



QVS

---

BOOSTING  
SCIENTIFIC  
KNOWLEDGE

---



# About us

SET-UP IN 2006

HIGHLY QUALIFIED PERSONNEL  
(80% MSc, MEngs and PhDs)

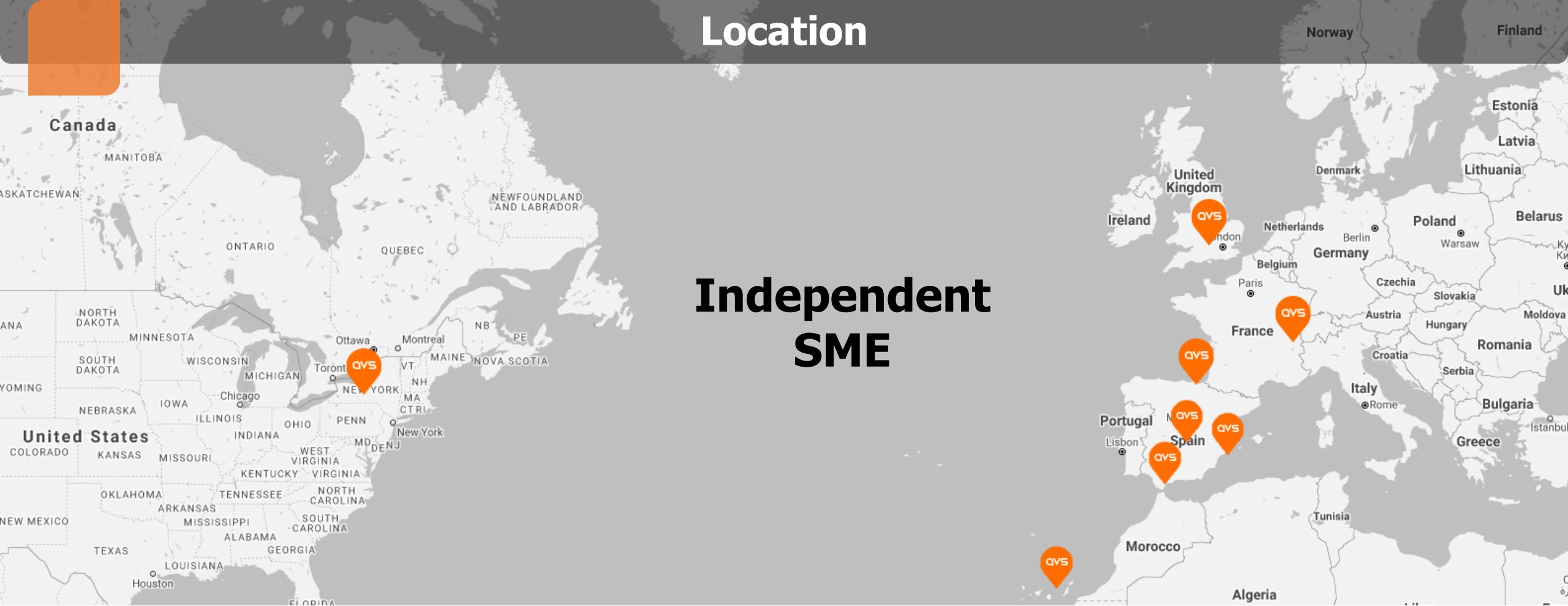
TÜV CERTIFICATES  
ISO 9001  
EN 9100

+10.000 m<sup>2</sup> FACILITIES

MODELLING DETAILED-DESIGN ANALYSIS PROCUREMENT MANUFACTURING ASSEMBLY INTEGRATION TEST

From concept  
to commissioning

"OUR SUCCESS  
OUR PEOPLE"



## SPAIN - HQ

Pol. Ind. Sigma, Xixilion kalea 2, bajo - Pab.10  
20870 Elgoibar  
Gipuzkoa

T +34 943 821 841  
[avs@a-v-s.es](mailto:avs@a-v-s.es)

## FRANCE

46 Rue des Pommaries  
74940 Annecy-le-Vieux  
Auvergne-Rhône-Alpes

T +33 6 51 32 50 81  
[france@a-v-s.es](mailto:france@a-v-s.es)

## UNITED KINGDOM

Rutherford Appleton Lab.  
OX11 0QX Harwell Oxford  
Didcot  
Oxfordshire

T +44 (0) 1235 567095  
[avs@a-v-s.uk](mailto:avs@a-v-s.uk)

## USA

126 Ridge Rd.  
Lansing  
NY 14882

T +1 607 533 3531  
[avsus@a-v-s.us](mailto:avsus@a-v-s.us)



# NEW SINGULAR FACILITIES





# Retos – en nuestro ADN

**ASTROPHYSICS**

**ACCELERATORS**

**FUSION**

**SYNCHROTRONS**

**NEUTRONS**

**LASERS**

**SPACE**



ISO 9001

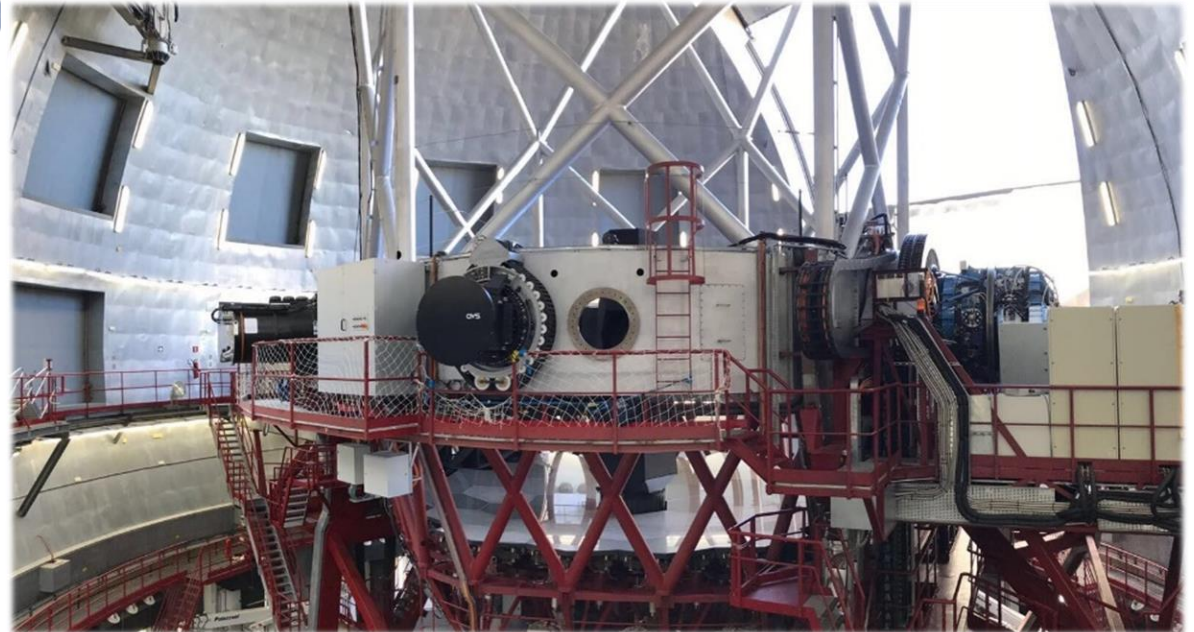
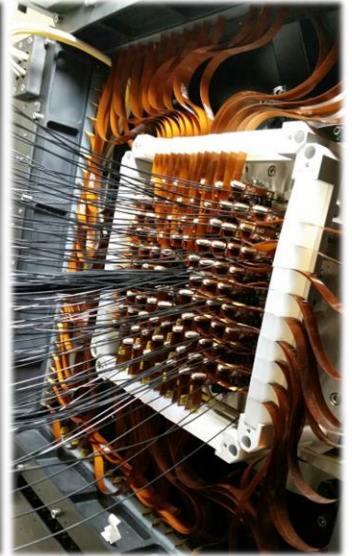
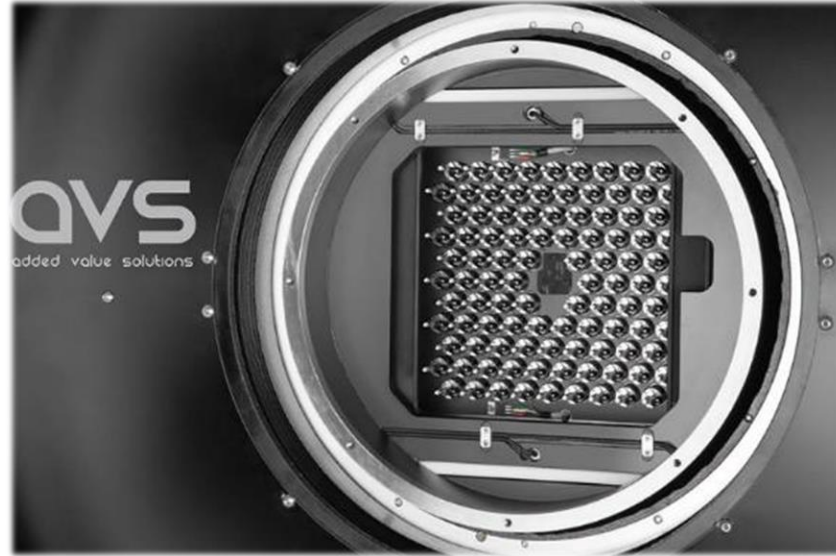
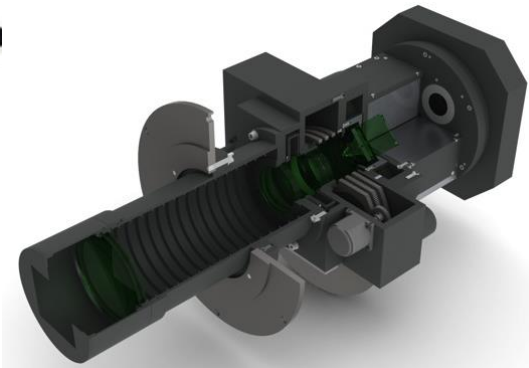
EN 9100

