

The background of the slide features a blue-tinted molecular structure with translucent spheres and connecting rods, creating a sense of depth and scientific focus.

The international ecosystem for accelerating the transition to Safe-and-Sustainable-by-design materials, products and processes.

Workshop with stakeholders of Horizon Europe projects related to SSbD - Update

Cris Rocca, Christina Apel, Eva Valsami-Jones

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Author(s)	Cris Rocca, Christina Apel, Eva Valsami-Jones

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Abbreviations and Acronyms

Abbreviation	Definition
AMI 2030	Advanced Materials Initiative 2030
BNN	BioNanoNet
CEA	Alternative and Atomic Energies Agency (French: Commissariat à l'énergie atomique et aux énergies alternatives)
CSA	Coordination and Support Action
D	Deliverable
EC	European Commission
EuMaT	European Technology Platform for Advanced Engineering Materials and Technologies
H2020	Horizon 2020
HE	Horizon Europe
JRC	Joint Research Centre
LCA	Lifecycle Assessment
NM	Nanomaterial
NMBP	Nanomaterial-based product
NSC	NanoSafety Cluster
OECD	Organization for Economic Co-operation and Development
RIVM	National Institute for Public Health and the Environment
RP	Regulatory Preparedness
SbD	Safe-by-Design
SMEs	Small and Medium-sized enterprises
SSbD	Safe and Sustainable-by-Design
SSIA	Safe(r) and Sustainable Innovation Approach
SusbD	Sustainable-by-Design
SusChem	European Technology Platform for Sustainable Chemistry
TE	Trusted Environment
VC	Value Chain
WP	Work Package
WPMN	Working Party on Manufactured Nanomaterials
WG	Working Group

1 Executive Summary

To establish input from the nanosafety sector, two workshops aimed at capturing the full range of ongoing and recently started (nanosafety-focused) Horizon Europe (HE) projects addressing Safe-by-Design (SbD) and Sustainable-by-Design (SusbD) concepts were organized.

The first event at the nanoSAFE 2023 & NSC joint conference was organised jointly by the EU NanoSafety Cluster (NSC), coordinated by three IRISS Partners - namely, University of Birmingham (UoB), BioNanoNet (BNN) and the Dutch National Institute for Public Health and the Environment (RIVM) – along with the French Alternative and Atomic Energies Agency CEA (*Commissariat à l'énergie atomique et aux énergies alternatives*), local host of the event. The event was held in Grenoble, France, from the 5th to the 9th of June 2023, involving all the major actors working towards the effective implementation of the SSbD approach in Industries and Small and Medium-sized Enterprises (SMEs).

The most important day for the IRISS project was Wednesday 7th of June 2023, the “SSbD SOLUTIONS DAY” which gave the chance to the ending Horizon 2020 (H2020) projects on SbD and Safe-and-Sustainable-by-design (SSbD) - funded under the H2020 calls NMBP 12, 15 and 16 - to look into ways to guarantee the legacy of their projects is kept alive, and provide/transfer their experiences and lessons learnt to the recently started and starting Horizon Europe (HE) projects working towards the SSbD approach implementation.

In the framework of this event, IRISS actively interacted with the nanosafety community and was able to share with the audience the key findings of the state-of-the-art mapping and highlights of the main gaps already identified. IRISS received further inputs from the whole NSC community, which will feed into the ongoing work of the identification of the gaps to be filled in to make the SSbD approach applicable as soon as possible.

Additionally, the collaboration was fostered through the engagement of the participants in a highly valuable exchange and also had the opportunity to attend two relevant panel discussions. The first panel was focused on the industrial perspective of applying SSbD and the second one involved all the major actors towards the SSbD approach implementation.

The whole event was a chance for IRISS to continue the creation of the SSbD community and engage the projects that were also part of the second IRISS SSbD workshop of Horizon projects.

The second event was an online workshop which took place on Friday, 10th of November 2023 from 10 to 15 CET via Zoom.

This guaranteed the fostering of the collaboration between IRISS and the NanoSafety Cluster Community. During the last workshop, IRISS and all the projects representatives part of the event, shared the common vision that collaborating with each other, as a whole SSbD community, is key in order to implement the SSbD approach in the shortest time possible. The projects having started earlier in time presented thoroughly their approach to the SSbD implementation in their projects, to receive useful feedback and to provide examples to the newly started ones.

2 Background and Objectives

The IRISS project is a Coordination and Support Action (CSA) funded under Horizon Europe (HE). IRISS aims to support the operationalisation and implementation of the Safe-and-Sustainable-by-Design (SSbD) approach into Industries and SMEs to achieve safer and more sustainable materials and products for society and to contribute to the European policy goal of a toxic-free environment. IRISS will establish an EU-led international and permanent SSbD network, connecting all SSbD actors and stakeholders and providing various services such as re- and up-skilling opportunities. The uniqueness of IRISS lies in the composition of its consortium, which brings together actors from policy, industry, applied science, research & innovation, and education organisations to build an EU-led permanent network, self-sustaining and international in scope. The IRISS SSbD network will also coordinate and support all relevant SSbD activities to maximise their impact. To achieve this, IRISS will need to liaise with existing networks, initiatives, communities, and other projects to create synergies by joining forces. The consensus and engagement of a wide range of actors from policy, industry and academia is essential to further develop the SSbD concept and make it readily applicable to industrial innovation processes. IRISS will act as the interphase between these actors (Figure 1).



Figure 1: IRISS as Science-Policy-Industry Interphase

IRISS Work Package 2 (WP2) namely 'Gap Analysis in SSbD Activities' aims at identifying the gaps in i) modelling tools and testing protocols in SSbD, taking into account the decrease of energy consumption of materials manufacturing and the prediction of the materials behaviour at the design stage to meet the value chain (VC) requirements and increase durability during use, ii) recyclability of materials and products and use of secondary materials, iii) environmental and resource issues of materials products and processes, and iv) lifecycle, cost and social assessment at materials development phase. WP2 will provide insights on suboptimal or missing strategies, structures, practices, or skills mapped in IRISS WP1 'Mapping SSbD methods and criteria' and then recommend steps that will offer opportunities for gap closure. It will also analyse the inputs from the different VC needs (IRISS WP4 'Value Chains SSbD Ecosystems') on SSbD for future research, addressing skills and knowledge needs, and state of the art methodologies, including lifecycle thinking approaches on novel advanced materials to define the gap analysis.

