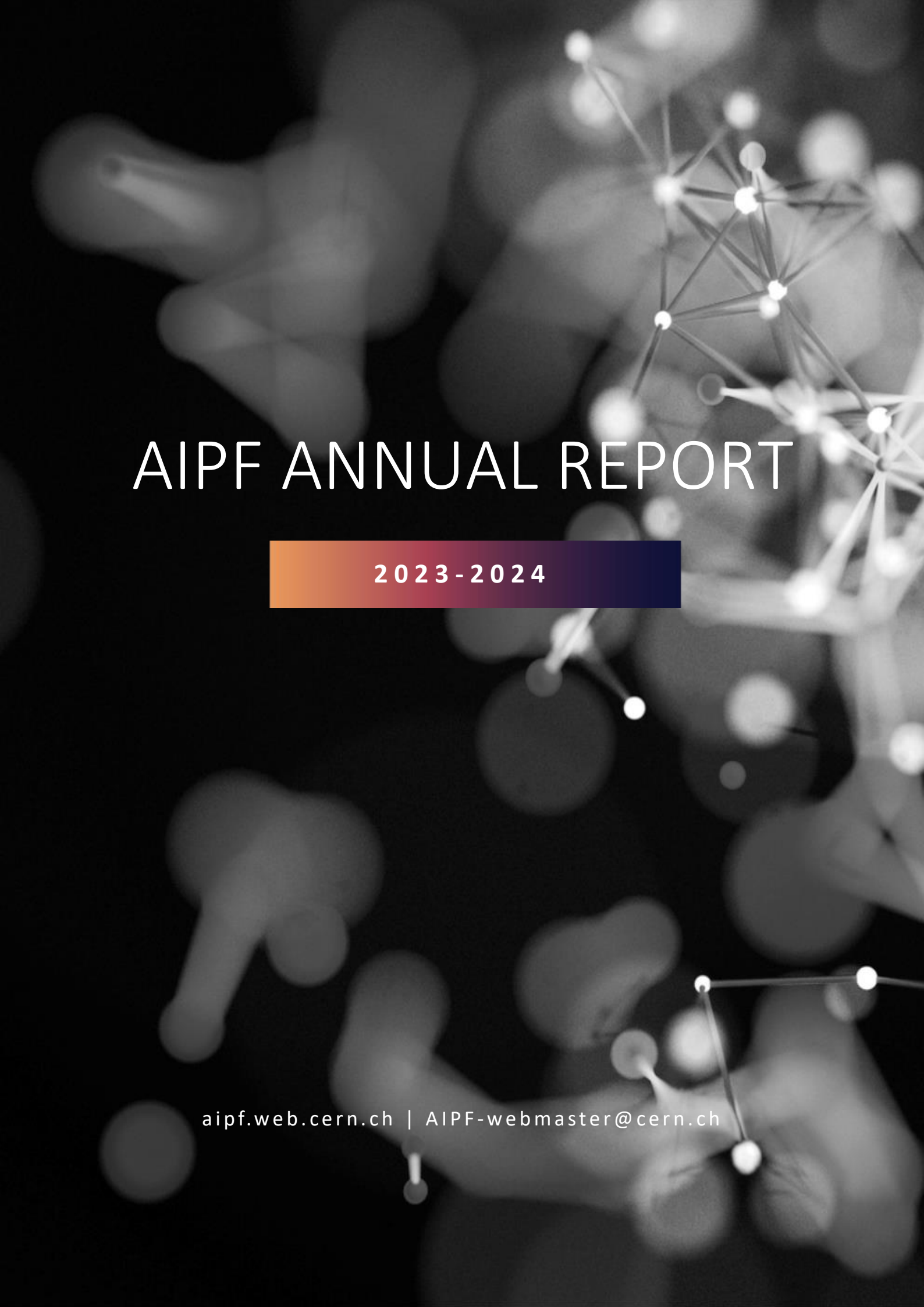

AIPF ANNUAL REPORT

2023-2024

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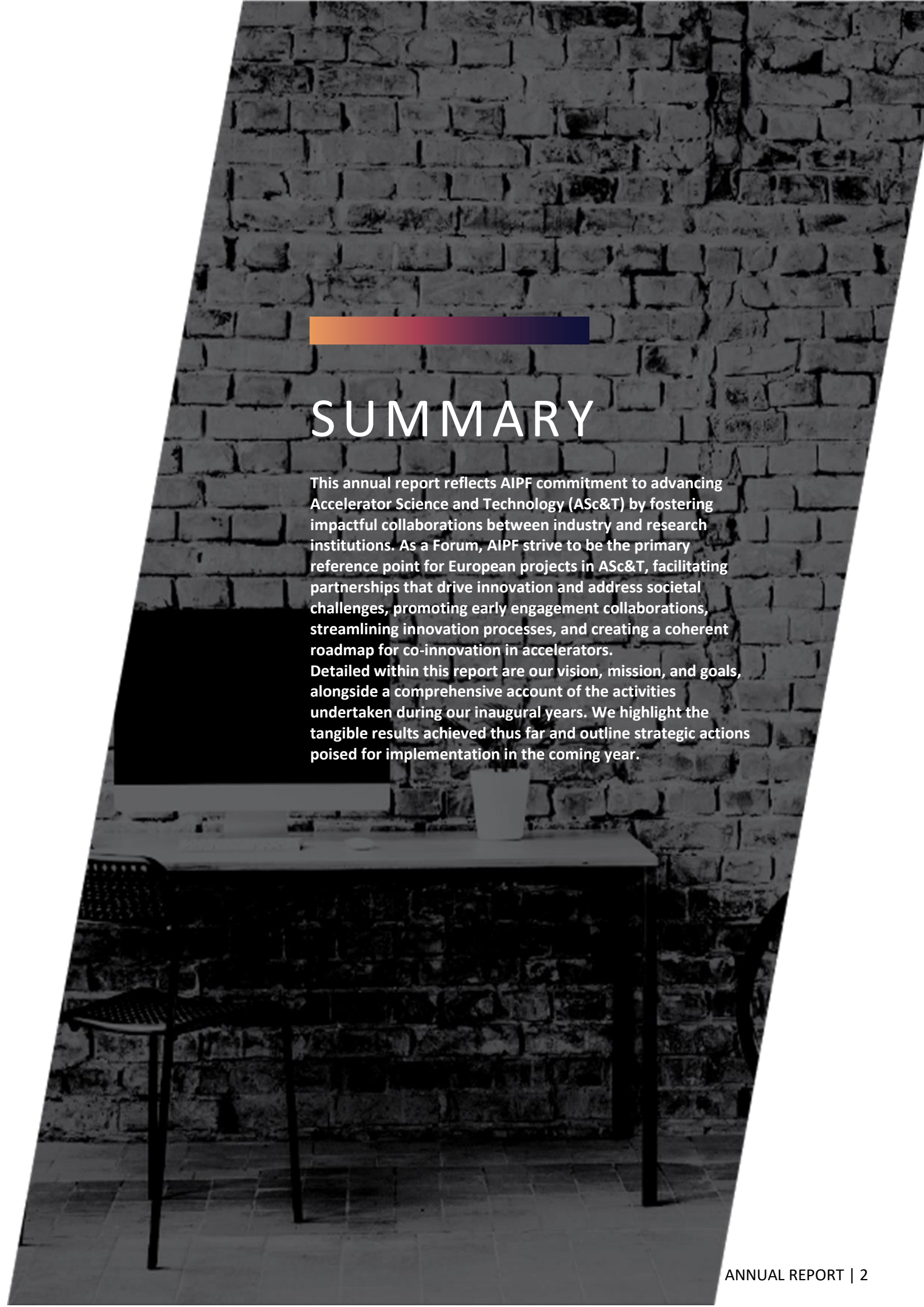

SUMMARY

This annual report reflects AIPF commitment to advancing Accelerator Science and Technology (ASc&T) by fostering impactful collaborations between industry and research institutions. As a Forum, AIPF strive to be the primary reference point for European projects in ASc&T, facilitating partnerships that drive innovation and address societal challenges, promoting early engagement collaborations, streamlining innovation processes, and creating a coherent roadmap for co-innovation in accelerators.
Detailed within this report are our vision, mission, and goals, alongside a comprehensive account of the activities undertaken during our inaugural years. We highlight the tangible results achieved thus far and outline strategic actions poised for implementation in the coming year.

