

EO40G

D1 Delivery

EO40G: Geo-information requirements

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1. Context

The aim of this document, which is part of the D1 delivery, is to describe the methodology used by the CLS consortium, to explain the results obtained and to list the documents delivered.

The D1 delivery concerns Task 1 of the EO40G project: Geo-Information requirements gathering.

The purpose of this task is to identify the requirements of the O&G industry throughout the different stages of an O&G project and to identify the needs with respect to specific geographical conditions.

2. Methodology

In order to complete this task, we decided to select O&G experts who could help us identify these needs and to interview them.

We worked hand-in-hand with our partner Tullow Oil to create an offshore questionnaire, which was then approved by C-CORE. We voluntarily changed the template compared to the on shore's one in order to stay focused on the products and data required by the OGP rather than challenges, which seemed to be most suitable for offshore issues.





Following a consortium meeting in April with CLS, METEOGROUP, TULLOW OIL and the NERSC, we agreed on a specific strategy for the interview:

We produced a brochure explaining the project and the purpose of our survey. We first sent it to all of our contacts in order to involve and inform them of this project and survey.

For fear of influencing our contacts from the O&G Industry, we decided not to propose them a preselected list of possible requirements. We wanted to interview them directly, by phone or by meeting them, and to have a discussion about the requirements. We used the template as a guideline during the interview. It enabled us to fill out the questionnaire once the interview was over, and to send it back to our contacts for validation. Completing the template by ourselves also helped us to avoid misunderstanding on the questions asked in the questionnaire.

We collected all of the results in one excel file with one row per interview.

We completed 15 interviews, and contacted about 30 persons.

CLS interviewed people at the following companies:



3. Results

Once we completed all of the interviews, we revised the excel file containing the answers to organize the results by requirements.

Each one of our contacts was able to talk about many different requirements, which is why we had to redo the table.

We then organized the requirements by stage. To do so, we selected the requirements with the most elevated impact score for each stage. The requirements found follow the logic of the lifecycle.

Requirements throughout the lifecycle:

Pre-license acquisition:

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This stage of the O&G project is about the decision process leading to purchasing an oil field license. The operator needs to gather all relevant data to evaluate both the potential and the exploration & production costs.

Thus the main requirements on the environmental side are:

- **Historic Metocean data for high level risk assessment**
- **Inputs for model**
- **Model validation**
- **Environmental conditions**

Satellite data have been requested several times to serve as a validation for metocean models O&G experts are using. They could be useful to calibrate the model.

Exploration:

This stage of the O&G project is about exploring the potential of the oil field. The purpose of this task is to find oil or gas, evaluate the viability of the field. This starts with seismic surveys followed by drilling permit submission and drilling operations on best candidate spots.

Thus the main requirements are:

- **Selection of the drilling rig**
- **Seismic survey : sound propagation properties**
- **Seismic survey : Current velocities**
- **Hurricane tracks**
- **Drilling Survey preparation : Metocean conditions**
 - **Hindcast**
 - **Forecast**
- **Drilling Survey preparation : Environmental conditions**
- **Monitoring water discharge/drill cuttings**

The purpose of most of these requirements is to reduce the cost and avoid downtime during the survey. Operations need to be carried during the best weather conditions as possible.

Development:

This stage of the O&G project is about building and installing the production infrastructure. Metocean data (statistics, extremes) are paramount to this stage as an input to the design studies of both the infrastructure and the marine operations. Weather and ocean forecasts are needed to conduct installation operations at sea.

Thus the main requirements are:

- **Recommendations for the design of the structure**
- **Evaluation of the efficiency of the structure**
- **Metocean forecast to avoid down time**
- **Coastal morphology**
- **Monitoring of the Water Quality / Turbidity during operations**
- **Estimation of the Climate Change impact**
- **Visibility during operations**

Due to climate change, the existing weather statistics are no longer reliable. O&G producers asked several times to have an access to satellite data which could show them the impact on a specific area.



Production:

This stage of the O&G project starts once the structure is built. The production phase can last several years with an increasing production followed by a decrease. The constant monitoring of the platform and the environmental conditions are of course important for the day-to-day operations, but the main requirements concern the response in case of emergency (Leak, Ice, damage on infrastructure...).