To achieve its objectives, WP2 will work closely with WP1 and WP4. The WP2 team will also perform a systematic review of the scope of ongoing and recently started projects selected

under the HE calls targeting Sustainable-by-Design (SusbD) materials. Furthermore, a harmonised methodology will be used to carry out gap-filling activities combining different inputs from relevant initiatives - like the EU Nanosafety Cluster (NSC), European Technology Platform for Advanced Engineering Materials and Technologies (EuMaT) the European Technology Platform for Sustainable Chemistry (SusChem) - and from relevant projects (e.g., HE projects granted in SusbD Resilience calls, including but not limited to: CL4-2021-RESILIENCE-01-11, CL4-2021-RESILIENCE-01-12, and CL4-2022-RESILIENCE-01-13; and ongoing governance projects of the NSC funded under call H2020-NMBP-13).

3 Description of Task 2.2

The scope of this paragraph is to present a brief description of IRISS Task 2.2 ‘Workshop for stakeholders from HE projects related to SSbD’. The objective of the above-mentioned task is to establish and maintain input from the nanosafety sector, culminating in two workshops aimed at capturing the full range of ongoing and recently started HE projects addressing SbD and SusbD concepts. In order to reach a consensus on the SSbD concept, the WP2 team will engage and work closely with relevant ongoing EU projects to bring stakeholders together, exchange knowledge, and build long-term collaborations. The main activities under Task 2.2 will include the establishment of a collaboration with the NSC community and the organisation of two workshops focusing on the SSbD implementation strategy adopted by the different nano sectors-related projects, fostering their interaction and mutual engagement. The outcome of these workshops will be integrated into WP3 for road mapping.

This Deliverable 2.6 (D2.6) gathers the results of the activities carried out within Task 2.2. It gives an overview of the planning, implementation and results of the workshops involving ongoing and recently started SSbD-related projects in the field of nanosafety. D2.6 is an update of D2.2, which included the activities performed until September 2023, i.e. the mapping activities (Chapter 4 *Mapping of ongoing SSbD-related Horizon projects*) and the first event, the SSbD Day at the nanoSAFE 2023 & NSC joint conference (Chapter 5 *SSbD Day at the nanoSAFE 2023 & NSC joint conference in Grenoble, France*).

4 Mapping of ongoing SSbD-related Horizon projects

Within the activities foreseen by IRISS, relevant SSbD-related projects funded under H2020 and HE Framework Programmes have been identified and are listed in Table 1 and 2 below. A questionnaire was distributed among IRISS partners and their network contacts to identify HE and H2020 projects related to SSbD in which they were involved. This initial list of projects was then cross-referenced with those analysed by other initiatives^[1,2,3]. Additionally, a search was conducted in CORDIS^[4] for projects funded under SSbD-related calls that started in 2018 or later, using the keywords 'SSbD' and 'Sustainable by Design'. The mapping of projects started as part of WP1, in which the most relevant identified H2020 projects and HE projects related to SSbD aspects were contacted for the conducted mapping activities. The focus was on H2020 projects, as the HE projects have only recently started. This projects mapping was continued in Task 2.2 with efforts focusing on HE projects that IRISS should connect to.

Even though Task 2.2 focuses mainly on the nanosafety sector, the mapping includes a list of projects targeting additional topics linked to SSbD with the aim to establish a closer collaboration with projects outside the nanosafety community. Considering that most of the projects funded under the H2020 calls will end in 2023, it is crucial to build a contact and to foster connection with the recently started and starting HE projects to transfer their experiences and lessons learnt.

Table 1: Relevant SSbD-related Horizon 2020 (H2020) projects

Topic identifier	Acronym	Title and Runtime
INFRAIA-02-2017: Integrating Activities for Starting Communities	<u>NanoCommons</u>	The European Nanotechnology Community Informatics Platform: Bridging data and disciplinary gaps for industry and regulators 2018-2022
DT-NMBP-07-2018: Open Innovation Test Beds for Characterisation (IA)	<u>i-TRIBOMAT</u>	Intelligent Open Test Bed for Materials Tribological Characterisation Services 2019-2023
NMBP-13-2018: Risk Governance of nanotechnology (RIA)	<u>NANORIGO</u>	Establishing a Nanotechnology Risk Governance Framework 2019-2023
	<u>Gov4Nano</u>	Implementation of Risk Governance: meeting the needs of nanotechnology 2019-2023
	<u>RiskGONE</u>	Risk Governance of Nanotechnology 2019-2023
	<u>NanoSolveIT</u>	Innovative Nanoinformatics models and tools: towards a Solid, verified

Topic identifier	Acronym	Title and Runtime
NMBP-14-2018: Nanoinformatics: from materials models to predictive toxicology and ecotoxicology (RIA)		and Integrated Approach to Predictive (eco)Toxicology 2019-2023
	<u>NanoInformaTIX</u>	Development and Implementation of a Sustainable Modelling Platform for Nanoinformatics 2019-2023
DT-NMBP-12-2019: Sustainable Nano-Fabrication (CSA)	<u>NanoFabNet</u>	NanoFabNet - International Hub for sustainable industrial-scale Nanofabrication 2020-2022
	<u>SUSNANOFAB</u>	Integrated EU strategy, services and international coordination activities for the promotion of competitive and sustainable nanofabrication industry. 2020-2023
NMBP-15-2019: Safe by design, from science to regulation: metrics and main sectors (RIA)	<u>ASINA</u>	Anticipating Safety Issues at the Design Stage of NANO Product Development 2020-2024
	<u>SABYDOMA</u>	Safety BY Design Of nanoMaterials - From Lab Manufacture to Governance and Communication: Progressing Up the TRL Ladder 2020-2023
	<u>SAByNA</u>	Simple, robust and cost-effective approaches to guide industry in the development of safer nanomaterials and nano-enabled products 2020-2024
	<u>SbD4Nano</u>	Computing infrastructure for the definition, performance testing and implementation of safe-by-design approaches in nanotechnology supply chains 2020-2024
NMBP-34-2019: In support of documentary standards (CSA)	<u>NanoHarmony</u>	Towards harmonised test methods for nanomaterials 2020-2023
	<u>NANOMET</u>	Development and standardisation of methods for the safety testing of manufactured nanomaterials at OECD 2020-2023

