





Equinor med verdens første drone-frakt til oljeplattform

- Dette er en stor merkedag for oss, sier leder for felles driftsstøtte i Equinor, Cecilie



0:00 / 2:04



RPAS as a service from an onshore control center

Scaling and Continous improvement of RPAS



THE PERSON NAMED IN

DB SCHENKER



Main objectives continuous improvement

- Customer driven implementation of RPAS
- Increased payload capacity (2000 kg+)
- Able to fly in all weather conditions including fog, lightning, dark and icing
- Reduced mobilization time (1-30 min.)
- Perform complex operations
- Increased reliability
- High degree of autonomous operations





Example future application areas



New Energy Solutions



Weather situations



Search & Rescue



Shared Services



Dangerous goods



E-ROV / Eelume / Subsea



Digital inventory (3D print)



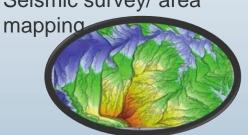
(Remote) Inspections



Oil spill



Seismic survey/ area

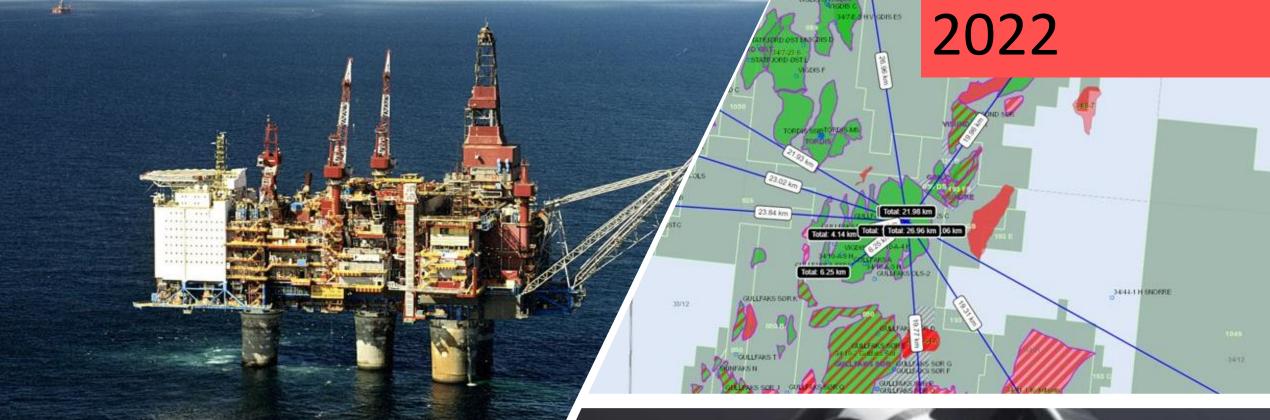


Data link



Urgent deliveries





Main objectives RPAS offshore

- Safe integration with offshore helicopter traffic
- Single crew RPAS operations
- GFC as hub for RPAS operations
 - GFC to installations (Tampen area)
 - GFC to ER vessel
- Verify and improve local work procedures (AT/SJA/(++)
- Infrastructure (landing systems, antennas, UTM)
- Governmental approval
- Scalable operations



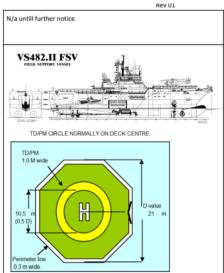


Installation overview(s):



Gullfaks Alpha (ENGA):

Delivery point Helideck Crew (Equinor) and NU representative available to receive cargo Mesh antenna installed on top of the Heli Radio-Room



CAUTION: Ensure to maintain RLOS: tell vessel to maintain the rear of the vessel pointing to the GCS

Generic Standby Vessel

Gulltaks A, B & C

Generic Vessel with Helideck on Bow CAUTION: Ensure to maintain RLOS: tell vessel to maintain the bow of the vessel pointing to the GCS

