Kick-off meeting for IFAST Task 12.1

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Task 12.1 - Sub-Task 3: Environmental applications of electron beams / M1 – M48 (RTU, INCT)

- In the context of overall Task objectives, we see for sub-Task 3 the following **contribution** to the Task 12.1:
- **Inputs** to *"Study some **new and important societal applications** of accelerators with the aim of developing roadmaps for their innovation"*: **reduction of environmental pollution**
- **Ideas** for strategy to allow {environmental application} potential to be fully exploited
- **Inputs** for *"Study the barriers which discourage the use of accelerators in industry"* – barriers we see in environmental field

What ideas and inputs are expected here?

Sub-Task12.1. 3: Environmental applications of electron beams

- This all by engaging partners from **industry, laboratories and universities**

Which ones and how widely?

Engagement = getting information from them?

Questionnaires, interviews?

Beyond I.FAST Community?

- **To consider** how to push forward environmental applications of electrons beams, as the e-beam treatment of: (a) wastewater and sewage sludge, (b) marine diesel engine exhaust gases, (c) ship ballast water

What means *to consider*? Case-studies?

Roles in the Task 12.1 – Sub-Task 3

RTU

- marine diesel engine exhaust gases
- ~~leather tanning~~

INCT

- wastewater and sewage sludge
- ship ballast water

Towards implementation of marine diesel engine exhaust flue gases treatemnt

RTU leads

Marine diesel engine exhaust gases – HERTIS Collaboration

Stakeholders

- Ship owners
- Associations and NGO’s
- Flag States
- Class Societies/IACS
- European Commission
- Engine manufacturers
- Scrubber manufacturers
- Shipyards and ship repair companies

It is a new and important societal application: **reduction of environmental pollution**

Ideas on how the potential to be fully exploited – this is already outlined in HERTIS

Inputs – barriers we see in maritime field

Barriers & potential to be fully exploited (HERTIS)

Challenges

- **Ideological**
- **Acceptance**
- Legislative
- Statutory req.
- Class req.
- Technical
- **Safety**
- Economical

- IMO - acceptance
- European Commission – marine equipment certification
- Flag States – set the rules
- Class Societies – RO’s
- Engine manufacturers – particular requirements for each engine type
- Accelerators manufacturers – to

Ship is very specific environment: safety first!

It is not «clean room», it is engine room

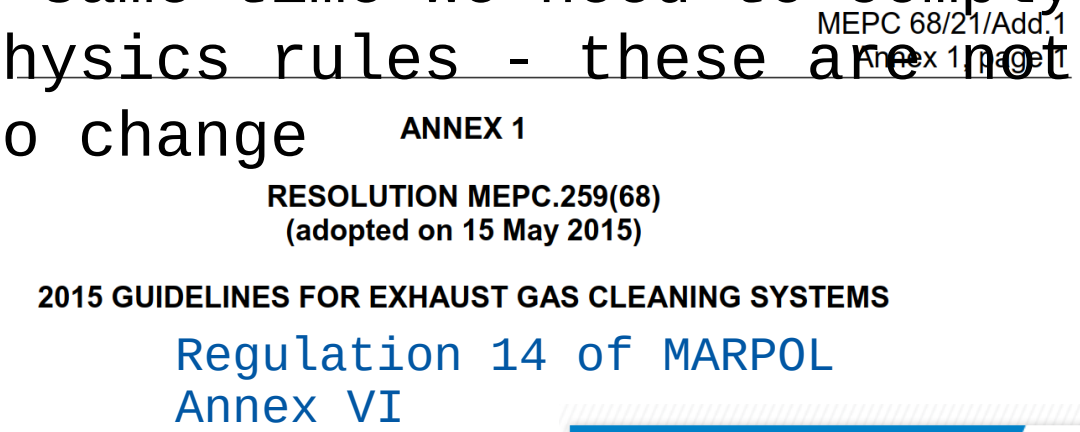
Barriers & potential to be fully exploited (HERTIS)

Challenges

- Ideological
- Acceptance
- **Legislative**
- **Statutory req.**
- **Class req.**
- Technical
- Safety
- Economical

- Flag States
- RO's - Class Societies
- IMO
- European Commission
- EMSA
- US CG
- Engine

There are many rules to comply with and there many rule makers – so, to succeed, we have to involve rule makers in the development process
In the same time we need to comply with physics rules - these are not so easy to change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ANNEX 1

RESOLUTION MEPC.259(68)
(adopted on 15 May 2015)

2015 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS

Regulation 14 of MARPOL Annex VI

RELEVANT LEGISLATION

Regulation 2015/757
Directive (EU) 2016/802
Directive 2012/33/EU
Directive 2005/33/EC
Directive 1999/32/EC

Barriers & potential to be fully exploited (HERTIS)

Challenges

- Ideological
- Acceptance
- Legislative
- Statutory req.
- Class req.
- **Technical**
- **Safety**
- **Economical**

- System is not directly related with ship seaworthiness?
- What is impact to normal ship operations?
- **Should be cheaper** than to run on marine gasoline or other dual

