

ESTiMat

D7.1 Plan on Communication, Dissemination and Exploitation of project results Version 6.0

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1. Executive Summary

This document defines the communication, dissemination and exploitation objectives for the ESTiMatE project, as well as target audiences, dissemination channels, interaction with similar projects, the activities to be done during the project, and the policy used to communicate and disseminate the results.

The aim of this document is to define the strategy for disseminating, communicating and exploiting the project results taking into account the major impact that this project will have on society. This plan intends to communicate the benefits of ESTiMatE's research to target groups such as research institutions, industry stakeholders, policy makers and the wider public. The strong presence of leading industries and research HPC institutions will help ensure wider dissemination through scientific channels, while the industrial partners will focus more on the exploitation and technology transfer activities.

2. Introduction

The main purpose of the Exploitation and Dissemination work package (WP7) is to maximise the visibility and impact of the project. It will support the communication and dissemination work by the partners and scientists involved, as well as collaborating with related EU projects that might benefit from the project's results. This document presents the target audiences, communication channels, dissemination and exploitation activities for the ESTiMatE project.

3. General objectives

The main objectives for communication, dissemination and exploitation of the ESTiMatE project are:

Awareness

- To raise awareness about the ESTiMatE's status and updates among project partners
- To disseminate its results to the major academic stakeholders in the European and international scientific and research communities.
- To communicate the project's actions and results to the media and general public.

Community building

- To build an online community among individuals from the research, scientific, industrial and related sectors and fields.
- To help strengthen information exchanges between European aerospace related industries and research.

Take-up and use

- To communicate the potential benefits of ESTiMatE 's research to industry stakeholders and the wider public.
- Provide access to the generated data from simulations and experiments on the test rigs from TUB and KIT for CFD validation on flow dynamics and emissions via the Turbulent Combustion of Sprays Workshop from ERCOFTAC, the International Sooting Flame Workshop from the Combustion Institute or the TNF-Workshop International Workshop on Measurement and Computation of Turbulent Flames.
- To facilitate cross-fertilization with other projects working on overlapping areas.
- To identify the exploitable results of the project and define the potential commercial products and commercial strategies for these results (target market, business model(s), distribution channels and promotional strategy) to reach the market.

3.1 Target audiences

This section lists the target audiences of the ESTiMatE project. The project plans to attract the attention and possible engagement of the following groups:

- ESTiMatE project partners
- Scientific community involved in the topics related to the project (with special emphasis on the aerospace and automotive sectors)
- Industrial energy stakeholders (atmosphere, aerospace and aviation markets)
- Policy makers and governmental institutions
- Research organizations (like PRACE)
- Researchers in the EU and international projects
- Media outlets
- General public

The main value of the project to different target audiences has been identified and key messages drafted based on this value proposition, along with the most appropriate communication channels for the audience. A table summarising this information may be found overleaf.

Target audience	Value proposition	Key messages	Register	Channels
ESTiMatE partners	Clear and constant communication among partners	<p>ESTiMatE will let all partners know when there are important updates and developments regarding the project.</p> <p>Clear and constant communication will help make the project a success.</p>	For specialists and non-specialists	<p>Face-to-face meetings</p> <p>Project meetings</p> <p>Website intranet</p> <p>Emails</p>
HPC researchers and application developers	<p>Improved efficiency of HPC codes</p> <p>Greater energy efficiency in soot formation simulations</p>	<p>ESTiMatE will develop a modelling strategy using CFD simulations for the prediction of soot in terms of chemical evolution and particle formation in conditions relevant to aero engine operation.</p> <p>ESTiMatE will develop efficient algorithms for the coupling of soot particles with gas phase dynamics allowing the use of large-scale applications with high computational efficiency.</p> <p>ESTiMatE will contribute to the characterization and prediction of the combustion process and subsequent emissions, to increase the productivity and reliability of soot predictions in the aeronautical sector.</p>	For specialists	<p>Website</p> <p>Social media</p> <p>Print material e.g. flyers, posters</p> <p>Publications</p> <p>Events such as SC and ISC</p> <p>Press releases</p>
Researchers and engineers	Improved CFD simulations and soot modelling	ESTiMatE will provide beyond state-of-the-art computational methods for combustion research	For specialists	<p>Website</p> <p>Social media</p> <p>Print material e.g. flyers, posters</p> <p>Publications</p> <p>Events such as ISFS 2020 and the International Symposium on Combustion</p> <p>Press releases</p>

Target audience	Value proposition	Key messages	Register	Channels
Industry stakeholders e.g. engine providers, combustion companies	<p>Enhanced understanding of propulsion and combustion thanks to accurate scaling simulations</p> <p>More accurate and robust computational methodologies to predict and assess particulate matter in propulsive systems</p> <p>Opportunities for EU companies in International markets</p>	<p>ESTiMatE will allow aerospace industry to become more efficient and therefore much more competitive</p> <p>ESTiMatE will pave the way to develop computational models and advance methodologies to predict particulate matter, more specifically soot particles in jet engines.</p> <p>ESTiMatE will open up possibilities for EU energy companies to operate in International markets</p>	For specialists	<p>Website</p> <p>Social media</p> <p>Print material e.g. flyers, posters</p> <p>Publications</p> <p>Events such as the European Combustion Meeting from the Combustion Institute, the International Conference on Numerical Combustion – SIAM, ASME Turbo Expo, Combustion Symposium, the AIAA Science and Technology Forum and Exposition (AIAA SciTech), the ETMM International ERCOFTAC Symposium (Engineering Turbulence Modelling and Measurements) or the CEAS Air and Space Conference.</p> <p>Press releases</p>
Policy makers	<p>Strengthening EU capabilities in developing advance physical models and methodologies to predict pollutant formation and combustion efficiency in aircraft engines</p> <p>Opening up new opportunities in new markets for EU companies</p>	<p>ESTiMatE will strengthen the EU aerospace and energy sectors through simulation codes ready for the pre-exascale era.</p> <p>ESTiMatE will help open new markets to EU companies</p>	For non-specialists	<p>Website</p> <p>Social media</p> <p>Print material e.g. flyers, posters</p> <p>Events such as EURO THERM and Aerospace Europe Conference</p> <p>Press releases</p>
Wider public	<p>Advancing high-performance computing at the service of the EU aerospace, aeronautical and energy sectors</p>	<p>ESTiMatE will enable high-performance simulations capable of driving forward the aerospace, aeronautical and energy sectors in the EU</p>	For non-specialists	<p>Website</p> <p>Social media</p> <p>Print material e.g. flyers, posters</p> <p>Press releases</p>

