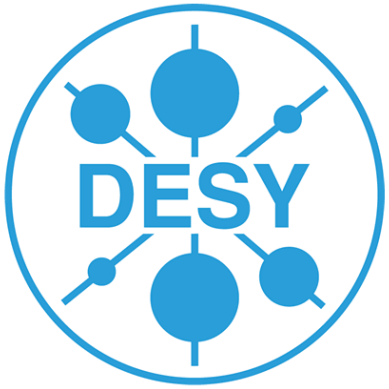
‘Accelerator and Magnet Infrastructure for Cooperation and Innovation’

Olivier Napoly, coordinator

CEA/Irfu

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR RESEARCH & INNOVATION
Research infrastructure

AMICI Consortium



AMICI: 01/01/2017 - 30/06/2019

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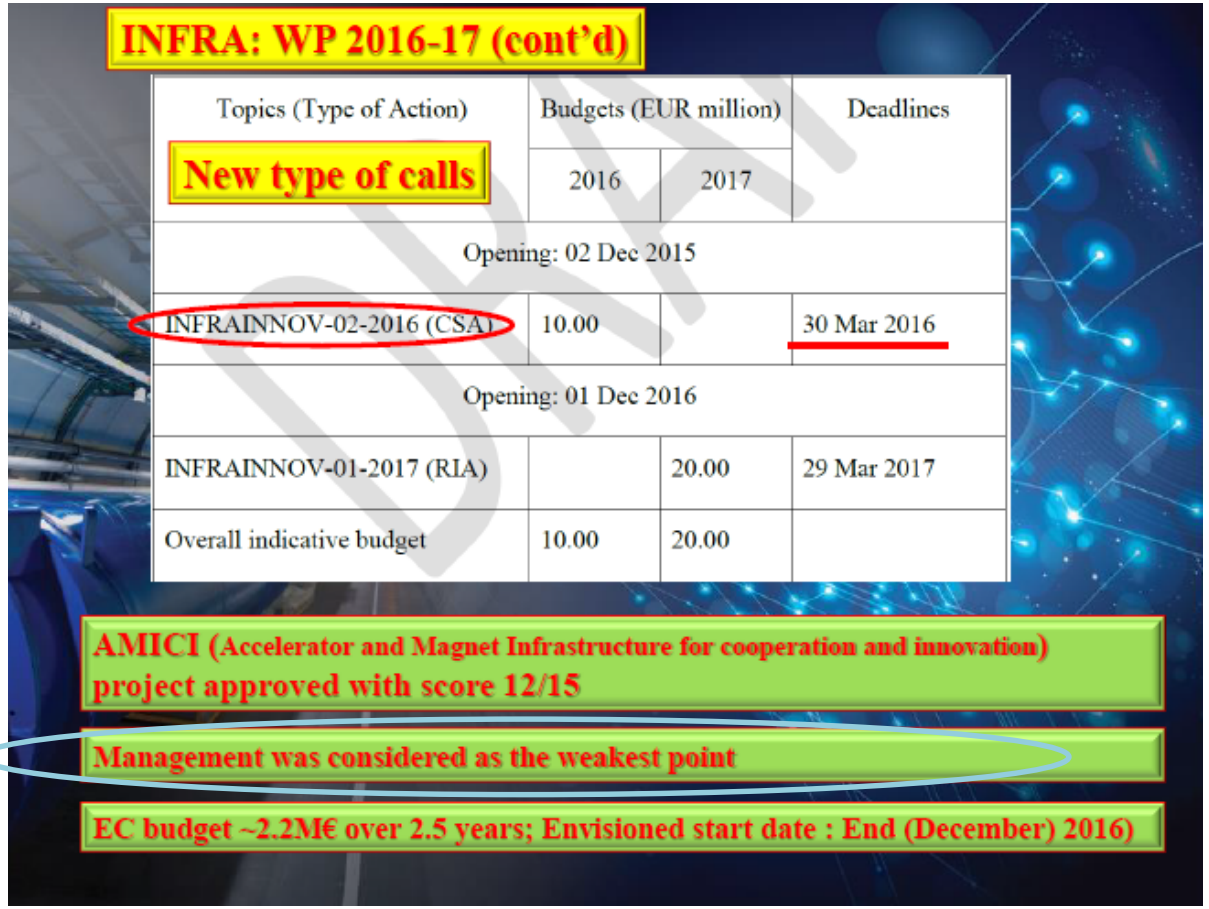

