DETERMINISTIC6G

Impact, exploitation, and dissemination plan for academic research, awareness of potential benefits to industry, standardization synergies

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Short abstract:	This report outlines the DETRMINISTIC6G impact and dissemination plan as well as the dissemination plan for industry stakeholders, and standardization bodies. It identifies academic events, conferences, meetings, workshops where the project results can be disseminated. It also establishes a strategic plan for dissemination and exploitation of the project results.
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Executive summary

This deliverable presents the communication and dissemination strategy of the DETERMINISTIC6G project. DETERMINISTIC6G adopts a systematic communication and dissemination approach aimed at achieving a high impact of the project activities and results. In this context, DETERMINISTIC6G results will be exploited at all relevant industrial, academic, and societal forums.

The objective of the communication, dissemination, and exploitation plan is to provide DETERMINISTIC6G partners with guidelines on the different communication and dissemination activities, available tools and channels for dissemination, and planned actions to achieve the exploitation of the results. More specifically, key performance indicators that can be used when assessing the project results, potential impact barriers, and key exploitable results have been identified. The communication activities identified in this document aim at interacting with both technical and non-technical audiences with the overall aim of spreading awareness of the 6G deterministic communication technological concepts and architectures. In terms of communication, dissemination, and exploitation, following are the main areas identified in this document:

- Internal and external communication and dissemination strategy
- Target audience and communication channels
- Key performance indicators with target values
- Relevant scientific publication societies and venues of high impact journals and conferences
- Industrial and academic workshops, summer schools, and webinars
- Specific standardization and regulation synergies including planned contribution ideas
- Exploitation strategy for the project including key exploitable results
- Exploitation plans for individual partners

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1 Introduction

The objective of this document is to provide communication, dissemination, and exploitation strategies for the DETERMINISTIC6G project to maximize the impact of the project. The DETERMINISTIC6G project focuses on developing an end-to-end (E2E) communication architecture for innovative 6G use cases. The impact and dissemination strategies are crucial to increase effective outreach of the innovative outcomes of the project such that they are made attractive for a wide range of stakeholders.

The overall goal of the dissemination and impact plan is to outline a path to increase the visibility of the project, promote the exchange of knowledge regarding the 6G deterministic communication, and contribute towards standardization. DETERMINISTIC6G will help reinforce European leadership not only in 6G technology development but also in the evolution of deterministic communication standards (including IETF Deterministic Networking (DetNet) and IEEE Time Sensitive Networking (TSN)).

The communication plan presented in this document aims at describing the planned efforts by the DETERMINISTIC6G project to reach out to relevant stakeholders including industry, academia, sister SNS projects, society, and standardization bodies. This document provides concrete plans on the impact and dissemination of DETERMINISTIC6G along with possible barriers and risks that could negatively influence the success of the project whereby appropriate countermeasures are also suggested.

Multiple activities and communication channels have been identified to be used for the promotion of the project and its results to relevant audiences. Moreover, internal, and external communication protocol as well as visual branding of the DETERMINISTIC6G project in terms of project logo, templates for slides, reports, and deliverables have been prepared.

The dissemination strategy outlined provides a clear plan on how knowledge and results obtained in DETERMINISTIC6G are planned to be transferred to potential users, including, for instance, the scientific community, industrial partners, policymakers, and standardization bodies. In addition, key performance indicators and their corresponding targets have been identified.

The exploitation plan of DETERMINISTIC6G presented in this document provides the strategy on how the project results could be effectively used. Special emphasis is given to assuring a high impact of DETERMINISTIC6G on standardization and regulatory bodies. Moreover, key exploitable results of the project have been identified that will be used for contribution towards standardization as well as exploitation by individual partners.

To ensure a coordinated approach on impact and dissemination by all partners of the consortium, DETERMINISTIC6G has both a separate work package that is dedicated to impact and dissemination as well as a dedicated exploitation and innovation manager, who closely oversees the dissemination activities and actively coordinates with all project partners to contribute to impact and dissemination of the project.

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1.1   Objective of the document

The purpose of this document is to outline an effective communication, dissemination, and exploitation strategy for the DETERMINISTIC6G project. Because the work packages and tasks of the project are interlinked, a close collaboration between all consortium partners with consistent communication and dissemination at all stages is essential. Therefore, an integrated approach from all partners through their active engagement in the project is formulated that will result in an active promotion of the project throughout the duration of the project. This will not only ensure a successful impact and dissemination of the project but will also enhance the visibility of the project that is targeted toward relevant audiences. The industrial partners will approach their relevant industry sectors, SMEs will target their client networks, while the academic and research partners will focus on disseminating the project results towards universities and academic forums.

1.2   Structure and scope of the document

The structure of the document is as follows: Section 1 introduces the deliverable document. Section 2 details the expected impact of the DETERMINISTIC6G project and evaluates the impact activities. Potential impact barriers on the path of creating impact and corresponding actions to lower these barriers are presented. Section 3 outlines the planned communication activities including the tools that will be used to support the communication and dissemination of the project. Section 4 presents the communication and dissemination protocol for the exchange of information within and outside the consortium. Section 5 presents potential dissemination activities including targeted industrial and scientific venues. In Section 6, the standardization and regulation synergies are elaborated. Section 7 presents DETERMINISTIC6G exploitation plan including key exploitable results and the individual exploitation plans for each partner. Lastly, section 8 concludes the deliverable.

2   Impact of DETERMINISTIC6G

The DETERMINISTIC6G project with its comprehensive and integrated approach aims to create economic impact, scientific impact, technological impact, and societal impact. Impact creation in these areas will ensure the reinforcement of European leadership not only in 6G technology development but also in the evolution of deterministic communication standards (TSN and DetNet). A path to create impact under the DETERMINISTIC6G project is depicted in Figure 1. This path originates from the project objectives that feed into generating 6G architecture and evolution of integrated wired and wireless infrastructure and are backed up by 6G technical key performance indicators and key value indicators from envisioned innovative 6G use cases. The impact areas are detailed as follows.
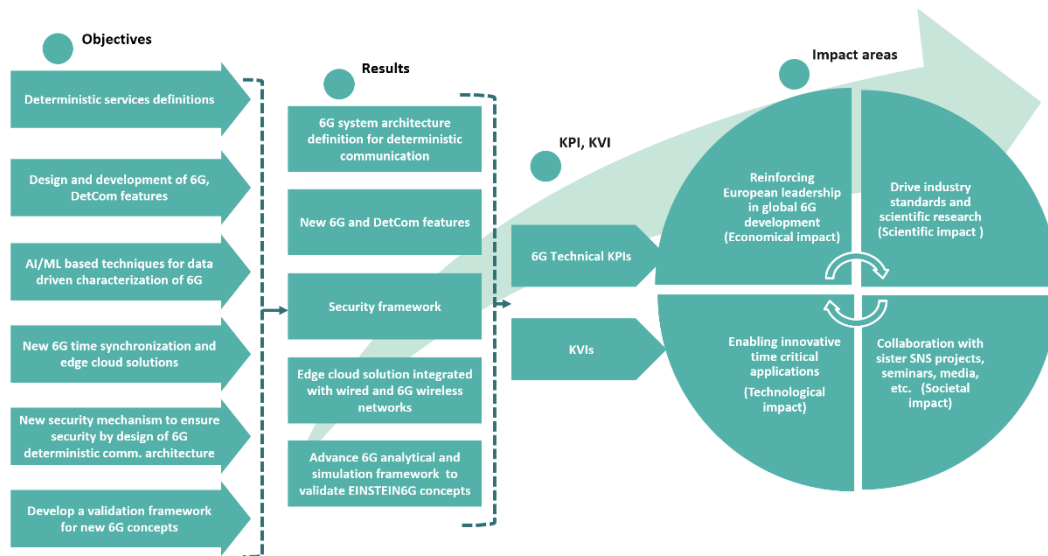
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Figure 1 DETERMINISTIC6G path towards impact

Economic impact

The economic impact refers to the dissemination of project activities and outcomes to relevant industry stakeholders and to make them aware of the potential benefits for their respective applications. This will also ensure a tight relation to other industry developments and outcomes of sister SNS projects. The development of deterministic communication technology can service across verticals including but not limited to Industry 4.0/Industry 5.0, automotive, augmented virtual reality, and healthcare. Therefore, the potential for innovation-based growth and leveraging investments from DETERMINISTIC6G results is extensive and can assist in generating EU autonomy in the emerging 6G technologies associated with applications of E2E deterministic communication. The objective of particular importance is promoting the transfer of technologies developed in the project to industrial end-users as well as to emerging European SMEs. DETERMINISTIC6G's fostering of key enabling communication technologies in a global context will provide a strong impetus for long-term job creation in the EU, in different industrial areas including ICT, Telecom, and those roles which are at the interface of industry verticals.

