPS Flight Trials Completed (M24)** All planned flight trials with the four HAPS platforms are successfully executed, and the corresponding CNS data sets have been collected and prepared for final analysis.
- **Sounding Rocket Validation Trial Successfully Executed (M28)** The flight trial with the sounding rocket is completed, and the performance data for the modified ADS-B transponder has been successfully collected and logged.
- **Final Consolidated Validation Report (VALR) Delivered (M32)** The comprehensive final VALR is submitted, containing the consolidated findings, data analysis, and performance assessments from all HAPS and sounding rocket flight trials conducted throughout the project.

Link to work package	ID Solution	Solution Title	Solution Definition	Solution Lead Beneficiary	Initial Maturity Level	Forecast Target Maturity Level	Qualitative Performance Expectation (as per project Handbook)
All	#1	Solution 1: CNS means to serve HAO	A highly cost-effective, resilient and secure CNS solution for HAO, that will be proven in flight and will adapt certain UTM technologies to HAO.	ECTL SkyNav Sceye	TRL 2-6 (functional prototype and early validation in ECHO).	TRL 6	CNS service KPIs, e.g. positioning accuracy, com latency, integrity, service volume, service availability.

Table 3.1c: List of Deliverables

Number	Deliverable name	Short description	Work package number	Short name of lead participant	Type	Dissemination level	Delivery date (in months)
D1.1	Kick-off Meeting Report	Report from KoM	1	ECTL	R	PU	M1
D1.2	Project Management Plan (PMP)	Initial project and risk management plan	1	ECTL	R	PU	M3

D1.3	Data Management Plan (DMP)	DMP	1	ECTL	DMP	PU	M6
D1.4	Periodic Report - Reporting Period 1	Report by the end of the 1st reporting period (M1-M18)	1	ECTL	OTHER	PU	M18
D1.5	Updated Project Management Plan (PMP)	Updated project and risk management plan	1	ECTL	R	PU	M20
D1.6	Updated Data Management Plan (DMP)	Updated DMP	1	ECTL	DMP	PU	M22
D1.7	Final Data Management Plan (DMP)	Final DMP	1	ECTL	DMP	PU	M32
D1.8	Final Project Report	Final report	1	ECTL	OTHER	PU	M36
D2.1	Communication, Dissemination and Exploitation (CDE) Plan	Detailed plan for CDE	2	ECTL	R	PU	M3
D2.2	Project Website and Online presence	External (open access) website	2	ECTL	DEC	PU	M3
D2.3	Updated CDE Plan	Updated plan for CDE	2	ECTL	R	PU	M20
D2.4	Mid-project Stakeholder Workshop Report	The report from the mid project dissemination event.	2	ECTL	R	PU	M18
D2.5	End-project Stakeholder Workshop Report	The report from the dissemination event by end of the project.	2	ECTL	R	PU	M36
D3.1	Initial SPR-INTEROP/OSED	Initial safety & performance/interoperability reqs.	3	SkyNav	R	PU	M12
D3.2	Initial TS/IRS	Initial technical specifications/interface requirements	3	SkyNav	R	PU	M12
D3.3	Intermediate SPR-INTEROP/OSED	Intermediate SPR-INTEROP/OSED	3	SkyNav	R	PU	M18
D3.4	Intermediate TS/IRS	Intermediate TS/IRS	3	SkyNav	R	PU	M18
D3.5	Initial STAND	Initial input to standardisation activities.	3	SkyNav	R	PU	M18
D3.6	Initial REG	Initial regulatory elements on HAO	3	SkyNav	R	PU	M18
D4.1	Initial VALP	Initial validation plan	4	Sceye	R	PU	M12
D4.2	Initial VALR	Initial validation report	4	Sceye	R	PU	M18
D4.3	Intermediate VALP	Intermediate validation plan	4	Sceye	R	PU	M18
D4.4	Initial CyberVerifier	Initial tool	4	Sceye	R	PU	M18

D5.1	Final SPR-INTEROP/OSED	Final SPR-INTEROP/OSED	5	SkyNav	R	PU	M34
D5.2	Final TS/IRS	Final technical specifications/interface requirements	5	SkyNav	R	PU	M34
D5.3	Final STAND	Final input to stand. activities.	5	SkyNav	R	PU	M34
D5.4	Final REG	Final regulatory elements on HAO	5	SkyNav	R	PU	M34
D5.5	CBA	Cost benefit analysis	5	SkyNav	R	PU	M34
D5.6	Contextual Note	Scope and main elements of the solution.	5	SkyNav	R	PU	M36
D6.1	Intermediate VALR	Intermediate validation report	6	Sceye	R	PU	M24
D6.2	Final VALP	Final validation plan	6	Sceye	R	PU	M28
D6.3	Final VALR	Final validation report	6	Sceye	R	PU	M32
D6.4	Final CyberVerifier	Final tool	6	Sceye	R	PU	M28

