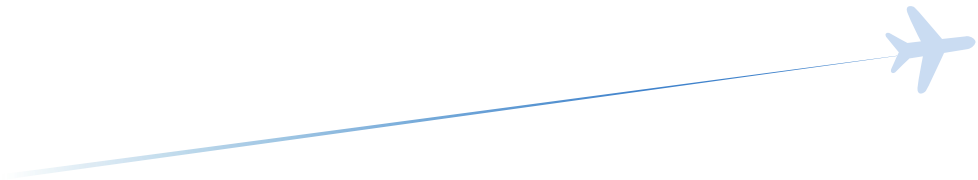

Dissemination Plan

DART

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DART

DATA DRIVEN AIRCRAFT TRAJECTORY PREDICTION RESEARCH

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Abstract

This document includes the strategy for knowledge management, protection, exploitation and dissemination of results, as well as the exploitation roadmap and the dissemination activities that will implement it following the H2020 Communicating EU research and innovation guidance [1]. This document provides detailed information about those activities outlined in the Grant Agreement (GA) [2], the Consortium Agreement (CA) [3] and the Project Management Plan (PMP) [4], including details regarding the application and management of Intellectual Property Rights (IPR).[1]

[1] "The opinions expressed herein reflect the author's view only. Under no circumstances shall the SESAR Joint Undertaking be responsible for any use that may be made of the information contained herein."

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1 Introduction

1.1 Purpose and Scope

Dissemination represents the means used to provide efficiently to the open community the findings and results obtained throughout the project lifecycle and beyond. Moreover, dissemination allows to measure acceptance of the proposed concepts and to exploit the capability of reusing them in other projects.

Additionally, this deliverable provides an overview of the dissemination materials that are designed to exploit the accomplished results and outlines the exploitable components.

More specifically, the objectives of the exploitation plan are:

- Establishing and maintaining mechanisms for effective exploitation once a market analysis has been carried out.
- Informing stakeholders of the project development and encourage interactions/ networking.
- Coordinating all levels and types of exploitation of the knowledge produced by the project.
- Ensuring that information is shared with appropriate audiences on a timely basis and by the most effective means.

These objectives will be enriched with the forthcoming project's achievements and contributions from all partners.

1.2 Intended readership

This document is intended to be used by DART members.

1.3 Acronyms and Terminology

Term	Definition
AAMAS	Autonomous Agents and Multiagent Systems
AC	ATM Community
AMAN	Arrival Manager
ARC	ATM Research Community

ART	Agency Research Team
ATACCS	Application and Theory of Automation in Command and Control Systems
ATC	Air Traffic Control
ATM	Air Traffic Management
BR&T-E	Boeing Research & Technology - Europe
CRIDA	Centro de Referencia de Investigación, Desarrollo e Innovación
DART	Data-driven AiRcraft Trajectory prediction research
DCB	Demand & Capacity Balance
DST	Decision Support Tool
FRHF	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung
GP	General Public
Horizon 2020	EU Research and Innovation programme implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness.
ICRAT	International Conference on Research in Air Transportation
IPR	Intellectual Property Rights
KPA	Key Performance Area
KPI	Key Performance Indicator
LTER	Long Term Exploratory Research
PMP	Project Management Plan
RC	Research Community
R&D+i	Research, Development and Innovation
RL	Reinforcement Learning
SESAR	Single European Sky ATM Research Programme
SID	SESAR Innovation Days
SJU	SESAR Joint Undertaking (Agency of the European Commission)
TBO	Trajectory Based Operations
TFM	Traffic Flow Management
TRL	Technology Readiness Level
UPRC	University of Piraeus Research Center
WAC	World ATM Congress
WBS	Work Breakdown Structure
WP	Work Package

CA	Consortium agreement
GA	Grant Agreement
ER	Exploratory Research

Table 1: Acronyms and Terminology

2 Strategy for knowledge management, protection, exploitation and dissemination of results

2.1 Problems addressed by the Project

DART (Data-driven AiRcraft Trajectory prediction research) project main research objective is to explore the application of different data-driven techniques to the aircraft trajectory prediction problem, accounting for complexity ATM network effects.

