

HSE as the Key Elements in the Offshore Upstream Segment

The West Patraikos Case Study

Patra, 24 October 2019

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Hellenic Petroleum Upstream S.A.***





**HELLENIC
PETROLEUM**



EDISON

Exploration & Production

A group of established, financially strong oil companies with vast experience and knowledge in Adriatic and Ionian sea,

are exploring the Earth with gratitude and respect,

investing for the prosperity and development of the local societies



HSSE Top Corporate Priority



Health



Safety



Society



Environment

Exploration Strategy:

- Detailed fit to target geological studies (2015 – 2017)
- High quality double azimuth 3D seismic 800 + 800 km² (2016 – 2017)



Implementing
the most up-to-date,
safe and environmentally friendly
technological methods,
showing the utmost respect
for local communities and
their current activities

Exploration operations

✓ Updated technology with excellent scientific results

✓ Close everyday cooperation with the authorities and stakeholders resulting to a smooth execution of the operations

✓ Application of high HSE standards with zero environmental footprint

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2016 CNES / Astrium
Image © 2016 DigitalGlobe

Google earth

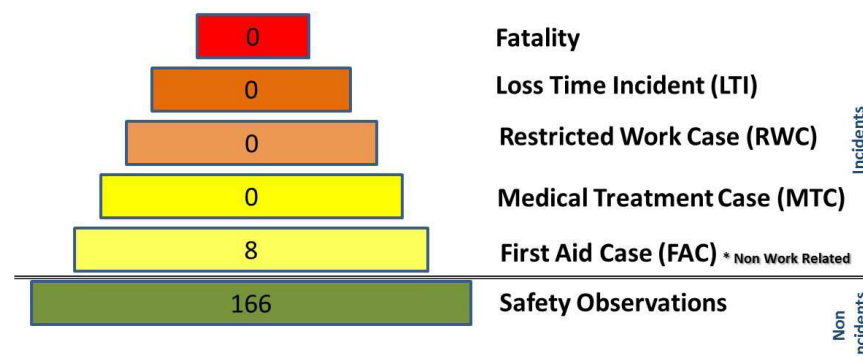
Achievement of high HSE standards with zero environmental footprint

- **Full Compliance** with the approved ***Environmental Monitoring Plan***
- **High safety standards** and positive safety culture on board Polar Empress
- **Very good relations with local fisheries, the Coast Guard and local communities** during the execution of the survey.
- **Seismic noise** exposure levels **never exceeded** the permanent and temporary acoustic loss threshold values of sea mammals.
- During the survey few sightings were recorded by MMO's . There were **six marine mammal sightings** (one *bottlenose dolphin* and five unidentified *dolphin or cetacean species*).
- **Zero Environmental footprint**

HSE Statistics and Performance

- Hellenic Petroleum, West Patraikos Gulf Project took place over 61 days
- No injuries to any crew member, nor were there any crew members in a position which could be considered dangerous.
- No work related injuries or illnesses sustained by crew members during the project.

Measure	Result
Fatality	Zero
Loss Time Incident (LTI)	Zero
Restricted Work Case (RWC)	Zero
Medical Treatment Case (MTC)	Zero
Zero	8 non work related



Project Man Hours highlights:

- More than 77K man hours on board Polar Empress
- More than 30K man hours on board support vessels (Ocean Dolphin, 7 Stars and 7 Oceans)
- Total man hours during the project: 106,000

Environmental Monitoring Effort:

- 365 hours of MMO effort
- 746 hours of PAM effort
- 430 hours of Acoustic Monitoring

Project HSE Activities highlights:

- 192 hours of emergency drills (emergency towing, fire drill, SOPEP drill etc.)
- 121 hours of operations (crane operations, work boat and fast rescue boat etc.)
- 124 hours of training (fire team, medical team, safety induction tours)

Seismic Vessel Auditing prior to the commencement of the survey



Common Marine Inspection Document

Seismic acquisition hazards identification and mitigation in place

Define buffer zones - safety zones

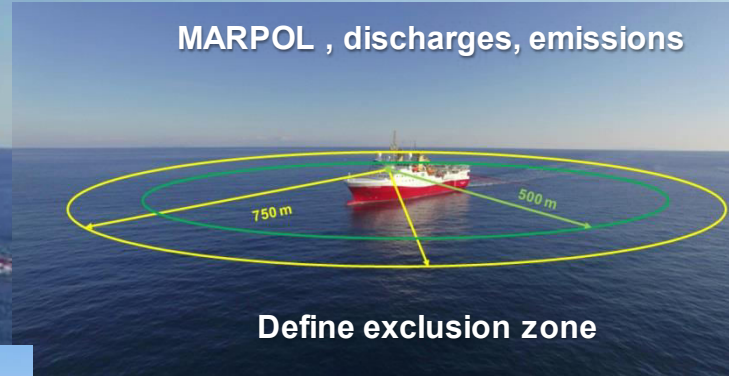


Support vessels

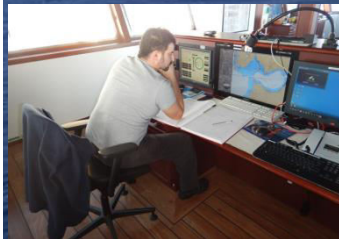
Apply soft start protocol



MARPOL , discharges, emissions



Define exclusion zone



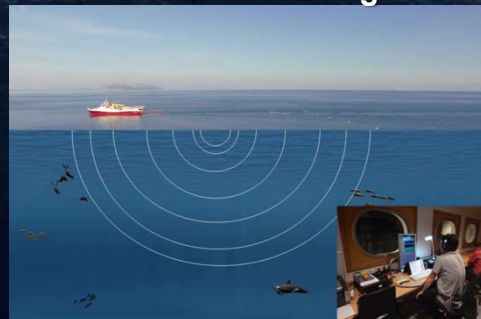
Fish Liaison officers



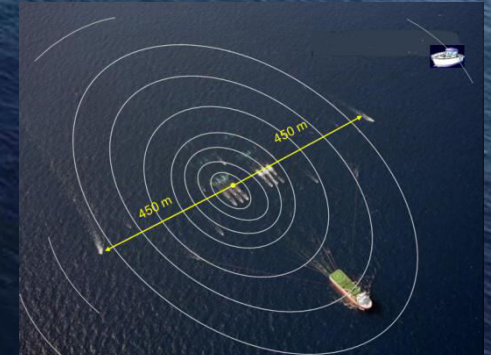
Install turtle guards



Visual monitoring



Passive acoustic monitoring



Verify exclusion zone
Noise level monitoring

ACCOBAMS resolutions and JNCC guidelines including Marine Mammal Observers and Passive Acoustic Monitoring

