I.FAST Open Steering Committee Meeting

15 November 2021

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Technology Infrastructure for Accelerators and Magnets

WP13 General objectives:

- Propose a strategic approach ensuring the long-term sustainability of the TI and the development of its capabilities in view of the construction of future accelerator-based RIs.
- Extend and strengthen the cooperation with industry to exploit opportunities of fostering innovation in related technologies.
- Develop and promote services, within a common approach, for the benefit of RIs, future scientific projects and high-tech industry.

Technology Infrastructure for Accelerators and Magnets

WP13 Tasks:

- **Task 13.1:** Strategy for the development of the AMICI TI(M1-M24)
  Partners: CEA,CIEMAT,CNRS,DESY,IFJ-PAN,INFN,KIT,PSI,UKRI,UU
- **Task 13.2:** Developing and promoting services to industry in AMICI TFs (M1-M24)
  Partners: DESY,CEA,CIEMAT,CNRS,DESY,IFJ-PAN,INFN,KIT,UKRI,UU
- **Task 13.3:** New RF amplifiers based on GaN semiconductors(M1-M24)
  Partners: UU,CERN
  - ↪ An example of an upgrade of a TP allowing to keep the TF at the forefront of the technology in a Key Technical Area (presentation by D. Dancila)

Task 13.1: Strategy for the development of the AMICI TI

- Sub-Task 13.1.1 (CEA): Define the roadmap for the strategic evolution and development of the AMICI TI, in terms of key TPs in key technological areas, required in view of the possible opportunities of engagement in new projects, in and outside Europe.
- Sub-Task 13.1.2 (CEA): Optimize the complementarity between the different TFs and maximize the involvement of their industrial partners by defining which interventions are needed to adapt the European TI in order to satisfy the requests from Industry.
- Sub-Task 13.1.3 (CEA): Raise awareness about the AMICI TPs and promote their use by external users in particular industry.

Sub-Task 13.1.1: Roadmap for the strategic evolution and development of the AMICI TI

1. Needs for the different fields of applications:
   - **1.1.** Particle Physics: P. Védrine, H. Weise, D. Bocian, W. Kaabi

     Use of the LDG Accelerator R&D Roadmap under development
   - **1.2.** Nuclear Physics: G. Bisoffi
   - **1.3.** Energy – fission (ADS) and fusion (accelerators and magnets): P. Vedrine, J.M. Perez, D. Bocian
   - **1.4.** Material and biological Science: (Light sources and Neutron sources for material studies): H. Weise, T. Ekelöf (use of the LENS Report on Low Energy Accelerator-driven Neutron Sources)
   - **1.5.** Medical applications (including hadron therapy, magnets for MRI…) : G. Bisoffi, P. Védrine, A. Gleeson, CERN?
   - 1.6. Other applications (of big magnets) : P. Védrine
2. Implications on the necessary developments/upgrades of the different categories of TPs:
   - **2.1.** Facilities for beam tests of accelerator components
   - **2.2.** Test stations for magnets
   - **2.3.** Magnetic measurement facilities

     Etc ….

Sub-Task 13.1.2: Optimize the complementarity between the different TFs and maximize the involvement of their industrial partners

- Definition of the categories of TPs : done
- For each TF
  1. make an inventory and do it by type of platform
  2. Categorize the different TPs
  3. Find specialists for each category
  4. Update information for each TP keeping only the TPs really open or to be open to external users
  5. Identification of needed adaptation, upgrade, improvement

  Work in progress for 1-4

Categorization of the TPs : Final list

- **Facilities for beam tests of accelerator components**
- **Test stations for magnets**
  - Test stations for superconducting magnets
  - Test stations for normal conducting magnets
  - Magnetic measurement facilities
- **Test stations for RF equipment**
  - Test stations for superconducting cavities
  - Test stations for normal conducting cavities
- **Test stations for high power RF components**
  - RF wave guides
  - RF power sources
  - Power transistors
  - High power amplifiers
  - Solid State Power Amplifiers with their combiners and control system
- **Test stations for mechanical manufacturing and tests (at cryogenic temperatures)**
- **Platform for characterization, treatments and tests of materials**
  - Thermal treatment platforms
  - Chemical treatment platforms
  - Facilities for surface analyses
- **Characterization, analysis and measurement facilities**
  - Magnetic measurement facilities
  - Facilities for surface analyses and material tests
- **Platforms for clean assembly, alignment and tests of accelerator components**
  - Complete accelerator modules
  - RF power couplers

Sub-Task 13.1.3: Raise awareness about the AMICI TPs and promote their use by external users in particular industry

- Migration of the website from Poland to France (CNRS/IJCLab) done: https://amici.ijclab.in2p3.fr
- An alias will be created so that the address of the website is the same as before, namely **https://eu-amici.eu/**
- Updates to the TP will be made on this website but in the long term, for more flexibility, a new site will be developed in Wordpress.