As part of this objective DART emphasizes the role modern visualization techniques can have in facilitating trajectory predictions.

To achieve this high-level main research objective, the following specific research objectives have been defined:

- Definition of requirements for the input datasets needed. The requirements will consider the trajectory prediction accuracy expected;
- Study of the application of big-data techniques to trajectory related data gathering, filtering, storing, prioritization, indexing or segmentation to support the generation of reliable and homogenous input datasets;
- Study of different data-driven learning techniques to describe how a reliable trajectory prediction model will leverage them;
- Formal description of the ATM complexity network to support correlated multiple trajectory predictions;
- Study of the application of agent-based models to the prediction of multiple correlated trajectory predictions considering the ATM complexity network;
- Description of visualization techniques to enhance trajectory data management capabilities;
- Exploration of advanced visualization processes for data-driven model algorithms formulation, tuning and validation, in the context of 4D trajectories.

2.2 New knowledge that will be generated by the project

DART aims to present to the ATM community an understanding on what can be achieved today in trajectory prediction by using data-driven models. This approach could become an alternative to the classic model-based trajectory prediction approach, or could be used in combination to improve the predictability of both individual trajectory and traffic predictions.

Specifically the following exploitable outcomes from DART project have been identified:

- Assessment of required datasets to obtain an increase of prediction accuracy thanks to the inference of implicit prediction deviations not captured by state-of-the-art model-based trajectory prediction algorithms.
- Assessment of most suitable machine learning algorithms to be applied according to the available datasets (surveillance data, reconstructed trajectories, aircraft intent descriptions,..), providing improved accuracy with respect to traditional trajectory prediction approaches.
- Assessment of applicability reinforcement learning (RL) algorithms in an agent-based trajectory prediction framework to obtain improved predictions thanks to the consideration of ATM network effects.
- Visualization techniques to enhance DST's capabilities related to trajectory data management in the context of future Trajectory Based Operations (TBO).

The final outcome for ATM community will be a detailed analysis of different big data techniques that can be applied to improve the predictability of individual and traffic predictions. The studied algorithms will provide the capability of increasing the accuracy of the predictions based on the availability of specific data sources.

2.3 Potential benefits derived from project outcomes

DART will contribute to facilitate the TBO capabilities by providing mechanisms to improve trajectory predictions based mainly on the use of historical surveillance data in conjunction to other data sources as specified in D1.1 "Data Management Plan" and further updated throughout the project lifecycle according to requirements and needs.

Trajectory prediction is a functionality that relies at the core of most ATM applications. Predictions are typically used to planning, de-conflicting, sequencing, scheduling and efficiently managing traffic. Predictability is one of the Key Performance Areas (KPA) defined by SESAR in which major operational improvements are foreseen. Potential benefits of the expected project outcomes are the improvement on prediction accuracy thanks to the analysis of trajectories previously flown and recorded, and the capability of capturing deviation from the Flight Plan that cannot be predicted by model-based approaches, taking also into account ATM network effects due to interactions between trajectories and restrictions imposed to the use of the airspace.

DART will assess the feasibility of integrating a data-driven trajectory predicting approach into the development of envisioned advanced DST.

Better traffic prediction capabilities will increase the efficiency of traffic management procedures, reducing the need of intervention to those strictly necessary situations.

Two possible paths for future exploitation of DART outcomes have been identified:

Research & Development (R&D):

- Data-driven predictions could be used as groundwork for future development, improving safety by means of advanced Decision Support Tools (DST) in future TBO environment.
- The new prediction approach could be combined with current tools to provide immediate improvements on prediction accuracy.

