AI-PRISM

D8.1 – AI-PRISM Impact Master Plan

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Disclaimer

Acronyms and definitions

Acronym	Meaning
AI	Artificial Intelligence
CEN	European Committee for Standardization
CENELEC	European Committee for Standardization in the Electrical Field
CWA	CEN or CENELEC Workshop Agreement
EN	European Standard
EOTA	European Organisation for Technical Assessment
ESO	European Standardisation Organisation
ETAG	European Technical Approval Guideline
ETSI	European Telecommunications Standards Institute
EU	European Union
hEN	Harmonised European Standard
HRC	Human Robot Collaboration
IEC	International Electrotechnical Commission
IPR	Intellectual Property Rights
ISO	International Organization for Standardization; International Standard
ITU	International Telecommunications Union
KER	Key Exploitable Result
KPI	Key Performance Indicator
LCA	Life Cycle assessment
NMC	National Mirror Committee
NSB	National Standardization Body
PPPs	Public-Private Partnerships
R&D	Research and Development
RTD	Research and technical development
SC	Subcommittee
SMEs	Small Medium Enterprises
STOs	Standardisation Technical Committees
TC	Technical Committee
TR	Technical Report
TRL	Technology readiness level
TS	Technical Specification
UNE	Spanish Association For Standardization
WG	Working Group
WI	Work Item
WP	Work Package

Abstract

Communication, Dissemination and Exploitation are vital elements of any successful Horizon Europe funded project. The present document presents a detailed overview **of AI-PRISM's** strategy while defining the goals, priorities and any potential implementation mechanisms to achieve all desirable outcomes. To this end, **AI-PRISM's** Impact Master Plan sets out the objectives, tools, materials, and channels to be exploited in order to effectively spread **AI-PRISM's** activities, achievements and tangible results to targeted audiences, also becoming the cornerstone for the successful commercialization and market uptake of **AI-PRISM** solutions.

Executive summary

AI-PRISM operates in a decentralized manner while managing a diverse ecosystem of organizations, initiatives, and influential stakeholders. To enhance its performance and expand its impact, the initiative requires a responsive growth factor that fosters new synergies throughout the project's duration. **AI-PRISM** is adopting an Agile Stakeholder Engagement Framework, a methodology designed to continuously develop and strengthen relationships with key stakeholder groups. This empowers the program's operations, aligning with the principles outlined in the Grant Agreement.

AI-PRISM recognizes the importance of a cohesive communication plan that is versatile and agile. To effectively reach target groups and stakeholders, a targeted but wide communication approach will be implemented. This approach focuses on raising awareness by highlighting key aspects and benefits of the **AI-PRISM** project to all audiences and end users. Clear and easily understandable visual materials will be designed and shared to make **AI-PRISM** concepts instantly recognizable to a broader audience and spark their interest in the project and its outcomes. Customized content will also be created and shared with specific target groups to foster an active ecosystem of stakeholders. Additionally, relevant information from project deliverables, partner interviews, pilot case studies, and industry reports will be disseminated through **AI-PRISM** communication channels to engage users and build a potential clientele base.

Dissemination is also crucial for **AI-PRISM** to share results with various stakeholders, including peers in research, industry, commercial players, and policymakers. Additionally, **AI-PRISM** aims to contribute to the progress of science and technology by making results available to the wider community. To achieve this, **AI-PRISM** has developed a flexible dissemination plan that focuses on creating awareness, understanding, and actionable outcomes among the target audience. Implementing this plan will maximize the utilization and adoption of project outcomes and research insights, aligning with the desired impacts outlined in the work plan.

Another key element, is exploitation. The primary goal of the exploitation activities is to maximize the effective utilization of the project results through various means such as scientific, economic, political, or societal exploitation routes - both commercially and non-commercially-, and with the aim of transforming the Research and Innovation efforts into tangible value. All results generated in **AI-PRISM**, will be strategically directed towards various 'Exploitation pathways', which encompass the routes and ways for exploiting these results, whether commercially or non-commercially, in order to reach the intended target groups.

Last but not least, standardisation plays a crucial role for **AI-PRISM**. Within the project timeline, the project aims to participle in several technical bodies for making technical contributions to existing and ongoing work while diffusing **AI-PRISM**'s key messages to the standardisation community.

The AI-PRISM project

AI-PRISM will provide industrial users with **human-centred artificial intelligence (AI)-based solutions to create a more efficient, resilient, digital, sustainable, and high-quality European manufacturing industry**.

To do so, we will develop an **integrated and scalable environment** with solutions adapted to dynamic and unpredictable manufacturing scenarios that require tasks that are difficult to automate and where speed and versatility are essential to meet users' needs. Furthermore, the solutions will be specific to semi-automated and collaborative manufacturing in flexible production processes and will not require specific robotic programming skills.

Our solutions ecosystem will have four main pillars:

1. **A human-centred collaborative robotic platform** oriented to ease hard-to-automate manufacturing tasks.
2. **A human-robot cooperative environment** powered by trustworthy AI.
3. **Social human-agent-robots teams' collaboration** — AI-based safety monitoring and robot control mechanisms to detect and avoid unsafe situations and ensure social and physical safety.
4. **An open-access network portal** to offer compliant infrastructure.

To evaluate our solutions' performance, transferability, scalability, and large-scale deployment, we will perform demonstrations in real operating environments. Specifically, in **four user pilots involving key manufacturing sectors** — furniture, food/beverage, built-in appliances, and electronics —, **types of robots and industrial processes that are difficult to automate, plus a generic demonstration facility.**

In addition to seeking quantitative improvements in the manufacturing sector, **AI-PRISM aims to use technological innovation to support a paradigm shift in which AI, robotics and Social Sciences and Humanities (SSH) are integrated into the manufacturing domain for the improvement of flexible production processes**, becoming a viable and widespread alternative for European factories.

During the next three years, **25 partners** from **12 countries** will join forces to make AI-PRISM a reality. From educational institutions to research and technology organisations, robot manufacturers, industries and use case providers; our interdisciplinary consortium brings together all the actors of the human-robot collaboration value chain and involves key experts in SSH, standardisation, exploitation, and dissemination.

Contents

Index of Figures

Index of Tables

1. Introduction

Research and innovation are driving forces for economic growth, the creation of new job opportunities and the enhancement of the standard of living. It is therefore important to ensure that the knowledge generated within research and innovation projects is properly diffused and that the means through which such knowledge can be delivered to the society are being effectively explored. This is realized through the commercial exploitation of products and services, which is the primary way of delivering research results to the citizens (end-users). In addition, communicating research results can effectively accelerate research and technical development (RTD) towards increasing the technology readiness level (TRL), going beyond the current state of the art, and even creating new research horizon lines on future and emerging trends. Furthermore, dissemination activities, such as participation in workshops or publication of information in websites, enable participants "*to get feedback on the economic potential and recommended market-oriented exploitation pathways*"[1].

For **AI-PRISM** all of the above are key, therefore preliminary plans have been developed and are presented in this document. **D8.1** outlines the initial **AI-PRISM's** Impact Master Plan comprising communication, dissemination and exploitation plans aiming to provide a holistic outreach strategy of the project, leading to success.

To achieve this, **AI-PRISM** has made a clear distinction between the three main concepts and plans:

- **Communication** means taking strategic and targeted measures for promoting the action itself and its results to a multitude of audiences, including the media and the public, and possibly engaging in a two-way exchange. The aim is to reach out to society as a whole and in particular to some specific audiences while demonstrating how EU funding contributes to tackling societal challenges.
- **Dissemination** is the public disclosure of the results of the project in any medium. Disclosure may sound passive, like a shop opening up, but it is an activity, like a shopkeeper attracting customers. It is a process of promotion and awareness-raising right from the beginning of a project. It makes research results known to various stakeholder groups (like research peers, industry and other commercial actors, professional organisations, policymakers) in a targeted way, to enable them to use the results in their

[1] D6.1: Dissemination and Exploitation Plan and Annual Dissemination Report 1 (31/08/2017), ICARUS Project, Retrieved from: https://icarus-alloys.eu/

work. This process must be planned and organised at the beginning of each project, usually in a dissemination plan.

- **Exploitation** is the use of the results during and after the project's implementation. It can be for commercial purposes but also for improving policies, and for tackling economic and societal problems.

AI-PRISM's Impact Master Plan has been developed through an extended fermentation and zymosis process among project partners, each one representing different stakeholder groups, to reflect their positions and views within this plan for ensuring maximum impact. This plan is a living document that will be revised when needed while mitigation actions will be implemented if required.

In terms of structure, **D8.1** consists of six interlinked sections. While sections 1 and 6 are the introductory and conclusive sections of the document, the other four sections present and discuss the key plans and frameworks that the project will follow throughout its lifetime. More specific, sections 2 to 5 discuss the following subjects:

- **Section 2** provides a clear overview of **AI-PRISM**'s Engagement Framework, the methodology of identifying and engaging with high-interest stakeholders (groups or individual).
- **Section 3** introduces the principles of **AI-PRISM**'s Communication & Dissemination Plan while showcasing the tools and channels. The section also presents International Cooperation objectives and phases.
- **Section 4** reveals key exploitation principles related to the project while introducing a clear plan for defining the right exploitation channel for all project's results.
- **Section 5** initiates the discussion around the standardisation plan of the project and its contributions to standardisation activities. It also presents an extensive overview of existing standards related to **AI-PRISM**.

2. AI-PRISM's Engagement Framework

As a Horizon Europe action, **AI-PRISM** is an initiative that is decentralised by nature, but with the need for managing an ecosystem of organisations, initiatives and players with a given position of influence on the project's performance - the stakeholders. The initiative requires a responsive growth factor capable of prospecting and creating brand new synergies over the project's lifetime, facilitating a greater advantage and extending its range of action. For that, **AI-PRISM** is implementing an **Agile Stakeholder Engagement Framework** - a methodology designed to continuously develop and strengthen work streams with key stakeholder groups, empowering the operation of the programme as introduced in the Grant Agreement.

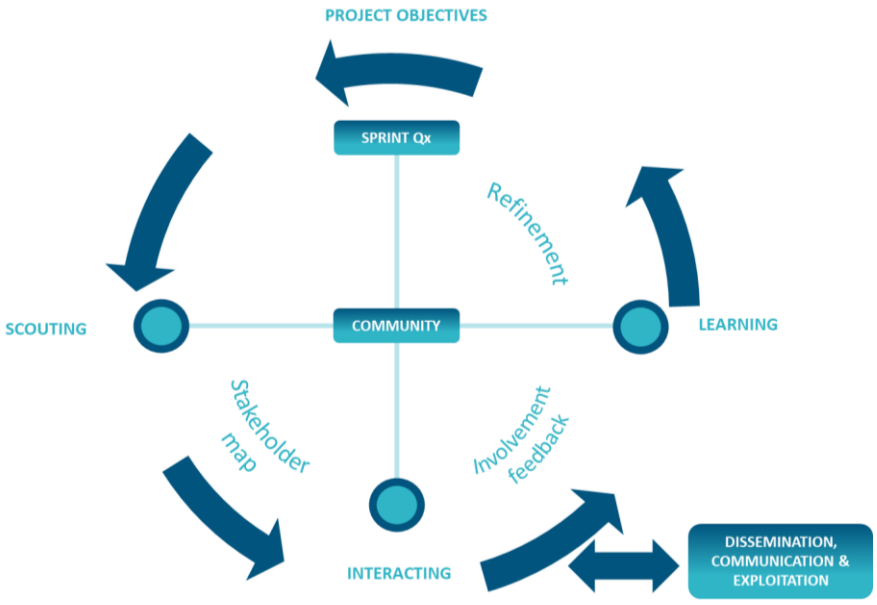


Figure 1 AI-PRISM's Stakeholder Engagement Framework

2.1. Mechanism's Phases

This mechanism follows an **iterative approach** based on **Sprints**; time-boxes of **six months** with three **phases** where the main goal is to increase and reinforce such engagement incrementally.

PHASE 1: Scouting

Building upon the objectives of **AI-PRISM** and the findings from previous Sprints, this phase explores, maps and assesses **Target Groups** -and specific candidates- with different degrees of relevance for the scope and impact of the work plan. **AI-PRISM** builds upon the sound experience and active involvement of the consortium members in initiatives and players that must be considered as the baseline for engagement, taking advantage of new leads generated by second-degree partnerships and new opportunities as an outcome of the Interaction phase, including

emerging PPPs and H2020/Horizon Europe projects. The key result will be the '**Stakeholders Map'**, a graphical instrument to 1) list key actors -and specific candidates within them; 2) thoughtfully organise and correlate these audiences; 3) define a common terminology to be used in all the project's references.

PHASE 2: Interacting

The next stage implies the interaction as such with the identified target groups, supporting the activities outlined in the **Dissemination, Communication and Exploitation strategies**. This is the phase where **AI-PRISM** will collaborate with initiatives having a specific mandate on industrial digitisation. Whenever relevant, the project will formally join specific Task Forces and Working Groups, contribute to scientific publications, and participate in events. Feedback extrapolated from previous Sprints will be used to enhance the efficiency and impact of these measures;

PHASE 3: Learning

From the actions performed during the interaction, the consortium will learn lessons and collect findings that will feed the next Sprint. This will also include insights obtained from the consultation (i.e., in the form of quick questionnaires or interviews), gathering valuable external remarks about the project and its operation.

2.2. Target Audience & Stakeholders

Promoting **AI-PRISM** and encouraging stakeholders to engage with the initiative requires understanding the 'target audience'. Understanding stakeholder profiles and their influence in the value chain is essential to craft the Dissemination, Exploitation and Communication Plans.

Figure 2 AI-PRISM Key Audience

2.2.1. Manufacturing Industry

Manufacturing is one of the European sectors that shall deeply seize automation and efficiency to reach its 2030 vision for competitiveness, productivity, and technology leadership. This category encompasses the managers who design and implement the digital transformation strategy that integrates automated robotics systems and breakthrough data solutions, and the workforce executing the operations –i.e., the demand-pull perspective. **AI-PRISM** will engage with these profiles to 1) obtaining hands-on requirements and feedback that will support the implementation of the project and its use cases, understanding internal processes, system integration and risk management; 2) have access to quality data acquisition raising broad awareness on the positive impact the operation of smart tools will have in real-world scenarios.

2.2.2. Digital Tech Providers

The members who develop research outputs, innovation findings, business activities and standardisation efforts around the technologies transforming the sector –i.e., the technology-push perspective. The objective for these profiles is to investigate, advance and demonstrate the benefits offered by the automated processes with robots, reliable prediction models powered by AI, distributed, and secured processing, more innovative decision-making systems, and more interoperable and reusable datasets. This category includes research-driven institutions (technical universities, RTOs, spin-offs) and private-sector organisations (from highly risk-taking start-ups and SMEs to innovation units in the large-scale industry). Bodies and communities driving standards and data interoperability will be considered as well.

2.2.3. Social Innovation Sector

The implementation of a disruptive manufacturing sector is not just a mere technical question. Human and ethical factors are compulsory to facilitate a transformation compliant with the workforce's needs. Social innovators identify the challenges, strengthen the opportunities for user-friendliness, and empower a smooth transition to the Future of Work, preventing the workers from continuously adapting to ever-evolving technology. These specialists strive for a safer and more attractive and sustainable industry, pointing out the way to opportunities for up/re-skilling. **AI-PRISM** will be committed to the New European Bauhaus, the interdisciplinary initiative convening future ways of living, situated at the crossroads between social inclusion, science and technology.

2.2.4. Advocate Ecosystem

One of the main intentions of **AI-PRISM** is to quickly harness the knowledge and capacity of initiatives advocating for the digital and green transformation of the sector. The project will leverage the consortium's participation in active ecosystems to create synergies, extending the collaboration across the 'Manufacturing Industry' and 'Digital Tech Providers'. Segments will include (1) the European partnerships emerging from Horizon Europe that will concentrate a big share of the projects and partners linked to **AI-PRISM**; (2) EU-wide associations conforming the AI, Data and Robotics Association (Adra) as well as the European Factories of the Future Research Association (EFFRA); (3) ecosystems concentrating large communities of private-sector organisations, generating value and upscaling the competitiveness of SMEs, including data and industry-oriented EU Digital Innovation Hubs; (4) current Horizon Europe and previous H2020 projects driving missions in digital transformation for manufacturing (e.g. H2020-INNOSUP-08-2020: Pan-European advanced manufacturing assistance and training for SMEs); (5) seize other relevant EU partnerships and associations.

2.3. Stakeholders' Map

2.3.1. Stakeholders Map Magic Quadrant

Figure 3 contains the first version of the **AI-PRISM Stakeholders Map**, that graphically summarises the main target audiences at this stage. The diagram has been defined by taking into consideration the different target stakeholders' groups identified so far, as the outcome of, the ongoing, Sprint Q1 of the Agile Stakeholder Framework. The figure below provides a framework for managing stakeholders based on interest and influence as:

- Y-axis depicts the "Influence" potential of the project to this target group and vice versa
- X-axis depicts the "Interest/ Availability" that the target group may have towards our project and vice versa.

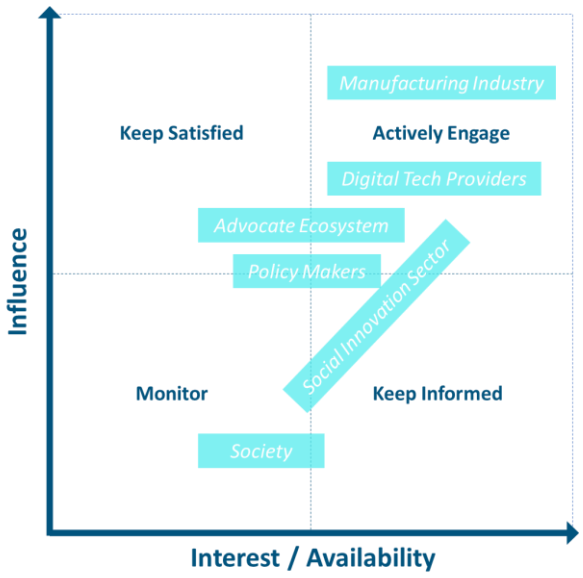


Figure 3 Stakeholders Map

2.3.2. Actively Engage Quadrant

This quadrant emphasises on stakeholders and target groups that have a high influence on the project while the project has great interest towards them. These are usually organisations or individuals who could potentially "stir", "influence" or "kill" the activities of the project as their views, visions and feedback can be considered as key "beacons" for the project. These target groups need to be approached and activated early in the project while maintaining an active and frequent communication channel.

2.3.2.1 Keep Satisfied Quadrant

This quadrant includes organisations and/or individuals who have significant decision-making influence and authority while having limited availability or interest to be actively engaged in the project activities. It is usually very difficult to have consistent touch points with this target group, however the project should take into consideration their limited but valuable feedback, while synchronise its activities with their directives.

2.3.2.2 Keep Informed Quadrant

The "Keep Informed" quadrant, depicts organisations and individuals (or EU projects in our case) who are directly correlated or associated with our project. This target group may not be significantly impacted by **AI-PRISM** or have low influence to project activities, however synergies, especially towards joint communication and dissemination, must be explored.

2.3.2.3 Monitor Quadrant

The current quadrant includes organisations, individuals or associations who may have low influence to the project activities and simultaneously show limited availability to get engaged into project activities. These target groups are not expected to be heavily involved in the project activities. However, the project needs to frequently communicate with them while staying alerted if they move to other quadrants.

2.3.2.4 Stakeholders Map Breakdown

The breakdown below depicts a first iteration of the interested to **AI-PRISM** Ecosystem of Stakeholders on a higher level.

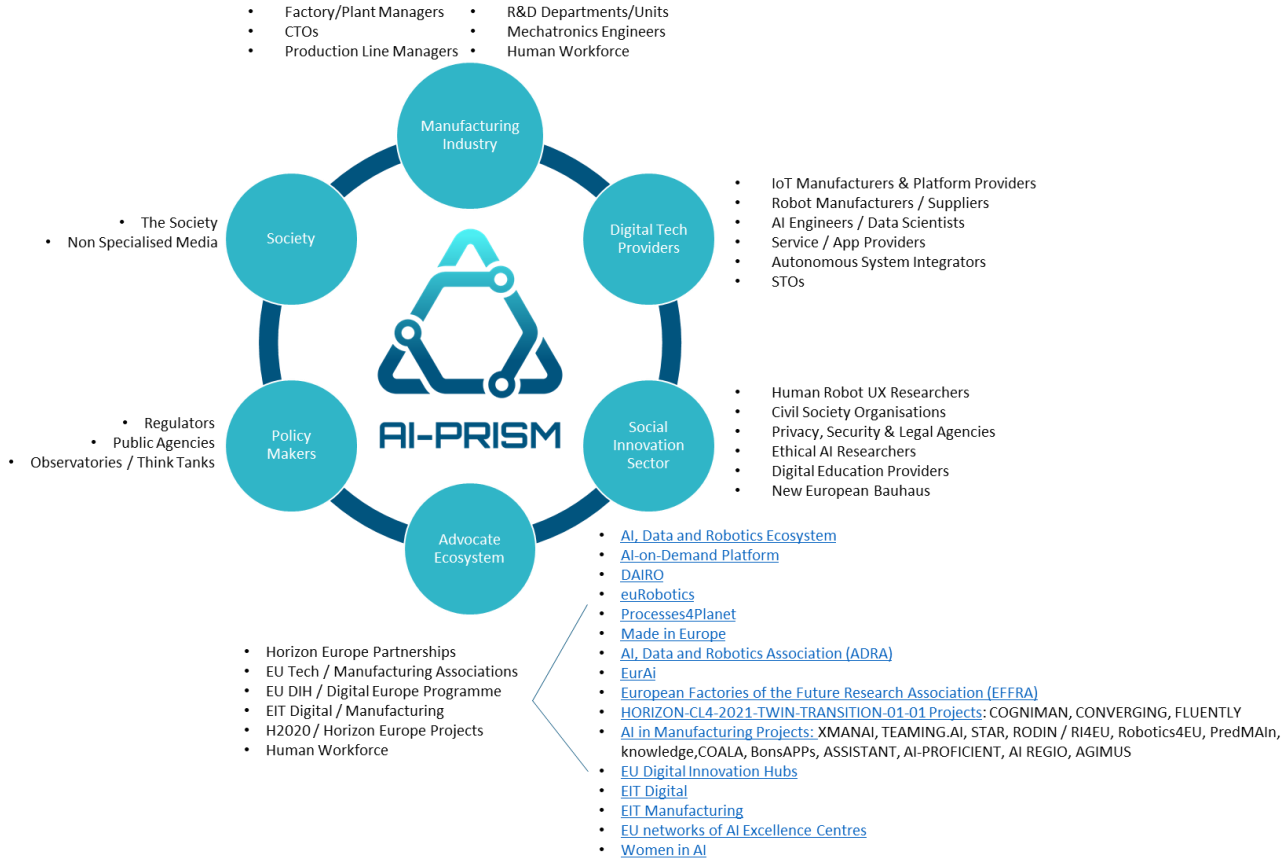


Figure 4 AI-PRISM Stakeholders Breakdown

3. Communication & Dissemination

Communication and dissemination sit in the heart of any **Horizon 2020** project and **AI-PRISM** is no exception. A well planned, vivid and agile communication and dissemination plan, taking into account the possibility of external factors and challenges (such as the recent Covid-19 crisis) which might affect the execution and effectiveness of this plan, has the potential to achieve

maximum impact for the benefit of the project. Although communication and dissemination are two interlinked activities, in this plan we choose to treat them as different but closely depended to each other. It is obvious that similarities and convergences exist and will be examined throughout the whole lifespan of the project.

3.1. Communication Plan

AI-PRISM takes into account the versatility and agility of a coherent communication plan and is adopting a funnelled approach[2] to ensure that a targeted but wide communication towards all possible target groups and stakeholders, will be deployed and achieved. Such an approach primarily focuses on generating awareness by conveying key aspects and benefits of the **AI-PRISM** project to all target audiences and end users. Easy to interpret, understand and recognize visual material will be designed and communicated allowing **AI-PRISM** concepts and benefits become instantly identifiable to the wider audience while growing and cultivating further interest towards the project and its key outcomes. Additional customised content will be produced and communicated towards specialised target group audiences aiming at creating and maintaining an active stakeholders' ecosystem. Similarly, relevant information will be extracted from project deliverables; interviews with partners, pilot case studies; industry reports; and will be relayed through the **AI-PRISM** communication channels to further support active user engagement, aimed at building an **AI-PRISM**'s potential clientele base.