INTRODUCTION

AIPF

The ASc&T Industry Permanent Forum was endorsed by the TIARA Governing Council on February 21, 2023. The Forum reports via its Chairs to the TIARA Collaboration Council every year on the status and outcomes of the activities, also presenting any communication that the Forum asks to transmit to TIARA. TIARA can at any time submit requests of feedback to the Forum on specific issues or invite the Forum to cooperate in initiatives promoted by TIARA itself.

VISION

- Act as an efficient link between industry and research institutions, representing the collective voice of the entire Accelerator Science and Technology (ASc&T) community.
- In subjects related to the link between industry and research institutions, become the main permanent reference forum for future European projects and decisions pertaining to ASc&T.
- Strive to exploit ASc&T capabilities, aligning them with societal needs and addressing pressing challenges in our society.

MISSION

- Promote collaborations between industry and research labs at early engagement to enhance scientific achievements.
- Promote and streamline innovation by the generation of innovative solutions ready for industrialization, market entry and exploitation.
- Create a coherent and accessible roadmap for co-innovation in accelerators, fostering strategic scientific innovation and societal progress.

By promoting collaborations, we envision a future where the ASc&T community stands at the forefront of ground-breaking advancements, driving innovation that makes a tangible impact on industry, society, and beyond.

GOALS

PRIORITIES

- Synergies between roadmaps
- High-level support body
- Facilitate dialogue

OPPORTUNITIES

- Enhance industrial competences
- Foster innovation
- Align efforts
- Identify pipeline of innovation common interests

PRESPECTIVES

- Growth as community
- Enabler of actions

INDUSTRY COLLABORATION AND PARTNERSHIP

Enabling efficient alliances between research institutions and industry, aiming to enhance industrial involvement in manufacturing and engineering competences, improving cooperation on a technical level, committing research institutes to involve industry early in new developments facilitating coherent technology advancements across research institutions to foster industry participation, and establishing a long-term co-innovation strategic cooperation between industry and research institutions.

ADVOCACY AND POLICY INFLUENCE

Becoming a premier reference industrial forum for policymakers, delivering a compelling message regarding the strategic importance of Accelerator Science and Technology, while also serving as a high-level support body for EC projects involving the ASc&T community, and delineating strategies aimed at overcoming obstacles hindering the optimal exploitation of collaboration between industry and research institutions and technology innovators.

FUNDING AND INVESTMENT

Mobilizing funding, leveraging both public and private investments to support research institutions and industry, while concurrently establishing mechanisms to merge proposals with industry and facilitate the necessary support.

KNOWLEDGE TRANSFER AND COMMUNICATION

Fostering and facilitating information exchange among research institutions, industry stakeholders, and funding institutions, thus strengthening the linkages between research and industries on present and future programs, competences, and business development strategies.

ROADMAP DEVELOPMENT

Encouraging the science community to actively consider industrial requirements and applications, promoting initiatives to provide support in defining accelerator Science and Technology roadmaps. To guarantee that the development of the roadmaps will foster a bridge between industry and scientific institutions to expedite innovation, facilitating increased industrial activities and participation in prototyping phases at R&D Centers, enhancing technology transfer processes and methods in accelerators, and establishing a pipeline to identify a sufficient number of innovation proposals with an appropriate Technology Readiness Level (TRL).