- This research might pave the way to enhanced ATM data exploitation to enable improvements in trajectory and traffic predictions.
- Improve our understanding of ATM network effects via appropriate multiagent computational models. Particularly understanding how network effects allow better trajectory predictions and use of the airspace, due to interactions of individual trajectories.

Commercial Use:

- Data-driven Trajectory Predictors could potentially be used and applied in all ATM applications that require the use of a predicted trajectory to perform their responsibilities.
- Commercial products could be further exploited not only by new advanced DST but also by those ones currently in use, by changing their own trajectory prediction capabilities by those provided by a Data-based Trajectory Predictor.

3 Dissemination and Communication

3.1 Introduction

DART role in the Research & Innovation pipeline is to introduce data-driven methods from the scientific arena to the TRL1 level towards its objectives. DART publications of research outcomes expect to setup the clear Basic Principles that demonstrate the applicability of these methods to the trajectory prediction problem and will evaluate how promising the results are in order to promote (or not) further research. In order to prepare an easier transition event to higher levels (TRL2), a specific ATM application will be down selected from the early stages of the project (M04). The intention is DART not only to show how data-driven methods can work from the trajectory prediction perspective exclusively, but also, how useful they are towards enhancing the ATM capabilities in a specific scenario showing a current pain point of the system.

If the results are promising, the proposal will be to further research on data-driven methods, for the application selected in DART (and/or other similar), aiming to build prototypes for early validation.

3.2 Potential Stakeholders and Target Audience

DART intents to address a wide and varied audience, ranging from research communities to acquire knowledge from and to boost adoption of new techniques, approaches and methods, to ATM communities to raise awareness of the project vision, objectives and results. The list of potential communities interested in the project progress and outcomes includes:

- R&D ATM community
- Operational ATM community
- Scientific community active in Trajectory Management and Demand and Capacity Balancing
- Education and training communities

Basically, any potential community can be included in one of the following Target Groups:

- General Public (GP): This group can benefit from general understanding of project objectives and results without going into too complex details.
- Research Community (RC): This group can benefit from project objectives and results due to possible application to similar problems, being relevant the techniques and methods used and the technical details of them.
- ATM Research community (ARC): This group can benefit from project objectives and results focusing specifically into ATM problems, being relevant the techniques and methods used and the technical details of them.

- ATM Community (AC): This group can benefit from project objectives and results by the improvement of prediction capabilities thanks to the adoption of proposed data-driven predictions techniques.

The identified target audiences are detailed in following Table 3, where each community is described against the corresponding dissemination objectives.

Table 2 Information needs by actor

Stakeholders	Dissemination Objective	TYPE
Air Traffic Control (ATC)	Quantitative and qualitative results: Benefits provided by the concept when implemented in DCB tools Use of trajectory and traffic predictions in the configuration of the airspace.	AC
ANSP´s	Quantitative and qualitative results: Benefits provided by the concept when implemented in DCB tools. Use of traffic predictions based on trajectory operations to establish DCB and capacity plans. Share insights on new operational concepts.	AC ARC
Network Manager	Quantitative and qualitative results: Benefits provided by the concept when implemented in DCB tools Use of traffic predictions to improve the performance of the European aviation network	AC ARC
Industry	Technical Specifications. Leverage of Research, Development and Innovation (R&D+i) to enhance the capabilities of current industrial tools and applications	GP
R&D Centres	Traffic Prediction Model description and results of its implementation	RC

3.3 Dissemination and Communication Objectives

DART aims to present to the ATM community an understanding on what can be achieved today in trajectory prediction by using data-driven models, while also accounting for network complexity effects. It is expected that data-driven techniques help to improve the predictability of individual trajectories as well as traffic samples by complementing classical model-based prediction approaches. These improved predictions will enable advanced collaborative decision making processes, which finally will lead to a more efficient ATM procedures.