Topic identifier	Acronym	Title and Runtime
BBI-2019-SO3-F3: Produce high-performance bio-based alternatives to harmful products or processes to protect and enhance human health and the environment	<u>ReSolute</u>	High performing and safe solvent derived from cellulosic feedstocks 2020-2024
JTI-CS2-2019-CFP10-THT-07: Ultra-High Aspect ratio wings	<u>RHEA</u>	Robust- and sustainable-by-design ultra-high aspect ratio wing and Airframe 2020-2023
NMBP-16-2020: Safe by design, from science to regulation: multi-component nanomaterials (RIA)	<u>DIAGONAL</u>	Development and scaled Implementation of safe by design tools and Guidelines for multi-component and harmful nanomaterials 2021-2024
	<u>HARMLESS</u>	Advanced High Aspect Ratio and Multicomponent materials: towards comprehensive intelligent testing and Safe by design Strategies 2021-2025
	<u>SUNSHINE</u>	Safe and sustainable by design Strategies for High performance multi-component Nanomaterials 2021-2024
NMBP-35-2020: Towards harmonised characterisation protocols in NMBP (RIA)	<u>CHARISMA</u>	Characterization and Harmonization for Industrial Standardisation of advanced Materials 2020-2024
	<u>EASI-STRESS</u>	European Activity for Standardization of Industrial residual STRESS characterization 2021-2023
	<u>nanoMECommons</u>	Harmonisation of EU-wide nanomechanics protocols and relevant data exchange procedures, across representative cases; standardisation, interoperability, data workflow 2021-2025
CE-NMBP-42-2020: Materials life cycle sustainability analysis	<u>ORIENTING</u>	Operational Life Cycle Sustainability Assessment Methodology Supporting Decisions Towards a Circular Economy 2020-2023

Table 2: Relevant SSbD-related Horizon Europe (HE) projects

Topic identifier	Acronym	Title and Runtime
HORIZON-HLTH-2021-ENVHLTH-03-01: European partnership for the assessment of risks from chemicals	<u>PARC</u>	Partnership for the Assessment of Risks from Chemicals 2022-2029
HORIZON-CL4-2021-RESILIENCE-01-09: Promote Europe's availability, affordability, sustainability and security of supply of essential chemicals and materials (IA)	<u>SIMPLI-DEMO</u>	Demonstration of Sonication and Microwave Processing of Essential Chemicals 2022-2026
HORIZON-CL4-2021-RESILIENCE-01-10: Paving the way to an increased share of recycled plastics in added value products (RIA)	<u>PRIMUS</u>	Reforming secondary plastics to become the primary raw material choice for added-value products 2022-2025
	<u>Precycling</u>	Plastics Recycling from and for home appliances, toys and textile 2022-2026
	<u>INCREASE</u>	INCREASE – Increasing recycled content in added value products for a resilient and digitized circular economy. 2022-2026
	<u>ABSoIEU</u>	Paving the way for an ABS recycling revOLution in the EU 2022-2026
HORIZON-CL4-2021-RESILIENCE-01-11: Safe- and sustainable-by-design polymeric materials (RIA)	<u>ESTELLA</u>	DESIGN of bio-based Thermoset polymer with rEcyCLing capabiLity by dynAmic bonds for bio-composite manufacturing 2022-2026
	<u>REDONDO</u>	Reversibly designed cross-linked polyethylene enabling its recycling 2022-2025
	<u>REPurpose</u>	Recyclable Elastomeric Plastics safely and sUstainably designed and produced via enzymatic Recycling of Post-cOnsumer waStE strEams 2022-2026
	<u>SURPASS</u>	Safe-, sUstainable- and Recyclable-by design Polymeric systems - A guidance towardS next generation of plasticS 2022-2025

Topic identifier	Acronym	Title and Runtime
HORIZON-CL4-2021-RESILIENCE-01-12: Safe- and sustainable-by-design metallic coatings and engineered surfaces (RIA)	<u>FreeME</u>	Toxic Free metallization process for plastic surfaces 2022-2026
	<u>MOZART</u>	Metal matrix nanocomposite coatings utilization as alternative to hard chromium. 2022-2025
	<u>NICKEFFECT</u>	Ni-based ferromagnetic coatings with enhanced efficiency to replace Pt in energy & digital storage applications. 2022-2026
	<u>NOUVEAU</u>	Novel electrode coatings and interconnect for sustainable and reusable SOEC 2022-2025
HORIZON-CL4-2021-RESILIENCE-01-20: Antimicrobial, Antiviral, and Antifungal Nanocoatings (RIA)	<u>MIRIA</u>	Development of antimicrobial, antiviral and antifungal nanocoatings for everyday surfaces. 2022-2026
	<u>NOVA</u>	Next Generation BiOactive Nanocoatings 2022-2026
	<u>RELIANCE</u>	Smart Response sELf-desInfected biobAsed NanoCoatEd surfaces for healthier environments 2022-2026
	<u>STOP</u>	Surface Transfer of Pathogens 2022-2026
	<u>SUSAAN</u>	SUStainable Antimicrobial and Antiviral Nanocoating 2022-2025
	<u>Triple-A-COAT</u>	Sustainable Development of a Safe and Biobased Antimicrobial, Antifungal and Antiviral Nanocoating Platform 2022-2026
HORIZON-HLTH-2021-IND-07-01: Green pharmaceuticals	<u>ENVIROMED</u>	Next generation toolbox for greener pharmaceuticals design & manufacturing towards reduced environmental impact 2022-2025
	<u>ETERNAL</u>	Boosting the reduction of the environmental impact of pharmaceutical products throughout their entire life cycle 2022-2026
	<u>IMPACTIVE</u>	Innovative Mechanochemical Processes to synthesize green ACTIVE pharmaceutical ingredients 2022-2026

Topic identifier	Acronym	Title and Runtime
	<u>SUSPHARMA</u>	Merging sustainable and digital chemical technologies for the development of greener-by-design pharmaceuticals. 2022-2025
	<u>TransPharm</u>	Transforming into a sustainable European pharmaceutical sector 2022-2026
HORIZON-CL4-2022-RESILIENCE-01-10: Innovative materials for advanced (nano)electronic components and systems (RIA)	<u>i-EDGE</u>	Nanomechanical Hardware Platforms for Edge Computing
	<u>PHASTRAC</u>	Phase Change Materials for Energy Efficient Edge Computing
	<u>GREENER</u>	Single Photon source and detector based on novel materials for the detection of endocrine disruptors
	<u>MatEl</u>	PZT and Graphene MATERIALS innovations for advanced opto-Electronic applications in AR and biosensing
	<u>NANOMAT</u>	Heterogeneous material and technological platform for a new domain of power nanoelectronics
	<u>MAGNIFIC</u>	Materials for a next-generation (nano-)opto-electro-mechanical systems
HORIZON-CL4-2022-RESILIENCE-01-12: Functional multi-material components and structures (RIA)	<u>DISCO2030</u>	Combining DISSimilar materials into functional large-scale and light-weight COmponents and structures
	<u>MADE-3D</u>	Multi-Material Design using 3D Printing
	<u>MIMOSA</u>	Multimaterial airframes based on 3D joints between AM metals and carbon-fiber composites
	<u>MULTHEM</u>	Multi-material additive manufacturing for lightweight and thermal management
	<u>MultiMag</u>	Multi-functional, multi-material magnetic components and structures for electrification
HORIZON-CL4-2022-RESILIENCE-01-13: Smart and multifunctional biomaterials for health innovations (RIA)	<u>BUCCAL-PEP</u>	Development of a multifunctional biomaterial patch for buccal delivery of peptide-analogue treatments
	<u>ELR-SCAR</u>	A novel multi-functional elastin-like recombinant hydrogel for the prevention of scar tissue formation following a myocardial infarction: "ELR-SCAR"
	<u>FORCE REPAIR</u>	Smart and multiFunctional 3D printable prO-Regenerative biologiCal matrix modulating

