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I.FAST Industry engagement: present and future

M. Morandin for the WP3 group

II Annual Meeting
Trieste 19 April 2023

iFAST



I.FAST WP3 "Industry engagement"

- The primary mission of Work Package 3 in I.FAST is to increase the **Industry involvement** in R&D and technical development activities, maximizing mutual benefits.
 - WP3.1: [lead by Mauro Morandin (INFN)]: Explore and leverage the **potential and original contributions of industry** in I.FAST, particularly SMEs
 - WP3.2 [lead by Djamschid Safi (DESY)] : Stimulate the **development of the Knowledge Transfer potential** in I.FAST activities and promote its exploitation
 - WP3.3 [lead by Jose M. Perez (CIEMAT)] : **Extend the involvement** of industry, favoring early engagement in R&D activities
- All WP3 partners **have actively participated** in planning and monitoring the activities

WP3.1: promoting and valorizing industrial participation I.FAST

- Coordination of the WP activities
- Organizing the activity of the I.FAST **Industry Advisory Board** (IAB)
- Organizing the I.FAST general **Industry workshops**:
 - a **general workshop** after approx. 1 year from the start of the project (May '22)
 - the second on **HTS R&D and applications** yesterday
 - topical workshop in 2023 and 2024

IAB Members



Angeles Faus-Colfe
Laboratoire de Physique des 2 Infinis Irene Joliot-Curie (IJCLab) CNRS/IN2P3



Miguel Angel Carrera
Founder and CEO of AVS



Ronald Dekker
Owner Demaco



Francesco Fantini
Sales manager Big Science Division - Fantini Sud S.p.A.



Pavel Hedbavny
CEO - Vakuum Praha



Rok Hrovatin
Senior BD advisor - Cosylab



Olivier Tasset - Maye
Sales Manager - Sigma phi



Charles Mangeot
Senior R&D Engineer, Product Specialist, Piezoelectric Actuators - CTS Corporation



Ziad Melhem
Founder and CEO - Oxford Quantum Solutions Ltd



Michael Peiniger
Managing Director - Research-Instruments



François Sylla
Co-founder and CEO of SourceLAB



Josef Troxler
Business Development Manager, Ampegon & OCEM Power Electronics

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I.F.A.S.T.
Innovation Fostering in Accelerator Science and Technology
Horizon 2020 Research Infrastructures GA n° 101004730

The I.F.A.S.T IAB

- First meeting in Oct. 2021
- **TI representatives from European companies**, not directly involved in I.F.A.S.T
- participation balanced across countries, industrial sectors and size of companies
- Mandate: providing advice on:
 - developing the **potential of technologies** developed in I.F.A.S.T
 - defining **suitable business cases**
 - optimizing **impact of the industrial participation** in I.F.A.S.T
 - stimulating **applications** of R&D results
 - **removing obstacles** which limit the effectiveness of collaboration with RI and TI

IAB at work

- IAB members participated:
 - in the selection of the proposals for the **Innovation Fund program** (WP4)
 - as Advisory Board for the AMICI **Technology Infrastructures coordination project** (WP13)
- provided its feedback in the first in-person meeting in May 2022 on issues proposed by I.FAST in three specific areas:
 - I.FAST and industry: **effectiveness of industrial partner engagement in I.FAST** as co-innovators
 - **Next EC Work Programme**
 - Evolution of the **Technology infrastructure for Accelerators**
- in **this annual meeting** IAB members were invited to participate and provide their feedback on the HTS Industry workshop and the Roadmap for T.I. workshop; other topics discussed with the IAB:
 - the **IIF initiative** and exploitation of industrialization and commercialization potential
 - the **Accelerator Industry Permanent forum**
 - the I.FAST **traineeship program**

I.FAST

Innovation Fostering in Accelerator Science and Technology
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Industry Advisory Board

II Meeting CERN - 5 May 2022

MEETING REPORT

HTS Industry workshop - 18/4/23

- **very interesting presentations and discussions**

- talks are available in Indico:
<https://indico.cern.ch/event/1264051/>

- we should have had **more time** for further interactions and exchanges

- a **notebook** has been prepared to exchange further comments, suggestions and comments
<https://docs.google.com/document/d/1az1Lp6iybSmixxpg1YRVrQBKwcLbiAY7X5XfTgkBdXQ/edit?invite=CPiUkT8>

- two important initiatives were presented:

- short-term: a **possible project proposal on HTS developments** to be submitted to the 2024 INFRA-TECH call

- a longer-term: **Superconductivity Global Alliance initiative (ScGA)** to promote the definition and implementation of an **aggressive roadmap** to exploit the disruptive potential of SC application for tackling some of the **most important societal challenges**: energy, transportation, computing, medical diagnostics and therapy,...