Table 3.1d: List of milestones

Milestone number	Milestone name	Related work package(s)	Due date (in month)	Means of verification
1	Kick-off Meeting (T0+1 month)	WP1	M1	Minutes are distributed.
2	PMP submission (T0+3 month)	WP1	M3	Check PMP is available and submitted.
3	Full Project Web Presence Established	WP2	M6	Public project website launched; Communication, Dissemination, and Exploitation (CDE) Plan finalised.
4	CNS User Needs Assessment Completed	WP3	M6	Comprehensive report on CNS requirements from HAPS, supersonic, and space launch operators delivered.
5	Technical Project Review (T0+9-10 months)	WP1	M10	Review meeting takes place, minutes distributed, actions are identified and addressed.
6	First Stakeholder Engagement Workshop	WP2	M12	Workshop with key stakeholders to present initial findings on CNS user needs and gather feedback.
7	Initial Technical Specifications (TS/IRS) and OSED Delivered	WP3	M12	First complete draft of the operational concept and technical specifications for the modular CNS architecture submitted for review.
8	Flight Authorisations for HTA HAPS Secured	WP4	M12	Formal authorisations and permits to fly for Heavier Than Air HAPS vehicles (Elson Space and Skydweller) obtained from relevant aviation authorities.
9	Flight Authorisations for LTA HAPS Secured	WP4	M12	Formal authorisations and permits to fly for Lighter Than Air HAPS vehicles (Sceye) obtained from relevant aviation authorities.

10	End of First Reporting Period (T0+18 months)	WP1	M18	Meeting by coordinator and WP leaders, checking that work is progressing as planned, deliverables issued, and any deviation is properly addressed.
11	Mid-Project Dissemination Event Completed	WP2	M18	Public webinar or event to share results from the first reporting period.
12	Final Gap Analysis for Standardisation & Regulation Delivered	WP3	M18	Initial analysis identifying gaps in current standards and regulations finalised and delivered.
13	First Phase of HAPS Flight Trials Executed & Data Analysed	WP4	M18	At least one HAPS flight trial successfully completed, and initial CNS data documented in an initial Validation Report (VALR).
14	Horizon Europe Project Review (T0+20-21 months)	WP1	M21	Review takes place, minutes and actions taken.
15	First Draft of Standardisation Contributions	WP2	M24	Initial proposals based on project findings drafted and shared with relevant EUROCAE working groups.
16	Gap & Risk Analysis Based on Flight Data Completed	WP5	M24	Comprehensive report detailing the gap and risk analysis of the proposed CNS solutions delivered.
17	Second Phase of HAPS Flight Trials Completed	WP6	M24	All planned HAPS flight trials successfully executed, and data sets collected.
18	Sounding Rocket Validation Trial Successfully Executed	WP6	M28	Sounding rocket flight trial completed and performance data for the modified ADS-B transponder collected.
19	Final Exploitation Plan Defined	WP2	M30	The plan for the commercial and operational exploitation of the project's results is finalised.
20	Final Cost-Benefit Analysis (CBA) Model Finalised	WP5	M30	The methodology and model for the CBA are complete, and preliminary results are available.
21	Final Solution Technical Deliverables (Tend–4 months)	WP1	M32	Deliverables are issued.
22	Final Consolidated Validation Report (VALR) Delivered	WP6	M32	The comprehensive final VALR, containing findings from all flight trials, is submitted.
23	Exit Maturity Gate(s) (Tend–2 months)	WP1	M34	Solution conforms to TRL6.
24	Final Non-Technical Deliverables (Tend–2 months)	WP1	M34	Non-technical deliverables are issued.
25	Final Technical Specifications (TS/IRS) & OSED Delivered for TRL-6	WP5	M34	The final, pre-deployment versions of the technical specifications and operational concept are submitted.
26	Grant Agreement Closure (Tend)	WP1	M36	All deliverables are issued on time, the solution on “CNS for HAO” meets its objectives with the required maturity.