QVS



# MULTI-OBJECT SPECTROGRAPH GALAXY OBSERVER

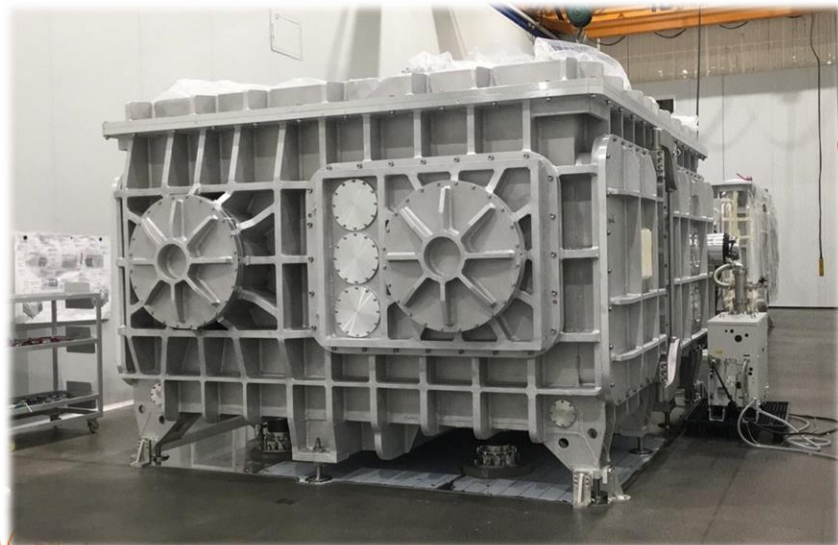
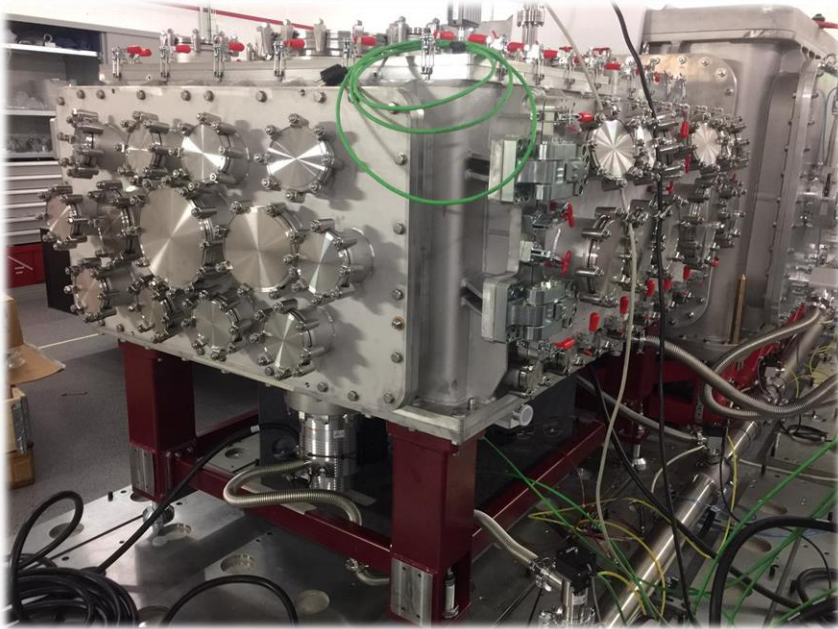
FOUR STOKES parameters  
POLARIMETER



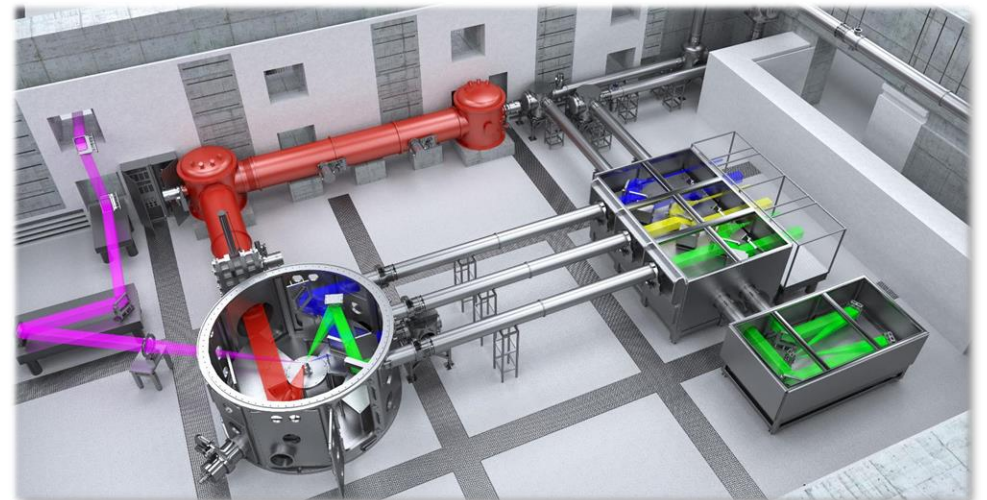
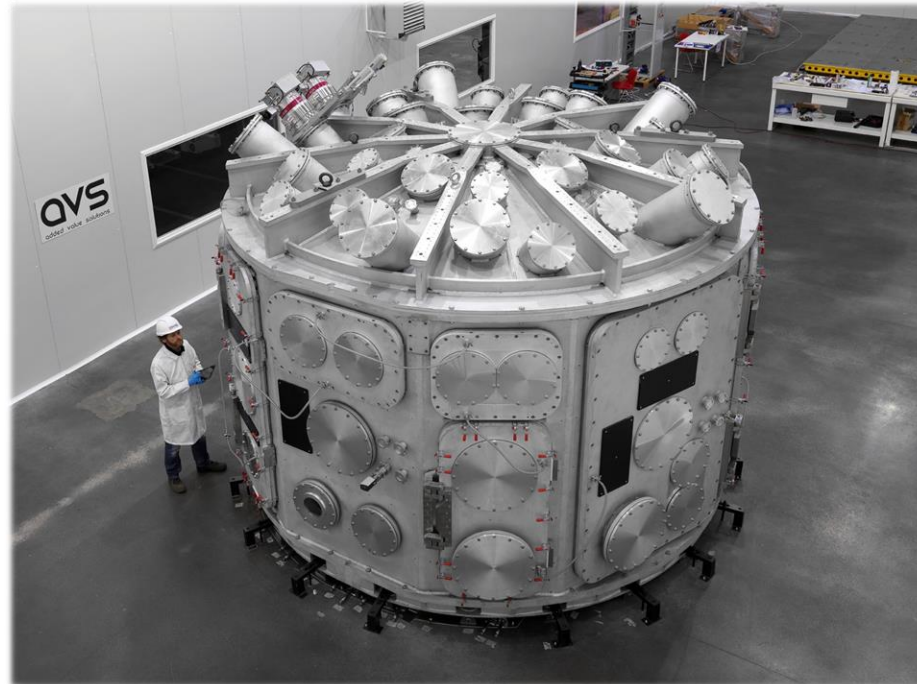
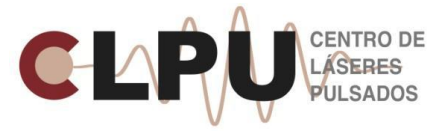