Scientific Impact

DETERMINISTIC6G will create high-quality and novel fundamental concepts on deterministic communication with a specific focus on the development of 6G and deterministic communication technology such as TSN and DetNet to support deterministic communication services requirements from a wide range of verticals. To name a few, DETERMINISTIC6G will focus on defining 6G architecture for deterministic communication, developing features to support evolution of the existing IEEE based TSN standards, modeling of 6G wireless systems, edge computing solutions to support deterministic communication for edge-based applications, and designing related security features. The scientific impact of the DETERMINISTIC6G project will be created through the dissemination of technical activities and results in peer-reviewed scientific journals, conferences, workshops, and white

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papers. DETERMINISTIC6G partners will also ensure the dissemination of the project results at the targeted scientific venues by organizing scientific workshops, tutorials, and special sessions. The scientific dissemination will mainly be driven by academic partners and supported by industry partners and SMEs. The partnering consortia members are actively involved in organizing conferences and workshops such as the conference on factory communication systems (WFCS), the European conference on wireless sensor networks (EWSN), EuCNC, etc. Moreover, members from partnering institutes are serving as editors / associate editors for prestigious journals e.g., James Gross (KTH) currently serves as an editor for IEEE Transactions on Wireless Communications. Further, details on potential scientific and industry venues for dissemination are provided in Section 5.

Societal impact

The scientific findings and the industrial advances of the DETERMINISTIC6G project will be integrated into lectures, seminars, and summer schools conducted by the R&D partners. Students working towards Bachelor-, Master-, or Doctoral thesis in different engineering disciplines will benefit from the outcome and activities of the project topics by not only making themselves aware of the cutting-edge advances of the technology but also helping them identify topics for their future research contributions. The societal impact will be influenced by the results achieved from the project by enabling E2E deterministic communication for 6G-powered use cases that will be required by many industrial stakeholders. This also includes creating awareness to a wider community of the benefits and uses of the technology being developed that will be disseminated through digital and print media, and other awareness events. Moreover, dissemination of the project activities will also be carried out through roadshows, newsletters, and press releases.

The DETERMINISTIC6G project is contributing towards United Nations's Sustainable Development Goals namely "Decent Work and Economic Growth", "Industry, Innovation, and Infrastructure", "Sustainable Cities and Communities", "Responsible Consumption and Production", and "Climate Action". The project contributes to these goals by identifying key value indicators of DETERMINISTIC6G use cases and defining corresponding deterministic communication services. The results of the project will enable vertical industries to benefit from positive societal and environmental impacts. Deterministic communication will be the backbone for communication of all industrial processes. Thus, enabling new ways of communication delivery concepts including offloading of computational expensive tasks to the edge, yet supporting determinism could benefit industries in reducing carbon emission through streamlining of industrial operations. The developed concepts will enable information delivery in a timely and reliable manner as well as ensuring intelligent use of resources for communication. DETERMINISTIC6G will enable higher flexibility and modularity through provisioning of E2E deterministic wireless communication to 6G applications envisioned for several industry verticals. In terms of sustainability, wireless communication supports more flexibility towards production design for industrial manufacturing, collaborative robots, AR/VR, healthcare, and applications for automotive industry. The benefit is not only in provisioning wireless interfaces but in improving operational effectiveness, improving control operations to increase production yield, digitization, and improving manufacturing processes leading to the goal of industry, innovation, and infrastructure. Automation and control through deterministic wireless communication can be one of the enablers to reduce resource consumption, as improvements, e.g., timely data transmission will enable information availability when needed, improving efficiency of industrial processes resulting in reduced energy consumption. In addition, advanced communication mechanisms can bring cost-

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effectiveness, flexibility to changes, and efficiency leading to the goal of responsible consumption and production.

Technological Impact

The technological impact is expected to be achieved by bringing the project findings to various standardization bodies and industry fora. Standardization will be one of the main focuses to ensure the exploitation of the project results. Having deep know-how on different stages of technological developments in global standardization bodies such as 3GPP, IEEE 802.1, IETF, NGMN, and OPC Foundation, DETERMINISTIC6G consortia partners will ensure that the results of the project are disseminated during technology standardization discussions. Standardization activities will mainly be driven by DETERMINISTIC6G industry partners namely Ericsson, Orange, and B&R but also supported by academic partners and SMEs. Ericsson is actively involved in 3GPP, and IEEE 802.1 standardization working groups activities and intends to bring DETERMINISTIC6G results as input to the pre-standardization and standardization work. Similarly, B&R is active in standardization work on IEC/IEEE 60802 TSN Profile and OPC UA FLC and will bring necessary input in the direction of deterministic communication models and traffic patterns. Moreover, dissemination will also be conducted through participation in industrial workshops, and global industrial alliances such as IIC, NGMN, and 5G-ACIA. It is also planned to have collaborations with sister SNS projects to ensure that new 6G technology components developed by other SNS projects consider DETERMINISTIC6G architecture and capabilities for deterministic communication with 6G (outwards sister SNS projects). At the same time, it will be ensured that the architecture and features developed under the DETERMINISTIC6G project consider results from the sister SNS projects on wireless 6G aspects relevant to deterministic communication (towards DETERMINISTIC6G).

2.1   Evaluation of impact generating activities

To evaluate the impact of DETERMINISTIC6G project activities and outcomes, as illustrated in Figure 1 the expected outcomes identified by SNS funding call STREAM B-01-01 will be addressed. In the following paragraphs, these expected outcomes, and corresponding ways on how DETERMINISTIC6G will meet them are listed.

An overall system functional architecture to cater for the expected extreme 6G use cases

This activity relates to the design of a system architecture such that a wide range of communication requirements of the forthcoming 6G use cases can be supported. The DETERMINISTIC6G project develops an E2E deterministic communication system architecture for better integration and interworking with deterministic communication standards (TSN, DetNet). Moreover, an advanced data-driven solution into the network architecture for 6G systems to support latency performance characterization and self-optimization will be developed. The DETERMINISTIC6G system architecture design will provide novel capabilities that fall well beyond the current Service Based Architecture (SBA) and will be able to support several 6G use cases.

An architecture capable of a unified service provision across heterogeneous communication and computing environments

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The DETERMINISTIC6G architecture will span across multiple heterogeneous integrated wired-wireless communication infrastructures, integrate edge cloud for deterministic communication services, and incorporate support with advanced application frameworks such as OPC UA FX. The development of these advanced architectures will serve several industry verticals for applications desiring a unified and deterministic communication model.

Solutions for inter-computing beyond the inter-networking capabilities of the Internet, making possible the execution of services across multiple heterogeneous domains

Enhanced traffic shaping mechanisms proposed within DETERMINISTIC6G will span across integrated wired and wireless communication infrastructure ensuring execution of services across multiple heterogeneous domains. An E2E security mechanism and framework is intended to be well adapted for satisfying deterministic latency requirements. In addition, the new concepts of edge cloud supporting deterministic communication and optimization of accessing resources bring in novel services to cater for future 6G communication requirements.

