



BIOASSEMBLER

Integrating bio-inspired assembly
into semiconductor manufacturing
technology for biosensors

Dissemination, Exploitation and Communication Plan

(GA 101070589)

Version: V7.0

Status: Final (after midterm evaluation)

Date: 19 July 2024

Project Coordinator: VTT (FIN)

Project Start Date: 1st September 2022

Project Duration: 36 months

Deliverable Nº: D2.1

Dissemination level: Public

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Funded by
the European Union

Revision History

Version	Status	Date	Contributor / Partner	Summary of Changes
1.0	Draft version	12.01.2022	Rita Campos; Patrícia Ferreira; Bernardo Valente/CES	First draft
2.0	Draft version	17.02.2023	Petri Saviranta; Emilia Barannik/VTT; Mark Somoza/UniVie	Review and comments
3.0	Draft version	17.02.2023	Rita Campos/CES	Integration of reviews and comments
4.0	Draft version	20.02.2023	Anna Spehar/Biomensio	Review and comments
5.0	Draft version	21.02.2023	Filipe Santos/CES	Review and comments
6.0	Final version	23.02.2022	Rita Campos; Bernardo Valente/CES	Integration of reviews and comments; finalization of report
7.0	Final version after midterm evaluation	19.07.2024	Rita Campos/CES	Integration of comments by the external evaluator

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List of acronyms

Abcalis	Abcalis GMBH (Germany)
Biomensio	Biomensio OY (Finland)
CA	Consortium Agreement
CES	Centro de Estudos Sociais, Universidade de Coimbra (Portugal)
DEC	Dissemination, exploitation and communication
EC	European Commission
EU	European Union
FIN	Finland
GA	Grant Agreement
IPR	Intellectual propriety rights
JOBST	JOBST Technologies GMBH (Germany)
KPIs	Key performance indicators
MEMS	Microelectromechanical systems
OA	Open Access
PC	Project coordinator
PT	Portugal
R&D&I	Research and Development and Innovation
SSH	Social Sciences and Humanities
TRLs	Technology readiness levels
UNIVIE	Universitat WIEN (Austria)
VTT	Teknologian Tutkimuskeskus VTT OY (Finland)
WP	Work package

1. Executive summary

This deliverable describes the dissemination, exploitation and communication (DEC) tools and actions planned for the BIOASSEMBLER project - the DEC Plan.

The DEC plan aims to maximise BIOASSEMBLER's impacts, and to promote effective dissemination, communication, and exploitation activities. The DEC plan will foster the promotion of BIOASSEMBLER results towards key target groups via tailored action, assuring a committed participation and interest in the project by key stakeholders. The DEC Plan further intends to promote the active engagement with society via participatory and collaborative communication strategies.

The DEC Plan provides information about the project's overall objectives and the specific plan for communication, as well as disseminating and exploiting the knowledge gained throughout the project's implementation, and beyond. To this end, the European Commission (EC) guidelines (https://ec.europa.eu/research/participants/docs/h2020-funding-guide/imgs/quick-guide_diss-expl_en.pdf) will be used to properly organize DEC tools, materials, actions and activities. As such, communication means the promotion of the project work by informing, promoting and communicating BIOASSEMBLER activities and results; dissemination means making the project knowledge and results publicly and freely available for others to use; and exploitation means making concrete use of the project results considering commercial, societal and/or political purposes.

The DEC Plan is a living document, meaning that during the project it will be updated and adapted according to the progress of the project, feedback from partners and impact indicators.

2. The DEC Plan

The main goal of the BIOASSEMBLER DEC Plan is to ensure that the project's outputs and results are widely disseminated to the identified target groups (scientists; market/industrial stakeholders, policymakers and regulators: standardization bodies, civil society, public at large; educational

communities; science communicators; end users), promoting the future large-scale adoption of the novel technology, raising awareness to its opportunities and challenges, and contributing to a more informed society. These objectives will be achieved by combining different strategies and activities, such as a regular online presence, participating in market and industry meetings and events, presenting project results in scientific meetings and publishing in scientific journals, organizing an advanced training workshop (Summer School), supporting an artistic residency and editing two books for non-specialist publics and educational actors.

The DEC Plan will guide the DEC actions at different stages and beyond the project lifetime, translating BIOASSEMBLER research findings into clear recommendations, ensuring the project's impacts on policymaking. It will also operationalize different forms of academic outreach, reaching wider audiences, needs and contexts. Furthermore, all project partners will utilize their national and international affiliation networks in their field of research, development and innovation (R&D&I), increasing the project's knowledge production outreach, the dissemination and awareness raising activities, guaranteeing the conditions for future exploitation of results beyond the project duration.

The BIOASSEMBLER project is committed to the promotion of transparency and trust in an era of fake news and misinformation about science, and to contribute to fight some common stereotypes in science and technology, such as those related to gender and age biases. The BIOASSEMBLER communication and dissemination strategies are conscious of these challenges, and will try to give a human face to the science behind BIOASSEMBLER, emphasising the role of individual scientists within the consortium.

As the Work Package (WP) "Dissemination, Exploitation and Communication" coordinator institution, the Centre for Social Studies (CES) is responsible for, in close collaboration with the project's coordinator institution Teknologian Tutkimuskeskus VTT OY (VTT), the implementation of the joint DEC actions and their overall monitoring. However, each partner will be responsible for adapting and implementing some of the communication actions in their national contexts (e.g. press releases). In this sense, CES is responsible for ensuring that the project DEC activities follow the strategy presented in this DEC Plan. Additionally, CES brings the Social Sciences and Humanities (SSH) perspectives to contribute to the project's interdisciplinary approach that is needed to adequately address the complexity of the challenges posed by introducing a new technology in the scientific market that have impacts in healthcare and food, as it is the case of biosensors.

In order to complement the technical solutions drawn and executed in the other WP, the SSH will specifically contribute to the development of communication and dissemination strategies that promote interdisciplinary dialogues through the co-creation between the partners disciplinary fields and the individuals engaged on the social dialogue, and the inclusion of an art and science approach, bridging the gap between scientific knowledge and the non-scientific publics. This will be done throughout the project, in the elaboration of drafts, developing the project's digital social networks (and other media) and adapting the scientific terminology to a mainstream communication model.

The SSH approach goes hand-in-hand with the EU innovation policy in the most diverse areas. As a result, the research agenda setters are more aware of SSH's importance in recent years. This effort removed the SSH from the peripheral areas of the Horizon projects and placed it in the multidisciplinary core of the EU research programmes. This new perspective on the role played by the SSH in scientific projects highlights the significant influence of CES on the communication and dissemination goals of the DEC WP.