Project HSE Plan

Medical Emergency Response Plan (MERP)

Patraikos Gulf, Offshore Greece

December 2015 to February 2016



MERP Revision History

Date dd/mm/yyyy	Vers.	UHCG Author	Dolphin Reviewer	Brief Change Description
30/11/2015	V 0.1	AGM		Draft 1, based on 2015 Norway MERP & new template.
02/12/2015	V 0.2	Dolp	F. Hoff	Updated phone numbers
9/12/2015	V 0.3	AGM		Add Primary flow chart, JRCC, Argostoli airport/hospital info; update TOC; update CTGCY plan B/C; update header & footer
29/12/2015	V 0.4		M.Hodge	Updated many contact numbers, Area Map, Primary and Secondary Flow Charts

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OF-0888



OIL SPILL PREVENTION AND RESPONSE PLAN

SRV POLAR EMPRESS

IMO number 9687370



Revision	Last revision date	Owner	Approved by	Page no	
01	29/08/2015	Head of CRSE	Elina Koskela	1 of 15	
Uncontrolled when printed. For the latest revisions check Utilises QA. It is the responsibility of the user of this document to ensure that printed paper copy is valid.					

Seismic acquisition documentation, policies and plans



Environmental Baseline Report



Environmental Action Plan



Acoustic Monitoring



Marine Mammals Observations



HSE Management System Bridging Documentation



Medical Response Plan



Project HSE plan



Oil Response Plan

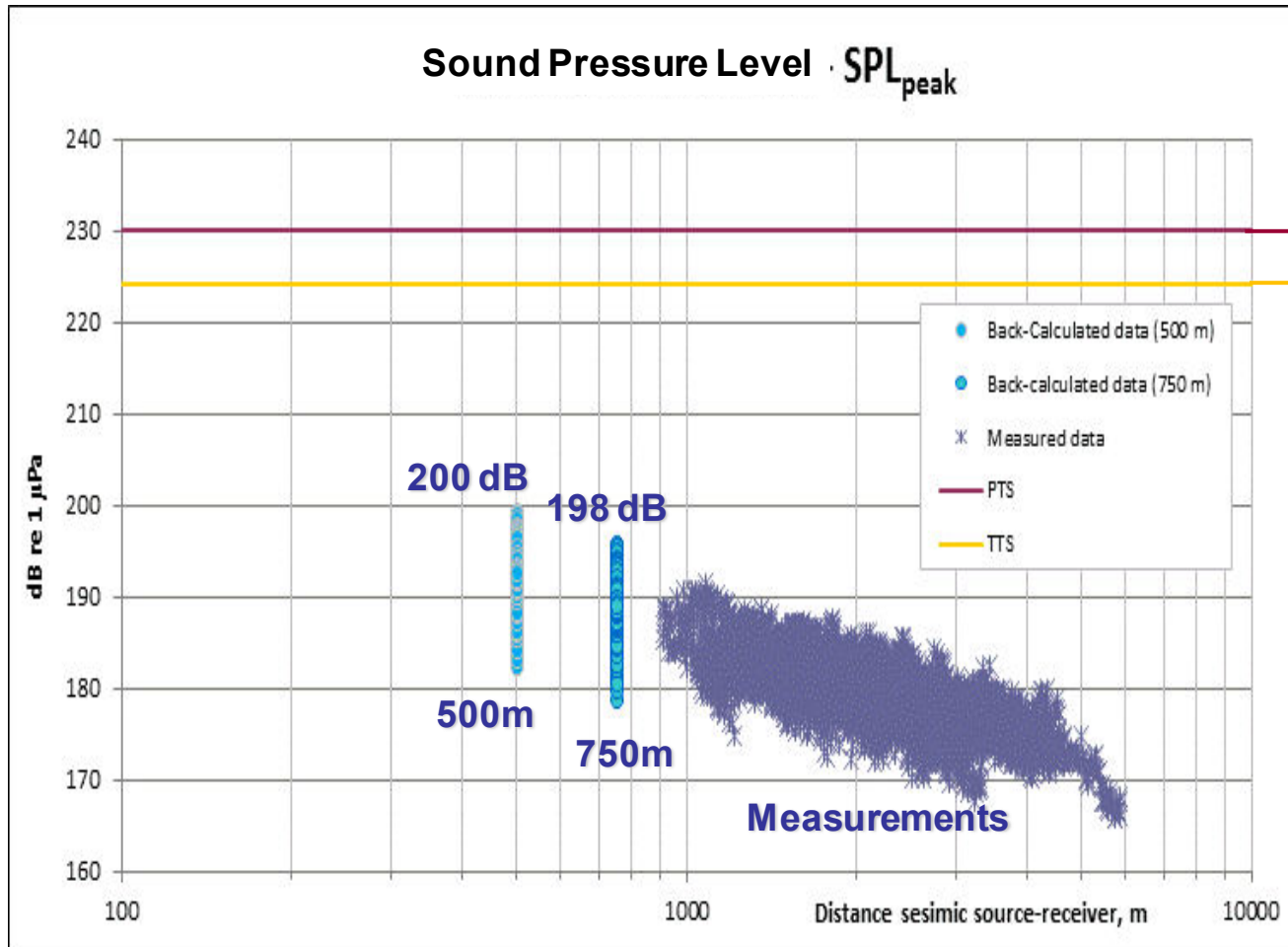


Waste Management Plan



Seismic Acquisition Report

Real Time acoustic monitoring



threshold values for
permanent loss
230dB re 1 μ Pa

threshold values for
temporary loss 225
dB re 1 μ Pa



Seismic noise exposure levels never exceeded the permanent and temporary acoustic loss threshold values of sea mammals.