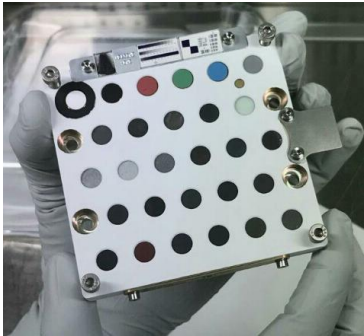
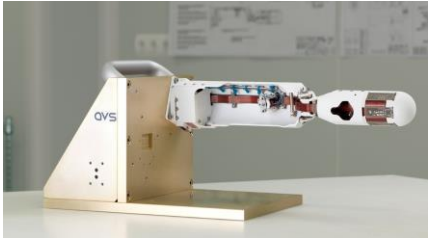
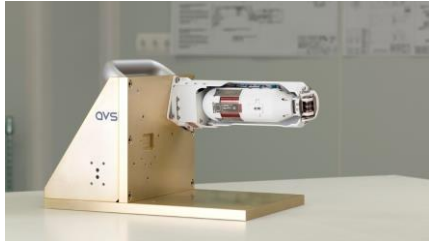








**MEDA - MARS  
ENVIRONMENTAL  
DYNAMICS ANALYZER;  
WIND SENSOR  
MECHANISMS  
SUPERCAM**



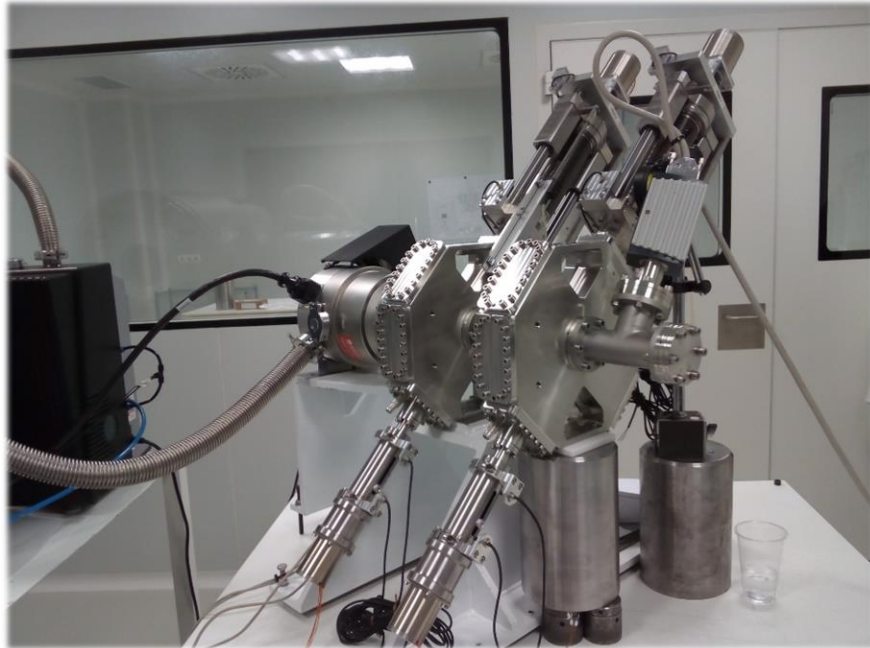
**Jet Propulsion Laboratory**  
California Institute of Technology



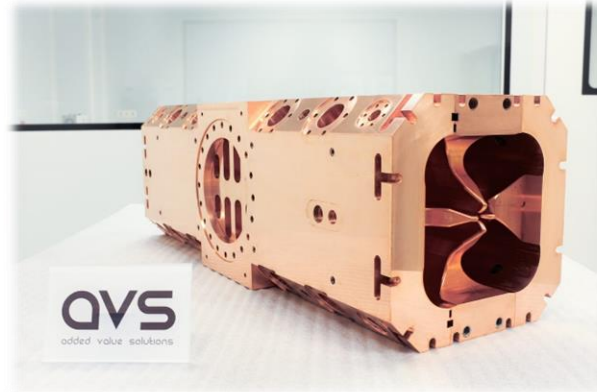
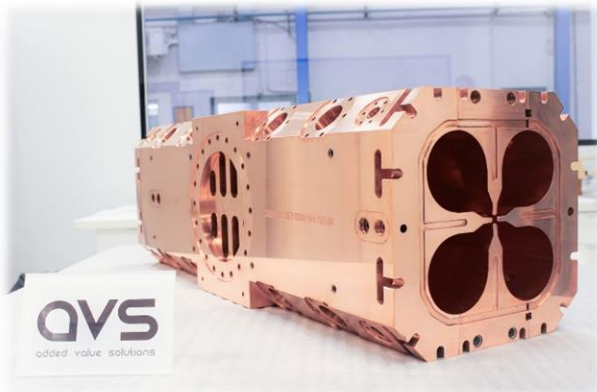




