



EGNOS, it's there. Use it.

Value proposition on EGNOS for off-shore Oil & Gas Operations in Europe

**Identifying a potential niche for EGNOS
Augmentation
ENAV20-13.15**



European
Global Navigation
Satellite Systems
Agency



Precise navigation,
powered by Europe



Outline

- Methodology overview
- GNSS positioning techniques and services available to support off-shore Oil & Gas operations
- Value chain for off-shore Oil & Gas GNSS positioning services
- EGNOS potential and benefits for off-shore Oil & Gas operations
- Conclusions

Methodology followed

Analysis on the **GNSS positioning techniques** available to support off-shore Oil & Gas operations



Analysis on the **GNSS positioning services** available in the market



Analysis on the value chain: **stakeholders, players & users**



Allows to identify the opportunities for EGNOS in off-shore Gas & Oil applications and the potential associated benefits.

GNSS Positioning techniques & services available in Europe

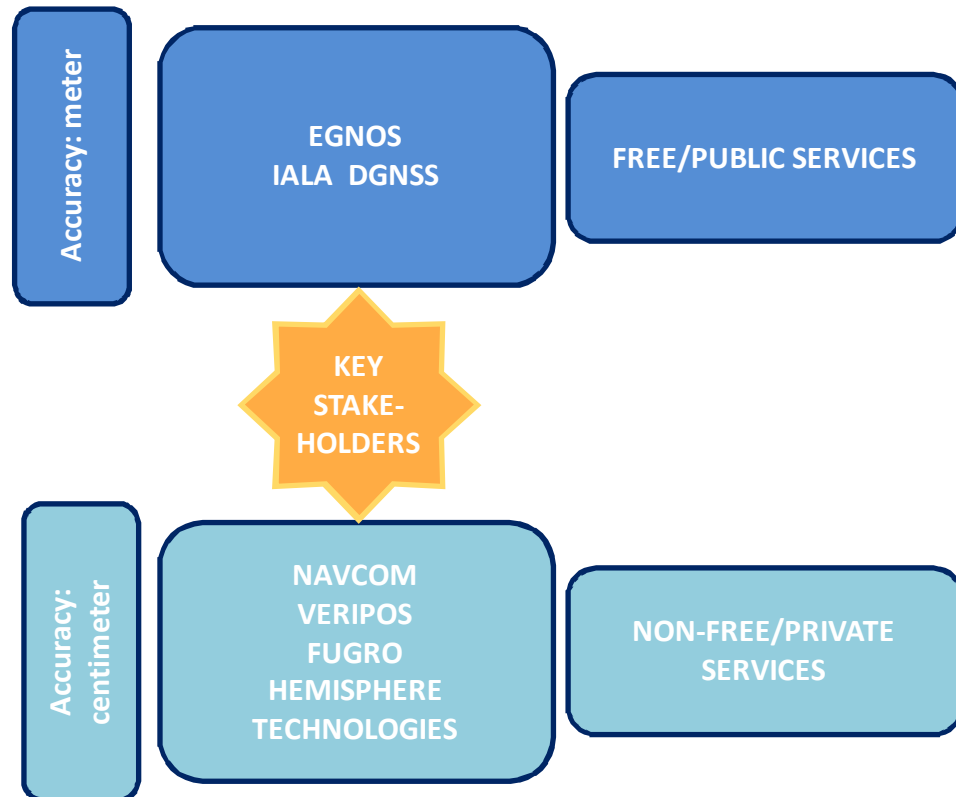
Oil & Gas off-shore User needs:

Application/Task	Horizontal Accuracy	Vertical Accuracy
Tugs and pushers	1 m	N/A
Cable and pipeline laying	1 m	N/A
Offshore exploration	1 m	N/A
Offshore exploitation	1 m	Variable
Hydrography	1-2 m	0.1 m
Dredging	0.1 m	0.1 m
Construction works	0.1 m	Variable
Automatic docking	0.1 m	N/A

