

#innovación
#ayudasCDTI
#asesoramiento
#internacionalización



Einstein Telescope meeting Spanish Science industry

08/10/2021

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Department of Large Research Infrastructures and Dual
Programmes

Big Science facilities: the role of CDTI

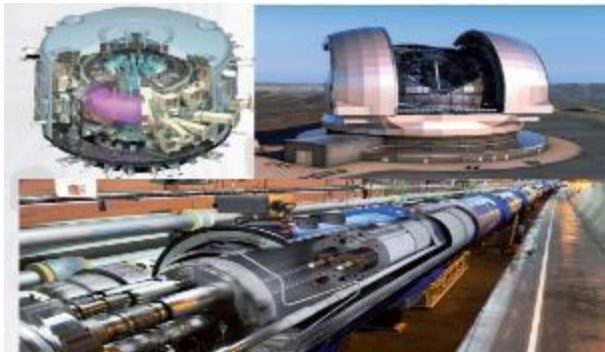
CDTI manages the industrial return coming from international research infrastructures

With RIs

- Spanish contact point for industrial matters
- ILO for Big Science Facilities and experts in finance committees.
- Support to RI in information about national industry capabilities
- Organisation of national events (Spain@CERN), etc.

With Spanish Public Administration

- Support in all industrial matters
- Definition of in-kind contributions
- RIs candidacies for Spain: support and building of industrial capabilities.



With industry

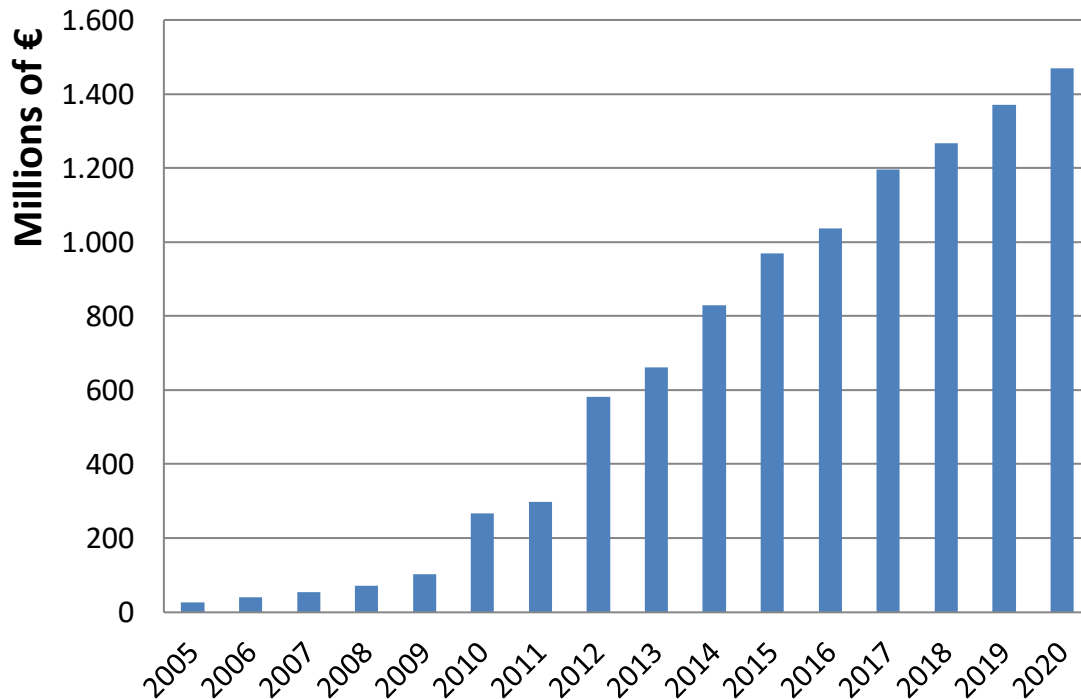
- Distribution of strategic plans and procurements
- Support in bid preparation, partner search
- Organisation of workshops, Infodays, site visits
- Support for R&D projects submitted to CDTI: since 2007 137 operations worth more than 50 M€
- Monitoring of georeturn and running contracts
- Edition of catalogue of national industrial capabilities for RIs

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Results in 2020

- **100 million euros returned in 2020 in technology contracts coming from ITER, CERN, ESO, ESS y ESRF**
- Excellent results in ITER(60% of return).
- Astronomy: leaders in advanced mechanics and optomechanics
- Good perspectives for our national industry in high grade magnets.

