



## NEW BUILD PROJECT – JURONG SHIPYARD

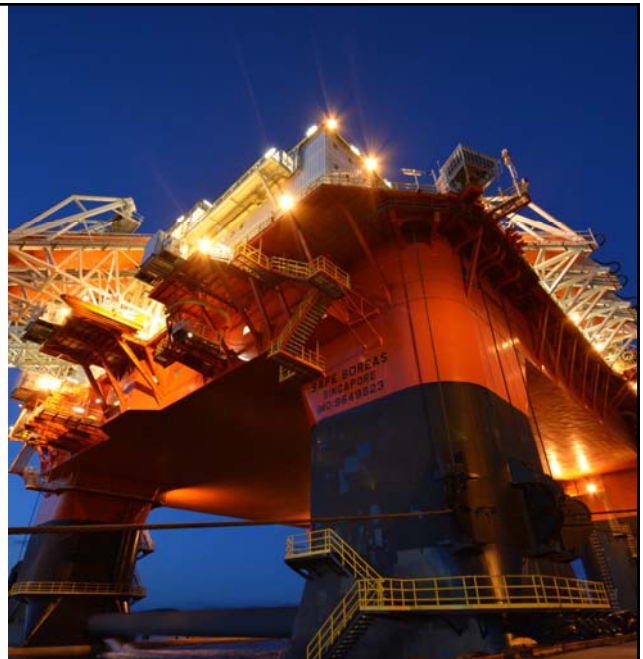
Mark Arlow – Senior Manager Marine Operations

19th April 2016

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## AGENDA

- Our Business
- Our Operational Experience
- New Build Strategy
- Safe Boreas/Safe Zephyrus
- Project Overview
- Maiden Contracts



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## OUR BUSINESS

We are the world's leading owner and operator of semi-submersible accommodation vessels.

## OUR BUSINESS

Our vessels have capacity for 306 – 812 people and are used when there is a need for additional accommodation offshore.

## OUR BUSINESS

Our operations are related to the maintenance and modification of fields already in production, hook-up and commissioning of new fields and decommissioning.

## OUR VISION

To be a leading and innovative provider of technology and services in selected niches of the global oil and gas industry.

## OUR AIM

To provide customers with innovative  
and cost-efficient solutions.

## OPERATIONAL EXPERIENCE

We have successfully completed 160 contracts  
worldwide, including 134 in the North Sea  
and 26 in other regions.

# OPERATIONAL EXPERIENCE

Extensive experience operating gangway connected to:

- Fixed Platforms
- FPSOs – moored & weather vaning
- TLPs
- SPARs

# ASIA PACIFIC EXPERIENCE

- Woodside – North Rankin B
- Origin Energy – Yolla B
- Shell – Malampaya (2009 & 2015)
- Swiber Offshore/Conoco Philips - South Belut
- Samsung/SEIC – Sakhalin Island

# OPERATIONAL EXPERIENCE

We have a proven track record for achieving excellent **operational efficiency** using both Dynamically Positioned and Moored Units.



OUR FLEET

## OUR FLEET

We have the **largest** and most **versatile** fleet of semi-submersible accommodation vessels available for operations **worldwide**.

## OUR FLEET

We have **14** vessels available to support our global operations and **1** new build unit under construction.

# OUR FLEET

## DP3

Safe Boreas  
Safe Zephyrus  
Safe Notos  
Safe Eurus  
(under construction)

## DP2

Safe Britannia  
Safe Concordia  
Safe Lancia  
Regalia  
Safe Regency

## Moored

Safe Astoria  
Safe Caledonia (TAMS)  
Safe Bristolia  
Safe Hibernia  
Safe Scandinavia  
Jasminia