CES is composed by researchers engaged in the Science and Society arena, and has a vast experience on conducting and collaborating in projects that aim to respond to the current challenges of collaboration and co-creation and that can contribute to a transformative impact on social reality, and on the development of research impact strategic plans that can translate it. This academic tradition of engaging the community meets one of the primary goals of the BIOASSEMBLER project. For that, we will promote a science and society and integrated communication strategy that considers the discourse adequacy and target publics' outreach.

An inclusive and creative approach is needed to promote a public-friendly tailored discourse that expands open science policies to the non-specialist public. It is within this European scientific context that the DEC WP proposes to contribute to the elaboration and execution of a strategic communication plan to co-create knowledge and promote and evaluate the impact of this project. This will be done through an effective communication methodology that enlightens the value of the SSH in the BIOASSEMBLER project within the European Framework Programme for Research and Innovation "Horizon Europe". By establishing this open information environment, the DEC WP will contribute to address the societal challenges of this research and add economic value to the desired outputs of the project.

2.1. BIOASSEMBLER DEC Committee

To facilitate internal communication and decision-making processes, a Dissemination, Exploitation and Communication Committee has also been created (Table 1).

This committee includes 7 members, representing all the consortium partners. It has the responsibility of overseeing, planning and organizing the multiple communication, dissemination and exploitation activities in the BIOASSEMBLER project, by its own initiative or by suggestion of the partners, and under the coordination of the DEC WP Coordinator and the Project Coordinator.

Table 1

Composition of the BIOASSEMBLER DEC Committee.

Partner	Member
VTT	Petri Saviranta - Project Coordinator
VTT	Emilia Barannik
UniVie	Mark Somoza
Jobst	Gerhard Jobst
Abcalis	Laila Al-Halabi-Frenzel
Biomensio	Anna Spehar
CES	Rita Campos - DEC WP Coordinator

3. Obligations and requirements for DEC actions

Unless the granting authority requests or agrees otherwise, or unless it is impossible, any dissemination, exploitation and communication activity and/or material on any media must indicate that the project has received funding from the EU, in accordance with Article 17 of the Grant Agreement (GA). In particular, it should display the EU flag (emblem; Figure 1) and the acknowledgement of funding (Table 2).



Figure 1 - EU flag (emblem)

Table 2

Funding statement of the acknowledgement of funding by the EU.

When the name of the project is already visible
This project has received funding from OR was funded by the European Union’s Horizon Europe Research and Innovation Programme under grant agreement 101070589.
When the name of the project is not visible
BIOASSEMBLER-Integrating bio-inspired assembly into semiconductor manufacturing technology for biosensors, has received funding from OR was funded by the European Union’s Horizon Europe Research and Innovation Programme under grant agreement 101070589.
When a shorter version is needed
BIOASSEMBLER project (GA 101070589) has received funding from OR was funded by the European Union’s Horizon Europe Research and Innovation Programme OR by the European Union.

When displayed with another logo, such as the partner institutional logos (Figure 2), the EU emblem must have appropriate prominence.



Figure 2 - BIOASSEMBLER partners logos

Moreover, all communication activities and materials must include a disclaimer sentence, excluding Commission responsibility (Table 3).

Table 3

Disclaimer statement.

Complete statement

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency (HADEA). Neither the European Union nor the granting authority can be held responsible for them.

Shorter version of the statement

[This document] reflects the views only of the author(s), and the Commission OR European Union OR European Health and Digital Executive Agency (HADEA) cannot be held responsible for any use which may be made of the information contained therein.

4. BIOASSEMBLER project overview

The BIOASSEMBLER project's unique contribution is to bring together microelectromechanical systems (MEMS) sensors and biotechnology in a novel bio-inspired self-assembly process. The project comprises an interdisciplinary team of scientists and researchers aiming to develop this technology for scalable manufacturing of silicon-based label-free multiplex biosensors in semiconductor fabrication platforms. BIOASSEMBLER's objective is to produce bio-intelligent enabling technologies for rapid and massively parallel integration of biomolecules onto silicon wafers. This technology is transformative to the European semiconductor-based biosensor manufacturing industry and creates opportunities to increase business opportunities and jobs by establishing a cross-cutting fusion between microelectronics and biotechnology.

The potential of silicon-based MEMS for biosensing has become evident in recent decades and has opened the door to the development of bioanalytical applications. However, the production facilities' high initial investment costs have been a bottleneck in access to suitable MEMS systems. The BIOASSEMBLER project aims to close this gap by lowering the cost and the barriers to accessing MEMS manufacturing platforms by developing a technology that promotes the biofunctionalization and fluidic integration of the MEMS sensors. This work will allow this technology to transition from mainly academic research projects to mass production and commercial applications.

The project will highlight the advantages of recombinant antibodies over traditional, animal-based antibody reagents. The recombinant DNA sequence-based animal-free antibodies offer advantages such as high specificity, scalable production, minimal batch-to-batch variations and better control over cross-reactivities. One of the most significant contributions of this project is to reach high-level and large-scale applications using animal-free detection reagents. This project inaugurates a new

generation of point-of-care testing and diagnostics with the potential for versatile multiplexed analysis with faster reaction.

Furthermore, the project has a sustainability component that must be emphasized. Mitigating the effects of climate change requires the emergence of innovative bio intelligent solutions, whilst considering the consequences of those new technologies in the economic and social environment. The transition of the semiconductor manufacturing industry in the EU and the creation of new sustainable value chains demands an adequate impact assessment that engages the perspectives of several civil society actors potentially affected by it. The project's commitment towards an open science model aims to attract the interest of a more informed society that can play an essential role in balancing the technological, economic and social ecosystems in pursuing a mass sustainable MEMS biosensor production.

4.1. BIOASSEMBLER project objectives

BIOASSEMBLER's overall goal is to develop a new generation of biosensors manufactured through a bio-intelligent process for rapid and massively parallel integration of biomolecules onto silicon wafers. This new technology will enable important applications for MEMS sensors, particularly as biosensors, that are not available until now.

BIOASSEMBLER practical objectives

- Develop the manufacturing of sensor arrays on silicon wafers.
- Develop the photolithographic chemistry process for creating DNA zipcode arrays on silicon wafers.
- Test a DNA-guided self-assembly process for addressing biomolecules to zipcodes on a silicon wafer.
- Develop the method for efficient bioproduction of DNA-tagged, self-assembling antibodies.
- Test wafer-scale integration of fluidics and silicon chips for scalable biosensor fabrication.
- Conduct functional testing and validation of the biosensors in multiplexed bioassays.
- Assess the societal and business challenges and opportunities involved in the technologies.

