



Decommissioning of Energy Assets Webinar

21/04/2020 15:00 CEST

Davide Coppola, Giulia Manzetti (ESA)
Silvia Grandi (MISE - Italian Ministry of Economic Development)
Audrey Banner (UK Offshore Petroleum Regulator for Environment and Decommissioning)
Axel Laval (The Crown Estate)

ESA UNCLASSIFIED



European Space Agency

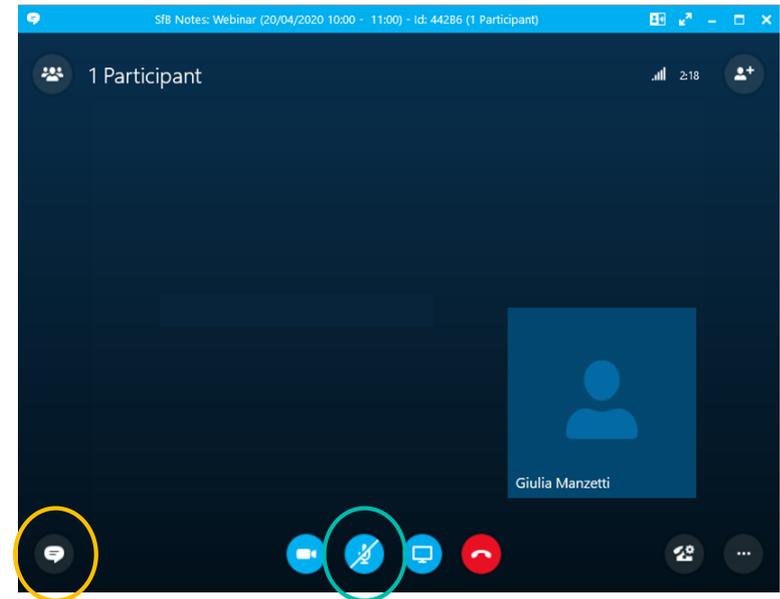


Davide Coppola

WELCOME TO THE WEBINAR!

Before we start...

- Due to the number of attendees, please **keep your microphones muted** at all times and switch off the webcam function
- You can use the **conversation function** anytime to submit your questions. They will be addressed during the Q&A at the end of the webinar





AGENDA

- **ESA introduction**
- **“Decommissioning of Energy Assets” Invitation to Tender**
 - Objectives
 - Examples of applications
 - Value of Space
- **Challenges in the decommissioning sector - Guest Speakers:**
 - Silvia Grandi - Italian Ministry of Economic Development
 - Audrey Banner - UK Offshore Petroleum Regulator for Environment and Decommissioning
 - Axel Laval - The Crown Estate
- **How to apply: funding and tender information**
- **Open Questions & Answers session**





THE EUROPEAN SPACE AGENCY

Purpose of ESA

To provide for and promote, for exclusively peaceful purposes, cooperation among European states in space research and technology and their space applications.

Facts and figures

- Over 50 years of experience
- 22 Member States
- 8 sites across Europe and a spaceport in French Guiana
- Over 80 satellites designed, tested and operated in flight



space transportation



science



human spaceflight



earth observation



telecommunications
and applications



navigation



exploration



operations



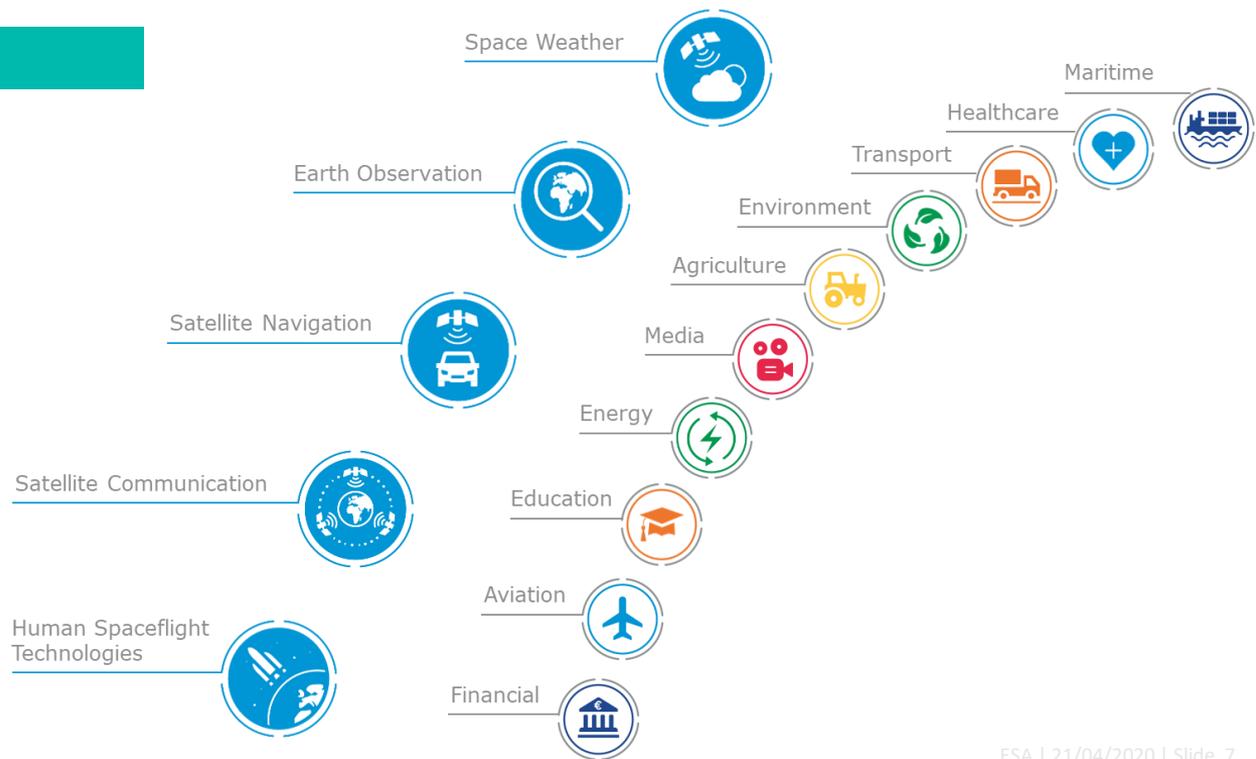
technology





ESA SPACE SOLUTIONS

Could you be leveraging Space technology and data for the benefit of life on Earth?