[2] Boosting Agricultural Insurance based on Earth Observation (BEACON) D7.1: Dissemination, Exploitation and Communication (DEC) Plan

Figure 5 Communication Funnel

3.1.1. Objectives

The communication plan is being driven by some key objectives which are crucial for the deployment of such plan. Although communication objectives may be treated and tackled as a single block, some objectives are being related to specific target groups only and will be approached with specific tools and activities throughout the lifespan of the project. The overall objectives are:

1. Increase general awareness and interest about the project for building a sustainable customer base/ecosystem for future expansion;
2. Communicate technical, scientific results and benefits to specialised target groups and stakeholders;
3. Deliver top level messages about the project to non-technical target groups and audiences;
4. Raise awareness to non-specialised audiences of the added value of **AI-PRISM** to the widest possible community;

Table 1 Communication Objectives per Target Group

	Awareness about & interest in	Communicate technical & scientific results	Deliver top level messages	Raise awareness to non-specialised audiences
Manufacturing Industry	x	x		
Digital Tech Providers	x	x		
Advocate Ecosystem	x		x	
Social Innovation Sector	x	x		
Policy Makers	x	x	x	
The Society	x			x

3.1.2. Phases & Timing

Communication activities will be implemented in three different phases, which are closely related to dissemination as well. The common goal of all three phases is not only to create a "buzz" around the project, but also to mobilise a community of end users who will interact and provide feedback to other project activities as well.

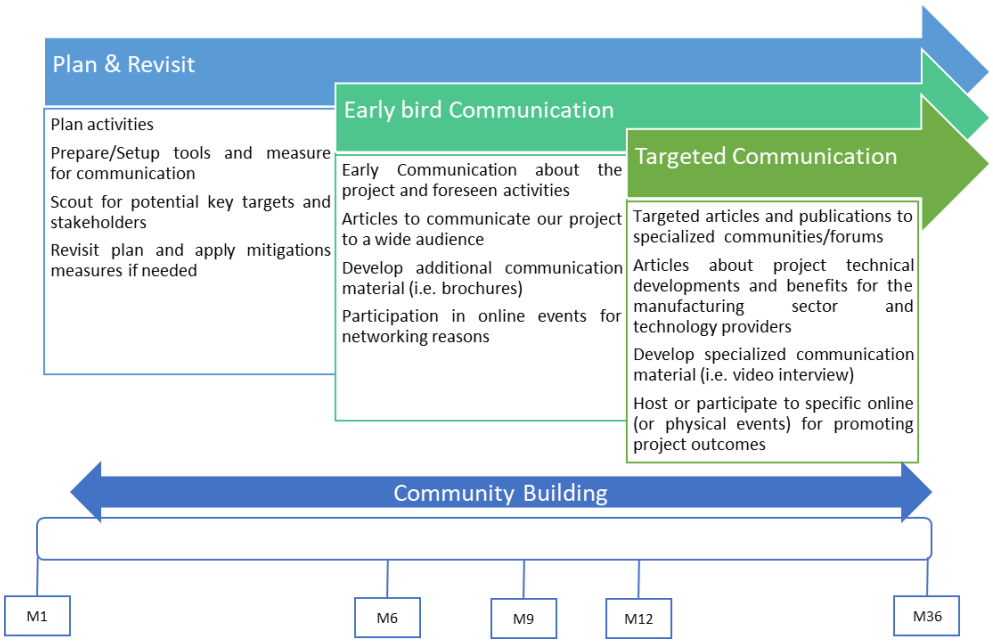


Figure 6 Communication Plan Phases & Timing

PHASE 1: Plan and revisit

The first communication phase will start in M1 of the project and primarily aims at planning all activities, setting up the main communication tools and channels (Website, Social Media), and identifying potential target groups and stakeholders. However, the latter is an activity that will be implemented throughout the whole project. This first phase also includes the concept of revisiting the plan: whenever this is required, the communication plan will be revisited and adjusted to

according the needs or circumstances that may exist at a specific period-of-time. During this phase, initial communication activities (i.e. press releases) will also take place.

PHASE 2: Early bird Communication

The second phase will start in M3. During this phase early bird communication activities will take place aiming to communicate both to a wider public and to specific communities, the existence of the project as an instance and its forthcoming activities and actions. Emphasis will be given to the online tools and measures as they tend to have a wider reach than traditional measures. During this phase, participation for networking purposes to webinars or other online events, articles over the internet about the project (i.e. CORDIS, etc.) will take place. This phase will last for the whole duration of the project as it mainly focuses on communicating the generic aspect of the project to a wide stakeholder base.

PHASE 3: Targeted Communication

The third communication phase will start around M8 as it requires the project to be in relative maturity stage while the first, initial and concrete outcomes are released. During this phase targeted communication activities will take place such as producing and communicating articles, blogs or posts specifically to certain project outcomes and benefits, hosting and/or participating in online events (or physical if possible) for the communication of **AI-PRISM's** innovations, production of targeted communication material (i.e. videos) for the community, etc. This phase will run in parallel with phase 2 as it focuses on targeted communication actions for specific audiences and not to actions for the whole community.

3.1.3. Communication Tools & Material

A number of communication tools will be developed to allow the project to reach the right audiences in a communication friendly and synchronous way. All communications tools will be produced throughout the whole lifetime of the project and will be customised if and when needed, while will be available for all phases above.

3.1.3.1 Online and Digital Tools

Table 2 Online and Digital Tools

What	Why	How	For whom
Project Website	The Project website is a key instrument for enhancing visibility of the project, introducing visitors to **AI-PRISM's** rationale and educating them about the project concept. All project	Establish online presence – website where general public and interested individuals can read about the project's progress and findings, including news, articles and public deliverables.	For all target groups

	findings are published on the website to allow anyone interested in the subject to follow the progress of the projoptimizingoptimising search engines.		
Social Media	Social media are fast, low-cost channels of reaching interest groups and communities that are normally not present at any events or conferences (physical or digital).	**AI-PRISM** will create and maintain actively its presence in a number of social media channels, with particular focus on Twitter and LinkedIn as they have proven to be the most effective tools when engaging with technology communities.	For all target groups
Newsletters	Project newsletter shows the progress of the project to all stakeholders and keeps their interest high	Complementary to email engagement, online newsletters will provide a snapshot of the main activities and achievements of. The project will pursue contributing to other Newsletters by the European Commission or associated initiatives. Professional marketing platforms will be used to automate the distribution among all contact points	For all target groups
Press Releases	Within the Communication tactic, press releases can also target specific stakeholders depending on the journal/paper/website where the press release is published or distributed.	**AI-PRISM** will develop and distribute press releases to mainstream and specialist media as well as relevant civil society newsletters, magazines and journals. Press releases will be also distributed individually by partners to communicate the project to their network of customers, members and collaborators.	-Manufacturing Industry -Digital Tech Providers -Advocate Ecosystem -Policy Makers
Slide Decks & One Pagers	Digital slide decks and one-pagers, often integrated with email campaigns, may replace in some cases the website as 'Point of Market Entry'.	Design Digital Slide Decks and One-Pagers, for sharing the communication the vision of the project with specialised audiences.	-Manufacturing Industry -Digital Tech Providers -Advocate Ecosystem -Social Innovation Sector
General Spreading	Creating and deploying a number of articles in several online media targets at shaping a communication globe around the web sphere to maximise the outreach of the project's results and scope to all stakeholders.	Publish online articles to various international platforms (i.e. Cordis, Medium, etc,) and on national/local portals, to leverage the **AI-PRISM's** scope and results.	For all target groups

3.1.3.2 Printed & Digital Promotional Material

Table 3 Printed & Digital Promotional Material

What	Why	How	For whom

Printed Material	Project collateral distributed at various events, conferences, workshops, etc. gain the project visibility with the general public and the national and European media	The most common items include brochures, catalogues, posters and any other laid out paper-based resource. Most of the PR material will be available as e-documents and printing will occur as required (e.g. for events, workshops, etc.). **AI-PRISM** will also explore other innovative alternatives to traditional informative material. Labelled gadgets and merchandise have turned out quite effective means of promoting initiatives among a less specialised audience, while encouraging a more sustainable approach when considering long-lasting items.	For all target groups
Multimedia Material	Visual content has always proven to be a very effective mean for communication	The project will produce multimedia material to have a self-explanatory and appealing presentation of the project, leveraging other available distribution channels of promotion (e.g. YouTube). The team will organise a set of video interviews throughout the project to collect inputs, taking advantage of plenary meetings and events of relevance. The final results will be edited to mix such interviews with animations.	For all target groups

3.2. Dissemination Plan

Dissemination is key for **AI-PRISM** as it aims not only at sharing results with potential users - peers in the research field, industry, other commercial players and policymakers, but also at making these results available to the community contributing to the progress of science and technology in general. To this end, **AI-PRISM** has developed a flexible and adjustable dissemination plan that aims on building effective awareness of the project results, creating understanding and aiming for action among the key target audience identified. The execution of this plan will facilitate the best use and uptake of the outcomes and research insights generated throughout the project lifetime, reinforcing each of the impacts aimed in the work plan. As already highlighted this plan is closely linked to the communication plan as well, however, we prefer to tackle this as a separate element.

3.2.1. Objectives

Dissemination objectives have been predefined since the beginning of the project. However, these objectives are closely interlinked both with communication objectives and with the overall project objectives, all to create impact beyond the boundaries of this project.

Figure 7 AI-PRISM's Dissemination Objectives

3.2.2. Phases and timing

Similar to the communication plan, the dissemination plan will be implemented in three different phases. The key difference between the two plans, although they are closely interlinked, is that the 3 dissemination phases do not span throughout the whole project duration, but have a starting and an ending date. Of course, this does not mean that these phases cannot be extended if necessary or cannot be adjusted if required.

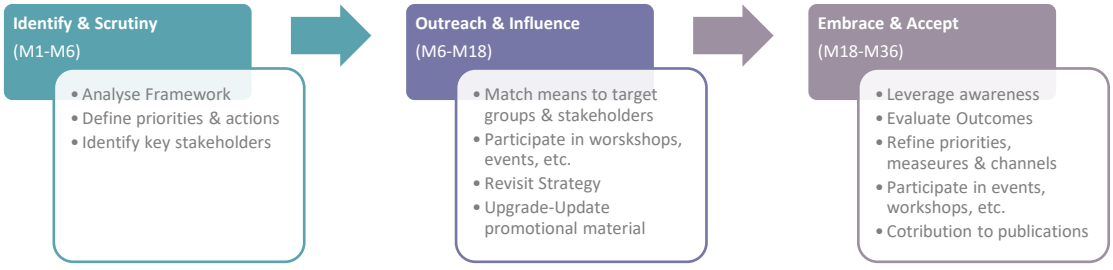


Figure 8 Dissemination Plan Phases

PHASE 1: Identify & Scrutiny (M1-M6)

During phase 1, **AI-PRISM** will seek to analyse the project's framework, with a special attention to internal and external barriers and obstacles that could slow down the dissemination activities, as well as to defining the priorities and actions for the first year of the project. During this phase, the, a first set of promotional material, produced in the frame of **AI-PRISM** communication plan will be prepared and delivered.

PHASE 2: Outreach & Influence (M6-M18)

The main objective of the second phase is to increase impact and awareness generated during the first phase and to mainly expose **AI-PRISM** achievements. All channels (including communication) will be adapted to the specific needs of this phase and it will work to properly find the right means to engage and collaborate with the target groups. This will help increase the potential impact of the project's results. Participation in workshops, organisations of ad hoc events, as well as organisation of tutorials/webinars (if needed) will boost the dissemination process. Specific PR material will be also produced.

PHASE 3: Embrace & Accept (M18-M36)

This phase will leverage the general awareness raised by the two initial phases, attracting more potential end users and clientele interested in **AI-PRISM** project's results. All outcomes of the two earlier phases will be evaluated and, if needed, priorities, measures and dissemination channels will be refined. Participation in events, workshops, and conferences as well as contributions to publications in targeted specific media online and printed trade and research journals will be implemented.

3.2.3. Dissemination Tools & Material

As already highlighted, communication and dissemination are closely interlinked therefore a number of tools are common for both. However, there are some dissemination tools specific to the dissemination and to creating impact for the project.

Table 4 Dissemination Tools (printed)

What	Why	How	For whom
Project Documentation	Publicly available information which can be disseminated and infused to similar to **AI-PRISM** initiatives and the community as a whole.	Documentation material in the form of public deliverables will be made available through **AI-PRISM's** public repository, as well as CORDIS[3], and communicated through our communication channels.	-Manufacturing Industry -Digital Tech Providers -Advocate Ecosystem - Social Innovation Sector -Policy Makers
Peer-reviewed Publications	Disseminate the outcomes of the project to a wide scientific community. Showcasing outcomes to the scientific community for further exploitation.	**AI-PRISM** aims at publishing and contributing to peer-reviewed publications in top refereed scientific journals and conferences relevant to AI related topics and Manufacturing. One of our main objectives is to ensure the technical achievements and experimental findings of the project will be known and exploited by a larger	-Manufacturing Industry -Digital Tech Providers - Social Innovation Sector

[3] https://cordis.europa.eu/

		research community and related scientific domains.	
Technical Publications	Technical articles can disseminate the project's views and outcomes to a wider scientific and technical audience, leveraging project's impact.	The project will publish and contribute to technical blogs and articles or any other reference from technology providers (bottom-up), as well as references related to the use case application domains under consideration (top-down).	-Manufacturing Industry -Digital Tech Providers - Social Innovation Sector

Table 5 Digital Channels

What	Why	How	For whom
Open Access Library	"Open Access" Scientific & Technical material allows a wider dissemination of the project's outcome to a wider scientific and technological community.	Following the principle 'as open as possible', **AI-PRISM** will provide open access to peer-reviewed publications and scientific research data. **AI-PRISM** is using **Zenodo**[4] **OpenAIRE+**[5] repository, where it is possible to deposit both publications and data, while providing tools to link them. The **Zenodo** infrastructure is also used as document repository for all public deliverables.	-Manufacturing Industry -Digital Tech Providers -Advocate Ecosystem - Social Innovation Sector -Policy Makers
Feedback	Being able to collect feedback from external stakeholders, not only allows to expand the project's horizons and scope but also to disseminate the project's outcome to a specialised audience.	**AI-PRISM** will set up online measures such as surveys and opinion polls among actors in the key application sectors and the Internet Ecosystem to gather feedback about critical issues of the project, such as validation of priorities and execution of services.	-Manufacturing Industry -Digital Tech Providers - Social Innovation Sector

Table 6 Events

What	Why	How	For whom
Conferences/ Workshops	Participating in conferences, workshops and trade fairs is a strategic mechanism to interact actively with multiple stakeholders at a time.	The consortium will disseminate outcomes achieved by the project in the form of presentations, talks and personal engagement. This action will include events directly related to BIM, but also end use-oriented affairs with a focus on digital transformation.	For all target groups
Exhibition/ Demo Spaces	Showcasing the project's tangible outcomes through exhibitions and demo events, allows the dissemination of concrete outcomes to a wider audience.	As an initiative targeting applied technology, one of the objectives of the project is to showcase and validate publicly the outcomes achieved. Hence, **AI-PRISM**'s dissemination plan will include some exhibition activities and demos to demonstrate the feasibility of the proposed capabilities.	For all target groups

[4] https://zenodo.org/
[5] https://www.openaire.eu/

3.3. Communication & Dissemination Monitoring

Monitoring and adjusting both the Communication and the Dissemination Plan, on a frequent basis, is a fundamental element of the project's success. Continuous monitoring allows the consortium to correct any possible deviations and improve its effectiveness by applying correction and mitigation measures when needed. It will also address possible implementation problems and identify whether further action is required to ensure that objectives are met. Emphasis is given on the pre-assessment of information needs, on the monitoring frequency and the method of collecting evidence.

The execution and effectiveness of the Dissemination and Communication Plan is dependent on close monitoring as well as flexible and prompt response mechanism. Every designed and implement activity will be monitored and evaluated according to its account and closely related to the KPIs. KPIs have been already defined but are considered to be confidential and are available for the European Commission's representatives and Consortium' Partners' eyes only. Moreover, Communication and Dissemination reporting tools have been also set up so that all partners may register their individual efforts and activities.

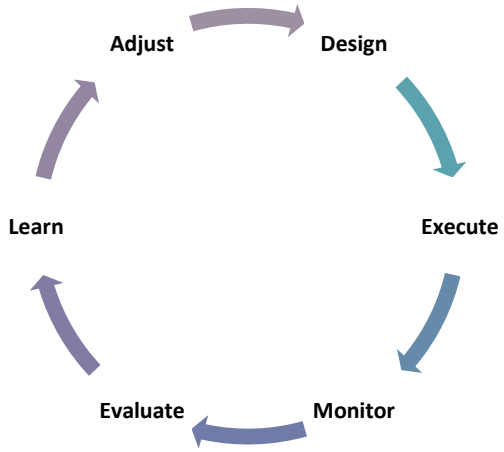


Figure 9 Dissemination & Communication Loop

- **Design:** Design is activity based on the Dissemination & Communication Plan and the desired impact;
- **Execute:** Execute according to plan;
- **Monitor:** Closely monitor the activity and collect input and results. Monitoring will be based on a template that is available only to partners through the internal website;
- **Evaluate:** Evaluate the outcomes of the activity collaboratively according to the desired targets set in the design phase;
- **Learn:** Learn through this evaluation and try to extract the most valuable outcomes out of it;
- **Adjust:** Absorb findings and lessons learnt adjust the plan accordingly, if needed.

All outcomes and results of the Dissemination and Communication plan will be reported in **D8.2 AI-PRISM Dissemination and Communication Report (I)** at Month 18 and **D8.3 AI-PRISM Dissemination and Communication Report (II)** at Month 36.

3.4. International Cooperation

3.4.1. Objectives

According to the Grant Agreement, the objective of the international cooperation task is to identify relevant South Korean and Japanese initiatives and organisations with whom a potential collaboration and exploitation of synergies can be explored and performed.

The key expected results from the international cooperation are two:

1) to identify new approaches to be considered arising from advances in the state of the art or new proofs of concept in other regions, 2) new synergies on collaborative robotics, the AI enhancing toolset and social robotics collaboration aspects. Collaboration on topics related to research or open ecosystems is expected to be more likely than on the commercial side.

The initial benefits that will be proposed to the entities or initiatives that will be open to cooperate are the following: exchange of approaches (knowledge), access to our network of open pilots (to allow them to experiment and collect feedback), generating join scientific publications, requirement gathering, blueprint designs, use cases replicability in their regions, among others. This point will be deeply revised during the discussions with the entities and initiatives.

3.4.2. Phases & timing

The international cooperation plan has been devised to achieve the above objectives. It includes the following phases:

PHASE 1: Mapping (M1- M12)

Identification of the most relevant initiatives and entities in South Korea and Japan by the consortium partners with local presence in the region (mainly ETRI and A&G in the case of South Korea and NTT DATA in the case of Japan). The consortium will take advantage of the local knowledge and networking of these partners (knowledge of the existing ecosystem, existing collaborations, language, and local idiosyncrasy) to carry out a first identification of entities and initiatives than are really achievable. This action will be able to generate a map with entities and initiatives around the different types of stakeholders (mainly academia and research centres) for each region. Depending on the results obtained from the mapping of entities and initiatives, further iterations may be carried out to expand it.

As an additional point, relevant events will be identified with the support of these local partners where we can disseminate our results and promote new collaborations.

PHASE 2: Contact (M13-M24)

Once the available map is sufficiently representative, **a discussion with the consortium will be performed to identify which lines of work may be more interesting to explore** and contact activities will be prioritised in that sense.

Contact with the entity or initiative to introduce AI-PRISM solution and the potential collaboration will be explored.

PHASE 3: Cooperation (M25-M36)

Once the type of collaboration with each specific entity or initiative has been defined, the corresponding collaboration actions will be carried out.

As a starting point, it is proposed to suggest different ways of collaboration with the entities or initiatives: External Advisory Group, stakeholder group associated to the project (without funding) or a project cluster, to name a few. This point will be further concreted during the discussions with the entities.

4. Exploitation & Sustainability

4.1. Objectives & Key Terms

This section aims to elucidate the key terms to be employed in the context of the exploitation strategy for **AI-PRISM**, as well as to outline the categorisation that will be considered for the project results.

The primary goal of the exploitation activities is to maximize the effective utilization of the project results through various means such as scientific, economic, political, or societal exploitation routes - both commercially and non-commercially-, and with the aim of transforming the Research and Innovation efforts into tangible value.

From a methodological perspective, the outcomes of **AI-PRISM** will be classified into two categories: **Key Exploitable Results** (KERs) **and Exploitable Results** (ERs).

A **Key Exploitable Result** (KER) is defined as a noteworthy outcome that has been identified and prioritized based on its significant potential for 'exploitation,' which refers to its utilization and the benefits derived from it, within the value chain of a product, process, or solution developed in AI-PRISM. Additionally, KERs may also serve as crucial inputs for policymaking, further research, or education. The KERs are identified based on criteria such as the degree of innovation, exploitability, and impact.

Key Exploitable Results (KERs) can be further categorized **as Joint Key Exploitable Results (J-KERs),** which are identified based on their high potential for exploitability, and which require consortium partners to jointly carry out specific activities aimed at consolidating the adoption of the results throughout the project (e.g., dissemination at events, publications, and other targeted efforts to ensure the widespread utilization of the results).

Another option for KERs is categorizing them as **Individual Key Exploitable Results** (I-KERs). While also possessing high exploitability potential, I-KERs are promoted and adopted by a **single partner** within the consortium.

The remaining results with **lower exploitability potential** will be categorised as **Exploitable Results (ER).** Similar to KERs, ERs can encompass various forms of data, knowledge, and information, regardless of their nature or format.

At a more detailed level, within the exploitation strategy, the concept '**Component'** will be employed to refer to those technical parts that are combined with other technical parts to make an ER or a KER.

All results generated in **AI-PRISM**, particularly the Key Exploitable Results (KERs), will be strategically directed towards various **'Exploitation pathways**', which encompass the routes and ways for exploiting these results, whether commercially or non-commercially, in order to reach the intended target groups ('**stakeholders'**).

Finally, '**Dissemination, Exploitation and Communication** Goals', will be measurable exploitation targets to be achieved through different project activities. These goals can be short-term (during the project) or mid-term (after the project-end) reflecting the **comprehensive approach of the exploitation strategy of AI-PRISM.**

4.2. Phases & Timings

The exploitation timeline provides a comprehensive overview of the planned sequence of work phases that will be followed during the **AI-PRISM** project, specifically within **T8.3** (Innovation Management, Exploitation, and Sustainability). It serves as a guiding document to ensure that the exploitation activities progress as planned and effectively meet their objectives.

The exploitation activities within the project are organized into three distinct stages - Exploration, Market Research and Business Models design- , each with its specific set of activities and tasks. The timeline of these stages spans the entire 36-month duration of the project, as follows:

PHASE 1: Exploration Stage (mainly M1-M12)

The first stage covers mainly M1-M12, and its objective is laying the foundation of the exploitation strategy, by defining the objectives, and the methodology and by identifying the KERs and ERs to be promoted.

From **M1 to M5,** the initial Description of Action and market analysis presented in the project proposal will be reviewed in order establish the **starting point**. This will be followed by the definition of the **methodological approach** for the exploitation activities.

Afterwards, **bilateral meetings** are planned with each project partner to thoroughly map and understand their **individual motivation and objectives** regarding their participation in **AI-PRISM**. The meetings are expected to take the form of workshops, allowing partners to also share their interests in reaching specific **stakeholders** through the exploitation activities. These efforts will result in the elaboration of well-defined and prioritized **exploitation pathways** for each result– further research, commercialisation, education and training, policy contribution, etc.-.

The progress made and insights obtained will be utilized to shape the key elements of **D8.1 (M6-M8).** At the same time, an internal intermediate exploitation report will be generated, including a diagram of technical components, an exploitation pathways map and a results map.

A **second iteration** will take place **from M9 onwards** and will be focused on **revisiting and validating** with the Consortium all the results and exploitation pathways initially identified. In parallel, **Intellectual Property Rights approaches and interests** will be collected from each partner.

With the incorporation of the previous updated inputs, a validated exploitation vision will be generated by the end of the exploration stage (M12). Specifically, a **global pathways map and several individual pathways maps** will be drafted and will serve as a strategic guide for the subsequent exploitation activities to be carried out by each partner, as well as by the entire Consortium in the short and mid-term. This may include events, networking, publications, and other initiatives.

It is important to note that the Exploration stage extends until the end of the project (M36) through two parallel tasks which will ensure the monitoring and updating of the innovation and exploitation contents and activities, to reflect the evolving exploitation progress and outcomes of **AI-PRISM**.