# HIE ISOLDE DBoxes



# CRAB cavities RH platforms



**ESS**  
Bilbao

ISO  
9001

EN  
9100

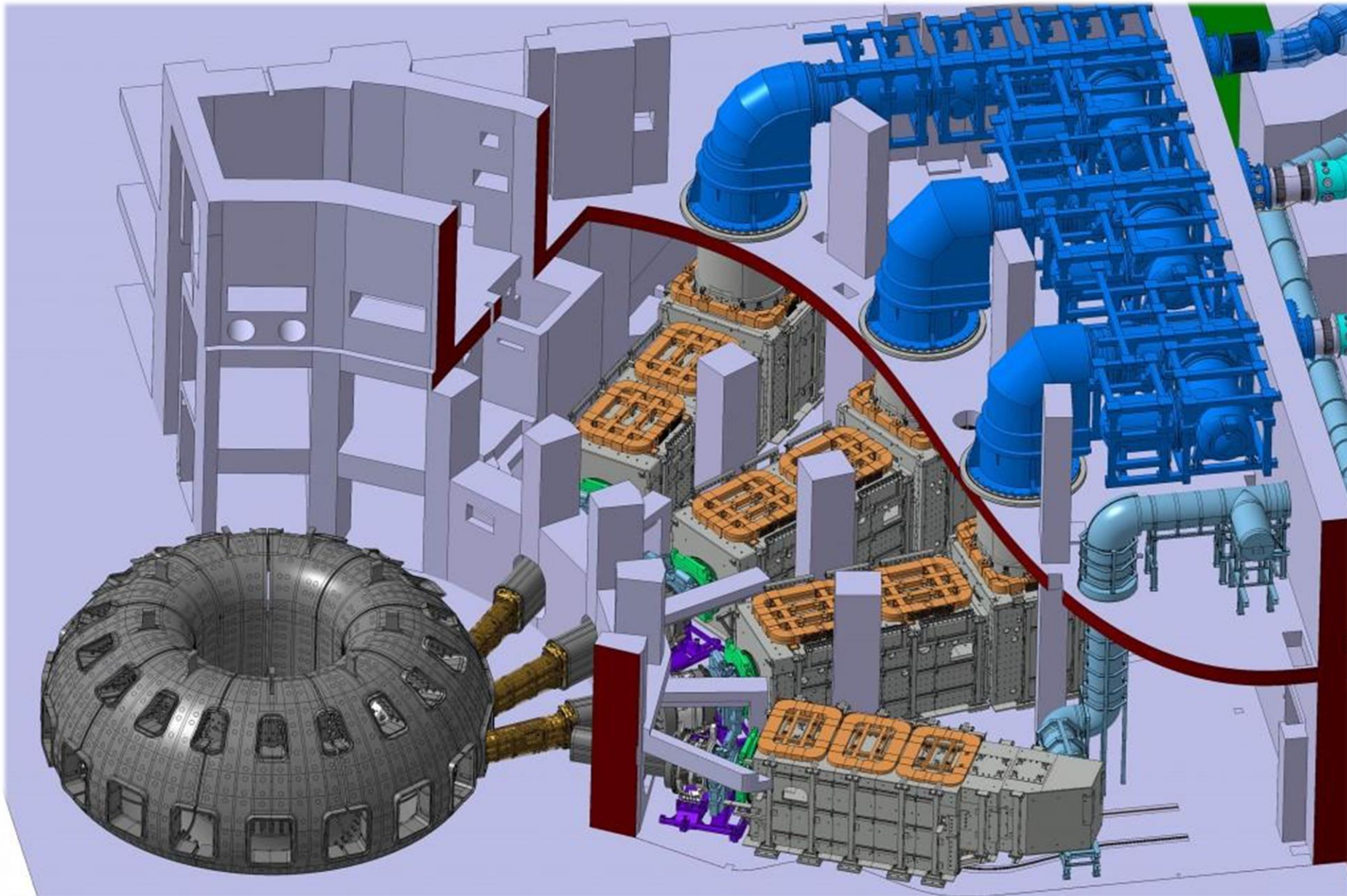
**QVS**  
added value solutions

**QVS**  
added value solutions

**QVS**



# Construir y calendar un SOL en la Tierra

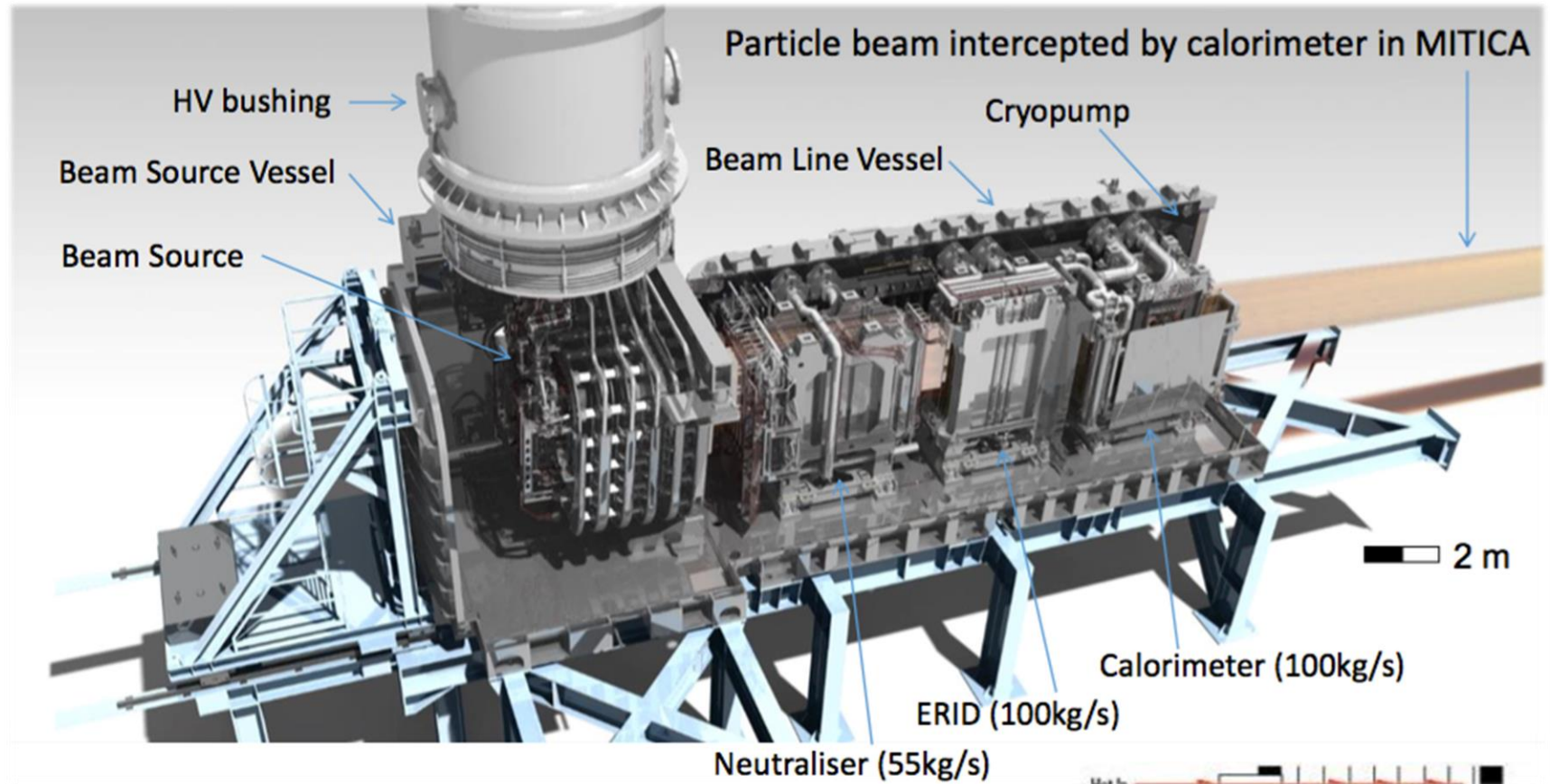




## El acelerador de neutros más potente del MUNDO para el mayor reactor de FUSIÓN Nuclear del MUNDO



$P_{\text{beam}}$	17 MW (33-40 MW)
$I_{\text{acc}}$	40-50 A
$V_{\text{acc}}$	1 MV
$t_{\text{pulse}}$	3600 s
Weight	50 T



BRINGING THE POWER OF THE SUN TO EARTH

About F4E Fusion ITER More Projects Benefits for Europe Get Involved News & Media