WHAT ESA OFFERS



Zero-Equity
Funding
(€60k-€3M+)



Tailored Project
Management
Support



Access to
Our Network
& Partners



Use of the
ESA Brand for
Credibility

A large offshore oil rig is shown at sea under a clear blue sky. The rig's complex yellow steel structure, including cranes and support beams, extends over the water. In the foreground, the back of a worker wearing a white hard hat and an orange safety vest is visible, looking out towards the rig. A semi-transparent green rectangular box is overlaid in the center of the image, containing white text.

Decommissioning of Energy Assets

Planned ESA's funded invitation to tender



Planned ESA-funded invitation to tender on decommissioning

ESA Space Solutions is planning on issuing an open competitive tender for a feasibility study to investigate the technical feasibility and economic viability of space based applications for decommissioning of energy assets (wind, oil and gas, etc.), and define a roadmap for services implementation and demonstration.

Invitation to tender planned to be issued in May 2020

Funding up to € 200K per activity (100% ESA funded)

Duration 12 months





Giulia Manzetti

OBJECTIVES

- Assess **technical** feasibility and **economic** viability of **space** based services in support of **decommissioning of offshore oil&gas plants and wind farms**;
- Get **anchor customers commitment** towards services implementation and **sustainable operation**;
- Identify and assess the **technical and non-technical risks** associated with the implementation, commercialisation and operations of the services;
- Consolidate the business plan for supporting an informed decision for investment in further activities
- Define a **roadmap** for services **implementation** and **demonstration** (potentially through a follow-up ESA co-funded demonstration project).



EXAMPLES OF AREAS OF INTEREST

- **Support to automation of decommissioning activities**

e.g. underwater operations; high precision positioning for assets removal.

- **Safety of workers off-shore and on-shore**

e.g. augmented reality services and data analytics providing early warning of immediate risks to workers.

- **Use of innovative space-enabled technology to support logistics and ensure safety of operations (onshore and offshore)**

e.g. use of robots & autonomous vessels to improve logistics efficiency; use of other space enabled tech, like HAPs / RPAS for high resolution monitoring.



EXAMPLES OF AREAS OF INTEREST

- **Monitoring of environmental impact**

e.g. residual hydrocarbons, oil spills, chemicals and harmful liquids that may accidentally be released during the decommissioning phase; environmental impact assessment of platform re-use.

- **Logistics and end-to-end business support services**

e.g. processes optimisation through supply chain management and monitoring of external factors affecting operations efficiency (e.g. weather conditions and sea status), and information on infrastructure status; evaluation of safe and cost-effective options for reuse/recycling.



VALUE OF SPACE



Satellite Navigation

- Vessels positioning;
- Positioning of assets as input to logistic management services;
- Augmented Global Navigation Satellite System (GNSS) for automation of assets lifting and disposal.



Satellite Communications

- Communication between offshore and onshore, including M2M (for process automation and end-to-end business processes), voice and data (for both end-to-end business processes and safety of workers).



Earth Observation

- Environmental monitoring and detection of harmful liquid spills
- Provision of weather forecast for planning and optimisation of decommissioning activities



Davide Coppola



Silvia Grandi

Head of Division

Italian Ministry of Economic Development (MISE)

Directorate general for the infrastructures, safety,
security of energy and mining systems





Ministero dello Sviluppo Economico

DIRECTORATE GENERAL FOR THE INFRASTRUCTURES, SAFETY, SECURITY OF ENERGY AND MINING SYSTEMS

Decommissioning of Oil & Gas offshore infrastructures

The Italian experience and the state of art

Silvia Grandi

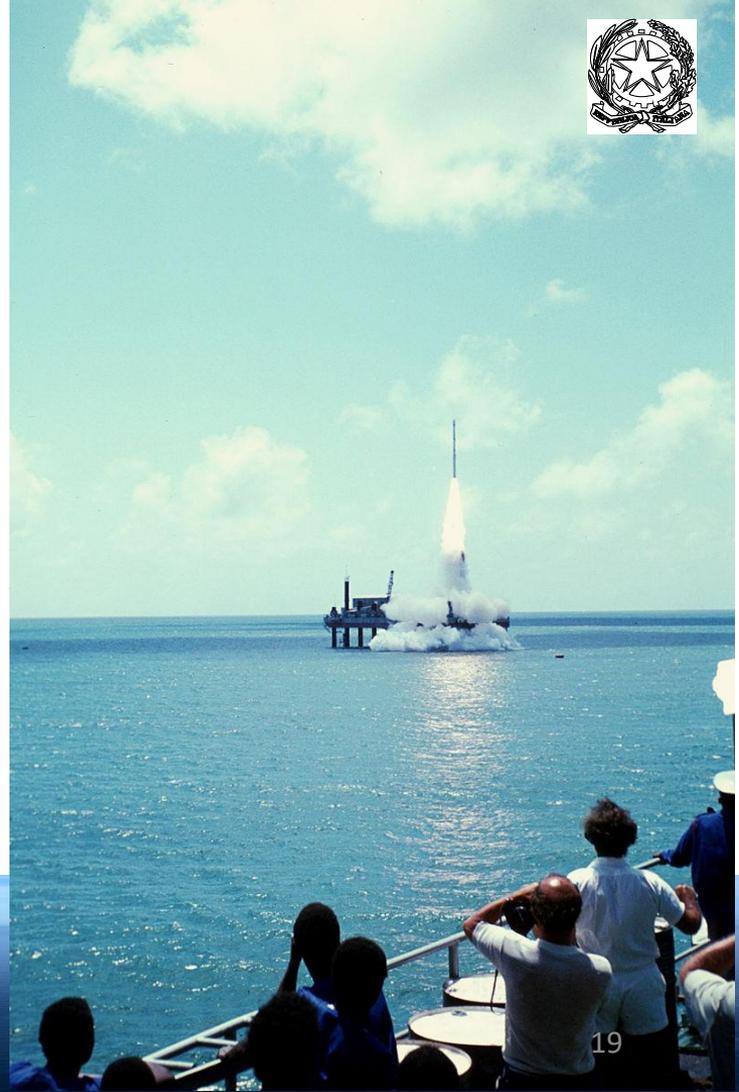
Webinar ESA, 21st April 2020





Space and Oil and Gas Offshore technology ... old Italian friends

Launch of a small satellite from the Santa Rita
Platform offshore Kenya (Italian San Marco
Research Programme) (1980s)





Drivers of offshore infrastructures decommissioning

TECHNICAL

Field Depletion



[Source: Roca, 2017]

