brightness²

Build on Best Practice

Video Workshop

Building on Best Practices @ Iberia Hub

Estefanía Abad & Fiamma G Toriello
ESS Bilbao

27.08.2020, Remote

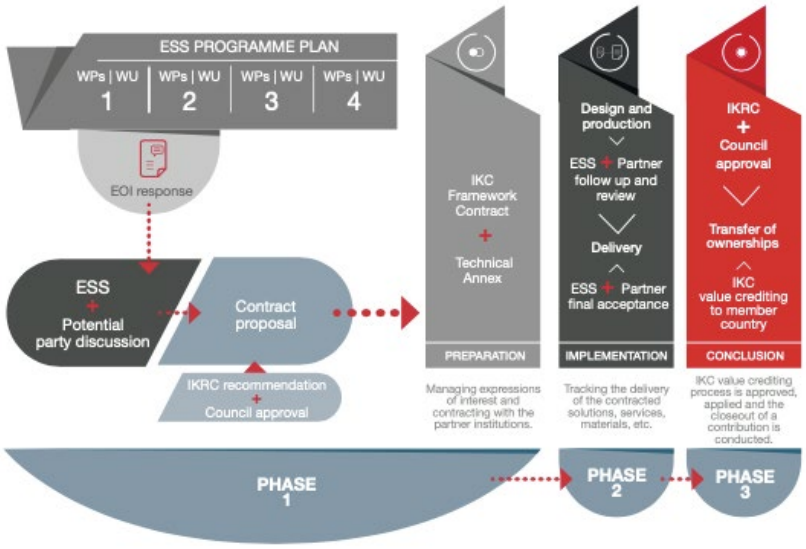
Background: Iberia Hub

- Iberia Hub: ESS Bilbao
  - Spain become Member Country of ESS in April 2018 and is committed to contribute 3% of total ESS construction cost (90% IKW: 49.8 M€$_{2013}$ and 10% cash: 5.5 M€$_{2013}$)
  - All In-kind contributions from Spain (Iberia Hub) are channelled to ESS through a single in-kind partner, ESS Bilbao

BrightnESS² is funded by the European Union Framework Programme for Research and Innovation Horizon 2020, under grant agreement 823867

Background

The In-Kind Contribution Process



WPs: Work Packages | WU: Work Unit | EOI: Expression of Interest | IKRC: In-Kind Review Committee

IKC as the Enabler of Return on Investment

Sub. PROJECT	SUMMARY	TA No.	CB VALUE €
ACCSYS	MEBT	AIK. 3.1	4,522,285 €
	RF for Warm Linac (Rev2.1)	AIK 8.1 Rev 2.1	6,644,000 €
	3 Klystron Modulators (Rev2)	AIK. 17.6 Rev 2	3,450,371 €
	MEBT Installation, Testing and Commissioning	AIK. 3.7	400,000 €
ICS	MEBT Control System (Rev2)	IIK 14.10.4 #1 Rev2	963,258 €
TARGET	Target Wheel (Rev2)	TIK 2.1 Rev 2	8,360,000 €
	Protom Beam Instrumentation Plug	TIK 4.2	540,000 €
	Proton Beam Window	TIK 4.4	890,000 €
	Monolith Vessel (Rev2)	TIK 4.5 Rev2	4,680,000 €
	Tuning Beam Dump	TIK 4.9	2,480,000 €
NSS	Beam Trasport Optimisation for the Extreme Condition Diffractometer	NIK 2 #3	20,000 €
	Training of Motion Control Engineer (ES)	NIK 5.3 #7	97,200 €
	Secondment of a Mechanical Engineer to LOKI	NIK 6.3 #1	54,000 €
	Instrument Miracles - PHASE 1	NIK 6.16 #1	423,500 €
	Miracles Instrument	NIK 6.16 #2	11,524,250 €

Technical Annexes describe the Scope of Work required to complete a specific IKC for ESS. The distribution of ESS Bilbao's TAs within the ESS technical areas is as follows:

ESS Bilbao´s TAs Distribution Acording to the CB Value

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Overview of Spanish In-Kind Contributions to ESS

1. ACCELERATOR

   MEDIUM ENERGY BEAM TRANSPORT: Accelerating element: Complete subsystem that goes after Radio Frecuency Quadrupole and integrates design, manufacturing, diagnostics, control, assembly and testing.

   RADIO FRECUENCY SYSTEMS: RF Chains: 1 for RFQ and 5 for Drift Tube Linac. The RF systems are composed by klystrons, modulators, loads, waveguides, interlocks and Low Level Radio Frecuency.

2. TARGET: The spallation process takes place when the accelerated proton beam hits the tungsten bricks of the 11-tonne target wheel. This will produce neutron brightne for scientific experiments across multiple disciplines.

3. INSTRUMENT MIRACLES: Time-of-Flight backscattering instrument for polymer science, energy materials and magnetism studies. ESS Bilbao is prime contractor for design, manufacturing, assembly & cold commissioning.

Best Practices workshops in Br1

- BP on engineering aspects of large-scale IK projects (Bilbao 2016):
  - ESS (black box) needed standardization, integration and project information management

- BP on installation (Catania 2017):
  - ESS needed an installation coordinator and processes

- BP on ESS IK installations: organizations, plans and support (Lund 2018):
  - Safety and working on site
  - Technical documentation
  - Acceptance, commission and hands over

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Best Practices at Iberia Hub (B-1/B-2)

- Transport and deliveries coordination
- Acceptance of IK project results
- Industry capacitation: coordination with Spanish ILO
- IKCA
- Installation: MEBT (IRR, RAMS, H&S, ID06…)
- Quality System certified under ISO 9001:2015 standard:
  - Document control
  - Personnel management
  - Public tender procedures
  - Risk management

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BP#1 – Deliveries of IK components

- ESSB-840-03-IT: ESS Bilbao procedure to manage IK deliveries:
  - SDE: PM to FC
  - Packing list (PM)
  - Preadvise (FC) to ESS Logistic
  - Delivery check list (signed by ESS Logistic)