Table 3.1e: Critical risks for implementation #@RSK-MGT-RM@#

Description of risk (indicate level of (i) likelihood, and (ii) severity: Low/Medium/High)	Work package(s) involved	Proposed risk-mitigation measures
The guidance material on the "regulatory sandbox" under development by EASA is not available when needed due to external factors, lack of resources or any other reason, impacting simulation and validation schedules. (Low / High)	WP4, WP6	1. Support EASA and Member States in the review process of the draft guidance material before publication, to ensure it is available when needed, reflecting a proportionate and consensus-based set of measures to allow early flight trails with HAPS, while guaranteeing safety to uninvolved parties in the air and on the ground. 2. Support EU Member States involved in the authorisation process of the flights e.g. to cross their airspace, as required depending on the intended mission trajectory. 3. Alternative validation sites: As part of contingency planning, maintain a list of alternative validation sites/airspace (within and outside of the EU airspace) that could be used if the primary choice becomes unavailable.
Delay in obtaining flight authorisation for HTA HAPS above FL500 due to lack of regulatory frame tailored to HTA HAPS flying at high altitude, currently based on UAS's SORA which is appropriate for flights at low level. (Medium / High)	WP4, WP6	1. Early & continuous engagement: initiate formal contact with EASA and relevant National Aviation Authorities within the first 3 months (M1-M3). [already established] 2. Contingency Planning: Identify alternative testing locations/airspace in parallel, e.g. flight over the sea. 3. Leverage consortium expertise: utilise EUROCONTROL's regulatory relationships and the experience of partners in securing flight permits.
Technical failure of key CNS payload or HAPS/rocket platform during a critical flight trial, resulting in data loss. (Low / Medium)	WP4, WP6	1. Extensive ground testing: mandate comprehensive ground integration tests for all payloads before flight. 2. Redundancy: where feasible, fly redundant sensors to ensure data collection continues if a primary unit fails. 3. Contingency flights: budget for a limited number of repeat flights within the project plan and schedule.
Adverse weather conditions prevent or significantly delay multiple flight trials, for the HTA and LTA HAPS platform. (Low / Medium)	WP4, WP6	1. Flexible scheduling: plan flight campaigns within wider operational windows rather than fixed dates. 2. use tools for accurate meteo (e.g. wind, gust) forecast. 3. Leverage multiple test sites: utilise the geographic diversity of the consortium's test locations (e.g. Teruel, Fuerteventura, etc.) to select favourable conditions.
Significant discrepancy between theoretical CNS performance (from WP3/5) and real-world flight data (from WP4/6). (Low / Medium)	WP3, WP4, WP5, WP6	1. Iterative feedback loop: establish a formal bi-monthly review between the technical study (WP3/5) and validation (WP4/6) teams. 2. Flexible test plan: design the validation plan with the flexibility to add specific test points or scenarios based on initial findings.
Key external dependencies (5G network coverage at altitude, Satcom payload and service) are not mature enough for validation. (Low / Medium)	WP3, WP4	1. Technology monitoring: assign a partner to actively monitor the status of key enabling technologies. 2. Alternative scenarios: develop validation scenarios that can proceed using simulated signals or alternative technologies (e.g., different SATCOM providers) if the

		primary choice is unavailable.
Insufficient quality or availability of data from flight trials to properly validate the technical solutions and KPIs. (Low / High)	WP4, WP5, WP6	1. Robust data acquisition plan: define a detailed data acquisition plan with primary and backup data logging systems for all flights. 2. Pre-Flight testing: use simulation tools and ground tests to define the precise data quality and quantity required before flights commence, ensuring the collection plan is adequate. 3. Data quality checks: implement real-time and/or rapid post-flight data quality check to identify any issues immediately, allowing for quick adjustments to subsequent flights.
Difficulties in coordinating the diverse consortium, leading to delays in sharing information and completing interdependent tasks between work packages. (Low / Medium)	All WPs	1. Establish a clear communication plan: implement a detailed communication plan with defined regular meetings, clear points of contact for each partner, and a centralised document repository. 2. Use of collaboration tools: utilise a shared project management and collaboration platform to track progress, dependencies, and actions in real-time.
Recruitment and retention of specialised personnel prove more difficult than anticipated, impacting the person-month allocation and project timeline. (Low / Medium)	All WPs	1. Contingency staffing: have contingency plans with partners to temporarily re-allocate staff if a critical role becomes vacant. 2. Cross-training: identify opportunities for cross-training personnel between partners to build resilience and cover potential gaps. 3. Proactive recruitment: if needed, begin recruitment activities for key project roles before the official project start.
Underestimation of the effort required for dissemination and stakeholder engagement, leading to a lower impact of the project's results. (Low / Low)	WP2	1. Detailed dissemination plan: create a highly detailed dissemination plan with specific targets, timelines, and responsible partners for each activity. 2. Dedicated resources: ensure that the partners leading dissemination activities have sufficient person-months allocated specifically for these tasks.

