ShuttlePilot

Safety & Efficiency in Offshore operations

ShuttlePilot is a completely customisable berthing aid for the Offshore Oil & Gas industry. It is designed to assist pilots in the process of monitoring the berthing of offload tankers to an FPSO/ FSRU/ FLNG/ SBM.

ShuttlePilot gives accurate and real-time information of relative positioning and complete awareness of the dynamics of both vessels during the approach. ShuttlePilot is suited to perform all kinds of Offshore Oil & Gas operations like tandem mooring, side-by-side mooring, ship to buoy mooring and single point mooring.

In addition to its primary navigation function, ShuttlePilot also offers a host of additional options to augment robustness and safety of operations. Functions like Emergency Shutdown (ESD), Riser monitoring, Pumping, Hawser Tension monitoring and a number of customisable warnings & alarms allow the pilot to have better control of the entire process, remotely from the tanker.

With ShuttlePilot, the efficiency and safety of oil and gas operations, can be significantly boosted. Apart from being accurate and reliable, the ShuttlePilot system is also highly preferred due to its portability and familiarity. With real-time & synchronised information about the dynamics of the FPSO, the tanker and other vessels of the operation, pilots have a reference source of critical information.
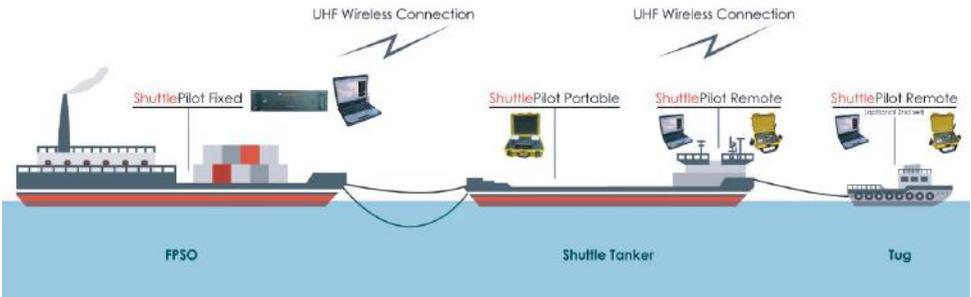
Navicom Dynamics
Innovate | Integrate | Communicate

ShuttlePilot **- Components** (Hardware)

ShuttlePilot Fixed (SPF)	**Shuttle**Pilot Portable (SPP)	**Shuttle**Pilot Remote (SPR)	**Shuttle**Pilot Display (SPD)
Installed permanently on FPSO	*Carried on board the vessel being manoeuvred (often a tanker)*	*Carried on board the vessel being manoeuvred (often a tanker)*	*Laptop + SPR in rugged case*
- Measures Position, Heading and Rate of Turn of the FPSO (FSO/FLNG). - Transmits data over a radio link to the ShuttlePilot Remote (SPR). - Provides the FPSO end of the Remote Emergency Shutdown link. - Also provides data that can be used for the Riser Monitoring function.	- Measures Position, Heading and Rate of Turn of the tanker. - Transmits data over a radio link to the ShuttlePilot Remote (SPR).	- Is a radio modem receiver. - Receives data from SPP & SPF and relays the data to the laptop. - Allows Emergency shut down of pumping operations. - Allows control of the start & stop of Pumping operations.	- Has Navigation Software (ECS) installed on it. - Displays all data from the FPSO (SPF) and tanker (SPP) with options to display AIS data. - Toggle other modes & set up alarms with ECS - Riser Monitoring, Jack - knife warnings. *More SPD's can be provided for OSV's in the operation.*
Data Generation and Transmission		**Data Reception**	**Data Display**

# **Shuttle**Pilot **- Concept of Operation**

ShuttlePilot **- Components** (Software)

Using the information from the sensors, their orientation and the dimensions of the vessel, the **software is able to generate and display**:
- Absolute position, Heading and Rate of Turn of the FPSO and of the Tanker
- Relative data (distance, speed bearing) between the Tanker bow and FPSO stern (and/or SPM centre)
- COG & SOG for FPSO and Tanker (including approach vectors)
- Graphical prediction at user-selectable intervals of future position of the tanker during approach & berthing
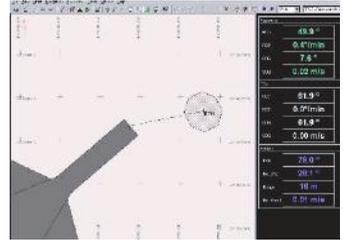- AIS targets within range (need AIS plug)