ESSB-840-03-IT
INSTRUCCIÓN TÉCNICA DE GESTIÓN DE ENVÍOS

ELABORADO	REVISADO	APROBADO	FECHA
EAG	FTO/ILH	MP	
ABAD GARCIA ESTEFANIA - 11078112R	LEZCANO HIDALGO IZASKUN - 16066283T	11832905A MARIO PEREZ (R: G95455473)	
	GARCIA-TORELLO OVELLERO FIAMMA - 78889653T		

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BP#1 – Deliveries of IK components

SOLICITUD DE ENVÍO

ESSB-IMD-DS-IH01 SDE Solicitud de Envío Rev.1

Delivery code	
Responsible of the delivery	☐ESS Bilbao ☐Manufacturer
Equipment to be Delivered	
Place of the delivery	
Manufacturer	
Contact in the manufacturer (if responsible for the delivery)	
ESS Bilbao Contact	
IK Reference	
Delivery Terms	
ESSB project/subproject	
Order/Tile	
Unloading place	
Expected loading date	
Expected delivery date	
Number of parcels	
Detailed description of content	
Size of each parcel	
Parcel reference (if applicable)	
Weight of each parcel in Kg	
Total weight	
Carrier name	
Carrier phone number	
Special unload tool needed	
Contact for unloading	
Need assistance from Skanska	
Special storage conditions	
Truck information	
Comments	

Attach Packing List

DELIVERY CHECK LIST

ESSB-IMD-DS-IH05 Delivery Check List Rev1

Supplier:

Delivery Number:

Equipment:

ESS Bilbao Project Number:

Technical Annex Number:

BEFORE UNLOADING:

Visual inspection upon delivery:

Inspect the external packaging for signs of damage or excessive movement in transit before the contents are handled or removed from trailer. Evidence any problems by taking photos of damages or sign of movement. If there are any damages, have the driver to sign the document to verify the damages before unloading.

Tilt watch:

Before handling or removing the components from the trailer, identify the locations of tilt-watches (if used) and note signs of activation or damage to the tilt-watch that could have been caused by nearby items during transit. If there are any damages, have the driver to sign the document to verify the damages before unloading.

Specific checks for this delivery: *(please complete if specific checks are required)*

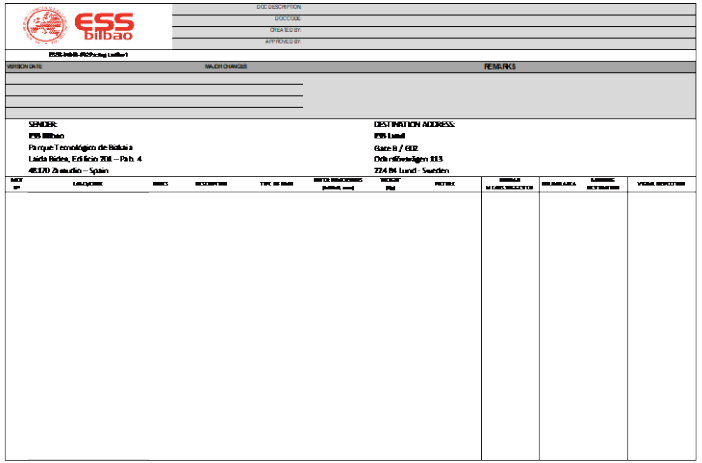
AFTER UNLOADING

Component and quantities:

Check that the correct component(s) has been delivered and in the right quantities against the delivery note.

Specific checks for this delivery: *(please complete if specific checks are required)*

Delivery Check List Notes: (To complete by ESS ERIC Logistic Coordinator)


ESS bilbao

SENDER:
ESS Bilbao
Parque Tecnológico de Bizkaia
Laida Bidea, Edificio 208 – Pab. 4
48170 Zamudio – Spain

DESTINATION ADDRESS:
ESS Lund
Gate 8 / 612
Odarslövsvägen 113
224 84 Lund - Sweden

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BP#1 – More than 30 Deliveries of IK components