AMICI: 01/01/2017 - 30/06/2019

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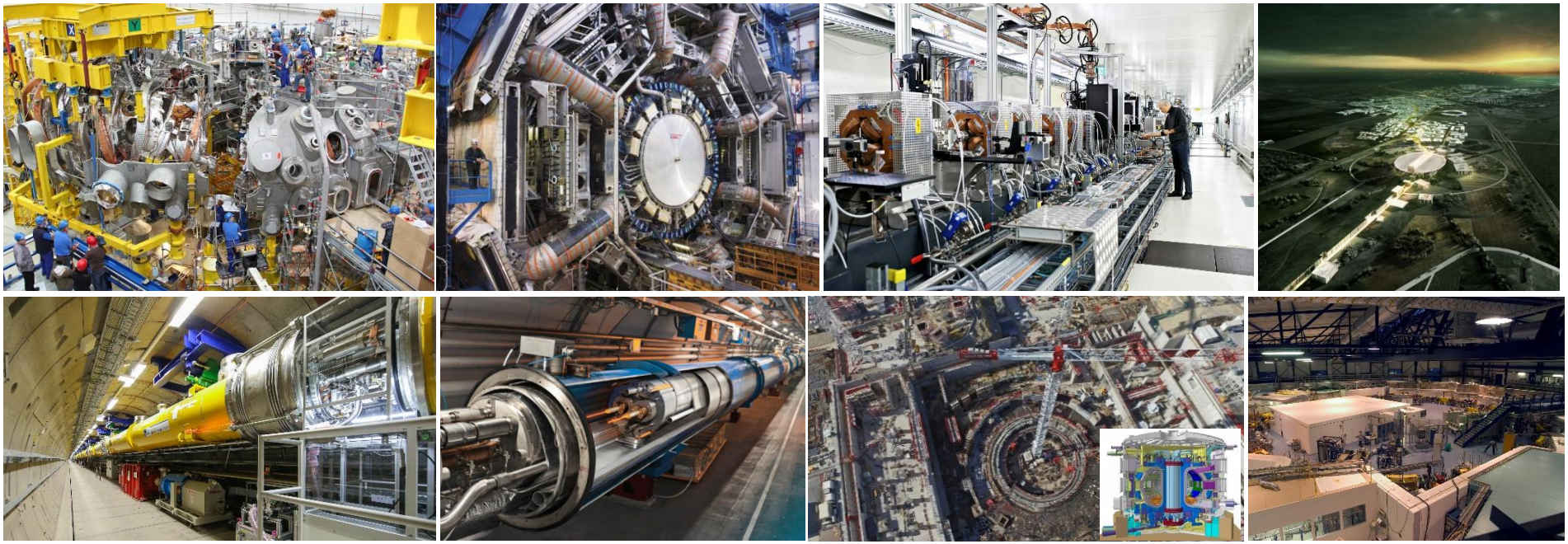
Evaluation Report : *The quality and effectiveness of the work plan, including the extent to which the resources are assigned to work packages, is in line with the stated objectives and deliverables. Some parts of the work programme are not described in sufficient detail: e.g. WP1 "Management, coordination and dissemination" (this includes WP1.2 "Organization of the participation of industry" and WP1.4 "Communication and outreach activities") is substantial in terms of tasks; however, its description is rather limited.*

European Research Infrastructures

The collaboration between European Technological Facilities and Industry has been seminal for the realization of unprecedented scientific endeavors, like LHC, W7X, EU-XFEL, SwissFEL, ESS and ITER, that have recently projected Europe to an undisputed position of worldwide leadership.



Science, Technology, Innovation

"Large-scale science projects address fundamental questions at the forefront of science and technology.
These projects require large and sustained infrastructures and a good collaboration on long time scales.
In turn, such projects provide unique equipment, challenging request for high technology and innovation, stimulating ideas that attract good people, and offer the occasion to bring people closer together."

Rolf Heuer, *The Role of Big Laboratories*,
Phys. Scr. T158 (2013)

European Technology Infrastructure

The construction of such projects is only possible through the realization of a large and distributed accelerator and SC magnet **Technology Infrastructure (TI)** including high technology systems built to unparalleled quality standards.

This TI represents a major investment and asset for Europe.

It includes several technological facilities, located at research laboratories and industrial sites, and entails:

- sophisticated R&D platforms for key technologies,
- large-scale facilities for assembly, integration and verification,
- large concentrations of dedicated, highly-skilled personnel and,
- **long-standing relationships between laboratories and industry**.

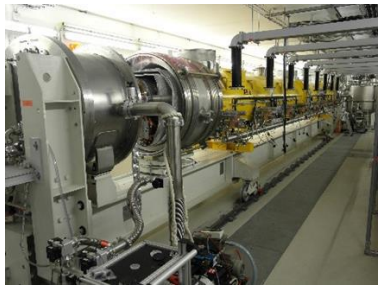
European Technology Infrastructure

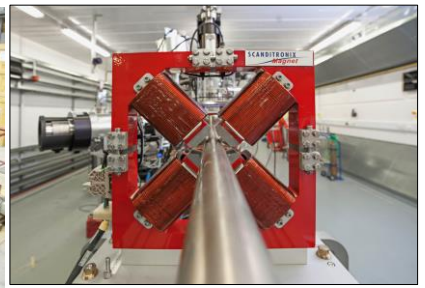
The **Technology Infrastructure** is the **basement** of the future large-scale accelerator and SC magnet construction projects:

from *Design* to *Construction*

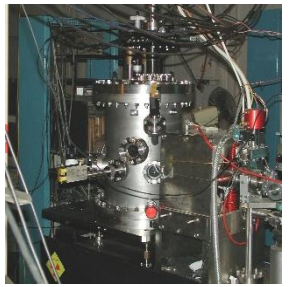
R&D → *Assembly* → *Prototyping* → *Test & Verification*





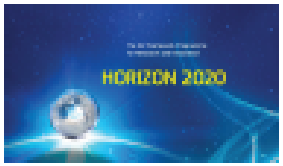




AMICI (1/01/17 – 30/06/19)

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR RESEARCH & INNOVATION
Research infrastructure



AMICI, for '**Accelerator and Magnet Infrastructure for Cooperation and Innovation**', is an H2020 '**Coordination and Support Action**' project.