POLITICAL

De-carbonisation



[Source: Greenpeace, 2014]

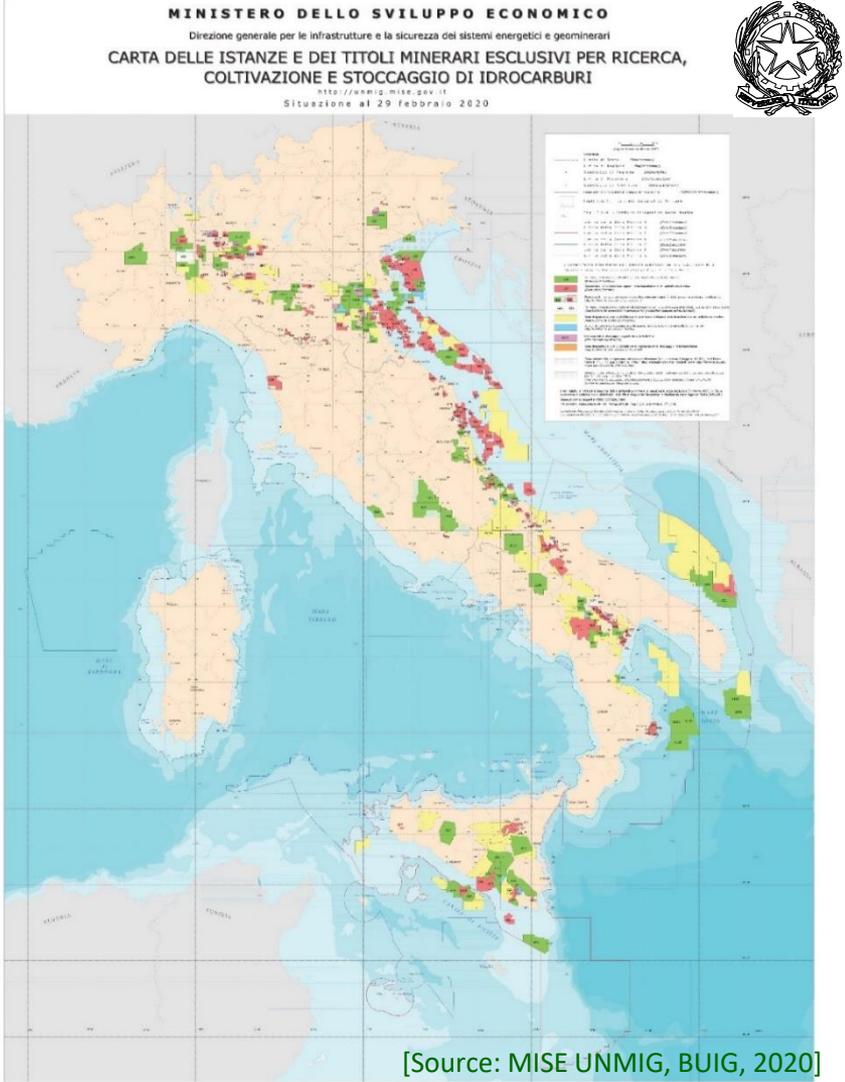
Lincences & Locations

Concessions:

- 113 onshore
- 66 offshore

Exploration and Research Permits:

- 39 onshore
 - 26 offshore
- are suspended
- Ex Art. 11-ter L.12/2019 PiTESAI Plan
(includes Decommissioning plan 2021- on)



[Source: MISE UNMIG, BUIG, 2020]



Main Italian O&G offshore infrastructures

	GAS	OIL	TOTAL
Monopiles	22	0	22
Bi-piles	3	0	3
Clusters	8	0	8
Steel Platforms	81	10	91
Subseas	12	2	14
TOTAL	126	13	138



[Source: Database MISE UNMIG, 2019]



The dimension of the phenomena

ITALY

138 Installations - 2 Licensed Operators

- 0% floating
- 10% subsea
- 83 % small steel
- 7% large steel (4)

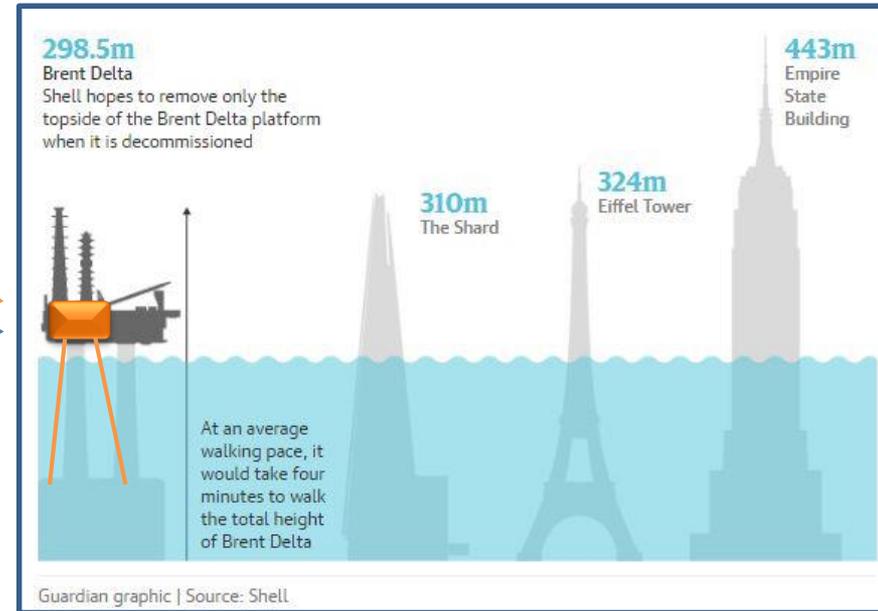
[Source: MISE DB-UNMIG, BUIG, 2019]

UK

470 Installations - 58 Licensed Operators

- 10% floating
- 30% subsea
- 50% small steel
- 10% large steel or concrete – potential derogations for abandonment

[Source: W. Kennedy, 2017]





From 1959 to 2000s

188 offshore infrastructures dedicated to oil & gas

- 49 decommissioned from the 1980s to 2010
- 1 decommissioned nel 2017
- 138 still offshore

✓ **Topsides, treatment facilities, deck infrastructures:** all **dismantled** and conveyed in **onshore** for the final recovery and/or disposal (**Circular Economy ante litteram**)

✓ **Jacket steel infrascures:** 23 have been used as **artificial reef (Paguro)** + 26 have been removed and treated in dedicated onshore areas for final disposal

