M. Vretenar, 2023 I.FAST Governing Board Meeting

Trieste, 21 April 2023

Status of the project

Completed the 2nd Year of activity (April 2023) – half way through the project.

Successfully completed the 1st EC Periodic Review (1.5.2021-30.10.2022):

- Periodic Report prepared in October-December 2022, submitted in January 2023.
- Scientific Review by external reviewer on 9 February.
- Periodic Report resubmitted with financial information on 9 March.
- Acceptance letter from EC for Period 1 payments received on **12 April**.

Next Period Report (PR2) will cover M18-M36: to be submitted in June 2024 (preparation March-April 2024)

Many achievements but also many delays, partly due to the complex economical environment.

Very successful 2023 Annual Event: 143 registered on-site, 27 on-line)

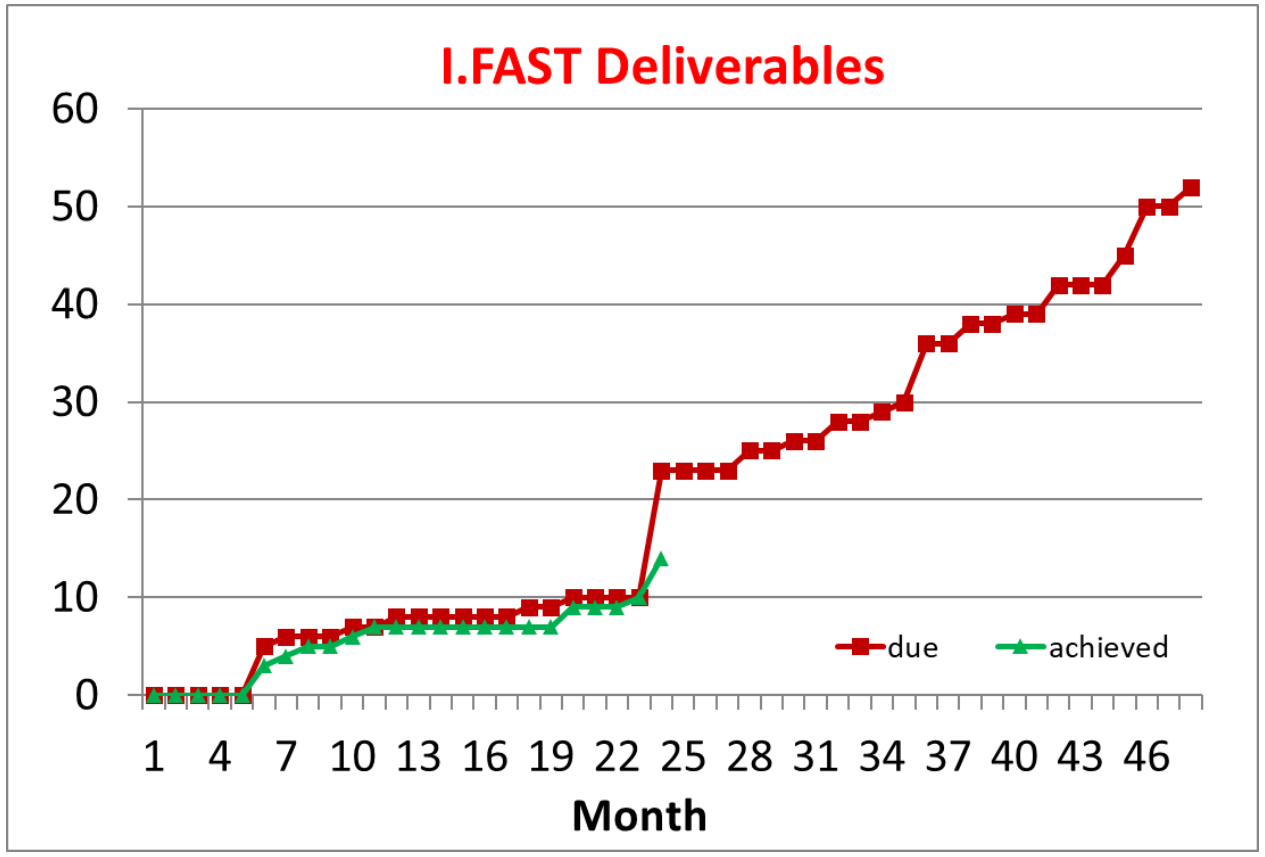
iFAST

Outcome of Period 1 Review

1. Overall assessment
Project has achieved most of its objectives and milestones for the period with relatively minor deviations.
The project has already delivered some significant results in both accelerator developments (additive manufactured RFQ) and also in training and networking activities (challenged based innovation with particle accelerators, management of innovation fund, industry participation) are all very good achievements.

5. Recommendations concerning future work, if applicable
The delayed milestones and deliverables should be achieved and delivered. The number of significant results in accelerator developments from the thematic Work Packages should be increasingly delivered. As one of the main objectives of the project is to promote co-innovation with industry, it is expected that efficient networking, training and also innovation fund management are critical during the future work.