#§RSK-MGT-RM§#

Table 3.1f: Summary of staff effort

	WP1	WP2	WP3	WP4	WP5	WP6	Total Person-Months per Participant
1/ECTL	20.00	10.00	21.00	13.00	21.00	13.00	**98.00**
2/DFS			4.22	1.26	2.44	1.43	**9.35**
3/LFV			5.62	5.22	5.62	5.22	**21.68**
4/ESSP		0.25	5.50		5.25	1.00	**12.00**
5/NATS			1.00	1.00	1.20	1.00	**4.20**
6/DSNA		1.00	3.50	3.50	3.50	3.50	**15.00**
7/SkyNav	8.50	8.50	19.50	4.50	22.50	8.00	**71.50**
8/ENAC	1.00	3.00	4.00	3.00	4.00	3.00	**18.00**
9/LiU			3.00	3.00	1.00	4.00	**11.00**
10/CIRA		2.00	10.00	4.50	8.50	4.00	**29.00**
11/SCEYE			2.00	74.00	2.00	68.00	**146.00**
12/SKYDWELLER			3.60	26.00	3.60	26.00	**59.20**
13/SKYDWELLER							
14/PTFSA	0.50			10.00		12.00	**22.50**
15/ELSON SPACE				36.00		52.00	**88.00**
16/DLR			4.00	24.00	10.00	23.00	**61.00**
17/PILDOLABS				18.00	4.00	18.00	**40.00**
18/ENAIRE	1.50	1.50	4.60	2.30	6.10	5.80	**21.80**
19/OpenUTM		1.00		8.50		7.00	**16.50**
20/ANRA			7.00	14.00	6.00	14.00	**41.00**
21/SKYPUZZLER		0.40	15.00	12.50	11.00	11.50	**50.40**
22/HAPS Alliance							
Total Person Months	**31.50**	**27.65**	**113.54**	**264.28**	**117.71**	**281.45**	**836.13**

Should this tender be successful, EUROCONTROL, as part of the consortium, will participate in the project actions without requesting funding. EUROCONTROL will, however, fully engage in the project and in particular is committed to providing the effort, contributions to deliverables and to other activities as set out in this tender and in the accompanying administrative forms.

Table 3.1g: 'Subcontracting costs' items

11/SCEYE		
	Cost (€)	**Description of tasks and justification**
Subcontracting	550 000	External software and cybersecurity support. External safety modelling, regulatory and legal support.
16/DLR		
	Cost (€)	**Description of tasks and justification**
Subcontracting	100 000	DLR will subcontract to Skysquitter company to develop hard- and software for a prototype transponder to be delivered and installed on a rocket for the Validation Trials on ADS-B tracking. WP4: 1 item with cost 50 000 EUR; WP6: 1 item with cost 50 000 EUR

18/ENAIRE		
	Cost (€)	**Description of tasks and justification**
Subcontracting	209 250	Some of the tasks committed by ENAIRE along WP3/4/5/6 will be performed by subcontracted personnel from OBIZCO, which will support ENAIRE providing their expertise in ATM R&D and CNS technologies.

Table 3.1h: 'Purchase costs' items (travel and subsistence, equipment and other goods, works and services)

11/SCEYE		
	Cost (€)	**Justification**
Travel and subsistence		
Equipment	2 175 000	Estimated cost of single-use HAPS hardware, hull fabric and associated avionics, and auxiliary equipment plus the rental of hangar facilities and associated tooling, machinery, helium supply, etc. for the duration of the program.
Other goods, works and services		
Remaining purchase costs (<15% of pers. Costs)		
Total	2 175 000	

12/SKYDWELLER CANARIAS SL		
	Cost (€)	**Justification**
Travel and subsistence		
Equipment	700 000	Depreciation cost for the use of the Skydweller HAPS during WP6.
Other goods, works and services	400 000	The global insurance (aircraft, staff, operations) is 30000 euros by month and the satellite communication plan needed to implement the aircraft costs is 35 000 euros by month. Total is therefore 325000 euros for 5 months of operations. Additionally, the hangar rental at the Stratoport of Fuerteventura has a cost of 15000 euros by month. Total is therefore 75000 euros for 5 months of operations.
Remaining purchase costs (<15% of pers. Costs)		
Total	1.100.000	