Table 1: Communication/dissemination strategy for target audiences

3.2 Dissemination team

WP7 is led by the Barcelona Supercomputing Center. With a focus on communication and dissemination, other partner institutions have each defined a dissemination representative who will support the efforts of the project. They are shown in the table below:

Participant role	Participant organisation name	Person(s) responsible	PMs
WP EU Leader	BSC	Rose Gregorio	4
Exploitation Manager	BSC	Joan Farnós	2
Participant	TUB	Panagiotis Stathopoulos	1
Participant	UPV	José M García-Oliver	1
Participant	TU/e	Abhijit Kalbhor	1
Participant	TUD	Federica Ferraro	1
Participant	KIT	Alexandra Loukou	1
Participant	USTUTT	Astrid Ramírez	1

Table 2: ESTiMatE dissemination team

Given that coordination between the European partners is key for the success of the project, the dissemination leader will ensure regular internal communication through emails and teleconferences.

It is important to highlight that each project partner will be responsible for identifying the contacts associated with their own institutions to be used to share the results of the projects. In addition, the WP7 dissemination leader will ensure that each partner fulfils the following requirements:

- Include a link from the partner’s website to the ESTiMatE project website
- Disseminate press releases to their own press contacts
- Include at least one article in an organization-related publication (website, newsletter or other) during the project
- Disseminate the promotional material, where appropriate.

4. Corporate image

A common graphic identity in all communication and dissemination tasks allows better visibility and recognition as well as branding of the project. All communication and dissemination materials will include the name of the project, the website and the graphic elements described in this section such as the logo, written in English (UK), Arial font, and the corresponding template, if applicable.

The brand of the ESTiMatE project includes its corporate image, brand and style. Guidelines will be given to all partners to ensure coherence and consistency.

4.1 Logo

The main image of the project is the design of the logo, as follows:



Figure 1: ESTIMATE project logo

The logo combines different elements that make up the ESTIMATE project. The red lines symbolize energy, the black lines soot formation.

This logo, chosen through a majority vote of ESTiMatE partners, should be included in all documentation related to the project and should be ideally used in colour. There is also a black and white version of this logo to be applied with coloured backgrounds, if needed. All versions of this logo can be downloaded in different formats (svg, jpg, png) from the download section of the website.

4.2 Typography

The font used in the website is the Source Sans Pro typography, in different thicknesses depending on the kind of text where it is used.

The recommended font to be used for all reporting documentation is Arial because this font is available on the vast majority of computers. Arial should be used in documents such as deliverables.

4.3 Language

The official language of the ESTiMatE project is British English. However, the dissemination material should be translated into the different partners' languages, where possible. Each partner should ensure that the materials are adequately translated into the local languages, e.g. in the case of the press releases for local media. Funding for this is not included in the dissemination budget.

4.4 Project templates

A set of designed templates will be used in the project.

4.4.1 PowerPoint

The PowerPoint template will be used in all presentations done by all partners and will be added onto the project portal for all partners to be use. This template gives some design guidelines, as well as a general-purpose ESTiMatE PowerPoint

content template that can be incorporated into other presentations in order to communicate and disseminate the project and its results.



Figure 2: ESTiMatE PowerPoint template

4.4.2 Poster

All ESTiMatE posters will follow a template that will be added onto the Project portal for all partners to use.



Figure 3: ESTiMatE poster template

4.4.3 Deliverables

All deliverables will follow a similar look and feel, and structure, as this facilitates the reading. The template will be included in the intranet. All public deliverables will be uploaded onto the Deliverables page of the website.



Figure 4: ESTiMatE deliverable template

5. Internal communication and dissemination channels

The internal communication channels will be used to communicate with project partners clearly, effectively and consistently to ensure the project's success. ESTiMatE recognises that it is important for project partners to have a clear idea about the progress and issues within the project. Besides face-to-face meetings which are planned every six months in different partner institutions, ESTiMatE has defined several other internal communication channels such as teleconferences, the website intranet, and emails.

5.1 Teleconferences

ESTiMatE plans to have a general teleconference that will involve all project partners every three months. The platform that will be used is Zoom, a remote conferencing service that combines video conferencing, online meetings, chat, and mobile

collaboration. The progress of each work package will be reported and project issues will be discussed. Minutes will be taken and then sent to project partners via email to revise as they see fit. Once the minutes are finalised, the final version will be sent to all partners then archived in the project's intranet.

Depending on the need, technical work packages will arrange their own teleconferences where they can have more informal discussions about their work.

5.2 Website intranet

Project partners will be given access to the intranet, which can be found on the ESTiMatE website. The intranet will serve as a repository that will include documents such as:

- Dissemination templates
- Presentations at events
- Photos from events and other project activities
- Publication pre-prints
- Monthly teleconference minutes

Partners will be constantly reminded to upload these documents to the intranet in order to facilitate the easy exchange of information within the project.

5.3 Emails

Emails are the most common form of communication among project partners. The following mailing lists have been created in order for different groups within the project to communicate effectively:

Mailing list	Receiver
estimate-project@bsc.es	All project partners
estimate-legal@bsc.es	Legal contacts of each partner

Table 3: ESTiMatE mailing lists

6. External communication and dissemination channels

A number of channels will be used to reach the different target audiences specified above, to ensure that they are aware of the ESTiMatE project and its strategic importance for Europe. They will also be used to create a community of researchers and industry partners around the project, and eventually to encourage the take-up and use of the project results.

6.1 Website

All partners will be notified once the public website (www.estimate-project.eu) has gone live. As the project's flagship channel for communicating and disseminating information, the website will play a central role. It will provide general information about the project's objectives, current activities, publications and achievements.

The WP7 dissemination leader, in collaboration with the dissemination team, are the main people responsible for editing the website content, website deliverables, feedback and statistics. The website will probably be the first contact for all target audiences and will be regularly updated by all WPs.

The website will be designed with the content management system Drupal. This system will be managed by a webmaster and web design team located in the Operations team at the Barcelona Supercomputing Center.

The ESTiMatE webpage will use a visitor statistics monitoring system from Google Analytics. This information will help to improve the content and structure of the site, as well as having more information about the target audience. The results will be included in the "Dissemination and Exploitation Report" deliverable.