						Delivery Check List		Acceptance Document													
Delivery ID	Equipment	ESSB Technical Responsibl	ESS Technical Responsibl	ESSBilbao TA Coordinato	ESS TA Coordinat	Signing date	Comments	Sending Date	Signing Date	Project/ Subproje	Manufacturer	Order/file	Aplicable TA	Incoter m	Estimated Cost €	Estimated shipping dat	Estimated arrival dat	Responsible of delivery	Manufacturer logistic coordina	ESSBilbao logistic coordinato	ESS logistic coordinato
ESSB-DL19001	RFDS of the MEBT buncher cavities	Nagore Garmendia	Bruno Lagoguez	Ibon Bustinduy	Janet Schmidt	25/3/19	No	25/3/19	1/4/19	3.5 RF (MEBT)	Rymsa RF	236/18	AIK 3.1-MEBT	DAP	45.222,85	mar-19	7/3/19	Rymsa	Vanesa Ortega	Estefanía Abad	Cassandra Waad
ESSB-DL19002-b*	Nuts and bolts for WR2300 waveguides	Pedro González	Morten Jensen	Pedro González	Morten Jensen	NA				4.6 DS (RFTX)	Sum. Gorbea	157/19	AIK 8.1-RF Power Statio	DAP	6.000,00	10/6/19	17/6/19	ESS Bilbao	Estefanía Abad	Estefanía Abad	
ESSB-DL19002-c*	Supports for coaxials and stub 100 waveguides	Pedro González	Morten Jensen	Pedro González	Morten Jensen	NA				4.6 DS (RFTX)	Hilti	171/19	AIK 8.1-RF Power Statio	DAP	1.200,00	10/6/19	17/6/19	ESS Bilbao	Estefanía Abad	Estefanía Abad	
ESSB-DL19002*	Klystron#004	Arash Kaftoosian	Morten Jensen	Pedro González	Morten Jensen	24/6/19	Yes	22/6/20		4.3 PA (RFTX)	CPI		AIK 8.1-RF for warm lina	DAP		10/6/10	17/6/19	ESS Bilbao	Arash Kaftoosian	Estefanía Abad	
ESSB-DL19003	MEBT	Ibon Bustinduy	Janet Schmidt	Ibon Bustinduy	Janet Schmidt	12/6/19	Yes			3 MEBT	ESSB	In house	AIK 3.1-MEBT	DAP		6/6/19	12/6/19	ESS Bilbao		Estefanía Abad	Richard Bebb
ESSB-DL19004	Modulator#001	Pedro González	Marko Kalafatic	Pedro González	Carlos Martins	28/5/19	No	21/10/19	21/10/19	4.2 HV (RFTX)	JEMA ENERGY		AIK 17.6-Modulators	DAP		20/5/19	27/5/19	Jema Energy	Jose María (Txema) de	Estefanía Abad	Jorgen Larson
ESSB-DL19005	WR2300 Waveguides (Stub 100) H3.1	Pedro González	Morten Jensen	Pedro González	Morten Jensen	11/6/19	No	22/6/20		4.6 DS (RFTX)	Rymsa RF	147/18-Lote1	AIK 8.1-RF Power Statio	DAP	60.000,00	4/6/19	10/6/19	Rymsa	Ana Esteban	Estefanía Abad	Cassandra Waad/W
ESSB-DL19006	Supports for waveguides in stubs	Pedro González	Morten Jensen	Pedro González	Morten Jensen	17/7/19	No	22/6/20		4.6 DS (RFTX)	Hilti	199/18	AIK 8.1-RF Station for R	DAP	10.000,00	8/7/19	15/7/19	ESS Bilbao	Estefanía Abad	Estefanía Abad	Walther Borg/Cass
ESSB-DL19007	Supports for waveguides in tunnel	Pedro González	Morten Jensen	Pedro González	Morten Jensen	26/7/19	No	22/6/20		4.6 DS (RFTX)	Hilti	208/18	AIK 8.1-RF Station for R	DAP	10.000,00	16/7/19	26/7/19	ESS Bilbao	Estefanía Abad	Estefanía Abad	Walther Borg/Cass
ESSB-DL19007-b*	Pumping Cart	Aitor Zugazaga	Lawrence Page	Ibon Bustinduy	Janet Schmidt	NA				3 MEBT			AIK 3.1-MEBT	DAP	30.000,00	17/7/19	26/7/19	ESS Bilbao		Estefanía Abad	Cassandra Waad
ESSB-DL19008	Modulator#002&#003	Pedro González	Marko Kalafatic	Pedro González	Carlos Martins	19/7/19	No	21/10/19	21/10/19	4.2 HV (RFTX)	JEMA ENERGY		AIK 17.6-Modulators	DAP		15/7/19	23/7/19	Jema Energy	Jose María (Txema) de	Estefanía Abad	Jorgen Larson
ESSB-DL19009	WR2300 Flexible Waveguides (Stub 100) H3.1	Pedro González	Morten Jensen	Pedro González	Morten Jensen	23/7/19	No	22/6/20		4.6 DS (RFTX)	AWGE	147/18-Lote2	AIK 8.1-RF Station for R	DAP		7/8/19	11/8/19	AWGE	Fernando Mirapeix	Estefanía Abad	
ESSB-DL19010	WR2300 Waveguides (Stub 110) H3.2	Pedro González	Bruno Lagoguez	Pedro González	Morten Jensen	9/9/19	No	22/6/20		4.6 DS (RFTX)	Rymsa RF	147/18-Lote1	AIK 8.1-RF Station for R	DAP		30/8/19	11/9/19	Rymsa/SENER		Estefanía Abad	Jorgen Larson
ESSB-DL19011	WR2300 Flexible Waveguides (Stub 110) H3.2	Pedro González	Morten Jensen	Pedro González	Morten Jensen	13/9/19	No	22/6/20		4.6 DS (RFTX)	AWGE	147/18-Lote2	AIK 8.1-RF Station for R	DAP			12/9/19	AWGE	Fernando Mirapeix	Estefanía Abad	Cassandra Waad
ESSB-DL19012	Klystron#002	Arash Kaftoosian	Morten Jensen	Pedro González	Morten Jensen	17/10/19	Yes	22/6/20		4.3 PA (RFTX)	CPI		AIK 8.1-RF for warm lina	DAP		10/10/19	17/10/19	ESS Bilbao		Estefanía Abad	
ESSB-DL19013	WR2300 Waveguides (RFQ Tunnel) H3.3+H3.4+5.1	Pedro González	Morten Jensen	Pedro González	Morten Jensen	16/10/10	No	22/6/20		4.6 DS (RFTX)	Rymsa RF	147/18-Lote1	AIK 8.1-RF Station for R	DAP		11/10/19	16/10/19	Rymsa	María José Bravo	Estefanía Abad	
ESSB-DL19014	WR2300 Special Waveguides (RFQ Tunnel) H3.3	Pedro González	Morten Jensen	Pedro González	Morten Jensen	21/10/19	No	22/6/20		4.6 DS (RFTX)	AWGE	147/18-Lotes 2 y	AIK 8.1-RF Station for R	DAP		14/10/19	18/10/19	AWGE	Fernando Mirapeix	Estefanía Abad	
ESSB-DL19015	Shieldings for 2 CPI klystrons	Nagore Garmendia	Morten Jensen	Pedro González	Morten Jensen	11/11/19	No	22/6/20		4.3 PA (RFTX)	Nortemecánica	193/19	AIK 8.1-RF for warm lina	DAP		31/10/19	6/11/19	Nortemecánica	Severino	Estefanía Abad	
ESSB-DL19016	Parts for MEBT installation II	Javier Martin	Alex Sosa/Edgar Sa	Ibon Bustinduy	Håkan Danared	12/11/19	No			3.1 MEBT						30/10719	7/11/19				
ESSB-DL19017	RF Components	Pedro González	Morten Jensen	Pedro González	Morten Jensen	12/11/19	No			4.6 DS (RFTX)	Several		AIK 8.1-RF Station for R	DAP		30/10/19	7/11/19	ESS Bilbao		Estefanía Abad	Cassandra Waad
ESSB-DL19018	WR2300 Waveguides (DTL) H5.2+5.3	Pedro González	Morten Jensen	Pedro González	Morten Jensen	5/12/19	No	22/6/20		4.6 DS (RFTX)	Rymsa RF	147/18-Lote1	AIK 8.1-RF Station for R	DAP		29/11/19	6/12/19	Rymsa	María José Bravo	Estefanía Abad	
ESSB-DL19019	WR2300 Special Waveguides (RFQ Gallery) H3.4+5	Pedro González	Morten Jensen	Pedro González	Morten Jensen	9/12/19	No	22/6/20		4.6 DS (RFTX)	AWGE	147/18-Lotes 3	AIK 8.1-RF Station for R	DAP		3/12/19	6/12/19	AWGE	Fernando Mirapeix	Estefanía Abad	
ESSB-DL19019-b	WR2300 Flexible Waveguides (DTL) H5.2+5.3	Pedro González	Morten Jensen	Pedro González	Morten Jensen	9/12/19	No	22/6/20		4.6 DS (RFTX)	AWGE	147/18-Lotes 2	AIK 8.1-RF Station for R	DAP		3/12/19	6/12/19	AWGE	Fernando Mirapeix	Estefanía Abad	
ESSB-DL19020	TBD Tcopper+ Steel shielding	Fernado Sordo	Mattias Wilborgss	Fernado Sordo	Rikard Linander	20/12/19	No			9.1 TBD shielding	Nortemecánica	157/18 159/18	TIK 4.9-TBD	DDP		13-16/12/19	19-20/12/19	Nortemecánica	Severino López	Estefanía Abad	Cassandra Waad
ESSB-DL19021	Circulators and Loads: part I	Pedro González	Morten Jensen	Pedro González	Morten Jensen	18/12/19	BM5 did a da	12/6/20		4.6 DS (RFTX)	AFT	193/18	AIK 8.1-RF for warm lina	DAP		16/12/19	20/12/19	AFT	Verena Feist	Estefanía Abad	Walther Borg
ESSB-DL20001	WR2300 Waveguides & Flexible Waveguides	Pedro González	Morten Jensen	Pedro González	Morten Jensen	13/1/20	No	22/6/20		4.6 DS (RFTX)	AWGE	147/18-Lotes 3	AIK 8.1-RF Station for R	DAP		7/1/20	10/1/19	AWGE	Fernando Mirapeix	Estefanía Abad	Cassandra Waad
ESSB-DL20002	TBD	Fernando Sordo	Mattias Wilborgss	Fernando Sordo	Rikard Linander	27/1/20	No			9 TBD	Nortemecánica	188/18 159/18 16	TIK 4.9-TBD	DDP		20/1/20	24/1/20	Nortemecánica	Severino López	Estefanía Abad	Cassandra Waad
ESSB-DL20003	WR2300 Waveguides (DTL) H5.2+5.3	Pedro González	Morten Jensen	Pedro González	Morten Jensen	31/1/20	No	22/6/20		4.6 DS (RFTX)	Rymsa RF	147/18-Lote1	AIK 8.1-RF Station for R	DAP		23/1/20	31/1/20	Rymsa	Vanesa Otega	Estefanía Abad	Cassandra Waad
ESSB-DL20004	LLRF for RFQ: MTCA crate, 2 power supplies, MCH,	Pedro González	Anders Svensson	Pedro González	Morten Jensen	11/2/20		22/6/20		4.4. RFTX LLRF	ESS Bilbao		AIK 8.1-RF Station for R	DAP		6/2/20	11/2/20	ESS Bilbao		Estefanía Abad	Cassandra Waad
ESSB-DL20005	RFQ Coupler	Pedro González	Morten Jensen	Pedro González	Morten Jensen	14/2/20	No			4.6 DS (RFTX)	AWGE	147/18-Lotes 3	AIK 8.1-RF Station for R	DAP		7/2/20	10/2/20	AWGE	Fernando Mirapeix	Estefanía Abad	Cassandra Waad
ESSB-DL20006	TBD Gallizo shielding blocks and Flood probe	Fernando Sordo	Mattias Wilborgss	Fernando Sordo	Rikard Linander	6/3/20	No			9.1 TBD (shieldin	Gallizo& Filsa	019/20&011/20	TIK 4.9-TBD	DDP		24/2/20	4/3/20	ESS Bilbao		Estefanía Abad	
ESSB-DL20007	WG DTL2	Pedro González	Morten Jensen	Pedro González	Morten Jensen	9/3/20	No	22/6/20		4.6 DS (RFTX)	AWGE	147/18-Lotes 3	AIK 8.1-RF Station for R	DAP		28/2/20	9/3/20	AWGE	Fernando Mirapeix	Estefanía Abad	Cassandra Waad
ESSB-DL20008	3 Circulators and 5 Loads	Pedro González	Morten Jensen	Pedro González	Morten Jensen	23/3/20	No	12/6/20		4.6 DS (RFTX)	AFT	193/18	AIK 8.1-RF Station for R	DAP		13/3/20	23/3/20	AFT	Verena Feist	Estefanía Abad	Cassandra Waad
ESSB-DL20009	Wire Scanner 3	Ibon Bustinduy	Clement Derrez	Ibon Bustinduy	Alex Sosa	13/5/20	No			3.10 MEBT/PBI	Proactive R&D	340/19	AIK 8.1-RF Station for RFQ and DTL and Spoke LLRF			11/5/20	13/5/20	Proactive	Juan Herranz	Estefanía Abad	Johan Larsson
ESSB-DL20010	WR2300 Flexible Waveguides (Bellows) for RF Syst	Pedro González	Walther Borg	Pedro González	Morten Jensen	31/7/20				4.6 DS (RFTX)	Mega	055/20	AIK 8.1-RF Station for R	DAP		15/6/20		ESS Bilbao		Estefanía Abad	Johan Larsson
ESSB-DL20011	Klystron#1 Thales	Pedro González	Morten Jensen	Pedro González	Morten Jensen	24/6/20	No	8/8/20		4.3 PA (RFTX)	Thales	145/18	AIK 8.1-RF Station for R	DAP		22/6/20	18/6/20	Thales	Bernard Kowalski	Estefanía Abad	Johan Larsson
ESSB-DL20012	WG resto	Pedro González	Morten Jensen	Pedro González	Morten Jensen					4.6 DS (RFTX)	AWGE					26/6/20					
ESSB-DL20013	Klystron#2 Thales									4.3 PA (RFTX)	Thales					Fin Julio					
ESSB-DL20014	Klystron Drivers: queda 1, 6 en Lund & LLRF					No				4.3 PA (RFTX)	Betesa(5)+ESSB(1)					Julio					