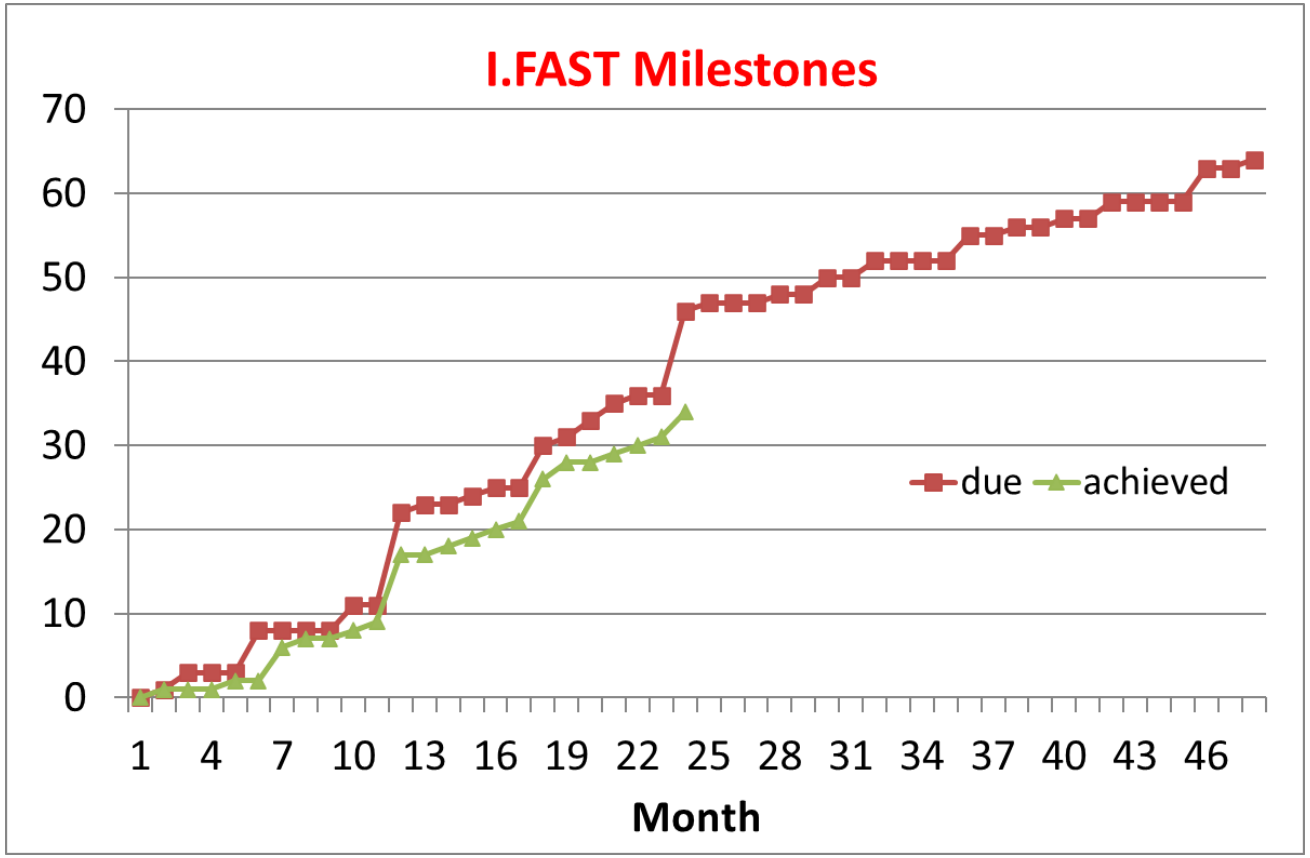
Status of I.FAST - Deliverables



Out of the **13 Deliverables** expected by end of April:

- 4 Deliverables have been submitted.
- 2 Deliverables are in preparation, could come by the end of the month.
- for 6 has has been announced a delay between 6 and 12 months
- for 1 Deliverable we have no news (Task 10.6).

Status of I.FAST - Milestones



- Out of 36 MS due by end of March, only 31 have been achieved (5 are late: AM SC, ACO Workshop, plasma in source, workshop efficient magnets, CCT readiness).
- Out of the additional 10 MS due by end of April, only 4 have been achieved (6 are late).

Known delays (at 6.3.23)

Snapshot at the date of publication of revised P1 Report:

Task 2.4: industrial trainee projects	Significant delay (1year)	Only 3/7 proposals received
Task 7.3: Magnet specifications	Minor delay (3 months)	Delayed hiring of a post-doc at CERN
Task 7.5: CompactLight prototype structures	Significant delay (1 year)	Decease of a key collaborator. Task reorganised, end date moved.
Task 10.4: Additive-manufactured SC cavities	Significant delay (6 Months)	Problems in the supply of material.
Task 11.2: Preliminary Klystron Design Rev.	Significant delay (9 m.)	THALES short of resources
Task 11.3: Prototype adjustable PM quad and CF magnet	Significant delay (6 months)	Magnet specification and mechanical design, took longer.
Task 13.3: First GaN amplifier module	Significant delay (9 months)	Unavailability of some electronic components.
Task 12.3: Internal source for cyclotrons	Significant delay (1year)	Redesign and fabrication difficulties.

Main problems so far:

- Personnel issues
- Material procurement.

inflation and increase in material prices are also coming into the scene (see next slide).