Topic identifier	Acronym	Title and Runtime
		mEchanotRansduction as advancEd theraPy to treAt skIn chRonic wounds
	<u>NABIHEAL</u>	Antimicrobial nanostructured biomaterials for complex wound healing
	<u>NOMAD</u>	Novel biomaterials to prevent dental peri-implant infections
	<u>REBORN</u>	Remodelling of the infarcted heart: piezoelectric multifunctional patch enabling the sequential release of therapeutic factors. S
	<u>SMARTSHAPE</u>	Development of a smart shape-memory sensor for biological pressure monitoring applications
HORIZON-CL4-2022-RESILIENCE-01-19: Advanced materials modelling and characterisation (RIA)	<u>AddMorePower</u>	Advanced modelling and characterization for power semiconductor materials and technologies
	<u>CoBRAIN</u>	Integrated Computational-Experimental material Engineering of Thermal Spray coatings
	<u>D-STANDART</u>	Durability modelling of composite structures with arbitrary lay-up using standardized testing and artificial intelligence.
	<u>KNOWSKITE-x</u>	Knowledge-driven fine-tuning of perovskite-based electrode materials for reversible Chemicals-to-Power devices
HORIZON-CL4-2022-RESILIENCE-01-20: Climate Neutral and Circular Innovative Materials Technologies Open Innovation Test Beds (IA)	<u>Convert2Green</u>	Converting Facilities Network for accelerating uptake of climate neutral materials in innovative products
	<u>Exploit4InnoMat</u>	An Open Innovation Ecosystem for exploitation of materials for building envelopes towards zero energy buildings
HORIZON-CL4-2022-RESILIENCE-01-23: Safe- and sustainable-by-design organic and hybrid coatings (RIA)	<u>BIO-SUSHY</u>	Sustainable surface protection by glass-like hybrid and biomaterials coatings
	<u>PROPLANET</u>	Enhanced Safe and Sustainable coatings for supporting the Planet
	<u>TORNADO</u>	New routes of safe and sustainable by design water and oil repellent biobased coatings.
	<u>ZeroF</u>	Development of verified safe and sustainable PFAS-free coatings for food packaging and upholstery textile applications
HORIZON-CL4-2022-DIGITAL-EMERGING-01-35: Advanced characterisation methodologies to assess and predict the health and	<u>ACCORDs</u>	Green deal inspired correlative imaging-based characterization for safety profiling of 2D materials
	<u>iCare</u>	Integrated assessment and Advanced Characterisation of Neuro-Nanotoxicity

Topic identifier	Acronym	Title and Runtime
environmental risks of nanomaterials (RIA)	<u>MACRAME</u>	Advanced Characterisation Methodologies to assess and predict the Health and Environmental Risks of Advanced Materials
	<u>nanoPASS</u>	Bridging the gaps in nanosafety for animal-free prediction of adverse outcomes
	<u>POTENTIAL</u>	Platform Optimisation To Enable NanomaTerIAL safety assessment for rapid commercialisation

5 SSbD Day at the nanoSAFE 2023 & NSC joint conference in Grenoble

5.1 Practical information and agenda

The SSbD Day took place on Wednesday, 7th June 2023, in the Auditorium Platine at Maison Minatec located in Grenoble, France.

The complete agenda of the event is shown in Figure 2. IRISS Consortium successfully involved partners/representatives from a total of nine H2020 projects (NanoFabNet, SUSNANOFAB, ASiNA, SAbYDOMA, SAbYNA, SbD4Nano, HARMLESS, DIAGONAL, SUNSHINE) and twelve HE projects (IRISS, SPINE, PARC, SURPASS, RE-PURPOSE, REDONDO, ESTELLA, MACRAME, ACCORDs, POTENTIAL, nanoPASS, iCare, GREENSME) as active actors of the event in Grenoble.

The participation of representatives from the Value Chains (VCs), European Commission, AMI2030, OECD, Malta Initiative, SPINE project in the various panel discussions and throughout the event was also very much appreciated and contributed, together with all the other participants, to the realisation of this important event for the implementation of SSbD. Approximately 120 people attended the SSbD Day, representing both Academia and Industry. Photos, recording of the two panel discussions which took place on that day, and additional materials concerning the event are available on the [nanoSAFE & NSC 2023 website](#).

SSbD Day

Wednesday 7 June, 2023 – Auditorium Platine



8:45 – 9:25 am	Plenary: SSbD framework for advanced materials Hubert Rauscher, EC Auditorium Platine
9:30–10:30 am	Horizon2020 CSA projects outcomes Horizon Europe SSbD CSA Project mapping results part 1
10:30–11:00 am	Coffee Break
11:00 am–12:30 am	Horizon Europe SSbD CSA Project mapping results part 2 H2020 SbD/SSbD projects by topics NMBP 15–16
12:30–2:00 pm	Lunch Break
2:00 – 2:20 pm	Plenary: AMI 2030 - paving the way for an United European Systemic Change for People, Planet and Prosperity Lars Montelius
2:20–4:00 pm	Horizon Europe SbD Policy Project SPINE Horizon Europe Project - PARC Horizon Europe SSbD CSA Project - IRISS Horizon Europe SSbD by topics
4:00–4:20 pm	Coffee Break
4:20–5:20 pm	Panel discussion: Industrial perspective and applicability of the SSbD Framework Chair: Martin Himly
5:20–5:30 pm	Coffee Break
5:30–5:40 pm	OECD WPMN–SSIA: Overview of the Safe and Sustainable Innovation approach
5:40–6:40 pm	Panel discussion: Collaboration and alignment towards SSbD Chair: Andreas Falk
6:40 pm	End of the Day
8:00–11:00 pm	Gala dinner

Figure 2: Agenda overview of the SSbD day at the nanoSAFE 2023 & NanoSafety Cluster joint conference from the Program Book of the Nanosafe 23

5.2 Workshop programme and description of sessions

This section aims at providing an overview on the main sessions foreseen as part of the “SSbD Day” workshop. The full detailed programme is listed in Table 3.

The SSbD Day started with a plenary presentation on the SSbD framework for advanced materials given by Hubert Rauscher, Scientific Officer at the European Commission’s (EC) Joint Research Centre (JRC). He gave an overview of the SSbD framework, presented the feedback from stakeholders collected by JRC, including the identified weaknesses and points of progress.