An internet-like architecture supporting much higher dynamics and versatility for its topology and service instantiation while significantly lowering energy consumption

The DETERMINISTIC6G architecture advances deterministic communication support that will improve operational effectiveness and control of manufacturing. This will increase the production yield. Timely, reliable, resilient, and safe communication provisioning through 6G architecture will reduce system failures, increased tolerance to faults that will prevent waste of energy and materials used in the production systems.

Architecture and technologies enabling the connectivity and service infrastructure to be programmable with a single, unifying, and open controllability framework

DETERMINISTIC6G key technical enablers bring together key deterministic technology in a single unified architecture which spans across all the resources from the wired and wireless infrastructure. Further, it proposes new dynamic interfaces to ensure unified control with novel resource allocation mechanisms. DETERMINISTIC6G defines a harmonized control framework to connect the control elements from the application middleware (OPC UA FX) towards integrated wired-wireless infrastructure components.

2.2   Potential impact barriers and obstacles

On the path of creating impact, potential barriers and obstacles have been identified. These barriers relate to political and legal disputes, acceptance rate, societal challenges, and standardization. These barriers and potential actions to lower the impact of barriers that will be taken under DETERMINISTIC6G projects are detailed in Table 1.

Barriers	DETERMINISTIC6G actions to lower barriers

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Political / legal barriers: Dispute against the use of technology due to safety legislations or interference with other systems such as air traffic control	The project design and outputs in the form of white papers and appropriate use case scenarios will be disseminated via strong industry and scientific networks as a basis for future implementation or strengthening legislation. Moreover, safe use of technologies will be advocated with the standardization bodies such that the technological developments can be realized with their highest potentials.
Low acceptance rate of the outcome by stakeholders and application community	The consortium partners are in contact with industry stakeholders, standardization bodies, and academia, and can positively influence acceptance and awareness. Moreover, the consortium members are conversant in different languages and are spread geographically over Europe, which will provide additional impetus in increasing acceptance of project outcomes.
Societal barriers: Lack of user acceptance or lack of understanding by the society referring to dangers of 5G/6G technology	Though DETERMINISTIC6G does not directly address the frequency spectrum that will be used in 6G technologies, public awareness will be created advising that before any rollout of new frequencies, it will be ensured that the output power is limited such that it does not negatively affect human health. Moreover, it will be emphasized that deterministic communication is supported for automation and digitization.
Standards: Some of the stringent requirements (of e.g., manufacturing) are not adopted in 3GPP and IEEE (or reported).	DETERMINISTIC6G will identify 1) technical implications of the Deterministic communication technology (TSN and DetNet) integration with 6G networks, 2) technical implications of IEEE standard enhancements, and 3) these implications will be lifted to major alliances such as 5G-ACIA and in addition the 3GPP and IEEE contributors in the project will formulate a common contribution towards 3GPP and IEEE.

Table 1 Potential impact barriers and obstacles

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3 Communication activities

The communication activities outlined in this section aim at promoting the project activities and results attained during the project. The objective of the proposed communication activities is to reach out to a critical mass and show the benefits of the research and innovation performed by the partners involved in the DETERMINISTIC6G project. The widespread knowledge sharing about the project will not only help support adoption of the project results and ideas at various industrial organizations and SMEs but will also help the public understand newer technological advancements applicable to other application scenarios. Communication campaigns will be designed and implemented throughout the project lifetime to build traction among the target audience efficiently, capitalizing on the multilingual nature of the consortium to cover an international footprint. Such campaigns build upon multiple channels including digital, print, scientific, and non-scientific venues to create awareness of DETERMINISTIC6G objectives and activities. Furthermore, summer schools, and tutorials will be organized by the academic partners to have an in-depth discussion of the project targeting young PhD students and researchers. Tutorials will be organized in conjunction with IEEE conferences. Ph.D. students will be able to find ideas during these events and can steer their careers toward 6G technologies and beyond. The exploitation and innovation manager coordinates the communication activities of DETERMINISTIC6G. The planned communication activities are closely aligned with the dissemination strategies and are described further in Section 5.

3.1 Target audience

The target audiences of DETERMINISTIC6G can be divided into five potentially overlapping categories. Communication channels related to each category have been identified. Table 2 summarizes the communication channels to target different audiences.

Target Audiences	Mechanisms	Channels
Academia, Public R&D (ICT)	Peer-reviewed scientific and technology conferences	Including but not limited to: IEEE Communication Magazine, IEEE WCNC, IEEE, International Conference on Dependable Systems and Networks, IECON conferences, WFCS
Advanced vertical industries	Industry workshops, industrial alliances	White papers, industry blogs
General public	Press releases, social media	LinkedIn, Twitter, YouTube channel
Sister SNS project	Common white paper and workshop	6G IA working groups
Standardization bodies and 6G technical forums	Standards contribution	Means to reach SDO, and 6G global forums

Table 2 Targeted audiences and communication channels

The overall efficiency and impact of the DETERMINISTIC6G communication activities will be maximized by a coordinated approach. Emphasis will be given to joint activities, including joint publication in

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world class conferences, journals, keynote speeches, invited talks to expert groups, fora, and standardization meetings, etc.

3.2   Communication material

A basic set of presentation materials targeted at various audiences as a core communication measure to promote the project has been created. The project logo, website, poster, and overview slides are designed and will be used during the project duration. Moreover, press news disseminating the scope and objectives of the project has been released for dissemination to a larger audience. A periodic newsletter will also be published that will include information on the latest achievements, links to recent public deliverables, and forthcoming events. The newsletter will also be available on the project website and social media channels.

3.3   Project website

The project website presents the DETERMINISTIC6G vision, objectives, work plan, consortium description, latest updates, and public deliverables. The project website serves as a central hub for the dissemination activities. Information about the project is provided on different levels of technical detail, thus addressing multiple audiences at the same time.

A snapshot of the project webpage is presented in Figure 2. The website is accessible at www.deterministic6g.eu. Since the launch of the webpage, it has received 470 hits from unique visitors.
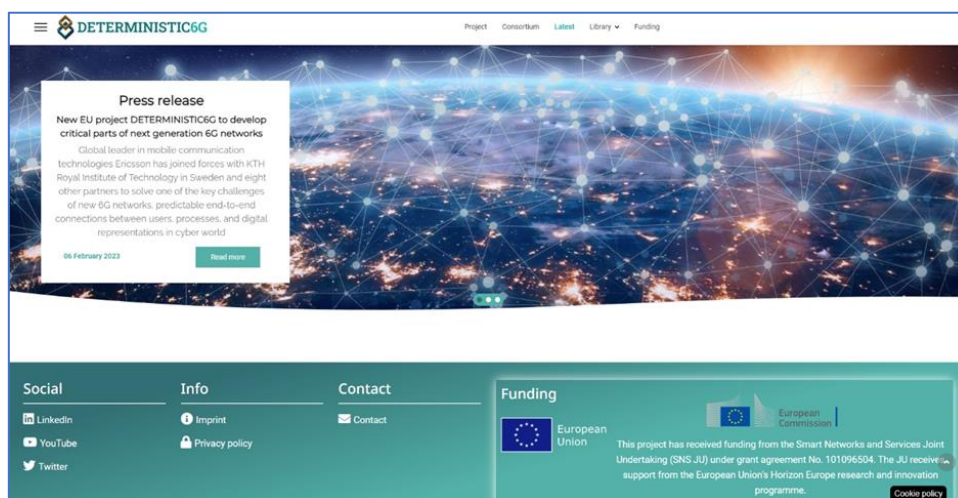

Figure 2 A screenshot of DETERMINISTIC6G webpage

The website is implemented using Joomla. After the completion of the project, the project webpages will be archived, and the website will be converted to static HTML. The archived copy will then be available on the web for at least 5 years. The website is GDPR compliant.

