

VHF Data Exchange System

The next generation maritime digital communications

13th February 2017 | The Lord Charles Hotel - Somerset West - Cape Town - South Africa

THE CHALLENGE OF VDES IN SPACE

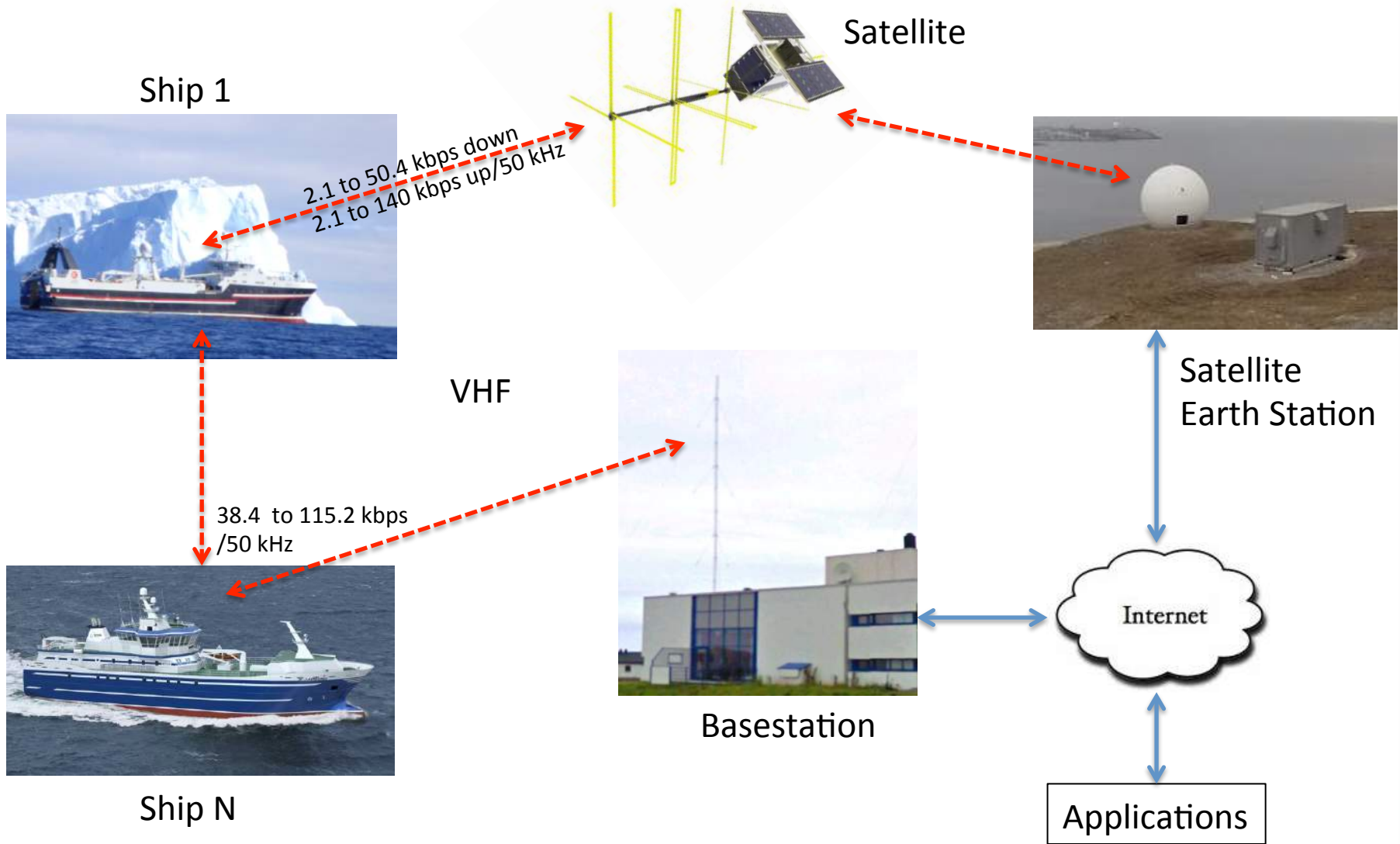
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SPACE
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VHF Data Exchange System Elements