The website has been designed as a multi-device experience that works well across different device types: PCs, tablets and mobile phones.

6.2. Social media

Social media is now considered one of the most effective dissemination channels to reach the [above mentioned target audiences](#). Social media will be used by ESTiMatE to:

- raise awareness about the project
- share content and information with peers from within the sector
- share content and information with a more general audience
- make industry and expert contacts in order to build a community around the project
- drive traffic to the project website

As ESTiMatE is a project under the Clean Sky 2 Joint Undertaking umbrella, ESTiMatE plans to post social media content about the project through the Clean Sky social media channels such as Twitter and LinkedIn. Additionally, ESTiMatE will also ask project partners to post content on their institutional social media channels since they already have an established number of followers. The primary social media channels used will be Twitter and LinkedIn. For the video due on M36, we will make use of the Clean Sky 2 and BSC YouTube channels.

Finally, we will also ask the EC Project Officer and dissemination team associated with ESTiMatE to help communicate and disseminate the project related news on

their own social media channels and news services such as CORDIS.

6.3 Dissemination pack

6.3.1 General leaflet

The general leaflet will provide information about the ESTiMatE project, its objectives and future achievements and its impact or benefit to society. The leaflet will be uploaded to the downloads section of the website so that project partners can easily download and print it for their own dissemination purposes. It will also be distributed at events, as well as to local scientific and industrial contacts defined by each partner.

6.3.2 Poster

A general poster will be designed to be used by all partners in ESTiMatE communication and dissemination activities. It will be used in all events where ESTiMatE needs to be promoted. The general poster will be periodically updated, if needed.

6.4 Publications

All publications resulting from the project (publications, white papers, technical reports, etc.) should include the following acknowledgement sentence:

The research leading to these results has received funding from the Clean Sky 2 Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No. 821418.

Partners should notify the consortium 45 days before publication. Any objection to publication must be made within 30 days of receipt of the notice.

6.4.1 Open access

The consortium is committed to providing at least “green” open access publications wherever feasible. The dissemination team has reviewed the [Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020](#) and defined a strategy for knowledge management and protection.

Green open-access means that the published article or the final peer-reviewed manuscript is deposited in an online repository, which should be interoperable within OpenAIRE. Some publishers request that open access may be granted only after an embargo period has elapsed. To comply with Horizon 2020 rules, authors must ensure open access to the publication within at most 6 months after publication to a third party publisher.

The metadata should also be included and available under open access. These should include:

- Terms [“European Union (EU)” & “Horizon 2020”] [Clean Sky 2]
- Name of the action, acronym and grant number
- Publication date, embargo period length (if applicable) and a persistent identifier, e.g. DOI

Each ESTiMatE partner institution maintains an open repository where project partners will upload their publications. They are presented below:

Institution	Open repository
BSC	UPCommons
TUB	DepositOnce
UPV	RuiNet
TU/e	Eindhoven University of Technology research portal
TUD	TUprints
KIT	KITopen
USTUTT	elib

Table 4: ESTiMatE partner institution open access repositories

6.5 Events

An important dissemination channel will be attendance and presentations at high level peer-reviewed conferences in the fields including aerospace, aeronautics, energy and HPC. Presenting the latest updates of the project at such events, meetings or workshops will be an effective means of involving industry leaders in discussions early on. The information will be previously announced on the “Events” page and, if necessary, highlighted in the website and disseminated through social media. A table listing the events that ESTiMatE partners plan to attend can be found [here](#).

7. Press strategy

The press strategy will be consistent with the communication and dissemination strategy and its objectives.

Press releases are one of the most effective ways of communicating the existence of the ESTiMatE project to a specific target audience (general public and related institutions). Press releases attract attention to the project’s progress and its achievements. The initial press release will set out ESTiMatE project objectives and workplan. At the end of the project another press release will be produced to promote the project’s results.

The content and date of the press release(s) should be ideally agreed by all project partners. Each partner has the responsibility of translating the press release from English into their own local language and distributing it to local media contacts.

All press releases will be included in the ESTiMatE News section of the project website.

In addition, all partners will have the opportunity to publish press releases on their institutional websites (example: BSC will include the press release into the press section of the website) in order to increase click rates. The ESTiMatE website will also include all press releases in all languages as well as all press clippings.

8. Results analysis

All communication and dissemination activities and tasks will be carefully monitored. Quality metrics will be examined, and quantitative indicators could include the following:

- Number of press clippings in national and international media
- Number of unique website visitors and their location captured by Google Analytics
- Number of ESTiMatE related presentations at public events and events where ESTiMatE has been present, i.e. through exhibition booths or conference presentations
- Number of scientific publications

Key Performance Indicator	Description	Total target (by the end of the project)
Press releases	At least 1 in a year	3
Media clippings	Articles in the press about ESTiMatE	10
Project brochure	At least one brochure that will be updated if necessary	1
Website sessions	Number of sessions registered by Google Analytics	1,000 sessions/year
Project presentations	Numbers of presentations about ESTiMatE research at conferences, workshops, etc.	15
Scientific publications	Peer-reviewed journals, conference proceedings, etc. – in green open access.	10

Table 5: Key Performance Indicators

9. Planned communication and dissemination activities

The tables below present the list of communication and dissemination activities foreseen throughout the project. This includes publications, conference and workshop presentations as well as website, social media and press efforts. These are initial plans and could change depending on project circumstances.

In order to maintain an updated and accurate record of ESTiMatE's communication and dissemination activities, project partners will be asked to send the WP7 dissemination leader an updated log following the defined template every three months. An email will be sent to the partners right before the end of every three months as a reminder. A master list of all ESTiMatE activities will be continually updated throughout the project.