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3.4   Social media

To ensure the maximum possible exposure of the project, social media and networking tools will be used (LinkedIn, Twitter, YouTube). A YouTube channel will be created to capture presentations from webinars, workshops, and online conferences. These presentations will be made available on the project website and disseminated through LinkedIn and Twitter posts.

Social media accounts are interconnected with the project website to improve the search engine ranking. Moreover, interaction with other SNS projects is planned which will be disseminated through social media accounts.

The success of the social media presence of DETERMINISTIC6G will be regularly monitored and evaluated using both quantitative (e.g., by Twitter Analytics) and qualitative measures (e.g., by evaluating comments).

3.4.1   LinkedIn

The LinkedIn account will be managed with the aim to disseminate official project information among a professional audience and the research community. Partners will regularly contribute to disseminate project activities via LinkedIn posts. This way they will be able to raise awareness of the project among their contact networks and dissemination of the project activities will be maximized to reach a wider audience. An account on LinkedIn has been created under the following URL:

https://www.linkedin.com/company/deterministic6g

Figure 3 shows the current view of the LinkedIn profile.

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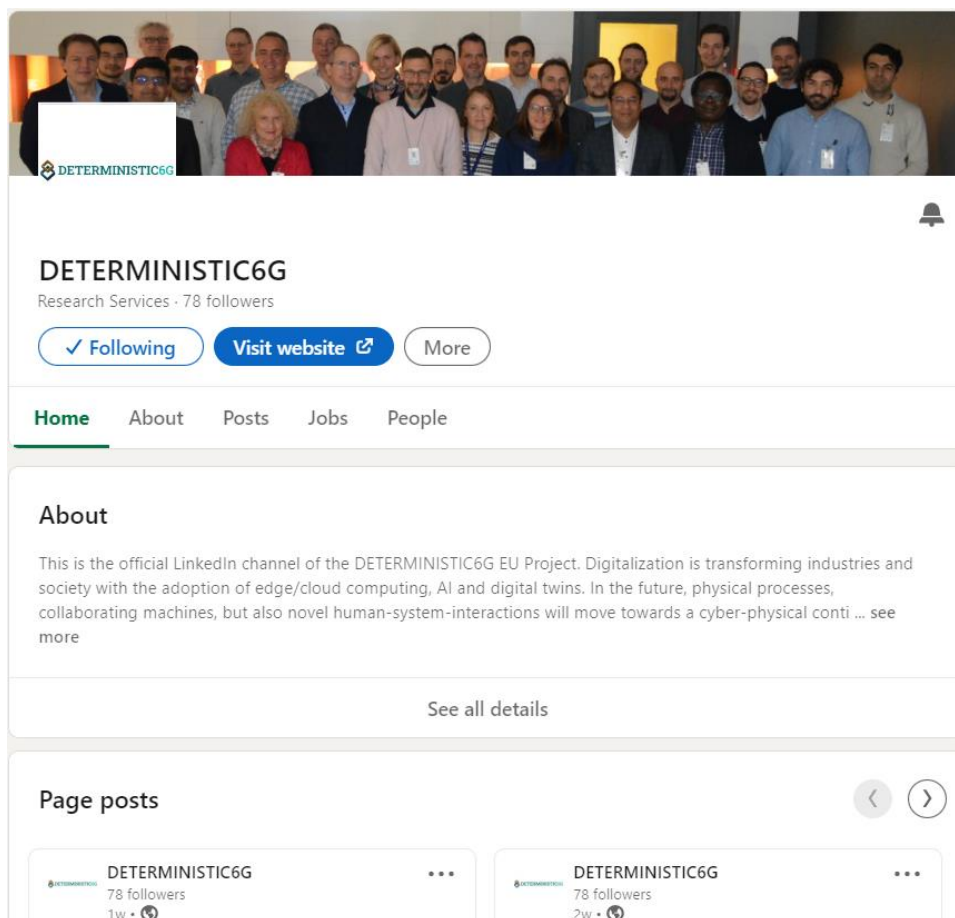Date: 31-03-2023   Status: Public

Figure 3 A screenshot of DETERMINISTIC6G Linkedin page

3.4.2   Twitter

The DETERMINISTIC6G project is also using Twitter as a tool for dissemination of project activities. The account is already active and regularly posting project updates. The Twitter account can be accessed via the following link:

https://twitter.com/DETERMINISTIC6G

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Figure 4 A screenshot of DETERMINISTIC6G Twitter profile

3.4.3   YouTube

A YouTube channel will be created to publish presentations from industry and academic workshops, seminars, and tutorials.

4   Communication and dissemination protocol

Communication within the consortia is important to exchange information, develop knowledge together, and inform each other on the progress of proposed work package activities. Internal communication between the consortia members is also needed to enhance and optimize external communication and dissemination activities. Internal communication will be ensured through regular exchange of information via e-mails and meetings to discuss the progress of the project, upcoming activities, deadlines, and issues arising on achieving the milestones of the project. This section explains the communication and dissemination protocol within the consortia members whereby dissemination tools are explained in Section 3 while Section 5 provides an overview on potential external dissemination activities.

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4.1   Communication within the consortium

Communication within the consortia members is performed via exchange of emails and regular WP meetings. Group email addresses for each WP have been set up to reach out to dedicated contributors of individual WP. In addition, email addresses for all consortia members, project management team, advisory board, and the general assembly are also in place. WP leaders and Task leaders organize meetings to discuss the WP/Task activities. Furthermore, monthly project progress meetings are also taking place.

A common project workspace is set up to share documents, related material, and videos. The common workspace is well organized forming it an easy access platform for all members of the consortia. Minutes of the meetings are recorded for each meeting where action items and discussion items are furnished to track the project progress. The organized workspace structure and easy access to information allows contributors of each WP to gain knowledge and access to other WP material. Internal communication and contribution of all members of the consortia also helps in the communication and dissemination activities, ensuring that the project is widely promoted, reaches a wider audience, and results in a greater impact.

4.2   Project branding and visibility

The project is commonly identified by its name" DETERMINISTIC6G" and its logo, as presented below.

The project logo is created for better recognition and visibility, as well as for its branding. Therefore, all dissemination tools and activities must refer to or include the name and logo of the project. In addition, an EU emblem and the following funding text must be included.

"The DETERMINISTIC6G project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement no 1010965604".

For the sake of project branding and visibility, templates for project slides, reports, and deliverables are also prepared. These templates should be used, wherever possible, for the representation and dissemination of the project activities.

4.3   Notice on release of content for dissemination

During the course of the project, the dissemination of project activities or results by one or several project partners should be notified to the members of the consortia. A prior written notice of the final version of any planned publication shall be given to other partners at least thirty (30) days before the planned publication submission date. Any objection to the planned publication shall be made in writing to all partners within fourteen (14) days after receipt of the written notice. If no objection is made within the time limit stated above, publication is permitted. An objection to a planned publication by a partner is justified if any of the following applies:

- the protection of the objecting partners results or background IP is adversely affected
- the proposed publication includes sensitive information pertaining to the objecting partner

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- the objecting partner's legitimate interests would be significantly harmed

Any and all objection(s) shall include, to the extent possible, a precise request for necessary modifications. If an objection has been raised on one or more of the above-mentioned grounds, the objecting partner and the publishing partner shall discuss how to overcome the objection in a timely manner.