Its general goal is to **propose a model** for the **profitability** and **sustainability** of the **Technological Facilities** dedicated to **Accelerators and Superconducting Magnets** in Europe, based on the engagement of the European Commission, the National Agencies and the Industry, and serving **innovation** and **scientific research**.

AMICI is charged by the EC with the challenging task of building the conditions for consolidating and exploiting these **Technological Facilities** :

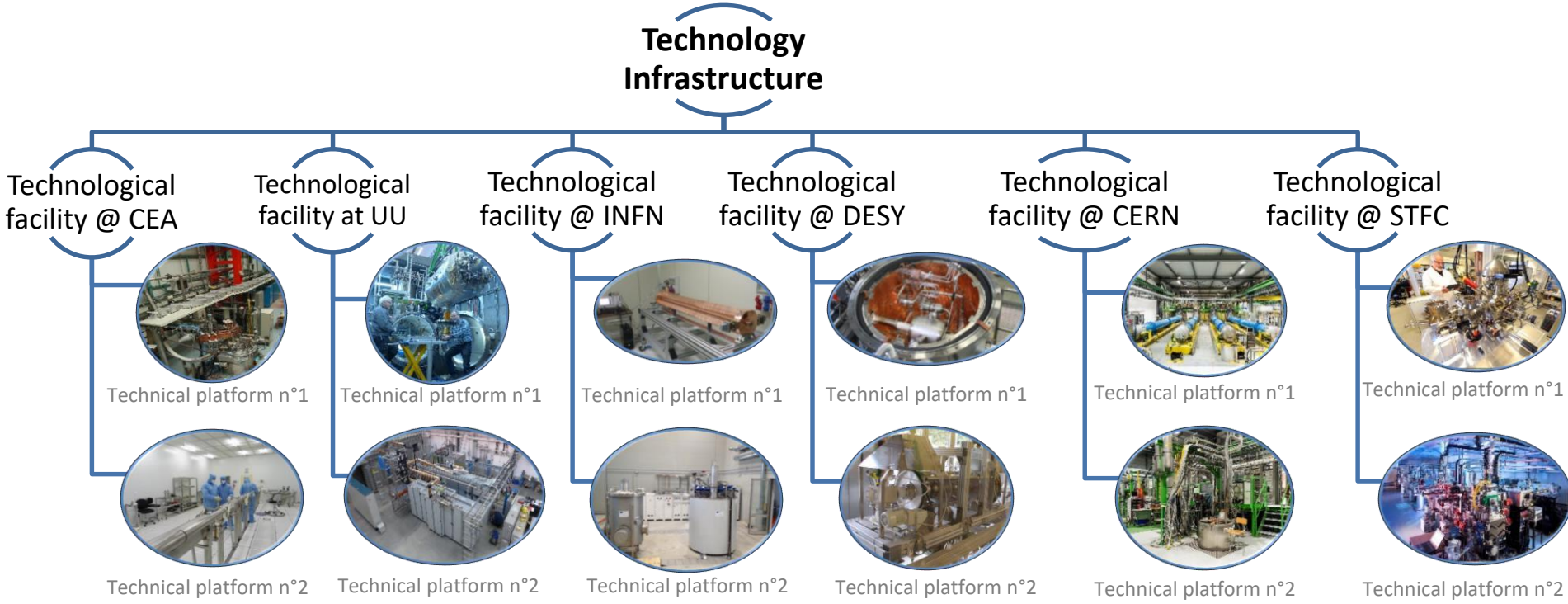
- **to strengthen the capabilities of European companies to compete on the global market**, as qualified suppliers of components for accelerators and big superconductor magnets,
- and also **in the development of innovative applications in advanced sectors such as healthcare, energy, environment and space**.

Technology Infrastructure (1/2)

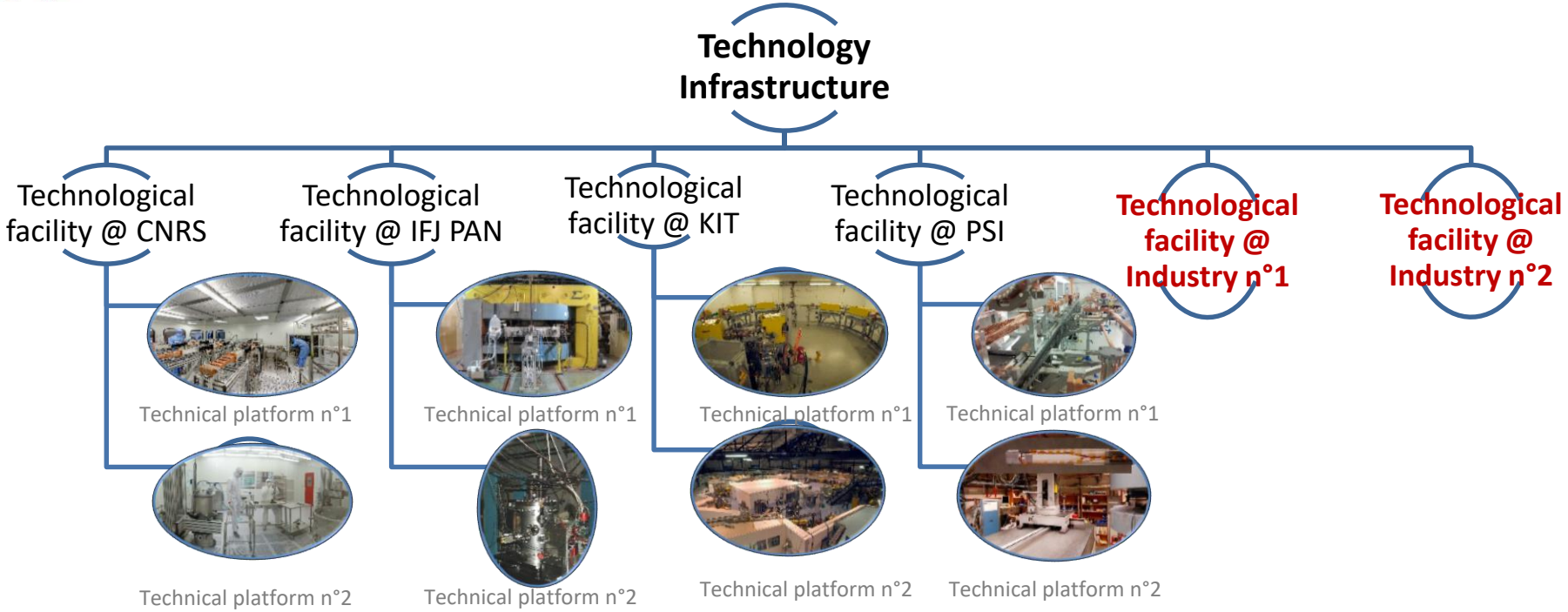
(Courtesy M-A. Maynard)