List of scientific (peer reviewed) publications and technical papers										
No.	Title	Main author	Title of the periodical or the series or the event	Number, date or frequency (N/A for events)	Publisher or organiser	Place of publication or event venue	Year of publication or event	Relevant pages or event session	Permanent identifiers (if available)	Is/Will open access provided to this publication?
1	Experimental and kinetic study of furfural oxidation (Submitted)	USTUTT	Combustion and Flame	TBC	Elsevier	TBC	2020 Q2	TBC	TBC	Yes
2	Erneuerbare alternative Treibstoffe für die Luftfahrt (Renewable alternative fuels for aviation – Accepted)	USTUTT	REUSS 2020 Jahrbuch der Luft- und Raumfahrt (Annals of Aviation and Aerospace)	TBC	German Aerospace Society - Lilienthal-Oberth e.V. (DGLR)	Bonn, Germany	2020 Q2	TBC	TBC	Yes
3	Effects of hydrogen enrichment and water vapour dilution on soot formation in laminar ethylene counterflow flames (Under review)	TU/e	International Journal of Hydrogen Energy	TBC	Elsevier	TBC	2020 Q3	TBC	TBC	Yes
4	Kinetics of kerosene fuels – A comparative experimental and modelling study	USTUTT	Fuel	TBC	Elsevier	TBC	2020 Q3	TBC	TBC	Yes
5	A combined experimental	USTUTT	Combustion	TBC	Elsevier	TBC	2020 Q3/4	TBC	TBC	Yes

	and modeling study of the combustion properties of an isoparaffinic alcohol-to-jet fuel (In preparation)		and Flame							
6	Evaluation of Quadrature-based Moment Methods in turbulent premixed combustion (Under review)	TUD	Proceeding of Combustion Institute 2020	TBC	The Combustion Institute	TBC	2020 Q4	TBC	TBC	Yes
7	Oxidation of kerosene surrogates: A Chemical Kinetic Modelling Study	USTUTT	Journal of Engineering for Gas Turbines and Power	TBC	ASME	TBC	2020 Q4	TBC	TBC	Yes
8	Soot measurements in counterflow non-premixed flames under pressurized conditions	KIT	Combustion and Flame	TBC	Elsevier	TBC	2021 Q1	TBC	TBC	Yes
9	Assessment, validation and computational performance of sectional soot model and FGM coupling for laminar and turbulent flames	TU/e	Combustion and Flame	TBC	Elsevier	TBC	2021 Q1	TBC	TBC	Yes
10	Modelling soot formation with Quadrature method of moments (QMOM) in turbulent flames	TUD	Combustion and Flame	TBC	Elsevier	TBC	2021 Q1	TBC	TBC	Yes

11	Development of a CMC method in the finite element framework	BSC	Flow Turbulence and Combustion	TBC	Springer	TBC	2021 Q1	TBC	TBC	Yes
12	Parallel performance optimization of detailed chemistry calculations	BSC	Computers and Fluids	TBC	Elsevier	TBC	2021 Q1	TBC	TBC	Yes
13	Influence of operating conditions on primary atomization	UPV	International Journal of Multiphase Flow	TBC	Elsevier	TBC	2021Q2	TBC	TBC	Yes
14	Modelling of species profiles of kerosene surrogates measured in atmospheric laminar flames	USTUTT	Combustion and Flame	TBC	Elsevier	TBC	2021 Q2	TBC	TBC	Yes
15	Evaluation of soot formation in turbulent flames of kerosene surrogate	TUD	Journal of Engineering for Gas Turbines and Power	TBC	ASME	TBC	2021 Q3	TBC	TBC	Yes
16	Study of soot formation in turbulent flames of kerosene surrogate	BSC	Combustion and Flame	TBC	Elsevier	TBC	2021 Q3	TBC	TBC	Yes
17	Development of a phenomenological model for air-blast atomizers	UPV	Atomization & Sprays	TBC	Begell House	TBC	2021Q3	TBC	TBC	Yes
Optional										
18	Modelling of species profiles of kerosene surrogates	USTUTT	Proceeding of	TBC	Elsevier	TBC	2021 Q4	TBC	TBC	Yes

	measured in counterflow flames at ambient and elevated pressure		Combustion Institute 2022							
19	Results of turbulent counter flow flame measurements	TUB	Combustion and Flame	TBC	Elsevier	TBC	2021 Q4	TBC	TBC	Yes
20	Development of kinetic mechanisms for jet fuels: Evaluating the Reaction Pathways to further integration with soot models	USTUTT	Combustion and Flame	TBC	Elsevier	TBC	2022 Q1	TBC	TBC	Yes
21	LES of soot formation in turbulent Jet-A flames using sectional soot model and FGM chemistry	TU/e	Combustion and Flame	TBC	Elsevier	TBC	2022 Q2	TBC	TBC	Yes
22	Modelling and evaluation of soot formation with Quadrature method of moments (QMOM) in laminar flames of kerosene surrogate	TUD	Proceeding of Combustion Institute 2022	TBC	Elsevier	TBC	2022 Q3	TBC	TBC	Yes

Table 6: List of planned publications

List of dissemination activities

No.	Type of activities	Main leader	Title	Date/Period	Place	Type of audience	Size of audience	Countries addressed
1	Conference presentation	TU/e	Combura: NVV 2019 (Assessment of a sectional model for soot formation in laminar flames: sensitivity to model parameters, and application to practical fuels)	9-10 October 2019	Soesterberg, The Netherlands	All	TBC	TBC
2	Workshop presentation	USTUTT	Workshop for Women in High Temperature Energy Technologies (Alternative fuels)	30-31 March 2020 (New date TBC)	Dresden, Germany	All	TBC	TBC
3	Conference presentation	BSC	13th International ERCOFTAC symposium on engineering, turbulence, modelling and measurements (Assessment of soot precursors in high-pressure spray flames using large-eddy simulations with reduced chemistry)	23-25 September 2020	Rhodes, Greece	All	TBC	TBC
4	Conference presentation	BSC	Parallel Computational Fluid Dynamics	26-28 October 2020	Nice, France	All	TBC	TBC

			International Conference 2020 (A dynamic load balance strategy for addressing chemical reactions in combustion problems)					
5	Conference presentation	TU/e	AIAA Science and Technology Forum and Exposition 2021 (Coupling sectional soot model with FGM in laminar flames)	11-15 January 2021	Nashville, Tennessee, USA	All	TBC	TBC
6	Workshop presentation	TUD	International Sooting Flame workshop - 38th International Symposium on Combustion (Evaluation of soot formation with Quadrature method of moments (QMOM) at combustor relevant conditions)	24-29 January 2021	Adelaide, Australia	All	TBC	TBC
7	Workshop presentation	USTUTT	International Sooting Flame workshop - 38th International Symposium on Combustion	24-29 January 2021	Adelaide, Australia	All	TBC	TBC