Task 13.2: Developing and promoting services to industry in AMICI TFs

- Sub-Task 13.2.1 (CEA): Organization and operation of a central information and contact point for industry and other external partners to access TPs.
  - CEA: Anne-Laure Pelé, Arnaud Madur and Sylvain Roux
  - INFN: Giovanni Bisoffi
  - KIT: Olaf Baake
  - UKRI: Anthony Gleeson
  - CIEMAT: Jose Manuel Perez
  - CNRS: Walid Kaabi
  - IF-JPAN: Dariusz Bocian
  - UU: Tord Ekelöf

- Sub-Task 13.2.2 (DESY): analysis of the different procedures in different TFs, corresponding to different cases, and propose a set of standardized rules, making the access simpler and faster for external partners.
  - ↪ The general terms of conditions for service contracts from DESY technology transfer group will be used as a departure point to define examples of procedures that should be adaptable to local conditions

- Sub-Task 13.2.3 (INFN): At least two small workshops dedicated to a particular type of TP will be organized per year

Task 13.2: Developing and promoting services to industry in AMICI TFs

- **Sub-Task 13.2.3 (INFN):** At least two small workshops dedicated to a particular type of TP will be organized per year, which will gather personnel from the labs operating TPs of this type and possible users in particular from industry.
    - **February 2022: test benches for SRF cavities organized by DESY**
        - Proposed date: week 7, 2022, starting February 14th
        - Advertise all vertical cavity test facilities which are operated by the ETIAM core team, guests are welcome.
        - DESY, STFC, CEA, IJCLAB, INFN LASA, Uppsala, (HZB) are operating such facilities : they all should be presented, perhaps by life moderated video
        - Industry participants will be invited to tell about their needs and plans. Possibility to invite people from other fields
        - A short abstract will be written to advertise the public concerned.

Sub-Task 13.2.3: Workshop on SRF test facilities at DESY

- **Sub-Task 13.2.3 (INFN):** At least two small workshops dedicated to a particular type of TP will be organized per year, which will gather personnel from the labs operating TPs of this type and possible users in particular from industry.
  - **June 2022:** SC magnets workshop organized by INFN (Milano)
    - Date to be defined together with WP3
  - **Autumn 2022:** Mechanical tests at cryogenic temperature organized by CEA.
    - Subject to be a little broadened
  - **Last workshop: subject and location to be defined**

Task 13.3: New RF amplifiers based on GaN semiconductors

↪ See presentation by Dragos Dancila

Links to other I.FAST WPs

- **WP3 - Industry engagement** (coord. M. Morandin (INFN))
  - **Task 3.1**: Coordination and industrial partnership support
    - ➥The I.FAST Industry Advisory Board (IAB) will be asked to be also the AMICI IAB
  - Meetings involving industry will be organized in collaboration with WP3
- **WP2 - Training, communications and outreach for accelerator science and technology in Europe** (coord. Ph. Burrows (UOXF))
  - **Task 2.4**: Industrial Training associated with Knowledge Transfer (T. Ekeloff (UU))
    - ➥Advertisement on the AMICI website of the industrial trainee program
    - ➥Participation to the selection of trainees

Deliverables and milestones

- **D13.1**: Strategy for the development of the AMICI TI

Report on the key TPs that need to be sustained over the long term and possibly developed/upgraded in the future: **M24**

MS61: Organization of the workshop: **M21** (Indico site)

- **D13.2:** Report on the development and promotion of services to industry.