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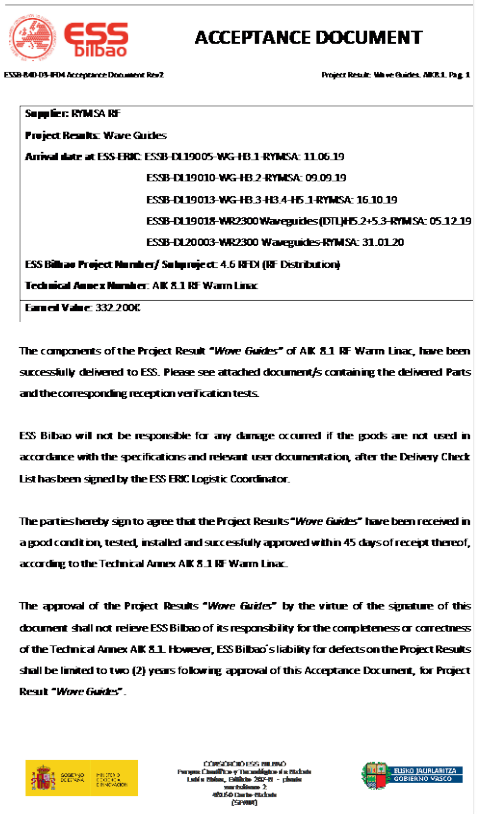
BP#2 – Acceptance of IK project results