The project also aims to develop innovative strategies to promote science and societal engagement between diverse social actors, contributing to the project's expected results and impacts, to the advancement of open science policies and to a more informed society.

5. BIOASSEMBLER key messages

All BIOASSEMBLER DEC actions will be based on key messages identified as the project's main messages to be transmitted to the target groups (Table 4). This is a fundamental step for the successful implementation of the DEC Plan and the impact of BIOASSEMBLER during and beyond the project lifetime.

The messages focus on significant outputs and/or innovative strategies of the project (including its scientific, technological and social dimensions, and art and science dialogue), the possible applications of the novel biosensors and their benefits and impacts.

Table 4

BIOASSEMBLER key messages and main targeted groups.

Target group	Key message(s)
Public at large; Civil society	<p>BIOASSEMBLER will contribute to the sustainable transformation of traditional manufacturing systems by enabling smart bioassembly of diagnostic sensors, with re-cycling of the raw materials.</p> <p>BIOASSEMBLER aims to produce a new generation of biosensors that will enable important new bioanalytical applications in self-monitoring of health, professional healthcare, food and agriculture product testing, law enforcement, or environmental monitoring.</p>
Market/industrial stakeholders	<p>BIOASSEMBLER promotes increased efficiency and sustainability by harnessing molecular biotechnology in the manufacturing of MEMS biosensors, which will be attractive for new business opportunities inside the EU market.</p>
Biosensor-related scientific community	<p>BIOASSEMBLER develops a bio-intelligent process that will allow for massively parallel integration of bioreceptors onto silicon wafers, enabling scalable production of multiplexed biosensors for various bioanalytical applications.</p>

By embedding communication and dissemination strategies in the research, BIOASSEMBLER will promote awareness and interest in adopting new technologies.

Science Communicators;

Social science researchers

BIOASSEMBLER innovates in connecting science and society, establishing a social dialogue and by mapping the economic impacts of the new technology and opportunities to set a base on the principles of sustainable innovation.

These key messages can be updated during the project's duration to make the concepts more substantive and appealing to the targeted interested parties.

6. BIOASSEMBLER communication

Communication activities promote the project and its impacts widely to all stakeholders throughout the lifespan of the project. BIOASSEMBLER will reach out to society to promote a regular and transparent dialogue on the scope and progress of the project for citizens.

BIOASSEMBLER communication is based on five core actions: 1) the creation of a visual identity; 2) the design of template files; 3) the development of a dedicated website; 4) the dynamization of social media; and 5) the delivery of press releases. It also foresees the production of three art-based co-created communication and educational resources able to reach a wider and diversified audience.

All the visual identity related communication materials are accessible to all partners in the project's internal file sharing platform. This includes all visual identity versions for print or web materials as well as editable templates for communication and dissemination actions. Additionally, a document with the Visual Identity Guidelines was produced and is available to all partners.

6.1. Visual identity

The BIOASSEMBLER project visual identity (logo) was created using a collaborative approach in three phases. In the first phase, the DEC WP coordinator/CES team coordinator and the project coordinator communicated the key-ideas and images of BIOASSEMBLER to the graphic designer Daniel Sansão, from Contágio (contagiocriacao.com.br). He then presented three possibilities, with variations and examples of uses. In the second phase, the three possibilities were presented to the BIOASSEMBLER team, and each member voted on the one they liked the most and had the

opportunity to give suggestions for the final logo, which were communicated to the designer. Finally, in the third phase the designer adapted the most voted versions according to the team member' suggestions and delivered the final product.

Figure 3 depicts the project visual identity – image and colours – chosen by the project team, and the versions created based on the same matrix to be used in different situations, such as light and darker backgrounds, and in the BIOASSEMBLER social media.



Figure 3 - BIOASSEMBLER visual identity (with versions)

According to the designer, the symbol was inspired by the chip wafer and the self-assembly of the biorecognition layer and is also influenced by organic shapes. It represents the chip wafer and the connection with organic molecules. The colour palette comprises shades of blue and lime green, which convey energy and a technological touch to the identity. Univia Pro typography was chosen because of its strong personality and modern look. It is used for the logo and titles. Roboto typography is used for longer texts. Alternatively, Calibri typography is the recommended font to be used in texts.

The BIOASSEMBLER project visual identity will be included in all the project dissemination materials, documents and communication tools, such as the website, deliverables, technical documents, guidelines and social media, throughout the project lifetime.

6.2. Templates

To unify and provide easy visual identification of BIOASSEMBLER, a set of templates was created: a PowerPoint, a report and a stationary template (Figure 4).

