Grant Agreement No: 731086

AMICI

Accelerator and Magnet Infrastructure for Cooperation and Innovation

Horizon 2020 / Coordination and Support Action (CSA)

DELIVERABLE REPORT

ELIGIBILITY CRITERIA FOR ACCESSING TO THE CORE GROUP OF LARGE TECHNOLOGY INFRASTRUCTURE

DELIVERABLE: 3.1

Document identifier:	AMICI-D3.1-v3.0
Due date of deliverable:	End of Month 18 (June 2018)
Report release date:	30/09/2018
Work package:	WP3: Cooperation
Lead beneficiary:	CEA
Document status:	Final

Delivery Slip

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Approved by	Steering Committee		26/09/2018

Deliverable:

Report defining the eligibility criteria for accessing to the core group of large Technology Infrastructure.

Executive summary:

The need and principle for eligibility criteria are explained. A set of criteria is enunciated and their applicability verified against the situation of every AMICI beneficiary.

1. INTRODUCTION

The realization of unprecedented scientific endeavors, like the LHC, EU-XFEL, ESS and ITER Research Infrastructures, has been made possible thanks to the 'de facto' foundation of a European **Technology Infrastructure** (TI) formed by a network of Technological Facilities (TF) located at European research laboratories that are dedicated to the development, testing and production of accelerator components and SC magnets, in collaboration with industry.

To face the long lead time needed for the construction of the future very large Research Infrastructures, and the unavoidable gaps between projects, the core AMICI group believes that the existence of the Technology Infrastructure must be secured and its future capacity reinforced by providing it with an organic constitution allowing, at some level, for organized relationships, dynamical planning and strategy coordination. A stronger organization will also make it possible to diversify further its activity towards innovation by fostering and hosting industrial developments.

If successful, such a Technology Infrastructure body would attract inevitably and rightfully other European partners active in the field of accelerators and superconducting magnets. Hence, the question of their eligibility as new members of the Technology Infrastructure without losing efficacy and direction must be decided.

2. ELIGIBILITY PRINCIPLE

The eligibility key principle is therefore the capacity and the willingness of the new Member to integrate itself in an organization of Technological Facilities that coordinate their efforts and their development towards the construction of future research infrastructures, and that are willing to provide access to their technical platforms (TP) to other partners and to industries. Several criteria can be used to assess this principle:

1) the TF record and future plans of contributions to the construction of Research Infrastructures, in collaboration with the existing TI (cf. Table of TP Occupancy),
2) the TF record and future plans of collaboration with industry,
3) the accessibility of the Technological Facility to partner and industry collaborators,
4) the operability of the platforms in terms of financial and human resources,
5) the adaptability and versatility of the Technological Facility to evolving technical needs.

Another crucial aspect is the capability of the new Member to reinforce the technical spread and the expertise of the existing Technology Infrastructure and hence contribute to more

efficient sharing of efforts at the European level. This can be assessed through the following criteria

1) the complementarity of the Technological Facility within the TI
2) the strength of personnel and technical platforms in some critical areas

The fulfilment of these criteria should be itemized and verified in the Membership Accession Agreement, together with a detailed description of the technical platforms constituting its Technological Facility.

Terms of Association for University research units and industrial companies to the benefits of the work of the Technology Infrastructure core group, will be sought and decided in a second stage.

3. ELIGIBILITY CRITERIA TABLE

In the following tables, the relevance and the applicability of the eligibility criteria enunciated above are verified and motivated by every AMICI beneficiary.