### How are the MITICA beam line components shaping up?

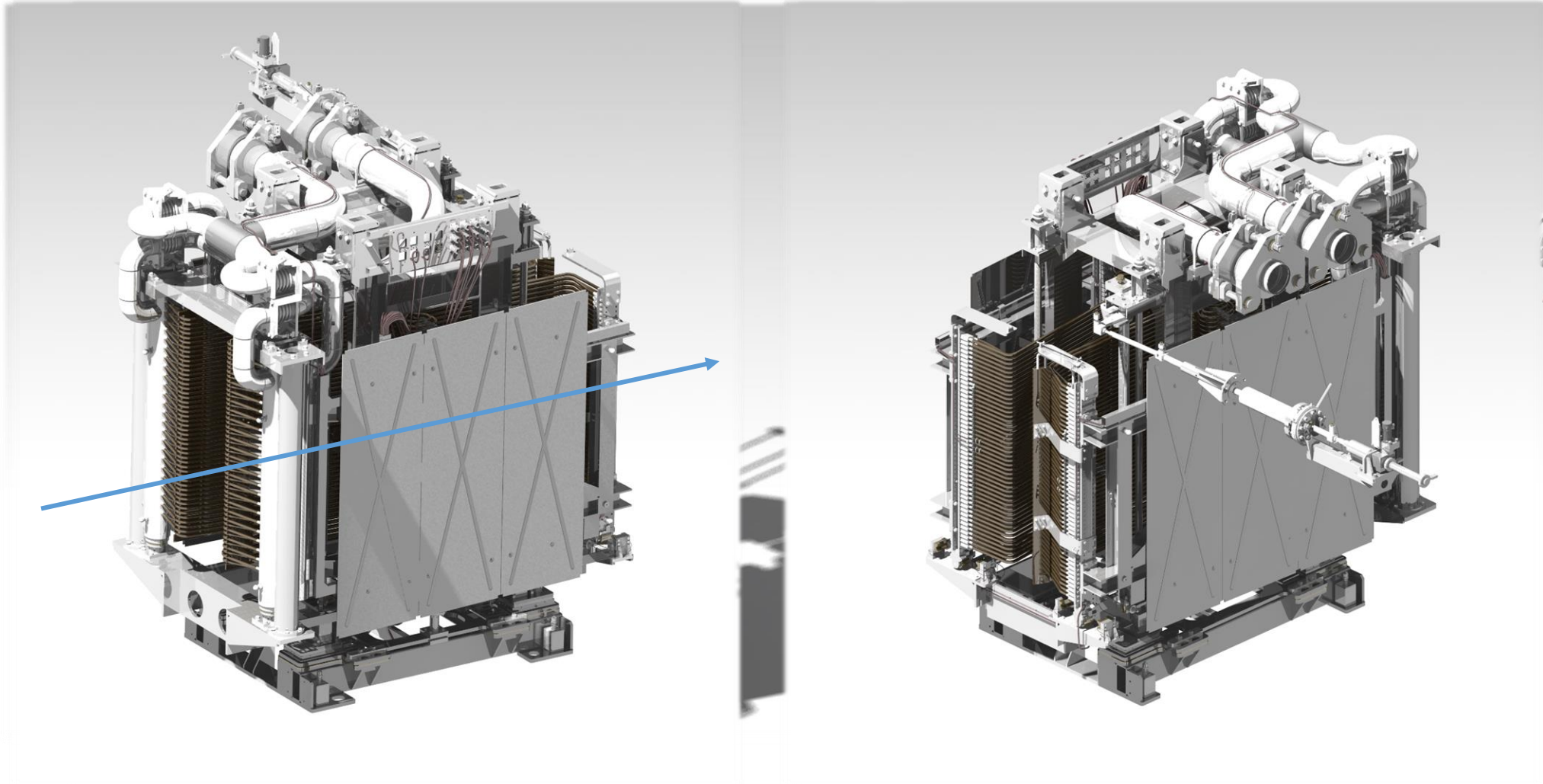


ISO 9001

EN 9100



# MITICA Beamlines: Calentar el plasma de ITER



Calorimeter (CAL)



7T  
3m x 2m x 3m



SINERGIA real

De nuestros desarrollos para grandes instalaciones científicas

A la idea (2016) de trasladar nuestras capacidades

a protonterapia (AVO) y hadron/carbon terapia

Valor en futuro



# Desarrollos hadron/carbon terapia: LINACs compactos

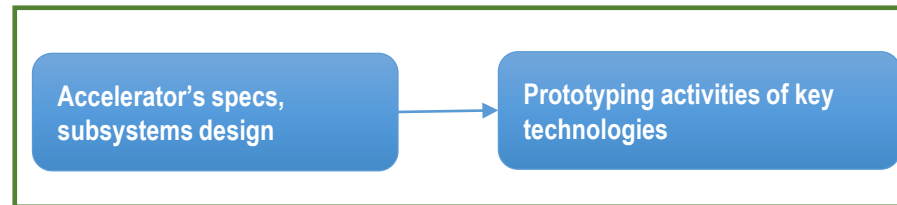
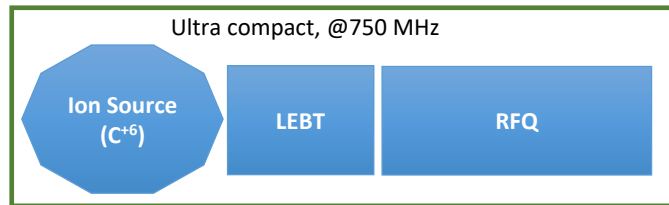
IKERTU. Principal objetivo

*Diseño de componentes clave* de un acelerador de partículas compacto lineal para **hadron/carbon terapia**. Actividades de prototipado para **validar tecnología clave**.

2016-2019

Fase I subsistemas (diseño pre. hasta RFQ)

Desarrollos en Fase I

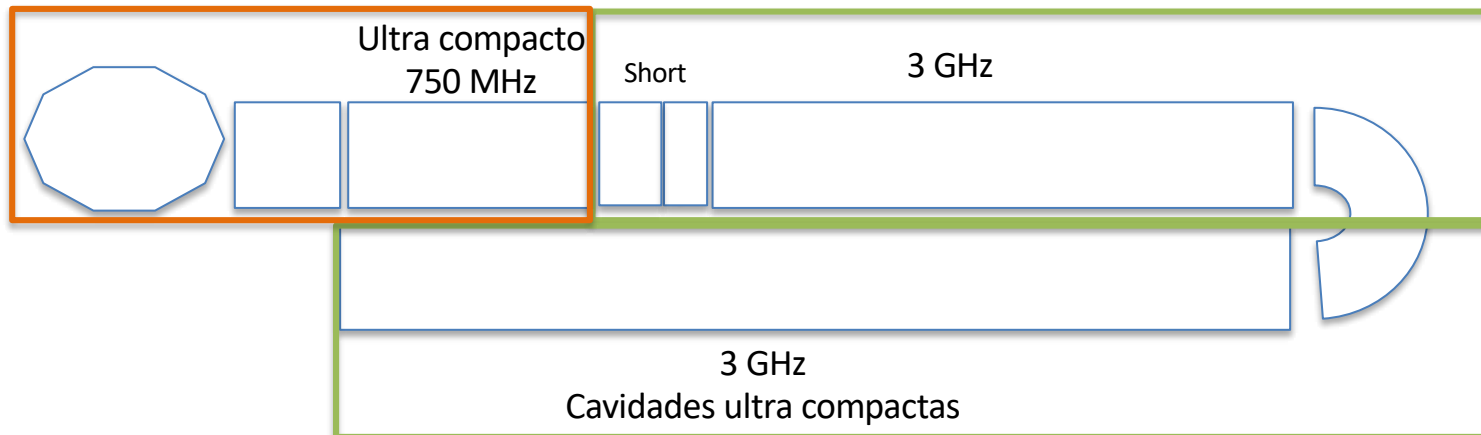


Una idea

2020-2022

Fase II subsistemas (diseño final hasta RFQ)

Desarrollos en Fase II (diseño pre. IH, MEBT, protos key tech)



2022





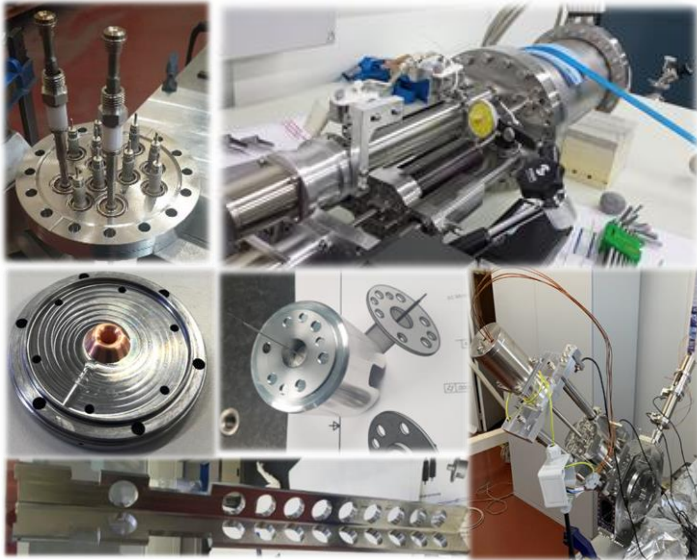
# Desarrollos hadron/carbon terapia: LINACs compactos

Retos de un LINAC @750 MHz (3 GHz post RFQ)

- Fuente de  $C^{6+}$  totalmente ionizado: electron beam Ion source (EBIS)
- Diagnósticos de haz (perfil, emitancia, corriente)
- Desarrollo de conceptos de solenoides
- RF & Fuente de alimentación pulsada, triggering system, p. transformers
- Tecnologías y procesos de fabricación precisa (mecanizado, brazing disimilares, cátodos)
- Testado de tecnologías clave

## AVS

Coordinator, System Engineering,  
Core EBIS source, beam diagnostics...