4.4   Open science practices

The consortium aims at providing benefit to the general academic-industrial community and promoting open science methods in this respect. Already today, several DETERMINISTIC6G partners either engage in open-source software projects or in open access with respect to project deliverables and publications.   For DETERMINISTIC6G, it is planned to systematically increase the level of engagement in open science methods throughout the project. It is believed that by engaging in open science practices, on the one hand, feedback can be incorporated faster while, on the other hand, synergy effects can be created. The following approaches and tools will be leveraged in detail:

- Project planning and evolution will be made publicly available through documentation on a project website, as well as documenting interactions with reference entities such as the scientific advisory board. Feedback mechanisms will be incorporated through publicly visible forum functions, and openness towards official feedback.
- Open-source contributions are planned for the software packages around the evaluation framework, corresponding to publicly available software repositories that will be established/extended, and promoted through the project webpage and social media networks. This will also enable networking effects through community contributions and software reviews.
- Project data collections will be provided through our webpage, usually either in relation to deliverables or in relation to project publications.
- Project deliverables, standardization contributions and project publications will – to the extent possible – be published through open access outlets, together with underlying material (software) and data.

5   Dissemination activities

DETERMINISTIC6G aims to define and develop new fundamental concepts for 6G deterministic communication technology for upcoming innovative applications. To ensure successful adoption of its technology across the eco-system, the project has defined a multi-fold dissemination, exploitation, and communications strategy to provide relevant information to all stakeholders and facilitate market adoption of the project's result. Table 3 provides the planned dissemination activities with the target values for the associated KPIs. The dissemination plan will be constantly monitored, evaluated, and potentially adjusted.

Category	KPI	Targets
Standard contributions	Standards and impact to standards groups	3GPP (SA1, SA2, RAN1, RAN2) Future revision of IEC/IEEE 60802 Intended new amendment to IEEE 802.1Q OPC UA FX framework

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	Number of contributions	30
Industry and scientific community	Keynotes and panels in major conferences	at least 6 key notes at least 2 panels
	Number of publications (including journals, conferences)	30
	Workshops in major conferences	at least 2
	5GPPP/6GIA activities	Contribution to steering board, technology board, pre-standardization, architecture, vision, and societal challenges
Influence towards academia	Training activities (summer schools)	2
	Graduation, PhD courses	3
Communication towards the general public	Website visits outside consortium	1000+
	Press release, research blog	10+
	Social media channel used	Twitter, LinkedIn, YouTube

Table 3 Planned dissemination activities with target values

5.1   Scientific publications

DETERMINISTIC6G aims to publish and contribute to peer-reviewed publications in top scientific journals and conferences relevant to communications, industrial informatics, robotics, computing, machine learning, and security. Publications across the technology value-chain of 6G deterministic communication will be encouraged to promote wide-spread distribution of knowledge whereby most publications will be targeted to be available as open access. A position paper focusing on the aims and objectives of the project is currently under review.

5.1.1   Journals and magazines

In the following, journals, magazines, and conferences, which are of particular importance for DETERMINISTIC6G, are listed together with the corresponding target society. Target societies and examples of relevant journals and magazines are outlined in Table 4 and Table 5, respectively.

Target Society	Example venue and URL
Industrial electronics society	IEEE Transactions on Industrial Electronics (JCR IF 8.162) https://www.ieee-ies.org/pubs/transactions-on-industrial-electronics
	IEEE Transactions on Industrial Informatics (JCR IF 11.648) https://www.ieee-ies.org/pubs/transactions-on-industrial-informatics
	IEEE Journal of Emerging and Selected Topics in Industrial Electronics https://www.ieee-ies.org/pubs/jestie

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	IEEE Open Journal of the Industrial Electronics Society https://www.ieee-ies.org/pubs/ojies
	IEEE Transactions on Industrial Hyperphysical Systems https://www.ieee-ies.org/pubs/transactions-on-industrial-cyberphysical-systems
Communications society	IEEE Transactions on Communications (JCR IF 6.166) https://www.comsoc.org/publications/journals/ieee-tcom
	IEEE Transactions on Wireless Communications https://www.comsoc.org/publications/journals/ieee-twc
	IEEE Wireless Communications https://www.comsoc.org/publications/magazines/ieee-wireless-communications
	IEEE Communications Surveys and Tutorials (JCR IF 33.84) https://www.comsoc.org/publications/journals/ieee-comst
Robotics & automation society	IEEE Transactions on Robotics (JCR IF 6.835) http://www.ieee-ras.org/publications/t-ro
	(Springer) Autonomous Robots (JCR IF 3.255) https://www.springer.com/engineering/control/journal/10514
Mixed societies	IEEE Internet of Things Journal (JCR IP 11.043) https://ieee-iotj.org/

Table 4 Target societies, including examples of specific journals

Target Society	Example venues and URL
Industrial electronics society	IEEE Industrial Electronics Magazine (JCR IF 8.360) https://www.ieee-ies.org/pubs/industrial-electronics-magazine
Communications society	IEEE Communications Magazine (JCR IF 9.03) https://www.comsoc.org/publications/magazines/ieee-communications-magazine
	IEEE Communications Standards Magazine https://www.comsoc.org/publications/magazines/ieee-communications-standards-magazine
Robotics & automation society	IEEE Robotics and Automation Magazine (JCR IF 5.229) https://ramagazine.ieee.org/

Table 5 Target societies, including examples of specific magazines

5.1.2   Conferences

Target societies and examples of relevant conferences are presented in Table 6.

Target Society	Example venues and URL
Industrial electronics society	IEEE International Conference on Factory Communication Systems (WFCS)

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	https://wfcs23.unipv.it/
	IEEE International Symposium on Industrial Electronics (ISIE) https://2023.ieee-isie.org/
	IEEE International Conference on Industrial Informatics https://2023.ieee-indin.org/
	IEEE International Conference on Emerging Technologies and Factory Automation (ETFA) https://2023.ieee-etfa.org/
	IEEE Industrial Electronics Conference (IECON) https://www.iecon2023.org/
Communications society	IEEE International Conference on Computer Communications (INFOCOM) https://infocom2023.ieee-infocom.org/
	International Conference on Computer Communications and Networks (ICCCN) http://www.icccn.org/icccn23/
	IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC) https://pimrc2023.ieee-pimrc.org/
	IEEE Global Communications Conference (GLOBECOM) https://globecom2023.ieee-globecom.org/
	IEEE/IFIP Network Operations and Management Symposium (NOMS) https://noms2023.ieee-noms.org/
	ACM International Conference on Mobile Computing and Networking (MobiCom) https://sigmobile.org/mobicom/2023/index.html
	IEEE Wireless Communications and Networking Conference (WCNC) https://wcnc2023.ieee-wcnc.org/
	IEEE International Conference on Communications (ICC) https://icc2023.ieee-icc.org/
Robotics & automation society	IEEE International Conference on Robotics and Automation (ICRA) https://www.icra2023.org/
	IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) https://ieee-iros.org/
	Robotics: Science and Systems https://roboticsconference.org/
Vehicular technology society	IEEE Vehicular Technology Conference (VTC) https://events.vtsociety.org/vtc2023-spring/
Mixed societies	European Conference on Networks and Communications (EuCNC) https://www.eucnc.eu/
	International Conference on Embedded Wireless Systems and Networks (EWSN) https://events.dimes.unical.it/ewsn2023/

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Table 6 Target societies, including examples of specific conferences

5.1.3   White papers

A white paper, being a technical report providing significant technical background through strong justification, is another means of dissemination that will be used. The project design and deliverables in the form of white papers with appropriate use case scenarios and overview of technical results will be published. This may not only be limited to independent project reports in the form of a white paper but also contribution to white papers from industry associations such as 5G-ACIA or 6G-IA network.

