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ALBATROSS

THE MOST ENERGY EFFICIENT FLYING BIRD

This Communication, Dissemination and Exploitation plan is part of project that has received funding from the SESAR Joint Undertaking (JU) under grant agreement No 101017678 under European Union's Horizon 2020 research and innovation programme.



Abstract

ALBATROSS aims at reducing the overall CO₂ footprint of aviation by bringing together multiple disciplines and partners of the aviation branch to demonstrate the potential of fuel consumption reduction already today. To do so several solutions are combined to work together in complete gate-to-gate scenarios that will be demonstrated across Europe.

This document contains the Final Dissemination and Communication Plan of the ALBATROSS project assisting the partners in carrying out the right types of dissemination activities, at the right time and towards the right target groups. It describes the project's communication and dissemination strategy, criteria for determining its success, and presents a tentative planning of corresponding activities. High-level messages and keywords provide SJU Communications with material for their communication activities at programme level.

This present report is the final version of the Dissemination and Communication Plan. The Final Report on Dissemination and Communication Activities will be delivered at the project end.



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1 Introduction

1.1 Definitions

Communication	Dissemination	Exploitation	
<p>"Communication on projects is a strategically planned process that starts at the outset of the action and continues throughout its entire lifetime, aimed at promoting the action and its results. It requires strategic and targeted measures for communicating about (i) the action and (ii) its results to a multitude of audiences, including the media and the public and possibly engaging in a two-way exchange."</p> <p>(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)</p>	<p>"The public disclosure of the results by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium."</p> <p>(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)</p>	<p>"The utilisation of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardisation activities."</p> <p>(Source: EC Research & Innovation Participant Portal Glossary/Reference Terms)</p>	 <p>Definition</p>
<p>Reach out to society and show the impact and benefits of EU-funded R&I activities, e.g. by addressing and providing possible solutions to fundamental societal challenges.</p>	<p>Transfer knowledge & results with the aim to enable others to use and take up results, thus maximising the impact of EU-funded research.</p>	<p>Effectively use project results through scientific, economic, political or societal exploitation routes aiming to turn R&I actions into concrete value and impact for society.</p>	 <p>Objective</p>
<p>Inform about and promote the project AND its results/success.</p>	<p>Describe and ensure results available for others to USE → focus on results only!</p>	<p>Make concrete use of research results (not restricted to commercial use.)</p>	 <p>Focus</p>
<p>Multiple audiences beyond the project's own community incl. media and the broad public.</p>	<p>Audiences that may take an interest in the potential USE of the results (e.g. scientific community, industrial partner, policymakers).</p>	<p>People/organisations including project partners themselves that make concrete use of the project results, as well as user groups outside the project.</p>	 <p>Target Audience</p>
<ul style="list-style-type: none"> • Rules for Participants • RIA & IA Proposal Template 2.2 b) • Grant Agreement Art. 38.1 	<ul style="list-style-type: none"> • Rules for Participants • RIA & IA Proposal template 2.2 a) • Grant Agreement Art. 29 	<ul style="list-style-type: none"> • Rules for Participants • RIA & IA Proposal Template 1.1, 2.1, 2.2 a) • Grant Agreement Art. 28 	 <p>Formal Obligations</p>

Figure 1: Definitions of Communication, Dissemination and Exploitation in H2020 [1]



1.2 Applicable Reference Material

- [1] Making the Most of Your H2020 Project - Boosting the impact of your project through effective communication, dissemination and exploitation, The European IPR Helpdesk, available at: <https://www.iprhelpdesk.eu/sites/default/files/EU-IPR-Brochure-Boosting-Impact-C-D-E.pdf>
- [2] Project Handbook of SESAR, Edition 02.02.00, June 2020.
- [3] Grant Agreement number: 101017678, 2020.
- [4] SJU, SESAR Communication and Dissemination, Kick-Off Meeting, mm 2020.
- [5] H2020 Programme. Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020, Version 3.2, 21 March 2017.
- [6] Project PMP D3.1
- [7] SJU slides used for the KoM (please add ref. and link to STELLAR)

1.3 List of Acronyms

Acronym	Meaning
ACI	Airports Council International
AEC	Aerospace Europe Conference
AIAA	American Institute for Aeronautics and Astronautics
ANSP	Air Navigation Service Provider
AG	Aktiengesellschaft (Public Limited Company)
ATM	Air Traffic Management
CEAS	Council of the European Aerospace Societies
CMS	Content Management System
CO	Confidential
COVID-19	Coronavirus Disease 2019
D<no.>	Deliverable <no.>
DLRK	Deutscher Luft- und Raumfahrtkongress (German Aerospace Congress)
EASA	European Union Aviation Safety Agency
EBAA	European Business Aviation Association
EC	European Commission
EU	European Union
EUR	European [Region]



Acronym	Meaning
EUROCAE	European Organisation for Civil Aviation Equipment
FAA	[U.S.] Federal Aviation Administration
GDPR	General Data Protection Regulation
H2020	Horizon 2020
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICAS	International Council of Aeronautical Sciences
ICRAT	International Conference for Research in Air Transportation
IPR	Intellectual Property Rights
M<no.>	[project] Month <no.>
MDPI	Multidisciplinary Digital Publishing Institute [open access publisher]
MET	Meteorology, meteorological
MIT	Massachusetts Institute of Technology
MS	Milestone
PBN	Performance-Based Navigation
Q<no.>	Quarter <no.>
RAD	Route Availability Document
SEPHER	Project to product and to store green energy for on ground CNS facilities
SES	Single European Sky
SESAR	Single European Sky ATM Research
SID	SESAR Innovation Days
SJU	SESAR Joint Undertaking
TBD	to be determined
TMA	Terminal Manoeuvring Area
TRL	Technology Readiness Level
WP	Work Package

Table 1: List of Acronyms



2 Project Introduction

2.1 Project “about” text

ALBATROSS aims at reducing CO₂ emission along the whole gate-to-gate movement of the aircraft by applying several solutions such as new technical systems, new infrastructure, procedures and communication methods. To achieve the necessary high level of collaboration, multiple stakeholders have to be directly and actively involved in the live trials of this very large demonstration (VLD). The mentioned groups of stakeholders are amongst others pilots, ground crew operators, controllers, network manager, airlines, OEM’s and scientific staff.