14/PTFSA		
	Cost (€)	**Justification**
Travel and subsistence	24.000	Traveling expenses for participation in progress meetings and meetings regarding WP4 and WP6
Equipment		
Other goods, works and services	30.000	Expenses dedicated to arrangement of seminars and meetings within WP4 and WP6
Remaining purchase costs (<15% of pers. Costs)		
Total	54.000	

15/Elson Space		
	Cost (€)	**Justification**
Travel and subsistence	€ 125,349.00	Covers flights, hotels, and per diem for the entire deployed team for the duration of each of the three trials. 3 Trials of 2 weeks x 16 Persons.
Equipment	€ 96,693.00	Accounts for performance degradation of the solar arrays.
	€ 90,000.00	Recurring cost reflecting the very limited life of the battery sets (2 flights per €60,000 set), a key operational constraint
	€ 96,693.00	Accounts for the degradation of the solar arrays due to exposure to stratospheric environment during long-duration flights.
	€ 45,000.00	Site Equipment Rental & Logistics & Recovery Equipment
	€ 29,340.00	Cost of replacing life-limited propellers
	€ 20,700.00	Procurement of weather balloons and sensors to gather precise local atmospheric data.
Other goods, works and services	€ 105,000.00	Integration Materials (Cabling, integration housing, customized housing materials and fabrication)
	€ 90,000.00	UAS System Insurance, Cost of specialized insurance policy for the HAPS asset during each two-week operational period.
	€ 42,600.00	Service fees for SATCOM and other data links
Remaining purchase costs (<15% of pers. Costs)		
Total	€ 644,682.00	

16/DLR		
	Cost (€)	**Justification**
Travel and subsistence	19 000	19 x travel à € 1 000 to meetings and with a team to integrate the transponder on the rocket and to the launch campaign in Scandinavia
Equipment		
Other goods, works and services	100 000	Consumables for the integration of the prototype transponder into the MAPEUS rocket: Aviation and Space-Ops certified wires, hardware adapters, electronic interfaces, aviation RF and GNSS antennas.
Remaining purchase costs(<15%ofpers. Costs)		
Total	119 000	

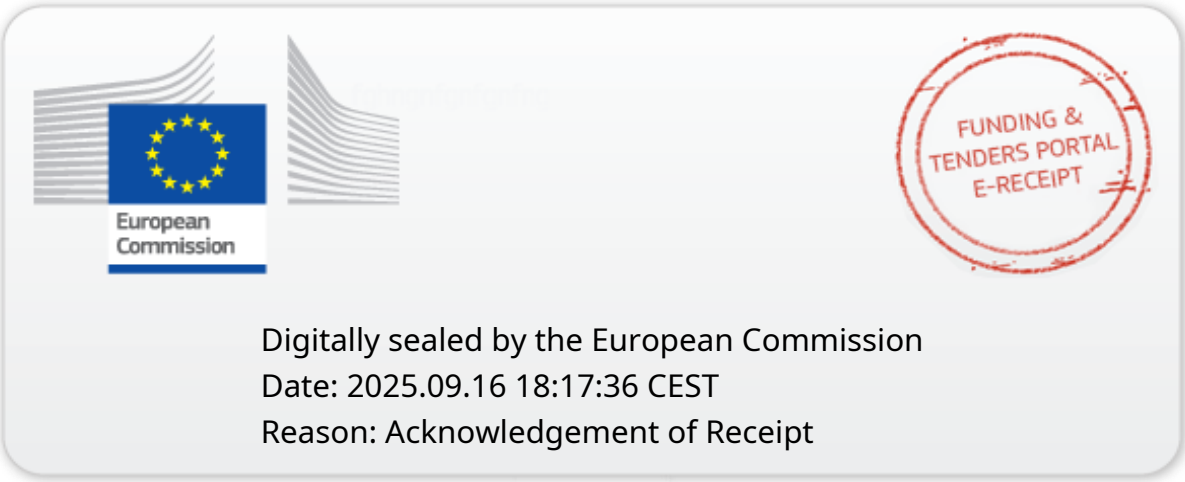
Table 3.1i: 'Other costs categories' items (e.g. internally invoiced goods and services)

Not applicable.

Table 3.1j: 'In-kind contributions' provided by third parties

Not applicable.

#§QUA-LIT-QL§# #§WRK-PLA-WP§#



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