PHASE 2: Market Research Related to AI-PRISM Solution Stage (M13-M18)

During the **Market Research stage**, which spans from M13 to M16, comprehensive research will be conducted to gather and analyse data about the **AI-PRISM** solution. This research will include a market analysis definition, which involves analysing market trends, customer needs, competitors, and potential opportunities. The findings from this research will be used to inform the development and positioning of the **AI-PRISM** solution in the market**.**

The market analysis task will undergo an iterative validation process, where the results will be processed and validated with the project partners.

A **benchmarking analysis of the competitors**, focused on the **functionalities** of the AI-PRISM solutions, will be conducted to assess their **advantages and disadvantages**. This will be followed by a **SWOT analysis** (Strengths, Weaknesses, Opportunities, and Threats) to further evaluate the solution's market positioning. **IPR** (Intellectual Property Rights) information, including identification of agreements and interests, will be further explored and collected.

Individual exploitation plans, which are based on the initial individual exploitation pathways maps, will be drafted by **the insights from the IPR agreements, the market analysis**, the **benchmarking,** and the **SWOT analysis**.

After a final validation workshop ensuring all partners are aligned on the exploitation strategy, the **D8.4** report will be elaborated (M18).

In parallel, the monitoring and updating tasks of the 'Exploration stage' will keep running.

PHASE 3: AI-PRISM Business Models design stage (M22-M36)

During the AI-PRISM business models design stage, spanning from M22 to M36, diverse business models will be developed for the **AI-PRISM** solutions.

Workshops and iterative validation processes will be carried out from M22 to M34 to define the pricing strategy, revenue streams, sales channels, and go-to-market approach for the complete solution.

From **M25 to M36**, efforts will also be directed towards the development of an **Innovation Roadmap** which will identify new functionalities for the **AI-PRISM** solution, taking a forward-looking approach to innovation. This will serve as a radar to identify potential areas for growth, ensuring that the business models are future-proof and aligned with market demands and technological advancements.

Finally, a comprehensive overview of the business model design process and its outcomes will be provided in the **final report D.8.4,** whose preparation will extend from **M31 to M36.**

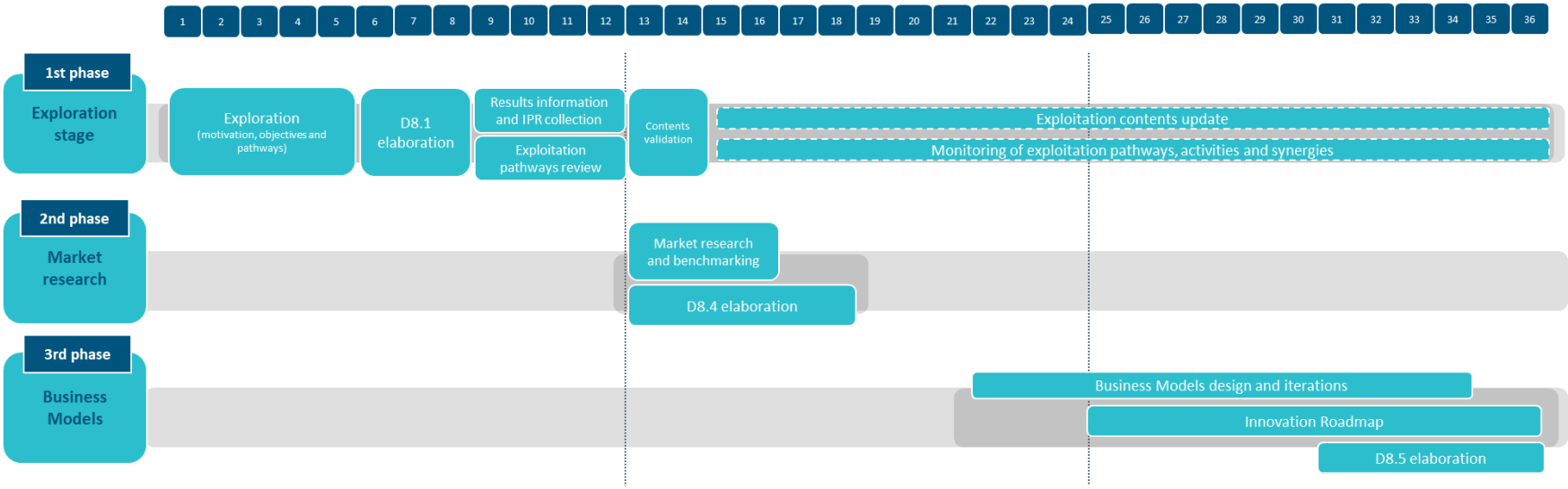


Figure 10 Exploitation Phases

4.3. Exploitation Tools

Table 7 Exploitation Tools

Tool	Description
Diagram of technical components	The 'Diagram of Technical Components' offers a graphical overview of the various parts, such as modules, datasets, subsystems, etc., that constitute the **AI-PRISM** solution, along with their interconnections. The diagram includes boxes and shapes representing individual components, labelled with their names, and arrows to indicate interconnections. Serving as an exploitation tool, the Diagram places a significant emphasis on the Key Exploitable Results (KERs), positioning them as the backbone or main pillars beneath which each component is positioned. The 'Diagram of Technical Components' tool will be used for two purposes: • **Documentation:** In order to capture and document the technical components of the **AI-PRISM** solutions for reference. • **Communication:** In order to visually convey the technical components and their interactions to team members. This will facilitate discussions and decision-making in the exploitation field.
Global exploitation pathways map	The global exploitation pathways map is a graphic diagram that includes well-defined and prioritized routes for exploiting **AI-PRISM** results (e.g., further research, commercialization, education and training or policy contribution). It provides a visual representation of the planned routes for maximizing the impact and value of the project's results. The map serves as a strategic guide for decision-making and resource allocation, ensuring that the exploitation efforts are aligned with the objectives pursued. In the map, the stakeholders targeted are identified and short-term objectives and mid-term impacts are also included, providing a reference timeline for each pathway. By outlining all of these, the tool facilitates coordinated and effective exploitation efforts.
Individual exploitation pathways map	The individual exploitation pathways map is a tool similar to the 'Global exploitation pathways map', but tailored to each specific partner within the **AI-PRISM** consortium, making it individualized and concrete for their unique context. It includes well-defined and prioritized routes for each partner to exploit the project results most relevant for them. This personalized approach ensures that each partner's interests and objectives in are taken into consideration.
Results map	The Results Map is a visual representation in the form of a table that provides a comprehensive overview of the categorization of **AI-PRISM** project results. The map includes Key Exploitable Results (KERs) - both Joint Key Exploitable Results (J-KERs) and Individual Key Exploitable Results (I-KERs) - as well as other Results. These are further divided into 'commercial' and 'non-commercial' categories. Commercial results encompass products (software and hardware), as well as professional services. Non-commercial results, on the other hand, can range from standards, knowledge, open-source or free-access results, recommendations for policy making, to education and training-related outcomes.
KERs Database	The KERs Database is a valuable tool for compiling and organizing information related to the Key Exploitable Results identified. It provides easy access to information on different elements such as a brief description, a categorization of the type of result, ownership, exploitation paths, interested partners, target audience, expected maturity in terms of Technology Readiness Level (TRL), as well as time to market and commercialization potential.
ERs Database	Similar to the previous tool, the ERs Database is a useful instrument for compiling and organizing information related to the identified Exploitable Results (ERs). It provides information on key elements such as a brief description of the result, the maturity of the result in terms of Technology Readiness Level (TRL), the time required to exploit the result after the project, the subtype of result, and the ownership.
IPR and licensing repository	The IPR and Licensing Repository is a centralized and organized database that stores information related to intellectual property rights (IPR) and licensing for the results generated by the **AI-PRISM** project. It serves as a repository for all relevant

	documentation, agreements, and licenses associated with the commercial and non-commercial outcomes of the project.
Innovation Roadmap	The innovation roadmap takes the form of an internal report. It is aimed at identifying and proposing new functionalities, features, and enhancements to the **AI-PRISM** solutions. The approach is forward-looking, focusing on making the solution more competitive and relevant in the market. The tool will also serve to align the business models of **AI-PRISM** with market demands and technological advancements to position the solution as an offering capable of meeting customer needs.
Market research and Benchmarking	"Market research and benchmarking" is used in the **AI-PRISM** project to gather and analyse data about the **AI-PRISM** solution and its competitors. The findings of the market research and benchmarking process are used to elaborate an internal report informing the development and positioning of the **AI-PRISM** solution in the market. It will include the conclusions of the market analysis, benchmarking, SWOT analysis, and exploration of intellectual property rights.
Business Models	The **AI-PRISM** business models are strategic roadmaps that define how the different stakeholders can generate and deliver value through the **AI-PRISM** solutions. They incorporate several elements, including the target customers, the unique value proposition, the revenue streams, the cost structure, the sales channels, as well as the go-to-market approach.

4.4. Exploitation Routes & Target Groups

The exploitation pathways of a project are structured in five main directions: research, education and training, commercialisation, standardisation, and policy recommendations.

The following is a brief description of each exploitation route and the target groups involved:

Further research: many of the technical results could evolve through new research projects, just as manufacturers and use case providers would be interested in validating their new products in new use cases. There is widespread interest in this exploitation route. Work will be done to identify like-minded groups that can collaborate on new projects. All kind of stakeholders can be involved in this exploitation route.

Education and Training: A number of partners have partnerships with universities and training centres, which will see their teaching content enhanced by the experience and lessons learned from the project. On the other hand, this updated material could help to upgrade the technical skills of workforce. The main target groups here are the academia and society.

Standardisation: UNE will participate very actively here to promote the new processes and technologies in the standars related with the robotics collaboration. On the other hand, improvements are expected in the standards related to working conditions where there is a collaboration with robots. The main target group involved is the standardisation community.

Commercialisation: Many of the partners (mainly industrial partners but also research institutes) aim to obtain an economic return through the sale of their products or professional services around them. This is one of the most powerful routes of the project (as it could not be otherwise since it is an Innovation Action). The main target groups involved in this route are the Manufacturing Industry and the Digital Tech Providers.

Policy contributions: certain contributions are expected to policymakers in three main topics: recommendations related to AI-Human collaboration about psychological aspects, safety standards, and sustainability of robotics. The main target group is Policymakers.

5. Standardisation Strategy & Landscape Analysis

5.1. Short introduction about standardisation

Standards are voluntary technical documents that set out requirements for a specific item, material, component, system or service, or describe in detail a particular method, procedure or best practice. Standards are developed and defined through a process of sharing knowledge and building consensus among technical experts nominated by interested parties and other stakeholders - including businesses, consumers and environmental groups, among others. These experts are organized in Technical Committees (TCs), which are subdivided in Subcommittees (SCs) or Working Groups (WGs). These TCs are included in the structure of the Standardisation Organizations (National, European and International, with the respective mirror committees) and work following their internal regulations.

The standardisation bodies operate at National (UNE, AFNOR, BSI, DIN, etc.), Regional (CEN, CENELEC, ETSI) or International (ISO, IEC, ITU) level. Sometimes there are different standardisation bodies at the same level but covering different fields. This is the case of ISO (general), IEC (electrical) and ITU (telecommunications) at international level, or CEN, CENELEC and ETSI at European level in the same way.

There are also different kinds of standardisation documents. The most widespread is the standard, which has a different code depending on the organization under which it was developed; e.g., EN for European Standards, ISO or IEC for International standards. Other types of documents are Technical Specifications (TS), Technical Reports (TR) and Workshop Agreements (CWA). Further Amendments to the standards are identified by adding A1, A2, etc. at the end of the standard code.

The formal definition of a standard is a “document, established by consensus and approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context”. These include requirements and/or recommendations in relation to products, systems, processes or services. European Standards (ENs) are documents that have been ratified by one of the three European Standardisation Organizations (ESOs), CEN, CENELEC or ETSI; recognized as competent around voluntary technical standardisation as for the EU Regulation 1025/2012, modified by EU Regulation 2022/2480

At European level, all the members of CEN and CENELEC shall adopt EN standards as national standards and have to withdraw any existing national standard which could conflict with them. A summary of the characteristics of the different standardisation documents could be found in the following table.

Table 8 Characteristics of different standardisation documents

Type	International code	European code	National code	Main characteristics
Standard	ISO / IEC	EN	UNE, NF, BS, DIN, etc. When adopting: UNE-EN, NF-EN, UNE-ISO, NF-ISO, etc.	Elaboration: 3 years 2 steps of member approval European: compulsory national adoption Revision: every 5 years
Technical Specification	ISO/TS IEC/TS	CEN/TS CLC/TS	When adopting: UNE-CEN/TS, NF-CEN/TS, UNE-ISO/TS, NF-ISO/TS, etc.	Elaboration: 21 months 1 step of member approval or internal approval in TC European: optional national adoption Revision: at 3 years (upgrading to EN or deletion)
Technical Report	ISO/TR IEC/TR	CEN/TR CLC/TR	When adopting: UNE-CEN/TR, NF-CEN/TR, UNE-ISO/TR, NF-ISO/TR, etc.	Elaboration: free timeframe Internal approval in TC European: optional national adoption No revision required
Workshop Agreement	IWA	CWA	Variable	Elaboration: free timeframe (usually few months) Internal approval in the Workshop European: optional national adoption Revision: at 3 years (upgrading to EN or deletion)

There is also an agreement established between European and International Organizations (e.g., CEN and ISO) to avoid duplication of efforts and promote global relevance of standards, which allows to adopt or develop in parallel each other's standards with the same content and code. National standards could also be proposed as a base for new European or International standards. The following figure shows the tracks of the standards.

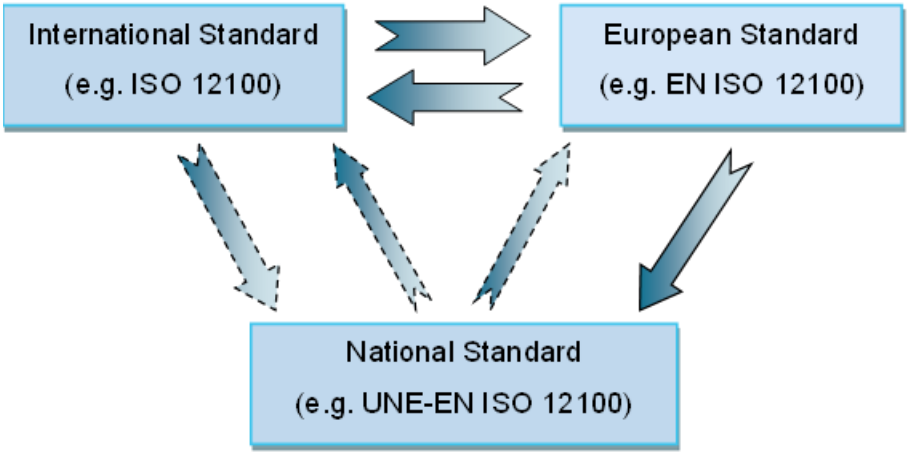


Figure 11 Possible tracks of standards adoption

Therefore, the code of any standard is the combination of the above-mentioned issues and could be explained as shown in figure below.

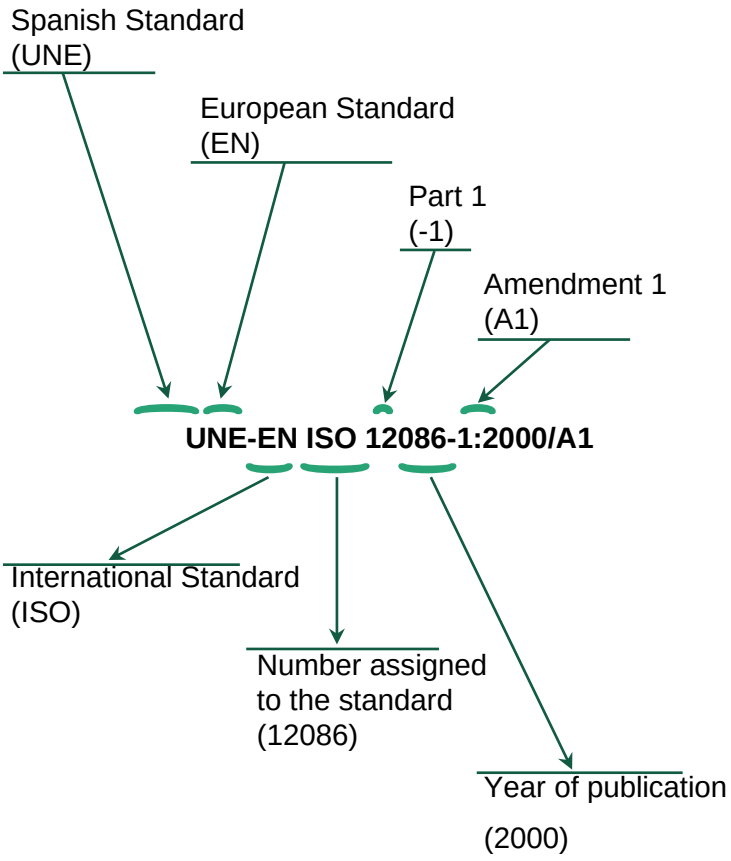


Figure 12 Example of identification of elements in the code of a standard

5.2. Standardisation Analysis Methodology

For analysis of standardisation landscape and identification of existing standards and standard documents under development relating to the project, the following methodology has been designed

and taken for understanding the key concepts of the project and assessing the identification of standardisation areas.

5.2.1. List of Key Concepts

A list of key concepts was prepared to act as a starting point for the identification of standardisation areas. For the selection of the key concepts the aims and goals of the project and the levels in which the project should integrate were considered. Also, the needs of the use cases were considered. The list was agreed by **UNE** and **AI-PRISM** partners:

Table 9 List of Key Concepts as a starting point for the identification of standardisation areas

MAIN SECTOR	SUBSECTOR
INDUSTRIAL ROBOTS	1 Robot/Robotics 2 Ethics in Robot Design
ADVANCED MANUFACTURING	3 Automation Systems and Integration 4 Industrial Automation System 5 Industrial Process Measurement, Control and Automation
ERGONOMICS & ANTHROPOMETRY	6 Ergonomics 7 Anthropometry 8 Ergonomics of Human-System Interaction
INDUSTRIAL CYBER SECURITY	9 Industrial Cyber Security
INTEROPERABILITY	10 Interoperability
INTERNET OF THINGS	11 Internet of Things
ARTIFICIAL INTELLIGENCE	12 Artificial Intelligence
HEALTH AND SAFETY OF WORKERS	13 Health and Safety 14 Personal Protective Equipment
SAFETY OF MACHINERY	15 Safety of Machinery
UNIVERSAL ACCESSIBILITY	16 Universal Accessibility and Design for All
LIGHTING	17 Lighting of work places
TRAINING	18 Learning, Education and Training
VIBRATION	19 Vibration
VR/AR/MR	20 Virtual Reality (VR), Augmented/Mixed Reality (AR/MR)

5.3. Published and under development Standards

Both published standards and standards under development were identified for each standardisation area, together with the technical committee responsible for the respective standards. The standardisation work covers European standardisation developed by the European Committee for Standardisation (CEN), the European Committee for electrotechnical Standardisation (CENELEC), the European Telecommunications Standards Institute (ETSI) and also the International standardisation developed by the International Organization for Standardisation (ISO), the

International Electrotechnical Commission (IEC) and ITU (United Nations specialized agency for information and communication technologies). Some relevant standards developed by other National Standardisation Bodies (such as ANSI, BSI) also have been considered.

5.3.1. Draft of Technical Committees identified

Because of searching process, a draft was prepared by **UNE: 36 Standardisation Technical Committees**. The Information with the published and under development Standards that have been circulated to **AI-PRISM** partners is detailed in subsections below.

5.3.2. Reference of relevant Standards to be considered as Compliance Requirements

After standards identification process, the References of the relevant standards to their respective WP are analyzed, which should be considered for the project, specifying in which WP those standards would be used, how those standards would influence/impact the project implementation and opportunities/risks from technical and business perspectives.

This analysis study to the References of those relevant Standards, can help the partners interact with the identified Standardisation TCs during the standards development.

The interaction with the Standardisation TCs could take place through:

- The participation of one or more **AI-PRISM** partners in the technical body (Standardisation is an open activity and all interested parties may participate in a CEN/CENELEC/ISO/IEC technical committee through the designation of National Standardisation Bodies/National Mirror Committee or as organization liaison representative in a CEN/TC).
- The participation through the formal liaison of the **AI-PRISM** project with main CEN/TC(s) to participate directly as liaison organization which intends to make technical contributions to their works.
- The dissemination of the **AI-PRISM** Project progress by delivering reports to the relevant TCs Secretaries or by attending relevant technical committees' meetings.

5.4. Classification of identified Standards

Because of all the process described above, a list of relevant and applicable standards relating to the **AI-PRISM** project have been specified. These standards have been classified as:

- **Standards to be used as guidelines:** it would be interesting to keep them in mind as they could be helpful, but they will not represent a requirement.
- **Standards to be considered as a compliance requirement:** it should be decided if the standards will represent a requirement for the WP developments during design/development phases.

5.5. Relevant Standardisation areas related to AI-PRISM

5.5.1. Relevant Standardisation Technical Committees

This section provides information about relevant standardisation Technical Committees and the corresponding Standards, in the List of key concepts. These Standardisation areas related to **AI-PRISM** have been considered in **Table 9 List of Key Concepts as a starting point for the identification of standardisation areas**.

5.5.1.1 Industrial Robots

Industrial Robots have been part of industrial automation for a long time and are thus covered by several international standards such as ISO 10218-1 and ISO 10218-2. As tasks for Industrial Robots have gotten more complex, e.g. cooperation with a worker, new standards are currently being developed. New standardisation efforts have also been started on Service Robots to specify general safety requirements before serial products enter the market. Within **AI-PRISM** project, standardisation efforts on robot safety are promoted.

a. Robot/Robotics

ISO/TC 299 - Robotics

ISO TC 184 dealt with Automatic system and Integration and one of its SCs, SC 2, has developed standards in the field of Robotics, “SC 2 Robots and robotic devices”. With increased robotic activity, greater visibility was needed for better coordination. This resulted in ISO/TC 184/SC 2 being upgraded to ISO/TC 299 with the title of “Robotics” in 2016. These changes over the years have reflected the increasing and broadening standardisation activities in the field of robotics.

This section describes current Standards Developments in ISO standardisation committee TC 299 “Robots and robotic devices” (formerly, ISO TC 184/SC 2) on a regular basis. All relevant standard development takes place in ISO/TC 299 and is organized in several working groups:

WG1 Vocabulary and characteristics

The main task is to define fundamental terms reviewing the existing vocabulary for traditional robots and adding new terms especially for the area of ***Service Robots***

WG2 Safety

The main task is the study of the need to develop new *service robot* standards. The areas, which are under consideration, are the performance criteria, coordinate system, characteristics of mobile robots, modularity in hardware and software and robotic software for ***Service Robots***.

Service Robots

- Improving quality of life

Personal Care Robots

- Mobile servant robot
- Physical assistant robot (fastened to a human during use such as exoskeletons) or restraint-free that is not fastened to a human during use.
- Person carrier robot (Excluding medical applications)

WG3 Industrial Safety

The Work Group 3 deals with Industrial Robots. There are two separate tracks of work in progress. Part 1 addresses only the safety of Industrial Robot and Part 2 deals with the safety of Industrial Robot system and integration. Therefore Part 2 mainly addresses the safety issues when they install Industrial Robots in the manufacturing environments

WG4 Service Robots

This Work Group deals with Service Robot but it has not provided any relevant standard yet.

The WG is under investigation of standardisation needs for service robots.

Examples of applications could be transportation, healthcare, rehabilitation, entertainment or inspection.

WG6 Modularity for Service Robots

The WG explores the standardisation modularity needs for service robots covering

- software modularity;

- hardware modularity;

with safety aspects, integrated design approach and interoperability.

WG 7 Management system for service robots

WG 8 Validation methods for collaborative applications

WG 9 Electrical interfaces for industrial robot end- effectors

CEN/TC 310 - Advanced automation technologies and their applications

Scope: Standardisation in the field of automation systems and technologies and their application and integration to ensure the availability of the standards required by industry for design, sourcing, manufacturing and delivery, support, maintenance and disposal of products and their associated services. Areas of standardisation may include enterprise modelling and system architecture, information and its supporting systems, robotics for fixed and mobile robots in industrial and specific non-industrial environments, automation and control equipment and software, human and mechanical aspects, integration technologies and system operational aspects. These standards may

utilize other standards and technologies beyond the scope of TC310, such as machines, equipment, information technologies, multi-media capabilities, and multi-modal communications networks.