Some ‘definitions’:

- Technology Infrastructure = a network of ‘Technological facilities’
- Technological facilities = a cluster of ‘Technical platforms’

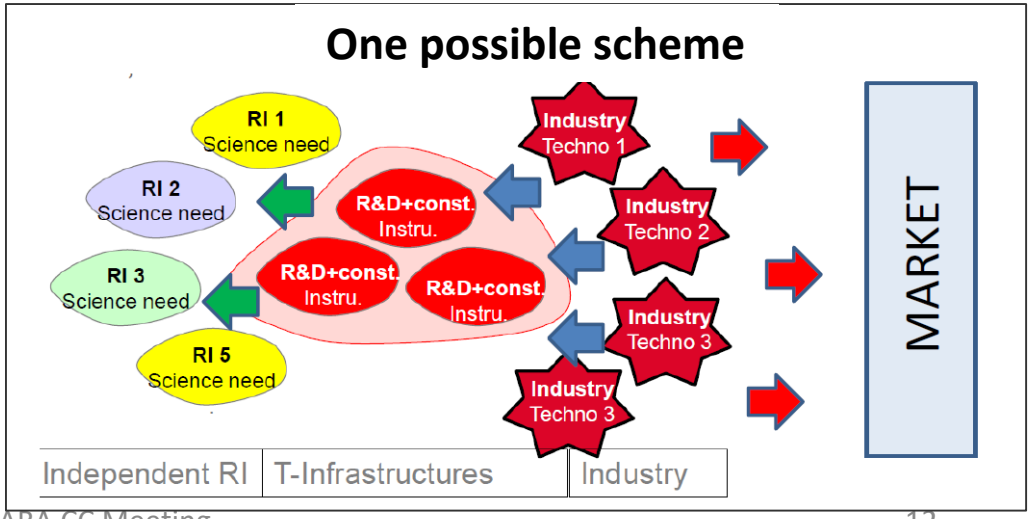


Technology Infrastructure (2/2)



The participation of Industry to the AMICI Work is the central question treated during these 'Partner and Industry Days for Technology Infrastructure'.

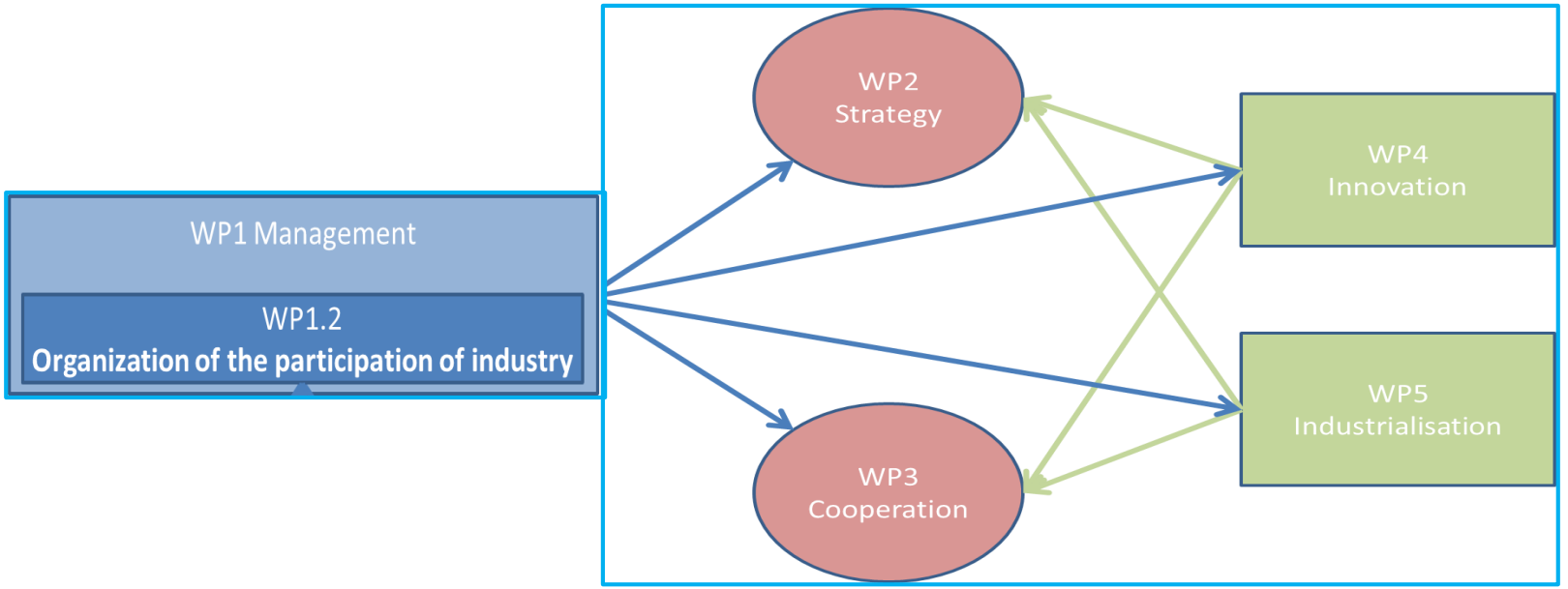
It precedes that of the association of Industry to the 'future' TI.