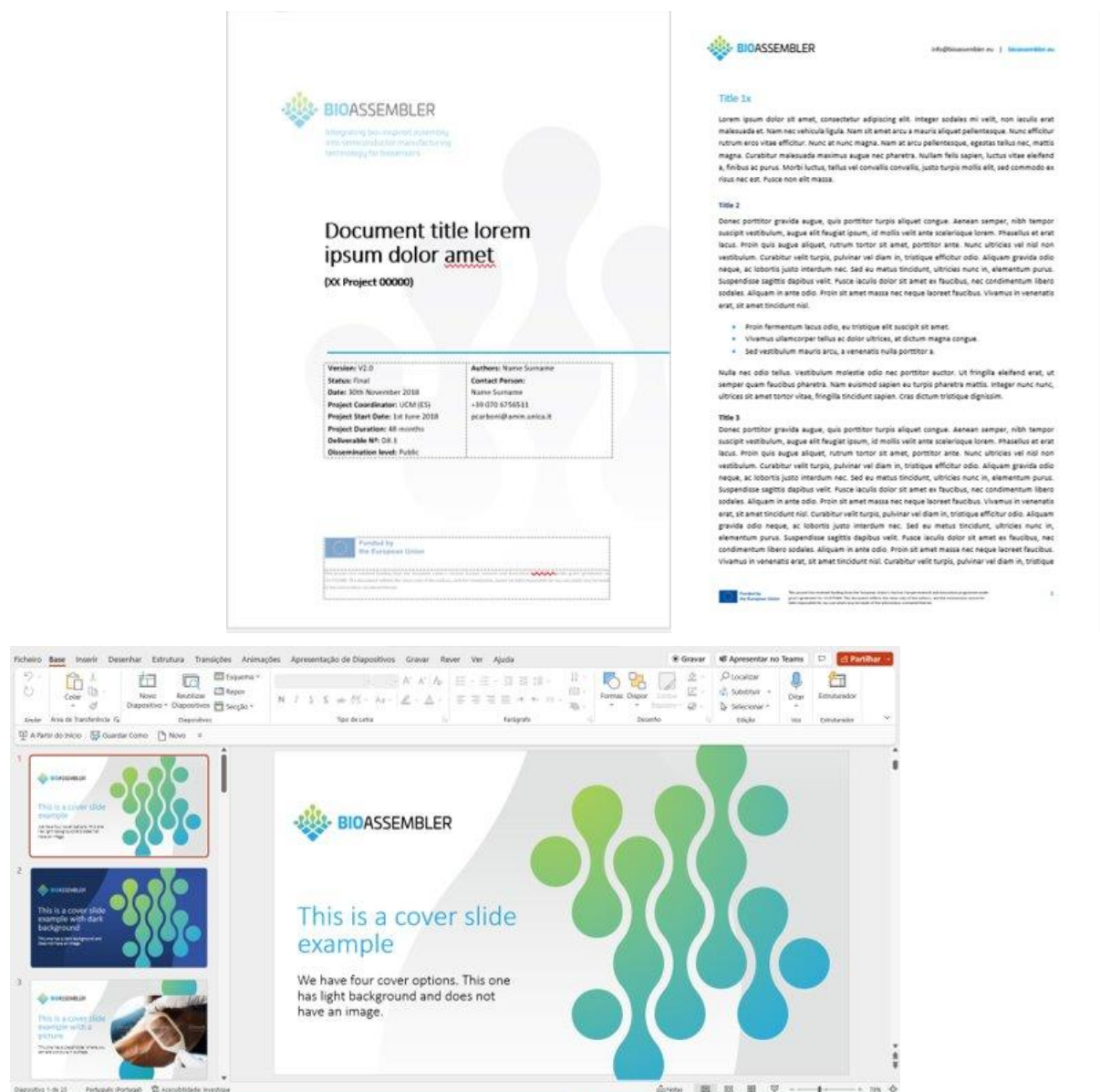


Figure 4 - BIOASSEMBLER templates (reports, stationary, oral presentations)

The different partners use these materials in all DEC activities they participate, such as lectures, seminars, public presentations, stakeholder invitations, press releases, or trade fair participations. These materials were designed in line with the project's visual identity to promote its recognition.

6.3. Website

The BIOASSEMBLER website will be the project's main reference for the DEC actions. It will gather the essential information related to the project, from its conception to its main results and products. To be in line with the project graphic identity, it will be developed by the graphic designer that conceived the BIOASSEMBLER identity, under the supervision of the DEC WP leader and the DEC Committee.

Following the same participatory approach used for the project's visual identity, the website map structure was presented to the team members and the final structure was agreed by all. The graphic layout (Figure 5) was presented to the DEC Committee and accepted by all members. A completely functional and operational website is foreseen for M6.

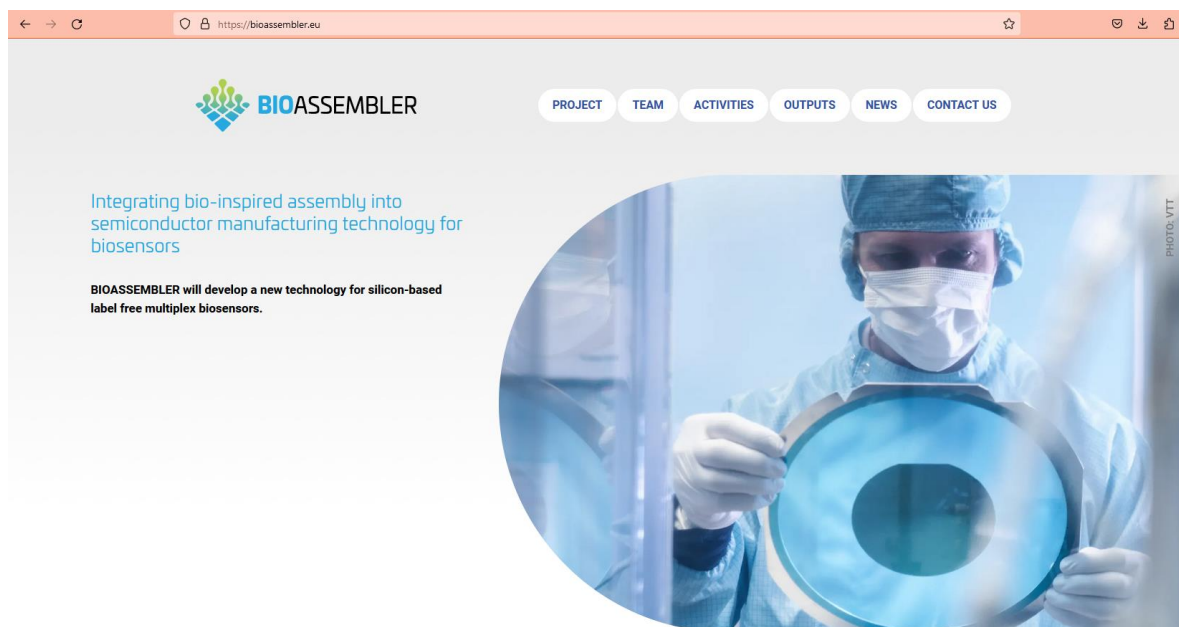


Figure 5 - BIOASSEMBLER website

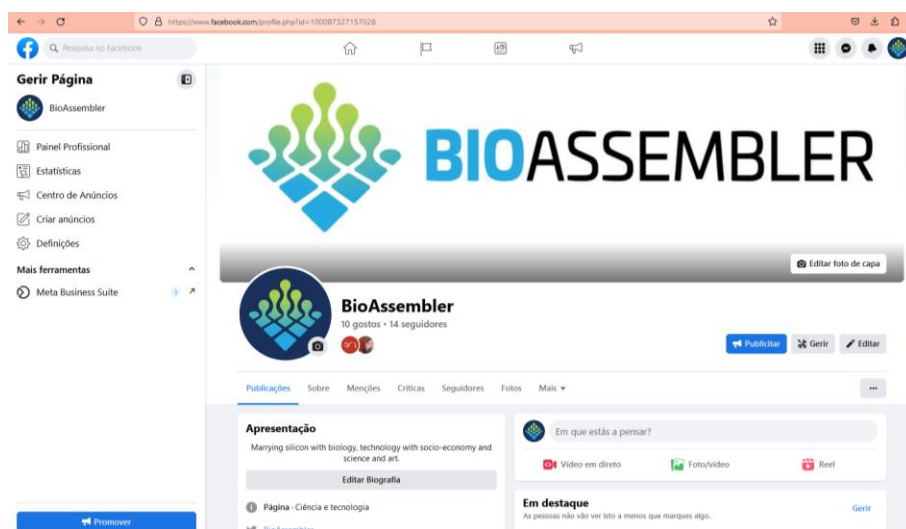
In the BIOASSEMBLER website (<https://bioassembler.eu/>) dedicated pages will present some basic information about the project, the project's objectives, organization and main work, the institutional partners and team members, their contacts and ongoing tasks, the project contacts and links to the