## Our DP3 Vessels





## OUR FLEET

DP3

POB CAPACITY

Safe Boreas	450
Safe Zephyrus	450
Safe Eurus	500
Safe Notos	500

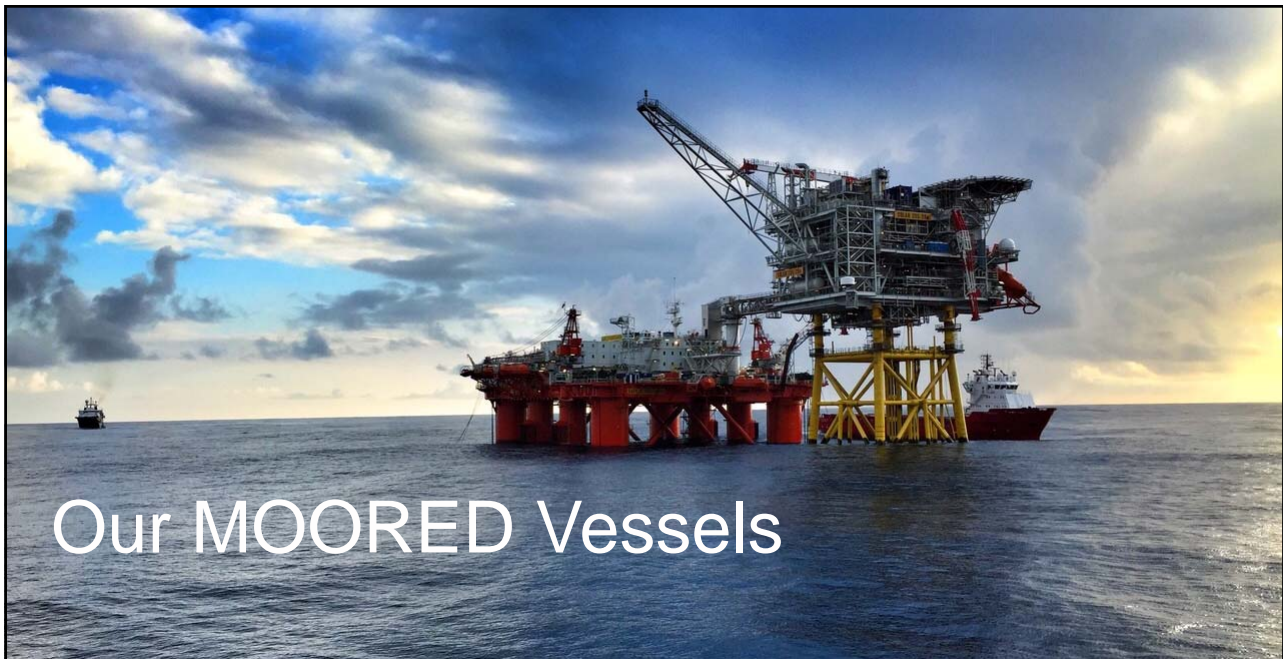
## Our DP2 Vessels



## OUR FLEET



	POB CAPACITY
Safe Britannia	812
Safe Concordia	461
Safe Lancia	605
Safe Regency	780
Regalia	306 (282 NCS)



Our MOORED Vessels

## OUR FLEET



	POB CAPACITY
Safe Astoria	349
Safe Bristolia	587 (316 UKCS)
Safe Hibernia	632
Safe Scandinavia	583 (159 TSV)
Jasminia	535

## OUR STRATEGY

“Prosaf shall be the world leader in offshore accommodation, & this shall be achieved by :-

- Employing & training the right people
- Achieving safety & operational standards that are amongst the best in the offshore industry
- Maintaining or increasing the market share within the high end of the offshore accommodation industry by renewing and increasing the fleet of offshore accommodation vessels”

## NEW BUILD STRATEGY

- Identify market areas where there is a strong demand for offshore accommodation units
- Strengthen our position as the market leader in semi-submersible accommodation vessels
- Design and build harsh environment units that exceed our clients expectations, now and in the future
- Longer term fleet replacement plan

## CLIENT DEMAND DRIVERS

- Higher POB capacity in single and double cabins
- Excellent standard of welfare and recreational facilities
- Advanced DP3, but also with the ability to Moor the vessel
- Advanced IT & Communications requirements
- Larger cranes and increased deck space

# DESIGN CONCEPT

1. Evaluate hull design criteria best suited for worldwide operations in **harsh environments**
2. Identify POB requirements for core markets
3. Analyse **motion & stability** characteristics
4. Evaluate yard options including relevant **experience**
5. Consider cost and delivery schedules

# DESIGN CONCEPT

With over 30 years experience operating semi-submersible flotels, it is essential that