Organization Count Down

To optimize the future impact of the Technology Infrastructure, i.e. its adequation to the **needs** of Society (**WP4 'Innovation'**) and Science (**WP5 'Industrialisation'**) applications, AMICI will:

- assess the prevailing **strategic** elements (**WP2 'Strategy'**)
- explore new modes of **cooperation** (**WP3 'Cooperation'**)



WP1 'Management' will ensure the overall coordination of the project, including the capital question the **Industry participation**.

WP4 Innovation

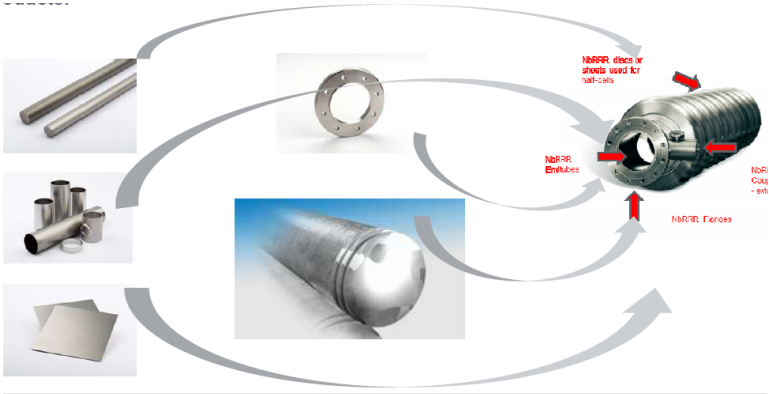
The *Innovation*-related activities aim at transferring the knowledge and know-how of research laboratories to industry and creating new products and new applications of direct benefit to society.

For that purpose, Industry will access a pool of technical platforms made available by European Research Institutes such as test beam facilities, cryogenics, magnet and RF facilities and test benches, laboratories for material analysis and vacuum technology, for chemistry and surface characterization, for beam electronics and instrumentation, clean rooms and assembly halls including the equipment and the associated human expertise.

WP5 Industrialization

The *Industrialization*-related activities aim at keeping industry at the forefront of the international competition, in terms of technology, quality and costs, in view of the construction of future scientific research instruments in Europe and elsewhere.

(Courtesy A. Spaniol)



This will be achieved by fostering collaboration initiatives and opportunities between Industry and the TI that include: research and development of key technology prototypes at high Technology Readiness Level, test and verification of industrial products, professional training and apprenticeship, certification studies and training (e.g. vacuum, cleanliness, welding, etc.), harmonization and standardization studies (e.g. cryogenics, material, etc.).

WP4&5 Deliverables to EC

Ref.	Deliverable Name	Deliverable Type	Task	Delivered by	Planned (in months)
D4.1	Report on acccelerator market study	Report	Innovation	STFC	30
D4.2	Report on SC magnet market study	Report	Innovation	CEA	30
D4.3	Report on best practice collaboration between industry and technology	Report	Innovation	INFN	30
D5.1	Definition of the structure and content of a database for materials and components	Report	Industrialisation	CNRS	26
D5.2	Final report on the required conditions for apprenticeships program in TI	Report	Industrialisation	CEA	28
D5.3	General harmonised guidelines for the safety of cryogenic equipment	Report	Industrialisation	KIT	28
D5.4	Final report on the required conditions for apprenticeship program in industry	Report	Industrialisation	INFN	30
D5.5	Final report on conditions for developing prototypes in industry	Report	Industrialisation	INFN	30

WP2 Strategy

The *Strategy*-related activities aim at providing strategic insights into opportunities and needs of future basic research and applications, thus steering and sustaining the activity of the Technology Infrastructure

Accelerators for America's Future, DoE Report, 2010

R&D Need	Energy & Environment	Medicine	Industry	Security & Defense	Discovery Science
Reliability					
Beam Power/RF					
Beam Transport and Control					
Efficiency					
Gradient (SRF and other)					
Reduced Production Costs					
Simulation					
Lasers					
Size					
Superconducting Magnets					
Targetry					
Particle Sources					