The key Dissemination and Communication objectives of the DART are:

- Creating awareness and reasoning behind the project objectives, concepts and relevant results.
- Understanding our targets groups and how they stand to benefit from the project results. The consortium will develop an acute understanding of the relevant stakeholders in both a commercial and research setting through outreach activities, as well as through the expertise of the project consortium and knowledge transfer within the relevant communities.
- Actions to receive feedback on the project in the form of validation of results, alternative approaches and industrial advice from within the project expertise or the wider project community.

- Promote understanding of project visions and innovative methods and actions to pave the way to knowledge transfer of project results and foresight.

DART aims at communicating three key messages that summarize the main project objectives and expected outcomes:

- **Message 1.** DART will deliver understanding on the suitability of applying data-driven models for enhancing our abilities to compute predictions of aircraft trajectories, accounting also for ATM network complexity effects concerning multiple correlated aircraft trajectories.
- **Message 2.** DART will explore the applicability of a collection of data mining, machine learning and agent-based models and algorithms to derive a data-driven trajectory prediction capability, accounting also for ATM network complexity effects.
- **Message 3.** DART aims at high-fidelity aircraft trajectory prediction capabilities, supporting the trajectory life-cycle at all stages efficiently.

The following section details the activities planned to achieve those Dissemination and Communication goals in an efficient and effective manner.

3.4 Dissemination and Communication Activities

The most relevant dissemination means that will be adopted are:

- **Technical reports (TR)** to be shared among all the members from the SESAR 2020 ER (Exploratory Research) Research Networks;
- **Papers and Publications (PP)** concerning the work done and the results obtained throughout the Project produced and submitted to a variety of different journals and conferences in order to guarantee a full visibility to the project;
- **Presentations (P)** of the project outcomes specially focused on the benefits of using data-driven methods for the ATM community;
- **Social/Professional Networks (SPN)**. These networks will provide an increased audience that would potential benefit the dissemination of project outcomes with a limited effort.
- **Website (Web)**. Its purpose is to show main contributions, progress and updates of the DART project.
- **Workshops (WS)**, both internal and external, in which stakeholders can track the progress of the project, discuss technical approaches and propose alternative solutions.
- **Conferences (CF)**, in which experts on the field showcase advances in related technologies that could be applied to DART and in which DART outcomes are presented to the community to receive feedback.

Dissemination activities will be separated in two main groups according their means of address:

- **Project internal communication** between Project partners. Dissemination of evaluation reports and final project reports are included. Project partners should be informed of every change or update taking place in the project.

- **External dissemination** to stakeholders and potential beneficiaries from the project outcome. Interested parties in the project should be informed of the project progress and possible changes or updates. Communication will work both ways.

Dissemination activity goals are presented in the following table:

Table 3 Dissemination and Communication Activities

Dissemination Goal	Target Quantity	Target Group	Activity
Publications (scientific Target Group)	Open access will be granted to all scientific publications resulting from DART, targeting not only ATM group but Big-Data Analytics, Interactive Visual Analytics, Machine Learning, Data and Information management groups.	Research Community	DART Vision paper. Big Data event TBD.
		Research Community	Presentation of DART Goals and Objective in a dedicated event (e.g., SESAR Innovation Days)
Papers at scientific conferences appearing in proceedings	At least 3. Potential conferences include: ATACCS, ATM SEMINAR (U.S.A. Europe), SESAR Innovation Days, DEBS, VLDB, ACMSIG Spatial, SSTD, EDBT, VAST, EuroVis, AAMAS	Research Community	Participation in Multiagent conference, target: Intl. Conf. of Agents and Multiagent Systems (AAMAS) May, 2018
		Research Community	Participation in Visual analytics conference. Target TBD by FRFH.
		ATM Research Community	Target: Submission to 8th ICRAT (June, 2018)
Papers in Journals	At least 1 submissions to journals of high impact. Potential journal titles include: (AIAA), IEEE National Aerospace & Electronics Conference, IEEE TKDE, ACM ToCL, International Journal of Geographical Information Science, ,International Journal of Location-based Services, Computers Environment and Urban Systems, IEEE Transaction on Visualization and computer Graphics, Information Visualization, Computer Graphics Forum,	Research Community	Journals initially identified: • AIAA Guidance, Control & Dynamics • IEEE Transactions on Intelligent Transportation Systems • Journal of Air Transport Management