After the plenary presentation, Eva Valsami-Jones (University of Birmingham, United Kingdom) welcomed everyone to the SSbD Day and opened a Mentimeter poll with the initial question “*Do you know what SSbD is?*” followed by other questions along the whole event meant to test the water and check/receive inputs from the audience towards a more effective SSbD framework implementation. The Mentimeter poll in fact, stayed open the whole day for input and feedback collection from the audience.

In the first session, representatives from the H2020-funded CSA projects NanoFabNet and SUSNANOFAB gave a combined presentation titled “*Securing the Future for sustainable Nanofabrication in Europe*”. The speakers, Steffi Friedrichs (ACUMENIST, Belgium) and Simon Clavaguera (CEA, France), introduced the above-mentioned projects, focusing on their combined activities and synergies to perform concerted actions and initiatives such as a Joint Networking & Brokerage Event and the definition of a joint whitepaper for a sustainable nanofabrication.

The next slots offered an overview on main results collected during the mapping carried out by IRISS project under WP1. More in details, Bernd Nowak (Empa, Switzerland) gave a short introduction to the IRISS projects and continued with the mapping results of Task 1.1, concerning the mapping of SbD criteria and methods for chemicals and materials. After a coffee break, the presentation of mapping results continued with Amaya Igartua (TEKNIKER, Spain) and Christina Apel (Leuphana University, Germany), who presented the results of the SusbD and Lifecycle Assessment (LCA) mapping (IRISS Tasks 1.2 and 1.3) and the skills and training needs (IRISS Task 1.5).

The next session, entitled “*From SbD towards SSbD implementation around nanomaterials*”, focused on the presentation of the objectives, work and activities implemented by the H2020 NMBP 15 and NMBP 16 mapped projects. The chairs for this session were Andrew Nelson (UNIVLEEDS, United Kingdom), Anna Costa (CNR, Italy) and Carlos Fito (ITENE, Spain). The session started with an introduction to the NMBP 15 projects by Andrew Nelson. The NMBP 15 projects presenting were SAbYDOMA (Matt Jellicoe, UNIVLEEDS, UK), SAbYNA (Apostolos Salmatonidis, LEITAT, Spain), ASiNA (Anna Costa, ISMMC CNR, Italy / Lisa Bergoli, WARRANT HUB, Italy) and SbD4Nano (Carlos Fito, ITENE, Spain). The NMBP 16 projects presenting were HARMLESS (Wouter Fransman, TNO, The Netherlands), DIAGONAL (Carlos Rumbo, UNIVERSIDAD THE BURGOS, Spain), and SUNSHINE (Vicky Stone, Heriot-Watt University, United Kingdom). The session ended with a short presentation of the ambassador’s concept delivered by Vicki Stone.

After the lunch break, the second plenary lecture on “*AMI 2030 - paving the way for a United European Systemic Change for People, Planet and Prosperity*” was given by Lars Montelius, co-chair of the AMI2030 Initiative for Research.

The next session focused on Horizon projects and started with a presentation of the SSbD Policy International Network SPINE by Maria Luisa Fernandez Cruz (CSIC, Spain). Afterwards, Bernd Nowak (EMPA, Switzerland) presented the SSbD activities implemented in the PARC project, including the development of the SSbD toolbox. Then IRISS Partners presented the first results achieved by the projects and upcoming activities within WP2 and WP3 in a combined presentation on SSbD Gaps & Supportive Roadmap. For WP2, Cris Rocca (University of Birmingham, United Kingdom), presented the first value chain-specific gaps that were identified in several interviews with the IRISS value chains. For WP3, Christina Apel (Leuphana University, Germany) presented the education, skills and competences needs as well as the knowledge sharing needs of the SSbD supportive roadmap that has been developed within IRISS. Following this presentation, the next slot foreseen a brief overview about applied methodologies, tools, and conducted case studies implemented in the framework of the SSbD-related HE projects from two main topics: RESILIENCE-01-11 and DIGITAL-EMERGING-01-35. Additional short presentations were delivered for SURPASS, RE-PURPOSE, REDONDO, ESTELLA (presented jointly by Andrea Tummino, CEA, France) as well as MACRAME, ACCORDs, POTENTIAL, nanoPASS, and iCare (presented jointly by Steffi Frederichs, ACUMENIST, Belgium). As the projects funded under the topic DIGITAL-EMERGING-01-35 have just started, their presentations focused on the major objectives outlined in the projects proposals rather than achieved results.

After a coffee break, a first panel discussion focused on the industrial perspective of implementation and applicability of the SSbD framework published by the EC JRC. The ultimate goal of the panel was to discuss about the main barriers faced by different industrial sectors in the implementation of the SSbD approach in their development workflows and what potentials they may anticipate in the long run. The panel was structured around the following guiding questions: *What is SSbD from an industrial perspective?, What could be a strategic contribution to competitiveness on the global market?, Will the implementation of the SSbD framework into the companies drive or hamper innovation?, Do different product sectors have different demands on SSbD or generally on sustainability? (If yes – how can SSbD be harmonized across product sectors? Do we need to prioritise?).* The discussion was chaired by Martin Himly (PLUS, Austria) and the panellists were Hubert Rauscher (representing JRC), Catherine Colin (from IPC, representing the Packaging Value Chain), Dmitri Petrovykh (from INL, representing the Electronics Value Chain), Amaya Igartua (representing GreenSME Project), Sean Kelly (representing NIA), Blanca Suarez (representing TEMAS SOLUTIONS), and Gunther Van Kerckhove (representing OCSIAL). The panel discussion was recorded and can be viewed free of charge on the [conference website](#).

Later, Araceli Sanchez from INSST, Spain, presented the Safe(r) and Sustainable Innovation Approach (SSIA) proposed by the OECD’s Working Party on Manufactured Nanomaterials (WPMN). This approach combines the concepts of SSbD, Regulatory Preparedness (RP) and Trusted Environment (TE). Also, the working description of SSbD by the OECD WMPN^[5] was presented.

The presentation was followed by a second panel discussion on collaboration and alignment towards SSbD amongst the major actors working towards the SSbD implementation, which was structured according to some key guiding questions: *What collaboration do we need between projects to come to a common understanding of what SSbD is and on how best to operationalise it? How much alignment are we able to achieve, for example amongst IRISS, PARC, and the NSC?* and *What are the assets needed and how to move forwards?* The discussion was chaired by Andreas Falk (BNN, Austria) and the panellists were Araceli Sanchez (representing OECD), Eva Valsami-Jones (representing NSC), Amaya Igartua (representing IRISS), Bernd Nowack (representing PARC), Hubert Rauscher (representing JRC), Lars Montelius (representing AMI2030), Maria Luisa Fernandez (representing SPINE) and Elisabeth Heunisch (representing Malta Initiative).