In summary, the relevant standards related to Robotics are:

Published standards:

EN ISO 10218-1:2011	Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots (ISO 10218-1:2011)	CEN/TC 310
EN ISO 10218-2:2011	Robots and robotic devices - Safety requirements for industrial robots - Part 2: Robot systems and integration (ISO 10218-2:2011)	CEN/TC 310
EN ISO 13482:2014	Robots and robotic devices - Safety requirements for personal care robots (ISO 13482:2014)	CEN/TC 310
ISO 8373:2021	Robotics — Vocabulary	ISO/TC 299
ISO 9283:1998	Manipulating industrial robots — Performance criteria and related test methods	ISO/TC 299
ISO 9409-1:2004	Manipulating industrial robots — Mechanical interfaces — Part 1: Plates	ISO/TC 299
ISO 9409-2:2002	Manipulating industrial robots — Mechanical interfaces — Part 2: Shafts	ISO/TC 299
ISO 9787:2013	Robots and robotic devices — Coordinate systems and motion nomenclatures	ISO/TC 299
ISO 9946:1999	Manipulating industrial robots — Presentation of characteristics	ISO/TC 299
ISO 10218-1:2011	Robots and robotic devices — Safety requirements for industrial robots — Part 1: Robots	ISO/TC 299
ISO 10218-2:2011	Robots and robotic devices — Safety requirements for industrial robots — Part 2: Robot systems and integration	ISO/TC 299
ISO 11593:2022	Robots for industrial environments — Automatic end effector exchange systems — Vocabulary	ISO/TC 299
ISO/TR 13309:1995	Manipulating industrial robots — Informative guide on test equipment and metrology methods of operation for robot performance evaluation in accordance with ISO 9283	ISO/TC 299
ISO 13482:2014	Robots and robotic devices — Safety requirements for personal care robots	ISO/TC 299
ISO 14539:2000	Manipulating industrial robots — Object handling with grasp-type grippers — Vocabulary and presentation of characteristics	ISO/TC 299
ISO/TS 15066:2016	Robots and robotic devices — Collaborative robots	ISO/TC 299
ISO 18646-1:2016	Robotics — Performance criteria and related test methods for service robots — Part 1: Locomotion for wheeled robots	ISO/TC 299
ISO 18646-2:2019	Robotics — Performance criteria and related test methods for service robots — Part 2: Navigation	ISO/TC 299
ISO 18646-3:2021	Robotics — Performance criteria and related test methods for service robots — Part 3: Manipulation	ISO/TC 299
ISO 18646-4:2021	Robotics — Performance criteria and related test methods for service robots — Part 4: Lower-back support robots	ISO/TC 299
ISO 19649:2017	Mobile robots — Vocabulary	ISO/TC 299
ISO/TR 20218-1:2018	Robotics — Safety design for industrial robot systems — Part 1: End-effectors	ISO/TC 299
ISO/TR 20218-2:2017	Robotics — Safety design for industrial robot systems — Part 2: Manual load/unload stations	ISO/TC 299
ISO 22166-1:2021	Robotics — Modularity for service robots — Part 1: General requirements	ISO/TC 299
ISO/TR 23482-1:2020	Robotics — Application of ISO 13482 — Part 1: Safety-related test methods	ISO/TC 299
ISO/TR 23482-2:2019	Robotics — Application of ISO 13482 — Part 2: Application guidelines	ISO/TC 299

Standards under development:

ISO/DIS 5363	Robotics — Test methods for exoskeleton-type walking RACA robot	ISO/TC 299
ISO/CD PAS 5672	Robotics — Collaborative applications — Test methods for measuring forces and pressures in human-robot contacts	ISO/TC 299
ISO/PWI 9409-1	Manipulating industrial robots — Mechanical interfaces — Part 1: Plates	ISO/TC 299
ISO/FDIS 10218-1	Robotics — Safety requirements — Part 1: Industrial robots	ISO/TC 299
ISO/FDIS 10218-2	Robotics — Safety requirements — Part 2: Industrial robot systems, robot applications and robot cells	ISO/TC 299
ISO/AWI 13482	Robotics — Safety requirements for service robots	ISO/TC 299
ISO/DIS 18646-2	Robotics — Performance criteria and related test methods for service robots — Part 2: Navigation	ISO/TC 299
ISO/NP 21196	Robotics — Legged Robots — Testing procedures for legged robots in industrial environments	ISO/TC 299
ISO/NP 21423	Robotics — Autonomous mobile robots for industrial environments — Communications and interoperability	ISO/TC 299
ISO/DIS 22166-201	Robotics — Modularity for service robots — Part 201: Common information model for modules	ISO/TC 299
ISO/CD 22166-202	Robotics — Modularity for service robots — Part 202: Information model for software modules	ISO/TC 299
ISO/PWI 22166-203	Robotics — Modularity for service robots — Part 203: Information Model for Hardware	ISO/TC 299
ISO/PWI 24112	Robotics — Electrical interfaces — Compatible end-effectors	ISO/TC 299
ISO/FDIS 31101	Robotics — Application services provided by service robots — Safety management systems requirements	ISO/TC 299
prEN ISO 10218-1	Robotics - Safety requirements - Part 1: Industrial robots (ISO/DIS 10218-1:2021)	CEN/TC 310
prEN ISO 10218-2	Robotics — Safety requirements for robot systems in an industrial environment — Part 2: Robot systems, robot applications and robot cells integration (ISO/DIS 10218-2:2020)	CEN/TC 310
prEN ISO 13482 rev	Robotics — Safety requirements for service robots	CEN/TC 310

5.5.1.2 Ethics in Robot Design

British Standards AMT/10 Robotics

Scope: Under the direction of the Standards Policy and Strategy Committee, is responsible for the UK input to ISO/TC 299 and some elements of CEN/TC 310 for standards in the field of robots, robotic devices and autonomous systems, Industrial Robots, medical care robots and personal care robot safety.

Published standards:

BS 8611: 2023	Robots and robotic devices. Ethical design and application of robots and robotic systems. Guide	AMT/10 Robotics

5.5.1.3 Advanced Manufacturing

The development of an inclusive European digital society calls for the uptake of innovative technologies by the European industry. CEN/TC 310 ‘Advanced automation technologies and their applications’, CEN/TC 438 ‘Additive manufacturing’ and CLC/TC 65X ‘Industrial-process measurement, control and automation’ will continue to collaborate with ISO and IEC (ISO/TC 184 ‘Automation systems and integration’ and IEC/TC 65 ‘Industrial-process measurement, control and

automation') in order to develop European Standards to support the digital transformation of European industry.

a. Automation Systems and Integration

ISO/TC 184 Automation systems and integration

Scope: Standardisation in the field of automation systems and their integration for design, sourcing, manufacturing, production and delivery, support, maintenance and disposal of products and their associated services. Areas of standardisation include information systems, automation and control systems and integration technologies.

Note: There will be an active collaboration with the relevant technical committees responsible for areas such as machines, manufacturing resources and facilities, robotics, electrical and electronic equipment, PLC for general application, quality management, industrial safety, information technologies, multi-media capabilities, and multi-modal communication networks.

CEN/TC 310 Advanced automation technologies and their applications

Scope: Standardisation in the field of automation systems and technologies and their application and integration to ensure the availability of the standards required by the industry for design, sourcing, manufacturing and delivery, support, maintenance and disposal of products and their associated services. Areas of standardisation may include enterprise modelling and system architecture, information and its supporting systems, robotics for fixed and mobile robots in industrial and specific non-industrial environments, automation and control equipment and software, human and mechanical aspects, integration technologies and system operational aspects. These standards may utilize other standards and technologies beyond the scope of TC 310, such as machines, equipment, information technologies, multi-media capabilities, and multi-modal communications networks.

Structure: CEN/TC 310/WG 1 Systems architecture

Published standards:

ISO 11354-2:2015	Advanced automation technologies and their applications--Requirements for establishing manufacturing enterprise process interoperability -- Part 2: Maturity model for assessing enterprise interoperability	ISO/TC 184/SC 5
EN ISO 11354-1:2011	Advanced automation technologies and their applications -Requirements for establishing manufacturing enterprise process interoperability - Part 1: Framework for enterprise interoperability (ISO 11354-1:2011)	CEN/TC 310

Standards under development:

ISO/PRF TR 3151-1	Visualization elements of PLM-MES interface — Part 1: Overview	ISO/TC 184/SC 4
ISO/NP 7791	Model-based standards authoring (MBSA)	ISO/TC 184/SC 5

ISO/AWI TR 15746-4	Automation systems and integration - Integration of advanced process control and optimization capabilities for manufacturing systems — Part 4: Application integration scheme of advanced process control and optimization system for distillation process	ISO/TC 184/SC 5
ISO/NP 16518	Automation systems and integration — Cooperative networking based on the "requester — performer" relationship between manufacturing software systems	ISO/TC 184/SC 5
ISO/AWI 17649	Model-Based Standards Authoring MBSA	ISO/TC 184/SC 5
ISO/NP 21175-1	Automation systems and integration --Collaboration Environment Requirements of Simulation on Different Manufacturing Platforms — Part 1: Part 1: Reference Model and Process	ISO/TC 184/SC 5

b. Industrial Automation System

ISO/ TC 184 Automation systems and integration

Scope: Standardisation in the field of automation systems and their integration for design, sourcing, manufacturing, production and delivery, support, maintenance and disposal of products and their associated services. Areas of standardisation include information systems, automation and control systems and integration technologies.

Note: There will be active collaboration with the relevant technical committees responsible for areas such as machines, manufacturing resources and facilities, robotics, electrical and electronic equipment, PLC for general application, quality management, industrial safety, information technologies, multi-media capabilities, and multi-modal communication networks.

IEC/TC65 Industrial-process measurement, control and automation

Scope: To prepare international standards for systems and elements used for industrial-process measurement and control concerning continuous and batch processes. To co-ordinate the standardisation of those features of related elements which affect suitability for integration into such systems. The work of standardisation outlined above is to be carried out in the international fields for equipment and systems operating with electrical, pneumatic, hydraulic, mechanical or other systems of measurement and/or control.

CLC/TC 65X Industrial-process measurement, control and automation

Scope: To contribute, support and coordinate the preparation of international standards for systems and elements used for industrial process measurement, control and automation at CENELEC level. To coordinate standardisation activities that affect integration of components and functions into such systems including safety and security aspects. This CENELEC work of standardisation is to be carried out for equipment and systems and closely coordinated with IEC TC65 and its subcommittees with the objective of avoiding any duplication of work while honoring standing agreements between CENELEC and IEC.

Published standards:

ISO 23570-1:2005	Industrial automation systems and integration -- Distributed installation in industrial applications -- Part 1: Sensors and actuators	ISO/TC 184/SC 1
IEC 62443-2-1:2010	Industrial communication networks - Network and system security - Part 2-1: Establishing an industrial automation and control system security program	IEC/ TC 65
IEC 62443-2-4:2019	Security for industrial automation and control systems - Part 2-4: Security program requirements for IACS service providers	IEC/ TC 65
IEC 62443-3-3:2019	Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels	IEC/ TC 65
EN 62714-1:2018	Engineering data exchange format for use in industrial automation systems engineering - Automation markup language - Part 1: Architecture and general requirements	CLC/TC 65X
EN 62714-2:2022	Engineering data exchange format for use in industrial automation systems engineering - Automation markup language - Part 2: Role class libraries	CLC/TC 65X
EN 62439-1:2010	Industrial communication networks - High availability automation networks - Part 1: General concepts and calculation methods	CLC/TC 65X
EN 62439-1:2010/ A1:2012	Industrial communication networks - High availability automation networks - Part 1: General concepts and calculation methods	CLC/TC 65X
EN 62439-2:2022	Industrial communication networks - High availability automation networks - Part 2: Media Redundancy Protocol (MRP)	CLC/TC 65X
EN 62439-3:2022	Industrial communication networks - High availability automation networks - Part 3: Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR)	CLC/TC 65X
EN 62439-4:2010	Industrial communication networks - High availability automation networks - Part 4: Cross-network Redundancy Protocol (CRP)	CLC/TC 65X
EN 62439-4:2010/ A1:2012	Industrial communication networks - High availability automation networks - Part 4: Cross-network Redundancy Protocol (CRP)	CLC/TC 65X
EN 62439-6:2010	Industrial communication networks - High availability automation networks - Part 6: Distributed Redundancy Protocol (DRP)	CLC/TC 65X

Standards under development:

IEC 62443-2-4/ AMD1 ED1	Security for industrial automation and control systems - Part 2-4: Security program requirements for IACS service providers	IEC/ TC 65
IEC 62443-3-2 ED1	Security for industrial automation and control systems - Part 3-2: Security risk assessment and system design	IEC/ TC 65
IEC 62443-4-1 ED1	Industrial communication networks - Security for industrial and control systems - Part: 4-1: Product development requirements	IEC/ TC 65
IEC 62443-4-2 ED1	Industrial communication networks - Security for industrial automation and control systems - Part 4-2: Technical security requirements for IACS components	IEC/ TC 65
prEN 62714-3:2016	Engineering data exchange format for use in industrial automation systems engineering - Automation Markup Language - Part 3: Geometry and kinematics	CLC/TC 65X

c. Industrial Process Measurement, Control and Automation

CLC/TC 65X Industrial-process measurement, control and automation

Scope: To contribute, support and coordinate the preparation of international standards for systems and elements used for industrial process measurement, control and automation at CENELEC level. To coordinate Standardisation activities which affect integration of components and functions into such systems including safety and security aspects. This CENELEC work of Standardisation is to be carried out for equipment and systems and closely coordinated with IEC TC65 and its subcommittees with the objective of avoiding any duplication of work while honoring standing agreements between CENELEC and IEC.

Published standards:

EN 61069-1:2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 1: Terminology and basic concepts	CLC/TC 65X
EN 61069-2:2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 2: Assessment methodology	CLC/TC 65X
EN 61069-3:2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 3: Assessment of system functionality	CLC/TC 65X
EN 61069-4:2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 4: Assessment of system performance	CLC/TC 65X
EN 61069-5:2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 5: Assessment of system dependability	CLC/TC 65X
EN 61069-6:2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 6: Assessment of system operability	CLC/TC 65X
EN 61069-7:2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 7: Assessment of system safety	CLC/TC 65X
EN 61069-8:2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 8: Assessment of other system properties	CLC/TC 65X
EN 62381:2012	Automation systems in the process industry - Factory acceptance test (FAT), site acceptance test (SAT) and site integration test (SIT)	CLC/TC 65X

Standards under development:

No relevant standards under development were identified.

5.5.1.4 Ergonomics & Anthropometry

CEN/TC 122 'Ergonomics' will start the revision of the EN 614 series (safety of machinery – Ergonomic design principles). The ergonomic principles given in the series apply to all ranges of human abilities and characteristics to ensure safety, health and well-being and overall system

performance. In addition, the CEN/TC 122, who is working in close cooperation with the *ISO/TC 159 'Ergonomics'*. Here is a non-exhaustive list:

- EN ISO 27501: 2019 'The human-centred organization - Guidance for managers', providing requirements and recommendations for managers associated with various types of organizational activities;
- prEN ISO 20685-1 'Ergonomics - 3-D scanning methodologies for internationally compatible anthropometric databases - Part 1: Evaluation protocol for body dimensions extracted from 3-D body scans'.
- EN ISO 10551: 2019 'Ergonomics of the physical environment - Subjective judgment scales for assessing physical environments.

a. Ergonomics

ISO/TC 159 Ergonomics

Scope: Standardisation in the field of ergonomics, in particular, general ergonomics principles, anthropometry and biomechanics, ergonomics of human system interaction and ergonomics of the physical environment, addressing human characteristics and performance, and methods for specifying, designing and evaluating products, systems, services, environments and facilities

Excluded: Standardisation of purely technical matters not related to human characteristics and abilities.

Structure:

- ISO/TC 159/AHG 1 Robotic, Intelligent, Autonomous Systems

- ISO/TC 159/CAG Chairman Advisory Group

- ISO/TC 159/WG 2 Ergonomics for people with special requirements

- ISO/TC 159/WG 3 Coordination group for accessibility

- ISO/TC 159/SC 1 General ergonomics principles

- ISO/TC 159/SC 3 Anthropometry and biomechanics

- ISO/TC 159/SC 4 Ergonomics of human-system interaction

- ISO/TC 159/SC 5 Ergonomics of the physical environment

CEN/TC 122 Ergonomics

Scope: Standardisation in the field of ergonomics principles and requirements for the design of work systems and work environments, including machinery and personal protective equipment, to promote the health, safety and well-being of the human operator and the effectiveness of the work systems.

Structure:

- CEN/TC 122/WG 1 Anthropometry

- CEN/TC 122/WG 11 Ergonomics of the Physical Environment

- CEN/TC 122/WG 14 Ergonomics of PPE systems

- CEN/TC 122/WG 2 Ergonomic design principles

- CEN/TC 122/WG 4 Biomechanics

- CEN/TC 122/WG 5 Ergonomics of human-system interaction

Published standards:

ISO 10075-3:2004	Ergonomic principles related to mental workload -- Part 3: Principles and requirements concerning methods for measuring and assessing mental workload	ISO/TC 159/SC 1/WG 2
ISO/TR 12295:2014	Ergonomics -- Application document for International Standards on manual handling (ISO 11228-1, ISO 11228-2 and ISO 11228-3) and evaluation of static working postures (ISO 11226)	ISO/TC 159/SC 3/WG 4
ISO 11228-1:2003	Ergonomics -- Manual handling -- Part 1: Lifting and carrying	ISO/TC 159/SC 3/WG 4
ISO 11228-2:2007	Ergonomics -- Manual handling -- Part 2: Pushing and pulling	ISO/TC 159/SC 3/WG 4
ISO 11228-3:2007	Ergonomics -- Manual handling -- Part 3: Handling of low loads at high frequency	ISO/TC 159/SC 3/WG 4
ISO 9355-1:1999	Ergonomic requirements for the design of displays and control actuators -- Part 1: Human interactions with displays and control actuators	ISO/TC 159/SC 4
ISO 1503:2008	Spatial orientation and direction of movement -- Ergonomic requirements	ISO/TC 159/SC 4
ISO 14915-1:2002	Software ergonomics for multimedia user interfaces -- Part 1: Design principles and framework	ISO/TC 159/SC 4
ISO 14915-3:2002	Software ergonomics for multimedia user interfaces -- Part 3: Media selection and combination	ISO/TC 159/SC 4
ISO 14915-2:2003	Software ergonomics for multimedia user interfaces -- Part 2: Multimedia navigation and control	ISO/TC 159/SC 4
ISO/TR 22411:2008	Ergonomics data and guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities	ISO/TC 159/WG 2
EN ISO 26800:2011	Ergonomics - General approach, principles and concepts (ISO 26800:2011)	CEN/TC 122
EN ISO 10075-1:2000	Ergonomic principles related to mental work-load - Part 1: General terms and definitions (ISO 10075:1991)	CEN/TC 122
EN ISO 10075-2:2000	Ergonomic principles related to mental workload - Part 2: Design principles (ISO 10075-2:1996)	CEN/TC 122
EN ISO 28803:2012	Ergonomics of the physical environment - Application of international standards to people with special requirements (ISO 28803:2012)	CEN/TC 122

EN ISO 28802:2012	Ergonomics of the physical environment - Assessment of environments by means of an environmental survey involving physical measurements of the environment and subjective responses of people (ISO 28802:2012)	CEN/TC 122
EN ISO 6385:2016	Ergonomics principles in the design of work systems (ISO 6385:2016)	CEN/TC 122

Standards under development:

No relevant standards under development identified.

b. Anthropometry

ISO/TC 159/SC 3 Anthropometry and biomechanics

Scope: to provide basic standards and guidelines for standardization in anthropometry and biomechanics with respect to terminology, methodology & data.

Structure:

- ISO/TC 159/SC 3/WG 1 Anthropometry

- ISO/TC 159/SC 3/WG 4 Human physical strength: manual handling and force limits

Published standards:

ISO/TR 7015:2023	Ergonomics — The application of ISO/TR 12295, ISO 11226, the ISO 11228 series and ISO/TR 23476 in the construction sector (civil construction)
ISO 7250-1:2017	Basic human body measurements for technological design — Part 1: Body measurement definitions and landmarks
ISO/TR 7250-2:2010	Basic human body measurements for technological design — Part 2: Statistical summaries of body measurements from national populations
ISO/TR 7250-2:2010/Amd 1:2013	Basic human body measurements for technological design — Part 2: Statistical summaries of body measurements from national populations — Amendment 1
ISO 7250-3:2015	Basic human body measurements for technological design — Part 3: Worldwide and regional design ranges for use in product standards
ISO 11226:2000	Ergonomics — Evaluation of static working postures
ISO 11226:2000/Cor 1:2006	Ergonomics — Evaluation of static working postures — Technical Corrigendum 1
ISO 11228-1:2021	Ergonomics — Manual handling — Part 1: Lifting, lowering and carrying
ISO 11228-2:2007/Amd 1:2022	Ergonomics — Manual handling — Part 2: Pushing and pulling — Amendment 1
ISO 11228-2:2007	Ergonomics — Manual handling — Part 2: Pushing and pulling
ISO 11228-3:2007	Ergonomics — Manual handling — Part 3: Handling of low loads at high frequency
ISO/TR 12295:2014	Ergonomics — Application document for International Standards on manual handling (ISO 11228-1, ISO 11228-2 and ISO 11228-3) and evaluation of static working postures (ISO 11226)
ISO/TR 12296:2012	Ergonomics — Manual handling of people in the healthcare sector

ISO 14738:2002	Safety of machinery — Anthropometric requirements for the design of workstations at machinery
ISO 14738:2002/Cor 2:2005	Safety of machinery — Anthropometric requirements for the design of workstations at machinery — Technical Corrigendum 2
ISO 14738:2002/Cor 1:2003	Safety of machinery — Anthropometric requirements for the design of workstations at machinery — Technical Corrigendum 1
ISO 15534-1:2000	Ergonomic design for the safety of machinery — Part 1: Principles for determining the dimensions required for openings for whole-body access into machinery
ISO 15534-2:2000	Ergonomic design for the safety of machinery — Part 2: Principles for determining the dimensions required for access openings
ISO 15534-3:2000	Ergonomic design for the safety of machinery — Part 3: Anthropometric data
ISO 15535:2012	General requirements for establishing anthropometric databases
ISO 15536-1:2005	Ergonomics — Computer manikins and body templates — Part 1: General requirements
ISO 15536-2:2007	Ergonomics — Computer manikins and body templates — Part 2: Verification of functions and validation of dimensions for computer manikin systems
ISO 15537:2022	Principles for selecting and using test persons for testing anthropometric aspects of industrial products and designs
ISO/TS 20646:2014	Ergonomics guidelines for the optimization of musculoskeletal workload
ISO 20685-1:2018	3-D scanning methodologies for internationally compatible anthropometric databases — Part 1: Evaluation protocol for body dimensions extracted from 3-D body scans
ISO 20685-2:2015	Ergonomics — 3-D scanning methodologies for internationally compatible anthropometric databases — Part 2: Evaluation protocol of surface shape and repeatability of relative landmark positions
ISO/TR 23076:2021	Ergonomics — Recovery model for cyclical industrial work
ISO/TR 23476:2021	Ergonomics — Application of ISO 11226, the ISO 11228 series and ISO/TR 12295 in the agricultural sector
ISO 24553:2023	Ergonomics — Accessible design — Ease of operation

Standards under development:

ISO/CD 5716	Multivariate analysis tools and techniques for synthesis with anthropometric data
ISO/DTR 7250-2	Basic human body measurements for technological design — Part 2: Statistical summaries of body measurements from national populations
ISO/PWI 7250-3	Basic human body measurements for technological design — Part 3: Worldwide and regional design ranges for use in product standards
ISO/DTR 7250-4	Basic human body measurements for technological design — Part 4: Expected performance of skilled anthropometrists
ISO/AWI 11228-3	Ergonomics — Manual handling — Part 3: Handling of low loads at high frequency
ISO/DIS 14738	Safety of machinery — Anthropometric requirements for the design of workstations for industries and services
ISO/PWI 15534-1	Ergonomic design for the safety of machinery — Part 1: Principles for determining the dimensions required for openings for whole-body access into machinery

ISO/PWI 15534-2	Ergonomic design for the safety of machinery — Part 2: Principles for determining the dimensions required for access openings
ISO/PWI 15534-3	Ergonomic design for the safety of machinery — Part 3: Anthropometric data
ISO/FDIS 15535	General requirements for establishing anthropometric databases
ISO/CD 17097	3-D digital human body scan data — Part 1: Terminologies and methodologies for processing of human scan data
ISO/FDIS 20685-2	Ergonomics — 3-D scanning methodologies for internationally compatible anthropometric databases — Part 2: Evaluation protocol of surface shape and repeatability of relative landmark positions
ISO/DTR 23474	Safety of machinery — Ergonomic principles for the design of sorting cabins intended for the manual sorting of dry household and similar waste originating from selective collection
ISO/DIS 24227	Validation protocol for walking speed as extracted from various sensor systems that measure human body motion for the healthcare sector

5.5.1.5 Anthropometry

ISO/TC 159 Ergonomics*

*The scope has been described in above section.