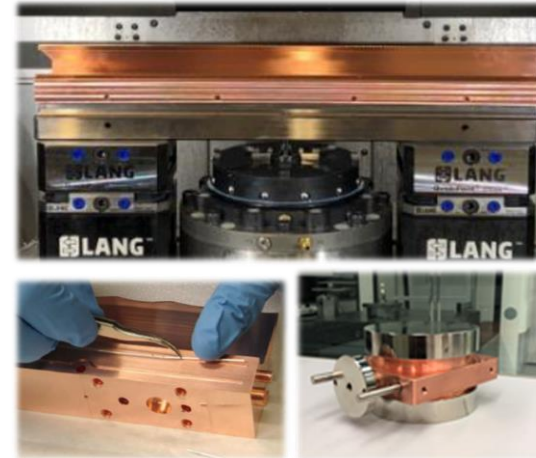
## Elytt

LEBT: Magnet, dipole, solenoid (HTS)



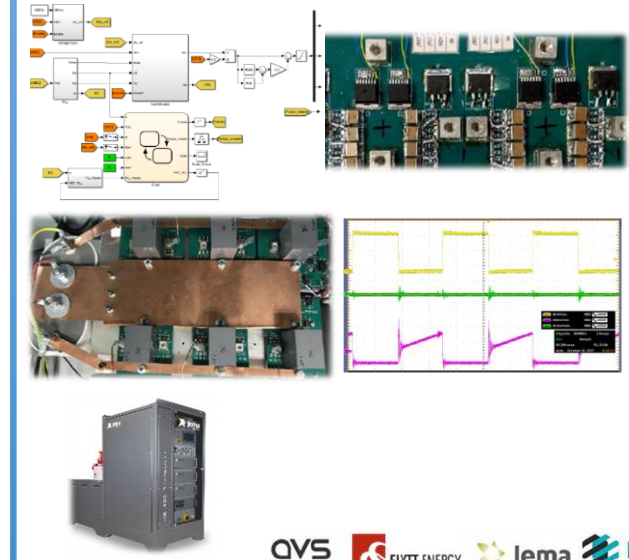
## Egile

RFQ: Compact RFQ



## Jema

Short pulse Klystron PS: Switcher, transformer...



QVS ELYTT ENERGY Jema Egile MECHANICS

IK4 TEKNIKER ineustar UPV EHU ceit tecnalia Ciomat

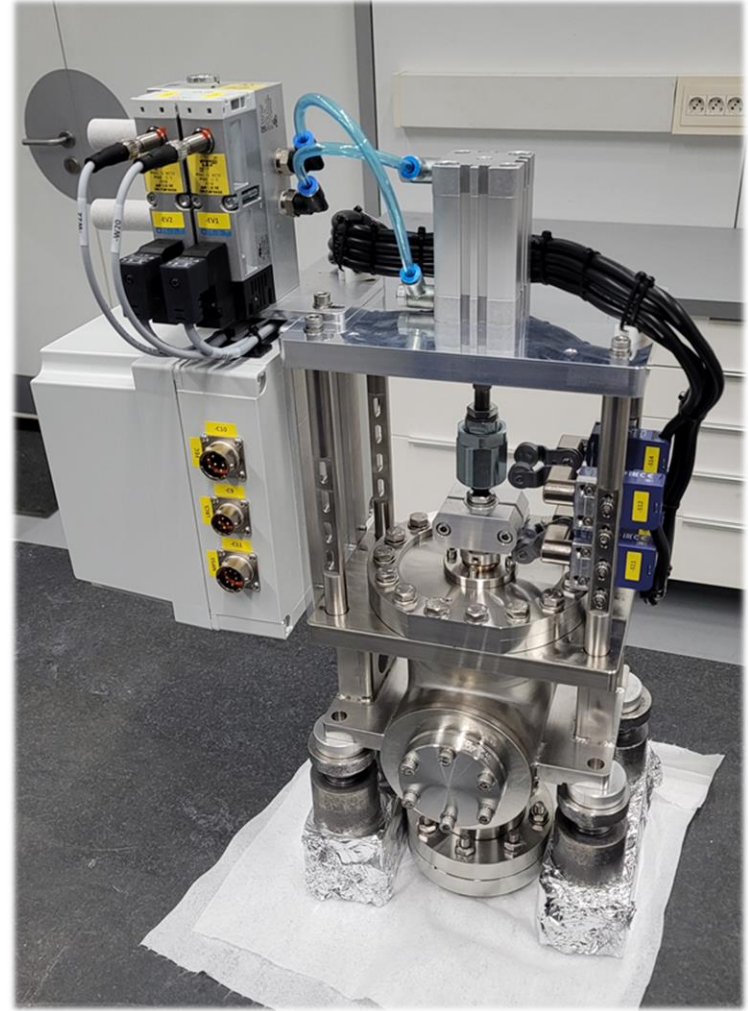
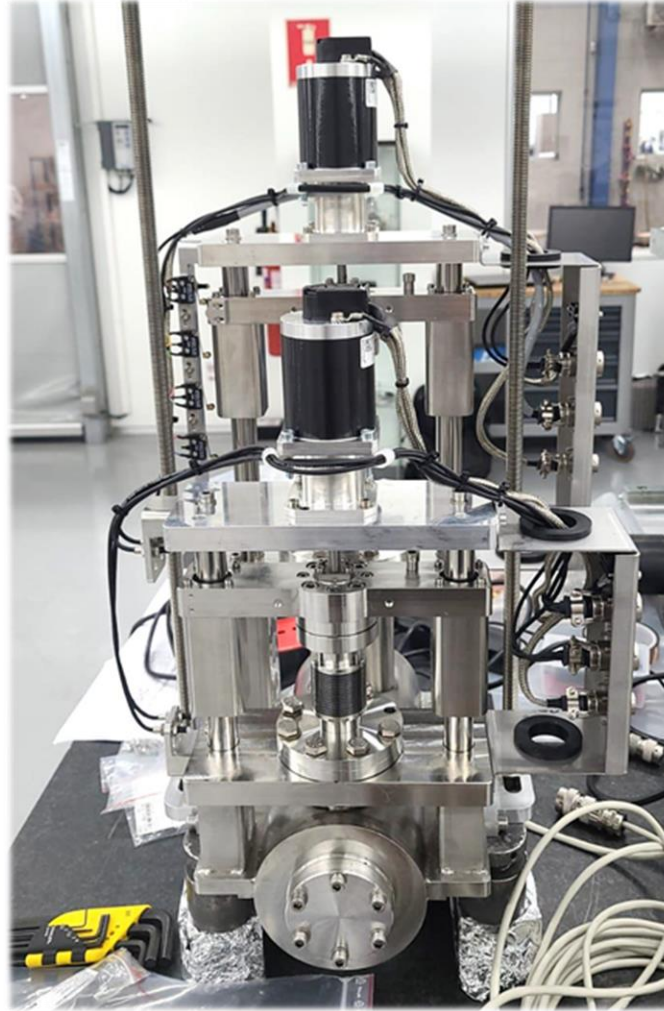
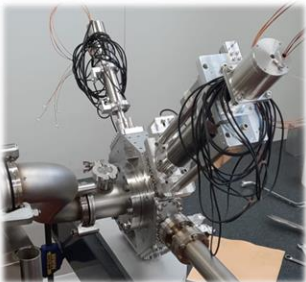
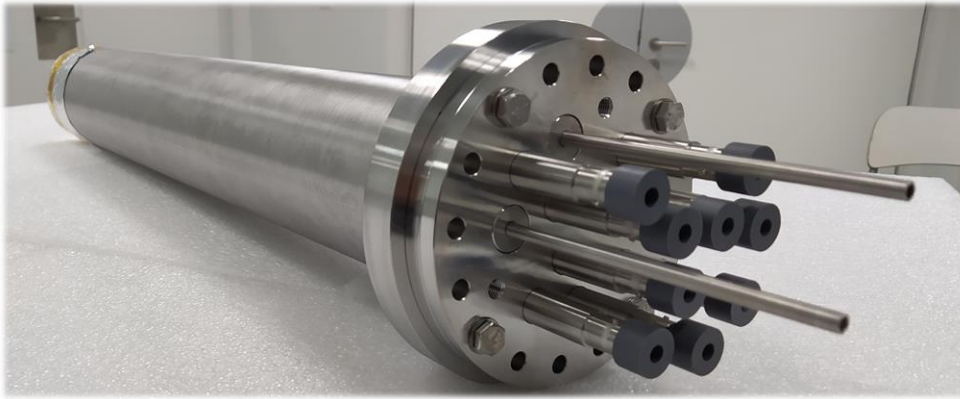
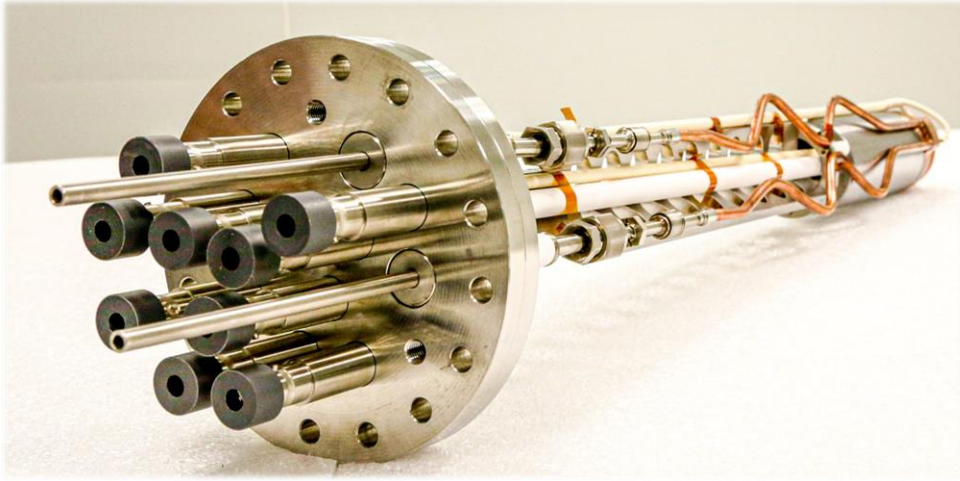
QVS