Many solutions will be put into practice in parallel to demonstrate the potential for minimising the environmental impact of aviation. Selected examples include the following: New precision approach procedures (RNP-to-ILS, RNP-AR, etc) will be implemented. Continuous Climb and Descent will be facilitated. Several novel data analytics-based tools will be introduced to assist pilots to identify tactical in-flight trajectory optimisation opportunities to improve fuel efficiency. Possibilities to relax and mitigate certain ATM constraints through airspace design by collaborative procedures and a certain degree of flexibility in the constraints will be tested. Ground CNS facilities powered by green energy (project SEPHER) will be operated. Improvements to taxiing operations will be investigated, in the form of single-engine taxiing and the usage of a sustainable hybrid towing vehicle for taxi assistance in order to reduce emissions.

The project will examine how a resulting adapted concept of operation could be permanently integrated into network operations.

2.2 Project key messages

The intentions of ALBATROSS can be summarised as follows:

- 1) ALBATROSS aims to identify currently valid figures of fuel consumption on selected city pair routes to create a data basis on the actual situation of aviation’s fuel demand
- 2) ALBATROSS will inventory ways to combine several solutions to reduce fuel consumption by organising multiple actors – each one acting as a specialist in his or her area – to converge many contributions in terms of fuel saving to get realistic and measurable results on how effective all actions can be if bundled once.
- 3) ALBATROSS will define key performance indicators to make the observed changes in fuel measurable
- 4) ALBATROSS will identify the impact of single actions on fuel consumption in the context of realistic gate-to-gate scenarios (in a holistic view)



2.3 Keywords

The following keywords apply to the project and suitable subset of them can be used in communication metadata (including hashtags):

flight efficiency, energy management, sustainable aviation fuel, environment, environmental impact, city pair, gate to gate, dynamic RAD, advance FUA, sustainable taxi, single engine taxi, LNAS, PBN to ILS

2.4 Focal point for communications, dissemination and exploitation

All dissemination, exploitation and communication activities of the project are bundled in a dedicated WP 5, in which all partners of the consortium engage. This Work Package is led by DLR. The communication manager as a focal point for all communication and dissemination belongings is Falk SACHS, the WP 5 leader is Fethi ABDELMOULA, who strongly contributed in the Grant Negotiation Phase.

Name	Role	Email address
Falk Sachs	Communication Officer	Falk.sachs@dlr.de
Fethi Abdelmoula	Work package Lead	Fethi.Abdelmoula@dlr.de

Table 2: Focal Points of contact



3 Communication

3.1 Communications objectives and strategy

Communication towards all aviation stakeholders, with particular attention to European citizens, are an essential activity in ALBATROSS. Dissemination activities within the aviation community aim to secure that ALBATROSS’s results reach all interested stakeholders and target organisations, fostering their interest into the project and allowing their recommendations to be considered during the project.

Communication and dissemination ensure the involvement of operational stakeholders through workshops, Advisory Board participation and other communication and dissemination actions to gather their inputs to the ALBATROSS work plan and to propose (post-project) measures to advance the TRL of the developed solution and the identification of the necessary technological and regulatory enablers.

Key stakeholders will be identified according to their interest and influence. For each group of stakeholders, specific means of communication will be developed, e.g. participation in the Advisory Board (group of external experts), participation in the stakeholder consultation workshops.

3.2 Target audiences

Target	How can they benefit from the project	Objectives and expected feedback
General Public	Get information on activities. Reduce environmental input for everyone.	Public awareness. Especially in groups dealing with pollution or noise issues.
Interested Public	Find out more aviation related implications touched by Albatross.	Spread information in own communities. (Students, online networks,...)
Airline Costumers	Increase consciousness.	Conscious choice of airlines.
World wide auditory	Get to know more about European initiatives.	Start similar activities.

Table 3: Communications target audiences





3.3 Communication channels

Channel	Link	Information to be shared
Project Website	https://www.sesar-albatross.eu	<ul style="list-style-type: none"> • Project deliverables • Project news • Communication tools, e.g. brochures, flyers, videos. • Etc.
SESAR Twitter account	SESAR 3 JU EU (@SESAR JU) / Twitter	<ul style="list-style-type: none"> • Photographs taken at project meetings • Brochures/flyers • Etc.
DLR Twitter account	Deutsches Zentrum für Luft- und Raumfahrt e.V.: Ihr Unternehmen LinkedIn	<ul style="list-style-type: none"> • Retweet
Airbus Twitter account	Airbus (@Airbus) / Twitter	<ul style="list-style-type: none"> • Retweet
Eurocontrol Twitter account	EUROCONTROL (@eurocontrol) / Twitter	<ul style="list-style-type: none"> • Retweet
SESAR JU LinkedIn Account	SESAR 3 Joint Undertaking: Übersicht LinkedIn	<ul style="list-style-type: none"> • Posts on ALBATROSS • Posts on Events • Posts on videos produced
Linked In Accounts of PJ Member (M. Nurisso, M. Gerber, J. Scheiderer, and many other)	multiple	<ul style="list-style-type: none"> • Several retweets, likes and posts highlighting project related posts
AIRBUS online Articles	www.airbus.com/newsroom	<ul style="list-style-type: none"> • 4 articles • 1 Press release
		<ul style="list-style-type: none"> •
SESAR JU Website	https://www.sesarju.eu/news	<ul style="list-style-type: none"> •
AIRBUS summit on sustainability and aviation' s decarbonisation	Sept 2021	<ul style="list-style-type: none"> • Summit