Accumulated industrial Return in Large Scientific Facilities - Astronomy, Particle Physics and Fusion



How we work with industry

- Our science industry database comprises about 200 companies.
- Collaboration with Induciencia and with national institutes
- For new RIs (such as the ET): early contact with industry to inform about the project
- Identification of initial interests and capabilities
- R&D projects to build industrial capabilities
- Consultation to industries to define in-kind contributions through surveys, workshops, etc.
- As ILOs: tender promotion in website, newsletters, etc.

Spanish industrial capacities in RIs (March 2020)



SPANISH CAPACITIES IN LARGE SCIENTIFIC FACILITIES



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- 85 companies
- Update of astronomy observatories in Spain
- Update of fusión and particle physics facilities
- Running collaboration with Induciencia (Science industry technology platform)

Spanish industrial capacities in RIs (March 2020)



COMPANY NAME CRYOVAC S.L.
ADDRESS C/Aquilesados 40 - 28940 Fuenlabrada (Madrid)
WEB www.cryovac.es
TURNOVER 2,5 ME in year 2018
EMPLOYEES 9 in year 2018
SME Yes
CONTACT PERSON Javier Lazarraga

POSITION CEO
PHONE +34 916 063 463 / +34 609 068 950
EMAIL info@cryovac.es

COMPANY ACTIVITIES AND SKILLS

Cryogenics, vacuum, fabrication and installation of high pressure equipment, control systems and precision machining and welding.

Vacuum: We design and manufacture custom made vacuum chambers for pressures as low as 10-10 mbar. We also provide vacuum line installations and auxiliary systems such as lifting mechanisms, support structures, pumps and instrumentation.

Cryogenics: We fabricate and install customisable vacuum insulated lines for all cryogenic liquids. We also design and manufacture custom cryostats, thermal vacuum chambers and temperature control equipment for heating and cooling by cryogenic liquid or cryocooler.

High pressure: We design and fabricate CE approved high pressure vessels, reactors and cells compatible with cryogenic to high temperatures. We also install and legalise high pressure gas tubing and auxiliary equipment in laboratories.

Control systems: We design and build hardware and software based control systems for temperature, vacuum, high pressure gases and cryogenic liquids.

Precision machining and welding: We provide high tolerance machining for materials including inconel, Cu-Be, titanium and tungsten carbide. Our welders are certified in several techniques including TIG, brazing and orbital welding.

LARGE SCIENTIFIC FACILITIES AND NATIONAL RESEARCH FACILITIES CONTRACTS

[CLPU] High vacuum equipment for Vega laser system (2019)

[CLPU] Semi-cylindrical vacuum chamber for Vega laser system (2017)

[CERN] Time projection chamber (2017)

[ESRF] Sample environment for high pressure diamond anvil cells (2016)

[IFMIF] IFMIF EVEDA Mechanical Structures (2015)

[CERN] DO-28141 - "Supply of supports for HIE-ISOLDE transfer line equipment" (2013)

[CERN] DO - 27581 - "The supply of five hydrogen buffer volumes" (2012)

[XFEL] XFEL Magnet Assembly (2011)

[ILL] High pressure large volume neutron diffraction cells (2010)

R&D PROJECTS

[MINECO-Retos Colaboración] Large Volume Cells for the Study of Materials in Extreme Conditions of High Pressure, Magnetic Field and Temperature, 2015-2018.

[CDT-EEA Grants] Cryogenic Transfer Lines: The Next Generation, 2014-15.

[CDT-ID] Instrumentation for Small Diamond Anvil High Pressure Cells, 2013-14.

[CDT-IDC] Conception of Large Volume High Pressure Cells for Neutron Diffraction, 2010-11.

Markets

Nuclear / Defense / Naval / Aeronautics / Space / Energy / Oil & gas / Other Medical and alimentary CT Engineering

Quality certifications, nuclear qualifications

ISO 9001, Official high pressure fabricator (FAP-147), installer (EIP-2-75) and repairer (ERP-2-2)



Adjustable support structures for IFMIF radiofrequency equipment



CERN time projection chamber



Support structures for HIE-ISOLDE transfer line equipment



CLPU vacuum equipment



Dipole magnet with vacuum vessel for XFEL



CLPU semi-cylindrical equipment

CRYOVAC



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Spanish industrial capacities in RIs (March 2020)