NORDIC

Offshore I Equinor Informa Gullfa

Gullfaks Alpha Approach Plate



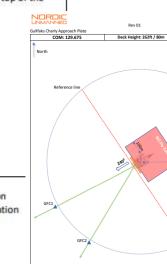
Rev 01

Waypoint	Bearing / Distance ENGA Helideck	Position
GFA1 (Entry/Exit point 500m zone)	000° / 600m	
GFA2 (Approach/Departure point)	332° / 150m	
GFAR (Rally Point-loss of link)	332° / 500m	
CONTINGENCY: In case of Loss of Link, oth	her reason to discontinue the approach:	proceed to GFAR and hol

EMERGENCY: In case of Gas alarm: proceed upwind 700M, avoiding the NO Fly Zone, Climb to Max 400ft &

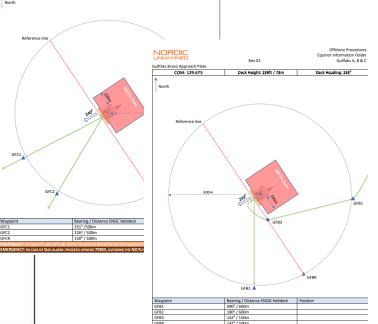
Gullfaks Bravo (ENQG):

Delivery point Helideck Crew (Equinor) and NU representative available to receive cargo Mesh antenna installed on top of the Heli Radio-Room





Gullfaks Charly (ENGC): Main hub for UAV operation GCS established at this location



quinor Information Folder Gullfaks A, B & C

B.2.3 - Equinor Offshore



1.5 COMMUNICATION FREQUENCIES

#	Name:	Description:	Frequency:
1	ATIS	Local Weather and NOTAM Information	123.700 MHz
2	Tampen Information	Tampen ATS Radio Frequency	129.675 MHz
3	LOG	Interfield logistics frequency	130.600 Mhz
4	Guard	Emergency Frequency	121.500 MHz
5	VOLMET	Area Weather Information	118.975 Mhz

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Collect Weather forecast for next flying Clean expected hericopter schedule an Make plan based on forward weather a Work Permits (NO's) based on plan (Inc. inform HPS, HSO at effected installatio Update SharePoint with Cally report to Create new relation in Centriti

Check that NOTAM and all approvals as Collect Weather Information and uploa Check actual helicopter schedule and o Confirm plan based on weather conditi Define Emergency Plant Can Alarm poli-wind, 700m Rarm Installation) Define Contingency Plant Loss of Link & Offersion Alternate

Secure Fre-Plight/Morning Briefing, in Pormathe Right schedule for the day as Prepare report(s) to be able to collect (Update Shi Assessment (align if requir Update Centrils with correct crew, roles

Call HSD's at all effected installations (Inform Melitica crow of activity (Page) Actions Work Permit(s) (ACN) Power up the antenna system Load Cargo (evelable payload, Impact) Impact Halldack and block assess to be

Cleak other activity in the surrounding Helbleck crew brieflys 30 minutes prior \$5 of

Notify Crane Operator of Intended Rigit blove URV and/or Zarges box with sha Fre Fight Imped UAV and hotel hate

NORDIC

Ambutes prior to \$7 of Althora Crane starm Flug in betterles and power up UAY Upload flight plan to UKV Check of proteins consultant and that the field of Clean record treffic in whichly of hebback

Request Airspace availability Ove Aircpace availability Secured Deals evaluability (Departure) Ove Deck Analysidity

Communicate Airquise and Helblack Availability Lift Into Hover, Check of green Secure estad US OF time and ETA at the death

Helideck Foot Departure Inspection

When passed the Approach/Departure points Clin Clean believy level

Person ETA and request deck availability (Arrive) Cleak result to fit in risks by of helidals Ove Deck Analysidity remarkate Heldesk Availability becute Fre-Whiching encitor tanding Checks

Briter SCOm some via Entry/Bult point; Descend, m.