World ATM Congress Madrid	SESAR walking tours and theatre presentations	<ul style="list-style-type: none"> • 26.-28.10.2021
World ATM Congress Madrid	SESAR walking tours and theatre presentations	<ul style="list-style-type: none"> • 21. -23.06.2022
Connecting Europe Days (CED) Lyon	ALBATROSS Presence together with SJU	<ul style="list-style-type: none"> • 28.06.2022
conference presentation ICAS Stockholm	Title: The ALBATROSS Project – A European Initiative to Reduce Aviation’s Carbon Dioxide Emissions in Large Scale	<ul style="list-style-type: none"> • 04-09. Sept. 2022
		<ul style="list-style-type: none"> •
etc		

Table 4: Communication channels



3.4 Project logo

3.4.1 Project logo



3.4.2 Project Banner





3.5 Communication key performance indicators (KPIs) and success criteria

Actions	KPIs and targets
Website https://www.sesar-albatross.eu	200 visits of the Website per year 20 posts on the news page over the whole project live time
Press and media	# 4 e-news and press releases per year
Social media	# 10 post / reposts on social media platforms per year

Table 5: Communication KPIs and success criteria



4 Dissemination

4.1 Dissemination objectives and strategy

ALBATROSS will pay special attention to the effective dissemination of the most relevant outcomes and reports to the public. ALBATROSS will focus in particular on strengthening the confidence of supervisory authorities, operational staff and management by providing additional environmental performance evidence from the analysis based on the performance assessment approach. To this end, efficient links to relevant European and international research and innovation activities comprising SESAR projects and solutions relevant for ALBATROSS will be maintained by regular teleconferences / direct involvement via participation in external experts' Advisory board and stakeholder consultation workshops.

The project has the following communication and dissemination goals:

- Showcase results to the ATM industry stakeholders through open day type activities, and through professional fora like the World ATM Congress or SESAR Innovation Days.
- Inform publicly about ALBATROSS's developments, their applicability and potential benefits for operations and the environment, targeting both experts in the field and the general public, at European and international level.
- Facilitate the transfer of the results into Industrial application to further use the developed approaches. The possible regulatory changes necessary for exploitation of the approach cannot be assessed in advance but it is part of the project, namely WP 5, to identify them and to draft a roadmap that will be included in the final version of this plan.

An important means, which ensures not only feedback from the interest groups but also their interaction with each other, is the conduction of stakeholder consultation workshops. Two of these will be organised:

- The first stakeholder consultation workshop, scheduled for October/November 2021, will present the methodology, concept and approach to be used in this project. Feedback of the stakeholders on these items will be complemented with ideas on how to incentivise the further development and eventual implementation of the concept identified to minimise the environmental impact during complete gate-to-gate scenarios. The feedback gathered from stakeholders will be used to finalise the approach, the dissemination plan, the incentives options and the methodology.
- The second stakeholder workshop will take place in October 2022 and present the project results and the impact analysis of environmental benefits as well as potential impact to other performance scheme indicators. The incentives options retained from the first stakeholder workshop and their estimated impact will be reviewed and discussed. It will be elaborated how the implementation decisions could be accelerated, how incentives and other potential measures could support that acceleration. The status of standardisation and regulation activities and possible additional elements identified by the project requiring further work with standardisation and regulation bodies will be explained. The stakeholder feedback obtained



about the results, the preferred incentives options and their estimated impact, the possible ways to accelerate implementations will be reported in the final project deliverable.

Further activities can be driven and organised by the different project partner. They significantly contribute to the dissemination activities. A past event was an airbus summit on sustainable aviation taking place end of September 2021. This event was a great opportunity to lead a green commercial AFR flight from CDG to Toulouse for which environmental gains will be calculated and analysed in details. Albatross was presented as one of the major activities to take further steps to bring Airbus zero-emission ambition into life.

4.2 Target audiences

Target	How can they benefit from the project	Objectives and expected feedback
European Decision Makers	Information about what is possible with state-of-the-art technology	Enabling Procedures and Principles for further daily use
Aviation OEM's	What needs can be derived for Aviation industry	New developments.
ANSP's	What procedures turn out to be environmentally friendly and easy to apply.	Adaption of standard procedures.
Airlines	Where to save emissions and fuel.	Adaption of standard procedures.
Pilots	Where to save emissions and fuel.	Increase Awareness.