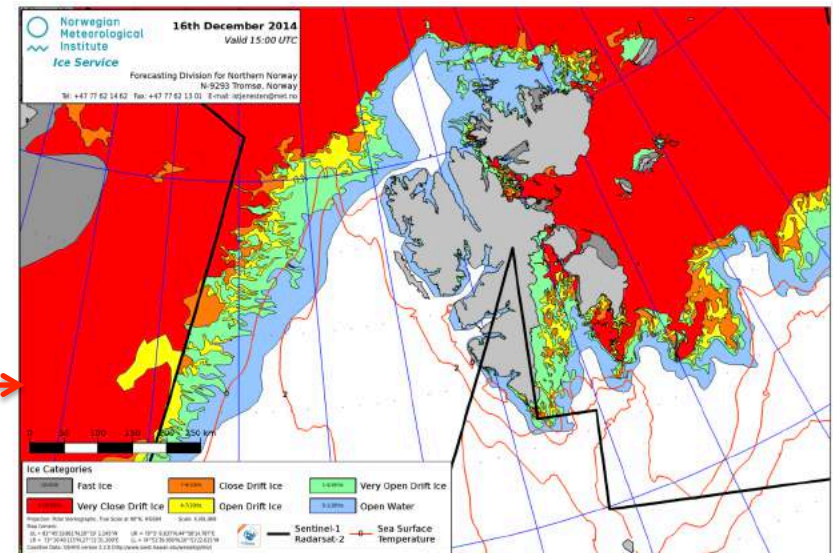
Why a VHF Data Exchange System?

- Complements AIS and offloads data traffic from AIS channels
- Significant increase in data capacity (10x)
- Integrated satellite component for part time global coverage including polar regions
- Combined AIS/VDES affordable ship equipment
- Important carrier of IMO digital eNAV services

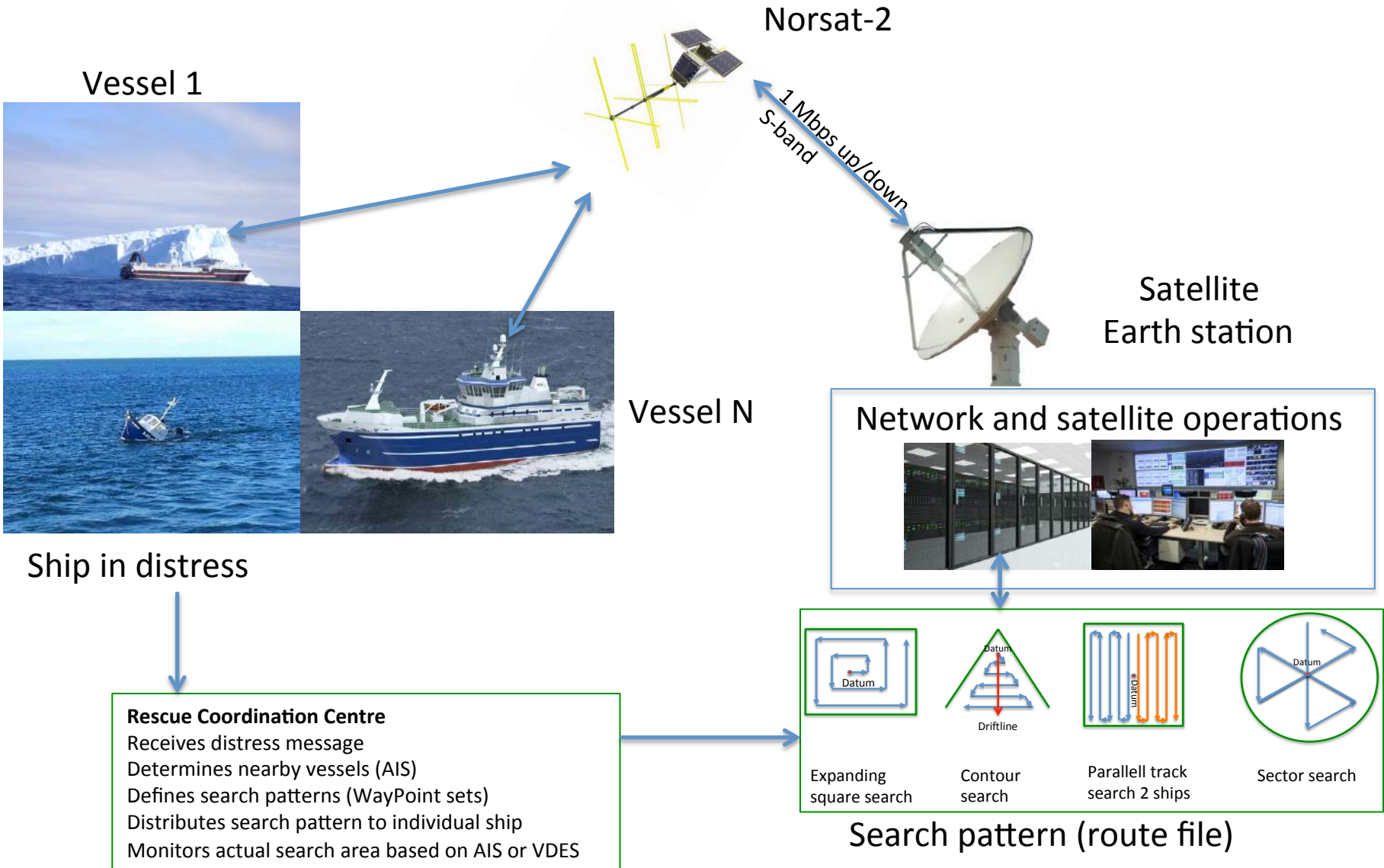
IMO eNav service portefolio (MSP)