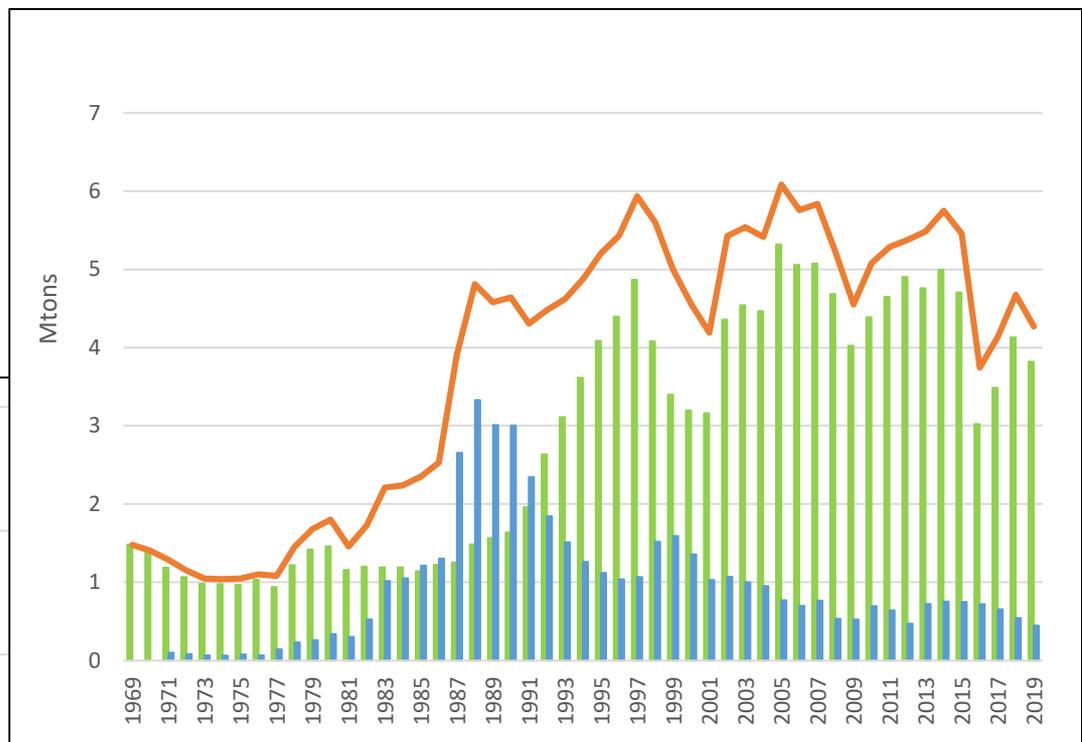
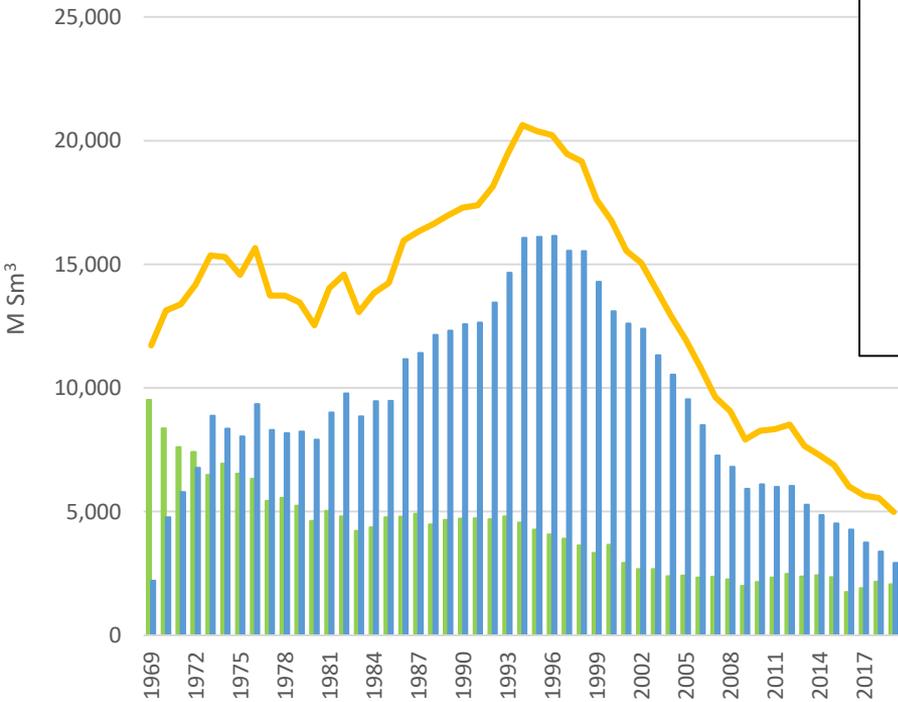
✓ **Sealines**



[Source: Micoperi, 2017]



Time-series of the national production of oil & gas (1969-2019)

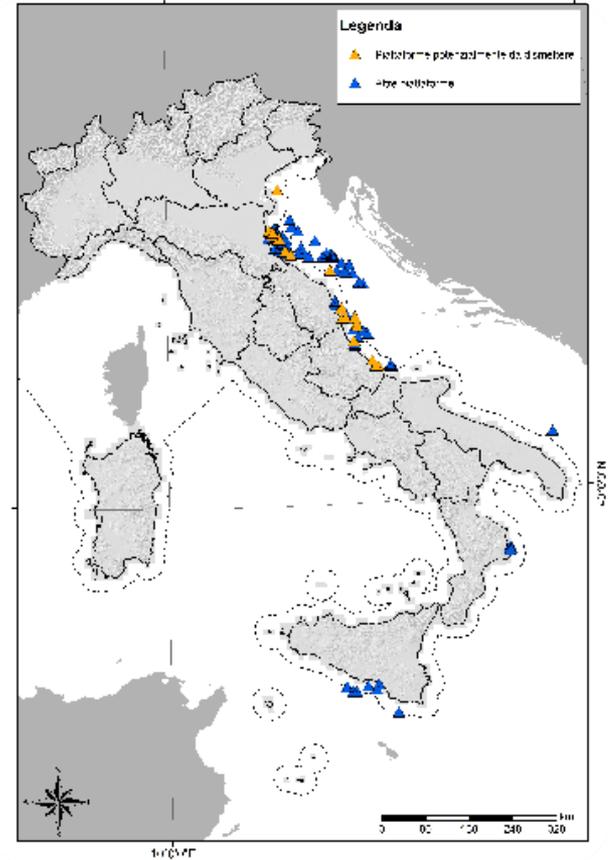


- Terra
- Mare
- Totale



National Decommissioning Plan - 2017-2021

- Review and classification
- Safe and Sustainable Decommissioning Project
- Stakeholders participation
- Refresh Legal framework
- Integration with BLUE GROWTH, MSP
- Development of monitoring tools
- Dedicated communication
- **R&D project promotion (CLYPEA, Blue MED, ESA, etc.)**
- Intertwined with the PiTESAI Plan