FIRST YEAR RESULTS AND ACHIEVEMENTS

In this Annual Report, we embark on a journey that began with a first phase dedicated to the initial coordination of diverse ideas and goals among AIPF members. As we consolidated our collective vision, our focus shifted towards the conclusions drawn from this initial analysis. This paved the way for the phase two of our approach, which culminated in the development of a 2024 work plan which outlines our strategic trajectory for the year ahead.

Additionally, the engagement and involvement of AIPF with EU-MATHS and IFAST European Projects are clarified and detailed.

PHASE 1 - INITIAL COORDINATION OF DIVERSE IDEAS AND GOALS AMONG AIPF MEMBERS

Analysis of the paradigms that refrain the usage of industrial partnership at early stages

Producing in-house offers the Research Institutions (RIs) the advantage of retaining proprietary know-how within the organization. It allows for the preservation and development of internal teams, fostering a stronger workforce. Additionally, in-house production often leads to increased opportunities for publishing research findings and obtaining patents owned by the team. The presence of in-house R&D activities also serves as an attractive prospect for students and postdoctoral researchers. Furthermore, internal production eliminates the need to invest time in training external industry partners, bypasses the requirement to draft procurement documents, and mitigates the risk of lock-in or encountering intellectual property issues. Moreover, internal production processes typically involve shorter procurement timelines and offer the possibility of creating synergies with other academic institutions and research institutes.

RIs are encouraged to go to industry when engaging with industry provides access to specialized expertise that may not be available in-house, particularly in areas related to production processes. Industry collaboration can offer valuable support for intellectual property filing, leveraging the resources and expertise of industry partners. Furthermore, partnering with industry becomes necessary when internal capacity is insufficient to meet production demands. Industry partnerships also facilitate the transition of ideas from academia to the market, potentially accelerating time-to-market for innovative products or technologies. Additionally, intellectual property generated through industry collaboration can generate revenue for academia and research institutes. Partnering with industry enables the integration of multiple systems and technologies, leveraging the management expertise of industry suppliers. Moreover, collaborations with industry often provide access to funding opportunities specifically tied to industrial projects and initiatives.

Not always Industry is interested in participating in RIs tendering. Industry often faces challenges when academia or research institutes prioritize projects that do not directly contribute to future revenue generation. This can result in a diversion of expert resources away from projects critical for product development. Additionally, industry may encounter difficulties when collaborating with academia or research institutes that have a lax approach to intellectual property (IP) protection. Insufficient IP protection can lead to the unauthorized use of valuable innovations by competitors, undermining the company's competitive advantage. Moreover, industry partners may find that collaborations with academia or research institutes often involve technologies or ideas at a lower Technology Readiness Level (TRL) than desired, making it challenging to translate them into practical applications for the market. Unrealistic expectations about market readiness can further complicate this issue. Furthermore, industry may encounter situations where there is insufficient market demand for the developments arising from collaborations with academia or research institutes, limiting the commercial viability of the projects. During the fabrication process, industry partners may face numerous constraints and changes, leading to delays and increased

costs. These constraints can arise from factors such as supplier origins, administrative burdens, and regulatory requirements. Moreover, industry may experience challenges associated with heavy contractual processes when collaborating with academia or research institutes, leading to delays and administrative burdens that impede project progress and efficiency.

To overcome these obstacles, it is important to increase the strengths that can be seen by the industry. Collaborations with academia or research institutes often facilitate knowledge exchange with a high level of openness. This allows industry partners to gain access to cutting-edge research, expertise, and innovative ideas that can drive advancements in their products and processes. Additionally, partnering with academia or research institutes provides industry with access to external intellectual property (IP). This can include patented technologies, methodologies, or research findings that can be leveraged to enhance the company's own intellectual assets and competitive position in the market. Moreover, collaborations with academia or research institutes may yield potential products with early buyers already identified. This reduces market uncertainty and provides a clearer path to commercialization, accelerating the time-to-market for new innovations. Industry partners can also benefit from collaborations with academia or research institutes by increasing existing production volumes and testing new suppliers. This allows for scalability and diversification of the supply chain, reducing reliance on single sources and mitigating supply chain risks. Furthermore, collaborations with academia or research institutes often come with additional funding opportunities for research and development (R&D) initiatives, as well as for infrastructure and equipment. This extra funding can help industry partners accelerate innovation, develop new technologies, and enhance their competitive position in the market.