The SSbD day was wrapped up by Eva Valsami-Jones (University of Birmingham, United Kingdom), and closed with the question: *Have you got a better idea of what SSbD is now?*

Table 3: Detailed workshop programme of the SSbD day at the nanoSAFE 2023 & NanoSafety Cluster joint conference

Time	Session	Speakers
8:45 – 9:25 am	Plenary: SSbD framework for advanced materials	Hubert Rauscher, EC Joint Research Center
9:30 – 10:00 am	Horizon2020 CSA projects outcomes	
9:30 – 9:40 am	Welcome to the SSbD Day: perceptions around SSbD	Eva Valsami-Jones, University of Birmingham, United Kingdom
9:40 – 10:00 am	H2020 - CSA Projects - NanoFabNet & SUSNANOFAB: Securing the Future for sustainable Nanofabrication in Europe	Steffi Friedrichs, ACUMENIST, Belgium Simon Clavaguera, CEA, France
10:00 – 11:30 pm	HE SSbD CSA Project IRISS – SSbD mapping results overview	
10:00 – 10:30 am	Introduction of the IRISS project (5 min) SbD for chemicals and materials (10 min) Circularity (10 min) Q&A (5 min)	Bernd Nowak, Empa, Switzerland
10:30 – 11:00 am	Coffee Break	
11:00 – 11:30 am	SSbD and LCA of chemicals and materials (15 min) Skills and Training needs (10 min) Q&A (5 min)	Amaya Igartua, TEKNIKER, Spain Christina Apel, Leuphana University, Germany
11:30 – 12:30 pm	H2020 NMBP 15-16: From SbD towards SSbD implementation around nanomaterials	Chairs: Andrew Nelson, Anna Costa/Lisa Bregoli and Carlos Fito

Time	Session	Speakers
11:30 – 12:00 pm	NMBP15 Introduction SAbyDOMA SAbyNA ASiNA SbD4Nano Discussion and Q&A	Andrew Nelson and Matt Jellicoe, Leeds University, UK Apostolos Salmatonidis, LEITAT, Spain Anna Costa, CNR, Italy / Lisa Bergoli, Warrant Hub, Italy Carlos Fito, ITENE, Spain
12:00 – 12:30 pm	NMBP16 HARMLESS DIAGONAL SUNSHINE Ambassadors concept	Wouter Fransman, TNO, Netherlands Carlos Rumbo, Universidad de Burgos, Spain Vicki Stone, Heriot-Watt University, United Kingdom
12:30 – 2:00 pm	Lunch break	
2:00 – 2:20 pm	Plenary: AMI 2030 - paving the way for an United European Systemic Change for People, Planet and Prosperity	Lars Montelius, Lund University, Sweden
2:20 – 5:40 pm	Horizon Europe SbD Policy Project SPINE Horizon Europe Project - PARC Horizon Europe SSbD CSA Project - IRISS Horizon Europe SSbD by topics OECD WPMN (SSIA)	
2:20 – 2:40 pm	SPINE. The Safe-and-Sustainable-by-Design Policy International Network	Maria Luisa Fernandez Cruz, CSIC, Spain
2:40 – 3:00 pm	PARC: SSbD activities in PARC	Bernd Nowak, EMPA, Switzerland
3:00 – 3:20 pm	IRISS WP2-3: SSbD Gaps & Supportive Roadmap	Cris Rocca, University of Birmingham, United Kingdom Christina Apel, Leuphana University, Germany
3:20 – 4:00 pm	SSbD HE Projects by TOPICS: overview (methodologies + tools + case studies) RESILIENCE 01-11: SSbD for novel advanced plastic materials (SURPASS, RE-PURPOSE, REDONDO, ESTELLA) DIG EMERGING 01-35: (MACRAME, ACCORDs, POTENTIAL, nanoPASS, iCare)	Andrea Tummino, CEA, France Steffi Frederichs, ACUMENIST, Belgium
4:00 – 4:20 pm	Coffee Break	

Time	Session	Speakers
4:20 – 5:20 pm	Panel Discussion: Industrial perspective and applicability of the SSbD framework Panellists: Hubert Rauscher – JRC, Catherine Colin – IPC (Packaging VC), Dmitri Petrovykh – INL (Electronics VC), Amaya Igartua (Tekniker GreenSME, Sean Kelly – NIA, Blanca Suarez – TEMAS, Gunther Van Kerckhove – OCSIAL	Chair: Martin Himly, PLUS, Austria
5:20 – 5:30 pm	Coffee Break	
5:30 – 5:40 pm	OECD WPMN: SSIA overview	Araceli Sanchez, INSST, Spain
5:40 – 6:20 pm	Panel Discussion: Collaboration and Alignment towards SSbD Panellists: Araceli Sanchez – OECD, Eva Valsami-Jones – NSC, Amaya Igartua – IRISS, Bernd Nowack – PARC, Hubert Rauscher – JRC, Lars Montelius – AMI2030, Maria Luisa Fernandez – SPINE, Elisabeth Heunisch – Malta Initiative	Chair: Andreas Falk, BNN, Austria
6:20–6:30 pm	Wrap-up session Do you know what SSbD is now?	Eva Valsami-Jones, University of Birmingham, United Kingdom

5.3 Outcomes

The SSbD workshop proved to be a valuable platform for knowledge exchange between the Horizon projects. The workshop gave the ending projects of the H2020-funded calls NMBP 12, 15 and 16 the chance to provide/transfer their experiences, best practices and lessons learnt to the recently started and starting HE-funded projects working towards the SSbD implementation and thereby keeping the legacy of their projects alive.

IRISS was able to successfully connect with other SSbD related projects in the field of nanosafety as well as the NSC, finding synergies between the projects and fostering collaboration. Through engaging discussions and presentations, participants discovered commonalities between projects, shared first results, and identified common challenges. The IRISS project succeeded in interactively share with the audience the key findings of the state of the art and highlights of main gaps already identified, receiving further inputs from the whole NSC community.

More specifically, the following suggestions to make the SSbD approach applicable as soon as possible were collected through the Mentimeter tool:

- Traceability is an important aspect and can support the implementation of SSbD;

- Identifying the design and performance spaces, their boundaries and relationship and allowed design cases;
- Taking into account the cost-benefit-profile;
- Just start to implement SSbD and find out how far you get;
- Training can support the SSbD implementation as well as the development of tools to measure and evaluate the SSbD performance;
- Starting “bottom up” with small demo cases.

The collected inputs will be integrated as part of main gaps already identified by the IRISS project and which need to be filled to make the SSbD approach applicable as soon as possible.