[Source: MISE UNMIG GIS, 2017]



Main regulations

International Conventions

1. **Geneva Convention (1958 – United Nations Geneva Convention on the Continental Shelf)**
2. **London Convention (1972 – Convention on the prevention of marine Pollution of wastes [..])**
3. **United Nations Convention - UNCLOS (United Nations Convention on the Law of Sea)**
4. **IMO (International Maritime Organization)**

Regional Convention

1. **Oslo Convention (mainly applicable for the North Sea)**
2. **Guidelines OSCOM (1991 - North Sea)**
3. **OSPAR Convention for the sea protection (1991 - North Sea)**
4. **Barcelona Convention (applicable for the Med. Sea)**

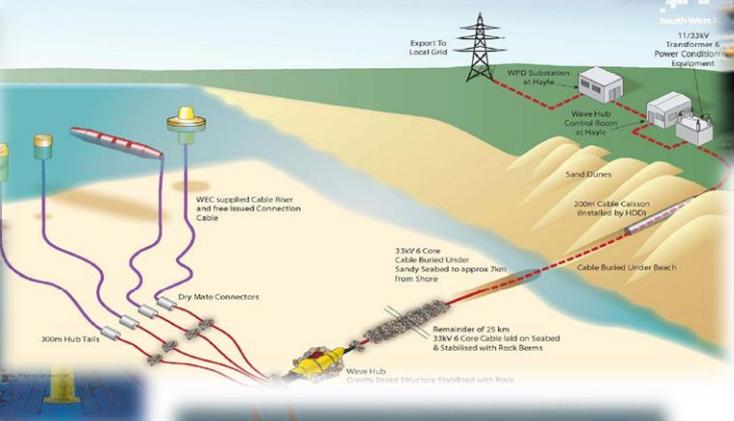
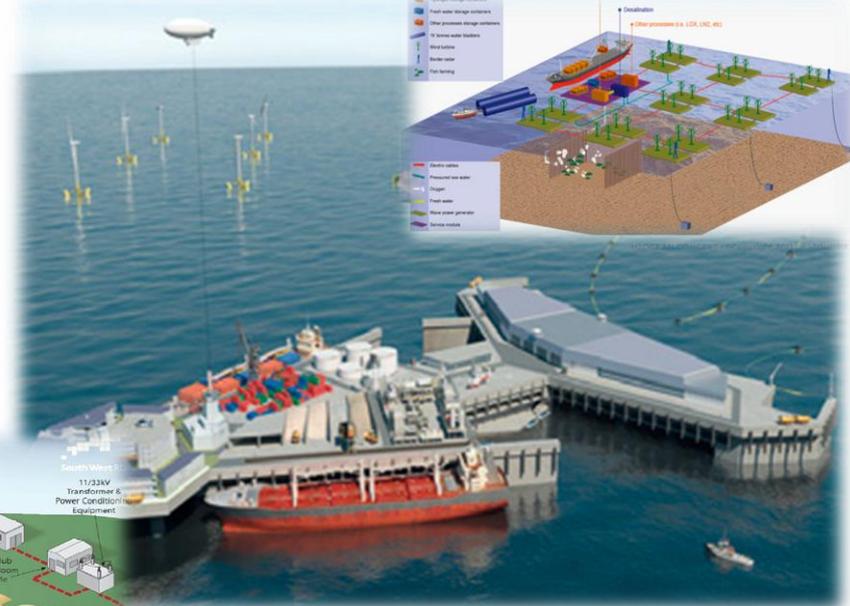
Italian regulations

1. **Mining Code:** plug and abandon of the gas/oil wells as well as the disposal of the treatment facilities and equipment of the platform
1. **Environmental Code:** EIA, emissions, waste, etc.
2. **EU/2013/30 Offshore directive** → D.Lgs. 145/2015
3. **DM. 15th February 2019: decommissioning guidelines**

→ **Baseline:**
Total removal of the platforms
& connected infrastructures

Partial Decommissioning and/or Multi-use (ri-functionalisation)

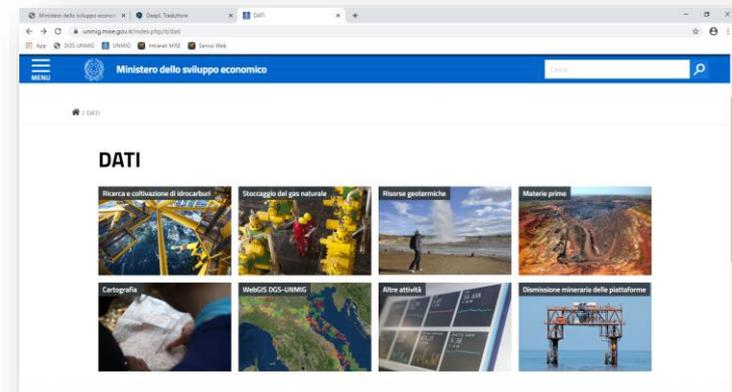
multi-use «areas» sharing sites, infrastructures and costs in diverse activities, such as transport, energy, aquaculture or leisure





Current List of Platforms in the official list for decommissioning

- **Part a) – List of platforms to be removed (published on September 1st, 2019)**
 - ADA
- **Part b) - List of platforms open to be requested for re-functionalisation (published on September 1st, 2019)**
 - AZALEA A (open until 31/08/2020)
 - PC73 (open until 31/08/2020)
- **To come (to be published on July 1st, 2020)**
 - REGINA 1
 - ARMIDA 1



<https://unmig.mise.gov.it/index.php/it/dati/dismissione-mineraria-delle-piattaforme-marine>



THANK YOU FOR YOUR ATTENTION!