	CIVIL ENGINEERING	Site Adaptation Works for Particle Accelerators	Design and construction of buildings for accelerator facilities	Clean rooms	HVAC systems (heating, ventilation, air conditioning)	Fire detection and safety	Biological systems for buildings	MECHANIC AND MECHATRONIC	High precision mechanics and mecatronics	High precision alignment of microscopes	Design and manufacturing of large mobile structures	Design/manufacturing support structures/guides, insertion device supports etc. RF power systems design	ELECTRICAL SYSTEMS	Design/manufacture of power converters for accelerators	Design/manufacture of high stable power supplies for magnets	Pulsed power technology	Manufacturing of superconducting cabling	ELECTROMAGNETISM AND SUPERCONDUCTIVITY	Design/manufacturing of warmagnets	Design/manufacturing of superconducting magnets	Design/manufacturing of permanent magnets	RADIOFREQUENCY SYSTEMS	Design/manufacturing of RF warm cavities	Design/manufacturing of RF superconducting cavities	Design/manufacturing of RF accelerator structures	Design/manufacturing of waveguides	Design/manufacture of RF low amplifiers and amplifiers	Design/manufacture of RF modulators	High voltage power supplies for RF structures	Integration RF power systems
ABENGOA																														
AERNNOVA																														
AHMEN																														
AIRBUS																														
ALIBAVA SYSTEMS																														
ALTER																														
ALTRAM																														
ANALISIS Y SIMULACION																														
ANTEC																														
APPLUS																														
ARRAELA																														
ASE OPTICS																														
ASTURFEITO																														
AVS																														
AWGE																														
BETESA																														
CADINOX																														
CEIT																														
CEN SOLUTIONS																														
CITD																														
COMET INGENIERIA																														
CRISA																														
CRYOVAC																														
CT INGENIEROS																														



Recent industrial events (SKAO)



The screenshot shows the top navigation bar with logos for CDTI, ESPANA PUEDE, and MI CUENCA. The main banner features a night sky with the Milky Way and the SKAO logo. The central text reads "2021: arranca la construcción de SKA". Below this are three yellow buttons: "Agenda", "Inscripción", and "Reuniones B2B". At the bottom, there is a calendar widget for May 31st, a "Webinario online" label, and a "Evento terminado" status. A "Añadir al calendario" button is also present.

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ESPAÑA PUEDE

MI CUENCA

Home Asistentes Presentaciones

SKAO

2021: arranca la construcción de SKA

Agenda Inscripción Reuniones B2B

Mayo
31
Comienza: 09:30

Webinario online

Evento terminado

Añadir al calendario

Descripción:

La primera fase del Square Kilometre Array, que supondrá una inversión internacional en construcción de 1.280 millones de euros, hará realidad uno de los proyectos científicos más visionarios y ambiciosos del siglo XXI: convertir el observatorio SKA en la principal infraestructura mundial en radioastronomía. Con sede en Reino Unido y los radiotelescopios situados en Sudáfrica y Australia, en 2021

Recent industrial events (Ris & Induciencia)

Home Asistentes Presentaciones

CDTI

MINISTERIO DE CIENCIA E INNOVACIÓN

CDTI

@CDTIoficial

INDUCIENCIA

Jornada Grandes Instalaciones Científicas:
CDTI-INDUCIENCIA "La Industria de la
Ciencia al frente de la recuperación 2021"

Agenda Inscripción B2B para asistentes registrados Enlace Zoom

Enero 26

Webinario online

Añade al calendario

Recent industrial events (CTAO)



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Recent industrial events (Spain@CERN)



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Big Science Business Forum 2022



www.bsbf2022.org

#BSBF2022 #BigScienceBusinessForum



bsbf2022



Big Science Business Forum 2022



EMBL



BIG SCIENCE BUSINESS FORUM

GRANADA (SPAIN), 4-7 OCT 2022

BSBF2022 Programme at a glance

- **Plenary Sessions**

- **Technical parallel sessions**

- Electrical, power electronics, electromechanical and RF systems
- Diagnostics and detectors, sensors, optics and instruments
- Information and communication technologies
- Basic material technologies and advanced manufacturing techniques
- Complex building construction and its safety related systems
- High precision and large mechanical components
- Instrumentation, control and CODAC
- Cryogenics, vacuum and leak detection technologies
- Superconductivity and superconducting magnets
- Remote handling systems

- **Thematic parallel sessions**

- Research Infrastructures and e-Infrastructures in Horizon Europe
- IFMIF-DONES
- SME Involvement and Key Aspects for Procurement
- Affiliated Big Science Organisations (ABSOs)

