

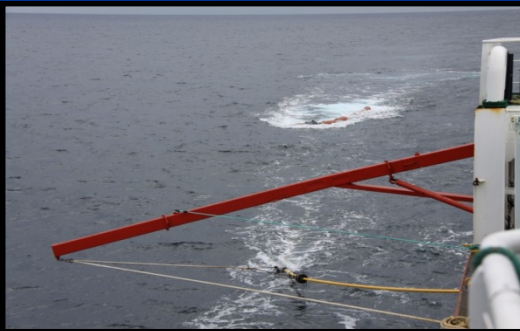
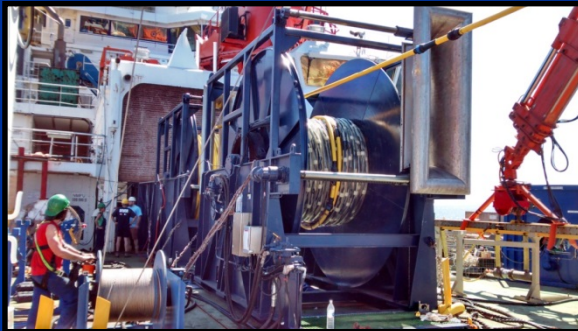
Cooperation in Seismic Operations NERC-CSIC



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VISION

To develop a world class trans-national capability for marine geophysics through a joint pool of United Kingdom-Spanish geophysics equipment and a trans-national team that can deploy the equipment on UK and Spanish RV's



Foundations of Strategy

Joint Pool of Equipment

- A complete set of interoperable geophysical facilities capable of operating in oceanic RV's
- A suite of equipment allowing the deployment of two 3km MCS streamers in close succession
- A suite of equipment supporting smaller (e.g. 600m) streamer requirements
- A common capital plan to enhance the pool of equipment

Trans-National Team

- A TNT of technicians to support a joint activity circa 100 sea going days of geophysics operations per year
- A critical mass of technicians skilled in geophysics operations
- An ongoing programme of training to enhance the skills and expertise of the technicians within the trans-national team

Marine Planning.

- A synchronised marine planning process to support scheduling of marine geophysics cruises
- An exchange of post cruise assessment forms to monitor and improve activities

The Framework: OFEG

OFEG represents Europe's leading oceanographic research organizations and provides a forum to barter exchange and co-operation opportunities for the Global and Ocean Class research fleet. OFEG aims to maximize the overall scientific output using its state-of-the-art facilities in support of the worldwide oceanographic community