Another important outcome of the workshop is an improved understanding of SSbD among the audience. As previously elucidated, the SSbD day started with a simple but important inquiry: **Do you know what SSbD is?** to which already a high number of participants expressed a positive response (Figure 3 top picture). The question was reproposed at the end of the sessions: **Have you got a better idea of what SSbD is now?** and the outcome showed that the (already high) understanding of SSbD could be improved and that some topics were now much clearer to the participants (Figure 3 bottom picture).

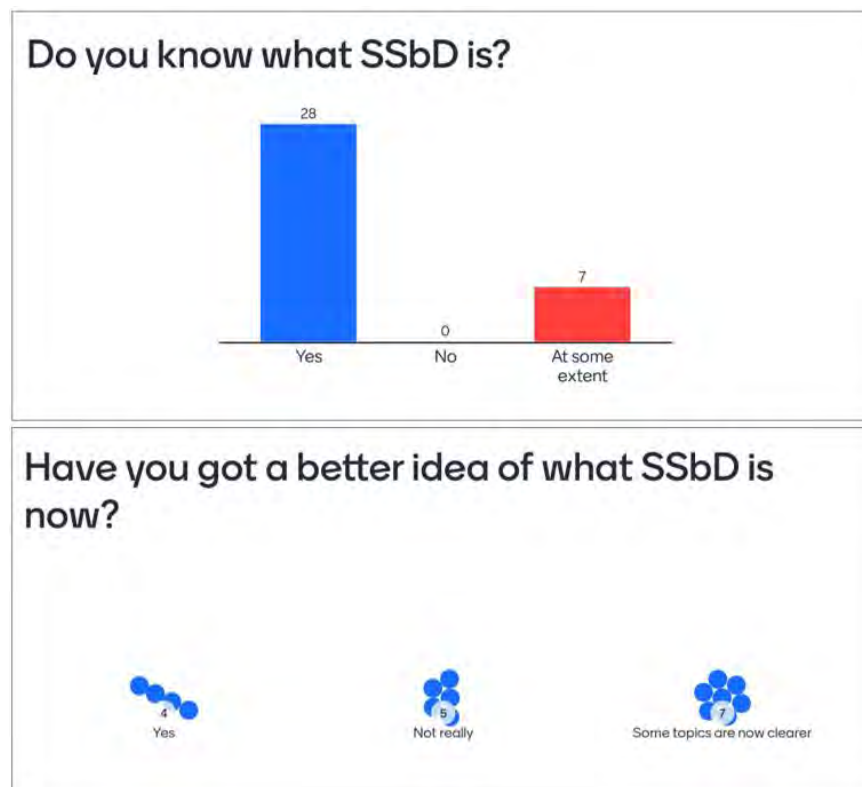


Figure 3: Mentimeter results for the participants' SSbD understanding at the beginning (top) and end (bottom) of the SSbD Day

Lastly, another important outcome of the SSbD SOLUTIONS Day was to bring together some of the most relevant stakeholder groups, working towards the objective of implementing the SSbD approach in real life. Two panel discussions were held and covered respectively the Industrial Perspective on SSbD implementation and ways to foster the collaboration amongst the most relevant actors in the SSbD field who could attend the event. The video recordings of the crucial parts of the event can be found on the conference website.

In conclusion, the workshop acted as a catalyst for identifying common goals and aligning efforts to implement SSbD of relevant actors from the nanosafety field.

6 Online SSbD workshop of HE projects

6.1 Practical information and agenda

The second workshop organised within Task 2.2 took place on Friday, 10th November 2023, online via Zoom and was recorded.

The complete agenda of the event is shown in Table 4. The IRISS Consortium successfully involved partners/representatives from the RESILIENCE-01-12 (MOZART, FreeMe, NICKEFFECT) and RESILIENCE-01-13 (NABIHEAL) calls, and gave the opportunity to the DIG EMERGING 01-35 sister projects (MACRAME, ACCORDs, POTENTIAL, NanoPass, iCARE) and the RESILIENCE-01-11 project SURPASS to present their work to a new audience providing an update on what happened since the first workshop held in Grenoble in June (Chapter 5 - SSbD Day at the nanoSAFE 2023 & NSC joint conference in Grenoble).

The participation of representatives of the European Commission, NSC, NSC SSbD Working Group, and PARC throughout the event and in the panel discussion also contributed to the fruitful discussions focused on how to better connect and collaborate with each other in order to achieve the practical applicability of the SSbD approach.

Table 4: Agenda of follow-up online workshop

Time (CET)	Topic	Speaker
10:00 – 10:05	Welcome and Agenda	Emma Strömberg, IVL
10:05 – 10:10	IRISS community	Emma Strömberg, IVL
10:10 – 10:25	The SSbD framework and the opportunities to be involved	Irantzu Garmendia-Aguirre, Joint Research Center
10:25 – 10:30	Introducing the EU NanoSafety Cluster, NSC	Eva Valsami-Jones, University of Birmingham
10:35 – 10:40	NSC WG on SSbD	Socorro Vazquez, LEITAT
10:40 – 11:00	IRISS – SSbD Supportive Roadmap	Lya G. Soeteman-Hernandez, RIVM
11:00 – 11:15	PARC SSbD Toolbox	Spyros Karakitsios, Aristotle University of Thessaloniki
11:15 - 11:25	Coffee break	
11:25 – 11:35	MOZART – Res 01-12	Alexandros Zoikis-Karathanasis, CNANO
11:35 – 11:45	FreeMe - Res 01-12	Alexis Grigoropoulos, CNANO
11:45 – 11:55	NICKEFFECT – Res 01-12	Josephine Steck, CEA
11:55 – 12:05	NABIHEAL – Res 01-13	Johanna Scheper, BNN
12:05 – 12:15	Q&A session	
12:15 – 13:00	Lunch Break	
13:00 – 13:20	DIG EMERGING 01-35 sister projects - MACRAME - ACCORDs - POTENTIAL	Represented by Steffi Friedrichs, AcumenIST

	- NanoPass - iCARE	
13:20 – 13:40	SURPASS - Res 01-11	Andrea Tummino, CEA
13:40 – 13:50	Q&A session	
13:50 – 14:00	Coffee break	
14:00 – 14:50	Panel discussion - EC DG RTD – Evangelos Daskalopoulos - EC JRC – Irantzu Garmendia-Aguirre - IRISS – Emma Strömberg - EU NSC – Eva Valsami-Jones - RES 01-11 rep – Andrea Tummino, CEA - RES 01-12 rep – Josephine Steck, CEA - DIG EMERGING 01-35 rep – Thomas Exner, 7P9/Steffi Friedrichs, AcumenIST	Chaired by Monique Groenewold, RIVM (NSC)
14:50 – 15:00	Wrap up and closing remarks	Emma Strömberg, IVL
15:00	End of Workshop	