			(Modeling of one and two ring aromatics in low pressure flames)					
8	Conference presentation	TUD	38th International Symposium on Combustion (Evaluation of Quadrature-based Moment Methods in turbulent premixed combustion)	24-29 January 2021	Adelaide, Australia	All	TBC	TBC
9	Conference presentation	USTUTT	38th International Symposium on Combustion (Entanglement of <i>n</i> -Heptane and <i>iso</i> -Butanol Chemistries in Flames Fueled by their Mixtures)	24-29 January 2021	Adelaide, Australia	All	TBC	TBC
10	Conference presentation	BSC	ASME 2021 Turbo Expo Conference (Numerical investigation of kerosene spray flames at atmospheric pressure)	7-11 June 2021	Pittsburgh, Pennsylvania USA	All	TBC	TBC
11	Conference presentation	USTUTT	ASME 2021 Turbo Expo Conference	7-11 June 2021	Pittsburgh, Pennsylvania	All	TBC	TBC

			(Oxidation of kerosene surrogates: A Chemical Kinetic Modelling Study)		USA			
12	Conference presentation	TUD	ASME 2021 Turbo Expo Conference (Evaluation of soot formation in turbulent flames of kerosene surrogate)	7-11 June 2021	Pittsburgh, Pennsylvania USA	All	TBC	TBC
13	Conference presentation	TUB	ASME 2021 Turbo Expo Conference (Soot emissions of swirl stabilized burners)	7-11 June 2021	Pittsburgh, Pennsylvania USA	All	TBC	TBC
14	Conference presentation	KIT	15th International Conference on Energy for a Clean Environment (Results from the experiments in non-premixed counterflow flames under pressure will be presented)	July 4-8, 2021	Albufeira, Algarve, Portugal	All	TBC	TBC
15	Conference presentation	UPV	International Conference on Liquid Atomization & Spray Systems 2021 (Influence of DNS	29 August – 2 September 2021	Edinburgh, Scotland UK	All	TBC	TBC

			boundary conditions on primary atomization)					
16	Conference presentation	TU/e	18 International Conference on Numerical Combustion 2021 (Coupling sectional soot model with FGM in turbulent flames)	2021 (TBC)	TBC	All	TBC	TBC
17	Conference presentation	BSC	International Conference on Numerical Combustion 2021 (Modelling of sooting flames with detailed chemistry)	2021 (TBC)	TBC	All	TBC	TBC
18	Conference presentation	TUD	18th International Conference on Numerical Combustion 2021 (Modeling of soot formation in laminar and turbulent flames using a Quadrature-based Method of Moments)	2021 (TBC)	TBC	All	TBC	TBC
Optional								

19	Conference presentation	TU/e	74th Annual Meeting of the APS Division of Fluid Dynamics (Assessment of Coupling sectional soot model with FGM in turbulent flames)	21-23 November 2021	Phoenix, Arizona, USA	All	TBC	TBC
20	Conference presentation	KIT	10 th European Combustion Meeting (Results from the atmospheric experiments in non-premixed counterflow flames)	2021 (TBC)	Naples, Italy	All	TBC	TBC
21	Conference presentation	BSC	10 th European Combustion Meeting (Modelling approach for kerosene spray flames subjected to soot formation)	2021 (TBC)	Naples, Italy	All	TBC	TBC
22	Conference presentation	TU/e	10 th European Combustion Meeting (Results on modeling soot formation in aviation fuel surrogates using sectional methods and FGM)	2021 (TBC)	Naples, Italy	All	TBC	TBC

23	Conference presentation	USTUTT	10 th European Combustion Meeting (A Modeling Study of Kerosene focusing on PAHs and their precursors)	2021 (TBC)	Naples, Italy	All	TBC	TBC
24	Conference presentation	TUD	10 th European Combustion Meeting (Evaluation of soot formation in flames of kerosene surrogate using QMOM)	2021 (TBC)	Naples, Italy	All	TBC	TBC
25	Conference presentation	BSC	12 th Mediterranean Combustion Symposium (Impact of turbulence/chemistry interactions on soot formation)	2021 (TBC)	TBC	All	TBC	TBC
26	Conference presentation	TUD	12 th Mediterranean Combustion Symposium (LES of turbulent sooting flames of kerosene surrogate using QMOM)	2021 (TBC)	TBC	All	TBC	TBC
27	Conference presentation	TU/e	ASME 2022 Turbo Expo Conference 2022	13-17 June 2022	Rotterdam, The Netherlands	All	TBC	TBC

			(LES of soot formation in Jet A fuel in Low TRL rig geometry)					
28	Conference presentation	TU/e	39th International Symposium on Combustion (LES of soot formation in Jet A fuel in combustor relevant conditions)	2022 (TBC)	TBC	All	TBC	TBC
29	Conference presentation	USTUTT	ASME 2022 Turbo Expo Conference 2022 (Modeling study of the sooting tendency of kerosene and their surrogates)	2022 (TBC)	TBC	All	TBC	TBC
30	Conference presentation	USTUTT	39th International Symposium on Combustion (PAHs reaction pathways and integration with insoot models – Experimental and chemical kinetic Study)	2022 (TBC)	TBC	All	TBC	TBC

31	Conference presentation	TUD	39 th International Symposium on Combustion (Modelling and evaluation of soot formation with Quadrature method of moments (QMOM) in laminar flames of kerosene surrogate)	2022 (TBC)	TBC	All	TBC	TBC
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Table 7: List of planned dissemination activities

List of communication activities								
No.	Type of activities	Main leader	Title/Subject	Date/Period	Place	Type of audience	Size of audience	Countries addressed
1	Website	BSC	ESTiMatE news on BSC website	10 March 2020	Online	Scientific community	TBC	All
2	Website	BSC	Website launch	May 2020	Online	All	TBC	TBC
3	Flyers	BSC	Project flyer uploaded to website	May 2020	Online	All	TBC	TBC
4	Press release	BSC	ESTiMatE press release	May 2020	Online	Scientific community/General audience	TBC	TBC
5	Website	TUD	News item on ESTiMatE website	June 2020	Online	TBC	TBC	TBC
6	Website	TUe	News item on ESTiMatE website	July 2020	Online	TBC	TBC	TBC
7	Website	BSC	News item on ESTiMatE	August 2020	Online	TBC	TBC	TBC