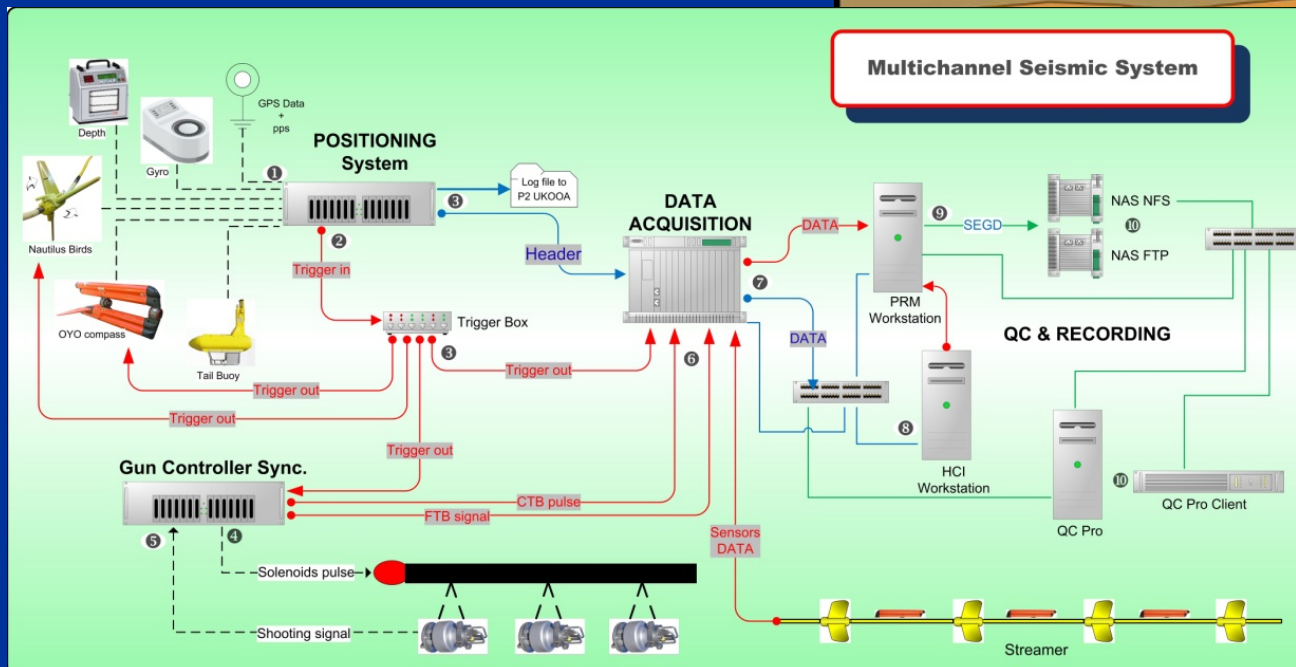
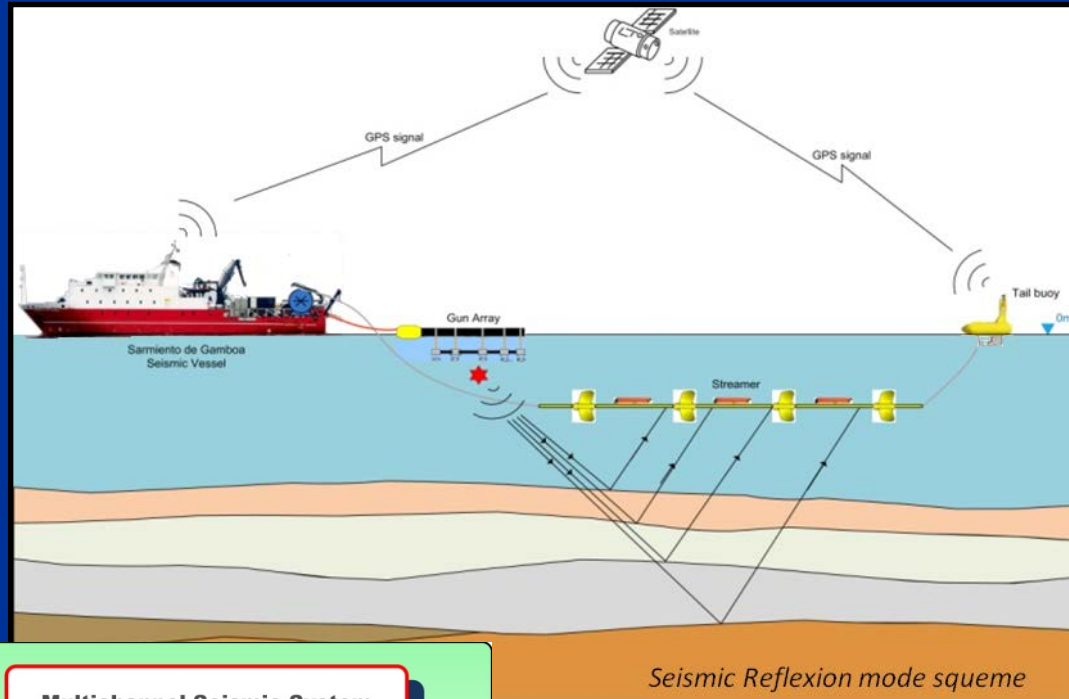
OFEG-ACCESS TO RV'S

8 non-polar Global class European vessels,
12 of 15 Ocean class European vessels,
Equipment (ROVs, multichannel seismic systems, multibeam echo-sounders etc.)



•MARINE SEISMICS

- **Power source** (provides a pulse of acoustic energy)
- **Acquisition and Control Systems** (operate and set deployed equipment, record the signals reflected and/or refracted by the seabed)
- **Processing Systems** (algorithms and mathematical process applied to the raw data for analysis and clear/help geological interpretation)