5.2   Workshops and presentations

To increase the project visibility and to engage in insightful scientific discussions, dissemination of DETERMINISTIC6G activities at workshops and seminars will be targeted. Workshops are of importance since they provide an impetus to the project's impact as presentations and discussions carried out during the workshops are targeted towards a larger audience. In addition, discussions further lead to identifying new challenges and ideas that are helpful in the development of the project goals. In this respect, not only contributions at scientific workshops will be made but also workshops will be organized during the project. DETERMINISTIC6G was recently presented at ETSI research conference 2023 where the goals and objectives of the project were highlighted.

Currently, a joint workshop titled "Future deterministic programmable networks for 6G" is being organized together with two other sister SNS projects at EuCNC 2023 where distinguished speakers from industry and academia will present the latest developments. Moreover, a special session titled "Dependable wireless communication systems and deterministic 6G communication" under DETERMINISTIC6G project is also being organized at EuCNC 2023.

In addition to the above, a workshop titled "Vision and challenges of wireless communication for future industrial IoT" with open call to papers is being organized at PIMRC 2023. During the project, participation at workshops in parallel with IEEE conferences and other relevant events will also be ensured. Dissemination of the project through summer schools, training, and teaching activities will also be on the agenda for the consortium.

5.2.1   5G-ACIA events

The 5G Alliance for Connected Industries and Automation (5G-ACIA) is a global forum, which brings ICT and OT players together, to ensure best possible applicability of 5G technology for connected industries, in particular the manufacturing and process industries. There are five plenary meetings planned each year in 5G-ACIA, for which workshops are scheduled either in the same week as the plenary, or throughout the year.

DETERMINISTIC6G consortium will contribute to relevant activities and work items to influence requirements and capabilities of deterministic communication for industrial automation and manufacturing use cases. DETERMINISTIC6G will establish a liaison relationship with 5G-ACIA to facilitate information sharing, events, and conference speaking arrangements.

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5.2.2   6G-IA events

DETERMINISTIC6G will be presented at 6G-IA organized events. During the public webinars organized in Feb. 2023 on Smart Network and Services Joint Undertaking (SNS JU) first phase of 6G projects, DETERMINISTIC6G was presented. A presence at similar events for the dissemination of project activities will be ensured. Contribution to 6G annual journal by SNS OPS is also submitted where the project description, goals, and objectives are presented.

5.3   Training and teaching activities

Summer schools and info days will be organized by academic partners to have in-depth discussions of the project and to disseminate the knowledge to young PhD students and researchers. Students and staff members will participate in the organized training activities that will be beneficial for them to gain advanced technical know-how on 6G deterministic communication and related DETERMINISTIC6G project topics. Dissemination of project activities to PhD students and young researchers will help shape their research from both the industry as well as standardization perspective, creating a better understanding of current and future research trends. Moreover, active interactions, discussions, and knowledge exchange with scientific peers will be an indispensable element for further development and project outreach.

The consortia members that will participate in such collaborative activities shall be able to present the project accomplishments and build a competitive professional profile. Both academic and industrial partners will contribute to these training activities that will be organized at partnering academic institutes. The organized tutorials will be recorded and disseminated via the DETERMINISTIC6G YouTube channel. Moreover, a live broadcast of the tutorials and training events will be organized to maximize the audience and impact of such activities. At least two training activities / summer schools are planned during the project that will be announced in advance at the project website, social media channels and via professional networks.

5.4   Recent dissemination and communication activities

Communication and dissemination activities started from the beginning of the project. A summary of recent activities is presented in Table 7.

Activity	Description
Project kick-off meeting	The project kick-off meeting took place on Jan. 11-12, 2023, at Ericsson Headquarters in Kista, Sweden where details on the work packages and tasks were discussed.
Webpage and social media	The project webpage (www.deterministic6g.eu) and social media accounts are launched providing project details and latest updates.
ETSI research conference	DETERMINISTIC6G aims and objectives were presented at ETSI standards research conference that took place on Feb. 6-8, 2023, at ETSI Headquarters, Sophia Antipolis, France.

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6G SNS annual journal	Contribution to European 6G Annual Journal prepared by the SNS OPS was submitted with the project goals and description.
Press release	A press release announcing the launch of the project and expected outcomes was published on Feb. 06, 2023.
6G IA webinar	An overview of the DETERMINISTIC6G project was presented during the 6G IA organized webinar on Feb. 23, 2023.
Scientific publication	A position paper on Deterministic communication with 6G has been submitted for publication.
Workshops	A joint workshop with sister SNS projects namely DESIRE6G and PREDICT6G at EuCNC 2023 titled "Future deterministic programmable networks for 6G" has been accepted. Another workshop with an open call for papers for PIMRC 2023 titled "Vision and challenges of wireless communication for future industrial IoT" has been accepted.
Special session	A special session in EuCNC titled "Dependable wireless communication systems and deterministic 6G communication" has been accepted.

Table 7 Recent communication and dissemination activities

6   Standardization and regulation synergies

DETERMINISTIC6G key communication and dissemination objective is to contribute to standardization, pre-standardization activities to exploit project innovation in European and worldwide market. DETERMINISTIC6G focus is around the key technology enablers that will have a clear impact on the future activities of the key Standard Development Organization (SDOs) pertaining to 6G deterministic technology. Therefore, DETERMINISTIC6G results have a positive influence on the standardization trend for coming years.

6.1   Specific standardization and regulation activities

The consortium has identified a list of relevant standardization and regulatory bodies where DETERMINISTIC6G findings and key results are expected to have a significant impact. The DETERMINISTIC6G consortium will monitor the list outlined below- of relevant standardization bodies in order to align project technical work with standardization and to prepare relevant contributions to particular working groups. Table 8 summarizes the list of SDOs to which DETERMINISTIC6G 6G participants are committed to contributing.

SDO, forum	Targeted groups	Contributing partners	Preliminary ideas for involvement
3GPP	SA groups RAN groups	EDD, ETH, EAB, ORANGE, SAL, Cumucore	Push the developed use cases and the respective solutions into 3GPP SA1, SA2 requirement study items. Enhancement to 5G/6G system architecture.
OPC Foundation	OPC UA FX NWG	B&R	Contributions for specification of TSN traffic types embedded in network policies.

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	OPC WG		
IEEE 802.1	TSN TG	Ericsson, Orange, B&R	Contributions for dynamic utilization of TSN traffic types for PubSub and Client/Server.
ETSI, ITU-T	SG-15	Orange	Push the developed use cases and the respective time synchronization solutions into ITU-T.
IETF	DetNet, RAW	Ericsson	Contributions on wireless friendly and cloud friendly extensions, incl. configuration enhancements.
5G-ACIA	WG1, WG3	Ericsson, SAL	Continuous contribution towards new work items belonging to architecture and use case working group.
NGMN		Orange	Input to NGMN activities.

Table 8 DETERMINISTIC6G planned contributions to standards and industry fora

6.1.1   3GPP

Active partners in 3GPP may individually influence future 3GPP releases by introducing requirements and capabilities identified as necessary in DETERMINISTIC6G. Approved or future work items may be an opportunity to propose concepts or mechanisms that have been evaluated in the project whenever relevant in scope. Target work groups may be (not limited to): SA1, SA2, SA3, SA6, RAN2, RAN3.

6.1.2   OPC Foundation

6G will enable a wider range of use-cases than currently covered by existing functional and interface models in the OPC UA core and companion specifications.

It is expected that the dynamic nature of many 6G use-cases will lead to the definition of new application requirements, communication models and traffic patterns. Enabling the discovery of these application requirements (by, e.g., exposing them in an OPC UA information model) by OPC UA network participants, configuring communication interfaces and network infrastructure to provide communication guarantees, as well as providing possibilities to diagnose common errors for communication failure, is envisioned to be a major part of the contribution to OPC UA standardization working groups.