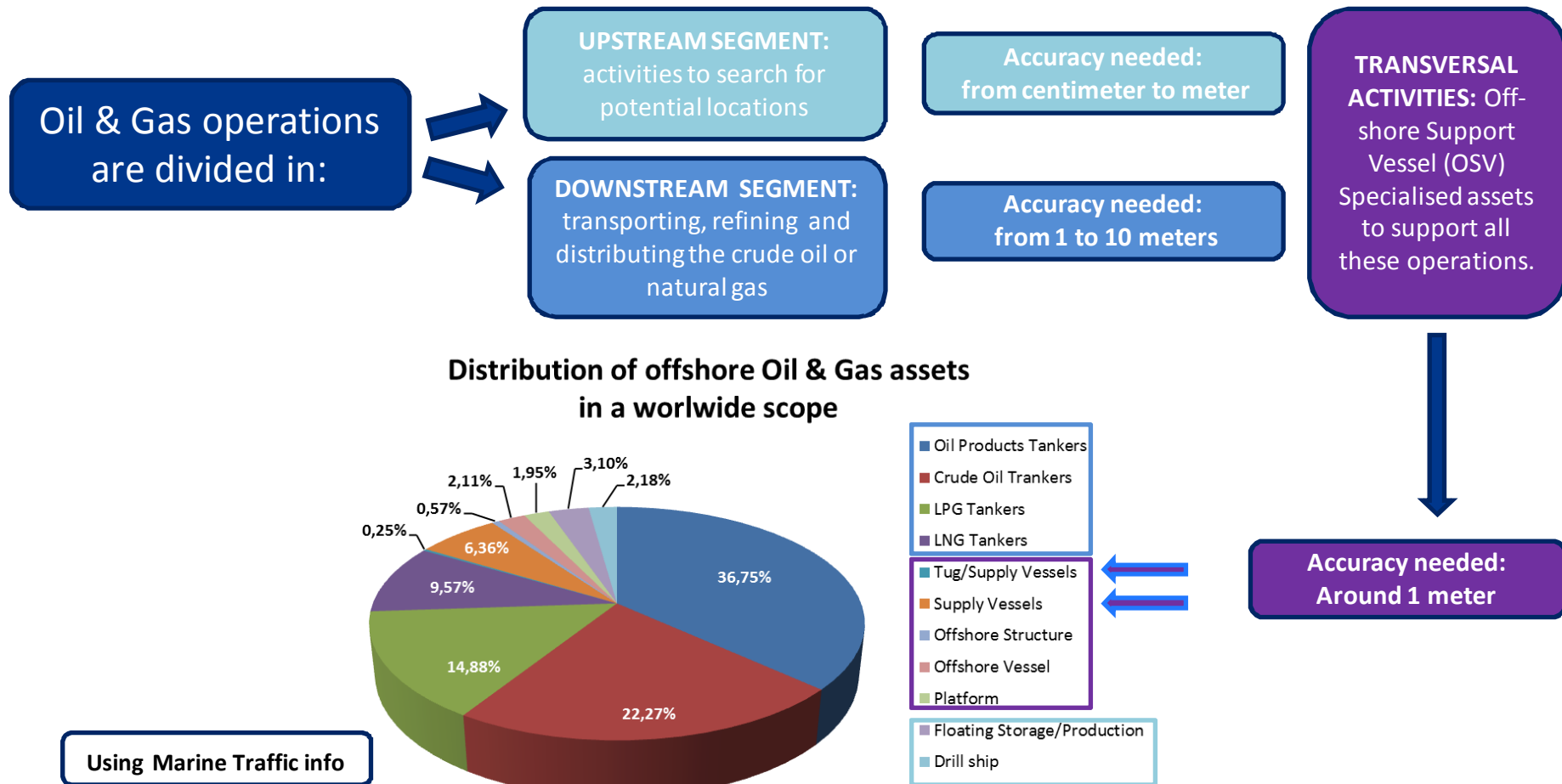
Source: IMO Res. A.915(22)

GNSS Positioning techniques available to cover user needs

Core Constellations
Differential GNSS
SBAS
High Accuracy DGNSS
PPP



Value chain for off-shore gas & oil positioning services



EGNOS to support off-shore Oil & Gas operations (1/4)

- **EGNOS** (European Geostationary Navigation Overlay Service) is the European free-of-charge SBAS which is to be used in combination with GPS, increasing the performance in terms of accuracy and integrity.
- SBAS systems are designed to augment the navigation system constellations by broadcasting additional signals in the form of “differential corrections” from geostationary (GEO) satellites.
- EGNOS Open Service (OS) aims at improving the achievable positioning accuracy by correcting several error sources affecting the GPS signals.
- The EGNOS OS is accessible in its corresponding service area to any user equipped with an appropriate GPS/SBAS compatible receiver for which no specific receiver certification is required.
- **EDAS** (EGNOS Data Access Service) is the EGNOS terrestrial service which offers ground-based access to EGNOS data in real time and also in a historical FTP archive to authorised users (e.g. added-value application providers).
- EDAS is the free-of-charge single point of access for the data collected and generated by the EGNOS ground infrastructure (RIMS and NLES) mainly distributed over Europe and North Africa.