Workshop organized at a scientific event	At least 1 concerning one of the following topics: Management of spatio-temporal big data in ATM Detection and forecasting of aircraft trajectories Recognition and forecasting of events concerning aircrafts	ATM Research community	Workshop in coordination with other ER on-going projects (e.g., COPTRA if the application selected matches)
Publications (technically interested community as large)	At least 1: Management of spatio-temporal big data in ATM Detection and forecasting of aircraft trajectories Recognition and forecasting of events concerning aircrafts	Research Community	Target journal identified: Data and Knowledge Engineering (Elsevier) IEEE Trans. of Knowledge and data Engineering (TKDE) Big Data Research (Elsevier) IEEE Trans. of Big Data Machine Learning (Springer)
DART white papers	At least 1: A "DART data-driven trajectory predictions" white paper	ATM Research community	A "DART data-driven trajectory predictions" white paper
Press releases	At least 1: For the technological developments and their impact in ATM.	ATM Research community	SJU dedicated webpage
Project Web Site http://dart-research.eu/	600 p.a. with 1/3 spending more than 2 minutes on the site	General Public	Project Website Launch and periodic update

Social Media Presence	Established groups in at least 2 networks (e.g. LinkedIn, Twitter) with regular updates. Evidence of engagement with target audience – demonstrated via comments, sharing of relevant content, RTs etc.	General Public	Linkedin Group Launch (Social Network 1) and periodic updates
		Research Community	Researchgate Project Launch (Social Network 2) and periodic updates
Stakeholders interest groups	At least 1 presentation at WP-E networks events	ATM Research community	Workshop on data-driven trajectory prediction (tentatively on June 2018).
Demonstrations of prototypes at ATM-dominated events	At least 1. (i.e., SID, WAC...)	ATM Research community	Workshop on data-driven trajectory prediction (tentatively on June 2018)..

Following Section **Error! Reference source not found.** specifies the roles and responsibilities to be carried out by each partner according to the planned communication and dissemination goals.

3.5 Communication Channels

Besides the aforementioned communities, which will be approached to transfer knowledge derived from the project, dissemination activities will include media and social media engagements as channels to get the attention of key communities and stakeholders.

Communication actions make an impact on different actors in independent ways, and therefore various communication channels are to be defined to pursue the strategic goals. These channels present different tools to be used to adapt to the communication needs that each stakeholder requires. The selected channels for DART are presented in the table below:

Table 4 Communication Channels

	Website	Research Gate	LinkedIn	SESAR/ATM Research Communities	Leaflets, posters & press releases	Visualization Research Communities	Newsletters	Workshops	Conferences & presentations
ATCo	■	■	■	■		■	■	■	■

ANSP´s	■	■	■	■	■	■	■	■	■
Airlines	■	■	■	■	■	■	■	■	
Industry	■	■	■	■		■	■	■	■
R&D Centres	■	■	■	■		■	■	■	■

It is planned to present and publish all the achievements and the project results to some relevant conferences among which the following stand out:

- International Conference on Autonomous Agents and Multiagent Systems (AAMAS) – http://www.aamas2017.org/
- IEEE VIS 2016 - http://ieeevis.org/
- SESAR Innovation Days (SID) – http://www.sesarinnovationdays.eu/
- International Conference on Research in Air Transportation (ICRAT) – http://www.icrat.org
- Conference on Application and Theory of Automation in Command and Control Systems (ATACCS) – www.ataccs.org
- World ATM Congress (WAC) – http://www.worldatmcongress.org/
- ATM Seminar – http://www.atmseminar.org/

In addition, the project outcomes will exploit any other communication channel at the disposal of project partners, including those available through the SJU. There are three channel of especial interest to DART:

- SESAR Research Networks. Within the SESAR Long Term Exploratory Research (LTER) program is envisioned the deployment of (at least) one research network that plays the role of a facilitator in process of disseminating main project outcomes. Current HALA! (http://www.hala-sesar.net/) And Complex World (http://www.complexworld.eu/) Research Networks will be replaced by a new one that gathers all achievements coming from current LTER projects. Due to the process of setting up this network could be longer than the DART lifecycle, it is planned to have an intense presence at any SESAR event, with an especial attention to the SID.
- EURCONTROL's Agency Research Team (ART), which is an advisory body of the EUROCONTROL Agency. It disseminates research topics, projects and results with relevance for ATM amongst its members and reviews the Agency's research work programme from a strategic as well as from a technical perspective. ART focusses specifically on the EUROCONTROL's contribution to the SESAR programme, ensuring convergence of initiatives and alignment with Air Navigation Service Provider (ANSP). It embraces issues specific to ATM while addressing influencing factors and the impact air transport and aerospace have on ATM, including societal considerations and the integration of transport modes.
- SJU Communication Channels. The overall goal of SJU communications strategy is to illustrate and showcase the solutions that the SESAR is already delivering and the tangible benefits they bring to the aviation industry and society as a whole and enhance the partnership spirit of the SJU through communications activities with SJU staff and SESAR experts. Thus, the project will take advantage of the SJU communication channels (webpage, newsletter,

LinkedIn group, YouTube channel, or Twitter) to share DART outcomes and main conclusions to the targeted audience.

The main advantage of these two channels is the ability to ensure the continuity of the proposed research techniques in future research initiatives promoted by SESAR or in dedicated ATM applications as per EURONTROL's technology development roadmap.

3.6 Definition of Communication Roles

All these dissemination and communication tasks aim at creating a 'brand identity'. The communication strategy will support the work of exploiting project results and promoting the work done during the project by using appropriate channels. The Dissemination task in the management work package will ensure these results are communicated through dedicated presentations, publications, participation in and organisation of workshops. The following Table 5 summarizes the roles of the different project patterns with respect the key communication activities.

Table 5 Communication Roles

	Website	Research Gate	LinkedIn	SESAR/ATM Research Communities	Leaflets, posters & press releases	Visualization Research Communities	Newsletters	Workshops
UPRC	C	C	C	C	**L**	C	**L**	**L**
FRHF	C	C	C	C	C	**L**	C	C
BR&T-E	**L**	**L**	**L**	C	C	C	C	C
CRIDA	C	C	C	**L**	C	C	C	C

L = Leader

C = Contributor

As BR&T-E is the leader organization of the Communication and Dissemination activities, the focal point designated to play this role will be David Scarlatti (David.Scarlatti@boeing.com).

4 Exploitation

4.1 Introduction

If the results are promising, the proposal will be to further research on data-driven methods, for the application selected in DART (and/or other similar), aiming to build prototypes for early validation. If results are interesting enough for the selected application, the partners will seek patent protection, independently of further research investment, to ensure early protection of the development.

The level of development of methods and methodologies explored in DART are TRL1 (Technology Readiness Level) in preparation to be transitioned to TRL2. This activity should bring the work to TRL2 and may link TRL3 activities, for example in SESAR 2020 PJ09 solution 1. Exploitation of results will be structured around the Project's TRL.

During the project, the consortium will exploit their combined expertise to deliver the project outcomes, and seek opportunities to disseminate its contributions. Following project completion, knowledge gained and prototypes/new technologies developed will be exploited in each partner's on-going and future activities. The exploitation activities will be threefold:

- Knowledge building;
- Technical advances in traffic predictions algorithms;
- Development of enhanced services that enable improvements in individual and traffic predictability.

The three natural ways for exploitation of the results of the project, considering the TRL of the project are:

- Further internal research: All partners have internal R&D programs in which the results of DART could be moved forward.
- Collaborative Research: DART results could be the starting point for further LTER projects.
- Internal product development: DART outcomes may form part of future products (i.e. Flight Planning Tools).