Lease Agreement (Article 12 - Environmental Protection)

Lessee Obligations – Drilling Operations

Environmental
Baseline Report
(Phase B)

Environmental
Parameters Monitoring

Geohazards Surveys

Major Hazard Report

Emergency Response
Plans

Environmental &
Social Impact
Assessment

Exploration drilling & production hazards – Mitigation in place



Discharges - Cuttings disposal
Case of zero discharge



**Oil spill
Protocol
2000**



**Offshore
EU Regulation
Major Hazards
Report**



**Personnel
training**



Subsea BOP stack

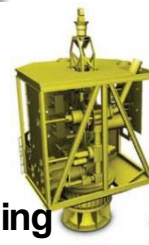


H2S services



**Produced water
treatment**

**Well capping
services**

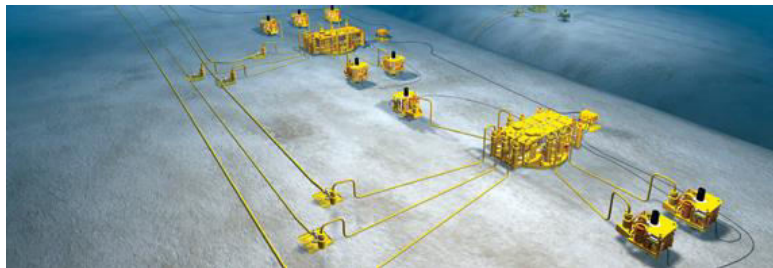


Helicopter services



**Logistics -
PSVs**

**Emergency
response
plans**



Subsea wellheads



**Equipment spec
Adequate
services &
material stock**

**Production operations
in the Adriatic Sea**

Indicative Exploration & Development drilling documentation, policies and plans



HSE Management System



Emergency Response Plan



Oil Spill Contingency Plan



Offshore Drilling Major Hazard Report



Waste Management Plan



Baseline Report Phase B



Corporate Major Accident Prevention Policy



Environmental & Social Impact Assessment



Environmental Monitoring Plan



Drilling Program



Drilling Manual Well Examination Scheme & Verification Scheme Descriptions



Environmental & Social Impact Assessment Logistics Land Base



Safety & Environmental Critical Elements Descriptions

International Exercises for the Prevention and Management of Oil Spills (Cooperation ELPE – EMSA)

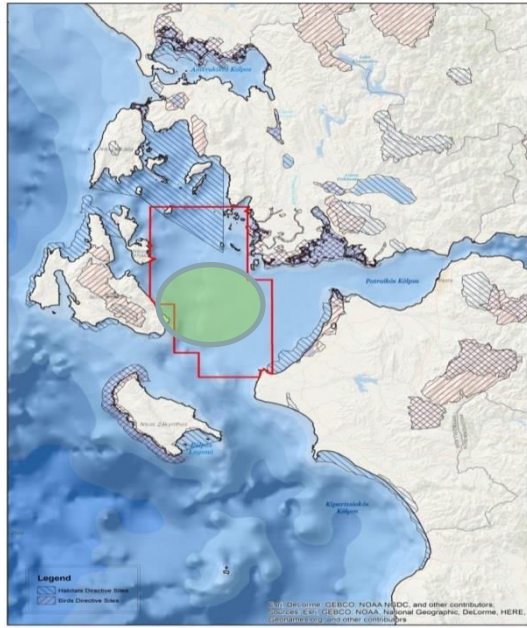
“Triton” international Maritime Pollution Exercise in collaboration with the Hellenic Petroleum and the European Maritime Safety Agency (EMSA)

From the perspective of HELPE, once again the integrity of the infrastructure and equipment as well as the procedures and training of our staff in dealing with such incidents have been proven.

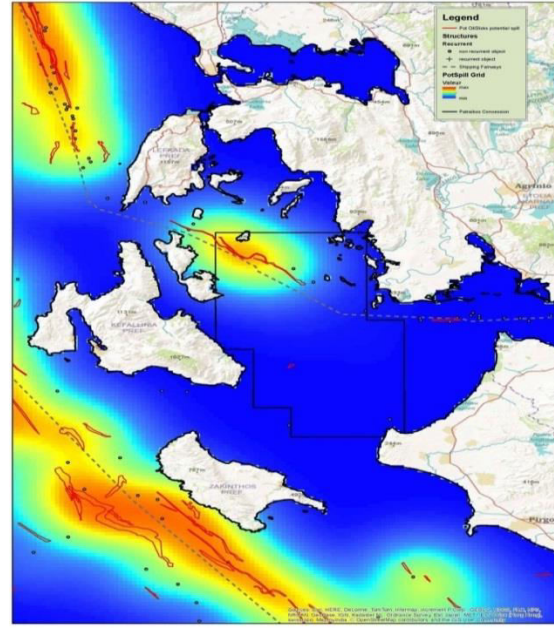


350,000 barrels of crude oil imported daily into refineries, and 200,000 barrels are exported by sea with absolute safety