CEN/TC 122 Ergonomics*

*The scope has been described in above section.

Published standards:

ISO/TR 16982:2002	Ergonomics of human-system interaction -- Usability methods supporting human-centred design	ISO/TC 159/SC 4
ISO/TR 18529:2000	Ergonomics -- Ergonomics of human-system interaction -- Human-centred lifecycle process descriptions	ISO/TC 159/SC 4/WG 6
EN ISO 9241-1:1997/A1:2001	Ergonomic requirements for office work with visual display terminals (VDTs) - Part 1: General introduction. (ISO 9241-1:1997/AM 1:2001)	CEN/TC 122
EN ISO 9241-1:1997	ERGONOMIC REQUIREMENTS FOR OFFICE WORK WITH VISUAL DISPLAY TERMINALS (VDTS) - PART 1: GENERAL INTRODUCTION. (ISO 9241-1:1997)	CEN/TC 122
EN ISO 9241-4:1998/AC:2002	Ergonomic requirements for office work with visual display terminals (VDTs) - Part 4: Keyboard requirements (ISO 9241-4:1998)	CEN/TC 122
EN ISO 9241-5:1999	ERGONOMIC REQUIREMENTS FOR OFFICE WORK WITH VISUAL DISPLAY TERMINALS (VDTS). PART 5: WORKSTATION LAYOUT AND POSTURAL REQUIREMENTS (ISO 9241-5:1998)	CEN/TC 122
EN ISO 9241-6:1999	ERGONOMIC REQUIREMENTS FOR OFFICE WORK WITH VISUAL DISPLAY TERMINALS (VDTS). PART 6: GUIDANCE ON THE WORK ENVIRONMENT (ISO 9241-6:1999)	CEN/TC 122
EN ISO 9241-11:2018	Ergonomics of human-system interaction - Part 11: Usability: Definitions and concepts (ISO 9241-11:2018)	CEN/TC 122/WG 5

EN ISO 9241-13:1998	ERGONOMIC REQUIREMENTS FOR OFFICE WORK WITH VISUAL DISPLAY TERMINALS (VDTS). PART 13: USER GUIDANCE (ISO 9241-13:1998)	CEN/TC 122
EN ISO 9241-14:1999	ERGONOMIC REQUIREMENTS FOR OFFICE WORK WITH VISUAL DISPLAY TERMINALS (VDTS) - PART 14: MENU DIALOGUES (ISO 9241-14:1995)	CEN/TC 122
EN ISO 9241-15:1997	ERGONOMIC REQUIREMENTS FOR OFFICE WORK WITH VISUAL DISPLAY TERMINALS (VDTS). PART 15: COMMAND DIALOGUES (ISO 9241-15:1997)	CEN/TC 122
EN ISO 9241-16:1999	ERGONOMIC REQUIREMENTS FOR OFFICE WORK WITH VISUAL DISPLAY TERMINALS (VDTS). PART 16: DIRECT MANIPULATION DIALOGUES (ISO 9241-16:1999)	CEN/TC 122
EN ISO 9241-20:2021	Ergonomics of human-system interaction - Part 20: An ergonomic approach to accessibility within the ISO 9241 series (ISO 9241-20:2021)	CEN/TC 122/WG 5
CEN ISO/TR 9241-100:2023	Ergonomics of human-system interaction - Part 100: Overview of ISO 9241 software ergonomic standards (ISO/TR 9241-100:2023)	CEN/TC 122/WG 5
EN ISO 9241-110:2020	Ergonomics of human-system interaction - Part 110: Interaction principles (ISO 9241-110:2020)	CEN/TC 122/WG 5
EN ISO 9241-112:2017	Ergonomics of human-system interaction - Part 112: Principles for the presentation of information (ISO 9241-112:2017)	CEN/TC 122/WG 5
EN ISO 9241-125:2017	Ergonomics of human-system interaction - Part 125: Guidance on the visual presentation of information (ISO 9241-125:2017)	CEN/TC 122/WG 5
CEN ISO/TS 9241-126:2022	Ergonomics of human-system interaction - Part 126: Guidance on the presentation of auditory information (ISO/TS 9241-126:2019)	CEN/TC 122/WG 5
EN ISO 9241-129:2010	Ergonomics of human-system interaction - Part 129: Guidance on software individualization (ISO 9241-129:2010)	CEN/TC 122
EN ISO 9241-143:2012	Ergonomics of human-system interaction - Part 143: Forms (ISO 9241-143:2012)	CEN/TC 122
EN ISO 9241-151:2008	Ergonomics of human-system interaction - Part 151: Guidance on World Wide Web user interfaces (ISO 9241-151:2008)	CEN/TC 122
EN ISO 9241-154:2013	Ergonomics of human-system interaction - Part 154: Interactive voice response (IVR) applications (ISO 9241-154:2013)	CEN/TC 122
EN ISO 9241-161:2016	Ergonomics of human-system interaction - Part 161: Guidance on visual user-interface elements (ISO 9241-161:2016)	CEN/TC 122/WG 5
EN ISO 9241-171:2008	Ergonomics of human-system interaction - Part 171: Guidance on software accessibility (ISO 9241-171:2008)	CEN/TC 122
EN ISO 9241-210:2019	Ergonomics of human-system interaction - Part 210: Human-centred design for interactive systems (ISO 9241-210:2019)	CEN/TC 122/WG 5
EN ISO 9241-220:2019	Ergonomics of human-system interaction - Part 220: Processes for enabling, executing and assessing human-centred design within organizations (ISO 9241-220:2019)	CEN/TC 122/WG 5
EN ISO 9241-300:2008	Ergonomics of human-system interaction - Part 300: Introduction to electronic visual display requirements (ISO 9241-300:2008)	CEN/TC 122
EN ISO 9241-302:2008	Ergonomics of human-system interaction - Part 302: Terminology for electronic visual displays (ISO 9241-302:2008)	CEN/TC 122

EN ISO 9241-303:2011	Ergonomics of human-system interaction - Part 303: Requirements for electronic visual displays (ISO 9241-303:2011)	CEN/TC 122
EN ISO 9241-304:2008	Ergonomics of human-system interaction - Part 304: User performance test methods for electronic visual displays (ISO 9241-304:2008)	CEN/TC 122
EN ISO 9241-305:2008	Ergonomics of human-system interaction - Part 305: Optical laboratory test methods for electronic visual displays (ISO 9241-305:2008)	CEN/TC 122
EN ISO 9241-306:2018	Ergonomics of human-system interaction - Part 306: Field assessment methods for electronic visual displays (ISO 9241-306:2018)	CEN/TC 122/WG 5
EN ISO 9241-307:2008	Ergonomics of human-system interaction - Part 307: Analysis and compliance test methods for electronic visual displays (ISO 9241-307:2008)	CEN/TC 122
CEN ISO/TR 9241-308:2015	Ergonomics of human-system interaction - Part 308: Surface-conduction electron-emitter displays (SED) (ISO/TR 9241-308:2008)	CEN/TC 122/WG 5
CEN ISO/TR 9241-309:2015	Ergonomics of human-system interaction - Part 309: Organic light-emitting diode (OLED) displays (ISO/TR 9241-309:2008)	CEN/TC 122/WG 5
CEN ISO/TR 9241-310:2015	Ergonomics of human-system interaction - Part 310: Visibility, aesthetics and ergonomics of pixel defects (ISO/TR 9241-310:2010)	CEN/TC 122/WG 5
CEN ISO/TR 9241-311:2023	Ergonomics of human-system interaction - Part 311: Application of ISO 9241-307: LCD screens for workstations (ISO/TR 9241-311:2022)	CEN/TC 122/WG 5
CEN ISO/TR 9241-312:2022	Ergonomics of human-system interaction - Part 312: Readability of electrophoretic displays (ISO/TR 9241-312:2020)	CEN/TC 122/WG 5
CEN ISO/TR 9241-331:2013	Ergonomics of human-system interaction - Part 331: Optical characteristics of autostereoscopic displays (ISO/TR 9241-331:2012)	CEN/TC 122
EN ISO 9241-333:2017	Ergonomics of human-system interaction - Part 333: Stereoscopic displays using glasses (ISO 9241-333:2017)	CEN/TC 122/WG 5
EN ISO 9241-391:2016	Ergonomics of human-system interaction - Part 391: Requirements, analysis and compliance test methods for the reduction of photosensitive seizures (ISO 9241-391:2016)	CEN/TC 122/WG 5
EN ISO 9241-392:2017	Ergonomics of human-system interaction - Part 392: Ergonomic recommendations for the reduction of visual fatigue from stereoscopic images (ISO 9241-392:2015)	CEN/TC 122/WG 5
CEN ISO/TR 9241-393:2022	Ergonomics of human-system interaction - Part 393: Structured literature review of visually induced motion sickness during watching electronic images (ISO/TR 9241-393:2020)	CEN/TC 122/WG 5
EN ISO 9241-394:2022	Ergonomics of human-system interaction - Part 394: Ergonomic requirements for reducing undesirable biomedical effects of visually induced motion sickness during watching electronic images (ISO 9241-394:2020)	CEN/TC 122/WG 5
EN ISO 9241-400:2007	Ergonomics of human-system interaction - Part 400: Principles and requirements for physical input devices (ISO 9241-400:2007)	CEN/TC 122
EN ISO 9241-410:2008/A1:2012	Ergonomics of human-system interaction - Part 410: Design criteria for physical input devices (ISO 9241-410:2008/AMD 1:2012)	CEN/TC 122

EN ISO 9241-410:2008	Ergonomics of human-system interaction - Part 410: Design criteria for physical input devices (ISO 9241-410:2008)	CEN/TC 122
CEN ISO/TS 9241-411:2014	Ergonomics of human-system interaction - Part 411: Evaluation methods for the design of physical input devices (ISO/TS 9241-411:2012)	CEN/TC 122
EN ISO 9241-420:2011	Ergonomics of human-system interaction - Part 420: Selection of physical input devices (ISO 9241-420:2011)	CEN/TC 122
CEN ISO/TS 9241-430:2023	Ergonomics of human-system interaction - Part 430: Recommendations for the design of non-touch gestural input for the reduction of biomechanical stress (ISO/TS 9241-430:2021)	CEN/TC 122/WG 5
CEN ISO/TR 9241-514:2022	Ergonomics of human-system interaction - Part 514: Guidance for the application of anthropometric data in the ISO 9241-500 series (ISO/TR 9241-514:2020)	CEN/TC 122/WG 5
CEN ISO/TR 9241-810:2022	Ergonomics of human-system interaction - Part 810: Robotic, intelligent and autonomous systems (ISO/TR 9241-810:2020)	CEN/TC 122/WG 5
EN ISO 9241-910:2011	Ergonomics of human-system interaction - Part 910: Framework for tactile and haptic interaction (ISO 9241-910:2011)	CEN/TC 122
EN ISO 9241-920:2016	Ergonomics of human-system interaction - Part 920: Guidance on tactile and haptic interactions (ISO 9241-920:2009)	CEN/TC 122/WG 5
EN ISO 9241-940:2022	Ergonomics of human-system interaction - Part 940: Evaluation of tactile and haptic interactions (ISO 9241-940:2017)	CEN/TC 122/WG 5
EN ISO 9241-960:2017	Ergonomics of human-system interaction - Part 960: Framework and guidance for gesture interactions (ISO 9241-960:2017)	CEN/TC 122/WG 5
EN ISO 9241-971:2022	Ergonomics of human-system interaction - Part 971: Accessibility of tactile/haptic interactive systems (ISO 9241-971:2020)	CEN/TC 122/WG 5

Standards under development:

ISO/FDIS 15535	General requirements for establishing anthropometric databases	ISO/TC 159/SC 3
ISO/DTR 23454-1	Human performance in physical environments — Part 1: A performance framework	ISO/TC 159/SC 5
FprCEN ISO/TR 7250-2	Basic human body measurements for technological design - Part 2: Statistical summaries of body measurements from national populations (ISO/DTR 7250-2:2023)	CEN/TC 122/WG 1
prEN ISO 7726 rev	Ergonomics of the thermal environment - Instruments for measuring physical quantities	CEN/TC 122/WG 11
prEN ISO 7730	Ergonomics of the thermal environment - Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria (ISO/DIS 7730:2023)	CEN/TC 122/WG 11
FprEN ISO 7933	Ergonomics of the thermal environment - Analytical determination and interpretation of heat stress using calculation of the predicted heat strain (ISO/FDIS 7933:2023)	CEN/TC 122/WG 11
prEN ISO 9241-5	Ergonomics of human-system interaction - Part 5: Workstation layout and postural requirements (ISO/DIS 9241-5:2023)	CEN/TC 122/WG 5

prEN ISO 9241-161 rev	Ergonomics of human-system interaction - Part 161: Guidance on visual user-interface elements	CEN/TC 122/WG 5
prEN ISO 9241-171 rev	Ergonomics of human-system interaction - Part 171: Guidance on software accessibility	CEN/TC 122
prEN ISO 9241-920	Ergonomics of human-system interaction - Part 920: Tactile and haptic interactions (ISO/DIS 9241-920:2023)	CEN/TC 122/WG 5
prEN ISO 10075-2 rev	Ergonomic principles related to mental workload - Part 2: Design principles	CEN/TC 122/WG 2
prEN ISO 14738	Safety of machinery - Anthropometric requirements for the design of workstations for industries and services (ISO/DIS 14738:2020)	CEN/TC 122/WG 1
prEN ISO 15535	General requirements for establishing anthropometric databases (ISO/DIS 15535:2022)	CEN/TC 122/WG 1
FprEN 17558	Ergonomics - Ergonomics of PPE ensembles	CEN/TC 122/WG 14
prEN ISO 20685-2	Ergonomics - 3-D scanning methodologies for internationally compatible anthropometric databases - Part 2: Evaluation protocol of surface shape and repeatability of relative landmark positions (ISO/DIS 20685-2:2022)	CEN/TC 122/WG 1
prCEN ISO/TR 22411-2	Guidance for use in the application of ISO/IEC Guide 71:2014 — Part 2: Ergonomics design considerations for accessibility	CEN/TC 122/WG 2

5.5.1.6 Industrial Cyber Security

This section describes the Standards of Industrial Cyber Security (Cyber Security in IndustriEnvironmentsnts).

IEC 62443 Standards Series on Security Approach:

- defines organizational and technical requirements for all stakeholders involved (manufacturer, integrator, operator).

- targets people, processes, systems, solutions and components/products.

- applies to all types of plants, facilities and systems in all industries.

- supports purpose fit security solutions by supporting security features with different strength.

- used for certification of security processes and security capabilities of the solution.

Standards and Regulations on Cyber Security in Critical Environments, are following:

ISO:

➢ ISO 27001 Information technology - Security techniques - Requirements

➢ ISO 27002 Code of Practice for information security management

➢ ISO 27019 Information security management guidelines for process control systems used in the energy utility industry based on ISO/IEC 27002

➢ ISO/IEC 15118 Road vehicles -- Vehicle to grid communication interface

IEC:

➢ IEC 62351-1 … -13 Power systems management and associated information exchange – Data and communications security

➢ IEC 62443-1-1 … -4-2 Industrial communication networks - Network and system security

IEEE:

➢ IEEE 1588 Precision Clock Synchronization

➢ IEEE C37.238 Profile for Use of IEEE 1588 PTP in Power System Applications

➢ IEEE 1686 Intelligent Electronic Devices Cyber Security Capabilities

In summary, the standardization Technical Committees and Standards related to Industry Cyber Security are following:

ISO/IEC JTC 1/SC 27 Security, cybersecurity and privacy protection

Scope: The development of standards for the protection of information and ICT. This includes generic methods, techniques and guidelines to address both security and privacy aspects, such as:

• Security requirements capture methodology;

• Management of information and ICT security; in particular information security management systems, security processes, and security controls and services;

• Cryptographic and other security mechanisms, including but not limited to mechanisms for protecting the accountability, availability, integrity and confidentiality of information;

• Security management support documentation including terminology, guidelines as well as procedures for the registration of security components;

• Security aspects of identity management, biometrics and privacy;

• Conformance assessment, accreditation and auditing requirements in the area of information security management systems;

• Security evaluation criteria and methodology.

SC 27 engages in active liaison and collaboration with appropriate bodies to ensure the proper development and application of SC 27 standards and technical reports in relevant areas.

IEC TC 65 Industrial-process measurement, control and automation

Scope: To prepare international standards for systems and elements used for industrial-process measurement and control concerning continuous and batch processes. To co-ordinate the

standardization of those features of related elements which affect suitability for integration into such systems. The work of standardization outlined above is to be carried out in the international fields for equipment and systems operating with electrical, pneumatic, hydraulic, mechanical or other systems of measurement and/or control.

Published standards:

ISO/IEC 27001:2022	Information security, cybersecurity and privacy protection — Information security management systems — Requirements	ISO/IEC JTC 1/SC 27
ISO/IEC 27002:2022	Information security, cybersecurity and privacy protection — Information security controls	ISO/IEC JTC 1/SC 27
ISO/IEC 27019:2017	Information technology — Security techniques — Information security controls for the energy utility industry	ISO/IEC JTC 1/SC 27
IEC TS 62443-1-1:2009	Industrial communication networks - Network and system security - Part 1-1: Terminology, concepts and models	IEC/TC 65
IEC 62443-2-1:2010	Industrial communication networks - Network and system security - Part 2-1: Establishing an industrial automation and control system security program	IEC/TC 65
IEC TR 62443-2-3:2015	Security for industrial automation and control systems - Part 2-3: Patch management in the IACS environment	IEC/TC 65
IEC 62443-2-4:2015/AMD1:2017	Amendment 1 - Security for industrial automation and control systems - Part 2-4: Security program requirements for IACS service providers	IEC/TC 65
IEC 62443-2-4:2015/COR1:2015	Corrigendum 1 - Security for industrial automation and control systems - Part 2-4: Security program requirements for IACS service providers	IEC/TC 65
IEC 62443-2-4:2015	Security for industrial automation and control systems - Part 2-4: Security program requirements for IACS service providers	IEC/TC 65
IEC TR 62443-3-1:2009	Industrial communication networks - Network and system security - Part 3-1: Security technologies for industrial automation and control systems	IEC/TC 65
IEC 62443-3-2:2020	Security for industrial automation and control systems - Part 3-2: Security risk assessment for system design	IEC/TC 65
IEC 62443-3-3:2013/COR1:2014	Corrigendum 1 - Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels	IEC/TC 65
IEC 62443-3-3:2013	Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels	IEC/TC 65
IEC 62443-4-1:2018	Security for industrial automation and control systems - Part 4-1: Secure product development lifecycle requirements	IEC/TC 65
IEC 62443-4-2:2019/COR1:2022	Corrigendum 1 - Security for industrial automation and control systems - Part 4-2: Technical security requirements for IACS components	IEC/TC 65
IEC 62443-4-2:2019	Security for industrial automation and control systems - Part 4-2: Technical security requirements for IACS components	IEC/TC 65

Standards under development:

No relevant standards under development have been identified.

5.5.1.7 Interoperability

IEC/SC 65 E Devices and integration in enterprise systems

Scope: To prepare international standards to specify digital representation of device properties and functions, methodologies and applications supporting automation of engineering processes, including diagnostic and maintenance techniques.

Published standards:

IEC TR 62541-1:2020	OPC Unified Architecture - Part 1: Overview and concepts	IEC/TC 65/SC 65E
IEC TR 62541-2:2020	OPC Unified Architecture - Part 2: Security Model	IEC/TC 65/SC 65E
IEC 62541-3:2020	OPC Unified Architecture - Part 3: Address Space Model	IEC/TC 65/SC 65E
IEC 62541-4:2020	OPC Unified Architecture - Part 4: Services	IEC/TC 65/SC 65E
IEC 62541-5:2020	OPC Unified Architecture - Part 5: Information Model	IEC/TC 65/SC 65E
IEC 62541-6:2020	OPC Unified Architecture - Part 6: Mappings	IEC/TC 65/SC 65E
IEC 62541-7:2020	OPC Unified Architecture - Part 7: Profiles	IEC/TC 65/SC 65E
IEC 62541-8:2020	OPC Unified Architecture - Part 8: Data Access	IEC/TC 65/SC 65E
IEC 62541-9:2020	OPC Unified Architecture - Part 9: Alarms and Conditions	IEC/TC 65/SC 65E
IEC 62541-10:2020	OPC Unified Architecture - Part 10: Programs	IEC/TC 65/SC 65E
IEC 62541-11:2020	OPC Unified Architecture - Part 11: Historical Access	IEC/TC 65/SC 65E
IEC 62541-12:2020	OPC Unified Architecture - Part 12: Discovery and global services	IEC/TC 65/SC 65E
IEC 62541-13:2020	OPC Unified Architecture - Part 13: Aggregates	IEC/TC 65/SC 65E
IEC 62541-14:2020	OPC Unified Architecture - Part 14: PubSub	IEC/TC 65/SC 65E
IEC 62541-100:2015	OPC Unified Architecture - Part 100: Device Interface	IEC/TC 65/SC 65E
IEC 62264-1:2013	Enterprise-control system integration - Part 1: Models and terminology	IEC/TC 65/SC 65E
IEC 62264-2:2013	Enterprise-control system integration - Part 2: Object and attributes for enterprise-control system integration	IEC/TC 65/SC 65E

IEC 62264-3:2016	Enterprise-control system integration - Part 3: Activity models of manufacturing operations management	IEC/TC 65/SC 65E
IEC 62264-4:2015	Enterprise-control system integration - Part 4: Objects models attributes for manufacturing operations management integration	IEC/TC 65/SC 65E
IEC 62264-5:2016	Enterprise-control system integration - Part 5: Business to manufacturing transactions	IEC/TC 65/SC 65E
IEC 62264-6:2020	Enterprise-control system integration - Part 6: Messaging service model	IEC/TC 65/SC 65E

Standards under development:

No relevant standards under development have been identified.

5.5.1.8 Internet of Things

ISO/IEC JTC 1 /SC 41 Internet of things and digital twin

Scope: Standardization in the area of Internet of Things and related technologies.

Serve as the focus and proponent for JTC 1's standardization programme on the Internet of Things and Digital Twin, including their related technologies.

Provide guidance to JTC 1, IEC, ISO and other entities developing Internet of Things and Digital Twin related applications.