BIOASSEMBLER social media. The website also hosts all public deliverables in a dedicated section, as well as the scientific publications and communication and educational resources, thus fulfilling the level of public dissemination projected at the proposal stage. The website will also feature news on relevant topics or actions conducted by the team and activities organized by the project or attended by team members.

6.4. Social media accounts

Social media are today the centre of dissemination of information across heterogeneous target groups. These channels serve on-demand access to content anytime, anywhere, on any digital device. In addition to the website, BIOASSEMBLER uses several social media platforms to build its community and draw attention to the project and its outcomes, achievements and updates. BIOASSEMBLER aims to have a solid online presence, achieved by a regular presence in social media, reaching a more comprehensive and a more diverse audience spanning from academia and industry to policy makers and funding bodies.

BIOASSEMBLER LinkedIn, Facebook and Twitter accounts (Figure 6) were set up by M2 and activated since M3. Through frequent activity and interaction, these accounts will give visibility to the project research, communication, dissemination and exploitation activities with simultaneous feedback collection.



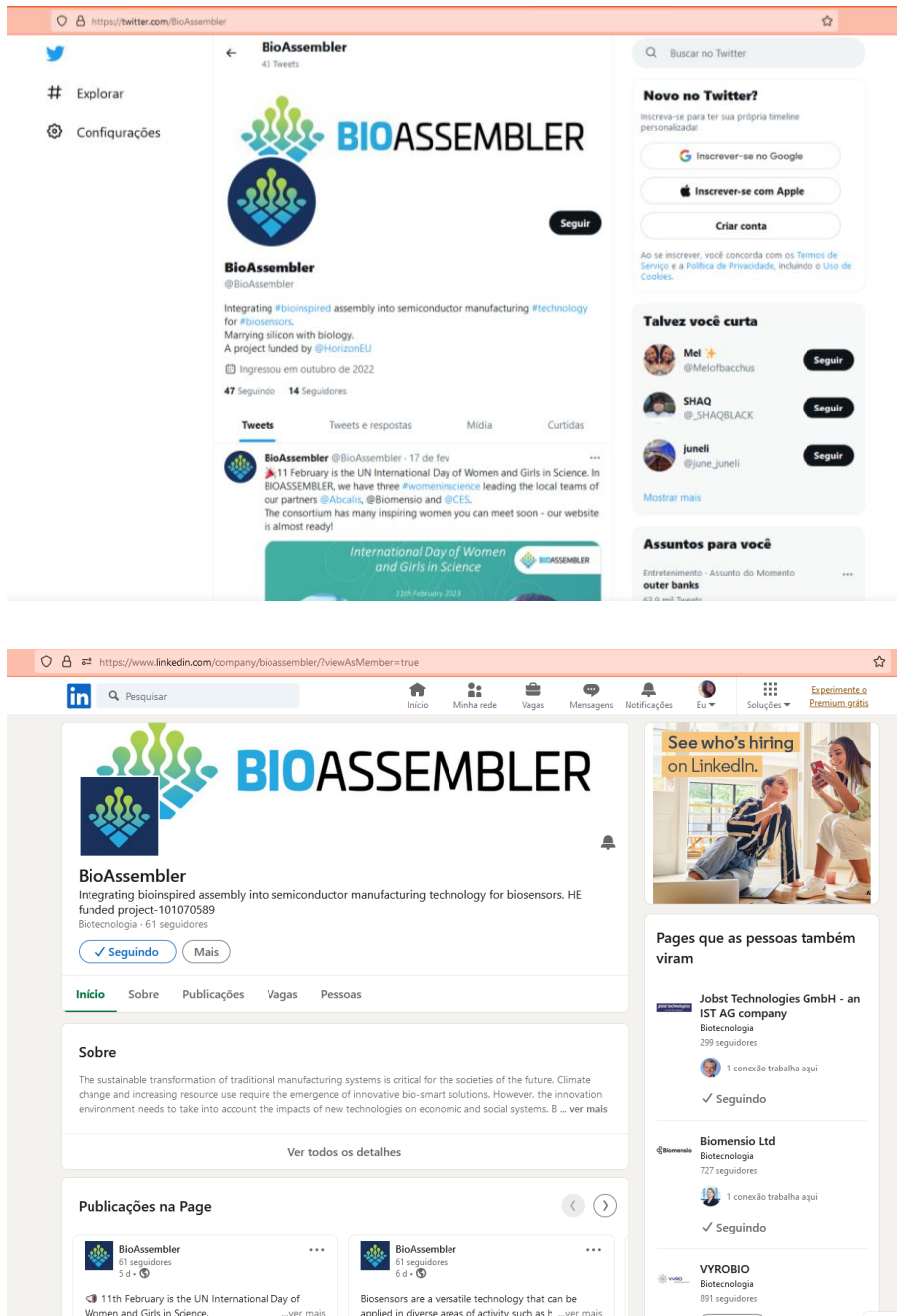


Figure 6 - BIOASSEMBLER social media accounts (Facebook, Twitter, LinkedIn)

A set of tailored hashtags will complement these efforts to ensure a broader diffusion of the BIOASSEMBLER project.

BIOASSEMBLER social media hashtags

#bioassembler #technology #biosensors #mems #bioinspired #innovation #sustainabletechnology #socioeconomicchallenges #scienceandsociety #scienceinsociety #sshresearch #HorizonEurope

Hashtags work as links that are perfect for finding relevant content to share, giving the BIOASSEMBLER audience an easy way to find content regarding the project and grouping together like conversations. They can increase the chances of getting opinions from people interested in areas that BIOASSEMBLER works in.