Plus many other “physiological” delays (< 6 months) related to late Workshops or events.

Navigating in a changing world

We are facing the increase of material and energy costs (and related inflation and delays in deliveries) due to the ongoing worldwide crisis.

This is particularly affecting a project like I.FAST with a large quantity of prototype production often made in industry, for which budget estimates were made at the end of 2019.

We are conscious of the problems encountered by some partners and we are ready to discuss solutions, remaining in the limit of the strict budgetary and time limitations of an EU project.

Mitigations: redistribution of work between partners to reduce costs (but increase risks), descoping of some activities (e.g. smaller prototypes), …

Example: The SC magnet case and solution

WP on SC magnets Tasks 8.4, **Construction of a curved CCT magnet demonstrator** and Task 8.5, **Construction of the HTS CCT demonstrator**.

BNG and Scanditronix have asked to quit the project. BNG sent a letter to the Coordinator stating that they "cannot fulfil the milestones to build the requested hardware with the budget available … material and energy prices have risen dramatically since the start of the project… We are thus not any more in the position to allocate R&D money … into I.FAST."

Actions:

Instead of declaring the companies as defaulting partners, the Project will keep them in the collaboration, with 0 or minimum EC contribution, and try to redistribute their work to others.

- **Elytt** (3rd magnet company in the project) has agreed to take BNG's part in Task 8.5.
- The part of Scanditronix in Task 8.4 will be instead internalised and go to **CIEMAT**.

Excellent solution, but comes at the price of increased risk and possibility of delays.