Published standards:

ISO/IEC 21823-1:2019 ED1	Internet of Things (IoT) - Interoperability for IoT systems - Part 1: Framework	ISO/IEC JTC 1/SC 41
ISO/IEC 21823-2:2020 ED1	Internet of Things (IoT) - Interoperability for IoT systems - Part 2: Transport interoperability	ISO/IEC JTC 1/SC 41
ISO/IEC 21823-3:2021 ED1	Internet of Things (IoT) - Interoperability for IoT systems - Part 3: Semantic interoperability	ISO/IEC JTC 1/SC 41
ISO/IEC 21823-4:2022	Internet of things (IoT) — Interoperability for IoT systems — Part 4: Syntactic interoperability	ISO/IEC JTC 1/SC 41
ISO/IEC TR 22417:2017 ED1	Information technology - Internet of things (IoT) - IoT use cases	ISO/IEC JTC 1/SC 41
ISO/IEC TR 22560:2017 ED1	Information technology - Sensor network - Guidelines for design in the aeronautics industry: Active air-flow control	ISO/IEC JTC 1/SC 41
ISO/IEC 29182-1:2013	Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 1: General overview and requirements	ISO/IEC JTC 1/SC 41
ISO/IEC 29182-2:2013	Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 2: Vocabulary and terminology	ISO/IEC JTC 1/SC 41
ISO/IEC 29182-3:2014	Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 3: Reference architecture views	ISO/IEC JTC 1/SC 41
ISO/IEC 29182-4:2013	Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 4: Entity models	ISO/IEC JTC 1/SC 41

ISO/IEC 29182-5:2013	Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 5: Interface definitions	ISO/IEC 1/SC 41	JTC
ISO/IEC 29182-6:2014	Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 6: Applications	ISO/IEC 1/SC 41	JTC
ISO/IEC 29182-7:2015	Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 7: Interoperability guidelines	ISO/IEC 1/SC 41	JTC
ISO/IEC 30101:2014	Information technology — Sensor networks: Sensor network and its interfaces for smart grid system	ISO/IEC 1/SC 41	JTC
ISO/IEC 30128:2014	Information technology — Sensor networks — Generic Sensor Network Application Interface	ISO/IEC 1/SC 41	JTC
ISO/IEC 30141:2018/COR1:2020	Corrigendum 1 - Internet of Things (IoT) - Reference architecture	ISO/IEC 1/SC 41	JTC
ISO/IEC 30141:2018 ED1	Internet of Things (IoT) - Reference architecture	ISO/IEC 1/SC 41	JTC
ISO/IEC 30147:2021 ED1	Internet of Things (IoT) - Integration of IoT trustworthiness activities in ISO/IEC/IEEE 15288 system engineering processes	ISO/IEC 1/SC 41	JTC
ISO/IEC 30161-1:2020	Internet of things (IoT) - Data exchange platform for IoT services - Part 1: General requirements and architecture	ISO/IEC 1/SC 41	JTC
ISO/IEC 30161-2:2023	Internet of Things (IoT) – Data exchange platform for IoT services – Part 2: Transport interoperability between nodal points	ISO/IEC 1/SC 41	JTC
ISO/IEC 30162:2022 ED1	Internet of Things (IoT) - Compatibility requirements and model for devices within Industrial IoT systems	ISO/IEC 1/SC 41	JTC
ISO/IEC 30163:2021 ED1	Internet of Things (IoT) - System requirements of IoT and sensor network technology-based integrated platform for chattel asset monitoring	ISO/IEC 1/SC 41	JTC
ISO/IEC TR 30164:2020 ED1	Internet of Things (IoT) - Edge computing	ISO/IEC 1/SC 41	JTC
ISO/IEC 30165:2021 ED1	Internet of things (IoT) - Real-time IoT framework	ISO/IEC 1/SC 41	JTC
ISO/IEC TR 30166:2020 ED1	Internet of Things (IoT) - Industrial IoT	ISO/IEC 1/SC 41	JTC
ISO/IEC 30169:2022 ED1	Internet of Things (IoT) - IoT applications for electronic label system (ELS)	ISO/IEC 1/SC 41	JTC
ISO/IEC 30171-1:2022	Internet of Things (IoT) - Base-station based underwater wireless acoustic network (B-UWAN) - Part 1: Overview and requirements	ISO/IEC 1/SC 41	JTC
ISO/IEC TR 30174:2021 ED1	Internet of Things (IoT) - Socialized IoT system resembling human social interaction dynamics	ISO/IEC 1/SC 41	JTC
ISO/IEC TR 30176:2021 ED1	Internet of Things (IoT) - Integration of IoT and DLT/blockchain: Use cases	ISO/IEC 1/SC 41	JTC
ISO/IEC 30179:2023	Internet of Things (IoT) - Overview and general requirements of IoT system for ecological environment monitoring	ISO/IEC 1/SC 41	JTC

Standards under development

PWI TR JTC1-SC41-9	Internet of Things (IoT) – IoT-based cultural heritage management – Part 1: Framework	ISO/IEC 1/SC 41	JTC

PWI TR JTC1-SC41-10	Internet of Things (IoT) – IoT-based cultural heritage management – Part 2: Use cases	ISO/IEC JTC 1/SC 41	
PWI TR JTC1-SC41-12	Internet of Things (IoT) – Environmental and ecological effects, risks, and considerations of underwater acoustic signalling	ISO/IEC JTC 1/SC 41	
PWI JTC1-SC41-8	Internet of Things (IoT) - Behavioral and policy interoperability	ISO/IEC JTC 1/SC 41	
PWI JTC1-SC41-6	Guidance for IoT and Digital Twin use cases	ISO/IEC JTC 1/SC 41	
ISO/IEC 20924 ED3	Internet of Things (IoT) and Digital Twin – Vocabulary	ISO/IEC JTC 1/SC 41	
ISO/IEC 30141 ED2	Internet of Things (IoT) - Reference architecture	ISO/IEC JTC 1/SC 41	
ISO/IEC 30149 ED1	Internet of Things (IoT) - Trustworthiness Principles	ISO/IEC JTC 1/SC 41	
ISO/IEC TS 30168 ED1	Internet of Things (IoT) - Generic Trust Anchor Application Programming Interface for Industrial IoT Devices	ISO/IEC JTC 1/SC 41	
ISO/IEC 30177 ED1	Internet of Things (IoT) - Underwater network management system (U-NMS) interworking	ISO/IEC JTC 1/SC 41	
ISO/IEC 30178 ED1	Internet of Things (IoT) - Data format, value and coding	ISO/IEC JTC 1/SC 41	
ISO/IEC 30180 ED1	Internet of Things (IoT) - Functional requirements to determine the status of self-quarantine through Internet of Things data interfaces	ISO/IEC JTC 1/SC 41	
ISO/IEC 30181 ED1	Internet of Things (IoT) – Functional architecture for resource ID interoperability	ISO/IEC JTC 1/SC 41	
ISO/IEC 30183 ED1	Internet of Things (IoT) – Addressing interoperability between heterogeneous underwater acoustic sensor networks (UWASNs) based on underwater delay and disruption tolerant network (U-DTN)	ISO/IEC JTC 1/SC 41	
ISO/IEC 30184 ED1	Internet of Things (IoT) – Autonomous IoT object identification in connected home – Requirements and framework	ISO/IEC JTC 1/SC 41	
ISO/IEC 30185 ED1	Internet of Things (IoT) – Addressing interoperability between IPv6-based network and UWASN	ISO/IEC JTC 1/SC 41	
ISO/IEC 30186 ED1	Digital twin – Maturity model and guidance for a maturity assessment	ISO/IEC JTC 1/SC 41	
ISO/IEC 30187 ED1	Internet of Things (IoT) - Evaluation indicator for IoT systems	ISO/IEC JTC 1/SC 41	

5.5.1.9 Artificial Intelligence

ISO/TC 184 Automation systems and integration

Scope: Standardization in the area of Artificial Intelligence. Serve as the focus and proponent for JTC 1's standardization program on Artificial Intelligence. Provide guidance to JTC 1, IEC, and ISO committees developing Artificial Intelligence applications.

CEN-CENELEC Focus Group on Artificial Intelligence

CEN-CENELEC Focus Group on Artificial Intelligence (AI) was established in December 2018 by the CEN and CENELEC Technical Boards (BT). The decision to establish the Focus Group followed the Stakeholders' engagement workshop 'Trustworthy Artificial Intelligence – building a framework with standardization' organized by CEN and CENELEC in September 2018, launching high-level discussion on standardization in the field of AI.

High-Level Expert Group on Artificial Intelligence (AI HLEG)

According to the guidelines, trustworthy AI should be:

(1) lawful - respecting all applicable laws and regulations

(2) ethical - respecting ethical principles and values

(3) robust - both from a technical perspective while taking into account its social environment

The guidelines put forward a set of **7 key requirements** that AI systems should meet in order to be deemed trustworthy. A specific assessment list aims to help verify the application of each of the key requirements:

- Human agency and oversight: AI systems should empower human beings, allowing them to make informed decisions and fostering their fundamental rights. At the same time, proper oversight mechanisms need to be ensured, which can be achieved through human-in-the-loop, human-on-the-loop, and human-in-command approaches.
- Technical Robustness and safety: AI systems need to be resilient and secure. They need to be safe, ensuring a fall-back plan in case something goes wrong, as well as being accurate, reliable and reproducible. That is the only way to ensure that also unintentional harm can be minimized and prevented.
- Privacy and data governance: besides ensuring full respect for privacy and data protection, adequate data governance mechanisms must also be ensured, taking into account the quality and integrity of the data, and ensuring legitimised access to data.
- Transparency: the data, system and AI business models should be transparent. Traceability mechanisms can help achieving this. Moreover, AI systems and their decisions should be explained in a manner adapted to the stakeholder concerned. Humans need to be aware that they are interacting with an AI system, and must be informed of the system's capabilities and limitations.
- Diversity, non-discrimination and fairness: Unfair bias must be avoided, as it could have multiple negative implications, from the marginalization of vulnerable groups, to the exacerbation of prejudice and discrimination. Fostering diversity, AI systems should be accessible to all, regardless of any disability, and involve relevant stakeholders throughout their entire life circle. •

- Societal and environmental well-being: AI systems should benefit all human beings, including future generations. It must hence be ensured that they are sustainable and environmentally friendly. Moreover, they should take into account the environment, including other living beings, and their social and societal impact should be carefully considered.
- Accountability: Mechanisms should be put in place to ensure responsibility and accountability for AI systems and their outcomes. Auditability, which enables the assessment of algorithms, data and design processes play a key role therein, especially in critical applications. Moreover, adequate and accessible redress should be ensured.

More details related to 'High-Level Expert Group on Artificial Intelligence (AI HLEG)' at this link:

https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence

Published standards:

ISO/IEC TS 4213:2022	Information technology — Artificial intelligence — Assessment of machine learning classification performance	ISO/IEC JTC 1/SC 42
ISO/IEC 22989:2022	Information technology — Artificial intelligence — Artificial intelligence concepts and terminology	ISO/IEC JTC 1/SC 42
ISO/IEC 23053:2022	Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)	ISO/IEC JTC 1/SC 42
ISO/IEC 23894:2023	Information technology — Artificial intelligence — Guidance on risk management	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24027:2021	Information technology — Artificial intelligence (AI) — Bias in AI systems and AI aided decision making	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24028:2020	Information technology — Artificial intelligence — Overview of trustworthiness in artificial intelligence	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24029-1:2021	Artificial Intelligence (AI) — Assessment of the Robustness of neural networks — Part 1: Overview	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24030:2021	Information technology — Artificial intelligence (AI) — Use cases	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24368:2022	Information technology — Artificial intelligence — Overview of ethical and societal concerns	ISO/IEC JTC 1/SC 42
ISO/IEC TR 24372:2021	Information technology — Artificial intelligence (AI) — Overview of computational approaches for AI systems	ISO/IEC JTC 1/SC 42
ISO/IEC 24668:2022	Information technology — Artificial intelligence — Process management framework for big data analytics	ISO/IEC JTC 1/SC 42
ISO/IEC 38507:2022	Information technology — Governance of IT — Governance implications of the use of artificial intelligence by organizations	ISO/IEC JTC 1/SC 42

Standards under development:

ISO/IEC DIS 5259-1	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 1: Overview, terminology, and examples	ISO/IEC JTC 1/SC 42

ISO/IEC CD 5259-2	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 2: Data quality measures	ISO/IEC 1/SC 42	JTC
ISO/IEC DIS 5259-3	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 3: Data quality management requirements and guidelines	ISO/IEC 1/SC 42	JTC
ISO/IEC DIS 5259-4	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 4: Data quality process framework	ISO/IEC 1/SC 42	JTC
ISO/IEC CD 5259-5	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 5: Data quality governance	ISO/IEC 1/SC 42	JTC
ISO/IEC CD TR 5259-6	Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 6: Visualization framework for data quality	ISO/IEC 1/SC 42	JTC
ISO/IEC DIS 5338	Information technology — Artificial intelligence — AI system life cycle processes	ISO/IEC 1/SC 42	JTC
ISO/IEC DIS 5339	Information technology — Artificial intelligence — Guidance for AI applications	ISO/IEC 1/SC 42	JTC
ISO/IEC DIS 5392	Information technology — Artificial intelligence — Reference architecture of knowledge engineering	ISO/IEC 1/SC 42	JTC
ISO/IEC CD TR 5469	Artificial intelligence — Functional safety and AI systems	ISO/IEC 1/SC 42	JTC
ISO/IEC AWI TS 6254	Information technology — Artificial intelligence — Objectives and approaches for explainability of ML models and AI systems	ISO/IEC 1/SC 42	JTC
ISO/IEC FDIS 8183	Information technology — Artificial intelligence — Data life cycle framework	ISO/IEC 1/SC 42	JTC
ISO/IEC WD TS 8200	Information technology — Artificial intelligence — Controllability of automated artificial intelligence systems	ISO/IEC 1/SC 42	JTC
ISO/IEC PWI 11935	Telecommunications and information exchange between systems — Artificial intelligence enabled networking	ISO/IEC 1/SC 6	JTC
ISO/IEC CD TS 12791	Information technology — Artificial intelligence — Treatment of unwanted bias in classification and regression machine learning tasks	ISO/IEC 1/SC 42	JTC
ISO/IEC AWI 12792	Information technology — Artificial intelligence — Transparency taxonomy of AI systems	ISO/IEC 1/SC 42	JTC
ISO/IEC AWI TS 17847	Information technology — Artificial intelligence — Verification and validation analysis of AI systems	ISO/IEC 1/SC 42	JTC
ISO/IEC PWI 17866	Artificial intelligence — Best practice guidance for mitigating ethical and societal concerns	ISO/IEC 1/SC 42	JTC
ISO/IEC AWI TR 17903	Information technology — Artificial intelligence — Overview of machine learning computing devices	ISO/IEC 1/SC 42	JTC
ISO/IEC PWI 18966	Artificial intelligence — Oversight of AI systems	ISO/IEC 1/SC 42	JTC
ISO/IEC AWI TR 18988	Artificial intelligence — Application of AI technologies in health informatics	ISO/IEC 1/SC 42	JTC
ISO/IEC AWI TR 20226	Information technology — Artificial intelligence — Environmental sustainability aspects of AI systems	ISO/IEC 1/SC 42	JTC
ISO/IEC AWI TR 21221	Information technology – Artificial intelligence – Beneficial AI systems	ISO/IEC 1/SC 42	JTC

ISO/IEC FDIS 24029-2	Artificial intelligence (AI) — Assessment of the robustness of neural networks — Part 2: Methodology for the use of formal methods	ISO/IEC JTC 1/SC 42
ISO/IEC CD TR 24030	Information technology — Artificial intelligence (AI) — Use cases	ISO/IEC JTC 1/SC 42
ISO/IEC AWI 27090	Cybersecurity — Artificial Intelligence — Guidance for addressing security threats and failures in artificial intelligence systems	ISO/IEC JTC 1/SC 27
ISO/IEC AWI 27091	Cybersecurity and Privacy — Artificial Intelligence — Privacy protection	ISO/IEC JTC 1/SC 27
ISO/IEC TR 27563	Security and privacy in artificial intelligence use cases — Best practices	ISO/IEC JTC 1/SC 27
ISO/IEC DIS 42001	Information technology — Artificial intelligence — Management system	ISO/IEC JTC 1/SC 42
ISO/IEC AWI 42005	Information technology — Artificial intelligence — AI system impact assessment	ISO/IEC JTC 1/SC 42
ISO/IEC CD 42006	Information technology — Artificial intelligence — Requirements for bodies providing audit and certification of artificial intelligence management systems	ISO/IEC JTC 1/SC 42

5.5.1.10 Health and Safety of Workers

a. Health and Safety

ISO/TC 283 Occupational health and safety management systems

Scope: Standardization in the field of occupational health and safety management to enable an organization to control its OH&S risks and improve its OH&S performance.

Published standards:

ISO 45001:2018	Occupational health and safety management systems — Requirements with guidance for use	ISO/TC 283
ISO 45002:2023	Occupational health and safety management systems — General guidelines for the implementation of ISO 45001:2018	ISO/TC 283
ISO 45003:2021	Occupational health and safety management — Psychological health and safety at work — Guidelines for managing psychosocial risks	ISO/TC 283
ISO/PAS 45005:2020	Occupational health and safety management — General guidelines for safe working during the COVID-19 pandemic	ISO/TC 283

Standards under development:

ISO/DIS 45004	Occupational health and safety management — Guidelines on performance evaluation	ISO/TC 283
ISO/DIS 45006	Occupational health and safety management — Guidelines for organizations on preventing and managing infectious diseases	ISO/TC 283

b. Personal Protective Equipment

CEN/TC 122 Ergonomics*

*The scope is described in the above section.

EN 13921:2007	Personal protective equipment - Ergonomic principles	CEN/TC 122

5.5.1.11 Safety of Machinery

CEN/TC 114 Safety of machinery

Scope: Standardization in the field of mechanical vibration and shock, including:

- methods for measuring and evaluating mechanical vibration and shock;
- methods for assessing human exposure to mechanical vibration and shock in any kind of environment;
- description of the effects caused by human exposure to mechanical vibration and shock and guidelines for the reduction of these effects;
- methods for evaluating the effects of mechanical vibration and shock on structures;
- methods for reducing by machine design, risks resulting from exposure to mechanical vibration and shock;
- methods for measuring and assessing the vibration and shock reduction characteristics of personal protective equipment (e.g. anti-vibration gloves), vibration isolators (e.g. resilient materials) and suspension systems (e.g. seats).

CEN/TC 114 'Safety of machinery' produces standards and other documents on general principles for the safety of machinery, including terminology and methodology. Nearly 100% of the standards published by CEN/TC 114 are developed in cooperation with ISO/TC 199, and most of them support the Machinery Directive (2006/42/EC). In 2019, CEN/TC 114, in cooperation with ISO/ TC 199, finalized the work on EN ISO 20607 'Safety of machinery – Instruction handbook – General drafting principles'. The aim of the standard is to explain to manufacturers how to ensure that instruction handbooks comply with the Machinery Directive (2006/42/EC), thus closing an important 'standardization gap' in the field of machinery safety. The standard will provide the requirements on content, structure and presentation of an instruction handbook taking into account all phases of a machine life cycle.

CEN/TC 122 Ergonomics*

*The scope has been described in above section.

CEN/TC 310 Advanced automation technologies and their applications*

*The scope has been described in above section.

CLC/TC 44X Safety of machinery: electrotechnical aspects

Scope: To prepare harmonized standards primarily relating to electrical and electronic equipment and systems of machines (including a group of machines working together in a coordinated manner excluding higher-level systems aspects) not portable by hand while working but which may include mobile equipment. The equipment covered commences at the point of connection of the electrical supply to the machine. To prepare harmonized standards for safety related equipment, using electrotechnology, intended to be used to satisfy the essential safety requirements of the Council of the European Communities directives covering safety of machinery that is outside the scope of any other Technical Committee. To co-ordinate with CEN, all matters concerning the safety of machinery. To advise the Technical Board (BT) on all matters concerning machinery.

ISO/TC 159/SC 3 Anthropometry and biomechanics

*The scope has been described in above section.

ISO/TC 199 Safety of machinery

Scope: Standardization of basic concepts and general principles for safety of machinery incorporating terminology, methodology, guards and safety devices within the framework of ISO / IEC Guide 51 and in cooperation with other ISO and IEC technical committees.

Excluded: Product safety standards, as defined in ISO / IEC Guide 51, and which are explicitly covered by the work of other ISO or IEC technical committees.

IEC TC 3 Information structures and elements, identification and making principles, documentation and graphical symbols

Scope: To prepare standards for the electrotechnical and related fields regarding:

1) Methods and rules associated with the human interpretation of information. presentation of information in technical documentation, graphical symbols for use in technical documentation, graphical symbols for the human interaction with equipment.

2) Methods and rules associated with the handling of information in computer sensible form, information models for the purpose of technical documentation and the exchange of technical information, and the identification of further needs for such models, definition of data element types and data sets for use in information models and technical documentation, and for exchange of technical information.

It includes definition and co-ordination of the information required during the whole life cycle of a device, system, or plant.

3) General and safety application concerning the man-machine interface, marking and identification in electrical installations and equipment, marking systems and general rules for:

- the meanings of colours and alternative means, when used for marking and identification,
- the arrangement of indicating devices and actuators,
- coding principles for indicating and actuating devices,
- terminal designation of electrical and electronic components, apparatus and equipment,
- the termination designation of certain designated conductors,
- marking of electrical and electronic equipment with ratings related to supply and to its properties,
- marking of bare and insulated conductors.

These standards are principally intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 104: Guide to the drafting of Safety Standards, and the role of committees with Safety Pilot Functions and Safety Group Functions, and in ISO/IEC Guide 51: Guidelines for the inclusion of safety aspects in standards.

IEC/TC 44 Safety of machinery - Electrotechnical aspects

Scope: Standardization in the field of the application of electro-technical equipment and systems to machinery (including a group of machines working together in a coordinated manner, excluding higher-level systems aspects) not portable by hand while working, but which may include mobile equipment. The equipment covered commences at the point of connection of the electrical supply to the machinery.

Standardization of interfaces (excluding local area networks and fieldbus) between control equipment and the electro-technical equipment of machinery.

Standardization of electrotechnical equipment and systems relating to the safeguarding of persons from hazards of the machinery, its associated equipment and the environment.

To coordinate with ISO all matters concerning the safety of machinery.

Published standards:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)	CEN/TC 114
ISO 13849-1:2023	Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design	ISO/TC 199
EN ISO 13849-2:2012	Safety of machinery - Safety-related parts of control systems - Part 2: Validation (ISO 13849-2:2012)	CEN/TC 114
EN 547-1:1996+A1:2008	Safety of machinery - Human body measurements - Part 1: Principles for determining the dimensions required for openings for whole body access into machinery	CEN/TC 122/WG 1

EN 547-2:1996+A1:2008	Safety of machinery - Human body measurements - Part 2: Principles for determining the dimensions required for access openings	CEN/TC 122/WG 1
EN 547-3:1996+A1:2008	Safety of machinery - Human body measurements - Part 3: Anthropometric data	CEN/TC 122/WG 1
EN 614-1:2006+A1:2009	Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles	CEN/TC 122/WG 2
EN 614-2:2000+A1:2008	Safety of machinery - Ergonomic design principles - Part 2: Interactions between the design of machinery and work tasks	CEN/TC 122/WG 2
CEN/TR 614-3:2010	Safety of machinery - Part 3: Ergonomic principles for the design of mobile machinery	CEN/TC 122
EN 842:1996+A1:2008	Safety of machinery - Visual danger signals - General requirements, design and testing	CEN/TC 122/WG 11
EN 894-1:1997+A1:2008	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 1: General principles for human interactions with displays and control actuators	CEN/TC 122/WG 5
EN 894-2:1997+A1:2008	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 2: Displays	CEN/TC 122/WG 5
EN 894-3:2000+A1:2008	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators	CEN/TC 122/WG 5
EN 894-4:2010	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 4: Location and arrangement of displays and control actuators	CEN/TC 122/WG 5
EN 981:1996+A1:2008	Safety of machinery - System of auditory and visual danger and information signals	CEN/TC 122/WG 11
EN 1005-1:2001+A1:2008	Safety of machinery - Human physical performance - Part 1: Terms and definitions	CEN/TC 122/WG 4
EN 1005-2:2003+A1:2008	Safety of machinery - Human physical performance - Part 2: Manual handling of machinery and component parts of machinery	CEN/TC 122/WG 4
EN 1005-3:2002+A1:2008	Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation	CEN/TC 122/WG 4
EN 1005-4:2005+A1:2008	Safety of machinery - Human physical performance - Part 4: Evaluation of working postures and movements in relation to machinery	CEN/TC 122/WG 4
EN 1005-5:2007	Safety of machinery - Human physical performance - Part 5: Risk assessment for repetitive handling at high frequency	CEN/TC 122/WG 4
EN 13861:2011	Safety of machinery - Guidance for the application of ergonomics standards in the design of machinery	CEN/TC 122/WG 2
EN ISO 14738:2008	Safety of machinery - Anthropometric requirements for the design of workstations at machinery (ISO 14738:2002, including Cor 1:2003 and Cor 2:2005)	CEN/TC 122
EN ISO 10218-1:2011	Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots (ISO 10218-1:2011)	CEN/TC 310
EN ISO 10218-2:2011	Robots and robotic devices - Safety requirements for industrial robots - Part 2: Robot systems and integration (ISO 10218-2:2011)	CEN/TC 310

EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	CLC/TC 44X
EN IEC 60204-11:2019	Safety of machinery - Electrical equipment of machines - Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV	CLC/TC 44X
EN IEC 61496-1:2020	Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests	CLC/TC 44X
EN IEC 61496-2:2020	Safety of machinery - Electro-sensitive protective equipment - Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)	CLC/TC 44X
EN IEC 61496-3:2019	Safety of machinery - Electro-sensitive protective equipment - Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)	CLC/TC 44X
EN IEC 62046:2018	Safety of machinery - Application of protective equipment to detect the presence of persons	CLC/TC 44X
EN IEC 62061:2021	Safety of machinery - Functional safety of safety-related control systems	CLC/TC 44X
EN 62745:2017/A11:2020	Safety of machinery - Requirements for cableless control systems of machinery	CLC/TC 44X
EN 62745:2017	Safety of machinery - Requirements for cableless control systems of machinery	CLC/TC 44X
ISO 14738:2002	Safety of machinery — Anthropometric requirements for the design of workstations at machinery	ISO/TC 159/SC 3
ISO 14738:2002/Cor 2:2005	Safety of machinery — Anthropometric requirements for the design of workstations at machinery — Technical Corrigendum 2	ISO/TC 159/SC 3
ISO 14738:2002/Cor 1:2003	Safety of machinery — Anthropometric requirements for the design of workstations at machinery — Technical Corrigendum 1	ISO/TC 159/SC 3
ISO 15534-1:2000	Ergonomic design for the safety of machinery — Part 1: Principles for determining the dimensions required for openings for whole-body access into machinery	ISO/TC 159/SC 3
ISO 15534-2:2000	Ergonomic design for the safety of machinery — Part 2: Principles for determining the dimensions required for access openings	ISO/TC 159/SC 3
ISO 15534-3:2000	Ergonomic design for the safety of machinery — Part 3: Anthropometric data	ISO/TC 159/SC 3
ISO 15535:2012	General requirements for establishing anthropometric databases	ISO/TC 159/SC 3
ISO 15536-1:2005	Ergonomics — Computer manikins and body templates — Part 1: General requirements	ISO/TC 159/SC 3
ISO 15536-2:2007	Ergonomics — Computer manikins and body templates — Part 2: Verification of functions and validation of dimensions for computer manikin systems	ISO/TC 159/SC 3
ISO 15537:2022	Principles for selecting and using test persons for testing anthropometric aspects of industrial products and designs	ISO/TC 159/SC 3
ISO/TS 20646:2014	Ergonomics guidelines for the optimization of musculoskeletal workload	ISO/TC 159/SC 3

ISO 20685-1:2018	3-D scanning methodologies for internationally compatible anthropometric databases — Part 1: Evaluation protocol for body dimensions extracted from 3-D body scans	ISO/TC 159/SC 3
ISO 20685-2:2015	Ergonomics — 3-D scanning methodologies for internationally compatible anthropometric databases — Part 2: Evaluation protocol of surface shape and repeatability of relative landmark positions	ISO/TC 159/SC 3
ISO/TR 23076:2021	Ergonomics — Recovery model for cyclical industrial work	ISO/TC 159/SC 3
ISO/TR 23476:2021	Ergonomics — Application of ISO 11226, the ISO 11228 series and ISO/TR 12295 in the agricultural sector	ISO/TC 159/SC 3
ISO 24553:2023	Ergonomics — Accessible design — Ease of operation	ISO/TC 159/SC 3
ISO Guide 78:2012	Safety of machinery — Rules for drafting and presentation of safety standards	ISO/TC 199
ISO 11161:2007/Amd 1:2010	Safety of machinery — Integrated manufacturing systems — Basic requirements — Amendment 1	ISO/TC 199
ISO 11161:2007	Safety of machinery — Integrated manufacturing systems — Basic requirements	ISO/TC 199
ISO 12100:2010	Safety of machinery — General principles for design — Risk assessment and risk reduction	ISO/TC 199
ISO/TR 14121-2:2012	Safety of machinery — Risk assessment — Part 2: Practical guidance and examples of methods	ISO/TC 199
ISO 20607:2019	Safety of machinery — Instruction handbook — General drafting principles	ISO/TC 199
IEC 60152:2021	Designation of phase differences by hour numbers in three-phase AC systems	IEC/TC 3
IEC 60445:2021	Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors	IEC/TC 3
IEC 60204-1:2016/AMD1:2021	Amendment 1 - Safety of machinery - Electrical equipment of machines - Part 1: General requirements	IEC/TC 44
IEC 60204-1:2016	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	IEC/TC 44
IEC 60204-31:2013	Safety of machinery - Electrical equipment of machines - Part 31: Particular safety and EMC requirements for sewing machines, units and systems	IEC/TC 44
IEC 60204-32:2008	Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines	IEC/TC 44
IEC 60204-33:2009	Safety of machinery - Electrical equipment of machines - Part 33: Requirements for semiconductor fabrication equipment	IEC/TC 44
IEC TS 60204-34:2016	Safety of machinery - Electrical equipment of machines - Part 34: Requirements for machine tools	IEC/TC 44
IEC 61310-1:2007	Safety of machinery - Indication, marking and actuation - Part 1: Requirements for visual, acoustic and tactile signals	IEC/TC 44
IEC 61310-2:2007	Safety of machinery - Indication, marking and actuation - Part 2: Requirements for marking	IEC/TC 44

IEC 61310-3:2007	Safety of machinery - Indication, marking and actuation - Part 3: Requirements for the location and operation of actuators	IEC/TC 44
IEC 61496-1:2020	Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests	IEC/TC 44
IEC 61496-2:2020	Safety of machinery - Electro-sensitive protective equipment - Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)	IEC/TC 44
IEC 61496-3:2018	Safety of machinery - Electro-sensitive protective equipment - Part 3: Particular requirements for active opto-electronic protective devices responsive to diffuse Reflection (AOPDDR)	IEC/TC 44
IEC TS 61496-4-2:2022	Safety of machinery - Electro-sensitive protective equipment - Part 4-2: Particular requirements for equipment using vision based protective devices (VBPD) - Additional requirements when using reference pattern techniques (VBPDPP)	IEC/TC 44
IEC TS 61496-4-3:2022	Safety of machinery - Electro-sensitive protective equipment - Part 4-3: Particular requirements for equipment using vision based protective devices (VBPD) - Additional requirements when using stereo vision techniques (VBPDST)	IEC/TC 44
IEC 62046:2018	Safety of machinery - Application of protective equipment to detect the presence of persons	IEC/TC 44
IEC 62061:2021	Safety of machinery - Functional safety of safety-related control systems	IEC/TC 44
IEC TR 62513:2008	Safety of machinery - Guidelines for the use of communication systems in safety-related applications	IEC/TC 44
IEC 62745:2017	Safety of machinery - Requirements for cableless control systems of machinery	IEC/TC 44
IEC TS 62998-1:2019	Safety of machinery - Safety-related sensors used for the protection of persons	IEC/TC 44
IEC TR 62998-2:2020	Safety of machinery - Part 2: Examples of application	IEC/TC 44
IEC TS 63074:2023	Safety of machinery - Security aspects related to functional safety of safety-related control systems	IEC/TC 44
IEC TR 63161:2022	Assignment of safety integrity requirements - Basic rationale	IEC/TC 44
IEC TS 63394:2023	Safety of machinery - Guidelines on functional safety of safety-related control system	IEC/TC 44

Standards under development:

No Standards under development identified.

5.5.1.12 Universal Accessibility

ISO/IEC JTC 1 Information technology*

*The scope has been described in above section.

ISO/TC 159 Ergonomics*

*The scope has been described in above section.

Published standards:

ISO/IEC 29138-1:2018	Information technology — User interface accessibility — Part 1: User accessibility needs	ISO/IEC JTC 1/SC 35
ISO/IEC TR 29138-2:2009	Information technology — Accessibility considerations for people with disabilities — Part 2: Standards inventory	ISO/IEC JTC 1/SC 35
ISO/IEC 29138-3:2022	Information technology — User interface accessibility — Part 3: Requirements and recommendations on user needs mapping	ISO/IEC JTC 1/SC 35
ISO/IEC 20071-11:2019	Information technology — User interface component accessibility — Part 11: Guidance on text alternatives for images	ISO/IEC JTC 1/SC 35
ISO/IEC 24786:2009	Information technology — User interfaces — Accessible user interface for accessibility settings	ISO/IEC JTC 1/SC 35
ISO 24505:2016	Ergonomics — Accessible design — Method for creating colour combinations taking account of age-related changes in human colour vision	ISO/TC 159/SC 5

Standards under development:

ISO/IEC PWI 29138-4	Information technology – User interface accessibility — Part 4: User needs reporting	ISO/IEC JTC 1/SC 35

5.5.1.13 Lighting

Lighting of workplaces

ISO/TC 274 Light and lighting

Scope: Standardization in the field of application of lighting in specific cases complementary to the work items of the International Commission on Illumination (CIE) and the coordination of drafts from the CIE, in accordance with the Council Resolution 19/1984 and Council Resolution 10/1989 concerning vision, photometry and colorimetry, involving natural and man-made radiation over the UV, the visible and the IR regions of the spectrum, and application subjects covering all usage of light, indoors and outdoors, energy performance, including environmental, non-visual biological and health effects.

CEN/TC 169 Light and lighting

Scope: Standardization in the field of vision, photometry and colorimetry, involving natural and man-made radiation over the UV, the visible and the IR regions of the spectrum, and application subjects covering all usages of light, indoors and outdoors, including environmental and aesthetic effects.

Published standards:

ISO 8995-1:2002	The lighting of work places — Part 1: Indoor	ISO/TC 274
ISO 8995-1:2002/ Cor 1:2005	Lighting of work places — Part 1: Indoor — Technical Corrigendum 1	ISO/TC 274
EN 12464-1:2021	Light and lighting - Lighting of work places - Part 1: Indoor work places	CEN/TC 169/WG 2

EN 12464-2:2014	Light and lighting - Lighting of work places - Part 2: Outdoor work places	CEN/TC 169/WG 2

Standards under development:

ISO/CIE CD 8995-1	Lighting of work places — Part 1: Indoor	ISO/TC 274
ISO/CIE 8995-3:2018	The lighting of work places — Part 3: Lighting requirements for safety and security of outdoor work places	ISO/TC 274

5.5.1.14 Training

Learning, Education and Training

ISO/IEC JTC 1 Information Technology

Scope: Standardization in the field of information technology.

Published standards:

ISO/IEC 19778-1:2015	Information technology — Learning, education and training — Collaborative technology — Collaborative workplace — Part 1: Collaborative workplace data model	ISO/IEC JTC 1/SC 36
ISO/IEC 19778-2:2015	Information technology — Learning, education and training — Collaborative technology — Collaborative workplace — Part 2: Collaborative environment data model	ISO/IEC JTC 1/SC 36
ISO/IEC 19778-3:2015	Information technology — Learning, education and training — Collaborative technology — Collaborative workplace — Part 3: Collaborative group data model	ISO/IEC JTC 1/SC 36

Standards under development:

No Standards under development identified.

5.5.1.15 VR/AR/MR

Virtual Reality (VR), Augmented/Mixed Reality (AR/MR)

This section describes the standardization activities on Augmented/Mixed Reality (AR/MR) at ISO/IEC JTC 1 SC 24, and at ISO/IEC JTC 1 SC 29.

ISO/IEC JTC 1 SC 24 has been the subcommittee at ISO responsible for producing standards for computer graphics and virtual reality (VR), e.g. X3D, and OpenGL.

ISO/IEC JTC 1 SC 24 has collaborated with SC 29 to produce AR Standards, and Technical Reports for AR reference model and AR application file format.

SC 24 has belatedly learned that SC 29 (another subcommittee at ISO which is best known for its contribution to MPEG and JPEG standards) has started to work on a technical report for AR reference model and AR application file format.

ISO/IEC JTC 1 SC 24 Computer graphics, image processing and environmental data representation

Scope: Standardization of interfaces for information technology based applications relating to computer graphics and virtual reality, image processing, environmental data representation, support for Mixed and Augmented Reality (MAR), and interaction with, and visual presentation of, information.

Structure:

- ISO/IEC JTC 1/SC 24/WG 6 Augmented reality continuum presentation and interchange

- ISO/IEC JTC 1/SC 24/WG 7 Image processing and interchange

- ISO/IEC JTC 1/SC 24/WG 8 Environmental representation

- ISO/IEC JTC 1/SC 24/WG 9 Augmented reality continuum concepts and reference model

- ISO/TC 184/SC 4/JWG 16 Joint ISO/TC 184/SC 4 - ISO/IEC JTC 1/SC 24 - ISO/TC 171/SC 2 WG: Formats for visualization and other derived forms of product data

Published standards:

ISO/IEC 18520:2019	Information technology — Computer graphics, image processing and environmental data representation — Benchmarking of vision-based spatial registration and tracking methods for mixed and augmented reality (MAR)	ISO/IEC JTC 1/SC 24
ISO/IEC 18039:2019	Information technology — Computer graphics, image processing and environmental data representation — Mixed and augmented reality (MAR) reference model	
ISO/IEC 14772-1:1997	Information technology — Computer graphics and image processing — The Virtual Reality Modeling Language — Part 1: Functional specification and UTF-8 encoding	ISO/IEC JTC 1/SC 24
ISO/IEC 14772-1:1997/Amd 1:2003	Information technology — Computer graphics and image processing — The Virtual Reality Modeling Language — Part 1: Functional specification and UTF-8 encoding — Amendment 1: Enhanced interoperability	ISO/IEC JTC 1/SC 24
ISO/IEC 14772-2:2004	Information technology — Computer graphics and image processing — The Virtual Reality Modeling Language (VRML) — Part 2: External authoring interface (EAI)	ISO/IEC JTC 1/SC 24

Standards under development:

No Standards under development identified.

ISO/IEC JTC 1/SC 29 Coding of audio, picture, multimedia and hypermedia information

Scope: Standardization of coded representation of audio, picture, multimedia and hypermedia information - and sets of compression and control functions for use with such information - such as:

- Audio information

- Bi-level and Limited Bits-per-pixel Still Pictures
- Digital Continuous-tone Still Pictures
- Computer Graphic Images
- Moving Pictures and Associated Audio
- Multimedia and Hypermedia Information for Real-time Final Form Interchange
- Audio Visual Interactive Scriptware

Excluded: Character Coding

Published standards:

ISO/IEC 23000-13:2017	Information technology - Multimedia application format (MPEG-A) - - Part 13: Augmented reality application format	ISO/IEC JTC 1/SC 29	
ISO/IEC 18040:2019	Information technology — Computer graphics, image processing and environmental data representation — Live actor and entity representation in mixed and augmented reality (MAR)	ISO/IEC JTC 1/SC 24	
ISO/IEC 18038:2020	Information technology — Computer graphics, image processing and environmental representation — Sensor representation in mixed and augmented reality	ISO/IEC JTC 1/SC 24	
ISO/IEC 18039:2019	Information technology — Computer graphics, image processing and environmental data representation — Mixed and augmented reality (MAR) reference model	ISO/IEC JTC 1/SC 24	

Standards under development:

No Standards under development identified.

5.6. Standardisation Activities & Next Steps

During the standardisation landscape analysis, several related standards have been identified. Several standards are especially relevant and might be considered as a compliance requirement for the outputs of the project: mainly around Robot/Robotics, Automation and integration, Industrial Cyber Security, Connectivity, Architecture design, Safety risk management, Optimal Automation Level KPI, HMI evaluation, HF evaluation and AR training.

In the future it might be possible to contribute to those standards through standards usage information and through the dissemination of the AI-PRISM framework which may include those standards. There will also be possible to report failures, improvement or any other kinds of suggestions.

It also might be possible to contribute in the future by supplying new knowledge on human-automation systems, self-optimizing automation, optimal automation levels (linked to human characteristics including satisfaction), etc.

Between these relevant identified standards, including the Standardisation Technical Specifications (TS) or Technical Reports (TR), could be used as Guidelines or Manual as they could be useful for

WP1, WP2, WP3, WP4, WP5, WP6, and WP7. They refer to training, certification, and development activities, collaborative robotics, artificial intelligence, cloud computing applied to smart manufacturing, Architecture, Ergonomics & Anthropometric requirements for design of workstations at machinery, Information Security Control, Safety of Machinery. They could be applied in design guidance and usability analysis.

Regarding future contribution to standardisation, it might be possible to contribute by supplying new knowledge about ethical considerations for Industrial Robotic systems. (Human Centered Collaborative Robotic Platform)

To be able to use the standardisation system as a tool for **dissemination of the project results** (led by UNE) an interaction with the market stakeholders there will be necessary to decide the type of **AI-PRISM**´s interaction of with the relevant Standardisation Committees (36 Standardisation Technical Committees identified) for **AI-PRISM**. UNE would lead these efforts and provide necessary technical or non-technical support required for those actions.

This work will contribute on the development of the **Guidelines for the Standardisation of Human-Robot Collaborative technologies and applications**, not only on **AI-PRISM's** benefit but also for the European ecosystem as a whole.

Table 10 Main technical committees for dissemination activities related to standardisation

Technical Committee	Name
ISO/TC 159	Ergonomics
ISO/TC 159/SC 1 /WG 1	Principles of ergonomics and ergonomic design
ISO/TC 159/SC1/WG 2	Ergonomic principles related to mental work
ISO/TC 159/SC3	Anthropometry and biomechanics
ISO/TC 159/SC4	Ergonomics of human-system interaction
ISO/TC 159/SC4/WG 5	Software ergonomics of human-computer interaction
ISO/TC 159/SC4/WG 6	Human-centred design processes for interactive systems
ISO/TC 184	Automation systems and integration
ISO/TC 184/SC 4	Industrial data
ISO/TC 199	Safety of machinery
ISO/TC 199/WG5	General principles for the design of machinery and risk assessment
ISO/TC 261	Additive manufacturing
CEN/TC 438	Additive manufacturing
ISO/TC 299	Robotics
CLC/TC 44 X	Safety of machinery- Electrotechnical aspects
CLC/TC 65X	Industrial-process measurement, control and automation
IEC/TC 44	Safety of machinery - Electrotechnical aspects

IEC/TC 57	Power systems management and associated information exchange
IEC/TC 65	Industrial-process measurement, control and automation
IEC/TC 65B	Measurement and control devices
IEC/TC 65/SC 65E	Devices and integration in enterprise systems
ISO/IEC JTC 1	Information Technology
ISO/IEC JTC 1/SC 27	IT Security techniques
ISO/IEC JTC 1/SC 27/WG1	Information security management systems
ISO/IEC JTC 1/SC 27/WG3	Security evaluation, testing and specification
ISO/TC 22/SC 31	Data communication
CEN/TC 114	Safety of machinery
CEN/TC 122	Ergonomics
CEN/TC 122/WG1	Anthropometry
CEN/TC 122/WG2	Ergonomic design principles
CEN/TC 122/WG5	Ergonomics of human-system interaction
CEN/TC 310	Advanced automation technologies and their applications
CEN-CENELEC Focus Group	Artificial Intelligence
CEN/CLC/WS SEP2	5G and IoT
CEN/CLC/WS SEP-	5G and IoT
British Standards AMT/10	Robotics

During the life of the **AI-PRISM**, consortium partners with the support and guidance of UNE, may establish two different actions:

- **Evaluation of the standardisation environment in order to choose the most adequate standardisation route for the project's outcomes**. The information produced will be crucial to assess the possible European or International focus, the willingness to immediately progress an activity in any TC, their intention to cover this topic in the near future or the possibility to develop a fast-track document out of the TCs structure (e.g. a CEN-CENELEC Workshop Agreement, CWA);
- **Elaboration of draft proposals to start new works in CEN-CENELEC** (or ISO-IEC), enabling the proposals to go through the respective approval processes of the standardisation organizations. Depending on the route chosen, this proposal can also serve as input of technical information for future standards development but, in any case, the project will feed the standardisation organizations with accurate information to be standardized. The results of the interaction with the relevant standardisation TCs, will include: the standardisation route chosen (proposal for new standard in a TC, proposal for future standard or a TC or proposal for a CWA), the technical proposals and the advance reached in the

consensus building process (including possible standard(s) publication if available at month 36) as well as future expectations after the project.

At European and international levels there are several documents from other organizations and Research and Innovations projects that cover fields similar to the **AI-PRISM** project, which in addition to their utility for the assessment of performances of the **AI-PRISM**, may establish a starting point for the development of future standardisation proposals.

These documents are the following:

- CEN-CENELEC Roadmap for AI Standardisation. Submitted 24th January 2019.
- ETSI Artificial Intelligence and future directions for ETSI. 1st edition - June 2020
- Commission Report on safety and liability implications of AI, the Internet of Things and Robotics
- The Economic Impact of Open Data - Opportunities for value creation in Europe
- EU guidelines on ethics in artificial intelligence: Context and implementation. Published 19th September 2019
- Horizon 2020 New Robotics Projects 2021

file:///C:/Users/farribas/Downloads/brochure_erf2021_final_5657CD2E-DC10-0A9C-5C50E3EBAB327A42_75587%20(1).pdf

6. Conclusion

AI-PRISM Impact Master Plan is the coordinated effort of all project partners to agree on the principles around communication, dissemination, exploitation and standardisation to achieve a wider impact for the project and its outcomes. This plan takes into account both the internal and the external environment for defining the appropriate tools, methodologies and activities for channelling **AI-PRISM's** scientific and technical activities towards the community.

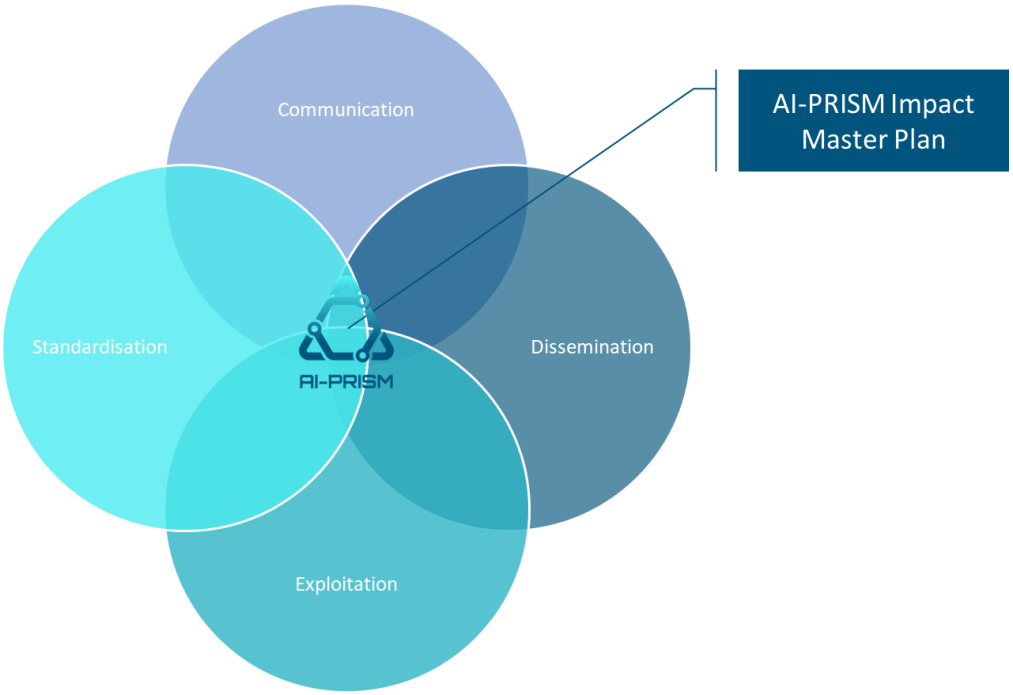


Figure 13 AI-PRISM Impact Master Plan

D8.1 is more than a formal deliverable; it is a clear point of reference for all partners as it presents not only the principles and the outcomes of the project's plan but also the rationale behind each decision and activities made or to be made.

However, this is a plan and all plans tent to deviate and shift throughout any project's lifetime. Therefore, all activities will be closely monitored and assessed to define if any correction measure is needed while keeping the initial defined objectives in scope: have a wide impact to and for the community as a whole.