- Acceptance doc:
  - ESS Bilbao will not be responsible for any damage occurred if the goods are not used in accordance with the specifications and relevant user documentation, after the Delivery Check List has been signed by the ESS ERIC Logistic Coordinator.
  - The parties hereby sign to agree that the Project Results "…" have been received in a good condition, tested, installed and successfully approved within 45 days of receipt thereof, according to the Technical Annex AIK 8.1 RF Warm Linac.
  - The approval of the Project Results "…" by the virtue of the signature of this document shall not relieve ESS Bilbao of its responsibility for the completeness or correctness of the Technical Annex AIK 8.1. However, ESS Bilbao´s liability for defects on the Project Results shall be limited to two (2) years following approval of this Acceptance Document, for Project Result "…".



ESS bilbao

ACCEPTANCE DOCUMENT

ESSB-840-03-IF04 Acceptance Document Rev2 — Project Result: Wave Guides. AIK8.1. Pag. 1

Supplier: RYMSA RF

Project Results: Wave Guides

Arrival date at ESS-ERIC: ESSB-DL19005-WG-H3.1-RYMSA: 11.06.19
ESSB-DL19010-WG-H3.2-RYMSA: 09.09.19
ESSB-DL19013-WG-H3.3-H3.4-H5.1-RYMSA: 16.10.19
ESSB-DL19018-WR2300 Waveguides (DTL)H5.2+5.3-RYMSA: 05.12.19
ESSB-DL20003-WR2300 Waveguides-RYMSA: 31.01.20

ESS Bilbao Project Number/ Subproject: 4.6 RFDI (RF Distribution)

Technical Annex Number: AIK 8.1 RF Warm Linac

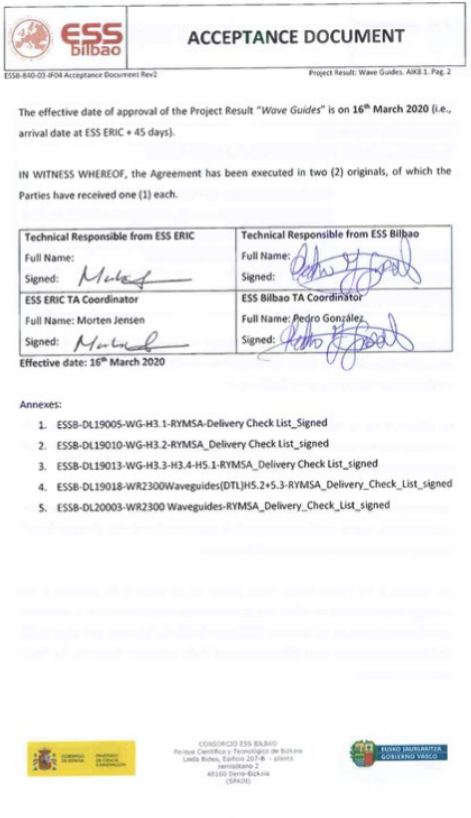
Earned Value: 332.200€

The components of the Project Result *"Wave Guides"* of AIK 8.1 RF Warm Linac, have been successfully delivered to ESS. Please see attached document/s containing the delivered Parts and the corresponding reception verification tests.

ESS Bilbao will not be responsible for any damage occurred if the goods are not used in accordance with the specifications and relevant user documentation, after the Delivery Check List has been signed by the ESS ERIC Logistic Coordinator.

The parties hereby sign to agree that the Project Results *"Wave Guides"* have been received in a good condition, tested, installed and successfully approved within 45 days of receipt thereof, according to the Technical Annex AIK 8.1 RF Warm Linac.

The approval of the Project Results *"Wave Guides"* by the virtue of the signature of this document shall not relieve ESS Bilbao of its responsibility for the completeness or correctness of the Technical Annex AIK 8.1. However, ESS Bilbao´s liability for defects on the Project Results shall be limited to two (2) years following approval of this Acceptance Document, for Project Result *"Wave Guides"*.



ESS bilbao

ACCEPTANCE DOCUMENT

ESSB-840-03-IF04 Acceptance Document Rev2 — Project Result: Wave Guides. AIK8.1. Pag. 2

The effective date of approval of the Project Result *"Wave Guides"* is on **16th March 2020** (i.e., arrival date at ESS ERIC + 45 days).

IN WITNESS WHEREOF, the Agreement has been executed in two (2) originals, of which the Parties have received one (1) each.