			website					
8	Website	TUB	News item on ESTiMatE website	September 2020	Online	TBC	TBC	TBC
9	Website	UPV	News item on ESTiMatE website	October 2020	Online	TBC	TBC	TBC
10	Website	TUD	News item on ESTiMatE website	November 2020	Online	TBC	TBC	TBC
11	Website	TU/e	News item on ESTiMatE website	December 2020	Online	TBC	TBC	TBC
12	Website	BSC	News item on ESTiMatE website	January 2021	Online	TBC	TBC	TBC
13	Press release	BSC	ESTiMatE press release about project results	January 2021	Online	Scientific community/General audience	TBC	BSC
14	Website	TUB	News item on ESTiMatE website	February 2021	Online	TBC	TBC	TBC
15	Website	UPV	News item on ESTiMatE website	March 2021	Online	TBC	TBC	TBC
16	Website	TUD	News item on ESTiMatE website	April 2021	Online	TBC	TBC	TBC
17	Website	TU/e	News item on ESTiMatE website	May 2021	Online	TBC	TBC	TBC
18	Website	BSC	News item on ESTiMatE website	June 2021	Online	TBC	TBC	TBC
19	Website	TUB	News item on ESTiMatE website	July 2021	Online	TBC	TBC	TBC
20	Website	UPV	News item on ESTiMatE website	August 2021	Online	TBC	TBC	TBC
21	Website	TUD	News item on ESTiMatE website	September 2021	Online	TBC	TBC	TBC
22	Press release	BSC	ESTiMatE press release	October 2021	Online	All	TBC	TBC

			about project results					
23	Website	TU/e	News item on ESTiMatE website	October 2021	Online	TBC	TBC	TBC
24	Videos	BSC	ESTiMatE video	October 2021	Online	All	TBC	TBC
Optional								
25	Website	BSC	News item on ESTiMatE website	November 2021	Online	TBC	TBC	TBC
26	Website	TUB	News item on ESTiMatE website	December 2021	Online	TBC	TBC	TBC
27	Website	UPV	News item on ESTiMatE website	January 2022	Online	TBC	TBC	TBC
28	Website	TUD	News item on ESTiMatE website	February 2022	Online	TBC	TBC	TBC
29	Website	TU/e	News item on ESTiMatE website	March 2022	Online	TBC	TBC	TBC
30	Website	BSC	News item on ESTiMatE website	April 2022	Online	TBC	TBC	TBC
31	Website	TUB	News item on ESTiMatE website	May 2022	Online	TBC	TBC	TBC
32	Website	UPV	News item on ESTiMatE website	June 2022	Online	TBC	TBC	TBC
33	Website	TUD	News item on ESTiMatE website	July 2022	Online	TBC	TBC	TBC
34	Press release	BSC	ESTiMatE press release about project results	July 2021	Online	All	TBC	TBC

Table 8: List of planned communication activities

10. Exploitation

Together with dissemination, WP7 includes the exploitation of the results and the knowledge transfer of the project to the research community, industry, policymakers and society.

Exploitation from a scientific and industrial perspective is a major commitment for ESTiMatE, as testified by the balanced consortium including a diversity of organizations. The objective is to identify the exploitable results of the project and define the potential commercial products and commercial strategies for these results (target market, business model(s), distribution channels and promotional strategy) to reach the market.

The outcome of the proposed numerical studies and reference experiments will be of great interest for the academic community interested in understanding the fundamental mechanisms behind the formation and characterization of soot formation and pollutant emissions in aero engine combustors and also on the operation of aero engine combustors in conditions of lean burn. The core activities in ESTiMatE will be developed across Germany, Spain and The Netherlands where each institution will be responsible for specific activities described in the work plan.

Through this task, the ESTiMatE consortium will build a deep understanding of the project market and exploitation context, aiming at providing a solid base for further exploitation actions. Another sign of the interest of the consortium for the utilization of the project results is the involvement of the ITP, Rolls-Royce, which is following up the progress of the project not only during the GA face-to-face meetings and provide feedback, but also in the remote meetings. With the objective of maximizing exploitation possibilities, the exploitation team lead will perform the following activities:

The main activities are:

- **Analysis of the exploitation context.** It is being carried out in order to find out what is the actual market situation for the different codes and applications covered by the project. The potential target markets (or target users) and the early adopters have been initially identified and analysed in Deliverable 7.1: Plan on Communication, Dissemination and Exploitation of Project Results. These are both the aviation industry and engine manufacturers.
- **Exploitation strategy.** Based on the exploitation context analysis, the Dissemination and Exploitation Report will be produced and assembled in Deliverable 7.2. Initial discussions are being addressed.
- **IP strategy.** The Intellectual Property status of the project codes and technologies are being identified and an appropriate protection strategy will be proposed to ensure an appropriate technology transfer.
- **Initial analysis of the market size and business opportunities** to find out what is the actual market situation for the different applications covered in the project.
- **Assessment of the competitive environment** of the project is being addressed: technology readiness, integration, standardization and regulatory,

policy framework at the targeted markets, and future trends at the social, business and policy levels.

- Synergies with major European projects and initiatives will be promoted.
- **Dissemination activities** related with the exploitation of the results, such as publications in international conferences and journals, and presentation of results in trade fairs, workshops and related events or press releases in technical media, widely explained in the previous sections.

It will be crucial to address strengths (benefits), weaknesses (drawbacks and prerequisites), opportunities (existing conditions suitable to promote the wide adoption of results) and threats, and will constitute the basis for planning a successful exploitation.

The consortium partners have already identified their intentions for using and exploiting the results of the project. They are presented in the table below:

Partner	Exploitation Plans
BSC	<p>BSC will use the results of this project to improve its internal research lines in the fields of pre-exascale computing, aerodynamics, combustion and fuels for transportation. The main benefits will be the development of new algorithms and methods, and the collaboration with key partners from EU.</p> <p>Our collaboration with EU research groups will be consolidated and reflected in joint publications, organization of events, etc. Some of the BSC developments in this project will be used inside Rolls-Royce and simulation platforms, increasing BSC's exposition to industrial relevant problems and thus enhancing BSC's technology transfer.</p>
TUB	<p>TUB will use the existing project to start its activities in detailed experimental investigations of spray flames. The scope goes well beyond the activities of the project and aims at the study of swirl-stabilized spray flames, under pressure. Beyond the know-how built in the current project, these activities will also consider thermo-acoustic investigations of spray flames under pressure.</p> <p>The results of the project will be directly published in peer-revised journals (like combustion and flame) and in acclaimed international conferences like the Asme Turbo Expo.</p>
UPV	<p>By means of ESTiMatE, UPV will strengthen its activities within the field of Gas Turbine numerical simulations. From a scientific perspective, developed atomization, combustion and soot models will become part of its portfolio of tools to be used for the understanding of combustion processes. In particular, activities leading to the development of the atomization model will help build routines and procedures that can be of future use within the group.</p> <p>From an industrial point of view, UPV will use such tools in collaboration projects at European level, both with the industry and relevant scientific partners, with special focus on knowledge transfer.</p>
TU/e	<p>Main exploitation for TU/e is through the extension of Flamelet Generated Manifold (FGM) approach's capability in predicting soot formation in aero-engine relevant turbulent flames. The FGM-sectional soot model coupling will be incorporated in BSC's computational platform through collaborative efforts such that the developed framework would be compatible with PRECISE-UNS interface. During the project, our</p>

	collaboration with Rolls-Royce and ESTiMatE consortium partners will be consolidated through technology transfer.
TUD	The main exploitation of TUD is the further development of the Quadrature-based method of moments (QMOM) and the integration with the Stochastic Field Turbulence-Chemistry interaction model for predicting particulate matter formation and growth at aero engine conditions. The soot model will be integrated in PRECISE-UNS through an interface, extending the long term established collaboration with Rolls-Royce. Furthermore, during the project, the collaboration with the Estimate partners will be consolidated through joint activities and technology transfer.
KIT	The main exploitable result for KIT will be the extension of experimental methods and techniques for accurate characterisation of model flames under high-pressure conditions. Particularly for the determination of soot particle size distributions with optical diagnostics, which is one of the main research interests of our group, the comparison of our experimental datasets with numerical predictions from the other key partners in the project, will support the establishment and refinement of our methodologies. Our collaboration with the different EU research groups in the project will be consolidated and reflected in joint publications, organization of events, etc.
USTUTT	As a result of the ESTiMatE project IVLR will obtain an extended and optimized chemical kinetic kerosene mechanism able to predict reliably major combustion properties for a broad parameter range. Then, the focus will be the construction of a reduced mechanism starting from the validated detailed reaction models generated. This step also includes the further reduction of the size of the detailed generic fuel reaction model to ensure its suitability for the integration in numerical simulation. IVLR will also develop and improve algorithms to formulate fuels surrogates, optimize kinetic mechanism and reduce them for further use in CFD application. This knowledge will be exploited in future within the analysis of a broad range of fuels including e.g. synthetic kerosene focusing on their emissions performance and their consequences on environment to minimize the climate impact of aviation. IVLR institute will constantly interact with the project partners. Experiments performed by ESTiMaTe partners will provide relevant data to consolidate and to further develop and optimize the mechanisms. The interaction with the simulation groups will be devoted to generate a relevant, i.e. a reduced mechanism for their application. This collaboration with Rolls-Royce and ESTiMatE consortium partners will be consolidated through joint publications.

Table 9: Partners' exploitation plans

Although some public synthetic models will be generated, most data will be private to the companies involved, unless they want to exceptionally release it.

WP6 leaders and the dissemination manager will work on close coordination to ensure maximum dissemination and impact of the project.

Initial market context

The ESTIMATE's consortium main target segments/customers within the aviation industry are described below. For each customer we provide their reason to want to subscribe to our technology:

- 1. Airlines** are the main agents within the aviation sector and the most vulnerable to soot formation and emissions events. According to IATA, the number of flights is expected to duplicate every 5-10 years.

- 2. Engine Manufacturers that rent their aircraft engines to Airlines and provide annual maintenance based on a scheduled fee.** Engine manufactures perform tests on “wind tunnels” to have a good understanding of the impact on the engine’s lifetime and environmental footprint. However, they do not have a system in place to monitor the exposure of their engines by airlines renting the equipment and they need a commercial tool to keep track of the engine dose accumulated by engine during its lifetime.

At time of writing, according to The Boeing Company, leading indicators for the industry remain positive, with aircraft more productive and the share of stored aircraft in the fleet continuing to fall.

Combined with record load factors all are positive signs that supply and demand are currently well balanced and that the airlines and fleet continue to operate more efficiently. The International Air Transport Association (IATA) expects 7.8 billion passengers to travel in 2036, a near doubling of the 4 billion air travellers expected to fly this year. The prediction is based on a 3.6% average Compound Annual Growth Rate noted in the release of the latest update to the association’s 20-Year Air Passenger Forecast. This is consistent with the Airbus’ Global Market Forecast for the next 20 years, reporting a 4.4% global annual air traffic growth. In addition, the dedicated freight aircraft fleet in service is expected to increase by 50% in the next twenty years, mainly driven by Asia-Pacific. The biggest driver of commercial passenger aircraft fleet demand will be the Asia-Pacific region. The region will be the source of more than half the new passengers over the next two decades. The point at which China will displace the United States as the world’s largest aviation market (defined as traffic to, from and within) has moved two years closer since last year’s forecast. Planning for growth will require partnerships to be strengthened between the aviation industry, communities and governments to expand and modernize infrastructure.

Market size and focus targets: The market size and potential target market share for the ESTiMatE’s consortium target segments is summarized employing the TAM, SAM, SOM breakdown:

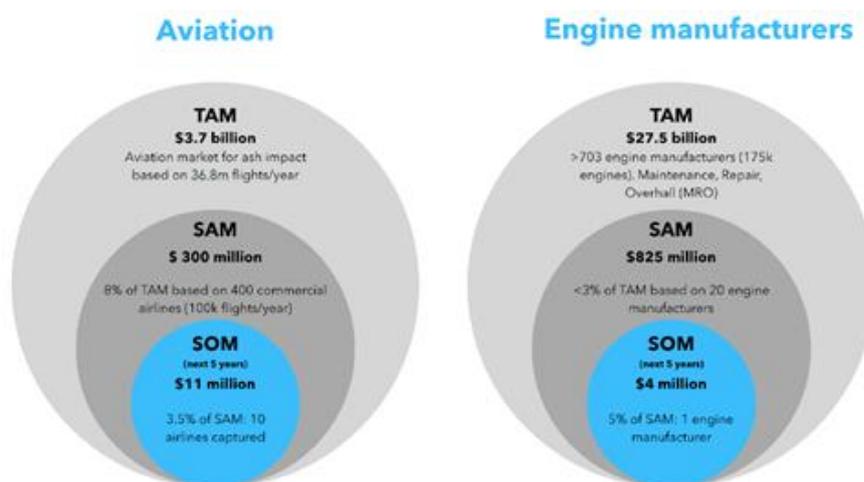


Figure 5: ESTiMatE Market Dive Analysis

TAM or Total Available Market is the total market demand for a product or service.
SAM or Serviceable Available Market is the segment of the TAM targeted by your products and services which is within your geographical reach.
SOM or Serviceable Obtainable Market is the portion of SAM that you can capture.