6.1.3   IEEE 802.1

Time Sensitive Networking (TSN) is a Task Group (TG) that evolved from the former Audio Video Bridging (AVB) TG as a part of the IEEE 802.1 Working Group (WG). TSN aims to provide deterministic services (guaranteed packet transport with bounded latency, low packet delay variation, and low packet loss) through IEEE 802 networks. Current standards contain only a general" TSN Bridge" component without considering any wireless specifics. DETERMINISTIC6G will closely follow the different topics in the TSN working group of IEEE 802.1 and will provide suitable input to facilitate the

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creation of interfaces and services that enable deterministic E2E communication in combination with
6G technologies.

6.1.4   ETSI

The edge cloud design and solutions resulting from DETERMINISTIC6G could be a good input for future
ETSI virtualization standards, especially virtualization management platforms that take into account
requirements coming from deterministic services, with support for real-time edge cloud services.

6.1.5   ITU-T

The ITU-T deems particularly interesting to promote time synchronization techniques and related use
cases developed in DETERMINISTIC6G. The SG-15 could be a good place to promote the
standardization of time synchronization between industrial network domains and operator domains
and promote the connection between public 6G networks and private industrial 6G networks.

6.1.6   IETF

The IETF is specifying DetNet standards intended to provide a deterministic transport solution over
Layer 3 (IP/MPLS) routed networks. DetNet specification enables time-sensitive features that
guarantee extremely low packet loss rates, bounded latency, and high reliability (including in-order
packet delivery). DETERMINISTIC6G will closely follow the different topics in IETF and will provide
suitable input to facilitate the creation of interfaces and services that enable deterministic E2E
communication in combination with 6G technologies.

6.1.7   5G-ACIA

Relevant activities/work items in 5G-ACIA may be addressed by DETERMINISTIC6G partners that are
members of this organization. In particular, influencing requirements and capabilities necessary in 5G
advanced/6G, targeting more deterministic mechanisms to aid industrial automation and
manufacturing.

6.1.8   NGMN

Orange is present and active in the NGMN alliance, where future generations of mobile network
standards are discussed. The NGMN has started discussions on 6G networks, in particular with its early
work on 6G use cases and analysis, and it's very recent publication on 6G requirements and design
considerations. The NGMN could be a good place to provide input and promote requirement results,
KPIs/KVIs and 6G system design architecture coming from DETERMINISTIC6G use cases.

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7   Exploitation plan

DETERMINISTIC6G aims to establish new technical knowledge on the deterministic communication aspect and explore feasibility of new enablers and improved concepts and solutions. Results of DETERMINISTIC6G will allow participants to explore new market areas and enable the definition of a roadmap for future products and solutions. The DETERMINISTIC6G consortium consists of strong industry players (e.g., Ericsson, Orange, B&R) and SMEs (e.g., CMC, MI) to ensure the commercial exploitation of the project results. Industrial partners will be leading future standardization work in the direction of deterministic communication technology. SMEs will be able to offer new techniques and functions that will allow them to maintain their innovative and competitive value. Academia will also participate in the exploitation of the results by triggering further research breakthroughs, for instance in the direction of semantic/context-dependent optimization of future wireless networks.

7.1   Project exploitation plan

DETERMINISTIC6G will define key exploitable results based on the above-listed potentially exploitable results. During runtime of the project, key exploitable results will be further refined and modified based on the ongoing progress of the project; this will also include monitoring of the exploitation plan executed by the partners. During the end phase of the project, feedback will be collected and documented in the final dissemination activities report. The major DETERMINISTIC6G results expected to be exploited are detailed below in Table 9.

Key exploitable results	Description of the result	Partners
KVI/KPIs pertaining to newly 6G visionary use case.	Report on the definition of the deterministic services and 6G visionary use case, further describing KPIs and KVIs.	All
An E2E architecture for deterministic communication ensuring 6G convergence with Edge cloud, deterministic communication standards (TSN, DetNet).	6G architecture description for deterministic communication which brings together all the novel DETERMINISTIC6G technical enablers	All
New feature to support deterministic wireless transmission in 6G system.	Solution for wireless 6G communication ensuring unprecedented determinism in wireless transmission. The solution will be further provided as input to standards.	ETH, EAB, EDD
Set of enhancements ensuring wireless-friendly operation of future TSN and DetNet standards technology.	Extension of TSN and DetNet node models to encode wireless characteristics. The solution will be further provided as input to Deterministic communication technology (TSN, DetNet) standards. Wireless-friendly network control algorithms triggering further research for deterministic E2E scheduling.	ETH, EDD, EAB, B&R, KTH, SAL, USTUTT
AI/ML based data-driven models.	Data-driven models for characterization of the bounded latency to ensure deterministic communication with deep neural network-based mixture models, leveraging extreme value theory.	KTH

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	The models will trigger further research in the context of semantic optimization.	
Security-by-design architecture for DETERMINISTIC6G	Security architecture and mechanisms for the deterministic communication services over integrated 6G-DetCom networks provided in the form of an open-source tool.	All
6G validation framework.	Simulation models for the envisioned 6G-DetCom control plane and data plane and edge cloud applications in the form of an open-source tool.	KTH, USTUTT, ETH, EAB

Table 9 DETERMINISTIC6G key exploitable results

7.2 Individual partner exploitation plans

In addition to the overall exploitation strategy, individual partners have specific exploitation plans that are summarized below. Any exploitation plan(s) will be reviewed and updated during the entire life cycle of the project, so it will accord with the project findings and overall exploitation strategy. The final version of the exploitation plan(s), which will detail all future exploitation activities at consortium level, will be contained in the final impact and dissemination report.

7.2.1 Ericsson

Ericsson is the market leader in mobile communication technology and a leading player in several global mobile communication standardization bodies. As an active leader in 6G research and innovation activities, Ericsson intends to influence the pre-standardization and standardization work for deterministic communication standards. The influence will be achieved by the active contribution and representation in Standardization Development Organization bodies: 3GPP, IEEE TSN Task Group, and IETF. The finding and results of the DETERMINISTIC6G will be used as an important input to several industrial fora and alliances and to Ericsson product roadmap strategy teams. In particular, the findings in the following areas are expected to be of great importance: 6G innovative use case and deterministic service definition, TSN, and DetNet enhancement, data-driven methods to ensure deterministic performance, and wired-wireless convergence. Ericsson will also publish DETERMINISTIC6G major research findings at leading conferences, journals, and in the form of white papers, Ericsson dissemination of results is intended to catalyze the activities towards a coherent 6G ecosystem. Ericsson will use DETERMINISTIC6G's results and findings to ensure an adequate generation and ownership of intellectual property, to guarantee the profitability of future mobile communication systems. Finally, the project results will be discussed with the business units, product development units, to shape a roadmap of the future products for innovative applications. Findings from the architecture work will be used to create a future roadmap of Dedicated Network solutions.

7.2.2 MONTIMAGE

MI develops an open-source network performance and security monitoring and management framework for 5G/IoT (called MMT), as well as tools to modify and replay 5G network traffic (e.g., for robustness, scalability, and fuzz tests of network elements). It integrates its framework into different

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solutions and supports its partners, such as Cumucore, to improve awareness and management of the quality and security of their 5G solutions. MI is also working with Orange to implement a congestion control algorithm based on L4S. In DETERMINISTIC6G, MI will define and prototype an E2E precision monitoring and security-by-design architecture and framework for DetNet and TSN. Project results will extend MI's solutions to address future 6G URLLC and time-sensitive industrial application needs, related to high-accuracy monitoring and optimal automated security and performance management of low-latency deterministic network services and applications. Finding a solution to improve the security and quality management of these types of applications, and integrating the different OSI protocol levels (i.e., L4S for L3 queuing latency and congestion response, DetNet for L2-bridged/L3 deterministic data paths connecting TSN networks, and TSN for L2 resource management for deterministic device connections) within the MMT framework will give rise to important innovations that will be exploited through a combined open-source/commercial business model.