The Coordinator wishes to thank the WP8 management for its dedication in working out possible solutions, and the partners who have accepted to extend their work plan replacing the two leaving partners

Four highlights of the first two I.FAST years

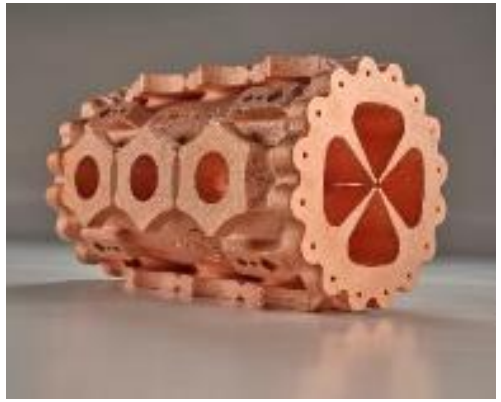
1. Additive-Manufactured RFQ

Task 10.2, **Additively-Manufacturing (AM)** survey and potential developments.

Aimed at identifying specific needs for AM (3D printing) in accelerators, no prototyping foreseen. At the start of work, the **Radio Frequency Quadrupole** (RFQ) compact copper linear accelerator for medical and industrial applications was identified as a component that could greatly profit from AM in terms of production time and cost.

The Task has contacted industrial partners, and Trumpf AG has agreed to produce at no cost for the project a full-scale prototype that is being tested by the Task. Trumpf is joining the Consortium as Partner Organisation.

Wide impact: articles, exhibitions, press release, CERN Bulletin, Accelerating News, CNRS newsletter, CORDIS.



The 3D-printed RFQ module

2. Challenge Based Innovation

Task 2.3, **Challenge-Based Innovation (CBI)** with particle accelerators.

Residential challenge for 24 master students with different backgrounds organised in 4 teams to propose new applications of accelerators for the environment.

Winner: project CYAN for stopping eutrophication (harmful algal bloom) in lakes.

Strong success, projects will be followed-up, articles on CERN Bulletin, Accelerating News and other newsletters, CORDIS. Will be repeated in 2023.

3. I.FAST Innovation Fund

Task 4.2, **Management of the Innovation Fund**.

1 M€ funding to an internal competitive call for innovative projects, starting early 2023, for a duration of 2 years. In advance on schedule (awarding at M20 instead of M24)

1. Funding between 100 and 200 k€ per project;
2. Consortium: at least one I.FAST beneficiary and one industry;
3. Initial TRL 3 or higher (from proof-of-concept to laboratory/environment validation);
4. Project contributes to improving sustainability of particle accelerator technologies;
5. Project must have potential for industrialisation or commercialisation.
6. Project must have potential to attract more resources than what deployed by IFAST alone.

18 projects submitted, 8 selected by a 10-member Evaluation Committee:

Smooth selection procedure and excellent quality of the selected projects.
Budget allocations approved by the Governing Board by e-mail vote.

4. Industry participation

Task 3.1 **Industry engagement coordination and industrial partnership support**

Engagement of industry has been so far excellent:

- 16 industrial partners,
- 12 industry members in the I.FAST Industry Advisory Board,
- **230** registered participants in the 1st I.FAST Accelerator-industry co-innovation workshop**, 91 from industry**.

Many interesting discussions, resulting in the creation of the "**Accelerator Science and Technology Permanent Industry Forum**" that will continue after I.FAST. The Terms of reference will be presented and discussed at the next Annual Meeting.

The Coordinator was invited to present the I.FAST industrial strategy at the **2022 International Particle Accelerator Conference** (Bangkok, June 2022), at the EPS Forum in Paris, and at the Big Science Business Forum in Granada.

Thank you for your attention

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under GA No 101004730.

Budget transfers for Task 2.4
Industry exchange programme

1. From CERN (Task 2.4) to Uppsala, 6’000 EUR (direct costs) for Dancila-Leijenaar exchange.
2. From CERN (Task 2.4) to Thales, 9’404 EUR (direct costs) for Thales visits to CERN.

69520 CHF at CERN, 79000 EUR allocated to Task 2.4