			Name :	Olivier Napoly (CEA)		Name :	Maurizio Vretenar (CERN)	
Type of eligibility criterion	#	**Eligibility criterion (idea of concrete item to be analyzed in order to decide the eligibility of the TF)**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**
Capacity and willingness of the new Member to integrate itself in an organization of Technological Facilities that coordinate their efforts and their development towards the construction of future research infrastructures, and that are willing to provide access to their technical platforms (TP) to other partners and to industries	**1**	TF record and future plans of contributions to the construction of Research Infrastructures, in collaboration with the existing TI (cf. Table of TP Occupancy),	OK	Fulfilled	Past record: LHC, HERA, SPIRAL2, XFEL, FAIR, ISEULT, JT60-SA, ITER, ESS,... Future plans: FCC, ILC, DEMO, PIP-II are being dicussed, with already some R&D activities	OK	Fulfilled	While all CERN TF contribute to CERN projects, some facilities have a record of contribution to external projects (magnet labs, cavity testing, surface treatement) and others have not.
	2	TF record and future plans of collaboration with industry,	OK	Fulfilled	Pantechnick, Thales, Alcen, Alstom, Zanon, ASP, ...	OK	Fulfilled	Only partially fulfilled. CERN TF's are accessible to industry only for magnet co-development.
	3	Accessibility of the Technological Facility to partner and industry collaborators,	OK	Fulfilled	Access is granted case by case	OK	Fulfilled	Priority is given to CERN projects.
	4	Operability of the platforms in terms of financial and human resources,	OK	Fulfilled	All platforms are operational, most of them in operation.	OK	Fulfilled	
	5	Adaptability and versatility of the Technological Facility to evolving technical needs.	OK	Fulfilled	A policy priority, with budget provided by projects	OK	Fulfilled	
Capability of the new Member to reinforce the technical spread and the expertise of the existing Technology Infrastructure and hence contribute to more efficient sharing of efforts at the European level	**1**	Complementarity of the Technological Facility within the TI	OK	Fulfilled	CEA TF is networked with all other AMICI TFs, an example is the current ESS construction	OK	Fulfilled	Some CERN facilities, in particular in the SC magnet area, are unique in the world. Others are less unique and their role in the TI can be rediscussed.
	2	Strength of personnel and technical platforms in some critical areas	OK	Fulfilled	- Platform for mechanical measurement at cryogenic temperature. - Platform for electrical and mechanical measurement at cryogenic temperature. - Vertical cavity electropolishing - Large ISO4 clean room	OK	Fulfilled	CERN has very competent technical personnel oerating the TF, in particular in the critical areas of SC magnets, RF, mechanical treatments, measurements.

			Name :	Hans Weise (DESY)		Name :	Pasquale Fabbricatore (INFN)	
Type of eligibility criterion	#	**Eligibility criterion (idea of concrete item to be analyzed in order to decide the eligibility of the TF)**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**
Capacity and willingness of the new Member to integrate itself in an organization of Technological Facilities that coordinate their efforts and their development towards the construction of future research infrastructures, and that are willing to provide access to their technical platforms (TP) to other partners and to industries	**1**	TF record and future plans of contributions to the construction of Research Infrastructures, in collaboration with the existing TI (cf. Table of TP Occupancy),	OK	Fulfilled	Past record: TTF/FLASH, European XFEL, LCLS-II, ELBE at FZD Rossendorf, S-DALINAC (Uni Darmstadt), MESA (Uni Mainz), TARLA, HZB Future: ESS, LCLS-II cont., SINAP Shanghai	OK	Fulfilled	Past record: LHC, XFEL, ESS, IFMIF Future plans: FCC, ILC
	2	TF record and future plans of collaboration with industry,	OK	Fulfilled	Research Instruments, Zanon,	OK	Fulfilled	ASG Superconductors, CAEN, Cecom, Cinel, OCEM, Zanon
	3	Accessibility of the Technological Facility to partner and industry collaborators,	OK	Fulfilled	Access is granted on a case by case decision	OK	Fulfilled	Access is granted case by case
	4	Operability of the platforms in terms of financial and human resources,	OK	Fulfilled	all operational and regularly used	OK	Fulfilled	All platforms are operational, most of them in operation.
	5	Adaptability and versatility of the Technological Facility to evolving technical needs.	OK	Fulfilled	All adaptable, depending on funding and needs	OK	Fulfilled	The facility are adapted and, in case , upgraded on the basis of the project and with project funds
Capability of the new Member to reinforce the technical spread and the expertise of the existing Technology Infrastructure and hence contribute to more efficient sharing of efforts at the European level	**1**	Complementarity of the Technological Facility within the TI	OK	Fulfilled	some TFs complementary, some unique; sustainability as part of the DESY strategy	OK	Fulfilled	INFN Technological Facility is networked with all other AMICI TFs, an example is the current ESS construction
	2	Strength of personnel and technical platforms in some critical areas	OK	Fulfilled	strength of personnel and technical platforms given; sustainability requires continuing R&D program to educate young scientists and engineers	OK	Fulfilled	All INFN technical platforms are highly qualified involving special tools, instrumentation and dedicated personnel. However none of them is unique, because there are similar TPs in other TF.