- **Industrial exhibition**

- **Technology Transfer Track**

- **SME Track**

- **B2B and B2C meetings**

- **Site visits**

- **Social programme**

Funding instruments – R&D projects

R&D Projects

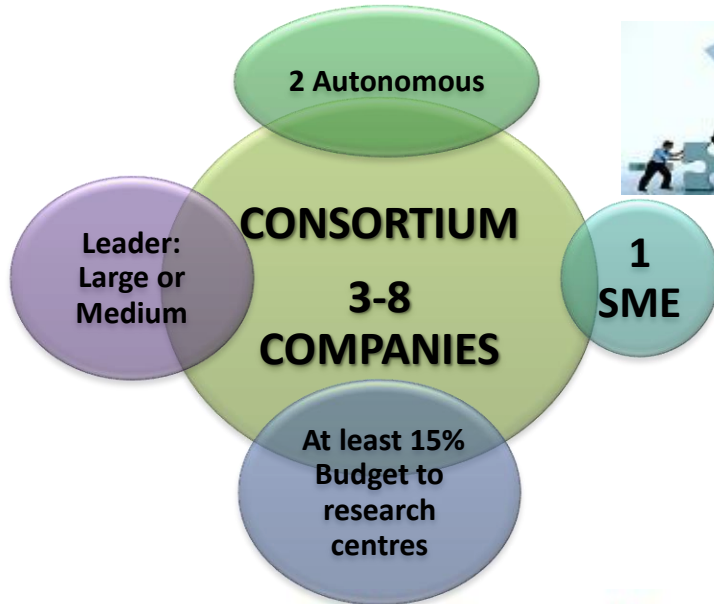
- Multiannual 1-3 years
- Beneficiaries: industry
- Up to 85% funding rate. Non-reimbursable rate 20%-33%
- 7 to 10 years for return of payment. Up to 3 years deferral period.
- Starting Budget: 175.000 EUR
- **33% non-reimbursable rate for R&D projects dealing with development of capabilities for future RI tenders, space programmes of national research infrastructures**
- **Call open all year round.**



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R&D projects - CIEN

Collaborative R&D projects: CIEN



Call Open

R&D Projects- Cervera Programme

Instruments



Two complementary actions:

- ❑ **R&D Projects Transferencia Cervera** (*call open*).
 - Foster collaboration between SMEs/midcaps and Innovation/Tech Centres (mínimo 10%)
- ❑ **Grants for Innovation/Tech Centres strategic programmes** (*call closed*).
 - Foster applied research

R&D Projects- Cervera Programme

Cervera Technologies

11 AREAS ->27 LINES OF WORK



- Advanced materiales
- Circular economy
- Energy transition to clean sources
- Advanced manufacturing
- Health
- Safe and healthy food supply chains
- Deep learning, IA
- Advanced mobile networks
- Inteliigent transport
- Data protection and security
- Quantum computing

R&D Projects- Missions

MISIONES (B.O.E 13/02/2020.). Themes

Safe, clean
and
efficient
energy for
the XXI
century

Sustainable
and
intelligent
mobility

Agrifood -
sustainability
and
health

Impulse of
national
industry in
the XXI
century
industrial
revolution

Response to
ageing related
diseases and
impairments

Large companies

SMEs



Budget

5 - 10M€

Minimum 175000

Last year at least 20% of budget.
85% industrial research

Budget

1,5 - 3M€

Minimum 175000

Last year at least 20% of budget
60% industrial research



Research institutes

Subcontracted. At least 20% of the budget
(significant participation)

Research institutes

Subcontracted. At least 15% of the budget
(significant participation)



Duration: multiannual: start in 2020 up to
31/12/2022 o 31/12/2023*

3 to 8 companies at least 2 independent. At
least 1 SME

Leader: large company

Duration: multiannual: start in 2020 up to 31/12/2021
o 31/12/2022*

3 to 8 companies at least 2 independent. All SMEs
Leader: medium company

R&D Missions - example

- **FUSION FUTURE: NEW MATERIALS, TECHNOLOGIES AND ADVANCED PROCESSES TO CONTRIBUTE TO THE NEW ENERGY ERA OF NUCLEAR FUSION**
- Leader: Empresarios Agrupados (Large)
- Partners: AVS, Innerspec Technologies Europe, Leading Metalmechanic Solutions, Sener Aeroespacial, Sener RYMSA, Técnicas Reunidas
- 3,5 year project
- Budget: 6 M€
- Institutes: CIEMAT, Tekniker, CTC, Tecnalia

ET – How could Spanish industry contribute?