Training the procurement teams of the RIs to the usage of new contractual methods such as the "innovation partnership" and the "competitive procedure with negotiation" could be key enablers of the change as eliminate part of the administrative burden, reduce risks for the industry and allow the establishment of a correct IP balance.

A workshop and several training sessions on Public Procurement of Innovative solutions and best practices is foreseen in 2025 promoted by AIPF and CERN.

Findings from the Survey on Actions Between RIs and Industry to Enhance Collaboration: Divergent Priorities and Synergistic Opportunities

In 2023 AIPF run a survey to prioritize the actions identified by the IFAST Report on extended industrial contributions in RD activities – working document 3.3. The survey showed that the priorities are not the same for the RI and Industry communities and that even the ILO network do not always share the same views.

The survey had 5 axis. The first one centred of the possible actions to be promoted by the RIs withing the ASc&T community. While for the RIs the highest priority was to promote Education and Training programs of interest to the industry, the Industry ranked this option as the lowest and gave the highest priority to promote the integration, classification and distribution of information on new initiatives. For the ILO network the highest priority was however to assure long term development plans. The differences are understandable but show that there are contradictory priorities and expectations. Each community prioritizes their own value creation and not the global value.

The second axis was related to the coordination efforts with other communities done by the RIs. In that case the ILOs considered unanimously extremely important to promote integration of roadmaps within the ASc&T sector and with other Big science fields. While RIs had a milder approach and Industry was more interested in the synergies in the ASc&T sector. The values show that ILOs that have to face a larger community see the big picture and the advantages of common roadmaps and developments. RIs in most cases see a big chasm in front of them as they do not know the other communities and synergies are very often refrain by administrative procedures. Industry is more centred in one sector because very often the RIS as for very narrow developments and so it is difficult to consider developments that can be used in other sector such as the space or fusion. However not pursuing this consolidation and synergies we are missing opportunities of development at larger scale and with broader objectives.

The third axis was related to actions regarding contract rules to be promoted by the RIs. While for the ILOs the biggest priorities where the reconsideration of the liabilities and the use of innovation procurement, industry had as first priority the R&D funding programs focused to Industry and for the RIs the priority was to work with funding agencies to advance on funding tools to the industry specific for R&D. This time there is a bigger alignment between RIs and Industry but each one of them looking from their own perspective. RIs want funding that can be used in

their own R&D using industry. Industry wants funding for R&D programs they can use to develop their capacity to innovate. Both interest can be synergic if there are clear roadmaps and commitment from the RIs. The industry can develop their R&D capacity in a subject that it is important for an RI if there is a potential market behind. This resources can be used to start industrializing and developing other products beyond the first requests from the RIs. The priorities from the ILOs are more linked to the everyday problems they rencounter with contractual rules.

The fourth axis was oriented to organizational actions to be promoted by Industry. The highest priority for the RIs was once more centred on Education and training followed by a desire of more proactive industry on the development of strategic plans. However once more the industry did not share this point of view and considered the highest priority the creation of AIPF and having a way to voice their opinions. ILOs shared with RIs the desire of more proactive industry on the development of strategic plans. Very often RIs complain on the difficulty of having a voice from industry as considering only a few can be seen as promoting or giving advantages to those few. Only a few countries have active associations putting together the science industry. This is considered by ILOs and RIs as a strong barrier to the development of industrial roadmaps.