Artist Whiting	
Makradin Clear Deck, monitor the whiching a	dVi
Arrive in hover at 15-20m over Planck QR Co	de
Makrado hover over Flanck QI Code	
Communicate arrival and time to HPS and O	œ
Secule Wisch Manageme	

Assess endurance remaining

Offshore Procedures NORDIC All Crew Checkflot Gulffalor A, B & C and if fattery change required, or depart incase of departure. Communicate hebitech has been received X X Advantage strange is still evaluate Collect Winch Stocks After Deck Vacanted message X

Arrival tarafing	HFIS	COM	RPIC	HLO	OCC	
Maintain Clear Deck, monitor the landing activity and Standby to receive Cargo				X		
Avive in Honer at 20m over Flanck QR Code			X			
Makriain 20m hover over Flanck QR socie			X			
Secule automatik Flanck Landing			X			
Communicate landing and Sine to HPS and OCC		×				
Auseu endurance remaining		×	X			
Power down UAV			X			
Communicate UNV is selfe to approach (NOTE: Strobe lights remain ON when UAV has powered down).		×				
Check betterles for agric of bulging. If so: Treat as Bettery Hot (see confingency procedure below)				X		
Disconnect Cargo Size and retrieve cargo (Incide)				X		
Frequired, replace betterles				X		
Reinstall Corgo Box				X		
Cear the Heldeck				X		
				~	-	

Commence on a read or representation of the commence of the co					
Montering during fight anti-blue	HEIS	COM	RPIC	HLO	OCC
Capture data for Delly Report		×			
Mankading of ACD & Surgets in the area (ForeFlight)		×			
Politiga	HEIS	COM	RPIC	HLO	OCC
Shot down antenna system		×			
Close Work Permit (c) (ACN)				X	
Fost flight UKV Impaction			×	00	

Marin and	100	-			-
Shut down antenne system		×			
Close Work Permit(s) (ACN)				X	
Post flight UNV Impection			X	(20)	
Log flights in Centrils (if feedwike) / connection boxes use daily report form and notify OCC)			X		
Post Arrhal Helidesk Inspection				X	
Remove Planck QR Code				X	
Remove bettertes from UAX, place in Zarges box and charge bettertes			X	X	
Pinelite Delly Report and send to Project Manager and DCC		×			
Quality Cleck Report, PDF, distribute to customer					X
Propere for next day (see 1º flam on sheddlet)	X	×	X	X	X

X

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roceed with Hormal Procedures, Arrival Landing procedure When at 20m hover clear the landing zone via camera ecute normal (automated) landing in accordance the 80-Cas

Proceed to appropriate finity/full point for appropriate piction Request to prepare appropriate helideds Notify 1975 of change in destination Install Planck CR-Code In case of sufficient time.

Communicate Helideck analysis for landing Proceed past Entry/folt point and descend to 100m Proceed with Normal Procedures, Arrheit Landing procedure

Proceed with Hormal Procedures, Arrival Landing procedure As soon as the UNV has landed: power down UNV

When LIAT has been switched off, communicate fails to approx Briter Helideck, approach UNV, field up UNV and move to a safe Remove Planck QR-Code from Helbleck

Take one control in MANUAL PURKET Mode

Proceed with Abnormal Procedures Contingency, 875/957 Attempt to regals OFS signal

Warn HLO of possible Ballery Not condition

WANTERS Was heat protective gloves, glasses/face chiefd, pr

Check If believy is building. If so take a temperature measureme Fluitery temperature is below 60°C. Remove bettery that is but Fithe furthery temperature is above 60°C. Deep a self-distance, standily in case a fire develops (in case of fire, see procedure to f, after 10-minutes a fire has not developed and the temperatu

Eafer 10 minutes the temperature is all above 60°C, and 80°C. the LAT with the betteries still connected, to a safe location. Cl soot bettery before moving the USV.