4.2 TRL-1: Basic Principles

Proof of concept will be performed through the development and analysis of the methods and techniques to be developed in WP2 and WP3, in conjunction to the datasets provided by WP1. The analysis will demonstrate the feasibility of using the proposed datasets and technical approaches.

Additionally, the operational feasibility of the implementation of the proposed solutions and services in a DCB environment will be studied in the context of specific use cases.

At this level, main project outcomes will be research papers published in relevant journals and/or conferences. These papers should present the DART approach to the scientific research community, aiming at facilitating awareness and discussion about the proposed solutions.

4.3 TRL-2: Technology Concept Formulated

The DART use cases (defined in D3.1 - Collaborative Trajectory Predictions Scenarios and Requirements Specification) will assess the feasibility of applying data-driven prediction techniques to existing Demand & Capacity Balance (DCB) applications.

The results of the validation of the proposed prototypes will be used to assess:

- Accuracy of individual trajectory and traffic predictions
- Improvement of on selected Key Performance Indicators (KPI) such as identification of departure delays or traffic counts within an airspace volume.

The results arising from the prototype analysis will be used to communicate and demonstrate the project results to selected users.

Main target at this level will be the SESAR 2020 participants, raising awareness about expected benefits coming from the DART approach.

5 IPR Management

5.1 Introduction

Intellectual Property Rights (IPR) Management is governed through both the Grant Agreement (GA) [2] and the Consortium Agreement (CA) [3] documents. This section provides additional details regarding its application and management as proposed by the European IPR Help Desk [5].

If project results are interesting enough for the selected application, the partners will seek patent protection, independently of further research investment, to ensure early protection of the development.

Consortium members will have access rights to all background and foreground information required to execute the project according to the plan and to later exploit the project outcomes.

5.2 Open Access to articles and deliverables

DART members are strongly encouraged to provide open access to other publications than those strictly required under the GA (peer-reviewed publications). Open access refers to online research outputs that are free of all restrictions on access (e.g., access tolls) and free of many restrictions on use (e.g. certain copyright and license restrictions).

Decisions on open access to deliverables and any other relevant documents and project outcomes beyond those defined in the GA will be agreed by DART members in accordance to that included in the CA and considering all the individual interests and requirements.

5.3 Regular reviews of project outputs to stimulate disclosure

To ensure that all project outputs are disseminated and exploited as widely as possible, the Consortium will review the available results as part of the DART Executive Board meetings. To ensure this, an item will be regularly included in the meeting's agenda.

5.4 Search for patentability, overlap, and/or potential partners/collaborator

Conducting, patent searches is useful to identify technical and commercial information that can be used to:

- Identify barriers to developing an IP strategy ;
- Define the state of the art ;
- Check if the Consortium does not infringe someone else's rights.

It is suggested that partners conduct patent searches through the use of the Espacenet[2] website http://worldwide.espacenet.com/

The Project Management Support Team will assess the need to patent specific aspects of the work performed by DART. The assessment will take into consideration the possibility of declaring the work as confidential until research has been completed, as well as the costs associated with the process.

In case of potential IPR infringements, the Project Coordinator will request help to the European IPR Helpdesk, whose main mission is to assist beneficiaries of EU funded research projects with IP and IPR matters.

[2] Espacenet is a database provided by the European Patent Office, which allows free access to more than 70 million patent documents worldwide.

References

[1] H2020 Communicating EU research and innovation guidance for project, Edition 01.00.00, 25/09/2014

[2] DART, DART 699299 Grant Agreement, 14/06/2016.

[3] DART, DART 699299 Consortium Agreement, v1.0, 18/02/2016.

[4] DART, Project Management Plan D4.1, Edition 02.00.00, 25/08/2016.

[5] Your Guide to IPR in Horizon 2020, The European IPR Help Desk.