Finally, the fifth axis was organized around actions to be promoted by industry regarding investment and risk. Without surprise the first priority for the industry was to promote mechanism to share the risk. This action was the lowest ranked by the RIs who consider more important to help to co-fund the needed investment at a fair balance depending on the distance to the market. However, this distance to the market is probably the hottest point of all discussions as Industry very often sees the TRL presented by the RIs far from the reality. In what concern the ILOs they align with industry, and they see the need of share the risk. The economic and technological risks that too often are transferred to the industry when requesting a prototype are nowadays considered unacceptable by many industries. This leads to developments done in-house what cause delays in a possible industrialization of the innovation.

Conclusion:

The results of the survey conducted by AIPF regarding the prioritization of actions outlined in the IFAST Report on extended industrial contributions in RD activities highlight significant disparities in priorities among the Research Infrastructures (RIs), Industry, and the Industrial Liaison Officers (ILOs) communities. These differences underscore the challenges of aligning objectives and expectations across diverse stakeholders within the ASc&T sector.

Across the five axes of the survey, it is evident that each community prioritizes actions based on their unique perspectives and interests, often leading to contradictory priorities. While RIs emphasize the promotion of Education and Training programs, Industry focuses on integration and distribution of information on new initiatives. Meanwhile, ILOs prioritize long-term development plans, reflecting a broader perspective covering community-wide benefits.

Actions to be Launched:

1. **Exploring Synergies with Other Big Science Fields:** AIPF will seek opportunities to learn from best practices in other Big Science fields and promote collaboration across different disciplines to maximize collective impact.

2. **Strengthening Industry Representation:** AIPF will work on strengthening industry representation by providing a platform for industry voices to be heard and included in strategic planning processes. This initiative aims to address concerns about the lack of proactive industry involvement in the development of industrial roadmaps.

3. **Addressing Investment and Risk Sharing:** AIPF will promote mechanisms for sharing risks between Research Infrastructures (RIs) and Industry, ensuring a fair balance in co-funding investments based on the distance to market. This will involve reassessing Technology Readiness Levels (TRLs) and adopting a more collaborative approach to innovation development to mitigate economic and technological risks.

In summary, addressing the disparities in priorities identified by the survey requires a common effort from all stakeholders to foster greater collaboration, understanding, and alignment of objectives within the ASc&T sector. By working together, we can unlock the full potential of industrial contributions to research and development activities, driving innovation and economic growth.

Contribution to EU MATHS

EU-MATHS has been the first call where industry has contributed from day zero. In particular for WP3 where the early involvement of AIPF allowed to obtain direct feedback on the call and on the interest from the Industry on the selection of co-innovation actions.

Role of AIPF on EU MATHS WP3

The global objective of the WP3 of EUMAHTS is the development of a co-innovation program with the European Science Industry involved or potentially related to High Temperature Superconductors (HTS). AIPF will play a key role on consolidating a reliable and stable link with the industry related to HTS.

Another goal is advance on consolidating a reliable and stable link with the industry related to HTS. Setting out an operative contact point with the industry has been declared a limitation in general terms, but more importantly for a co-innovation strategy. This WP will devote resources to constitute an HTS industry board. **The RI co-chair of AIPF will be in charge of this task**.

The HTS Industrial Board will have to address various challenges. including:

- Consolidate bridges between existing industrial and scientific associations interested in HTS technologies.
- Build synergies and provide a critical mass of early adopters.
- Identify existing gaps between present needs, future needs, and industrialization capacity.
- Identify together tools and technologies that can solve the present industrialization challenges.
- Bridge industrial reality with scientific needs towards a higher standardization
- Unite disperse communities with common needs that could be fulfilled by the HTS technology.
- Promote the interest of SMEs on the field of HTS to nourish the HTS industrial ecosystem.
- Improve the communication and visibility of the common success histories in the field of HTS.
- Identify the technological drivers to reduce time to market of superconductivity and HTS to the EU consumers.

The Board will create a network and then propose activities with the aim to:

- Enhance interactions among stakeholders, potentially increasing the likelihood of discovering innovative products and applications.
- Facilitate collaboration among enterprises, particularly welcoming technology-oriented SMEs looking to expand their market presence and participate in exploration projects.
- Envision robust cross-pollination among Industry and Research institutions to increase the Technology Readiness Level (RTL) of new HTS components.