Table 6: dissemination target audiences

4.3 Dissemination channels

Channel	Link	Information to be shared
DLR FLugBlatt	No web presence	1 article
DLR Twitter account	Deutsches Zentrum für Luft- und Raumfahrt e.V.: Ihr Unternehmen LinkedIn	Retweet
Partners Social Media accounts	As mentioned above	As mentioned above

Table 7: Dissemination channels (general)

Scientific papers/presentations	Title	Date
Conference presentation Euro GNC Berlin	Paper “Engine Thrust Model Determination from Large Operational Flight Data Base”	3rd-5 th May 2021
conference presentation ICAS Stockholm	Title: The ALBATROSS Project – A European Initiative to Reduce Aviation’s Carbon Dioxide Emissions in Large Scale	04-09. Sept. 2022
Akademischer Aviatik Zürich, ETH Zürich	Increasing the efficiency of airline flight operations with next-generation cockpit functions	26. Oct 2021
Towards Sustainable Aviation Summit Toulouse	Collaborative european wide efforts for more sustainable aviation in the very large scale demonstration project ALBATROSS	18-20 Oct 2022

Table 8: Scientific papers, publications and presentations



Event	Location	Date
Workshop on dynamic RAD	Workshop with externals from AIRBUS, DSNA, EC and Air France	Jul 1st ,2021
AIRBUS summit on sustainability and aviation' s decarbonisation	Event at Toulouse, Arrival of a green commercial flight with press and media on board	Sept 2021
Advisory board workshop	Presentation of current project status to AB – collection of inputs	Oct 2021
World ATM Congress	SESAR walking tours and theatre presentations	26.-28.10.2021
World ATM Congress	SESAR walking tours and theatre presentations	21. -23.06.2022
Connecting Europe Days (CED)	ALBATROSS Presence together with SJU	28.06.2022
SESAR Innovation Days	Conference with exhibition, networking and other activities (poster etc...)	2022
SESAR webinar	Participation at appropriate SESAR webinar	2022
stakeholder workshop	Workshop for Evaluations, Recommendations and Roadmap; with external experts and Advisory Board	Q4 2022
Final Dissemination Workshop	Present project results and	Q1 2023



	coordinate all partners for a common way of communication on those results, identify future chances for cooperation and follow-ups	

Table 9: Dissemination conferences and workshops

4.4 Dissemination KPIs and success criteria

Activity	KPIs and targets
Publications	<ul style="list-style-type: none"> - 1 to 2 published scientific publications per year - 4 published articles over the PJ Lifetime -
Events	<ul style="list-style-type: none"> - 2 workshops per year

Table 10: Dissemination KPIs and success criteria

4.5 Open access to scientific publications

Euro GNC 2021, Berlin

Thrust Model Determination from Operational Flight Data Using a Smart Data Approach

- ➔ Achieved
- ➔ Open Acces CC-BY-4.0, CEAS-GNC-2022-013

Contribution to « Towards Sustainable Aviation Summit 2022 » - Association Aéronautique et Astronautique de France

- ➔ In Preparation

Contribution to ICAS Stockholm 2022

- ➔ Contribution Accepted



5 Exploitation

5.1 Project exploitable results

- 1) LNAS-CDA (EXE-03): LNAS is a pilot assistance system to help pilots optimise approaches in terms of fuel consumption and noise emissions by predicting the optimal vertical flight path as well as the ideal speed, flap configuration and landing gear sequence.
- 2) TMA Optimization with Data Analytics (EXE-04): Apply state of the art trajectory analysis based on machine learning and artificial intelligence, in order to systematically implement measures for an operational concept to optimize airspace geometry and flight trajectories, to obtain a reduction of environmental impact.
- 3) DYNAMIC RAD (EXE-01): The dynamic RAD objective is to introduce a more flexible process to manage RAD restrictions allowing more efficient trajectories whenever it is possible to relax the restrictions.
- 4) PBN-to-ILS at Vienna airport (EXE-05-A): Curved Procedures (radius-to-fix) enabled by RNP to the interception of the final approach (ILS CATII/III or LOC). This allows the aircraft to follow a new approach path and thereby avoid noise sensitive / populated areas, reduce track miles, and yet be able to use ILS landing guidance.
- 5) ATC Tactical (Green) Solutions at Stockholm Arlanda Airport (EXE-02)
- 6) Fuel / CO2 reduction & Improved descent management: The expected exploitable results are an analysis of the fuel / CO2 reductions obtained with the different functions: IFO, DPO and CPO.

Concerning the descent functions (IFO and DPO) additional elements on the energy management of the descent are expected as for example, decrease in both use of additional thrust or airbrakes to recover the path at real idle level.

- 7) EXE-06A: The outcome of this exercise is an evaluation of the benefits of PBN-to-ILS procedures in CDG. (As a reminder, the actual design and implementation of the PBN-to-ILS procedure was not part of ALBATROSS, and took place before the start of the project. ALBATROSS covers the assessment of the environmental benefits.) Two exploitable results will stem from the activities of this exercise:
 - i. (Id = RES_EXE-06A_1) For DSNA, the PBN-to-ILS deployment roadmap for CDG and the live trial noise analysis;
 - ii. (Id = RES_EXE-06A_2) For Air France, a methodology for the evaluation of the fuel-burn reduction, based on data from the flight recorders; this method is applicable to the descent phase and will also be used in EXE-02B.
- 8) EXE-06B: The outcome from this exercise is a process that allows ATC to reduce the vertical constraints for arrivals, in the CDG TMA airspace; this is achieved by setting the constraints in a more dynamic way, namely allowing higher altitudes at the IAF points, when the traffic conditions allow for it. (Id = RES_EXE-06B_1).



- 9) EXE-06C: Single-engine taxi. The result of this exercise is a detailed analysis of the operational conditions for single-engine taxiing during departure for Air France flights: first and foremost the evaluation of the current rate of application, to determine whether a margin of additional benefit actually exists; then, if a margin of improvement is confirmed to exist, an analysis of the prerequisites to achieve the highest possible rate of application. (Id = RES_EXE-06C_1)
- 10) EXE-06D: The results from this exercise are the process by which the tools of the "OptiFlight" suite can be used in daily operations by Air France crews (Id = RES_EXE-06D_1).
- 11) EXE-06E: The result of this exercise is the knowhow about installation and usage of SEPPER power supplies. (Id = RES_EXE-06E_1)
- 12) TaxiBot: Updated Roadmap Sustainable Taxiing, Upgraded and improved TaxiBot, draft CONOPS Sustainable Taxiing.