ISO  
9001

EN  
9100

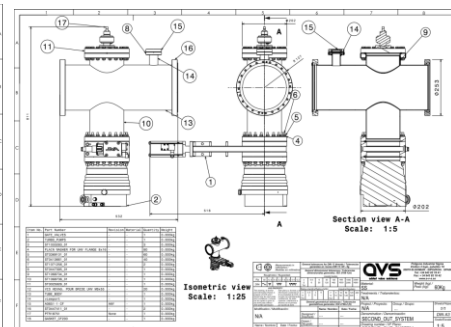
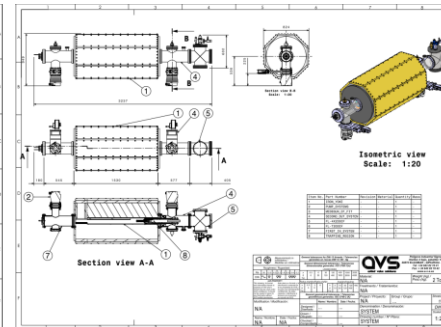
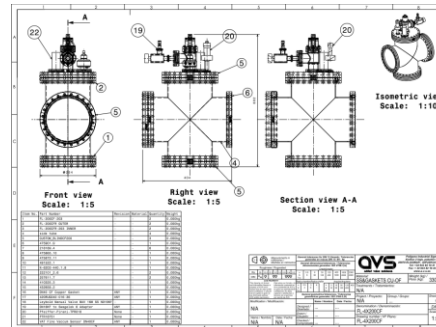
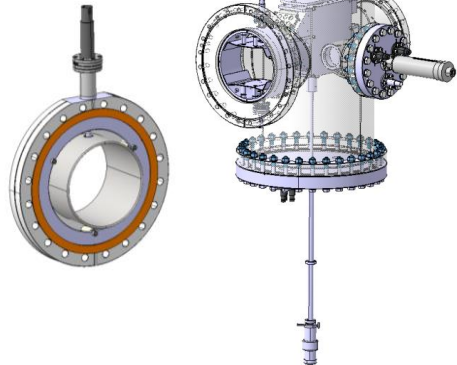
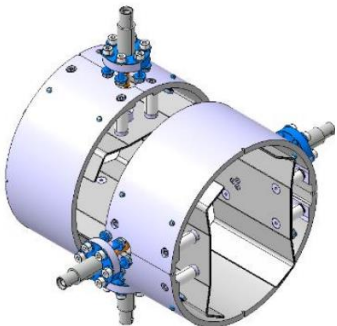
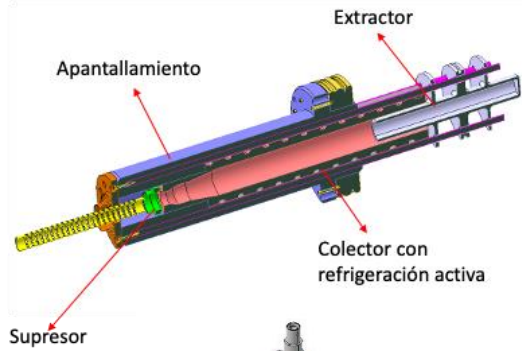
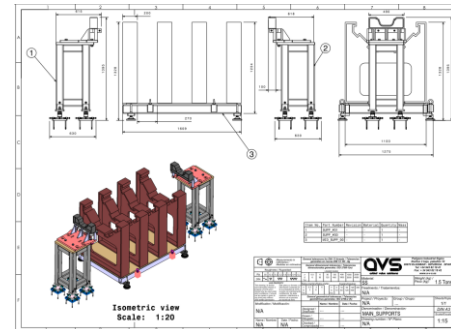
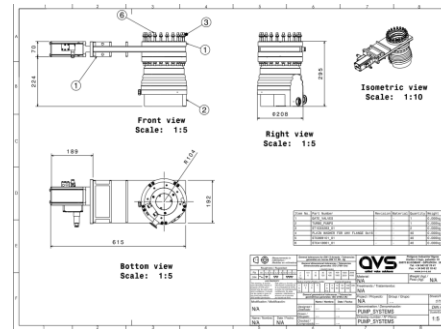
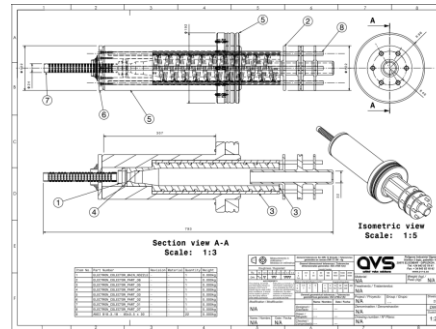
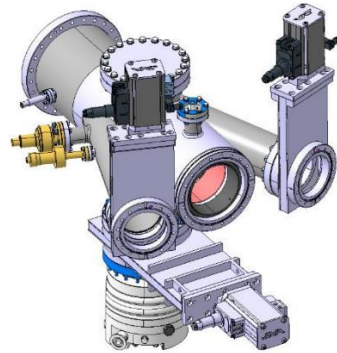
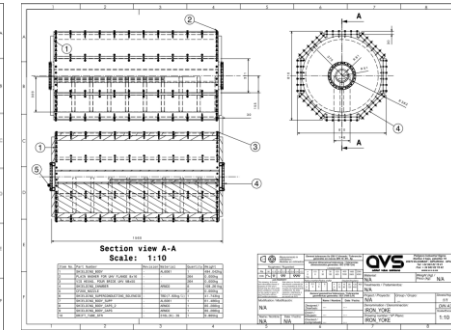
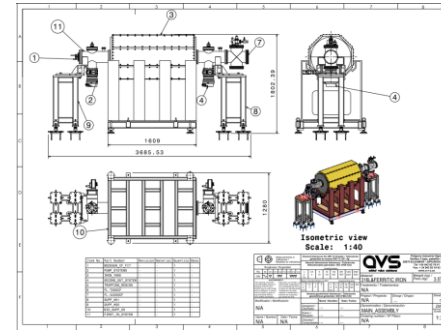
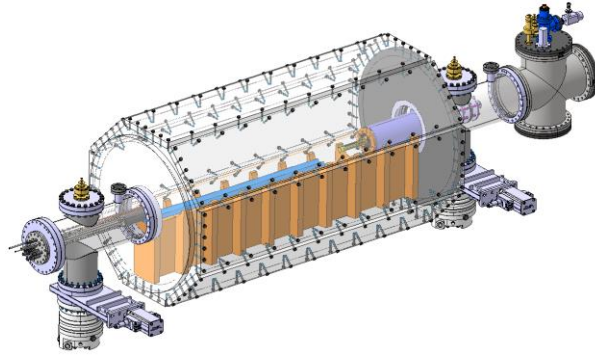
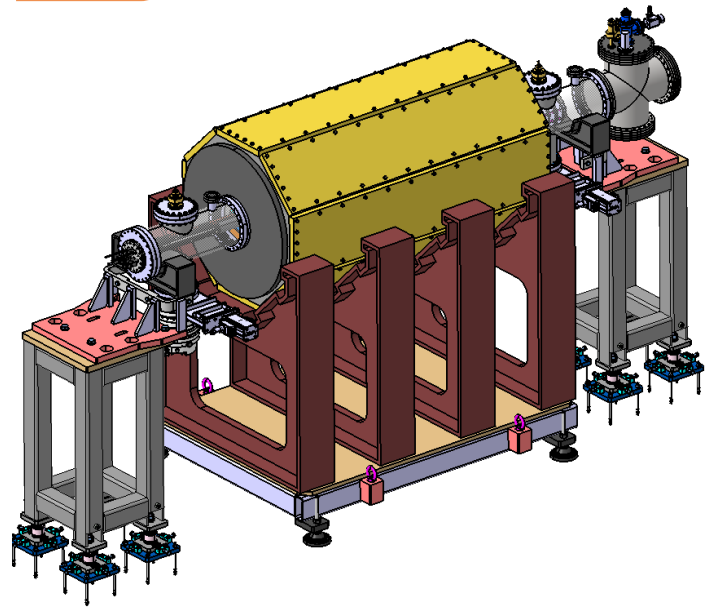