Report on the organization and operation of the contact point, on the organized workshops and proposition for standardized access rules: **M24**

MS62: Central information and contact point operational: **M15** (Web site)

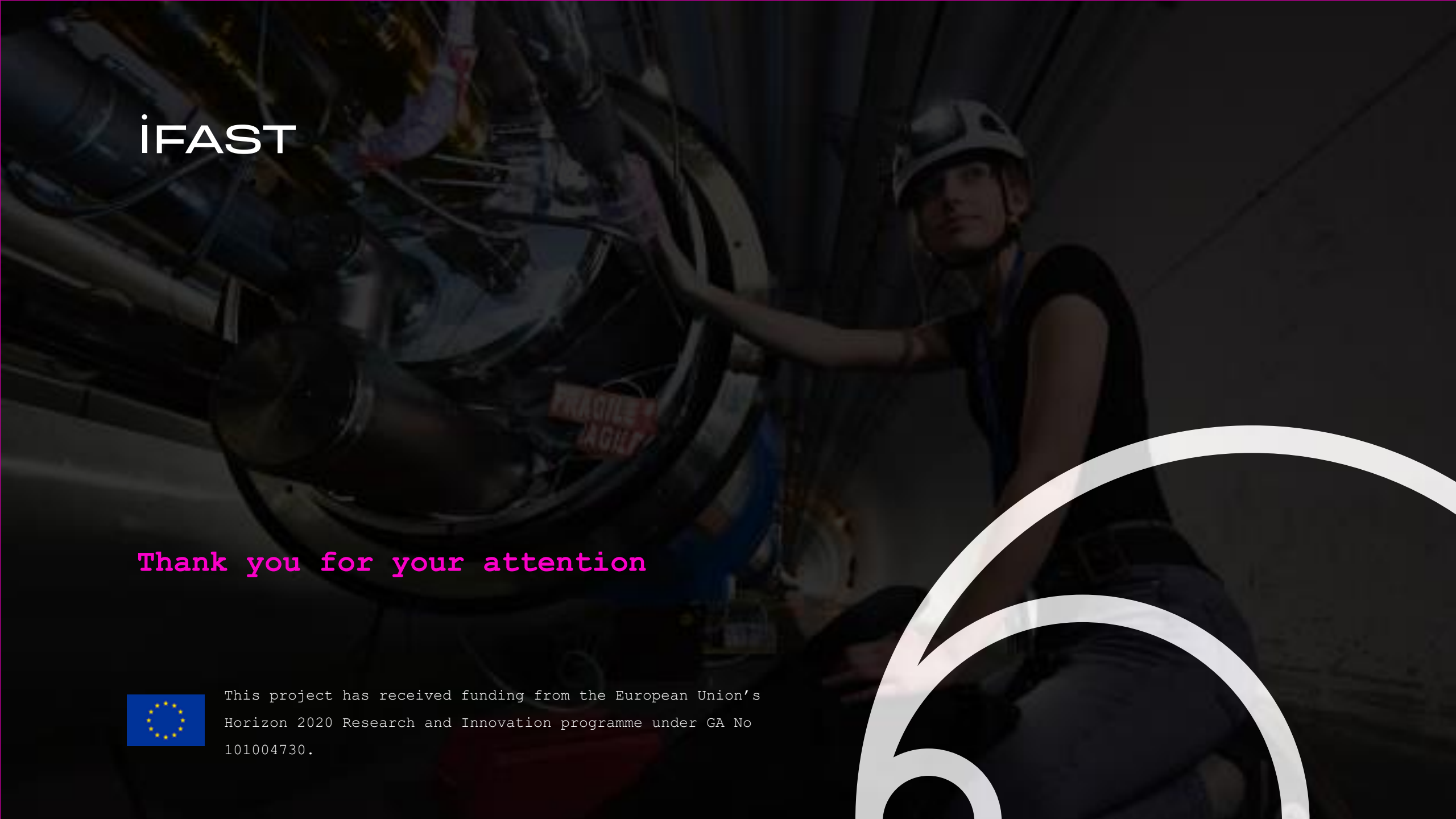
- **D13.3:** GaN RF amplifier module at kW level.

Realisation of an RF amplifier module based on GaN semiconductor technology and demonstration of combined power at kW level: ***M24***

MS63: Demonstration of operation with high efficiency and nominal power of the first GaN amplifier: **M12** (Report)

Conclusion

- Work is progressing in the 3 Tasks more or less according to the schedule



Thank you for your attention

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