Color code: Increased priority

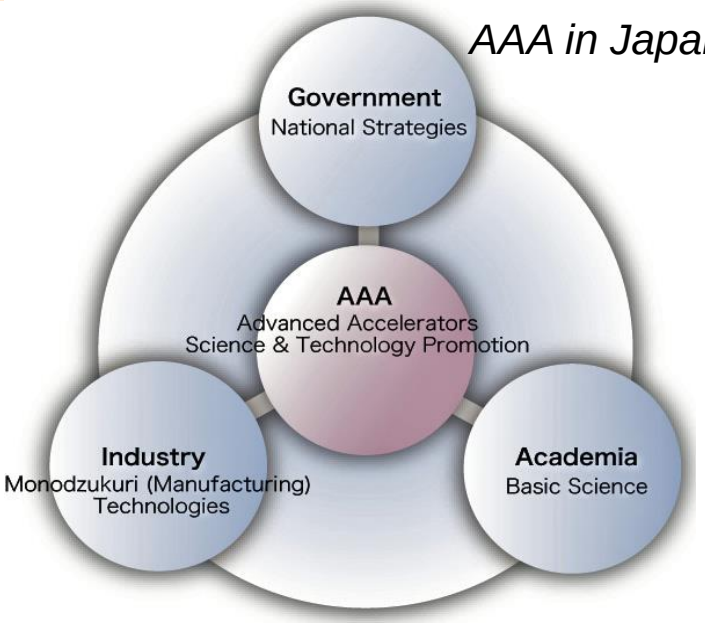
This will be achieved by:

- updating the Key Technological Areas (KTA) of accelerator and superconducting magnet science and technology,
- collecting the scientific roadmaps Research Infrastructures in Europe (ESFRI) and in the global landscape,
- assessing the workload, the capabilities and, when possible, the priorities of the Technology Infrastructure in the different KTAs.

WP3 Cooperation

The *Cooperation*-related activities will study the conditions of the coordination of the Technology Infrastructure in order to harmonise its operation and increase its efficiency, and to establish a co-innovation platform with industry.

AAA in Japan



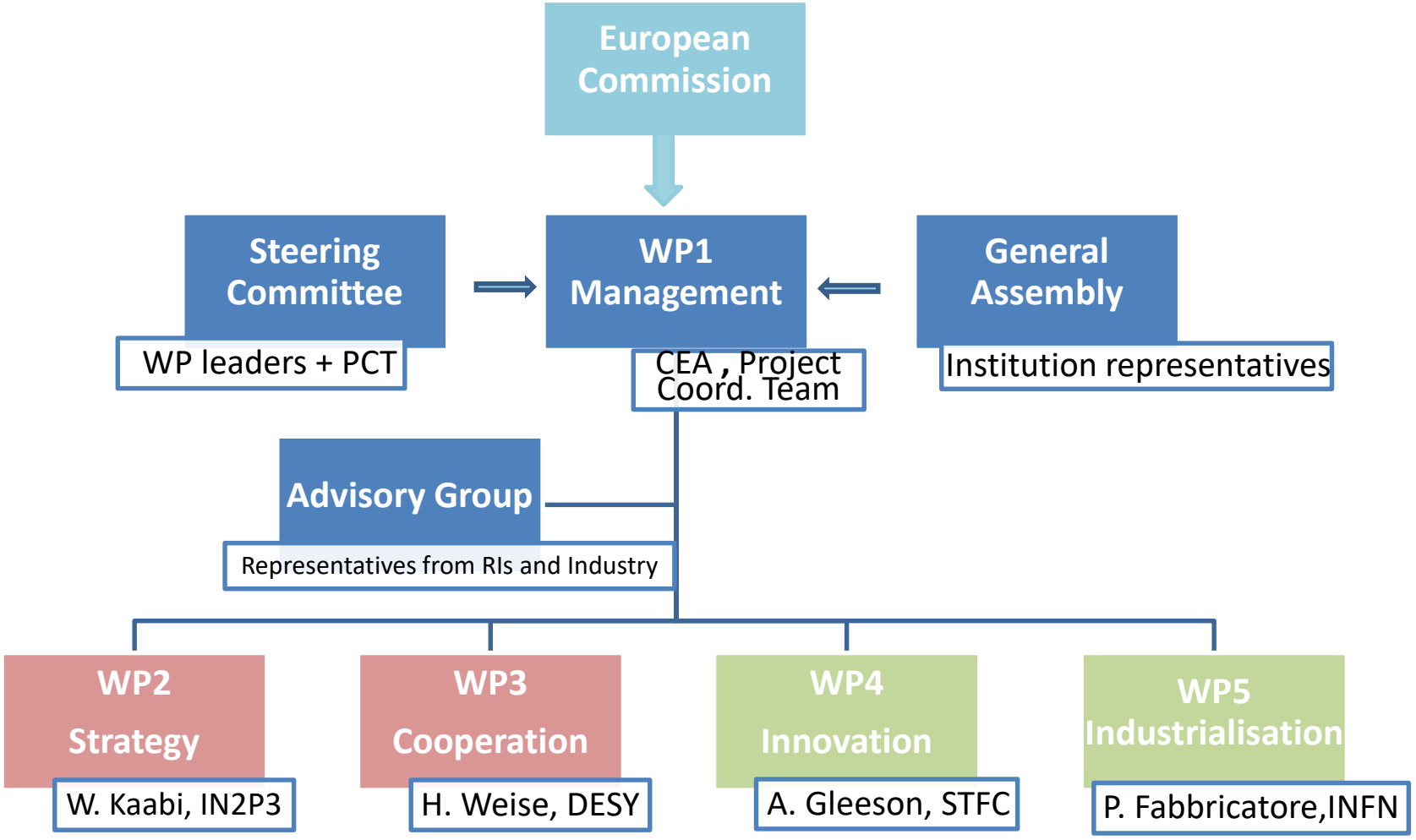
These investigations will be performed by:

- defining the eligibility criteria for the participation/association to the Technology Infrastructure,
- developing a coordination model for the use of eligible TFs and industries
- supporting the integration into local, regional and global innovation systems,
- identifying synergies, complementarities and duplication.