- The hull design has been proven in the harshest environments
- The vessel has sufficient air gap for the area of operation
- The vessel has exceptional motion characteristics that maximise gangway connectivity and personnel comfort
- Excellent station keeping properties

# VESSEL OPTIMISATION

Two main operating criteria for accommodation units:

1. Operating gangway connected to a fixed target with a Moored or Dynamically Positioned vessel
2. Operating gangway connected to a moving target with a Dynamically Positioned vessel

Motion Stability and Station Keeping are considered critical operational parameters for safe and efficient accommodation services

# VESSEL OPTIMISATION

Key ratios for offshore accommodation vessels, gangway connected to an adjacent installation :-

- Thruster power/Displacement in operation (kw/tonne) to measure station keeping alongside a fixed or moving target
- Mooring Strength/Displacement in Operation (tonne/tonne) to measure station keeping alongside a fixed target
- Displacement in Operation/Water plane area (tonne/m<sup>2</sup>) to measure motion and deck stability

# DESIGN CONCEPT

Taking all the design considerations into account, we identified the requirement for a vessel :-

- Suitable for world wide operations, including the Norwegian Continental Shelf, with a design fatigue life of 30 years.
- With a mooring system designed for a water depth of 150m
- With a DP3 positioning system, designed for all year round operations on the Norwegian Continental Shelf.
- With a POB of 500, accommodated in single man cabins.

# YARD SELECTION CRITERIA

## Why Jurong Shipyard?

- Experience building semi-submersibles to NORSOK standards
- Reduced technical risks due to past experience
- Strong combination of proven design & competent yard
- Confidence of delivery in agreed timeframe
- Financially stable

# YARD SELECTION CRITERIA

## Why Jurong Shipyard?

- Good facilities equipped with sophisticated machinery
- Total land area of 68 hectares, four graving docks and 2728m of berthing quays
- Skilled workforce
- General flexibility of the yard to incorporate owner specified equipment for main components
- Adaptability of yard to implement Prosafe's quality standards

# MACHINERY & EQUIPMENT

Best in class main machinery and equipment suppliers:

- Wartsila L32 engines
- Rolls Royce thrusters
- Liebherr cranes
- ABB power generation & distribution
- Kongsberg Integrated Control & Management System
- Marine Aluminium gangway
- Aluminium Offshore helideck, with DIFFS



KONGSBERG





# DESIGN CONCEPT

	Safe Boreas	Concordia	Ocean 500	CIMC 500A	BT 3500A	Floatel Superior	Floatel Endurance	Floatel Victory
DP class	DP3	DP2	DP3	DP3	DP3	DP3	DP3	DP3
Shape – square or rectangular	Square	Rectangle	Square	Square	Square	Square	Square	Rectangle
Number of thrusters	6 x 4000kW Rolls Royce	4 x 2500kW	6 x 3700kW Rolls Royce	6 x 3,800 Wartsila	6 x 2500kW or 6 x 2800kW	6 x 3200kW (Lips)	6 x 3500kW	6 x 3200kW
Thruster power total (KW)	24,000	10,000	22,200	22,800	15,000 or 16,800	19,200	21,000	19,200
Thruster power to weight ratio (KW per tonne)	0.71	0.56	0.67 @ 20m draft  0.71 @ 17.5m draft	0.67	0.59 or 0.66	0.66	0.68	0.72

# OUR INVESTMENT

Our new build vessels are the most **technologically advanced** and **efficient** harsh environment accommodation units on the market.

# SAFE BOREAS & SAFE ZEPHYRUS



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## SPECIFICATION

### CLASS

DNV +A1 Column Stabilised Accommodation Unit (N) HELDK E0 DYNPOS AUTRO  
POSMOOR ATA/V CLEAN DESIGN

### MAX BEDS

450 single person cabins

### TELESCOPIC GANGWAY

38.0 ± 7.5 m

### STATION KEEPING & MOORING

Dynamic positioning system DP3, 6 x 4.0MW azimuth thrusters, 12 point mooring system, 90mm wire, breaking load 6490kN, POSMOOR ATA/V

### LIFESAVING

8 x 70 person free fall lifeboats - designed and built to the latest PSA requirements