5.2 Exploitation strategy and objectives

to 1) LNAS-CDA (EXE-03): LNAS is constantly developed and enlarged in its functions. ALBATROSS offers the opportunity to test the system in big scale at the airport of Zürich and to prove its benefits for the reduction of fuel consumption. The overall strategy is to make the system mature enough and to highlight its benefits to motivate OEM's to integrate LNAS functions into the primary FMS. Currently the systems must be operated on the EFB's.

to 2) TMA Optimization with Data Analytics (EXE-04):

Derivation of optimization measures applying artificial intelligence and expert knowledge (scientists, ATC controllers, pilots, engineers)

Identify traffic patterns that would benefit from restructuring of the procedures in the TMA.

Specific changes to the current procedures in the TMA are identified, that would environmentally improve the analysed traffic patterns.

to 3) DYNAMIC RAD (EXE-01): The dynamic management of the restrictions aim to allow the ANSPS to daily evaluate the need to activate/de-activate selected RAD restrictions and notified their status to AUs via European Airspace Use Plan (EAUP). Based on the notification, interested airspace users can file/re-file FPLs to get benefits from the relaxed RAD restrictions. To prove the effectiveness of the process, live trials have been performed in 2021 with direct involvement of Albatross partners, including ANSP (DSNA) and AUs (AF, DLH). Based on the positive results of the trials, operational implementation is expected in 2023.

To 4) PBN-to-ILS at Vienna airport (EXE-05-A):

Procedure used in off-peak periods or on request (pending the traffic situation).

Benefits assessment on the noise exposure / reduction, fuel burn and evaluating CO2 reductions from reduced track miles and improved flight efficiency.



Assess the operational efficiency / capacity of this procedure. It is recommended that airspace users provide their feedback to consolidate the design and operating aspects of the procedures.

Based on the success of the procedure, in the medium to long term it could even be applied in more traffic-intensive situations. Furthermore, the concept will /could be applied at additional airports.

To 5) ATC Tactical (Green) Solutions at Stockholm Arlanda Airport (EXE-02)

There are many ATC procedures utilised at Stockholm Arlanda Airport aiming to reduce environmental impact. However, it is challenging to capture the net effect of these procedures. For example, a shortcut in the final segments of the arrival phase is commonly considered as positive in terms of environmental impact (i.e., less track miles equals less fuel usage equals less CO₂ emission). Instead, avoiding being too high on the profile, this may force the flight crew to increase the descend angle with a subsequent pre-mature level capture and thereby thrust increase at low altitude. The net effect of the initiative is thereby reversed.

EXE-02 aims to define a reliable strategy and method able to understand and quantify the effects of tactical ATC interventions with subsequent flight crew response, within Stockholm Arlanda TMA. The effect in this context means difference in fuel consumption as a result of the ATC initiative. The strategy and method will be based on fuel figures from actual flights (QAR/DAR data) with associated (actual) ATC clearances and will therefore be considered very reliable. EXE02 ambition is also to provide a strategy and method possible to be applied on any TMA, i.e., to be used anywhere after project closure.

Included in EXE-02 is also improvement of descend profile via tool developed by Airbus (Idle Factor Optimisation). In addition, NOVAIR enhanced internal fuel initiatives will also be part of EXE-02.

To 6) Fuel / CO₂ reduction & Improved descent management

After the coordination phase with the airlines, the flights of the exercise will mainly help to evaluate the IFO (Idle Factor Optimization) function. Indeed, DPO will be part of the flights, but the difficulty is to find a baseline with flights where aircraft are not equipped with DPO.

Concerning CPO, the demonstration will be based on a post-flight analysis.

The focus of the exercise will be mainly on IFO which monitors the performance variation of individual aircraft through its lifecycle and finetunes the FMS descent trajectory thanks to the IDLE factor. In the exercise, aircraft are rather recent and so, the Idle deviation to the FMS level should be rather low and so the fuel and CO₂ reduction as well.

This is why our analysis strategy is to go beyond the fuel / CO₂ analysis with an analysis of the energy management in descent to demonstrate an improvement for the pilot to be on the computed FMS descent path, and so encourage the use of managed mode in descent and lead, for example, to more predictable descents for the ATC by the use of ADS-C.

The strategy for DPO will be the same, but the demonstration should be limited by the missing of baseline flights (flights without DPO).

Concerning CPO, the objective is to demonstrate the conditions where the function can bring some benefits and to provide the associated fuel / CO₂ reduction.



To 7), 8), 9), 10) & 11) "French Cluster" (EXE-06):

For all subjects of exercise EXE-06 "French Cluster", the strategy for the exploitation of the results consists in quickly bringing the demonstrated concepts to the widest possible deployment.

The objective is to maximize the number of flights that can benefit from the improvements, so that CO2 emissions are reduced as much as possible (through the reduction of fuel burn) and as soon as possible. This improvement is targeting in particular the Paris TMA and some other portions of French airspace. The concepts implemented by the French ANSP, DSNA, will benefit all airspace users operating in the concerned airspace. Some concepts implemented by Air France will eventually apply to all Air France flights operating on CDG.

For some of the results, the full rollout is planned to start within one year after the project, namely for RES_EXE-06A_1, RES_EXE-06B_1, RES_EXE-06D_1, RES_EXE-06E_1.

For some other results, additional operational evaluation is necessary before full implementation, namely RES_EXE-06C_1.