			Name :	Karol Kasprzak (IFJ PAN)		**Name :**	Walid Kaabi (CNRS)	
Type of eligibility criterion	**#**	**Eligibility criterion (idea of concrete item to be analyzed in order to decide the eligibility of the TF)**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**
Capacity and willingness of the new Member to integrate itself in an organization of Technological Facilities that coordinate their efforts and their development towards the construction of future research infrastructures, and that are willing to provide access to their technical platforms (TP) to other partners and to industries	**1**	TF record and future plans of contributions to the construction of Research Infrastructures, in collaboration with the existing TI (cf. Table of TP Occupancy),	OK	Fulfilled	Past record: LHC, SPIRAL2, XFEL, ESS, FAIR, HL-LHC Future plans: FCC, ILC, DONES, PIP-II, POLFEL	OK	Fulfilled	Past record: TTF, FLASH, CTF3, Spiral2, XFEL, ESS, ThomX, FAIR,EUROTRANS, EURISOL,MYRTHE Future plans: PIP II, ILC, MYRRHA, PERLE@Orsay
	2	TF record and future plans of collaboration with industry,	OK	Fulfilled	KRIOSYSTEM, FRAKOTERM, PONAR, ZAMET	OK	Fulfilled	Pantechnick,Thales, RI, Sigmaphi, SEF, Cryodiffusion, Zanon, Air Liquide, TAV,SDMS
	3	Accessibility of the Technological Facility to partner and industry collaborators,	OK	Fulfilled	Access is granted	OK	Fulfilled	Access is granted depending on TF occupancy schedule
	4	Operability of the platforms in terms of financial and human resources,	OK	Fulfilled	A budget is provided by statutory foundings and projects	OK	Fulfilled	All platforms are operational
	5	Adaptability and versatility of the Technological Facility to evolving technical needs.	OK	Fulfilled	The new infrastructure is under construction and will be adopted to the project needs.	OK	Fulfilled	Could be adapted up to a certain level: without deep changes of main equipment characteristics. In case that projects provide funds for deep changes, this could be discussed regarding policy priority and occupancy schedule.
Capability of the new Member to reinforce the technical spread and the expertise of the existing Technology Infrastructure and hence contribute to more efficient sharing of efforts at the European level	**1**	Complementarity of the Technological Facility within the TI	OK	Fulfilled	IFJ PAN is taking part in the current ESS construction in Lund(Sweden) and LHC-HL .	OK	Fulfilled	CNRS TF is networked with all other AMICI TFs, an example is the current ESS construction and E-XFEL before.
	2	Strength of personnel and technical platforms in some critical areas	OK	Fulfilled	IFJ PAN personel is highly qualified with an ability to travel.	OK	Fulfilled	The strength of CNRS Technical platforms is the adaptability to mass production and the proximity and complementarity with other TFs in the same geographical area (CEA).

			Name :	Peter McIntosh (STFC)		Name :	Tord Ekelof (FREIA)	
Type of eligibility criterion	**#**	**Eligibility criterion (idea of concrete item to be analyzed in order to decide the eligibility of the TF)**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**
Capacity and willingness of the new Member to integrate itself in an organization of Technological Facilities that coordinate their efforts and their development towards the construction of future research infrastructures, and that are willing to provide access to their technical platforms (TP) to other partners and to industries	**1**	TF record and future plans of contributions to the construction of Research Infrastructures, in collaboration with the existing TI (cf. Table of TP Occupancy),	OK	Fulfilled	Past record: LHC, ELI-NP, SwissFEL, CLIC, ESS, ... Future plans: FCC, PIP-II are being dicussed, with already some R&D activities	OK	Fulfilled	Past record: ESS, XFEL Future plans: ESS, LHC High Lumi Upgrade
	2	TF record and future plans of collaboration with industry,	OK	Fulfilled	e2v, Rapiscan, FMB-Oxford, Dbeam,	OK	Fulfilled	ScandiNova AB, Scanditronix AB, RFR Soultions AB
	3	Accessibility of the Technological Facility to partner and industry collaborators,	OK	Fulfilled	Access is granted case by case	OK	Fulfilled	Access is granted case by case
	4	Operability of the platforms in terms of financial and human resources,	OK	Fulfilled	All platforms are operational, staffing and financial resources are available.	OK	Fulfilled	All platforms are operational, except of the vertical cryostat which is undr construction and will be in operation from the autumn 2017
	5	Adaptability and versatility of the Technological Facility to evolving technical needs.	OK	Fulfilled	A policy priority, with budget provided by projects	OK	Fulfilled	A policy priority, with budget provided by projects
Capability of the new Member to reinforce the technical spread and the expertise of the existing Technology Infrastructure and hence contribute to more efficient sharing of efforts at the European level	**1**	Complementarity of the Technological Facility within the TI	OK	Fulfilled	STFC TF is networked with all other AMICI TFs, an example is the current ESS and ELI-NP construction	OK	Fulfilled	FREIA TF is networked with several other AMICI TFs taking part in the current ESS construction
	2	Strength of personnel and technical platforms in some critical areas	OK	Fulfilled	- electron beam exploitation platform such as VELA, higher energy facility CLEAR available at CERN. - FETS proton front-end maybe unique.	OK	Fulfilled	Personnel: highly specialized in cryogenics, rf source, high vacuum, process control, sc accelerator cavities, sc magnets, mechanics. Technical Platforms: a highly versatile horizontal cryostat of the HobyCat type, high capacity He liquefier 150 l/hour, 800 kW 352 MHz and 300 kW 704 MHz power sources, soild state 352 MHz power sources, vertical cryostat and high current sources for sc magnet test under construction