Traditionally, Facebook is oriented towards a more general audience, whereas Twitter targets the scientific and communication communities and LinkedIn professional/business-oriented communities. BIOASSEMBLER's social media accounts will seek to establish direct contact with broad audiences and build communities around the project, adapting and tailoring the messages to each channel whenever appropriate. Together, they will inform about the project, partners and related topics, give updates, promote events, share results, news, and create awareness and curiosity about the project activities.

6.5. Press releases

Besides the solid and regular online presence managed by DEC WP members, BIOASSEMBLER will also invest in communicating project highlights to the printed/traditional press and other media outlets via press releases. Press releases are issued in English, translated into local languages and adapted according to partners' needs.

Press releases on the main activities and developments of the BIOASSEMBLER project will be prepared and distributed for publication among the national/regional/EU press to promote the project more broadly, as well as in the partner's institutions website and social media channels. In addition to specific project activities, topics covered may include opinions/interviews from experts within and outside the partner institutions, or from individuals, companies, or organisations with a direct interest in the project theme, attracting media attention to relevant topics. All BIOASSEMBLER partners will promote continuous cooperation with the press and media. All press releases, as well as news produced from these releases, will also be available on the BIOASSEMBLER website and will be shared on the project's social media accounts.

The first press releases were published and circulated at the beginning of M3, after the project kick-off meeting, containing information summaries about the project, its objectives, partner institutions, contributions, and funding. These press releases received attention from the Portuguese regional press (Jornal de Proença and Diário de Coimbra), a German online, globally distributed magazine

targeting the electronic industry (OPE Journal) and a German platform that supports a network for life sciences (BioRegion) (Figure 7).



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Home > Ciência > Investigação visa a...

Investigação visa a transformação sustentável do fabrico de biosensores

Redação | 07:37 · 10 de Novembro, 2022 | 25

CES participa em investigação que visa a transformação sustentável do fabrico de biosensores

O Centro de Estudos Sociais (CES) da Universidade de Coimbra (UC) integra o novo projeto de investigação BIOASSEMBLER - integrando a montagem bio-inspirada na tecnologia de fabrico de semicondutores para biosensores, que procura promover a integração das Ciências Sociais e Humanidades no desenvolvimento de tecnologias inovadoras no fabrico de microssores e na transformação sustentável deste sector.

Assegurada pela União Europeia (UE), o CES irá liderar a avaliação social e económica destas inovações tecnológicas e o de-



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VTT: Bio-intelligent micromanufacturing paves the way for new biosensors

Thursday 17 November 2022

Microelectromechanical sensors are essential components in all walks of life. However, bringing biospecific elements into miniaturised sensors has been a challenge, obstructing the development of bioanalytical applications. A new European project aims to change this by developing key enabling technologies for producing silicon-based multiplexed biosensors rapidly and cost-effectively. This could transform semiconductor-based biosensor industries in Europe.

ConSlitter

Costems

Abcalis: Vegane Antikörper treffen Biosensoren

Höchstwahrscheinlich besitzen Sie selbst oder Ihr Umfeld ein Smartphone, das Ihnen sagen kann, wie viele Stunden Sie geschlafen haben oder wie viele Schritte Sie am Tag gegangen sind. Aber wussten Sie, dass diese Informationen von sehr kleinen Sensoren geliefert werden, die wahrscheinlich außerhalb Europas hergestellt werden? Das Braunschweiger Unternehmen Abcalis hat jetzt ein neues Projekt für die nachhaltige Transformation der Herstellung von Biosensoren initiiert.

Mikroelektromechanische Sensoren sind heute unverzichtbare Bestandteile in allen Bereichen des Lebens, etwa im Verkehrswesen, in der Telekommunikation und in der Unterhaltungselektronik. Sie werden mithilfe der MEMS-Technologie (mikroelektromechanische Systeme) auf der Oberfläche von Siliziumwafern (dünne runde Scheiben mit einem Durchmesser von 15, 20 oder sogar 30 cm) hergestellt. Diese Technologie ist dank ihrer zahlreichen Anwendungsmöglichkeiten umfangreich einsetzbar, aber für die Herstellung gibt es sehr spezielle und aufwändige Anforderungen. Für die MEMS-Technologien sind derart hohe Investitionen in hochspezialisierte und kostspielige Reinraumanlagen erforderlich, dass sich die Sensorherstellung auf nur wenige große Unternehmen der Halbleiterindustrie konzentriert, von denen viele in Asien tätig sind. Auch das Anwendungsspektrum dieser Technologie auf weitere Bereiche der Biosensorik wird immer noch durch die Schwierigkeiten begrenzt, biospezifische Elemente so in miniaturisierte Sensorarrays einzubauen, dass verschiedene Substanzen erkannt und identifiziert werden können.

(Quelle: Pressemitteilung Abcalis)

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Ihr direkter Draht zum Netzwerk

Telefon: 0511 760 726 0
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Kennen Sie schon unseren Newsletter?

In unserem Newsletter liefern wir Ihnen Neuigkeiten und geben Ihnen einen Überblick zu Events, Fördermöglichkeiten und

Figure 7 - Echoes of the first BIOASSEMBLER press releases in different media outlets and countries (two local press, Portugal; an online magazine for electronic industry, Germany; a network for life sciences, Germany)

6.6. Communication and Educational resources

The communication strategy of the BIOASSEMBLER project will contribute to the creation of a shared vocabulary, the promotion of interdisciplinary dialogues and the involvement with the arts and society. Additional to the online and media presence, and in complement with the scientific and technological innovations, BIOASSEMBLER will be guided from the perspective that public participation is a component of communication, and that communication is a participatory process trying to encourage the involvement of people in issues that concern them. The communication strategies adopted in the project are framed within a concept of engaged citizen social science, considering that engagement with science should be bidirectional, hereby both the scientists and the public are committed to establish an effective dialogue between different forms of knowledge to co-create new meanings and impacts for the project's results.

The planned art-based approaches to science will help to facilitate participation through a more dynamic, creative, and meaningful involvement and a greater understanding of different worldviews, thoughts and understandings, being potentially more effective communicating BIOASSEMBLER impacts than traditional methodologies. One artistic residency in one of the partners' research centres with the corresponding organization of an artistic exhibition, in a later stage of the project, will expand the communication possibilities and public engagement with science. Two participatory and collaborative books - a visual dictionary and a comic book -, also in a later stage of the project and produced in articulation with part of the SSH research work, will allow BIOASSEMBLER to reach a broader, non-specialist public as well as school and university-level students.