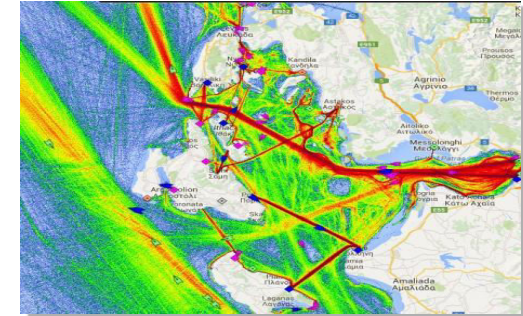
Environmental Baseline Study Phase B



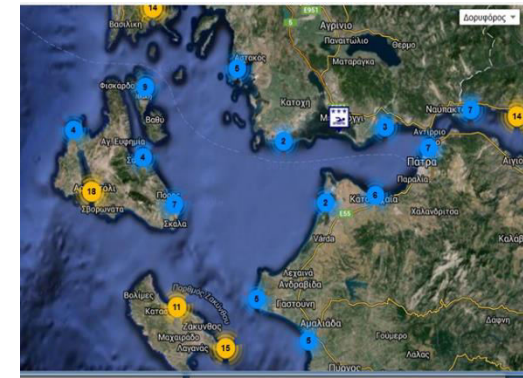
Natura Protected Areas



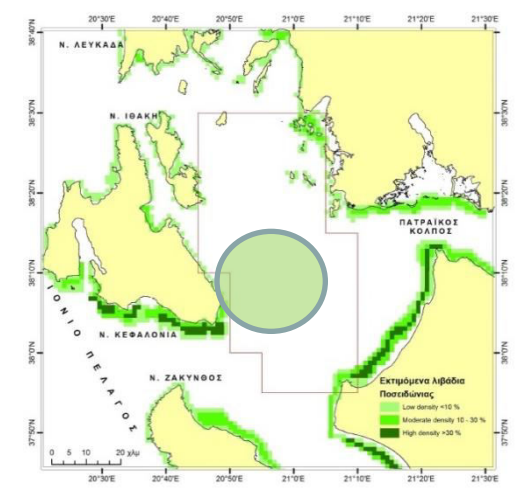
Oil Spills



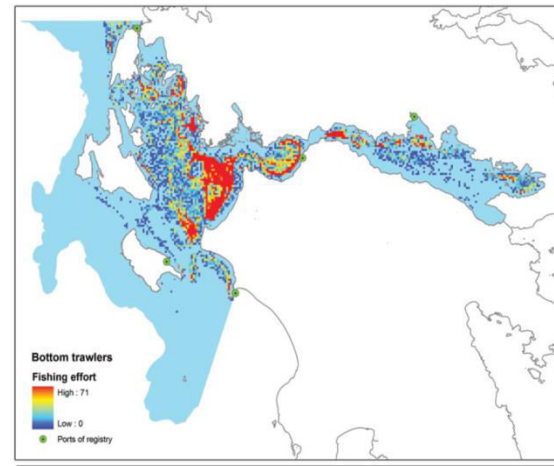
Marine Traffic



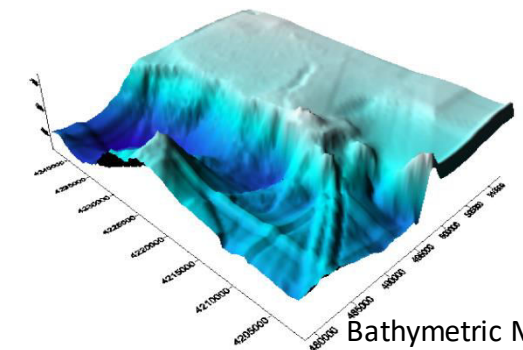
Touristic Development



Posidonian Meadows



Fishing Activity



Bathymetric Map

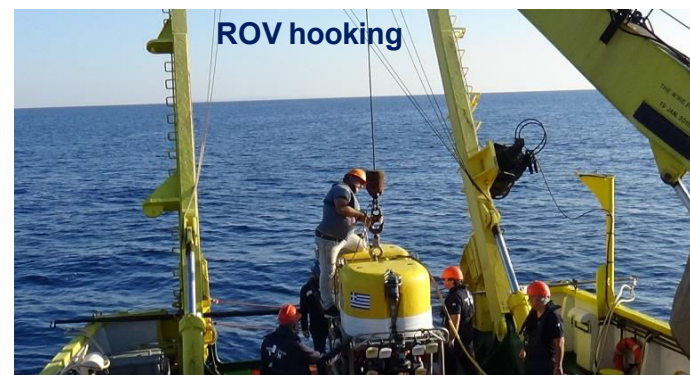
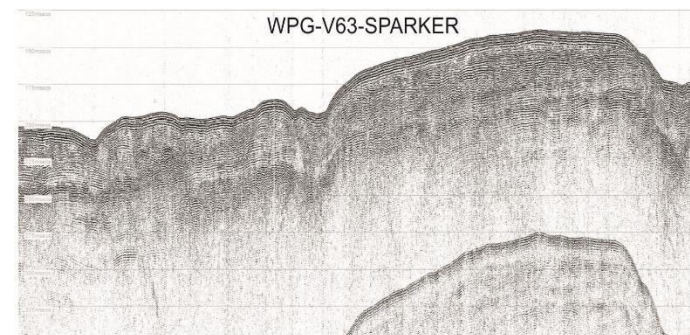
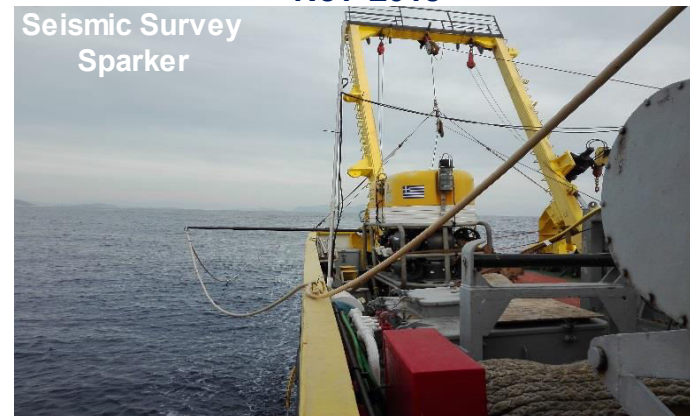
Baseline Report Phase B will be concentrated in an area covering the drillable targets.
Field Survey is anticipated for the critical environmental components

ENVIRONMENTAL BASELINE STUDY (PHASE B)

Geohazards & Environmental Sampling Nov 2018

The purpose of the 2nd phase of the **Environmental Baseline Study (EBS 2)** is the acquisition of data regarding the **state of the environment in the immediate area** of the proposed drilling program in order to assess the environmental status within the exploration area before the commencement of drilling operations.