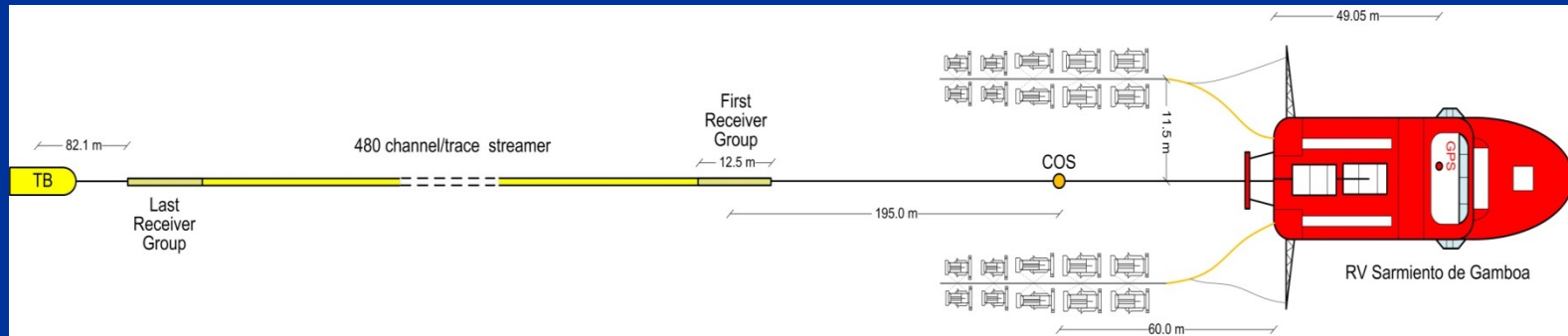


•Marine Technology Unit (UTM) has made great efforts to set, complete, improve, upgrade and perform all CSIC marine seismic techniques. UTM is responsible for the installation, operation, maintenance, design and improvements of all these devices.

•Even we usually offer our services in Spanish vessels, we already carried out seismic surveys for any other nationality vessels with official convention or agreement (closely with our British NOC colleagues).

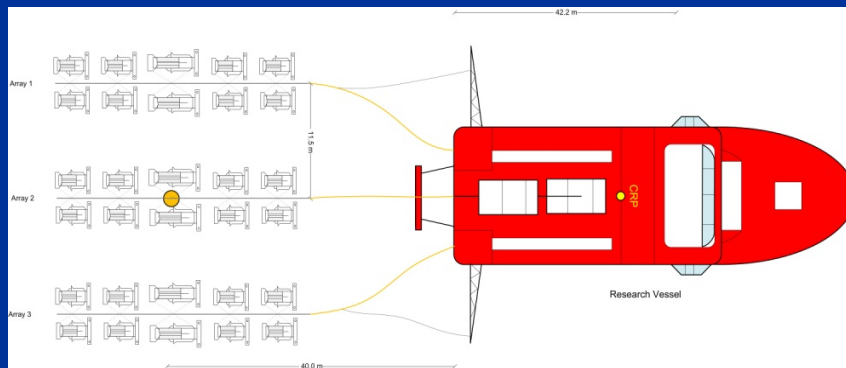
Reflection mode

Suitable for both vessels; RRS James Cook and RV Sarmiento de Gamboa

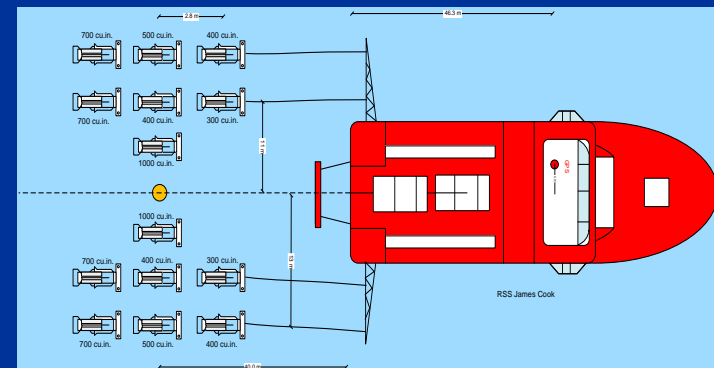


Refraction mode

Two different array designs; RRS James Cook and RV Sarmiento de Gamboa



CSIC-UTM



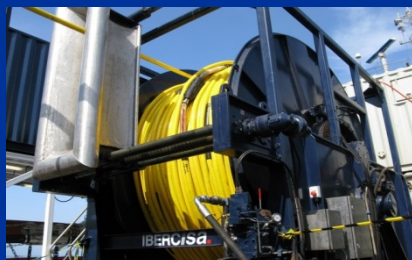
NERC-NOC

Heavy shared Equipment (MCS- digital streamer)

CSIC-UTM

NERC-NOC

Active and stretch sections



6 km of
SSAS-12.5m-50-2C-3Hz



1,5 km of
SSAS-12.5m-50-2C-3Hz

Birds/levelers



SERCEL® Nautilus



ION® Digicourse

Compass-retrievers



GEOSPACE® HSRD-500S

Tail buoy



SEAMAP® complete RGPS
(Master + remote units)

Positioning systems are fully compatible with UTM and NOC's streamer, coils and connections.