To 12) TaxiBot:

ALBATROSS is a key enabler for the first phase of the Roadmap Sustainable Taxiing – an effort by the aviation sector to implement large-scale emission reductions for aircraft ground movements. The goal within ALBATROSS is to develop an updated CONOPS to carry out Sustainable Taxiing operations at Amsterdam Airport Schiphol using TaxiBots as an airport based solution. Several showcases will allow involved stakeholders to gain first learnings. As an evolution to the goal for green taxiing solutions, these steps are a continuation of previous building blocks, and lay the groundwork for future development and wide-scale testing and deployment of such operations. In creating a draft CONOPS, valuable steps are made with regards to stakeholder alignment – which is a crucial element of both the development of the solution as well as any further exploitation.

By collaborating with the EUROCONTROL Sustainable Taxiing Taskforce, we wish to share first learnings (on both process and solution) directly with relevant European stakeholders. Furthermore, the draft CONOPS can be exploited at Amsterdam Airport Schiphol by the sector (including many partners outside of the ALBATROSS consortium) at a future point in time, be translated to other European airports and subsequently serve as a first step towards a SESAR solution. Operational implementation of green taxiing based on these efforts is expected in 2024 or 2025, while parts of the procedures might be implemented ahead of this time schedule.

The preparations for live demonstrations, combined with learnings from previous years, have also led to an iteration of the TaxiBot. In collaboration with demonstrator partners (outside of the consortium), the new vehicles are equipped with more eco-friendly drivetrains and feature updated dimensions to better allow operations in smaller spaces at cramped airports. To strengthen the efforts in ALBATROSS, Schiphol purchases two vehicles to allow for demonstrations, while also opening up the possibility to continue to learn and train operations through limited operational implementation with sector partners. At a future point in time, these updated TaxiBots will enable further tests, evaluations and demonstrations and ultimately help speed up actual operational readiness. As a derivative to the efforts in ALBATROSS, SAS is working with local aviation partners to create a next generation of zero-emission vehicles where electric and hydrogen technology is explored.



5.3 Exploitation of results

Beneficiary	Result (ID)	How do they plan to use the project results	When
DLR	LNAS-CDA (EXE-03)	<p>Further development of LNAS</p> <p>Rely on the proved functionalities to further mature the system implementing new functions / aircraft types</p>	In project lifetime and after project end
Lufthansa	TMA Optimization with Data Analytics (EXE-04)	Derive concrete measures for the optimization of ATM	1-3 years
ECTL	DYNAMIC RAD (EXE-01)	<p>Technical improvements are expected to support the operational implementation of Dynamic RAD concept.</p> <p>Additional live trials are expected by interested ANSPs before the technical improvements will be implemented</p>	<p>April 2023</p> <p>End 2022-beginning 2023</p>
Austro Control	PBN-to-ILS at Vienna airport (EXE-05-A)	<p>Further development of the PBN-to-xLS concept. Derive concrete measures from the airspace users, ATC and other stakeholders. (e.g. local communities).</p> <p>Improve the flight efficiency of procedures.</p> <p>Noise Protection.</p>	In project lifetime and continued after project end
NOVAIR	ATC Tactical (Green) Solutions at Stockholm Arlanda Airport (EXE02)	<p>Further identify possible efficiency effects at Stockholm Arlanda and/or other airports. Use these results to enhance operation overall (in terms of increased fuel efficiency), for example in discussions with local ANSPs (concept proofing).</p>	Partly within project lifetime, but mostly after project closure. If fully successful, this strategy and method may be the generic go-to solution to identify actual (real) effects of various ATC initiatives.



NOVAIR / WizzAir	Fuel / CO2 reduction & Improved descent management	To evaluate the interest to be equipped with the different evaluated functions.	Functions being available, they can be used at the end of exercise.
Air France	RES_EXE-06A_2	Apply the analysis methodology to other exercises, namely EXE-06B	Q3/2021 onwards
ALBATROSS airlines	RES_EXE-06B_1	Perform optimized arrivals into CDG, in particular as part of EXE-01	Q1/2022 onwards
Air France	RES_EXE-06C_1	Identify actions that will allow for full adoption of single-engine taxiing at departure	2024 onwards
Air France	RES_EXE-06D_1	Deploy the pilot-assistance tools to all fleet and crew	2024 onwards
DSNA	RES_EXE-06D_1	Deploy SEPHER-type generators in other locations	2024 onwards
SNBV SAS	TaxiBot	<p>Further development of Sustainable Taxiing CONOPS using a TaxiBot</p> <p>Create acceptance of green taxiing operations</p> <p>Updated TaxiBots available for purchase/exploitation by interested 3rd parties.</p> <p>Updated TaxiBots form the base for next-generation zero-emission vehicles being developed in collaboration with sector partners for both narrow body and wide body aircraft.</p>	<p>1-3 years</p> <p>1-3 years</p> <p>In project lifetime and after project end.</p> <p>In project lifetime and after project end.</p>