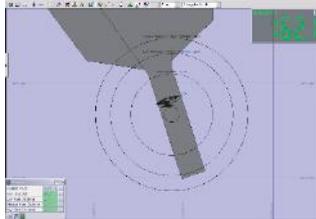# **Shuttle**Pilot - Assisting Primary Operations
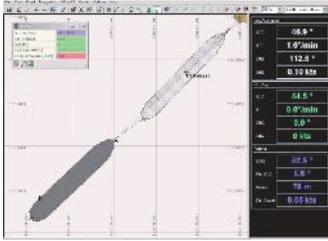
Tandem Mooring
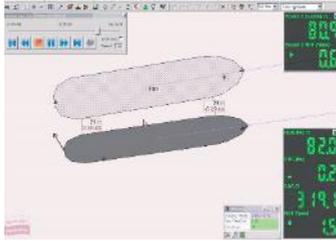
Side-by-side Mooring

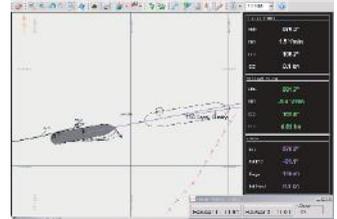**Ship to Buoy Mooring**

ShuttlePilot - Additional Options

Riser monitoring for integrity of mooring
– add-on to main system or stand alone

ESD - for initiating an emergency
shut down of pumping
Pumping - to stop flow or send
signal to start flow

Hawser tension display for safety of
operations - *add-on to main system
or stand alone*

We also provide other engineered solutions as per your unique needs, to support various offshore operations.

ShuttlePilot Features

Improves Safety
- Provides reliable & accurate data to support critical decision
  making.
- Early warnings can be set for excessive closing speeds
  and/or yawning of FPSO during approach.
- Optional display on tug can be used to monitor rig alignment.
- Exceptional in poor visibility conditions.

Efficient & Reliable
- Completely independent of either vessels' systems.
- Same high quality data on-board every vessel.
- Provides total situational awareness of the relative position of
  both (or more) vessels.
- Early indications of developing trends during approach,
  improves odds of success on first attempt.

Improves Operational Performance
- Improved situational awareness when combined with `
  available tools.
- Recordings are invaluable for pilot training & risk management.
- Can incorporate additional data (from shore based systems)
  in the software and make available alongside other data from
  the sensors.
- Hot swappable batteries ensure continued performance for
  longer offtake operations.

Ease-of-use
- Easy to set-up.
- Built and packaged for portability and tough conditions.
- Fully customisable as per unique requirements of the
  customer & their operations.

ShuttlePilot - Performance Specifications

Position	0.25m (SBAS/DGPS)
	0.08m (Atlas)
	0.01m (RTK)
Rate Of Turn (ROT)	± 0.5°/min
Heading	± 0.02°
Velocity (SOG)	± 0.04m/sec (0.1kn)
Pitch/roll	<1°
Heave	5cm
Data Output	GPGGA, GPHDT, GPROT, AIVDM,
	GPVTG & battery status

** Detailed specs are available for each component of the system. Please request datasheets for ShuttlePilot Fixed,
Portable, Remote and Display.*

Entirely customisable Portable Pilot systems, fully packaged & ready-to-use

- Sensors
- Display (we offer a range of ruggedized laptops & tablets)
- Software (fully installed & configured)
- ENC's (fully installed)

There are over 20 operations using ShuttlePilot today. Some of them are:

- **FSO Liberdade, Conoco Philips, Australia**
- **FPSO Pyrenees, BHP Billiton, Australia**
- **FPSO OKHA, Woodside Energy, Australia**
- **Mundra SPM, HMPL, India**
- **Mangalore SPM, MRPL, India**
- **FPSO Peregrino, Statoil, Brazil**
- **FPSO John Agyekum Kufuor, Konsberg Eni & Yinson, Ghana**
- **FPSO Sanha LPG, Chevron, Angola**

To refer case studies of our products, please visit our website on:
www.navicomdynamics.com/case-studies

▶ 2 year product warranties and all-encompassing (optional) support contracts (3 years or 5 years)

▶ Customised on-site training (individual or groups) with certification

▶ World leading quality, sophistication and an excellent customer experience

Other Navicom Dynamics Portable Pilot Units:

HarbourPilot	Exceptional accuracy and fully independent of ship systems. Supports all piloting operations - anywhere.
ChannelPilot	Small, lightweight and cost effective. Ideal for navigating narrow channels and some restricted manoeuvres.
GyroPilot	Adds smoothed heading and ROT to pilot plug data with GPS fall-back.

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