### HELIDECK

Maximum 'D' value 22.2m, Maximum take-off weight 13.0t

### CRANES

Port side: 50t at 40m, Starboard side: 50t at 40m

### WELFARE AND RECREATION

Cinema, gymnasium, saunas and internet cafe

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# MAIDEN CONTRACTS

- Safe Boreas – Lundin Norway
- Safe Zephyrus – Det Norske Oljeselskap ASA

## SAFE BOREAS EDVARD GRIEG



# SAFE BOREAS EDVARD GRIEG

- Support Hook up and Commissioning activities
- Contract commenced May 2015
- 450 POB on-board the Safe Boreas at peak of HUC project
- Operated on DP mode for duration of the contract
- Lundin Norway achieved first oil on the 28<sup>th</sup> November 2015
- Project was delivered on time and on budget
- Demobilised from location on the 30<sup>th</sup> November 2015

## PROJECT OVERVIEW



# OPERATIONAL CHALLENGES

- Delivery of the vessel from Jurong shipyard to Norway
- Crew training and vessel familiarisation during mobilisation
- Final testing of vessel systems
- Delivery, installation and testing of containerised services
- AoC approval from PSA to operate at Edvard Grieg
- Mobilisation to field to start maiden contract with Lundin



# ADDITIONAL SERVICES

## Emergency Response Facility

- Create a fully functional standalone ER facility for the Edvard Grieg facility
- Design install and test IT systems
- Lundin personnel operated from the Safe Boreas during the initial HUC phase
- Install additional Firefighting water pumps and associated equipment

# LUNDIN NORWAY

“This has been a very rewarding project for everyone involved and we have appreciated and benefitted from the good cooperation with Safe Boreas”.

Per-Johan Fallrø, OIM Edvard Grieg



# SAFE ZEPHYRUS IVAR AASEN



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## DET NORSKE IVAR AASEN

- Discovered in 2008 in the Northern North Sea, 175 km West of Karmøy, Norway
- Ivar Aasen is Det Norske's first major development project as operator
- Gross reserves are estimated at 204 million boe
- Planned start-up in Q4 2016
- Anticipated economic life of 20 years

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# SAFE ZEPHYRUS IVAR AASEN

- Departed Singapore on the 3<sup>rd</sup> February
- Scheduled stops for re-fueling and crew changes at Mauritius, Walvis Bay (Namibia) and Las Palmas
- Support Hook up and Commissioning activities
- Contract commences 22<sup>nd</sup> July 2016 – 21<sup>st</sup> January 2017
- 4 month option period commencing 22<sup>nd</sup> January 2017
- Vessel will operate DP & Moored during contracted period

## SAFE NOTOS





# SAFE NOTOS

- Constructed at COSCO shipyard to an enhanced Gusto **MSC Ocean 500** design
- Technologically advanced and efficient DP3 semi-submersible accommodation vessel
- Designed for worldwide operations, excluding Norway, in harsh environments

## SPECIFICATION

### CLASS

DNV +A1 Column Stabilised Accommodation Unit, DYNPOS AUTRO E0, HELDK, COMF V(2) C (2), BIS, POSMOOR ATA/V CLEAN

### MAX BEDS

500 persons in single and double cabins

### TELESCOPIC GANGWAY

38.0 ± 7.5 m

### STATION KEEPING & MOORING

Dynamic positioning system DP3, 6 x 3.7 MW azimuth thrusters, 10 point R4 76mm chain mooring system. Breaking load 6001kN, POSMOOR ATA/V

### LIFESAVING

8 x 125 person TEMPSC, 1 x rescue boat and 21 x 25 person inflatable liferafts

### HELIDECK

Maximum 'D' value 22.2m, Maximum take-off weight 12.8t

### CRANES

Port side: 50t at 16m, Starboard side: 300t at 12m

### WELFARE AND RECREATION

Cinema, gymnasium, games room, saunas and internet cafe

# OUTSTANDING FACILITIES

- Interior design concept developed by Peter Silling Associates Ltd, Hotel Interior Design
- Hotel standard common areas & cabins that exceed client expectations and lead industry standards
- Excellent welfare and recreational facilities onboard
- Spacious, modern design that focuses on functionality & workforce welfare



## RECREATION



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THANKS FOR LISTENING!

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