Superconductivity Global Alliance (ScGA) initiative for a greener, healthier, prosperous, and sustainable future

Superconductivity
Global Alliance
ScGA

- We wish to catalyse this process and fast-track development through an **“Initiative for Superconductivity” towards a greener, healthier, prosperous, and sustainable future.**

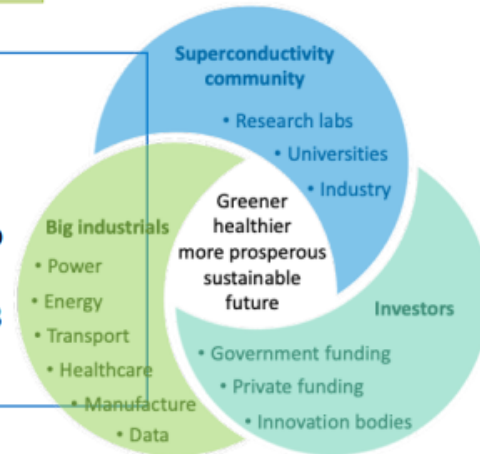
The Vision

Superconductivity has already enabled major advances and capabilities such as MRI, NMR, high magnetic field research, and high energy physics accelerators which otherwise would not be possible. In the future, superconductivity will provide a means towards zero-emission targets, for example by enabling fusion power, expanding usage of wind power, and facilitating zero-emission transportation, as well as enabling new technologies such as superconducting classical and quantum computing, water purification, new medical diagnosis and therapy tools, and new scientific breakthrough

Superconductivity from the Frontier end to Mainstream technologies

ScGA Top Level Targets and Deliverables

- Target 1-** Options for national and private funding of the proposed grand challenges (2024)
- Target 2-** Develop consortia/partnerships between the SC Community, National and Private funding, and Big industrials to address grand challenges (2024)
- Target 3-** Superconducting Global summit at the senior level to facilitate the proposed partnership (2024)
- Target 4** – Adoption of identified options with public + private funding for grand challenges ~ > 1 B Euro over 10 years to deliver on the Strategic Roadmap and the promise from SC for the future



Outcome of the I.FAST Industry workshop in May '22

- fruitful and open discussion between representatives of Industry and R.I.
- common realization of the need to extend **collaboration with Industry** to the stages when **programs, roadmaps and initiatives of common interest are defined, analyzed and prioritized** and to overcome the possible limitations and shortcomings in **exploiting the full collaboration potential** with the necessary commitment and continuity
 - finally, a proposal emerged to move forward by establishing a **permanent Industry - Accelerator R.I. forum**

Accelerator Industry permanent forum (AIPF): the follow up

- Idea discussed during the **2022 BSBF in Granada** (October 2022) with some representatives of the I.FAST IAB and WP3 members
- Proposal submitted to the **TIARA Collaboration Council** on 2022-10-18. Very well received
- **Forum Terms of Reference** was drafted, discussed with the I.FAST IAB, and finally approved by the TIARA collaboration
- Work on-going to draw a first tentative list of members.
- Aiming at setting up the Forum in Spring 2023

AIPF Terms of Reference: goals and charge (I)

- **general**

- 1) Establish a long-term **co-innovation strategical cooperation between industry and research institutions**, beyond the **scope and time frame of specific projects**.

- **ad hoc activities:**

- 1) Provide support for the **definition of the accelerator Science and Technology road-maps**, following an integrated approach that takes into account the resources and the capabilities available, or to be developed, at both Research Institutions and Technological Infrastructures (RI&TI) **and Industry**.

- **periodical activities:**

- 1) Produce a **periodic assessment**, based on well-defined criteria, of the degree and **effectiveness of cooperation between research institutions and industry and further possibilities for improvement**.