EGNOS to support off-shore Oil & Gas operations (2/4)

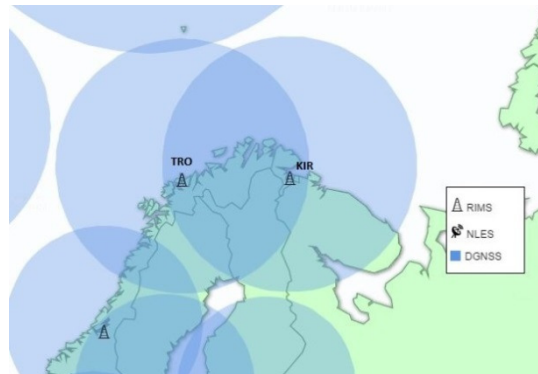
Segment	Phase	Application	Horizontal accuracy
Upstream	Exploration	Survey of offshore areas to identify prospective petroleum field	1-2 m
		Precise positioning of geological structure	< 1 m
		Seismic vehicle guidance	
		Continuous monitoring to simplify seismic takeout	
		Confirming that location is suitable	
		Construction of subsea structures	1 m
Downstream	Transportation	Pipeline route planning	1 m
		Pipeline construction and maintenance	10 m
		Bulk transport of Oil & Gas	
		Fleet management	
	Storage	Dimensional control across storage terminals	1 m
		Retrofit and revamp projects	
		Tank calibration	
	Refining/ Petrochemical	Dimensional control across plant facilities	< 1 m
		Tracking and management of assets	
	Distribution	Fleet management	10 m



Can play a role!

EGNOS to support off-shore Oil & Gas operations (3/4)

- Oil & Gas extraction in Europe is concentrated in North Sea
- EGNOS RIMS stations in this area (Trondheim & Kirkenes -both in Norway-)



EDAS Can
play a role!

- EGNOS GEO visibility problems may appear above 60N and are increased above 70N

EGNOS to support off-shore Oil & Gas operations (4/4)

		Exploration and Production Phases			
		Exploration	Development	Production	Decommissioning
Type of vessel / operation	AHTS	✓	✓	✓	✓
	PSV	✓	✓	✓	✓
	CSV		✓		✓
	Seismic vessel	✓			
	Dive / Subsea support vessels		✓	✓	
	Pipe layer		✓		
	Well Intervention, Stimulation & Test (Drill ships)	✓		✓	
	Others (inspection, maintenance and repairs)			✓	
				accuracy of 1 meter	

Offshore Support Vessels (OSVs)
Transversal activities within Upstream Segment

Target market:
Platform
Supply Vessels
PSVs

Used along the whole life cycle of a platform

Higher number of vessels than other type of OSVs with similar positioning requirements

Oil & Gas off-shore operations

- Difficult to carry on.
- Require high levels of safety and skills.
- Huge required investment and small margin of failure.
- Consequences of a minor error could be of great magnitude (economically and environmentally).

This has led to a variety of specialised off-shore assets and support vessels, focusing on certain tasks within the off-shore industry.

Conclusions



- **EGNOS Open Service** and **EDAS** are free of charge services that can contribute to the computation of resilient PNT.
- **EGNOS Open Service** can be used for a range of downstream and upstream applications requiring up to sub-meter accuracy level within the North Sea area. The EGNOS Open Service would probably not require a change in the user equipment since most receivers in the market are EGNOS enabled. **Platform Support Vessels** are a good example of users that may benefit from EGNOS.
- **EDAS** can be useful in resilient PNT computation for production fields in extreme latitudes (Bearing Sea) beyond the GEO visibility limit, although some modifications at user equipment could be required to allow the retrieval of EDAS corrections through satellite-based internet. EDAS can be also useful in the coverage area of EGNOS RIMS stations (eg: Trondheim & Kirkenes).





EGNOS, it's there. Use it.

Thank you!



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