The **EBS 2** and the **ESIA** will also incorporate the results of the **Geohazards & Environmental Sampling and Habitat Assessment Surveys** conducted by *HELLENIC CENTER OF MARINE RESEARCH AND RPS ENERGY LTD.* in **November 2018** over the drillable Target. *(see photos)*

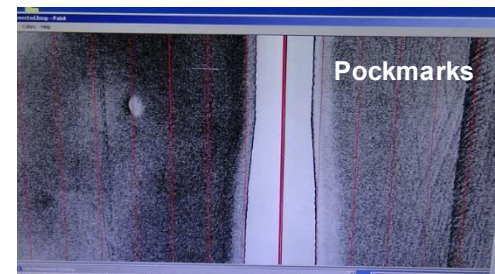


Environmental Baseline Study Phase B – Environmental & Social Impact Assessment (ESIA)

According to the JMD 169896/8.8.2013 for the «**approval of Strategic Environmental Assessment for W. Patraikos**», prior to the **Exploration Well**, and in due time to be included in the relevant **ESIA** Study, detailed Surveys shall be conducted in the area of drilling program, including at least:

- **Assessment of ecology and extent of important benthic societies** such as Posidonia, Coral and chemosynthetic societies.
- Mapping the **functions of the Special Conservation Area GR2220003 *Inner Ionian Archipelago***.
- **Sediments quality**. In particular, hydrocarbon and heavy metals concentrations
- **Geological Hazards Study** with emphasis on slope stability.
- **Meteorological data** acquisition (surface, sub-surface currents, temperature and salinity of seawater)
- **Ocean forecasting model** development for the monitoring of any potential oil spills
- Mapping of possible **archaeological finds, wrecks and communications cables**.

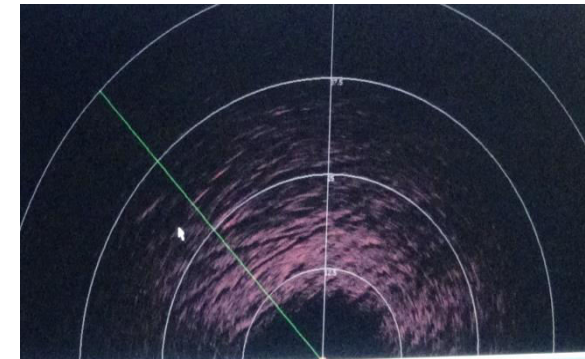
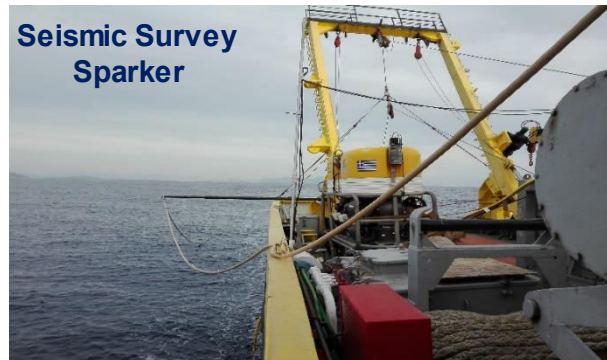
Geohazards & Environmental Sampling Nov 2018



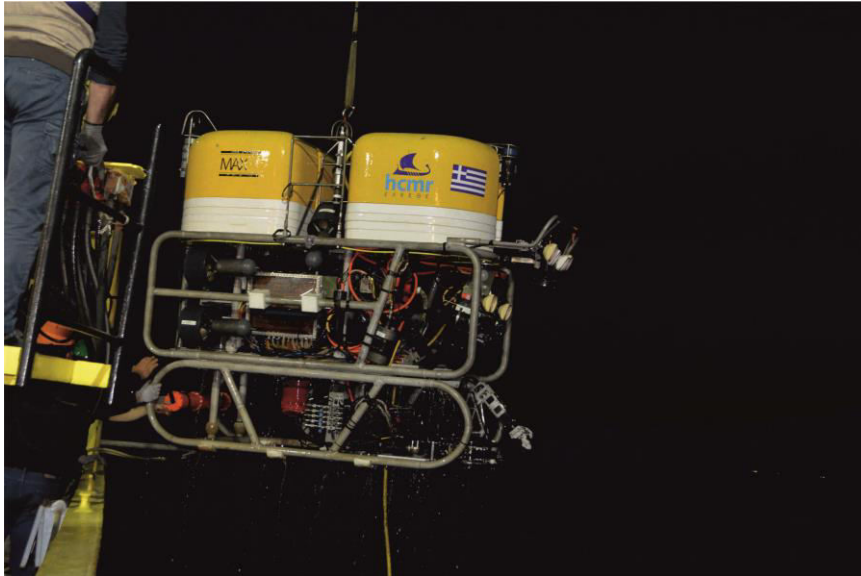
Geohazards & Environmental Sampling Surveys - November 2018

HELPE West Patraikos with the collaboration of the **HCMR and RPS Energy Ltd** carried out the project of the **Geological Hazards & Environmental Sampling Surveys** in *November 2018*.

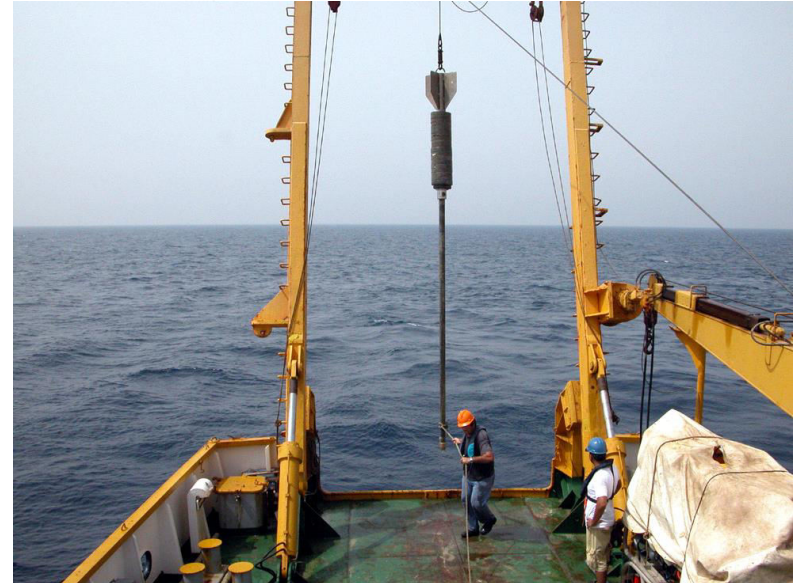
Both studies will be incorporated into Environmental Baseline Report Phase B and the Environmental and Social Impact Assessment (**ESIA**) for the drilling campaign in W. Patraikos.