WP1-3 Deliverables* to EC

Ref.	Deliverable Name * Non purely administrative	Deliverable Type	Task	Delivered by	Planned (in months)
D1.2	Definition of the participation of industry	Report	Coordination	INFN	4
D1.3	Public website with searchable databases and communication tools	Other	Coordination	IFJ-PAN	11
D1.6	European Forum on accelerators and SC magnets Technological Infrastructures	Other	Coordination	INFN	24
D2.1	Report on Key Technological Areas survey and prospective outlook	Report	Strategy	CNRS	24
D2.2	Report on the Technological Roadmaps for the different KTA	Report	Strategy	CEA	27
D2.3	Report on propositions to guarantee the long term sustainability of TI	Report	Strategy	UU	30
D3.1	Report defining the eligibility criteria for accessing to the TI	Report	Cooperation	CEA	18
D3.2	Report on the networking and coordination model	Report	Cooperation	IFJ PAN	30
D3.3	Report about the proposed model of collaboration agreement	Report	Cooperation	DESY	30

Management Structure



‘Deliverables’ to Industry

By mid-2019 the AMICI project will have explored and assessed means to ensure that European industry:

- will have a clear information about the strategic science and technology roadmaps for the future accelerator and superconducting magnet-based Research Infrastructures worldwide and therefore they will be in a strong position to compete on the global market, *(WP2 Strategy)*
- will have a simplified and supported access to the most adequate Technical Platforms thanks to the stronger and optimized integration model established among the large existing Technological Facilities, *(WP3 Cooperation)*
- will benefit from the integrated ecosystem that will foster innovation based on cutting-edge tools and developments allowing them to enhance their visibility and competitiveness in new markets, *(WP4 Innovation)*
- will overcome their technology development barriers and further develop commercial opportunities within the Research Infrastructures and wider societal markets, *(WP4 Innovation, WP5 Industrialization)*
- will profit from the information exchange, definition of harmonized and standardized procedures and access to databases, which should lead to cost reduction in the long term. *(WP5 Industrialization)*

AMICI Web Site

First step : http://eu-amici.eu

– **Developing list and description of AMICI TIs**

First Two Deliverables to EC

Grant Agreement No: 731086

AMICI

Accelerator and Magnet Infrastructure for Cooperation and Innovation
Horizon 2020 / Coordination and Support Action (CSA)

DELIVERABLE REPORT

MINUTES OF THE KICK-OFF MEETING
DELIVERABLE: 1

Document identifier:	AMICI-D1.1-v1.0
Due date of deliverable:	End of Month 2 (February 2017)
Report release date:	15/02/2017
Work package:	WP1: Management, coordination and dissemination
Lead beneficiary:	CEA
Document status:	Final

Delivery Slip

	Name	Partner	Date
Authored by	O. Napoly	CEA	31/01/2017
Reviewed by	S. Leray [WP1 Leader]	CEA	08/02/2017
Approved by	Steering Committee		08/02/2017

Grant Agreement No: 731086

AMICI

Accelerator and Magnet Infrastructure for Cooperation and Innovation
Horizon 2020 / Coordination and Support Action (CSA)

DELIVERABLE REPORT

DEFINITION OF THE PARTICIPATION OF INDUSTRY
DELIVERABLE: 1.2

Document identifier:	AMICI-D1.2
Due date of deliverable:	End of Month 4 (April 2017)
Report release date:	4 June 2017
Work package:	WP1: Management, coordination and dissemination
Lead beneficiary:	INFN
Document status:	Final

Delivery Slip

	Name	Partner	Date
Authored by	M. Morandin, M.A. Maynard	INFN	1 June 2017
Reviewed by	S. Leray, O. Napoly	CEA	5 June 2017
Approved by	Steering Committee		8 June 2017

Aims of the 'Industry Days'

The aims of these '**Partner and Industry Days for Technology Infrastructure**' are to:

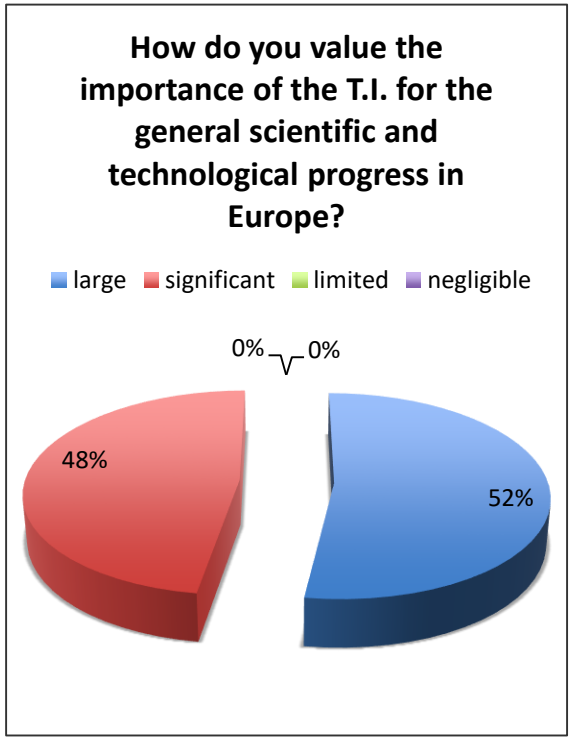
1) Understand the scopes and activities of the 2 Work Packages (WP2 & 3) and 6 Tasks (WP4 & 5)