Audrey Banner

Head of Decommissioning Programme and Policy

UK Offshore Petroleum Regulator for Environment
and Decommissioning



Offshore Petroleum Regulator
for Environment & Decommissioning





Technology in Decommissioning

Audrey Banner

OPRED

Photograph provided by CNR showing Murchison jacket sections at Vats disposal yard on a misty October morning

Background – how much Decommissioning Activity is there in the UKCS

Decommissioning Projects approved to date

Complete Removal

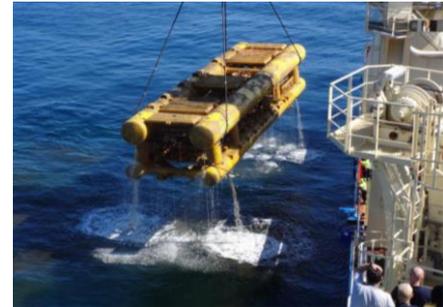
Platforms/Surface Installations	50
Subsea Installations	103

Derogations

Steel Jackets removed to top of footings	3
Concrete Gravity Base to be left in situ	3
Toppling	1



Photograph provided by Total showing Janice FPSO on quayside



Photograph provided by Total showing Leadon South Towhead recovery



Decommissioning in action

Subsea infrastructure recovery



Photograph provided by Fairfield showing concrete mattresses from Dunlin, Merlin & Osprey fields recovered to deck.

Topsides removal and well P&A



Photograph provided by Total showing Frigg QP topsides lift.

Pipelines decommissioning



Photograph provided by Total showing Leadon flowline packed onto anchor winch drum.



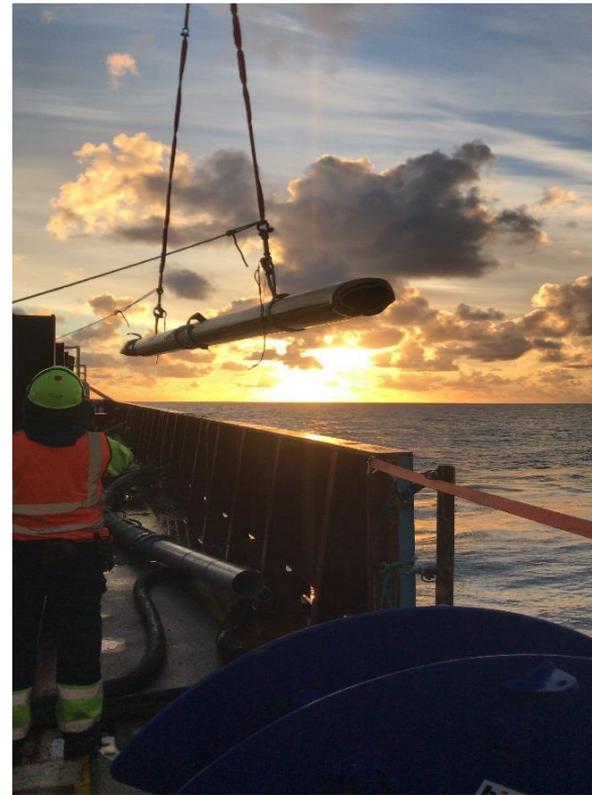
Projects vary in complexity



Learning lessons as we go...

Background - Pipelines

- Currently 35,000 km of pipelines in the UKCS.
- Alongside complex related installations, mattresses and other pieces of kit.
- Pipelines are considered for removal or decommissioning in situ
- Removal technology has to be considered as part of the assessment
- 151 pipelines have been left in situ as part of the decommissioning of the fields, with monitoring requirements



Photograph provided by Total, showing section of pipeline from Janice, James & Affleck fields being recovered to deck.

Pipeline – in situ



Types of pipelines

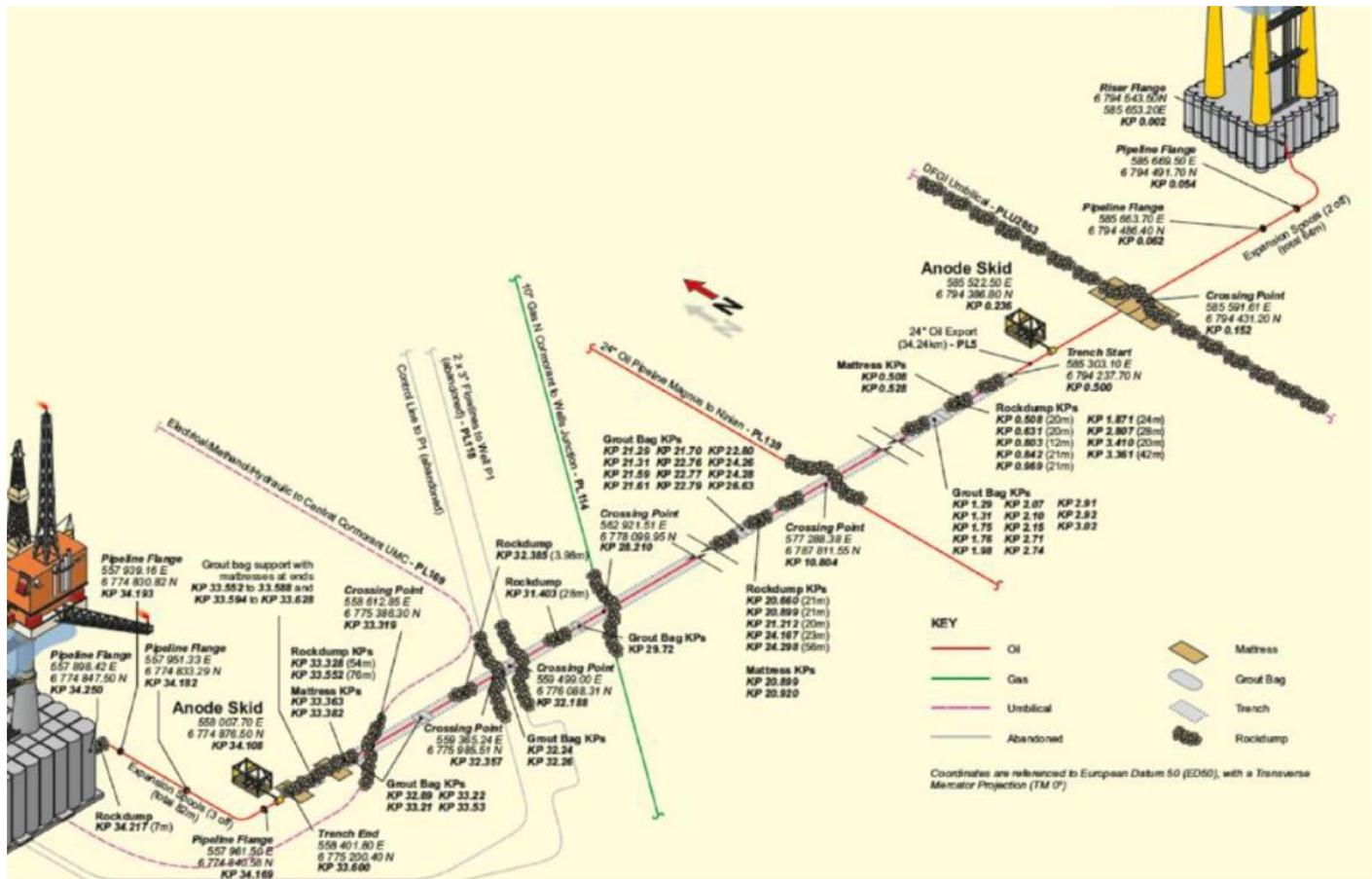
- infield pipelines
- Export pipelines, sometimes concrete coated and very large
- Pipeline Bundles, from around 30" up to 40" wide, with loose internals.
- Jumpers and umbilicals
- Cross border pipelines with Norway and the Netherlands