ANNEX A: Communication & Dissemination KPIs

Table 11 Communication & Dissemination KPIs

DISSEMINATION AND COMMUNICATION KPIs		
Measure	**Indicator**	**Target**
Website	No. of Unique Visitors (monthly average)	200
Social media	No. of Followers (total)	5.000
	No. of Impressions (total)	200
Publications	Peer-reviewed Scientific Publications in Journals	10
	Peer-reviewed Scientific Publications in Conferences	30
	Awareness Publications: • Policy brief • Articles • Newsletters • Press releases	50
Events	No. of Events participated	50
Webinars/Workshops	No. of Webinars / Workshops (co-)organised	10
	No. of Registrations / Participants	300
Open Access	No. of Downloads (total)	1.000

ANNEX B: Official Website

Official Domain: https://aiprism.eu/

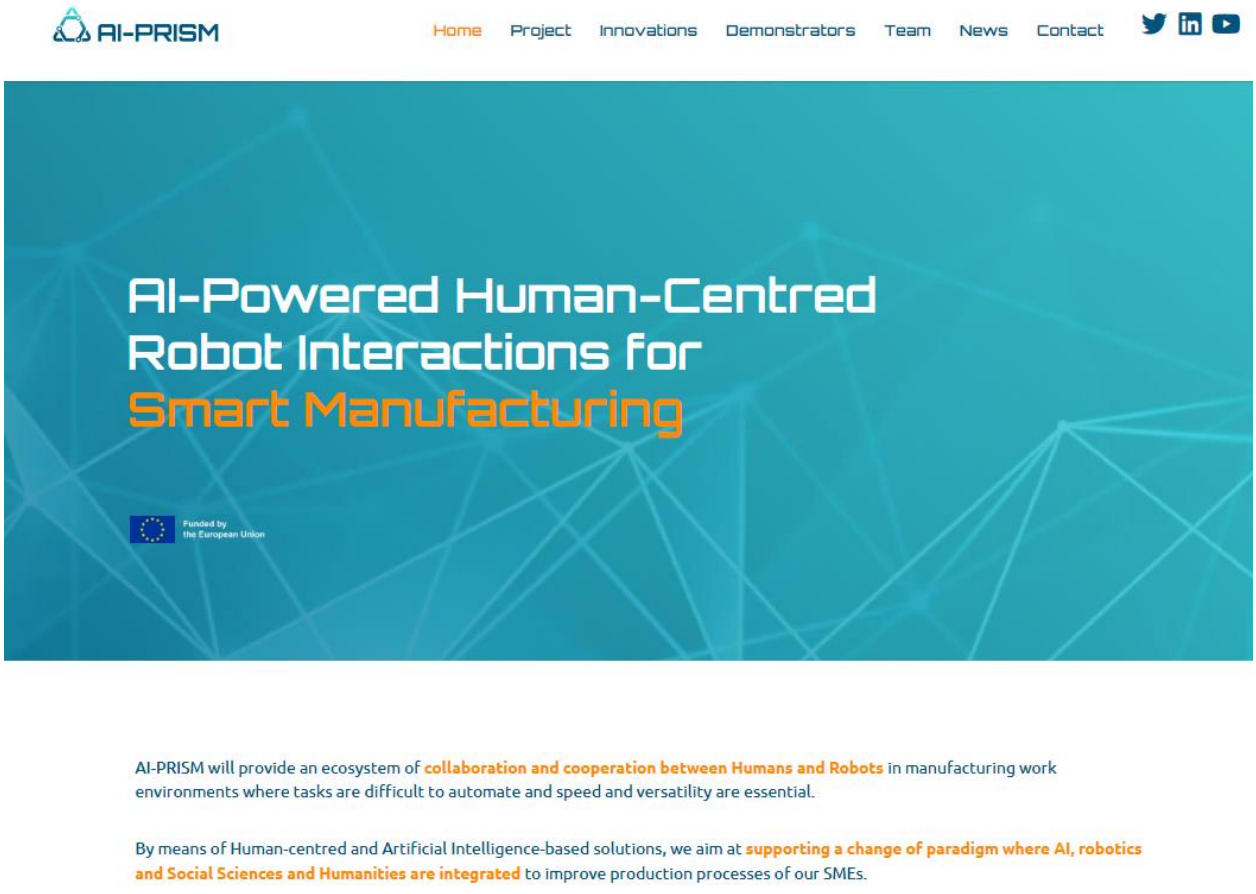


Figure 14 Part of the "Home" Page

Figure 15 Part of the "Innovations" Page

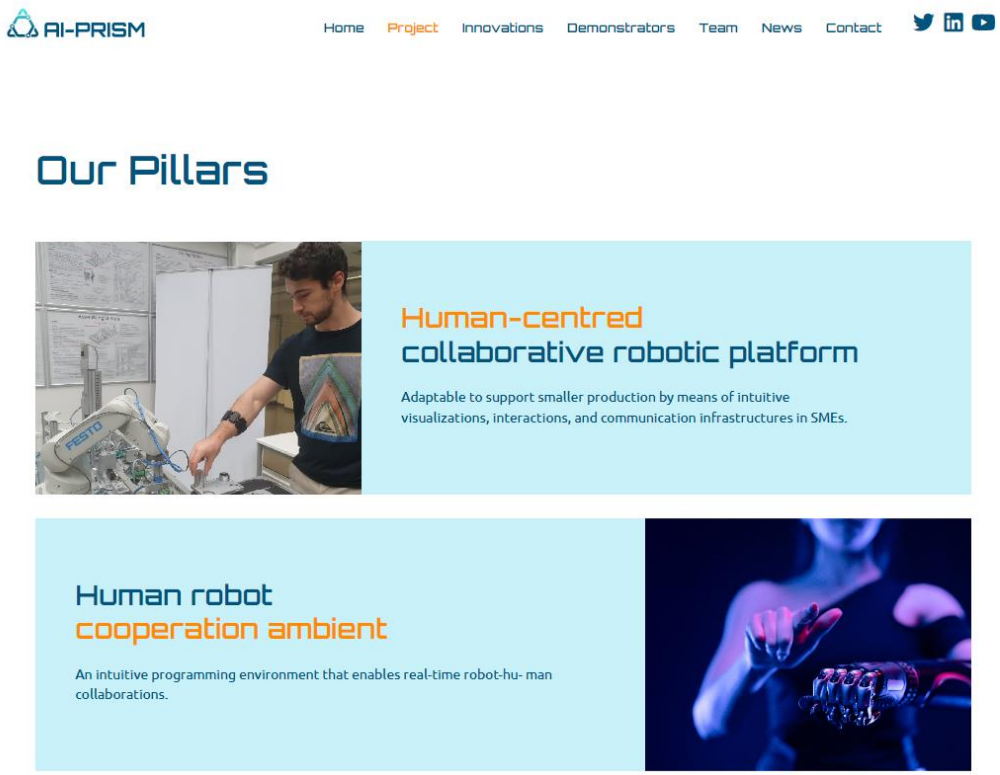


Figure 16 Part of the "Project" Page

Figure 17 Part of the "Demonstrators" Page

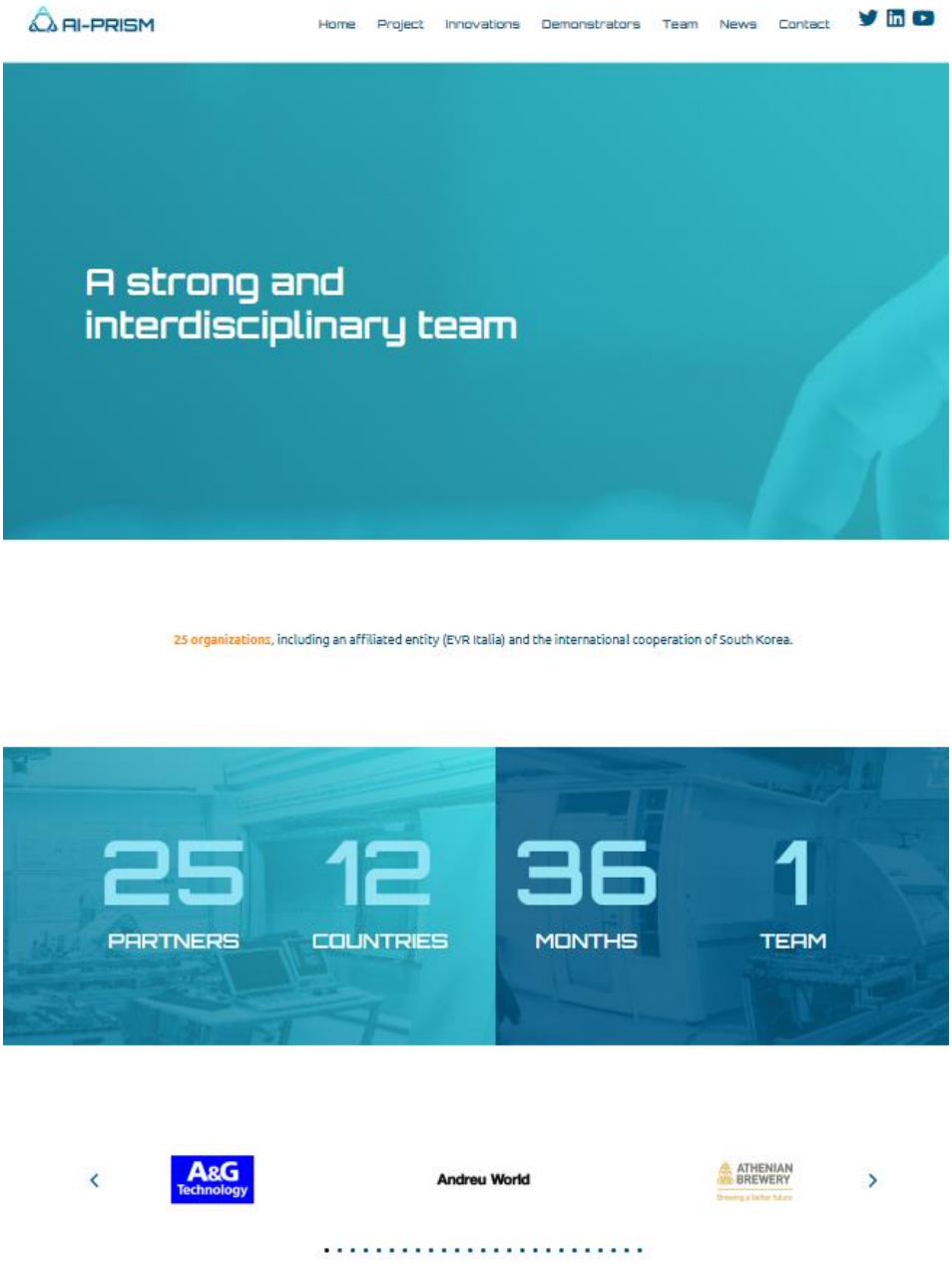


Figure 18 Part of the "Team" Page

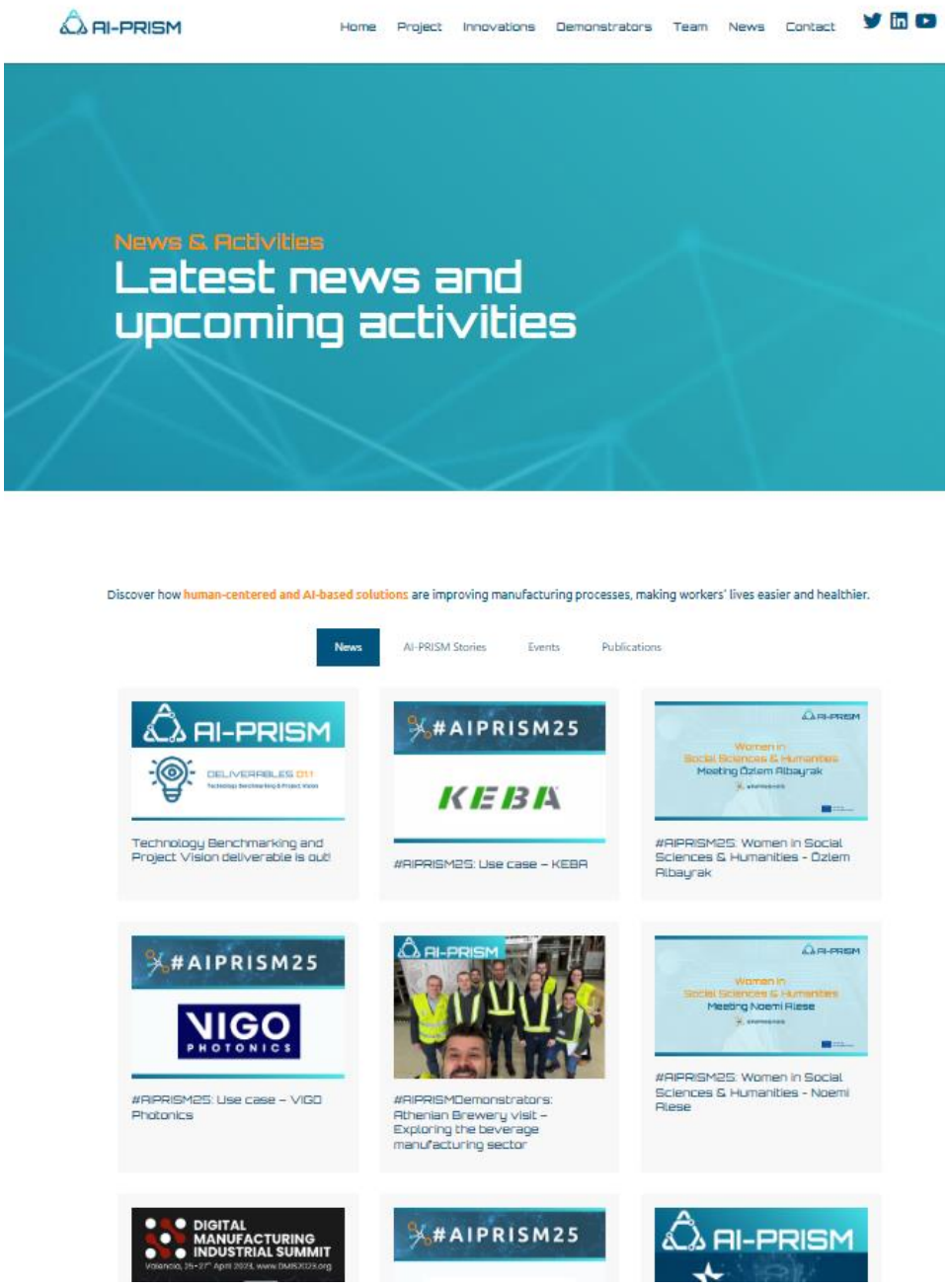


Figure 19 Part of the "News" Page

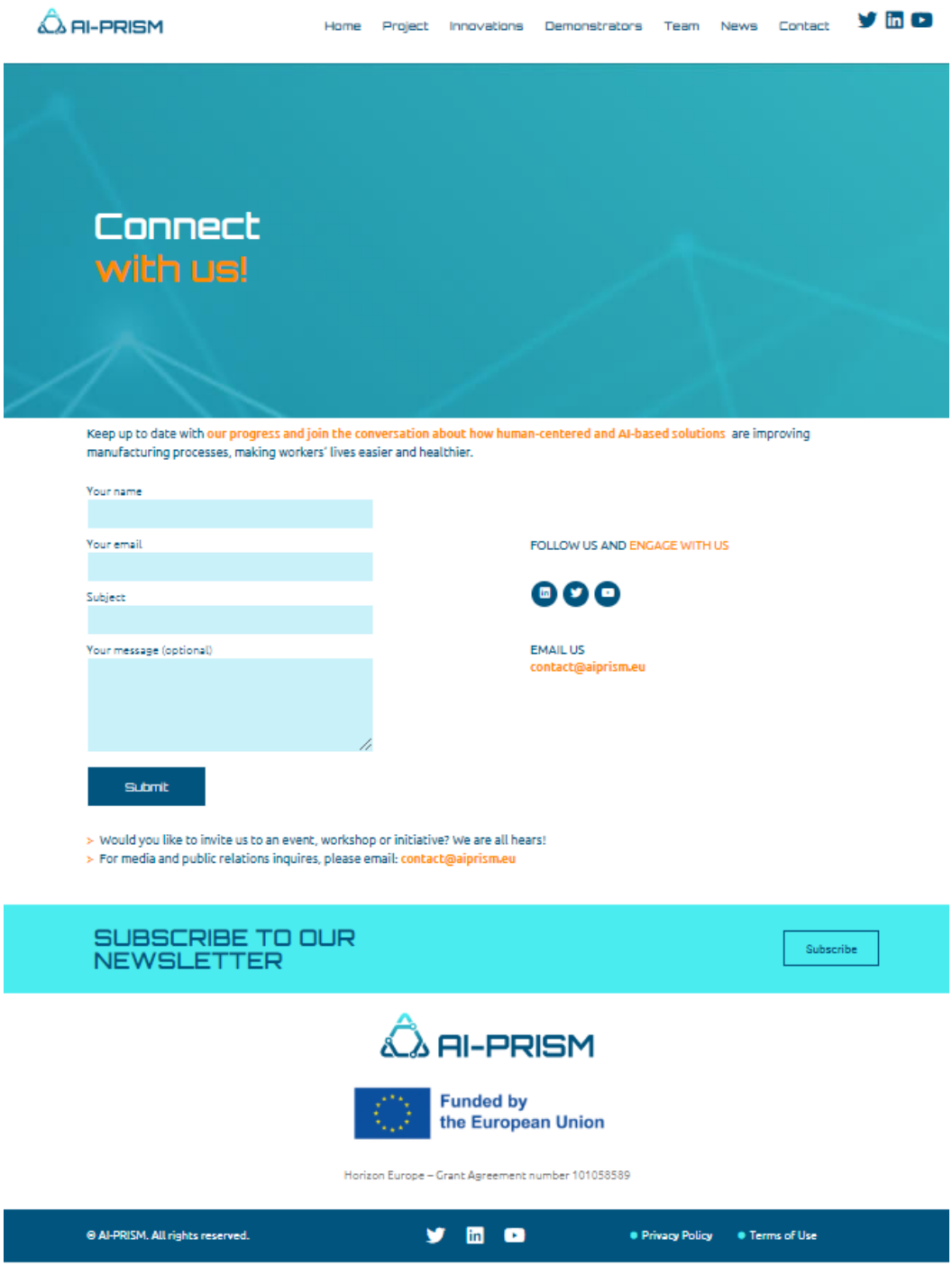
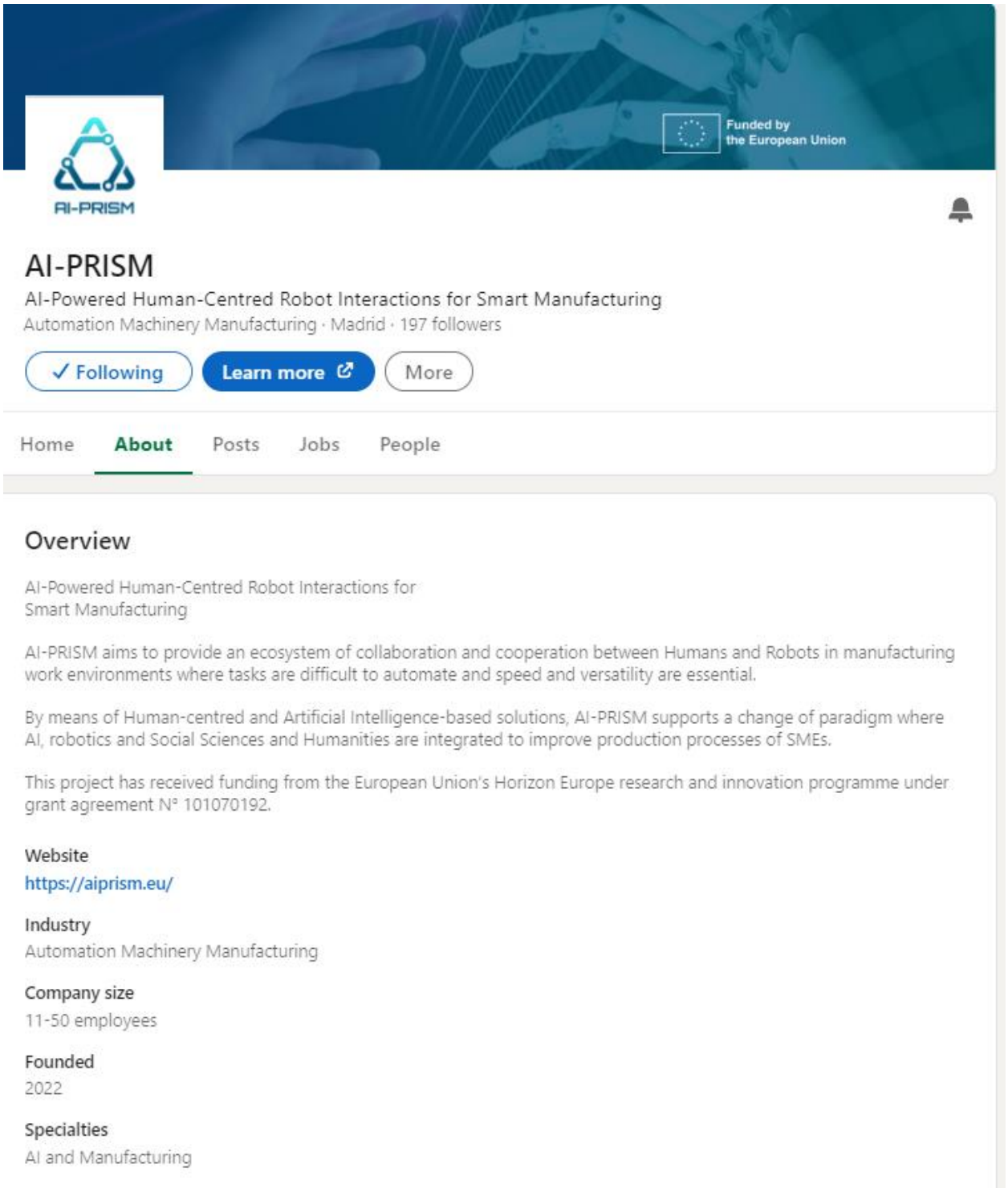


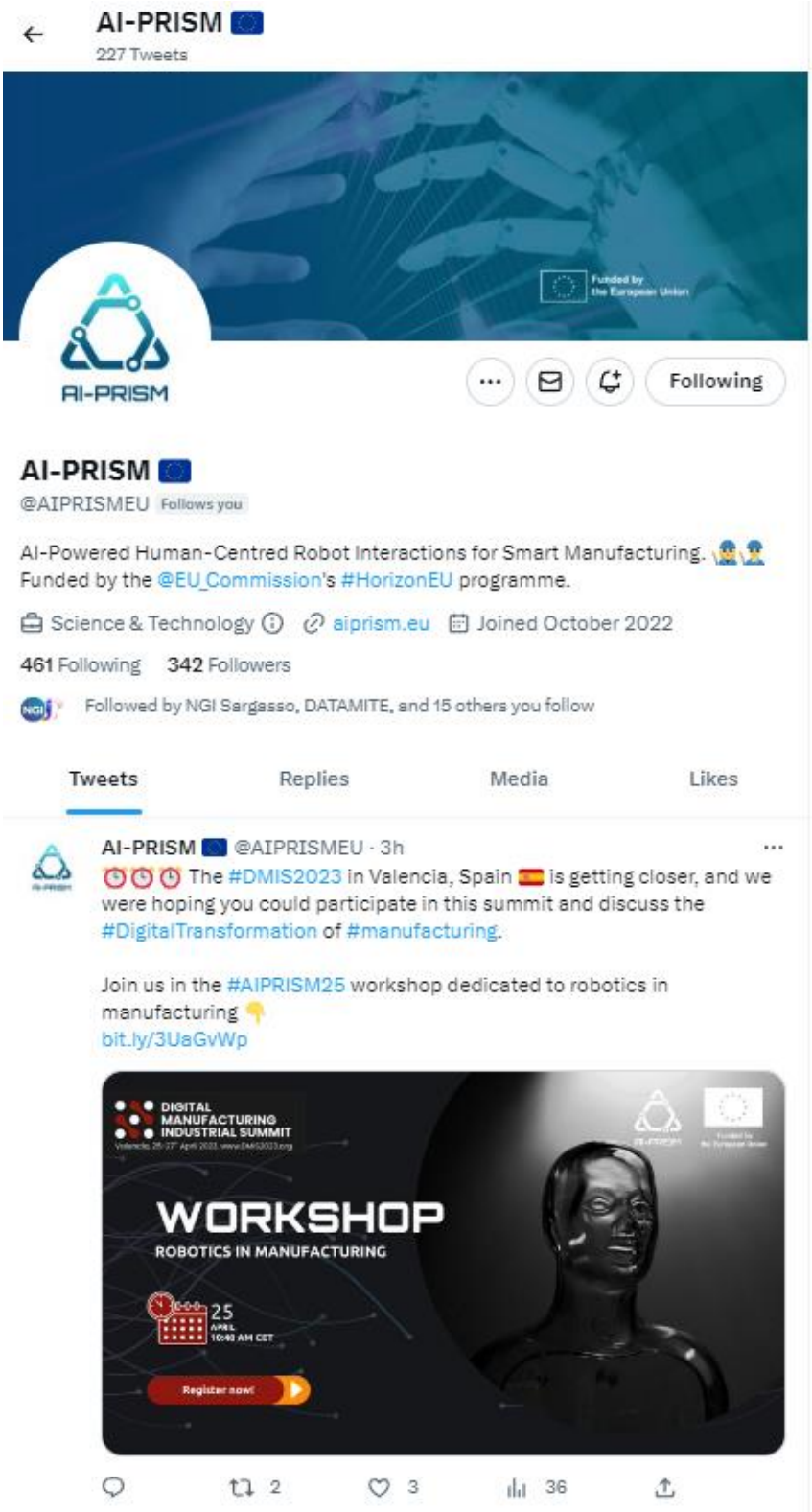
Figure 20 Part of the "Contact" Page

ANNEX C: Official social media

Official LinkedIn Page



Official Twitter Account



Official YouTube Account