Technical Responsible from ESS ERIC	Technical Responsible from ESS Bilbao
Full Name: Signed:	Full Name: Signed:
ESS ERIC TA Coordinator	**ESS Bilbao TA Coordinator**
Full Name: Morten Jensen Signed:	Full Name: Pedro González Signed:

Effective date: 16th March 2020

Annexes:

1. ESSB-DL19005-WG-H3.1-RYMSA-Delivery Check List_Signed
2. ESSB-DL19010-WG-H3.2-RYMSA_Delivery Check List_signed
3. ESSB-DL19013-WG-H3.3-H3.4-H5.1-RYMSA_Delivery Check List_signed
4. ESSB-DL19018-WR2300Waveguides(DTL)H5.2+5.3-RYMSA_Delivery_Check_List_signed
5. ESSB-DL20003-WR2300 Waveguides-RYMSA_Delivery_Check_List_signed

BrightnESS² is funded by the European Union Framework Programme for Research and Innovation Horizon 2020, under grant agreement 823867

BP#2 – Acceptance of IK project results

ESS BILBAO PROJECT RESULTS DELIVERED TO LUND

30/6/20

ESSB TOTAL DELIVERED:	**12.874.422,26 €**
ESSB TOTAL ACCEPTED	**5.757.341,96 €**
WAITING FOR ACCEPTANCE:	**7.117.080,30 €**

AIK 3.1

MEBT

Project Result	% EV	EV €	Delivery code	Delivery date	Acceptance
General MEBT	16	723.565,60 €	ESSB-DL19003-MEBT	12/6/19	NO
Magnets	11	497.451,35 €	ESSB-DL19003-MEBT	12/6/19	NO
Bunchers	9	407.005,65 €	ESSB-DL19003-MEBT	12/6/19	NO
Chopper	15	678.342,75 €	ESSB-DL19003-MEBT	12/6/19	NO
Collimators	7	316.559,95 €	ESSB-DL19003-MEBT	12/6/19	NO
MEBT PBI	20	904.457,00 €	ESSB-DL19003-MEBT	12/6/19	NO
SSPA	10	452.228,50 €			
RFDS	4	180.891,40 €	ESSB-DL19001-MEBT	25/3/19	1/4/19
LLRF	8	361.782,80 €			
	100	4.522.285,00 €			

Redistribution 4% EV of LPS AIK 3.1, into LLRF

	%	
Delivered AIK 3.1:	**82**	**3.708.273,70 €**
Accepted AIK 3.1:	4	180.891,40 €
Waiting for acceptance:	78	3.527.382,30 €

AIK 3.7

MEBT Installation

Project Result	% EV	EV €	N/A	Delivery date	Acceptance
STAGE 0: Preparatory Works	20	80.000,00 €		J[illegible] 2019	NO
STAGE 1: Rack Installation	15	60.000,00 €			
STAGE 3:Beam Line Comp. Inst.	20	80.000,00 €		[illegible]e 2019	NO
STAGE 4:Hardware & EPICS	20	80.000,00 €			
STAGE 6: Buncher Condit.	20	80.000,00 €			
SAR	5	20.000,00 €			
	100	400.000,00 €			

	%	
Delivered AIK 3.7:	**40**	**160.000,00 €**
Accepted AIK 3.7:	0	0,00 €
Waiting for acceptance:	40	160.000,00 €

IIK 14.10.4#1

MEBT Control System

Project Result	% EV	EV €	Delivery code	Delivery date	Acceptance
FC	20	172.651,60 €		12/6/19	sent 19/05/2020
EMU	15	129.488,70 €		12/6/19	sent 19/05/2020
CHOPPER	10	86.325,80 €		12/6/19	sent 19/05/2020
QUAD	15	129.488,70 €		12/6/19	sent 19/05/2020
SCRAPPERS	20	172.651,60 €		12/6/19	sent 19/05/2020
BUNCHERS	20	172.651,60 €		12/6/19	sent 19/05/2020
INSTALLATION & SUPPORT					
STAGE0: Preparatory Works	20	20.000,00 €		4/6/19	NO
STAGE 1: Rack Installation	20	20.000,00 €			
STAGE 2: Control Integ. Preparation.	10	10.000,00 €			
STAGE 4: Hardware Test	15	15.000,00 €			
STATE 5: EPICS Integr.	20	20.000,00 €			
STATE 6: Buncher Conditioning.	10	10.000,00 €			
SAR	5	5.000,00 €			
	200	963.258,00 €			

Installation and support (100.000€) added in an amendment (v2 of TA).
Two tables with EV for Control (100%) and for Installation (100%)

	%	
Delivered IIK 14.10.4#1, Control:	**100**	**863.258,00 €**
Accepted IIK 14.10.4#1, Control:	0	0,00 €
Waiting for acceptance:	100	863.258,00 €

	%	
Delivered IIK 14.10.4#1, Installation:	**20**	**20.000,00 €**
Accepted IIK 14.10.4#1, Installation:	0	0,00 €
Waiting for acceptance:	20	20.000,00 €

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BP#2 – Acceptance of IK project results