7. BIOASSEMBLER dissemination

BIOASSEMBLER is committed to advancing the scientific state-of-the-art, and innovative technologies for public and private use. The dissemination activities will thus target primarily market/industrial stakeholders, policy makers, standardization bodies and the scientific community. The dissemination of the project results will follow the conditions under which research data will be made accessible, as outlined in the Consortium Agreement (CA) and the GA.

Regular dissemination actions allow sharing main scientific results with peers in conferences and journals, ensuring an open data policy, and the knowledge transfer for potential exploitation of its academic and commercial uses. Tailored dissemination activities to policy makers and standardization bodies will ensure a wider applicability landscape for BIOASSEMBLER end products. Both dissemination and exploitation activities will be aligned with the needs, capacities, and networks of each consortium member.

The dissemination plan will go through three phases corresponding to the three years of the project (Table 5).

Table 5

BIOASSEMBLER dissemination phases.

Phase	Timeline	Description
Awareness	M1-12	<p>Prioritizes the generation of a community of interested stakeholders and of suitable channels.</p> <p>By M12, BIOASSEMBLER is disseminated in at least 10 virtual and/or in-presence academic, educational, media-related or industry spaces/events.</p>
Scientific/technical dissemination phase	M12-36	<p>Disseminates the generated knowledge mainly among scientific and industrial communities, ensuring the availability of research outputs to targeted audiences.</p> <p>By M30, BIOASSEMBLER is disseminated in at least 10 open-access publication and 10 industry events.</p>
Exploitation-focused	M24-36	<p>Supports the actual exploitation of project results via development of business plans, marketing towards end users (commercial results) or workshops and roadmaps (non-commercial results).</p> <p>By M30, a draft of the exploitation plan is ready.</p>

BIOASSEMBLER scientific activities for disseminating main project results will mainly target the scientific community and market/industry stakeholders. The activities will include 1) participation in key scientific meetings; 2) participation in relevant trade shows/industry events/stakeholder meetings; 3) devising a strategy for publishing in scientific journals; 4) co-organization of one interdisciplinary advanced training summer school; and 5) preparation of short reports or brochures with tailored key messages to market/industry stakeholders.

The dissemination activities will acknowledge the different stakeholder groups and will be delivered according to the dissemination phase. Table 6 presents a draft plan for the BIOASSEMBLER dissemination activities.

Table 6

Draft plan of BIOASSEMBLER dissemination activities.

Activity/action by stakeholder group	Objective	Specific channel
Market/industrial stakeholders		
<ul style="list-style-type: none"> • Technical reports and deliverables • Prototypes • Designs and specifications 	<ul style="list-style-type: none"> • Generate interest among early adopters • Cooperation • Promote uptake of individual project results 	<ul style="list-style-type: none"> • Professional fairs and events • Stakeholder workshops • Webinars • Horizon Results Platform
Scientific community		
<ul style="list-style-type: none"> • Research results • Scientific publications • Journal articles • Conference papers 	<ul style="list-style-type: none"> • Contribute to scientific literature and state-of-the-art in relevant fields of research 	<ul style="list-style-type: none"> • Scientific publications and communities • Stakeholder workshops • Webinars • Advanced training school
Policy makers		
<ul style="list-style-type: none"> • Scientific and technical results • Validation results • Performance reports 	<ul style="list-style-type: none"> • Removal of barriers to uptake and spread of BIOASSEMBLER and compliance of protocols with relevant standards 	<ul style="list-style-type: none"> • Technical briefs/brochures • Contacts and meetings • Social media
Standardisation bodies		
<ul style="list-style-type: none"> • Technical characteristics/specifications 	<ul style="list-style-type: none"> • Ensure compliance of products, processes, and technologies with current standards, and/or feed the development of new and adapted standards 	<ul style="list-style-type: none"> • Technical briefs/brochures • Contacts and meetings

7.1. Scientific meetings and trade shows/industry events/stakeholder meetings

Meetings and events serve the double purpose of sharing ongoing work or final results of the BIOASSEMBLER project and amplify the stakeholder network, primarily the scientific community, by facilitated contact with interested persons. Presence at these events allows the promotion of BIOASSEMBLER results to different target stakeholders, sharing main scientific results and engaging with the scientific community, engaging with potential users of the novel technology, and identifying synergies with different people, organisations, and initiatives, for potential collaboration and knowledge transfer.

Several events organised by third party organisations were identified for possible presentation of work, including workshops and exhibitions, participation in panels, poster sessions, demonstrations, networking, among others. Table 7 lists a limited and non-exhaustive sample of events related to the topics of BIOASSEMBLER, mirroring its goals and interdisciplinary nature. Identifying the main events in which BIOASSEMBLER members may participate is part of the dissemination strategy and will be updated throughout the project's life.

Table 7

Key events to disseminate BIOASSEMBLER.

Type of event	Event name
Scientific meetings	<ul style="list-style-type: none"> • Biosensors • International Round Table on Nucleosides, Nucleotides and Nucleic Acids • Eurosensors • IEEE Biosensors Conference • European Forum for Studies of Policies and Innovation (EU SPRI) • MicroTAS • Triple Helix • DRUID • European Sociological Association (ESA) • Rapid Methods Europe Conference • Public Communication of Science and Technology (PCST) • European Association of Citizen Science (ECSA)

Trade shows/Industry events	<ul style="list-style-type: none"> • Compamed • Analytica
Stakeholder meetings	<ul style="list-style-type: none"> • To be defined later
Other type of events	<ul style="list-style-type: none"> • Summer School

Stakeholder workshops will also be organized to share and discuss the progress of the project and the technological developments.

7.2. Scientific publications

BIOASSEMBLER’s main results will be published in scientific and technical peer-reviewed journals, conference proceedings, monographs, or reports. In accordance with the Horizon Europe guidelines on Open Access (OA) to Scientific Publications, each partner will ensure the release in the public domain of all peer-reviewed scientific publications relating to BIOASSEMBLER results. These will be done by choosing the most appropriate way of publishing, either green open access or gold open access. Any scientific peer-reviewed publication will be available online, whenever possible in national/local OA repositories, and proper communication activities will be pursued. A dedicated section of the BIOASSEMBLER project website will gather all links to the published materials.

Table 8 lists a limited and non-exhaustive selection of international journals and OA repositories best suited for publishing and/or archiving BIOASSEMBLER scientific articles. This list will be updated throughout the project’s life. It is expected that by M24 at least 3 open-access academic articles are published.

Table 8

Open Access scientific journals and repositories to publish BIOASSEMBLER results.