- VTS Information Service (IS)
- Navigational Assistance Service (NAS)
- Traffic Organisation Service (TOS)
- Local Port Service (LPS)
- Maritime Safety Information Service (MSI)
- Pilotage Service
- Tugs Service
- **Vessel Shore Reporting**
- Telemedicine Assistance Service (TMAS)

- Maritime Assistance Service (MAS)
- Nautical Chart Service
- Nautical Publications Service
- **Ice Navigation Service**
- Meteorological information Service
- Real time Hydrographic and Environmental info Service
- **Search and Rescue Service (SAR)**

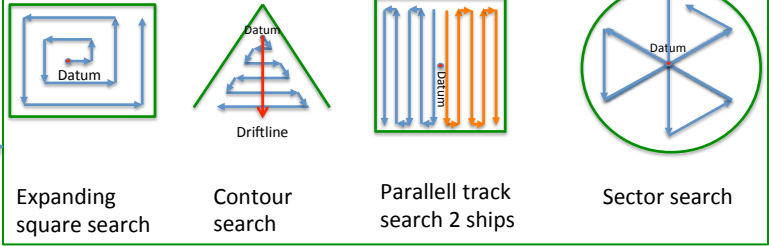


Example: Satellite based SAR coordination concept



Rescue Coordination Centre

- Receives distress message
- Determines nearby vessels (AIS)
- Defines search patterns (WayPoint sets)
- Distributes search pattern to individual ship
- Monitors actual search area based on AIS or VDES