AIK 8.1					
RF Warm Linac					
Project Result	% EV	EV €	Delivery code	Delivery date	Acceptance
HP amplifiers	43				
Klystron 1 004 incl shielding	7	465.080,00 €	ESSB-DL19002_Klystron#004	24/6/19	30.06.2020
			ESSB-DL19015-Shieldings for 2 CPI klystrons-Norte	11/11/19	
Klystron 2 002 incl shielding	7	465.080,00 €	ESSB-DL19012_Klystron#002	17/10/19	30.06.2020
			ESSB-DL19015-Shieldings for 2 CPI klystrons-Norte	11/11/19	
Klystron3	7	465.080,00 €			
Klystron 4 001	7	465.080,00 €	ESSB-DL20011-Klystron#001	24/6/20	sent 30/7/2020
Klystron 5	7	465.080,00 €			
Klystron 6	7	465.080,00 €			
Klyst. Drivers	1	66.440,00 €			
RF Distribution	24				
Flexible Guides	4	265.760,00 €	ESSB-DL19009_ WGFLEX-H3.1-AWGE	23/7/19	30.06.2020
			ESSB-DL19011_WGFLEX-H3.2-AWGE	13/9/19	
			ESSB-DL19014_WGFLEX-H3.3-AWGE	21/10/19	Lots 2&3
			ESSB-DL19019-WG-H3.4+5.1&WGFLEX- H5.2+5.-AW	9/12/19	
			ESSB-DL20001-WG&WGFLEX-AWGE	13/1/20	
Semi Flex WG	1	66.440,00 €			
Wave Guides	5	332.200,00 €	ESSB-DL19005-WG-H3.1-RYMSA	11/6/19	30.06.2020
			ESSB-DL19010-WG-H3.2-RYMSA	9/9/19	
			ESSB-DL19013-WG-H3.3-H3.4-H5.1-RYMSA	16/10/19	
			ESSB-DL19018-WR2300Waveguides(DTL)H5.2+5.3-I	5/12/19	
			ESSB-DL200[illegible] Waveguides [illegible]RYMSA	31/1/20	
Special Components	4	265.760,00 €			
Circ and Loads	7	465.080,00 €	ESSB-DL19[illegible]1-Circulat[illegible]&Lo[illegible]AFT	[illegible]	30.06.[illegible]
			ESSB-DL20[illegible]s&Loads part [illegible]AFT	[illegible]3/3/20	
Supports	1	66.440,00 €	ESSB-DL19[illegible]6_WG Supports [illegible]	19/7/19	[illegible]0.06.[illegible]
			ESSB-DL19[illegible]7_WG Support[illegible]unnel	[illegible]6/7/19	
Arc Detectors Systems (crates)	2	132.880,00 €			
LLRF	33				
LLRF RFQ	1	66.440,00 €	ESSB-DL20004-LLRF RFQ	11/2/20	30.06.2020
LLRF DTL	5	332.200,00 €			
LLRF SPOKE	24	1.594.560,00 €			
LO BOX and distribution	1	66.440,00 €			
LLRF piezocontrol	2	132.880,00 €			
	100	6.644.000,00 €			

AIK 17.6					
Modulators					
Project Result	% EV	EV €	Delivery code	Delivery date	Acceptance
Modulator 1	35	1.207.629,70 €	ESSB-DL19004-Modulator#001	28/5/19	21/10/19
Modulator 2 & 3	65	2.242.740,86 €	ESSB-DL19008-Modulator#002&#003	19/7/19	21/10/19
	100	3.450.370,56 €			

TIK 4.9					
TBD					
Project Result	% EV	CBV €	Delivery code	Delivery date	Acceptance
TBD Complete	100	2.480.000,00 €	ESSB-DL20002-TBD-Nortemecánica	27/1/20	NO
			ESSB-DL20006-TBD Shielding Blocks Gallizo	6/3/20	
	100	2.480.000,00 €			

EV% distribution not according TA, needs discusion with ESS RF.

Project results according commercial components that need to be acceptance by ESS at delivery

LPS out of scope of ESS Bilbao in Amnedment v2 of AIK 8.1RF warm linac including LPS of AIK 3.1 MEBT.

Needed

TIK 4.4					
PBW					
Project Result	% EV	CBV €	Delivery code	Delivery date	Acceptance
PBW	75%	667.500,00 €			
Shielding	20%	178.000,00 €			
Auxiliary Components	5%	44.500,00 €			
	100%	890.000,00 €			

Not EV% distribution on TA, needs discusion with ESS TARGET.

	%
Delivered TIK 4.4:	0
Accepted TIK 4.4:	0
Waiting for acceptance:	0

TIK 4.2					
PBIP					
Project Result	% EV	CBV €	Delivery code	Delivery date	Acceptance
PBIP structural Piece	75%	405.000,00 €			
Slides	20%	108.000,00 €			
Auxiliary Components	5%	27.000,00 €			
	100%	540.000,00 €			

Not EV% distribution on TA, needs discusion with ESS TARGET.

	%
Delivered TIK 4.2:	0
Accepted TIK 4.2:	0
Waiting for acceptance:	0

TIK 4.5					
MONOLITH VESSEL					
Project Result	% EV	CBV €	Delivery code	Delivery date	Acceptance
L&M MV	35	1.638.000,00 €			
Port Blocks Welding	15	702.000,00 €			
Connection Ring	15	702.000,00 €			
Head Vessel	25	1.170.000,00 €			
PBW PB	6	280.800,00 €			
PBW Vessel	3	140.400,00 €			
PBW PB auxiliary components	1	46.800,00 €			
	100	4.680.000,00 €			

Not EV% distribution on TA, needs discusion with ESS TARGET.

	%
Delivered TIK 4.4:	0
Accepted TIK 4.4:	0
Waiting for acceptance:	0

Delivere

Acceptec

Waiting

TIK 2.1					
TARGET WHEEL					
Project Result	% EV	CBV €	Delivery code	Delivery date	Acceptance
Target Wheel	50	4.180.000,00 €			
Target Shaft	25	2.090.000,00 €			
Drive Unit	10	836.000,00 €			
Rotative Seal	10	836.000,00 €			
Union Seal	5	418.000,00 €			
	100	8.360.000,00 €			

Not EV% distribution on TA, needs discusion with ESS TARGET.

	%
Delivered TIK 2.1:	0
Accepted TIK 2.1:	0
Waiting for acceptance:	0

Delivere

Acceptec

Waiting

Delivere

Acceptec

Waiting

INSTRUMENT					
NIK 6.16					
MIRACLES					
Project Result	% EV	CBV €	Delivery code	Delivery date	Acceptance
TG3	5	576.212,50 €			
TG4	15	1.728.637,50 €			
TG5	8	921.940,00 €			
NBOA	2	230.485,00 €			
BWI	1,5	172.863,75 €			
Neutron guides in Bunker	7,5	864.318,75 €			
Neutron guides outside Bunker	15	1.728.637,50 €			
Support Guides	2	230.485,00 €			
Choppers in Bunker	5	576.212,50 €			
Frame Overlap Mirror	2	230.485,00 €			
Vessel and In-vessel	21	2.420.092,50 €			
Experimental Cave y control room	10	1.152.425,00 €			
Utilities Distribution E01	2	230.485,00 €			
Utilities Distribution E02+D03out of bunker	2	230.485,00 €			
Utilities Distribution D03 in bunker	2	230.485,00 €			
	100	11.524.250,00 €			