AIPF Terms of Reference: goals and charge (II)

- **continuing effort:**

- 1) Outline strategies to **remove obstacles** that limit the optimal exploitation of the synergistic cooperation between industry and RI&TI.
- 2) Indicate possible actions to **fully develop the European industrial potential and respond to possible specific industry needs**, such as:
 - a) exploitation of opportunities for industrial involvement across the broader spectrum of scientific sectors (Fusion, Space, Astrophysics, ...);
 - b) achievement of appropriate critical mass on the ASc&T activities;
 - c) promotion of stronger internal coordination of the industrial companies involved in the ASc&T field
 - d) consolidation of the competitiveness of the European Industry worldwide.
- 3) provide **support to Accelerator-related European projects** in setting up and coordinating their industrial liaison of advisory bodies

AIPF Composition

- equal number of representatives from European:
 - **Accelerator Science and Technology (ASc&T) community**
 - **Industry**
 - 10 - 20 members
- two **Industrial Liaison Officers** of Accelerator International European Organizations
- the **Tiara Coordinator, ex-officio**

AIPF mode of operation

- **two co-chairpersons**, one from R.I., one from Industry
- at least **three meetings** per year
 - can be in person or online
 - remote participation always possible
- possibility foreseen to **span AIPF working groups**
 - and include external experts
- ACTF **will report to TIARA**, at least once per year
- support for AIPF activities:
 - some limited financial support will come from TIARA
 - secretarial support should be provided from the R.I. co-chairperson

I.FAST Task 3.2: Knowledge Transfer and Business Opportunities

- one of the task in I.FAST (WP3.2) is to foster **Knowledge Transfer and Business opportunities in I.FAST accelerator R&D projects**
- the rationale:
 - I.FAST projects are striving to achieve their R&D goals, mainly motivated by scientific interest
 - but, besides the scientific potential to be developed, there is another potential, not often fully exploited, i.e. the potential to;
 - **create transfer Knowledge to industry**
 - **stimulate the build-up of added industrial value** in terms of creating new IP, creating new market opportunities for existing companies, facilitating the creation of spin-offs, etc.
 - one of the goals of the task is therefore to support the I.FAST beneficiaries in achieving an optimal exploitation of this potential

I.FAST Task 3.2

- the new projects funded by I.FAST via the IIF represent **an optimal application domain** for the goals of task 3.2, due to the requirements the proposals had to satisfy:
 - Consortium: at least one I.FAST beneficiary and **one industry**;
 - Initial **TRL 3 or higher** (from proof-of-concept to laboratory/environment validation)
 - Project contributes to improving sustainability of particle accelerator technologies;
 - Project must have potential for **industrialisation or commercialisation.**
 - Project must **have potential to attract more resources** than what deployed by IFAST alone.

Exploiting this potential will not be a free lunch

- **Market acceptance:** It can be difficult to convince potential customers to adopt a new technology, especially if it requires them to change their existing processes or behaviors. **Projects may need to invest in marketing efforts** to help build awareness and understanding of the technology.
- **Competition:** New technologies often face competition from established players and technologies in the market, who may have more resources and a better standing. **Projects may need to differentiate the technology** by highlighting its unique benefits or advantages.
- **Regulatory hurdles:** Bringing new technologies to market often involves navigating complex regulatory environments. **Projects may need to invest time and resources in obtaining or understand necessary approvals or certifications** before they can commercialize.
- **Technical challenges:** Developing and commercializing new technologies can involve overcoming technical challenges, such as scaling up production or ensuring reliability. **Projects may need to invest in additional research and development** to address these maturity issues.
- **Funding:** Bringing new technologies to market can be expensive, and **projects may need to secure funding from investors or partners** to support the efforts.

Next steps

- the plan discussed with Marcello, who coordinates the IIF initiative, is to:
 - **carry out an evaluation of the IIF projects**, based on documentation provided so far :
 - Business Problem, Value Proposition, Applications, foreseeable Impact-Pathways, outlined Business Plan , outlined Commercialization Approach, Risk Analysis, Customer and Partner Interfaces and Relationships, Market Assessment, Actions
 - schedule **individual meetings with the IIF projects**, in the second part of this year, to get a feedback on the approach they have adopted:
 - are the SWOTs of the project, in terms of exploitation of the potential for industrialization and commercialization understood ?
 - is a strategy being developed ?
 - organize a **dedicated session at the Annual meeting in 2024** with experts that can address the most critical aspects that emerged from the interactions with the projects
- this process should also make clear it there are projects that it **may be worth and feasible to support** with expertise available inside I.FAST (WP3) and in the collaborating institutions (e.g.: RIs TT offices, Business Development Units) or outside.