Thus the main requirements are:

- **SAR imagery to detect ships and icebergs**
- **Pollution monitoring**
- **Efficiency of vessels and helicopters**
- **Safety of marine operations**

In that case, the access to NRT data is paramount. Some requirements such as lightning are uncommon but could be really helpful to guide helicopters as an example.

Decommissioning:

This stage of the O&G project represents the end of the project. Once the production is no longer profitable (extraction of the remaining oil or gas is too difficult or too expensive), the infrastructure needs to be deconstructed. The most important thing here is respect of the environmental conditions.

Thus the main requirements are:

- **Metoccean monitoring**
- **Environmental monitoring**

Global requirements:

- **Site monitoring**

During all the phases, RT site monitoring is equally important and operators need a continuous flow of data to achieve this goal.

- **Use of EO Products**

Thanks to the methodology chosen, we've been able to discuss about the concerns and the issues of the O&G producers about using the EO Products which could be helpful for the gap analysis.

- More communication on the availability should be done. Some of O&G producers didn't know who they should contact to gain access to these data or how they could access them.
- EO products could be of a great use to study the impact of climate change since historical data are no longer reliable. Indeed, O&G experts told us they would like to see the global effects of the CC with satellite data.
- An important issue with the use of EO products is poor knowledge about their performance and reliability. The O&G industry need some sort of certification or validation process (standards).
- The limitation concerning the use of EO products can be the difficulty to have a guaranteed access to these data. A model is more likely to provide this guarantee, that's why it is important to communicate on reception tools and mission continuity to show EO products as a reliable source of information.
- Another issue is the lack of tools to read and view these data. The products should be provided in a common format to producers (Matlab, Fortran) or delivered with a turnkey tool. There is a paramount need for international industry wide standards.



- The Spatial coverage could also be an issue due to some limitations in the area outside [52° N-52° S].
- Besides, in order to be able to study a given phenomenon, the survey revealed that geostationary satellites were most likely to be useful. Nevertheless, EO data is often unable to properly resolve space and time scale of dynamic oceanic features. There was a clear need for a « observed current product » (globcurrent mentioned) and synoptic data.
- The use of EO products is of even greater concern in coastal areas and in crisis situations (oil spills).
- Composite products require too many days to be generated and it could be an issue for operational needs.
- Different orbit characteristic are needed depending on the context. For example, to study a given phenomenon, geostationary orbits are preferred.

Geographical dependence:

- The requirements do not vary hugely depending on the geographic location. The areas definition is quite artificial since it was not really a relevant criterion in the industry for EO data.

However some particular specifications need to be highlighted:

- Historical wind, wave and current data:
 - These data are particularly needed during design and operation phases.
 - They are used all over the world but some parameters are more predominant in some regions.
 - The main issue for these data is having a time series in time and space at a specific location. Satellite data are sparse in both time and space.
- Coastal morphology:
 - These products are particularly needed during development phases
 - The coastal areas locations are useful worldwide to enable the good planning of operations (vessels, helicopters...)
 - The main problem concerns the spatial resolution of images (sometimes larger than the expected variations of the shoreline position)
- Middle East Countries
 - Some O&G experts mentioned the fact that they needed the solar radiation on some locations mainly to evaluate the impact on the structure.

Results interpretation and feedbacks:

More generally, we were confronted by different communication issues during the interviews:

- Some contacts didn't want to reply to the interview because of lack of time or because they didn't feel it was important (even if they could have been). It confirms the necessity to communicate more about EO products and their capabilities.
- Most of the time, people don't directly use EO data and don't know much about these products. EO data are mainly used by big companies for environmental permitting and mostly by highly specialized experts coming from the science community within the company. The work is often sub-contracted out and handled



by the geomatic department. O&G companies buy Metocean packages, which include the EO data and which are provided by a subcontractor.

- The current use of EO data is often indirect, as for inputs for models.
- EO data are usually good enough but there's a need for awareness on products, training and ad-hoc tools to download and process the data.

4. Documents delivered on the portal

List of the documents to be posted on the OGEO Portal, part of the D1 delivery:

- Requirements graphic
- Portal web pages listing the requirements
- Brochure produced for the interview
- Document on methodology and results of Task 1.