			Name :	Terry Garvey (PSI)		Name :	Steffen Grohmann/Anke-Susanne Mueller (KIT)	
Type of eligibility criterion	**#**	**Eligibility criterion (idea of concrete item to be analyzed in order to decide the eligibility of the TF)**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**	**Do you agree with this criterion?**	**Would your TF fulfill this criterion?**	**Remarks**
Capacity and willingness of the new Member to integrate itself in an organization of Technological Facilities that coordinate their efforts and their development towards the construction of future research infrastructures, and that are willing to provide access to their technical platforms (TP) to other partners and to industries	**1**	TF record and future plans of contributions to the construction of Research Infrastructures, in collaboration with the existing TI (cf. Table of TP Occupancy),	Yes	Yes	Depending on the TF it is already the case for SwissFEL, SLS, Ring cyclotron, E-XFEL, FLASH.	OK	Fulfilled	Past record: ANKA, XFEL, FLASH, FAIR, SOLEIL, DELTA, TELBE Future plans: HL-LHC, FCC, CLIC, BESSY VSR with R&D activities
	2	TF record and future plans of collaboration with industry,	Yes	It could do	There are no current plans for collaboration with industry using the TI	OK	Fulfilled	Bilfinger Noell, Thales, Microworks
	3	Accessibility of the Technological Facility to partner and industry collaborators,	Yes	Yes	Could be used by industry subject to availability.	OK	Fulfilled	Access is granted case by case
	4	Operability of the platforms in terms of financial and human resources,	Yes	Yes	Resources would be maintained as long as the TF is needed for a corresponding RI.	OK	Fulfilled	Most platforms are operational and in operation, one in commissioning
	5	Adaptability and versatility of the Technological Facility to evolving technical needs.	Yes	Possibly		OK	Fulfilled	A policy priority, with budget provided by projects or research program
Capability of the new Member to reinforce the technical spread and the expertise of the existing Technology Infrastructure and hence contribute to more efficient sharing of efforts at the European level	**1**	Complementarity of the Technological Facility within the TI	Yes	Yes		OK (but same as 2 in my opinion)	Fulfilled	KIT ATP is one TF to combine accelerator-relevant infrastructure with interdisciplinary research (see #2)
	2	Strength of personnel and technical platforms in some critical areas	Yes	Yes	At least for some platforms.	OK	Fulfilled	KIT ATP combines accelerator-relevant infrastructure, interdisciplinary research and all technologies available in the Research University in the Helmholtz Association (examples: electron storage ring and short-pulse linac test facilities accessible via ARIES, cryogenics infrastructures, Karlsruhe Nano-Micro Facility, Gyrotron Test Faciltiy)

4. CONCLUSION

Based on the above poll, all AMICI beneficiaries are indeed potential members of a future Technology Infrastructure organization. The next step towards establishing such a Technology Infrastructure requires answering the following questions:

1) To which body our present AMICI collaboration should morph past 2019?
2) Which status and rules should we propose for its core group?
3) Which status and rules of association should we propose to industries and universities, European and non-European?

WP3 together with AMICI partners will act towards providing some elements of answers.