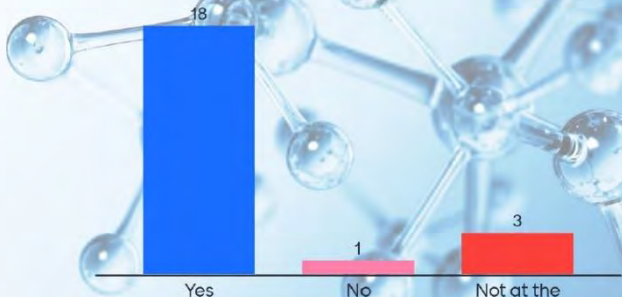
6.2 Background of participants

A total of 48 participants joined the online event. The Mentimeter tool was used to collect some background information of the participants. Representatives of the following EU projects (ASINA, Bio-SUSHY, IRISS, MACRAMÉ, MOZART, NABIHEAL, NICKEFFECT, PARC, PREMIER, RESPECT, SABYDOMA, SAbYNA, SUNSHINE, SURPASS, TRANSPHARM, ZERO), networks (EU NSC, ISC3), and organisations (Aristotle University of Thessaloniki, CEA, EC, LEUPHANA, RIVM) participated their views in the event (Figure 4). Most of the participants who replied to the Menti questions are actively working on the SSbD framework implementation (82%, i.e. 18 participants; Figure 5). This time, it was noticed that the participation to the Mentimeter tool was higher compared to the responses received in Grenoble where actually the audience provided direct feedback taking the floor and raising questions assuring direct interactions.

In both events, the audience belonged to the same field of expertise, nanomaterial safety, and in the second WS more awareness of what SSbD is and what the common direction is was perceived.

It was of crucial importance to hold the follow-up workshop in order to keep the community engaged and increase the collaboration towards the common goal of SSbD implementation.

Are you actively working on the implementation of the SSbD framework?



A bar chart with three bars representing different responses. The first bar is blue and labeled 'Yes' with the value 18. The second bar is pink and labeled 'No' with the value 1. The third bar is red and labeled 'Not at the moment, but soon' with the value 3. The chart is set against a background of a molecular structure.

Response	Count
Yes	18
No	1
Not at the moment, but soon	3



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6.3 Workshop programme and description of sessions

The event started with Emma Strömberg (IVL, Sweden) welcoming everyone to this “follow-up” workshop to the “SSbD Day”, that was held last June in Grenoble (Chapter 5 - SSbD Day at the nanoSAFE 2023 & NSC joint conference in Grenoble), giving a quick and comprehensive overview of the IRISS community and how other projects working on the SSbD implementation in their projects can get connected with each other.

The event continued with a high-level overview of the SSbD Framework presented by Irantzu Garmendia-Aguirre from the EC Joint Research Center, in order to explain how practically apply the SSbD framework and allow the participants at the workshop to have a better understanding of it. Irantzu also shared with the audience the needs for fostering the implementation of the framework and requested the projects to collaborate with each other and share information, as the only way to be able to apply the SSbD approach is to have enough and reliable data available.

Immediately after, Eva Valsami-Jones, member of the EU NanoSafety Cluster (NSC) Coordination team, gave a presentation on the cluster, focusing on its work done, structure and how the legacy of the NSC projects could be of valuable help to the IRISS Community.

The NSC is formed by various Working Groups, one in particular of high relevance to the SSbD implementation, the SSbD Working Group (WG), which was presented by Socorro Vazquez, from LEITAT, as one of the chairs of this well-established WG working on the SSbD implementation and knowledge sharing between the running projects.

Lya G. Soeteman-Hernandez, from RIVM (NL), leader of the WP dealing with the SSbD RoadMap implementation within IRISS, shared the work done so far, the vision and information needed along with the next steps to be pursued in order to receive valuable inputs and share a clear direction with the audience.

Spyros Karakitsios, representing the Aristotle University of Thessaloniki, concluded the first part of the workshop introducing the PARC project, which is actively working on the implementation of the SSbD Toolbox, gathering all the available tools which can help in the assessment of SSbD requirements and necessary for the SSbD concrete implementation.

This first part of the workshop was planned to provide the audience with as much information as possible on the current initiatives working on the SSbD implementation, to better understand what is needed and how they can contribute with their work to support the initiative presented in implementing and finally completing their work.

The second part of the event started off with a presentation of the new HE projects concretely working on the SSbD implementation.

The following projects belonging to the topics RESILIENCE 01-12 and 01-13 were presented: MOZART, NICKEFFECT, FREEME and NABIHEAL.

These projects were selected and invited to join the workshop in order to enlarge the community, to share their approach in implementing SSbD and create even more opportunities to receive and provide inputs and feedback on the current state-of-the-art.

On the same line, the DIGITAL EMERGING 01-35 sister projects, represented by Steffi Friedrichs (AcumenIST) shared a high-level overview of the different approaches applied by

the various projects towards the SSbD implementation, and the high value that collaborating with each other brings to the table.

The same approach was followed also by the RESILIENCE 01-11 project SURPASS, which shared its way of implementing the SSbD within the project and next steps forward.

The event reached its end, going over one of the most crucial parts of the event. The high-level Panel Discussion which also welcomed the EC DG RTD representative, Vangelis Daskalopoulos amongst the panellists and representatives of the various call topics presented during the day. The chair of the session was Monique Groenewold (RIVM) who is also a member of the Coordination Team of the EU NSC.

The chair of the discussion wisely walked the panellists through the following crucial and practical questions:

1. What is your take home message from this Workshop?
2. Would you suggest better ways to collaborate with each other?
3. What are the concrete ACTIONS you will take from today?

The conclusions of the workshop – presented by Emma Stromberg – will be outlined in the next paragraph.

6.4 Outcomes

From the various interventions of the panellists, it was clear that the main and most important message is related to the need of collaborating with each other, which is the most effective and needed way to achieve the applicability of the SSbD approach implementation in the shortest timeframe possible.

Data to be shared more freely, collaborations to be implemented even more between all the projects, need to create even more sister projects collaborations in order to facilitate the knowledge exchange and implementation of common results, considering as highly valuable also the collaboration amongst different sister-projects belonging to different calls.

IRISS, which is actively working on the creation of an international network on SSbD, will create the platform to provide the needed support to the whole SSbD community, making sure that a common understanding of what SSbD really is can be assured amongst the various actors and provide guidance and support to the interested parties.

7 Next steps

The organized events represented an opportunity for the IRISS project to continue the creation of the SSbD community and to engage other ongoing Horizon Europe and Horizon 2020 projects for future collaborations. The increased involvement of IRISS with the NSC community, in particular the NSC working group on SSbD, is expected to have a favourable impact on the success of aligning efforts and bringing SSbD closer to practical applicability. The workshops further promoted knowledge-exchange between the projects and provided a platform to receive feedback on the roadmaps created in IRISS WP3 through co-creation.

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