WP3.3: Actions and final objective

- Main planned actions:
 - Perform a survey among the companies to identify **possible ways of extending the industrial contributions** to the R&D activities
 - Collect the feedback from RIs/TIs on the **conditions that should be fulfilled to make the extended contributions possible**
 - **Compile and analyze** the collected material
 - Discuss and propose **specific recommendations**

WP3.3: work carried out

- The specificity of the question recommended face-to-face contacts with companies, RIs, BSOs
- 1-hour conversations carried out with many companies, thanks to cooperation by ILOs

	Company	Contact	Meeting status	
France	ILO	Nicolas Breton	24/2/22	09:30
	SEF-Technologies	Eric Fanio	9/3/22	09:30
	SODITECH	Adrien Deverre	18/3/22	17:00
Netherlands	ILO	Jan Visser	4/3/22	13:00
	CRYOWORLD	Marcel Keezer	31/3/22	13:00
Italy	ILO	Mauro Morandin	18/2/22	15:30
	OCEM Power Electronics	Miguel Pretelli	3/3/22	10:10
	CAEN	Ferdinando Giordano	3/3/22	12:00
	ASG	Antonio Pellecchia	22/3/22	14:00
	SAES	Paolo Manini	9/3/22	16:00
	KYMA	Rafaella Geometrante	28/6/21	15:00
Germany	ILO	Friedrich Haug	2/3/22	16:00
	Billfinger Noell	Michael Gehring	1/7/21	13:30
	Trumpf	Marcus Lau	21/4/22	
	Bevatech	Holger Höltermann		
Spain	Research Instruments	Michael Pekeler	21/4/22	
	ILO	Manuel Moreno		
	AVS	M. Angel Carrera	20/10/21	15:00
	ELYTT	Aitor Echandía	8/10/21	09:00
Sweden	BTESA	Juan Lluch	2/6/21	09:15
	ILO	Fredrik Engelmark	27/4/22	13:3
	Qamcom	Otto Lilja	5/5/22	13:00
Denmark	Scandinova Systems	Mikael Lindholm		
	ILO	Jonas Okkels Birk	8/4/22	14:00
	Mark-wedell	Torven Ekvall	21/4/22	10:00

WP3.3: current status

- **Outcome** of the interviews reported in a document and **summarized through a SWOT table** that will represent the basis for the next phase
- now the emerged issues will have to be examined and recommendations **supported by both Industry and RIs delivered**
- at this point, the Accelerator Industry Permanent Forum seems to provide the right context for carrying out this last part of the planned work



	COLLECTION OF FEEDBACK FROM INDUSTRIAL PARTNERS AND RIS PARTICIPATING IN I.FAST	Milestone: MS10 Date: 30/01/2023
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IFAST

Accelerator Research and Innovation for European Science and Society
Horizon 2020 Research Infrastructures GA n° 101004730

MILESTONE REPORT

Collection of feedback from industrial partners and RIs participating in I.FAST

MILESTONE: MS10

Document identifier:	M10 Extended industrial contributions in RD activities_v6.docx10
Due date of milestone:	End of Month 20 (December 2022)
Report release date:	30/01/2023
Work package:	WP3: [Industry engagement]
Lead beneficiary:	CIEMAT
Document status:	Final report

ABSTRACT

The fundamental goal of the Task 3 of WP3 of IFAST (WP3.3) is to identify how the accelerator science and technology community can improve the effectiveness of industry-research institution collaboration since early stages. In this milestone report, the workplan of WP3.3 is described, together with a description of the activities done at this period of the project. In particular, the collection of feedback from industrial partners and RIs.

WP3.3: topics to be addressed

- main topics emerged in the interaction with Industry and R.I. representatives so far:
 - **effectiveness of the exchange of information** between RI and industry
 - difficulties due to the **small potential market size**
 - successful and less successful programs and **collaborations schemes**
 - use of **funding opportunities**
 - exploitation of **Industry-Academia complementary** roles
 - **IP management**
 - specific contributions that I.FAST can provide, in particular the value of **coordinating strategies with synergistic communities** on accelerator science specific subjects
 - early consideration of **market-related** aspects
 - discussions about the right level of **internal capacities of prototyping**

Conclusions

- WP3 activities **have been carried out as originally planned** for all tasks
- they have confirmed the importance of **consolidating the collaboration with Industry** to implement a real co-innovation paradigm
- the **response from Industry** to the initiatives aimed at implementing this approach **has been very encouraging**
- the activities also highlighted **challenges to be faced and opportunities to be seized** for developing the Technology Transfer potential of I.FAST R&D activities and of Industrial contributions;



- they represent the basis for the WP3 work in the second part of I.FAST