NORDIC

Attempt to re-establish this

Rev01

Offshore Procedures

All Crew Checklist Guilfalis A, B & C							
MOC	RRC	HLO	000	4			
x	X						
x				П			

	UNY will have		×				L
	Warn vessels to remain clear of position of failly Point (DOS)	X					
	In case this has been recovered. Proceed with Abnormal Procedures: Contingency, 615/ALT		×	X	X		Г
	In case this is not able to recover; Inform HPS of position the UNY will disply, Initiate SEP		×				Г
	Clean area around fully Point is clear of vessels (Marine treffic or radar)	X					Г
	File appropriate report		×	X		X	
í							_

manufacture and the state of the party of the state of th				
Maintain Clear Deck, monitor the whiching activity and Standby to receive Cargo			X	Г
Communicate that which sargo box has not released / Which cable is stock on dark			X	
Alternot to release hook / sable	×	X		
In case hook / cable still does not release. If possible, in a hover move to downwind side of helideck, alternion paymed.	×	x		Г
Move to upwind side of heitilest and land without use of QR-Code, power down after landing Castion: Se mindful of lose which wire		x		
Communicate UNV is Safe to Approach, UNV is CMF	×			
Settlere which range box and which cable			X	Г
Replace before			X	Г
Communicate UNV is needy to power ON			X	Г

Is assert Energying, ADE or unemember set fit for work	HFS	COM	RRC	HLO	000	7
In case of ESP. Contact customer representative and proceed as per customer ESP		×				
Nulliy OCC (HET 81 78 34 24)		×	X			
Cell the department lead of effected drone type					X	
Assentite the appropriate Support Issum (937, ACG, etc.)					X	

Offshore Procedure All Crew Check Bit Guilfalox A, B & C

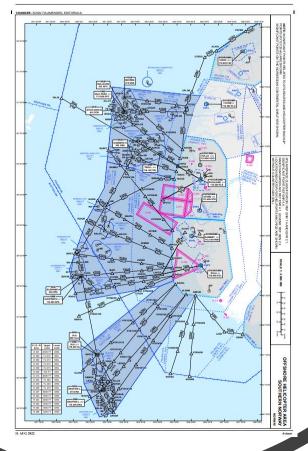
ABITOTION, THOUSAND STREET, TO			Participant of the Participant o				
Bio Alice	HFE	COM	RRC	HLO	OCC		
Mentily If Cas Alarm is on destination or at departure		×					
Fall destination. KTS and clear helibect for possible future SAX helicopter (see confingency procedure(s)		x	x	x			
Fel departure: Continue to destination and dear halidesk for possible future SMI halikopter (see contingency procedure) ()		×	x	x	П		
WARNESS Stay Indde Helf-booth until Instructed to proceed to muster point.							
in case of Lines of Lines. USAY will proceed to the Alarm point (700m perpendicular to the Installation) and hold. Atlanget to remarkable this with OCS antenna Install Methodolic		x	x				
Communicate Interdiors to HPIS		×					
Inform DCC and file a report		X	×				

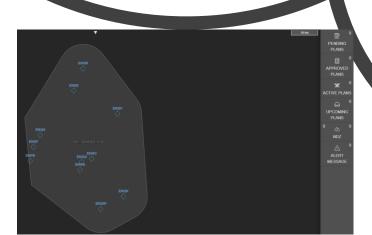
Uttron file	HFE	COM	RRC	HLO	000	F
Communicate UKV on fire				X		
E UNIV en hebbed						Г
Power down UAV			X			Г
Communicate Safe to approach UAV, UAV power off		×				Г
Approach UNV and extinguish fire				X		
Inform MTS		×				
# UNIV is alchorae						
Do not land, proceed to exit 900m zone in most direct way, if possible down wind			X			
Inform MPS		×				
Designed to tim			X			
Dishuki			X			
before OCC and the a report		×	×			г

Disting	HFE	COM	RRC	HLO	000	4
Proceed to Ollubing Point (700m downwind of Installation)			X			
Inform MPS		×				
Broure area betwe UAV is clear			X			
Descend to tim			X			
Brian hover			X			
Clargins			X			
Shut diven UKY			X			
before OCC and the a report		×	X			



INR 6 - 22 AIP NORGE / NORW















OFFSHORE NORGE