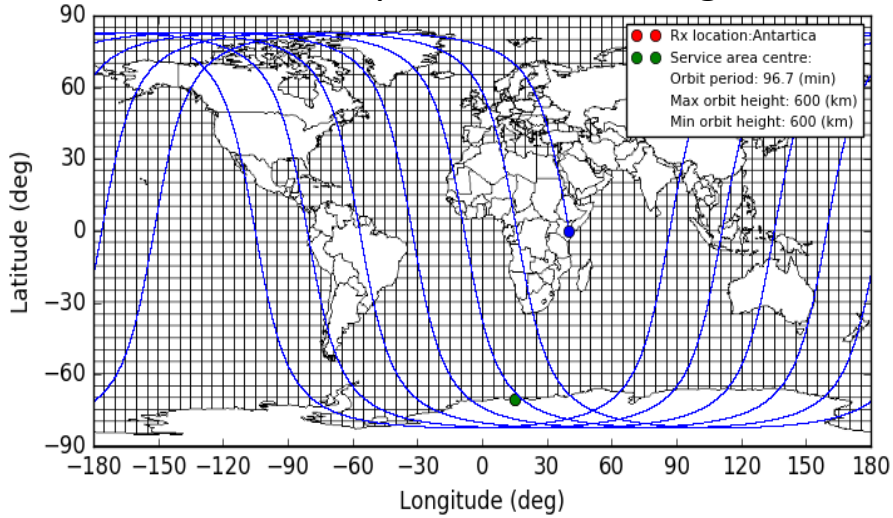
Norwegian Satellite VDES activities

- Space Norway is working closely with stakeholders
 - Norwegian Coastal Administration
 - General Lighthouse Authority (UK)
 - Norwegian Maritime Authority
 - Norwegian Coast Guard
 - Kongsberg Seatex ship equipment, infrastructure and satellite payload manufacturer
 - Defence Research Establishment
 - Norwegian Space Centre
 - Statsat
 - UTIAS SFL
 - European Space Agency
 - ITU
 - IALA
- The Norsat-2 satellite scheduled for launch Q2 2017 has a VDES payload that will be used for test and demonstrations

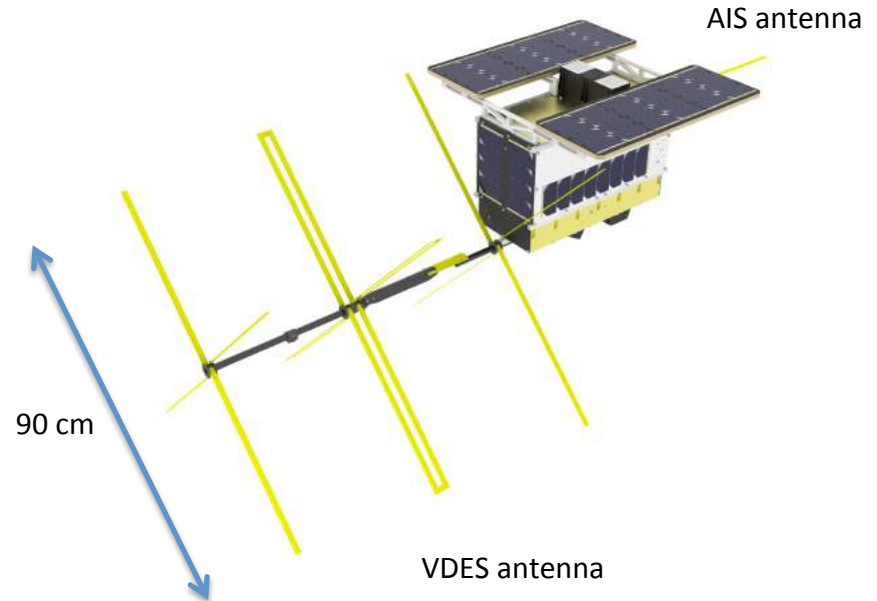
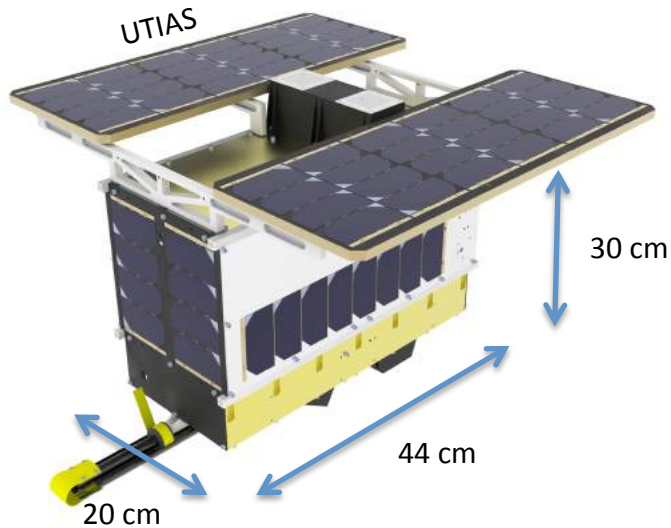
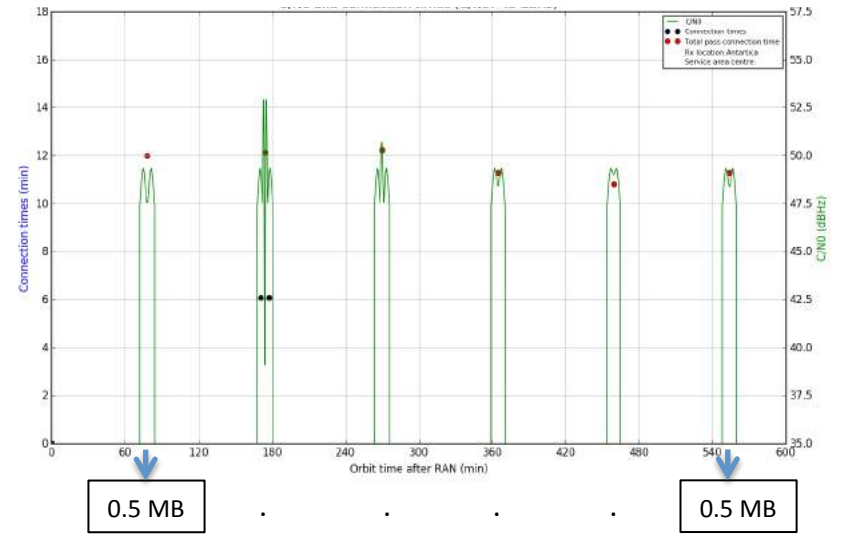