Among the activities there will be seminars, roundtables, workshops and a final summit.

Importantly, the industrial network is envisioned to encompass not only current HTS R&D actors but also future industrial clients, facilitating the transition from early adopters to mass production.

The networking's activities developed during the project will assure that the European industry is involved and sets the basis for an exploitation of their requirements to improve their productivity and competitivity.

I-FAST

AIPF has been invited to the 3rd Annual Meeting of the European project IFAST (Innovation Fostering in Accelerator Science and Technology), hold in Paris on April 2024 to showcase and discuss the diverse initiatives and activities implemented by the Permanent Forum. This invitation provided an opportunity to present insights, exchange ideas, and contribute to collective efforts aimed at enhancing collaboration between industry and research laboratories.

AIPF already worked with I-FAST on the prioritization of actions identified by the IFAST Report on extended industrial contributions in RD activities – working document 3.3.

Communication actions

During the 2023-2024 period, AIPF has used its internal network to spread the information on the different activities organized by the RIs and EU projects to the ASc&T community. The direct emailing has been replaced recently by the usage of LinkedIn and the new web site. While in this moment the network membership is limited to the Board members in 2024-2025, with the approval of the AIPF chart, the membership will be enlarged to:

- Researchers from European Centers and Institutions who have been playing key roles in important R&D Accelerator programs; have matured a consolidated experience in interacting with industry and have been involved in coordinating activities in the context of Accelerator projects.
- Industry professionals who are actively fostering valuable collaborations with research and technology institutions to drive impactful advancements in accelerator technology.
- Individuals, institutions, and associations enhancing the research-industry collaboration.

However, some of the postings have accumulated nearly 1000 views demonstrating the growth an impact possibilities.

WWW: aipf.web.cern.ch

LinkedIn: linkedin.com/in/aipf-asct-permanent-forum-215332296

Internal evolution (Chart, web/linkedin (?)

Towards BSBF
Let's discuss during tomorrow meeting with AIPF about this

WHAT'S NEXT

Integrating information, Fostering community synergy, Prioritizing industry R&D funding, Engaging with research institutions, and Facilitating risk-sharing

After reviewing the conclusions drawn during the initial period following AIPF's establishment, the following working plan for 2024 has been deliberated:

The 2024-2025 Action plan has 5 priorities based on the survey developed last year:

- Promote the integration, classification, and distribution of information on new initiatives, calls, projects and infrastructure upgrades.
- Promote the integration of roadmaps within synergetic communities.
- Work on R&D Funding programs focused to industry.
- Strength the relationship with the Research Institutions, being proactive in the ASc&T strategic development plans.
- Promote mechanism to share the risk between Research infrastructures and Industry for the development of prototypes and low TRL components.

INTEGRATION, CLASSIFICATION, AND DISTRIBUTION OF INFORMATION

Classification system or directory including keywords

AIPF has determined that improved communication channels are essential for effectively disseminating information about initiatives, calls for proposals, projects, and infrastructure opportunities to industry stakeholders. To address this need, a proposal has been put forward to establish a classification system or directory containing keywords associated with various areas of expertise. This system would enable companies to easily locate relevant information. TIARA could potentially play a role in distributing this information to industry stakeholders through their website or other channels. An example of such a classification system is the one utilized in the Netherlands, where users first select one or more lines of work, followed by specifying the activities within that domain. Please refer to the following lists for an illustration.

Line-of-work-and-activities

- Cryogenics
- Cabling & Connectors
- Electronics
- Detectors & Sensors
- Diagnostics & Metrology
- ICT
- Instrumentation & Controls
- Materials
- Materials Handling
- Mechanics
- Mechatronics
- Magnets
- Photonics
- Remote Handling
- Vacuum

Activities

- Assembly
- Consultancy
- Engineering
- Machining
- Production
- Project Management
- Research & Development
- Software
- System Engineering
- System Supplier
- Test & Measurement

Simplification and standardization

In addressing issues related to procurement processes, AIPF advocates for the simplification and standardization of various portals and platforms used for submitting offers. A proposal is put forth for the creation of a unified European database dedicated to submitting European proposals. This initiative aims to streamline the preparation process by consolidating administrative documents, certifications, and declarations required for European calls for tender. The implementation of such a unified system is envisioned to enhance efficiency and effectiveness in proposal preparation, thereby fostering a more cohesive European framework.