# Pre-inyector Fuente C+6 (eGUN). Diagnósticos. Degradadores Energía





# Diseño de una Fuente de C<sup>6+</sup>, diagnósticos, vacío, estructuras



# Desarrollos hadron/carbon terapia: LINACs compactos

Preparados para el siguiente paso

Construcción de un inyector/acelerador

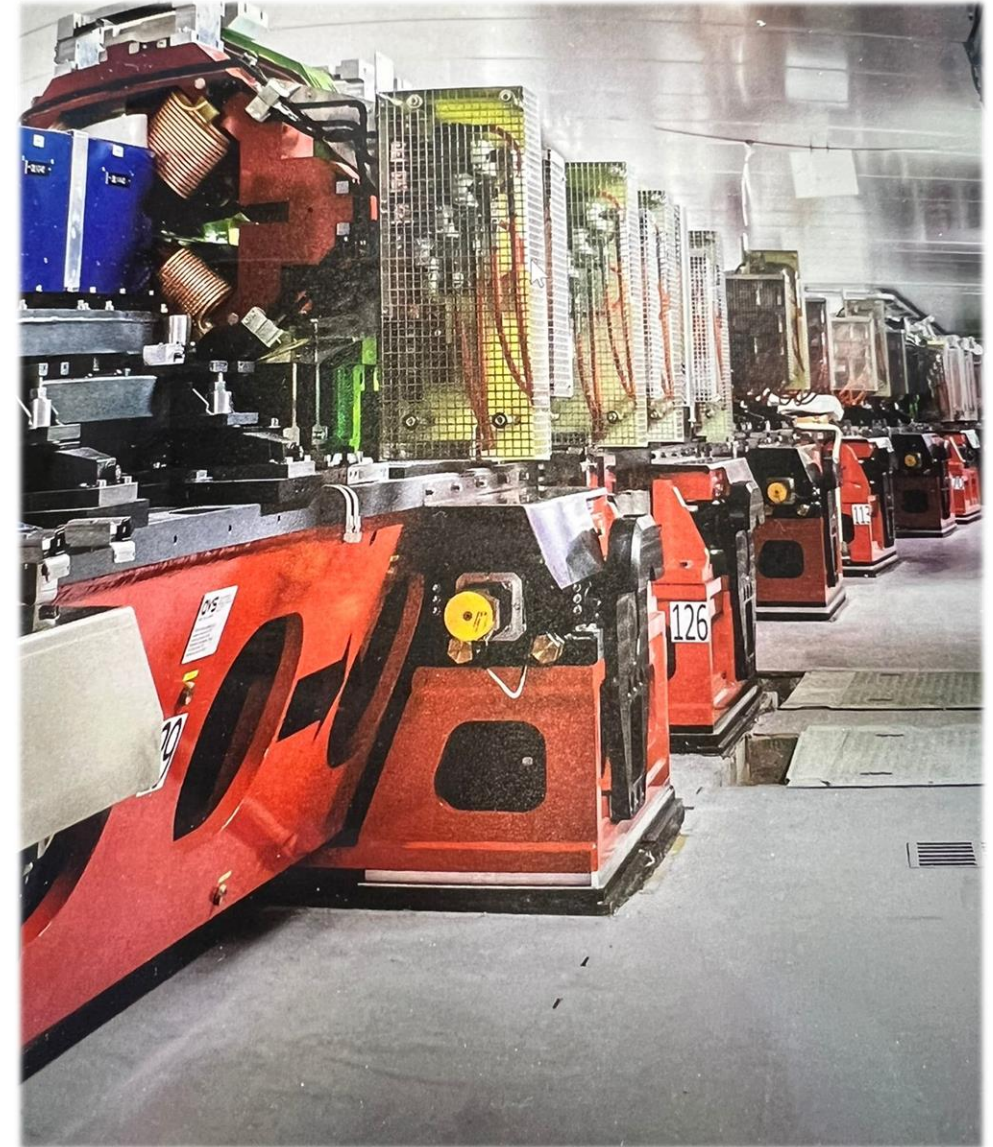
Experiencia en gestión grandes proyectos GICs

Experiencia diseño, construcción y arranque

Riesgos mitigados

Ideas claras y estables: Programas I+D en ciencia desde 2006

Estructura	Energía de Salida (MeV)	Long. Activa (m)	Potencia pico (MW)
RFQ compacto @ 750 MHz	5 MeV	2	0.4
Estructura IH @ 750 MHz	10 MeV	0.9	0.1
3 GHz DTL/scDTL	70 MeV (10-70)	4.1 (conjunto 10-70)	13
3 GHz BTW (o CCL)	70-410/u	TBD (4.4/u)	108





QVS

---

EN  
9100

Thank you

ISO  
9001

---