Geohazards & Environmental Sampling Surveys - November 2018



Recovery of ROV Max Rover on the working deck of R/V AEGAEO.



Gravity corer deployed through the A frame at the stern of R/V Aegaeo



The control room of ROV Max Rover on R/V AEGAEO.



Box corer deployed through the A frame at the stern of R/V Aegaeo

SEISMICITY MONITORING AND SEISMIC HAZARD STUDY

Contractor: National Observatory of Athens - Institute of Geodynamics (GI)

- **Seismicity Monitoring in the Western Patraikos Gulf in real time aiming to update the current state of the active tectonics of W. Patraikos.**

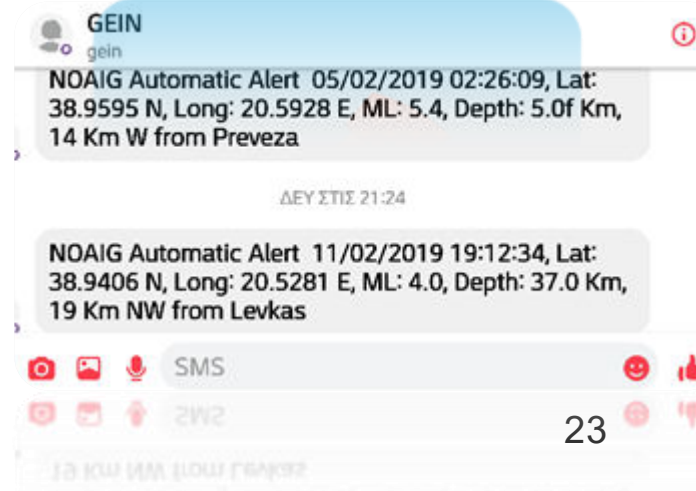
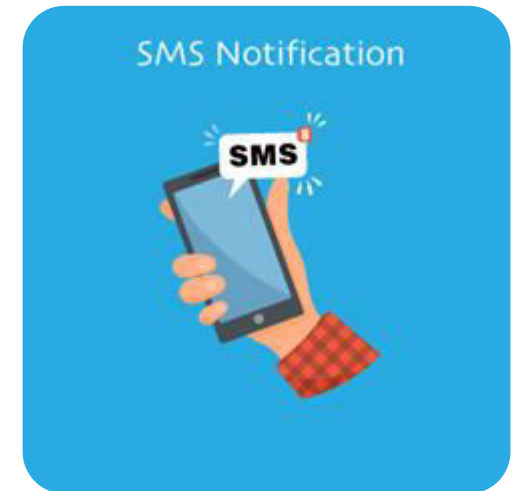
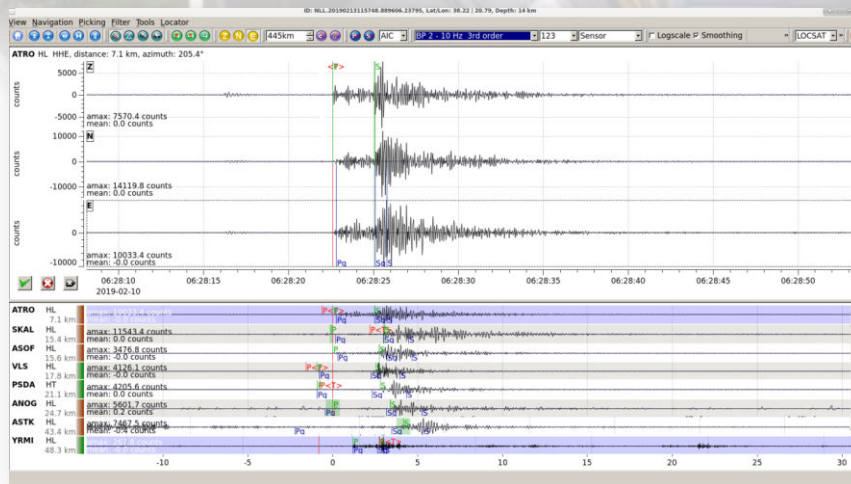
(Oct 2018 – Apr 2020)



- 1. Installation of 15 new stations**
- 2. Maintenance of all nearby GI stations**
- 3. Activation and monitoring of the 2 seismic arrays installed in the area of W. Greece**
- 4. Monitoring and recording of the Micro- and Macro-seismicity**
- 5. Seismic Hazard Assessment in the area of W. Patraikos.**