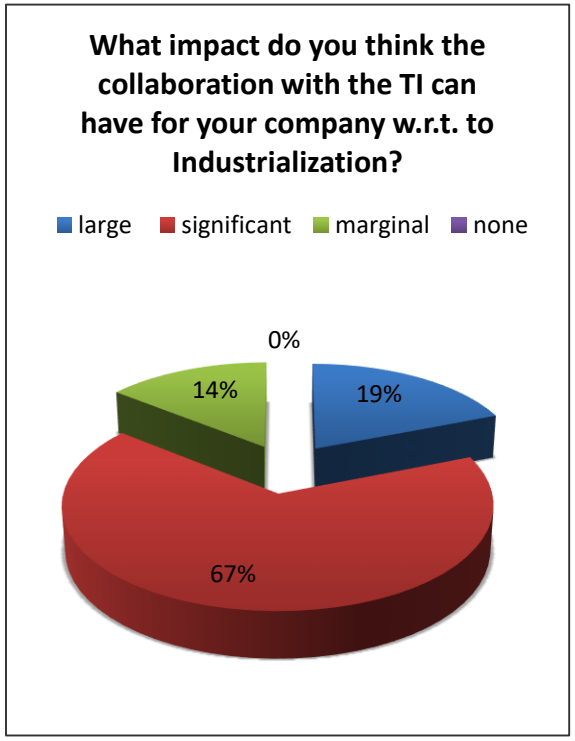
2) Collect the interest of industry in such activities

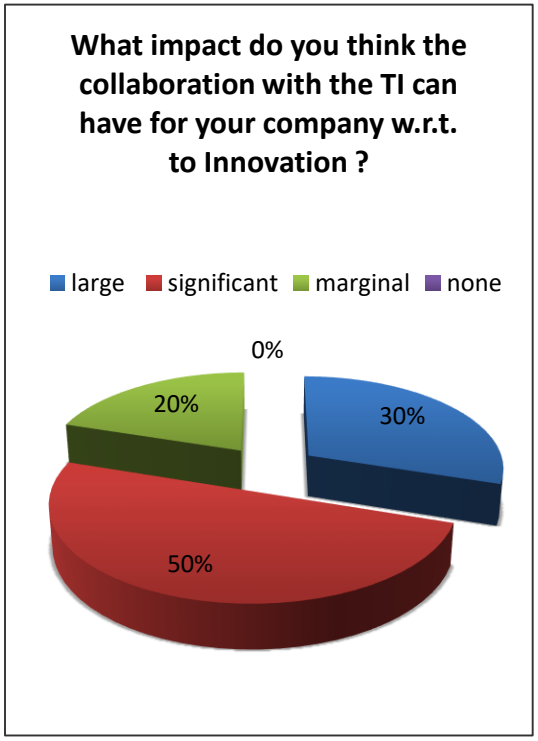
3) Establish the basis for collaborative work, identify next steps and define timescales.

Achievements of the 'Industry Days'

- **Total Participation**: 83 individuals, including one ILO (Spain/F4E)
- **Industry Participation**: 33 individuals from 29 companies, including Spanish and Danish companies
- **Survey Participation**: 20 companies + Spanish ILO







Achievements of the 'Industry Days'

Survey Participation:

20 companies + Spain ILO

Task Leaders have been informed and have been invited to start their Work

Since June 4, 2017.

		Companies Total
WP2 STRATEGY		
	□ being informed about the outcomes	18
	□ participating in the survey	7
WP3 COOPERATION		
T3.1	□ being informed about the outcomes	17
	□ participating in the survey	7
T3.2	□ being part of the network	18
T3.3	□ being informed about the outcomes	19
	□ being invited to participate in the working group	7
WP4 INNOVATION		
T4.1	□ being informed about the outcomes	19
	□ participating in the survey	13
	□ participating in preparing the survey	4
T4.2	□ being informed about the outcomes	16
	□ participating in the survey	7
	□ participating in preparing the survey	5
T4.3	□ being informed about the outcomes	19
	□ participating in the survey	12
	□ participating in preparing the survey	8
WP5 INDUSTRIALIZATION		
T5.1	□ being informed about the outcomes	17
	□ being invited to participate in the working group	6
T5.2	□ being informed about the outcomes	17
	□ being invited to participate in the working group	4
T5.3	□ being informed about the outcomes	10
	□ being invited to participate in the working group	1
T5.4	□ being informed about the outcomes	19
	□ being invited to participate in the working group	14

2020: post-AMICI Horizon

Objective:

- convince EU Commission of the importance of the **Technology Infrastructure**, along with with Research Infrastructures, for RI sustainability, in a new scheme associating more closely industry and innovation, e.g. '*European Technology Platform*' (ETP)
- follow-up of AMICI ideally in the next Work H2020 Programme (2018-20) or in FP9 with a (substantial €-budget) call integrating the structure and ideas proposed by AMICI.

AMICI is only a first step towards a European **TI**