European Dimension: Aeronautics is one of the EU's key high-tech sectors on the global market, generating around 220 Billion Euro and 4.5 Million direct and indirect jobs. The EU is a world leader in aerospace products and aeronautical technologies are catalysts for innovation contributing to the growth of the EU economy as a whole.

List of applications for patents, trademarks, registered designs, etc.						
No.	Type of IP Rights	Confidential YES/NO	Foreseen embargo date dd/mm/yyyy	Application reference(s) (e.g. EP123456)	Subject or title of application	Applicant (s) (as on the application)
1	The soot model implemented in ALYA will be integrated in PRECISE-UNS through an interface.	YES	TBD	-	Soot formation software library	BSC + TU/e
2	The ALYA software code for combustion and pollutant formation.	YES	TBD	-	Combustion and pollutants software library implemented in ALYA	BSC
3	The soot model will be integrated in PRECISE-UNS through an interface, extending the long term established collaboration with Rolls-Royce.	TBD	TBD	-	Soot model library.	TUD
4	Scientific publications in peer-reviewed journals (like combustion and flame) and in acclaimed international conferences like the Asme Turbo Expo.	NO	TBD	-	ESTiMatE consortium partners collaboration will be consolidated through joint publications.	All

Table 10: Record of patents, trademarks, registered designs, etc.

List of exploitable foregrounds										
No.	Type of Exploitable Foreground	Nature of Exploitable Foreground	Description of exploitable foreground	Confidential YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary (s) involved
1	Numerical model of soot formation	Containerised Software library	SaaS, Scientific partnerships, R&D Projects.	YES	TBD	Creation of an interface to connect the BSC developed library to Rolls-Royce own	Academia, Aeronautics Industry,	TBD	Alya LuL (BSC own software)	BSC + TU/e

List of exploitable foregrounds										
No.	Type of Exploitable Foreground	Nature of Exploitable Foreground	Description of exploitable foreground	Confidential YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary (s) involved
						software (PRECISE-UNS). Limited Use License Agreement (LuL).	Automotive			
2	Experimental know-how in detailed experimental investigations of spray flames and thermo-acoustic investigations of spray flames under pressure.	Know-how in experimental methods	Academic and R&D Projects.	TBD	TBD	Publication in peer-reviewed journals and R&D Projects.	Academia	TBD	TBD	TUB
3	Atomisation, combustion and soot model	Physical model	Academic and R&D Projects. These models will be used for the understanding of combustion processes. In particular, activities leading to the development of the atomization model will help build routines and procedures that can	TBD	TBD	UPV will use such tools in collaboration projects at European level, both with the industry and relevant scientific partners, with special focus on knowledge transfer Publication in peer-reviewed journals, and project collaboration (Academia and Industry)	Academia, Industry	TBD	TBD	UPV

List of exploitable foregrounds										
No.	Type of Exploitable Foreground	Nature of Exploitable Foreground	Description of exploitable foreground	Confidential YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary (s) involved
			be of future use within the group.							
4	Model, Know-how	Physical Model	Academic and R&D Projects. Extension of Flamelet Generated Manifold (FGM) approach's capability in predicting soot formation in aero-engine relevant turbulent flames.	TBD	TBD	The FGM-sectional soot model coupling will be incorporated in BSC's computational platform through collaborative efforts such that the developed framework would be compatible with PRECISE-UNS interface. During the project, our collaboration with Rolls-Royce and ESTiMatE consortium partners will be consolidated through technology transfer.	Academia, Aeronautics Industry, Automotive	TBD	BSC-TU/e agreement	TU/e
5	Physical model	Software, Physical Model	SaaS, Academic, and R&D Projects. Quadrature-based method of moments (QMOM) and the integration with the Stochastic Field Turbulence-Chemistry interaction model for predicting particulate matter	TBD	TBD	The soot model will be integrated in PRECISE-UNS through an interface, extending the long term established collaboration with Rolls-Royce.	Academia, Aeronautics Industry, Automotive	TBD	TBD	TUD

List of exploitable foregrounds										
No.	Type of Exploitable Foreground	Nature of Exploitable Foreground	Description of exploitable foreground	Confidential YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary (s) involved
			formation and growth at aero engine conditions.							
6	Know-how: Extension of experimental methods and techniques for accurate characterisation of model flames under high-pressure conditions.	Know-how in experimental methods	Academic and R&D Projects. Development of experimental methods for the determination of soot particle size distributions with optical diagnostics.	TBD	TBD	Our collaboration with the different EU research groups in the project will be consolidated and reflected in joint publications, organization of events, etc.	Academia, Aeronautics Industry, Automotive	TBD	TBD	KIT
7	Model, Know-how	Physical model	Academic and R&D Projects. Extended and optimized chemical kinetic kerosene mechanism able to predict reliably major combustion properties for a broad parameter range.	TBD	TBD	The focus will be the construction of a reduced mechanism starting from the validated detailed reaction models generated. This step also includes the further reduction of the size of the detailed generic fuel reaction model to ensure its suitability for the integration in numerical simulation. IVLR will also develop and improve algorithms to formulate fuels	Industry: Analysis of a broad range of fuels including e.g. synthetic kerosene focusing on their emissions performance and their consequences on environment to	TBD	TBD	USTUTT

List of exploitable foregrounds										
No.	Type of Exploitable Foreground	Nature of Exploitable Foreground	Description of exploitable foreground	Confidential YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary (s) involved
						surrogates, optimize kinetic mechanism and reduce them for further use in CFD application. Publications in Sci Journals are also considered.	minimize the climate impact of aviation. Academia.			

Table 11: Record of exploitation foregrounds

Furthermore, Table 9 intends to briefly describe the exploitation plan per partner.

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