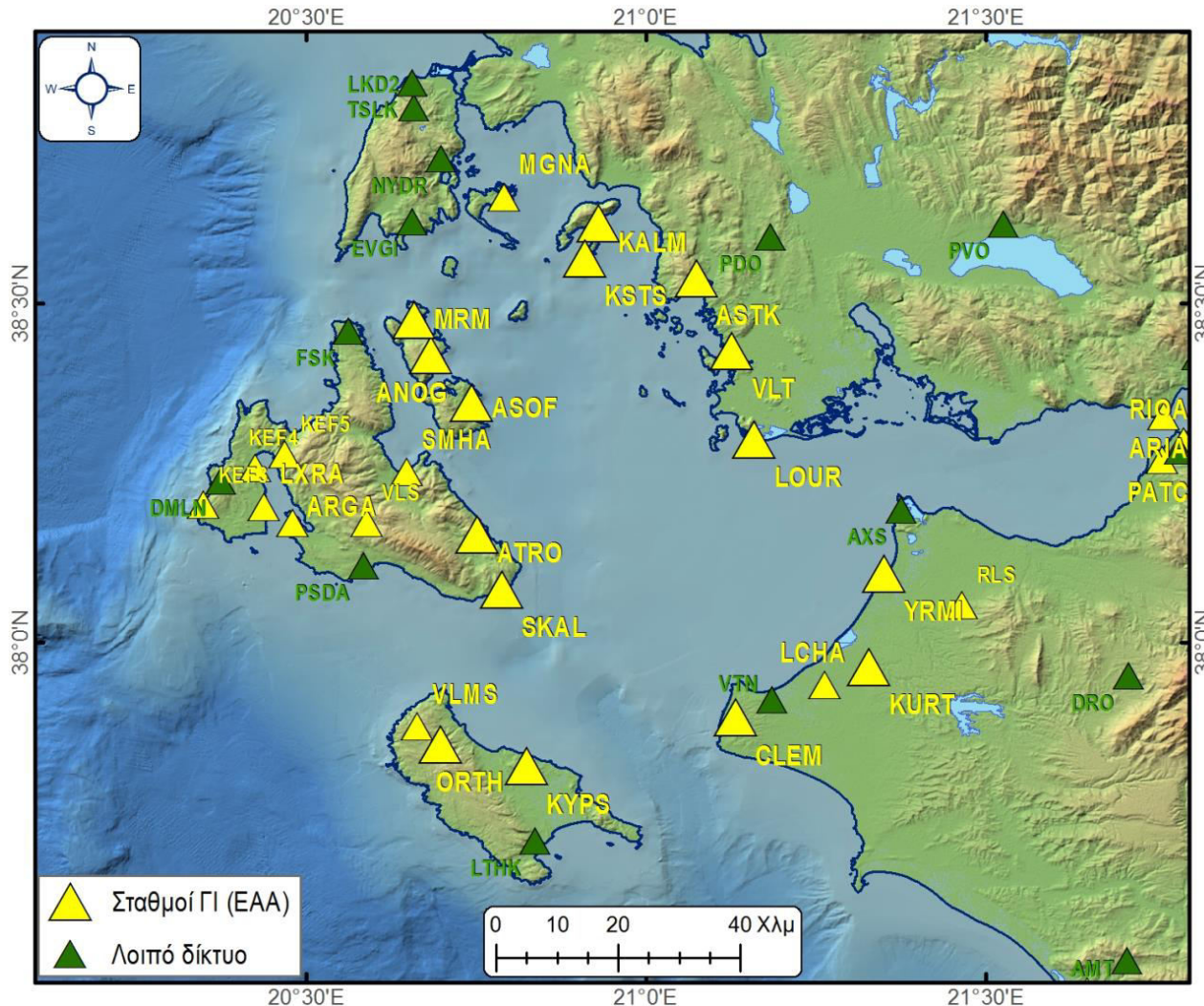
Seismicity Monitoring and Seismic Hazard Study

*In collaboration with the National Observatory of
Athens - Institute of Geodynamics (GI)*



SEISMICITY MONITORING AND SEISMIC HAZARD STUDY

Contractor: National Observatory of Athens - Institute of Geodynamics (GI)



We have strengthened the Monitoring Network of the GI so that at this time West Patraikos Gulf and the Inner Ionian Archipelago are the best seismically monitored areas in Greece!

Station locations in the wider area of W. Patraikos

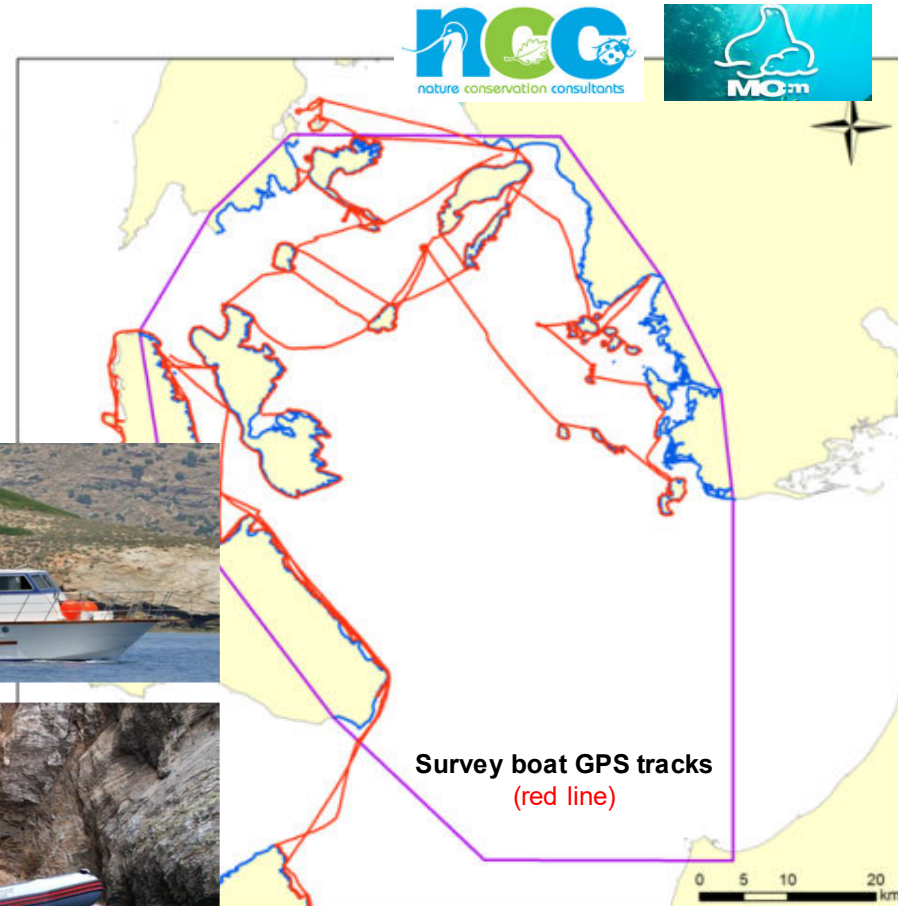
Environmental Monitoring and Recording of Critical Environmental Indicators of Biodiversity

In collaboration NCC, MOM, BIOTOPIA

“Survey of the Status of Important Fauna Species in the W. Patraikos area”

The Project consisted of the following monitoring stages included research reports in conjunction with existing bibliographic information:

- **Coastal Survey - Seabirds in nesting places**
(Spring 2018)
- **Coastal Survey - Monk Seals**
(Autumn 2018)
- **Pelagic Survey -**
Monk Seals – Seabirds –
Sea Turtles
(Autumn 2018)