Removal

- We ask companies to decommission using remote technology where it is available, and encourage its development.

Example of Pipeline schematic

We require companies to provide evidence as part of the comparative assessment process



OPRED - reasons for encouraging the development of new technology in Decommissioning and Environmental management

- Reducing the cost of decommissioning, thus reducing the cost to the taxpayer
- To develop safer methods for execution
- To increase efficiency
- To reduce emissions and energy usage



Gaps and main areas for improvement and development

- **Pipeline monitoring** – looking at the changes in the infrastructure from live usage through to decommissioning, at the stages of removal or long term monitoring of pipelines left in situ. Specifically the deterioration and degradation of the pipeline and interactions with other users of the sea (fishermen).
- **Infrastructure monitoring** – Monitoring the deterioration and degradation of infrastructure left in situ with detail of interactions with other users of the sea and any leaks from materials left in situ.
- **Emergency operations and oil spill considerations**
- **Environmental monitoring** – long term monitoring of environmental impacts of infrastructure left in situ. Technologies to analysis drill cutting piles, site monitoring and cell isolation have been identified and present collaboration opportunities



Assessment of decommissioning programmes

Where technology fits



Technology: Topside preparation : Environment, Logistics

Priority	Areas for development
<ul style="list-style-type: none">• Process areas cleaning• Topside platform lift preparation• Separation of process equipment and flow lines	<ul style="list-style-type: none">• Hydrocarbon free - Cleaning and Flushing of various topside equipment during preparation, execution and removal• Complex cutting operations and retrofitting lifting hooks, during modular removal and lifting is an area where companies are looking for autonomous technology development, to enable safe operations.• Oil spill monitoring for both production and decommissioning.



Technology: Subsea preparation : Environment, Logistics, Safety

Priority Main tasks	Potential areas for development
<ul style="list-style-type: none">a) Underwater surveys of seabedb) Assessment of the jacket statec) Marine growth removal	<ul style="list-style-type: none">• Remote monitoring and surveying of pipelines and subsea equipment.• Remote debris clearance and verification of clear seabed• Long term area wide remote monitoring post execution• Analysis and surveying of drill cutting piles• 3D mapping of the jacket and footings, as well as associated tanks to detail cutting points and provide evidence of size and long term deterioration.• Mapping and characterisation of marine growth prior to execution.



Technology: Topside platform removal : Logistics, Safety

Priority	Potential areas for development
a) Topside platform lifting operations b) Transportation vessel loading	<ul style="list-style-type: none">• Dynamic positioning for Vessel usage• Ongoing Monitoring during removal execution



Technology : Subsea and pipeline decommissioning : Environment, Logistics, Safety

Priority	Potential areas for development
a) Pipeline flushing b) General subsea operations c) Jacket and piping removal	<ul style="list-style-type: none">• Remote environmental and physical monitoring for pre execution decommissioning• 3D imaging of pipelines to help inform comparative assessments for pipeline decommissioning• Long term remote monitoring of deterioration of pipelines and snagging hazards.• Long term remote monitoring of jacket footings left in marine environment• Long term monitoring of Drill cuttings pile degradation• Possible long term monitoring of in cell contents degradation.



Technology: Onshore disposal, remediation and monitoring: Logistics, Safety

Priority	Potential areas for development
a) Vessel unloading and onshore disposal b) Monitoring programme	<ul style="list-style-type: none">• Dynamic positioning and mapping• As in previous tables long term monitoring





Axel Laval

Assets Manager

The Crown Estate



Space-based applications for decommissioning offshore energy assets

The Crown Estate

Axel Laval - April 2020





Offshore Wind Energy

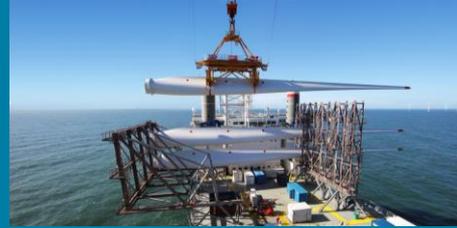
- The Crown Estate issues leases for Offshore Renewable Energy Installations.
- Consulted on decommissioning programmes
- Duty of stewardship:
 - Environment protection
 - Customers' interests
 - Cost of energy

Key legislation

- The Crown Estate Act 1961
- The Energy Act 2004
- The Scotland Act 2016

also to note:

- UNCLOS 1982
- IMO standards 1989
- OSPAR Convention 1992



UK offshore wind assets



Offshore Turbines

Offshore Substations

Export Cables

Offshore Masts

Wind Farms

2180
739
2919

31
10
41

73
11
84

16
1
17

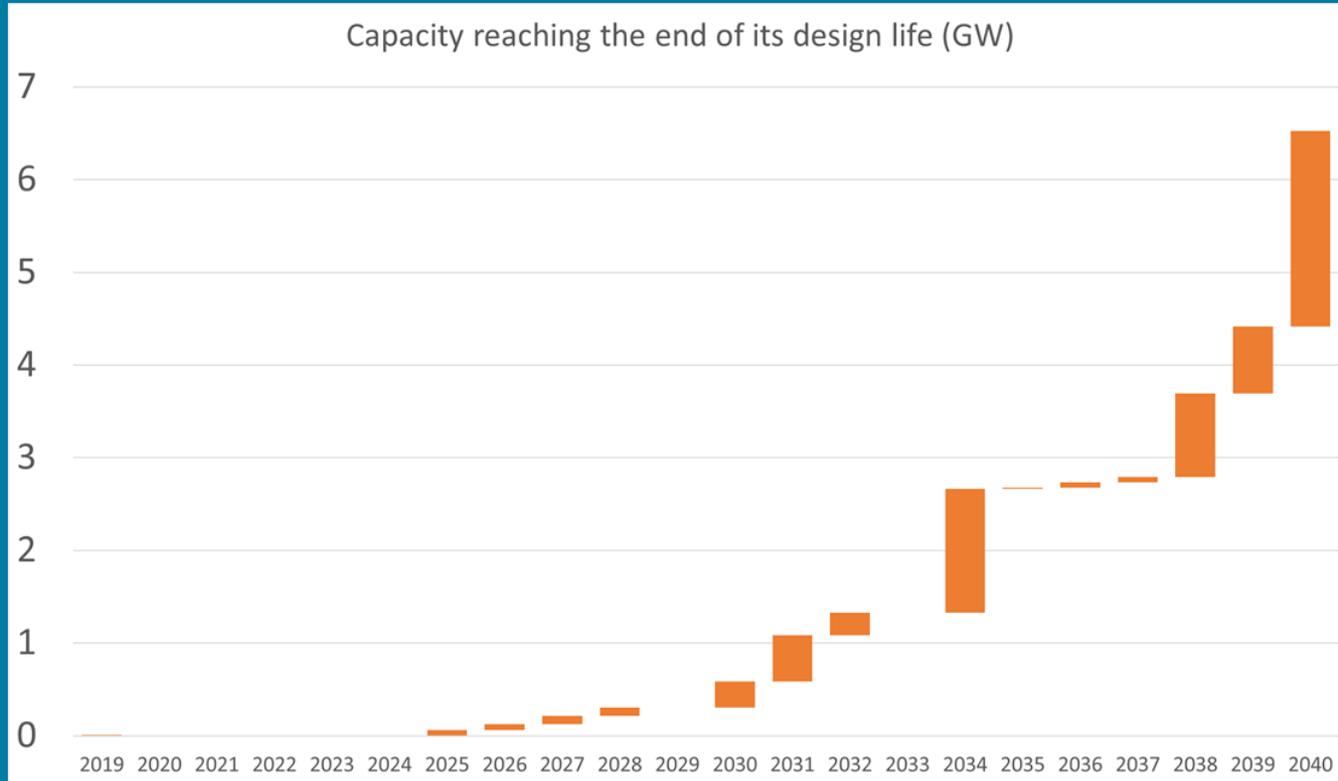
41
6
47

Operating
Under Construction
TOTAL

30 September 2019

Assets managed by The Crown Estate and Crown Estate Scotland

Capacity to decommission



Design life assumption of 22 years for offshore wind assets commissioned before 2012 and 25 years afterwards. Individual sites may vary.



Space-based applications

Environmental surveys:

- Pollution monitoring
- Long-term seabed mobility
- Weather and sea-state surveys to optimise operations
- Wildlife monitoring

Vessel localisation:

- High precision positioning for asset removal
- Areas where fishing activities may cause an increased risk of snagging (trawling)
- Optimum strategy where multiple assets are decommissioned simultaneously

The Crown Estate





Davide Coppola

A photograph of an offshore oil rig at sea. In the foreground, a worker wearing a white hard hat and an orange safety vest is seen from the back, looking out over the rig. The rig's complex yellow steel structure, including cranes and walkways, extends across the blue ocean. In the background, several tall, blue cylindrical structures are visible against a clear sky. A semi-transparent green rectangular box is overlaid in the center of the image, containing white text.

**How to apply:
Funding and Tender Information**



ESA TENDER INFORMATION

Funded participation to ESA Space Solutions is open to any company and/or organisation, be it as group of users, public body or non-governmental organisation, residing in the following Member States:

Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom



HOW TO APPLY

1. **Register** (minimum 'light registration') by completing online questionnaire on ESA-STAR Registration (esastar-emr.sso.esa.int)
2. **Download** the official tender **documentation** (Invitation to Tender), which will be available as soon as the ITT is open (May 2020) via EMITS (emits.esa.int)
3. Create 'Bidder Restricted Area' in ESA-STAR
4. **Write your Proposal** using the template provided in the Tender documentation and obtain **Letter of Authorization** from your National Delegation (business.esa.int/national-delegations)
5. **Submit** your proposal via 'Bidder Restricted Area' in ESA-STAR Tendering (esastar.sso.esa.int)

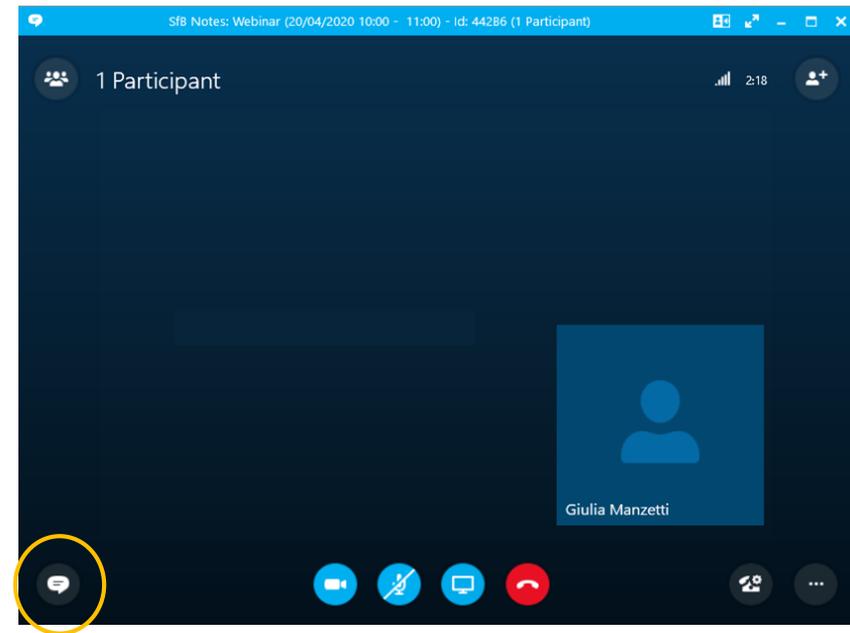
More info can be found here:

esa.int/About_Us/Business_with_ESA/How_to_do/esa-star_Registration_Process





OPEN QUESTIONS & ANSWERS SESSION



business.esa.int

**THANK YOU
FOR PARTICIPATING**

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