- High energy consumption
- Electrical installations and power balance
- Exhaust back-pressure?
- Integration with on-board systems
- Reliability
- Control and monitoring
- Vibration
- Maintenance and service
- Crew training
- Radiation control and shielding
- Redundancy
- Efficiency
- Functionality

Towards implementation of

- wastewater and sewage sludge
- ship ballast water EB treatment

INCT leads

Wastewater EB treatment

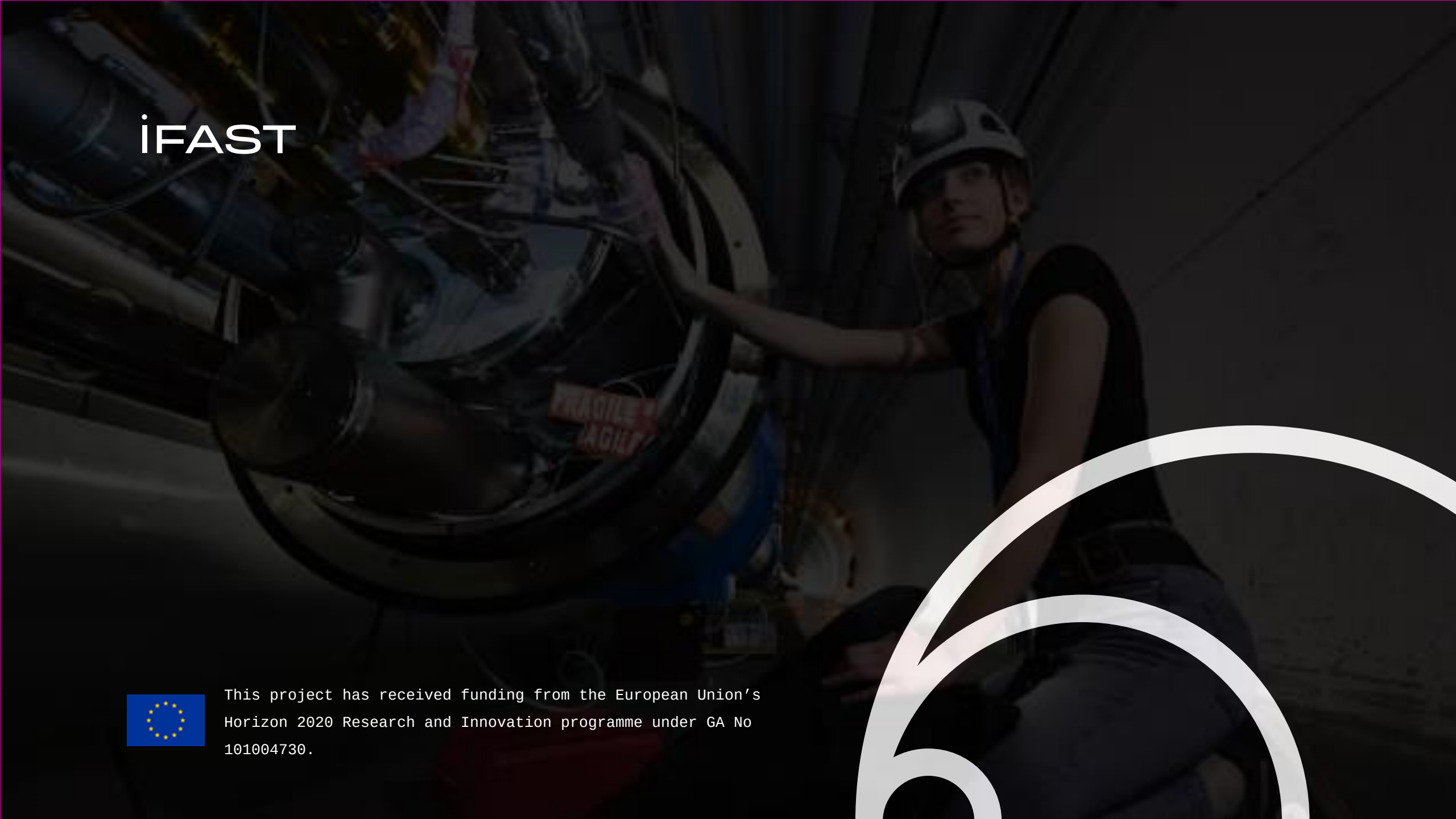
- Regulations supporting new advaced technologies applications, including eb based technologies
- Recent developments in the eb technology development and applications
- EB accelerators development strategy and its role in further environmental applications
- Challanges regarding technology applications in industry

Sewage sludge EB treatment

- Regulations supporting new advaced technologies applications, including eb based technologies
- Recent developments in the eb technology development and applications
- EB accelerators development strategy and its role in further environmental applications
- Challanges regarding technology applications in industry

Ship ballast water EB treatment

- Regulations supporting new advaced technologies applications, including eb based technologies
- Recent developments in the eb technology development and applications
- EB accelerators development strategy and its role in further environmental applications
- Challanges regarding technology applications in shipyards



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