- **Vacuum technologies:** several industries with experience with different RIs (ESRF, F4E, CERN) in vacuum vessels, also in ultra-high vacuum
- **Cryogenics plants and systems and cryomodules:** also considerable experience
- **Civil works:** extensive experience, seismic studies
- **Optical coatings:** some experience, R&D phase necessary
- **Noise mitigation:** possible R&D phase? Companies with experience in real-time control and active optomechanics
- **Optics & lasers; optomechanics**

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Some references



CLPU HV VACUUM CHAMBER
(Cadinox)



Cryostat Body JT-60SA (Asturfeito)



CERN RICH VESSEL NA62
(Cadinox)

Some references

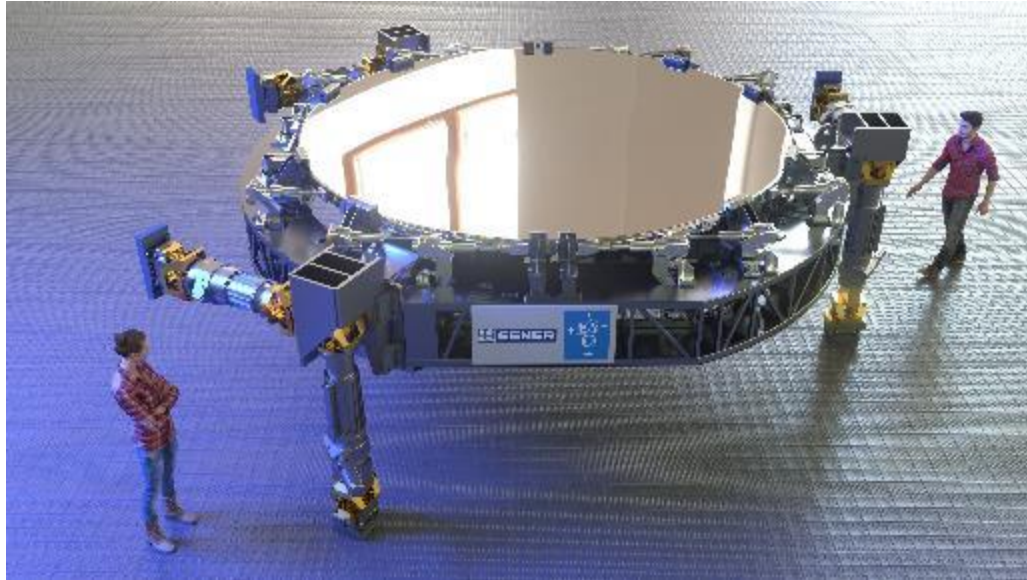


Optomechanics for a petawatt laser (AVS)

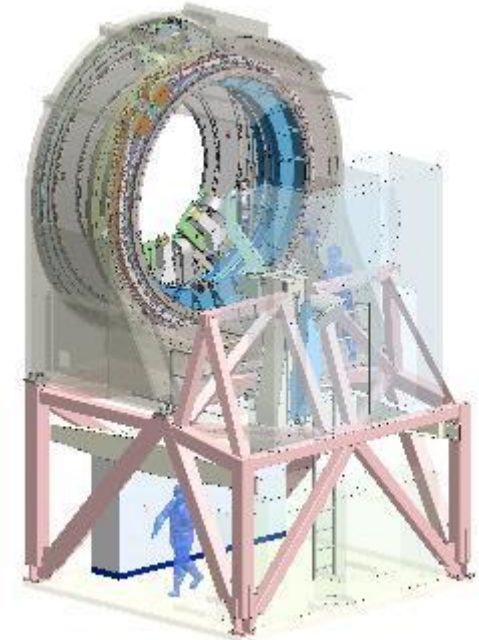


Tokamak assembly pit (Ferrovia)

Some references



ELT M2-M3 Cell (ESO, Sener)



ELT PFS-A (ESO, Idom)

CDTI is a member of ENRIITC



- **ENRIITC objective:** to build a permanent pan-European network of Industrial Liaison and Contact Officers (ILOs and ICOs) and enable industry to become a full partner of research infrastructures whether it is as a user, a supplier, or a co-creator.
- Lead by the **European Spallation Source** with **five RIs y five ILO organisations in the consortium.**
- **Possibility to become an associate member**

www.enriitc.eu

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www.enriitc.eu/EnriitcyourKnowledge



¡Thanks for your attention!

+info sobre programas y ayudas CDTI
para
proyectos de I+D empresarial e innovación



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