PROMOTE THE INTEGRATION OF ROADMAPS WITHIN SYNERGETIC COMMUNITIES.

Emphasizing Competencies

There is a call for a shift in focus towards competencies: rather than solely highlighting the equipment needed for future upgrades, the emphasis is placed on understanding the competencies required to provide such equipment. This approach aims to attract a wider range of companies, expanding the pool of potential suppliers and enriching overall offerings in the totality of the Big science community.

WORK ON R&D FUNDING PROGRAMS FOCUSED TO INDUSTRY

Enhancing Industry Representation

It is confirmed that there is a need to strengthen industry representation in strategic planning processes. AIPF believes that industry should not only be included as members of the Industrial Advisory Committees but also as members of the strategic boards or teams during the preparation of proposals for EC calls and funds designated to support collaboration between RIs and Industry, prior to proposal submission.

STRENGTH THE RELATIONSHIP BETWEEN INDUSTRY AND RESEARCH INSTITUTIONS

Early engagement and collaboration

The importance of **early engagement and collaboration** with industry during project planning and development is emphasized. It is stressed that industry involvement should start from the project's inception to ensure seamless coordination and alignment between research institutions and industry. Examples of successful interaction between research institutes and industry, such as joint workshops and thematic events facilitating cross-community dialogue, are highlighted to identify common challenges and cooperation opportunities.

PROMOTE MECHANISM TO SHARE THE RISK BETWEEN RESEARCH INFRASTRUCTURES AND INDUSTRY

Addressing Investment and Risk Sharing

AIPF underscores the significance of promoting mechanisms for sharing risks between Research Infrastructures (RIs) and Industry, ensuring a fair balance in co-funding investments relative to the proximity to market. This necessitates a reassessment of Technology Readiness Levels (TRLs) and the adoption of a more collaborative approach to innovation development to mitigate economic and technological risks.

GROWTH OF THE NETWORK

What we are going to do to move to become a board with a real big number of members.

AIPF GOVERNANCE

AIPF is composed of members from European institutions and industrial partners, who are actively engaged in collaborating with the RI&TI to develop Accelerator technologies, materials and components.

- Researchers from European Centers and Institutions who have been playing key roles in important R&D Accelerator programs; have matured a consolidated experience in interacting with industry and have been involved in coordinating activities in the context of Accelerator projects.
- Industry professionals who are actively fostering valuable collaborations with research and technology institutions to drive impactful advancements in accelerator technology.
- Individuals, institutions, and associations enhancing the research-industry collaboration.

AIPF can invite as observers Policymakers and members of the International community.

Membership is granted by the AIPF Steering Committee.

New members must be formally sponsored by current members.

The leadership of AIPF is provided through the Steering Committee, which is governed by two co-chairs, one elected among the institutional members and the other among the industrial members. The co-chairs are elected by consensus by the respective members of their group in the Steering Committee and the members representing the research-industry collaboration. The TIARA coordinator manages the process.

AIPF STEERING COMMITEE

INDUSTRY


Raffaella Geometrante Co-chair


Josef Troxler


Hans Priem


Miguel Angel Carrera


Michael Gehring

Rok Hrovatin


Francois Sylla

RESEARCH INSTITUTIONS


Isabel Bejar Alonso Co-chair


Luis Garcia Tabares


Mauro Morandin


Angeles Faus-Golfe


Anthony Gleeson


Antonio Falone


Peter Spiller

ILOs


Jan Visser


Jose Antao

TIARA


Jose Manuel Perez