Table 11: Project internal exploitation of results



User Group	Result (ID)	How could they use the project results	When
OEM's	LNAS-CDA (EXE-03)	Offer FMS functions based on LNAS	From now on
Pilots / Airlines	LNAS-CDA (EXE-03)	Findings for adapted pilot training (situational awareness, environmental awareness)	From now on
ATC	TMA Optimization with Data Analytics (EXE-04)	Performance Feedback, improvement of procedures	1-3 years
ATC	TMA Optimization with Data Analytics (EXE-04)	Traffic Design Evaluation, improvement of operations	1-3 years
AUs	TMA Optimization with Data Analytics (EXE-04)	individual performance considering other users, improvement of flight planning and operations	1-3 years
ANSPs	DYNAMIC RAD (EXE-01)	Minimise the application of RAD restrictions	Whenever traffic situation allows the relaxation of selected RAD restrictions to be managed through a dynamic process
AUs	DYNAMIC RAD (EXE-01)	Improve flight efficiency with unconstrained filed trajectories	Whenever ANSPs will provide relaxation of RAD restrictions
NM	DYNAMIC RAD (EXE-01)	Coordinate/facilitate the application of dynamic RAD by interested ANSPs	By 2023
NM	DYNAMIC RAD (EXE-01)	Facilitate the extended application of AFUA	On-going
Airlines / AUs	PBN-to-ILS at Vienna airport (EXE-05-A)	The procedure serves to gain experience with this technology /concept (RNP-to-ILS). Improve flight efficiency	Whenever procedure is implemented and available in the Austrian AIP.
ATC	PBN-to-ILS at Vienna airport (EXE-05-A)	Feedback on operational efficiency & improvement of procedure. Input on possible usage in more traffic-intensive situations.	Whenever procedure is implemented and available in the Austrian AIP.



Pilots/Airlines	ATC Tactical (Green) Solutions at Stockholm Arlanda Airport (EXE02)	Adjusted pilot training based on outcome of analyses (e.g. Green SOP per analysed TMA)	
ATC	ATC Tactical (Green) Solutions at Stockholm Arlanda Airport (EXE02)	Information sharing, knowledge enhancement, improvement of ATC procedures, introduction and/or removal of procedures.	
ANSPs	ATC Tactical (Green) Solutions at Stockholm Arlanda Airport (EXE02)	TMA general oversight, possible airspace re-design, removal of unnecessary restrictions.	
Airlines	Fuel / CO2 reduction & Improved descent management	To evaluate the interest to be equipped with the different evaluated functions	Functions being available, they can be used at the end of exercise.
All Airlines flying into CDG	RES_EXE-06A_1	Fly PBN-to-ILS arrivals in CDG	2024 onwards
All Airlines flying into CDG	RES_EXE-06B_1	Perform optimized arrivals into CDG	2022 onwards
OEMs	TaxiBot	Speed up certification of a possible SESAR solution	After project conclusion
Pilots / Airlines	TaxiBot	Train pilots for showcase demonstrations and limited operational implementation of TaxiBots Prepare for aircraft certifications	During project and after project conclusion During project and after project conclusion
ATC / ANSPs	TaxiBot	Speed up certification of a possible SESAR solution	After project conclusion



European Decision Makers	TaxiBot	<p>Acquire insights on impact of green taxiing operations</p> <p>Speed up certification of a possible SESAR solution</p>	<p>During project and after project conclusion</p> <p>After project conclusion</p>
Airports	TaxiBot	<p>Acquire insights on impact of green taxiing operations</p> <p>Speed up certification of a possible SESAR solution</p>	<p>During project and after project conclusion</p> <p>After project conclusion</p>
Truck drivers / Handlers	TaxiBot	<p>Train drivers for showcase demonstrations and limited operational implementation of TaxiBots</p>	<p>During project and after project conclusion</p>
SAS	TaxiBot	<p>Engineering of next generation of zero-emission TaxiBots for narrow and wide body aircraft</p> <p>Aircraft manufacturer certification of next generation of zero-emission TaxiBots for narrow and wide body aircraft.</p>	<p>After project conclusion</p> <p>After project conclusion</p>

Table 12: Project external exploitation of results



5.4 IPR Management

The IPR Management is part of the agreed and signed Consortium Agreement:

- ✓ Each Beneficiary shall be solely and fully responsible for defence against any claim by third parties related to infringement of intellectual property rights by that Beneficiary's supplies and services and shall keep the other Beneficiary(ies) harmless from such claim.
- ✓ Ownership and Access Rights on Background IPR Any Background IPR with respect to information, data, know-how and patents which are owned or acquired by a Beneficiary prior to the Grant Agreement shall be retained by said Beneficiary and the Beneficiary shall be obliged to provide the SJU with the necessary license(s) as per the Grant Agreement. In ANNEX4, the Parties may identify and agree on the Background for the Project. This acknowledgement however does not prevent future identification of such Background IPR should the Beneficiary concerned realizes the need in order to properly implement the action or Exploit the Results

Insofar as this is possible as per the Grant Agreement:

- Each Beneficiary shall grant a non-exclusive, non-transferable, royalty free licence to use the Background IPR when such Background IPR is Needed to another Beneficiary in order to perform its related Work Share for the Project.

Each Beneficiary shall grant a non-exclusive, non-transferable, licence to use the Background IPR when such Background IPR is Needed to another Beneficiary in order to Exploit its own Results. Such Licence shall be granted on Fair and Reasonable Conditions.

- ✓ Ownership and Access Right on Results

Results are owned by the Beneficiary that generates them.

Joint ownership is governed by Grant Agreement The joint owners shall agree on all protection measures and the division of related cost in advance.

Insofar as this is possible as per the Grant Agreement:

- Each Beneficiary shall grant a non-exclusive, non-transferable, royalty free licence to use the Results when such Result is Needed to another Beneficiary in order to perform its related Work Share for the Project.
 - Each Beneficiary shall grant a non-exclusive, non-transferable, licence to use the Results when such Results are Needed to another Beneficiary in order to Exploit its own Results. Such Licence shall be granted on Fair and Reasonable Conditions,
- ✓ The provision of data by the airlines, from production flights involved in the demonstration is subject to internal approval, including procedures negotiated with the workers union. This approval is to be discussed on a case-by-case basis, and may imply that the data undergo suitable aggregation or de-identification or that some information is removed.