7.2.3   SILICON AUSTRIA LABS

SAL is a research centre for electronic based systems and aims to bridge the gap between research and industry. SAL is actively involved in research activities on TSN and 5G/6G technologies supporting factories of the future. SAL will exploit the research work carried out under the DETERMINISTIC6G project to attract industry and academic partners and to create awareness on activities performed to maximize the impact and collaboration in research activities. SAL will further exploit the project results via its networks and platforms on European and international levels such as 5G-ACIA, IEEE Standards Association (IEEE-SA), and international standardizations bodies like the National Institute for Standards and Technology (NIST, USA). Moreover, the project results will be exploited on a European and international level in the form of peer-reviewed journals and conference publications.

7.2.4   CUMUCORE

Cumucore provides 5G Core (5GC) targeted for Non-Public Networks (NPN) including latest 3GPP Release 17 features such as 5GLAN, TSN and network slicing. The target is to update the current 5GC with new architecture components to deliver a competitive solution for industrial private mobile networks. DETERMINISTIC6G results will allow Cumucore to develop an innovative roadmap for keeping Cumucore on the cutting edge of E2E deterministic networking solutions for industrial private networks.

7.2.5   KUNGLIGA TEKNISKA HOEGSKOLAN (KTH)

KTH has a long-standing research footprint in wireless systems, for future industrial automation applications. Given this background, KTH strives for exploitation primarily by publishing research results and releasing software packages, as well as collected data sets. This will mainly relate to all activities around the data-driven modelling and prediction of RAN latencies by ML approaches, leveraging extreme value theory. Apart from publications in strong venues (conferences/journals) and associated interactions in the research community, KTH sees as further exploitation dimension to leverage research results in the context of follow-up projects on a national and international level. Accurate latency predictions are highly relevant in the cross-layer optimization of closed-loop control

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applications. Semantic optimization, in the spirit of cross-layer optimization, is a new concept in the academic community that could be addressed in this direction as an important follow-up activity. Finally, the research results will influence our teaching activities with respect to courses in the domain of wireless industrial networking.

7.2.6   UNIVERSITY OF STUTTGART

University of Stuttgart has developed an open-source TSN simulator framework, which is open to the international research community and industry and based on the popular OMNeT++/INET framework. This simulator framework will be enhanced during this project and developed into a powerful tool to test networked real-time systems through simulations and evaluate research concepts in this area. Its open-source character makes it an attractive platform for other projects to develop further extensions. Therefore, the goal is to establish this simulator framework as a prominent tool for TSN/DetNet research by presenting it to the network community, e.g., at conferences and through scientific publications, and by making its code available through open software repositories. Moreover, the E2E scheduling algorithms developed by USTUTT as part of this project complement the standard mechanisms as defined, for instance, by IEEE in the TSN standards. Such scheduling algorithms are subject to current research. USTUTT aims at presenting the research results at premium conferences and in journals to discuss the results with the research community and shape future research directions. The work of this project will also influence the teaching activities at USTUTT, e.g., by teaching real-time communication technologies such as TSN as part of lectures and seminars and actively involving students in the research in this area through software projects, bachelor and master theses, PhD projects, etc.

7.2.7   B&R Industrial Automation

B&R is a leading system supplier for high-end industrial automation systems mainly for machine building OEMs. B&R has publicly communicated to substitute its current industrial Ethernet fieldbus POWERLINK with OPC UA FX technology on the field level as soon as possible. Hence, B&R is active in standardization work (IEC/IEEE 60802, OPC UA FLC), and has been a key player in initiating those standardization activities. B&R will exploit the results of DETERMINISTIC6G in the form of contributions to standardization, and in turn will use the results of standardization for further developing its product and service portfolio. Furthermore, B&R considers 6G as a game-changer for wireless industrial applications, where currently no solution exists for closing sub-ms control loops with wireless technology. Therefore, the results of DETERMINISTIC6G will enable and drive the integration of 6G into the product and service portfolio of B&R.

7.2.8   ORANGE

Orange may be interested to promote the development of 6G and industrial network standards with deterministic communications, using the results of DETERMINISTIC6G. Orange may also use DETERMINISTIC6G results and findings to generate ownership and profitability in the operation of 6G networks and the provision of 6G connectivity to IT services. Orange expects the results of DETERMINISTIC6G to play an important role in industrial automation and the digital transformation

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of industries, in enabling new classes of IT and network services and in developing new markets within the industrial services domain by extension of the existing business-to-business market sector.

7.2.9   IUVO

IUVO's mission is the development of innovative wearable robotics technologies and to foster their market exploitation in different market fields, such as medical, industrial and consumer. Results of the project will be exploited to promote access to new markets/clients: the IUVO team envisions that the deep investigation of the exoskeleton use case will bring a clear understanding of the impact of 6G technologies in the exoskeleton market. This will likely be reflected into a revision of the roadmap of IUVO and its partners to a large-scale adoption of exoskeletons in the industrial as well as other market domains. In addition, we can foresee that IUVO (and its partners) will acquire a dominant position in the global exoskeleton market, strengthening its leading position in the EU market in the field of wearable technologies.

7.2.10   SCUOLA SUPERIORE DI STUDI UNIVERSITARI E DI PERFEZIONAMENTO SANT'ANNA

SSSA is producing high-quality research and technology transfer actions to the benefit of industry and various communities of end users. It has a vast wealth of knowledge in bio-robotics and wearable robotics, and advanced facilities to build and test related robotic components. The outcomes of DETERMINISTIC6G will be exploited to raise awareness on scientific communities and industrial partners about the potential of 6G solutions for offloading computational resources from wearable robots, to build a new generation of lightweight, ergonomic exoskeletons with improved performance and actuation capabilities. Results of the project will be exploited on a national and international level via established networks.

8   Summary and conclusions

This document presents the DETERMINISTIC6G project plan regarding communication and dissemination activities. The document has been created with the input from consortia partners and includes initiatives related to projects dissemination and exploitation strategy. This document shall be considered as a guide to support the consortium to carry out the dissemination activities using the right material and channels. The impact and dissemination plan shall be followed to ensure maximum visibility of the project and its outcomes. A clear plan that highlights the methodologies employed for communication, dissemination, and exploitation of results is provided. Industrial and academic venues are identified for dissemination of the project results. Furthermore, a detailed description of the available communication channels as well as communication and dissemination protocol has been furnished. An exploitation plan both for the project as a whole and individual consortium partners is provided. Moreover, the key exploitable results of the project are highlighted. Activities that potentially could lead to contributions towards standardization are also presented. Potential risks and obstacles on the path to creating impact are identified whereby strategies to overcome these barriers are formulated. During the project's timeline, targets identified may change in line with the outcomes of the projects, however, dissemination activities will be followed extensively to be on the forefront of research dissemination related to deterministic communication concepts for 6G technology.

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List of abbreviations

3GPP	3rd Generation Partnership Project
5G	Fifth Generation Cellular Network Technology
5G-ACIA	5G Alliance for Connected Industries and Automation
6G	Sixth Generation Cellular Network Technology
6G-IA	6G Smart Networks and Services Industry Association
DETERMINISTIC6G	Deterministic End-to-end Communication with 6G
DetNet	Deterministic Networking
E2E	End-to-end
EC	European Commission
ETSI	European Telecommunications Standards Institute
EU	European Union
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IIC	Industry IoT Consortium
IoT	Internet of Things
IT	Information Technology
ITU-T	International Telecommunication Union - Telecommunication
NGMN	Next Generation Mobile Networks
OPC	Open Platform Communications
OPC UA FX	OPC Unified Architecture Field Exchange
R&D	Research and Development
SBA	Service Based Architecture
SDO	Standards Development Organization
SME	Small and Medium-sized Enterprise
SNS	Smart Networks and Services
TSN	Time Sensitive Networking

Table 10 List of abbreviations