SEAMAP® Novatel Buoy module

MOBILIZATION

Loading Seismic parts



	Weight (Tones)	Qty	Footprint (feet)
LMF compressor	18 net	1	20
	26 isolated	1	high cube & extra-width
Lönne frequency converters	9	2	10
Source structure with 2 strings	16	1	40 feet
Source structure with 1 string	13	1	40 feet
Twin winch + umbilical's	10	1	10
Single umbilical Winch	4.5	1	10 (bottom frame)
3 km streamer + winch	33.5	2	20 (bottom frame)
Workshop & Storage	5	1	20
Acquisition & Electronics	3	1	10
Total	180.5		

On board Installation Timing

Twin structure + Umbilical	2 days
Single Structure + Umbilical	1 day
LMF portable compressor	2 days
High-rise workshop	1 day
3 Km streamer Winch	6 hours
6 km streamer Winch	8 hours

Cruise Activity

Survey		
UTM-CSIC	NOC	Dates
SERCEL Trails	NOC staff came on board as observers	2010 25 Mar - 03 Apr
UTM acquisition and positioning system were loaded on RRS James Cook . 2 x Engineers were involved during installation and set-up. 1 x Technician embarked as engineer and observer.	JC-049 (North Atlantic)	2010 01 Jul - 17 Jul
UTM streamer and positioning system were loaded on RV Sonne . 1 x Technician embarked.	SO-2015 (South Pacific)	2011 25 May - 11 Jun
UTM acquisition and positioning system were loaded on RRS James Cook . 2 x Engineers were involved during installation and set-up. 2 x Technicians embarked as observers.	JC-089 (Iberian Margin)	2013 02 Ago - 22 Ago
NOC Digicourse levellers were shared to carry out survey on RV Sarmiento De Gamboa	CSIC-Fugro J-225, Black Sea	2013 20 Ago - 14 Oct
UTM acquisition and positioning system were loaded on RRS James Cook . 2 x Engineers were involved during installation and set-up. 4 x Technician embarked as engineers and observers.	JC-098 (Pacific Margin of Mexico)	2014 17 Feb - 19 Mar
Few Digicourse levellers were used to carry out on RV Sarmiento de Gamboa	CSIC-Fugro J-300, Black Sea	2014 29 Oct - 03 Dec

Conclusions

The exchange activities provided for by this cooperation are based on this being an 'equitable' and 'balanced' partnership

Agreement in planned procurements of seismic equipment prior to purchase to ensure its interoperability and to ensure it appropriately maintains and enhances the capability of the Joint Equipment of Pool.

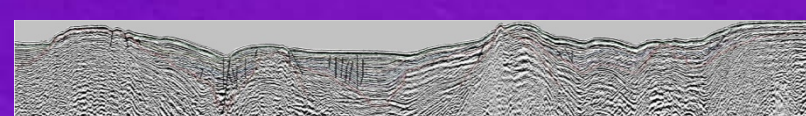
Build, on an opportunistic basis, the capability requirements of the Joint Pool of Equipment into capital expenditure plans

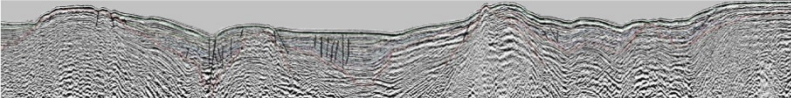
Trans-national Team. A key element of the initial capability covered by this collaborative agreement

Provide training berths – on an opportunistic basis – on seismic cruises to maintain and enhance the technical capability of the trans-national team. Enhance the operational capability of the joint equipment pool by ensuring that the trans-national team addresses common technical matters.

Exchange of seismic facilities. NERC and CSIC will ensure that the science community in the United Kingdom and Spain, respectively, has the opportunity to use the capabilities provided by this agreement.

The mutual benefits are clear, increasing our ability to respond to the scientific community with increased performance for complex and expensive equipment and well-trained technicians. In the near future we could increase other OFEG partners





UTM Seismic Portable System

Evaluation and improvements



Thank you.