6 Schedule of communication and dissemination activities

Activity	Description	Target audience	Tools to be used to further support communications and dissemination	Provisional dates /frequency	Responsible Role	KPIs and targets
Kick-off meeting of ALBATROSS project	Presentation of project high-level objectives and key messages; familiarisation with SJU communications	Project internal	Power Point	Jan 29th, 2021	Com. Lead	achieved
New VLD Project ALBATROSS	Short description of the Project – preliminary Version for initialisation	European decision makers	Webdesign cordis	Jan 2021	Author	achieved
SESAR project webpage	Presentation of project’s objectives in SESAR context	General Public	Webdesign SJU	Feb 2021	Author	achieved
announcement on project start (e-news#1)	Information about project’s initiation and objectives	General Public	Sesar e-news	Feb 22 nd , 2021	Author	achieved
VLD Project ALBATROSS	Information about project’s initiation and objectives	General Public	Twitter	Feb 24 nd , 2021	Contributor	achieved
‘new project’ presentation	Information about project’s initiation and objectives	Scientific	DLR Flugblatt	Mar 5 th , 2021	Author	achieved
Conference Presentation and Paper EURO GNC	Paper “Engine Thrust Model Determination from Large Operational Flight Data Base”	Scientific	none	May 3 rd -5 th 2021	Author and Presenter	achieved





project webpage	Initial version of official ALBATROSS homepage	General Public	Content XXL	June 15th, 2021	Author	achieved
e-news#2; general project presentation	Interview with project leader on objectives, challenges and activities of ALBATROSS	General Public	Webdesign SJU	Jun 21st, 2021	Author	achieved
Workshop on dynamic RAD	Workshop with externals from AIRBUS, DSNA, EC and Air France	Project Internal	WebEx	Jul 1st ,2021	Participant	achieved
e-news#3 KPI'S	Presentation of WP4 – KPI's for ALBATROSS	General Public	Webdesign SJU	Aug 2021	Author	achieved
AIRBUS summit on sustainability and aviation' s decarbonisation	Event at Toulouse, Arrival of a green commercial flight with press and media on board	Interested Public	Live Conference Recorded Livestream	Sept 2021	Participant Panelist	achieved
Online Article	ALBATROSS SAGA PART I	General Public	Airbus - Webdesign	Sept 21st, 2021	Author Airbus	achieved
Online Article	ALBATROSS SAGA PART II	General Public	Airbus - Webdesign	Sept 28th, 2021	Author Airbus	achieved
Scientific Presentation	Increasing the efficiency of airline flight operations with next-generation cockpit functions	Student Lecture	none	Oct 26 th 2021	Author Martin Gerber	achieved
e-news#4 Concept of Operations	Presentation of WP 2 first CONOPS	General Public		Oct 2021	Author	achieved
Advisory board workshop	Presentation of current project status to AB – collection of inputs	Advisory Board	Webex and Presence	Oct 2021	Moderation /Organisation	achieved
Official Videoclip	Information on ALBATROSS Project Idea and the demonstration flight CDG-TLS	General Public	Video Software	Oct 2021	Contributor	achieved





Online Article	ALBATROSS SAGA PART III	General Public	Airbus - Webdesign	Oct 06th , 2021	Author Airbus	achieved
Online Article	ALBATROSS SAGA PART IV	General Public	Airbus - Webdesign	Oct 12th , 2021	Author Airbus	achieved
World ATM Congress	SESAR walking tours and theatre presentations	ATM Society	none	26.-28.10.2021	Participant	achieved
World ATM Congress	SESAR walking tours and theatre presentations	ATM Society	None	21. -23.06.2022	Panelist in dedicated session	achieved
Connecting Europe Days (CED)	ALBATROSS Presence together with SJU	ATM Society	None	28.06.2022	Participant	achieved
e-news#5 Summary of the actions	Presentation of WP3 different exercises and cluster and their coordination	General Public	SJU Webdesign	2022	Author	open
SESAR Innovation Days	Conference with exhibition, networking and other activities (poster etc...)	Aviation Stakeholder	None	2022	Author and Presenter	open
SESAR webinar	Participation at appropriate SESAR webinar	SESAR Participants	Webex	2022	Presenter	open
e-news#6 Exercise Presentation	Presentation of exercise (active/ first results etc)	General Public	SJU Webdesign	2022	Author	open
conference presentation	Title: The ALBATROSS Project – A European Initiative to Reduce Aviation’s Carbon Dioxide Emissions in Large Scale	Scientific Society	Power Point	04-09. Sept. 2022	Author and Presenter	submitted
e-news#6 Exercise Presentation	Presentation of exercise (active/ first results etc)	General Public	SJU Webdesign	2022	Author	open
press release by DLR	findings of the project’s analysis phase	General Public	none	TBD 2023	Author	open



e-news#7 Exercise Presentation	Presentation of exercise (active/ first results etc)	General Public	SJU Webdesign	2022	Author	open
stakeholder workshop	Workshop for Evaluations, Recommendations and Roadmap; with external experts and Advisory Board	Stakeholder	Webex and F2F	Q4 2022	Organization	open
journal paper	DLR's project results – emphasis LNAS flight trials in ALBATROSS context	Scientific Society	TexnicCenter	2023	Author	open
conference presentation	Final project results	Scientific Society	None	2023	Author	open
Final Dissemination Workshop	Present project results and coordinate all partners for a common way of communication on those results, identify future chances for cooperation and follow-ups	Stakeholder	None	Q1 2023	Organisation	open
press release by DLR	findings of the project's analysis phase	General Public	None	Q2 2023	Author	open

Table 13: Schedule of Communication and Dissemination Activities