Survey boat and team



Mediterranean Shag (*Phalacrocorax aristotelis*) concentrations



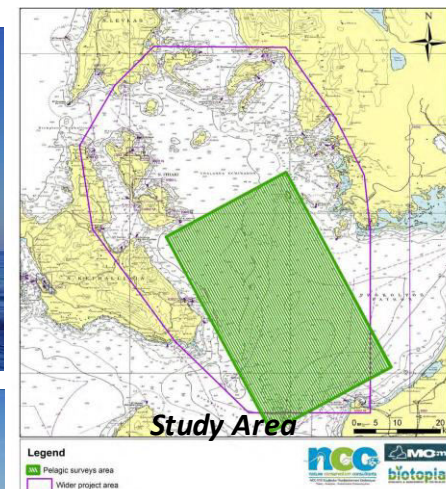
Mediterranean Shag nest sites



Pelagic Surveys for marine mammals, seabirds and sea turtles

- The Study in **2018** constituted the ***most integrated field expedition carried out so far in Greece*** for the systematic simultaneous recording of cetaceans, seabirds and monk seals, combining:

- ✓ ***systematic optical boat surveys***
- ✓ ***hydrophone transect surveys***
- ✓ ***aerial optical transect surveys***



In this respect, it represents a significant first step towards a more comprehensive and systematic sampling and spatial mapping effort for the marine mammals and the seabirds in the Greek seas, ***thus creating a benchmark for the baseline information to be gathered in future similar surveys.***

Complementary Baseline Surveys of the Status of Important Fauna Species in the Western Patraikos area for 2019

The Continuation of the Monitoring Program with NCC, MOm and Biotopia, will include the following Tasks:

1. **Systematic monitoring** of the **Mediterranean Monk Seal** at **breeding sites** in the wider project area.
(August-December 2019)
2. **Pelagic boat surveys** for marine mammals, seabirds and **sea turtles** in the wider project area using a research vessel. *(May 2019)*
3. **Coastal seabird nests survey and telemetry** for locating nesting sites, estimation of breeding population size, monitoring of the species breeding performance and GPS-based telemetry of the Mediterranean Shag *(April and May 2019)*
4. **Seabird colony** for the search for colonies of **Scopoli's Shearwater, Yelkouan Shearwater and European Storm-petrel** colonies *(July 2019)*.

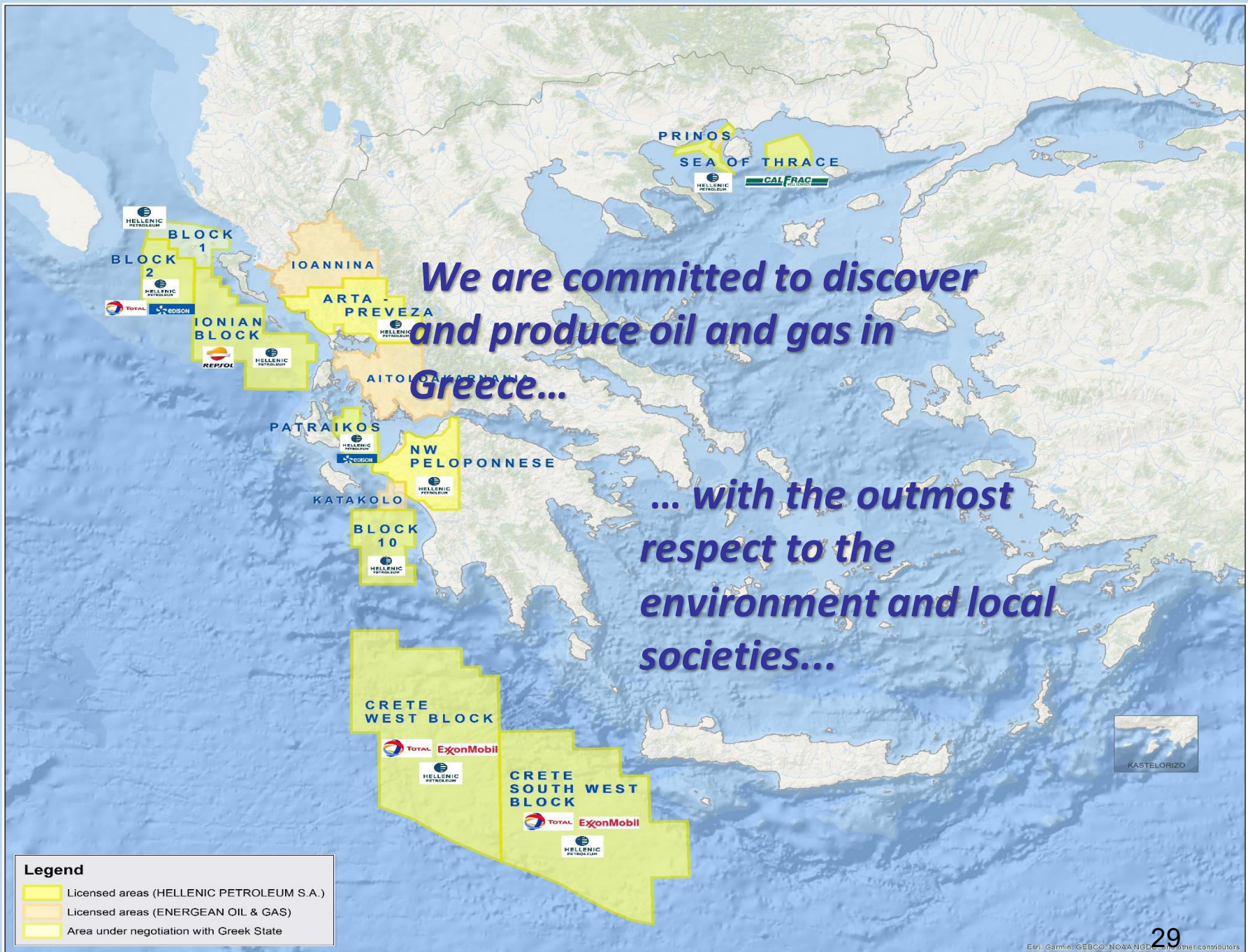


*We are committed to discover
and produce oil and gas in
Greece...*

*... with the outmost
respect to the
environment and local
societies...*

Legend

-  Licensed areas (HELLENIC PETROLEUM S.A.)
-  Licensed areas (ENERGEAN OIL & GAS)
-  Area under negotiation with Greek State



*Many thanks
for your kind attendance*