Distribution of EV% on Project Results by matching Milestones,

	%
Delivered NIK 6.16:	0
Accepted NIK 6.16:	0
Waiting for acceptance:	0

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BP#3 – Industry capacitation

- Meetings with companies
- Spanish ILO coordination
- R&D projects
- Innovation: ESS-ILO strategy WS
- Collaboration with Ineustar: Spanish association for Science Industry

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BP#3 – Industry capacitation

- In the period 2017-2019, Spain was the country with the highest cumulative value (almost 30 M€) of ESS direct contracts awarded.
- Success stories:
  - Jema Energy (Modulators)
  - ENSA (TW prototypes)
  - Thune Eureka (TBD)

Spanish companies awarded contracts with ESS through public procurements issued by ESS

	COMPANY	ORIGIN	DESCRIPTION	VALUE €
2019	Asturfeito	National	Inneer shielding (4th part)	1,590,000 €
	Tekniker	Basque	Remote Clamp	236,411 €
	Asturfeito	National	Inneer shielding - Part 2 and 3	4,845,000 €
	ENSA	National	Monolith Portblock Package	5,987,972 €
	Nortemecánica S.A.	National	Provision of raw material and manufacturing of the In-Bunker Baseplates	127,750 €
2018	Jema Energy	Basque	Design, Fabrication of 9 Klystron Modulators	9,155,193 €
	Thune Eureka S.A.	National	Ground Shielding and Vessel Support	280,100 €
	Asturfeito	National	Inner Shielding First Part	640,000 €
	Tekniker	Basque	Support in Engineering Services	Framework Agreement
2017	GMV S.A.U	National	Integrated Control Systems	Framework Agreement
	Pocon Systems S.A.	National	Integrated Control Systems	Framework Agreement
2016	GTD S.A.U	National	Technical Consultants and Services	Framework Agreement
	IDOM	Basque	Technical Consultants and Services	Framework Agreement

Distribution of Spanish companies which have been awarded contracts with ESS through public procurements issued by ESS. Percentages refer to procurement value.

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Main risks identified in IK Management

- Transport and delivery: Communication and coordination between all the parties involved, i.e., ESSB Technical & FCs, ESS Technical & Logistics and Suppliers.
- Acceptance of project results: more than 7M€ in components delivered to ESS being installed and tested without acceptance and guarantee.
- Industry capacitation: ESSB has to follow public procurements rules while keeping high return of investment for Spanish and Basque companies.
- Constant change of requirements by ESS after TAs signature: extra cost and time always intended to be assumed by the partner.

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Main risks identified in IK Management

ID	Event	Cause	Impact	C - Cost S – Schedule	Prob. 1-5	Mitigation Measures
	Problems in transport and delivery	Lack of communication and coordination between ESS, partner and supplier	Lost of delivered components, damages during transportation and unloading…	C: Yes S: Yes	4	1. Implement deliveries management procedure
	Lack of partial acceptance of IK delivered components or project results	ESS IK process allows only final acceptance and transfer of ownership after finishing complete the TAs	Lots of components (money) delivered by partners being tested and installed by ESS without any partial acceptance	C: Yes S: Yes	5	1.Acceptance of partial project results
	Insufficient local industry capacitation	Low interaction with local suppliers and ILO	Low return on investment and unsatisfaction of governments	C: Yes S: Yes	3	1.ILO coordination and local industry capacitation
	Constant change of requirements after TAs signature	Requirements not defined by ESS at the time of IKW negotiation	Extra cost and delays (always intended to be assumed by the partner)	C: Yes S: Yes	5	1.Project risk analysis with ESS stablishing risk owners and list of actions
				C: S:		

Probability: 5 = most severe; Cost: Estimated potential cost in M€ if not mitigated; Schedule: Estimated delay of activity in months if not mitigated

Possible new Best Practices to develop in B-2

- Implement at ESSB BP developed in other hubs

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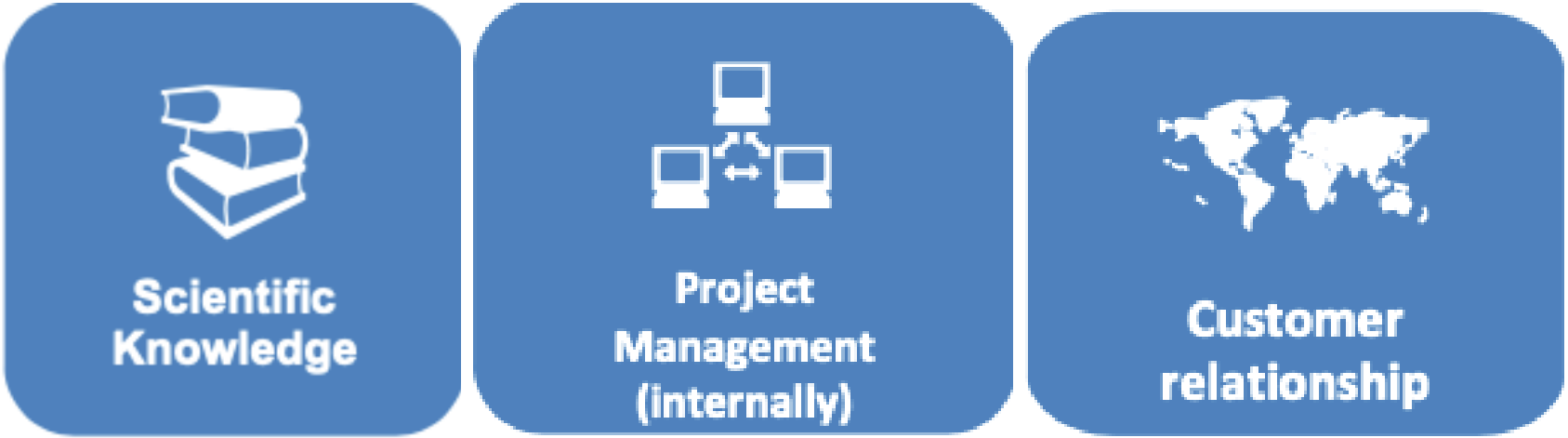
Achievements & Lessons Learnt

First ESS Bilbao internal workshop on Lessons Learnt in three areas for the ESS projects hold on June 2020



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Thank you!

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