Type	Name
EU platform	<ul style="list-style-type: none"> • Open Research Europe (ORE) platform [https://open-research-europe.ec.europa.eu/]
National/Local Open Access repositories	<ul style="list-style-type: none"> • SIBUC (PT) [http://webopac.sib.uc.pt/]

	<ul style="list-style-type: none">• VTT's Research Information Portal (FIN) [https://cris.vtt.fi/en/]
(Gold and/or Green) Open access journals	<ul style="list-style-type: none">• Biosensors• Talanta• Biosensors and Bioelectronics• Lab on a chip• Research Policy• Technological Forecasting and Social Change• Angewandte Chemie International• Journal of Nanobiotechnology• Journal of Clinical Microbiology• Journal of Science Communication

Detailed procedures for scientific publications are stated in the GA and the CA and, in general lines, will respect the following:

- Planned publications will be distributed to all partners within one week prior to publication.
- A partner may object the planned publication within an agreed period.
- Any objection needs to be clearly justified and must include a precise request for necessary.
- Prior notice of any planned publication shall be given to the other Parties at least 45 calendar days before the publication.
- For conference or seminar presentations, the notice shall be given at least 10 days prior to the planned presentation.

7.3. Interdisciplinary advanced training course - CES Summer School

BIOASSEMBLER will organize an interdisciplinary advanced training course to foster learning of current concepts in different scientific domains, such as photolithographic chemistry, nanobiotechnology and socio-economy, and aiming at establishing a social dialogue with interested third parties and potential end-users.

The co-organization of one interdisciplinary advanced training course based on the project's concepts, processes, and results, is foreseen for M18-24. The course aims at training graduate

students and early-stage researchers to understand, articulate and debate the opportunities, benefits, challenges and impacts of the results and knowledge generated in the framework of BIOASSEMBLER. Thus, besides being planned as a dissemination activity, this summer school is also a strategy to exploit project results by creating opportunities to exchange knowledge, skills and technical know-how between the involved partners and the participants, establishing an effective link between the project and target groups (scientific community, market/industrial stakeholders, civil society).

The BIOASSEMBLER interdisciplinary advanced training course will be organized as a CES Summer School, taking advantage of this well-established international training program. As stated in the program page (<https://ces.uc.pt/summerwinterschools/>), the CES Summer & Winter Schools reflects the CES approach which values transdisciplinarity, epistemological pluralism, North/South perspectives, as well as a strong interrelationship between practice and theory conducive to the production of policy-oriented knowledge. CES Summer & Winter Schools bring together academics, experts, and activists/practitioners. It therefore caters to students and professionals.

7.4. Reports and brochures

Technical reports and brochures with key messages related to the scope of the BIOASSEMBLER project and ongoing work will be prepared and disseminated to the identified target groups. At least five technical reports will be made available in the project website and disseminated in the project social media accounts before M26. By M30, the DEC Committee will meet to agree on the final message to be included in the brochures.

8. BIOASSEMBLER exploitation

Exploitation of BIOASSEMBLER's results and outcomes aims to promote wide uptake and replication of the results, both during the project's lifetime and beyond. This covers further research, increasing the potential for commercial exploitation, feedback to policy measures and other possible uses.

An exploitation strategy will be prepared to provide and implement a business and market analysis, as well as a plan for achieving higher Technology readiness levels (TRLs). This will allow the exploitation of the scientific results from the project at different levels, such as Go-to Market Strategy, Scientific, Commercial or Open-Source Exploitation, and will identify plausible paths to commercialise the innovations, while considering the requirements for open data and open science. The plan will be continuously developed throughout the project.

Exploitation activities are foreseen to start in M13 and will last until the end of the project, aiming at ensuring the long-term impact of the project beyond its completion. Comprehensive exploitation will cover:

- Identifying the most promising exploitable results using the methodology from the EC innovation radar.
- Identifying obstacles, requirements and necessary actions involved in reaching higher TRLs.
- Creating an advisory group to involve (e.g. industry and end-users) to receive feedback in terms of commercial potential.
- Developing joint and/or single partner relevant business models and business plans.
- Conducting a market analysis, including research of existing and emerging markets.
- Mapping existing partner intellectual propriety rights (IPR), creating IPR strategy and management for commercial exploitation.
- Supporting for standardization.
- Up-scaling and replication, including identification of further R&D&I needs and opportunities to reach higher TRLs; most suitable locations for initial medium scale production site(s); suitable funding and financing models; and analysis of exploitation risks and barriers.

9. Evaluation and monitoring

BIOASSEMBLER communication and dissemination activities will be monitored according to a set of quantitative and qualitative indicators. The evaluation of these activities will determine the degree to which the objectives have been reached, and the relationship between the outcomes and the efforts made to achieve the goals. This analysis will help the project to better understand facilitators and barriers of successful communication and dissemination, and will serve to refine the planned activities accordingly. A set of main key performance indicators (KPIs), and draft target values (Table 9), has been specifically defined to monitor and manage the dissemination and exploitation activities.

Table 9

KPIs for BIOASSEMBLER communication and dissemination activities.

KPI	Target value	Description
Website – average monthly single users	≥ 200	# of users accessing the project website
Twitter – followers	≥ 200	# of followers, # of interactions

Facebook – followers	≥ 200	# of followers, # of interactions
LinkedIn – followers	≥ 600	# of followers, # of interactions
Networking events	≥ 15	# of events attended by partners linked to existing initiatives
Press releases	≥ 30	# of media mentions
Artistic product	≥ 20, ≥ 2000	# of visitants for the live presentation, # of views for the virtual format
Visual dictionary	≥ 500, ≥ 200	# of readings, # of downloads for the online edition
Comic book	≥ 1000, ≥ 500	# of readings, # of downloads for the online edition
Presenting project results at national and international events	> 20	# of events hosting partners as speakers
Stakeholder Workshop	> 200	# of representatives of market/industrial stakeholders, # of representatives of the scientific community
Publishing results	> 20	# of scientific paper drafts prepared by partners, # report and brochures

Partners will be encouraged to organize and/or participate in communication and dissemination activities during the project implementation. To monitor each partner's activities, BIOASSEMBLER will implement a joint document named “Communications and Dissemination Log”. The log will be designed based on an excel sheet accessible to all partners in the project’s internal file sharing platform. Specific communication and dissemination actions carried out by the partners should be registered in the log, including some key information about the action (type of action, dates, place/location, channels used, number of participants, links, brief description). Every six months the DEC WP coordinator will check the log and update the specific KIP’s. This will be used as a strategy to closely monitor the communication and dissemination efforts of the project.