Norsat-2 LEO satellite

Global part time coverage

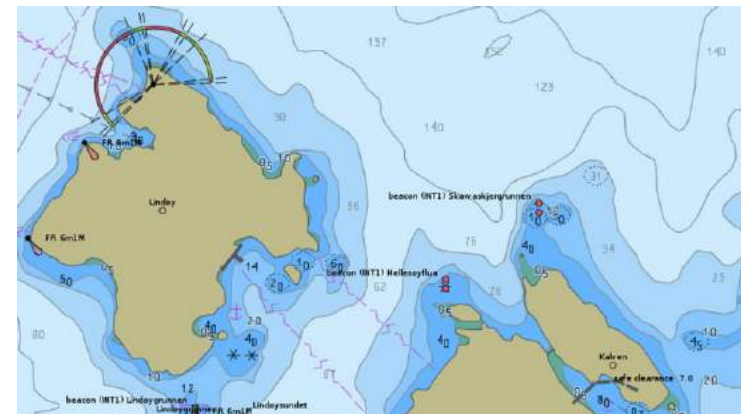
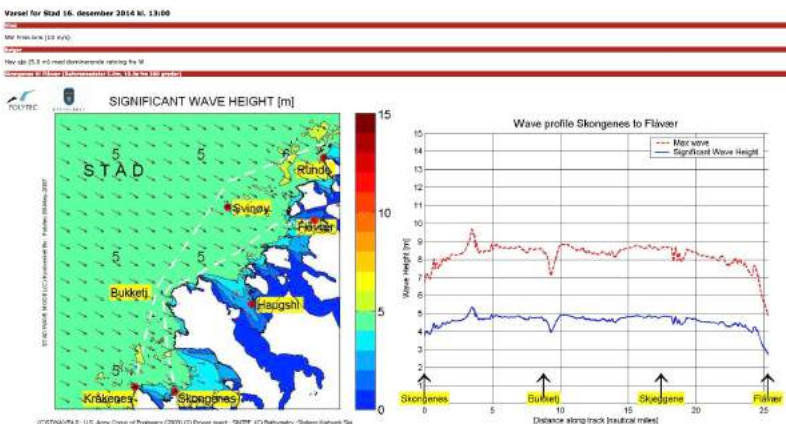


Link available 11 min every 97 minutes @70°S



Conclusions - 1

- The VHF Data Exchange data communications System can be an important contributor to improving efficiency, safety and a clean environment at sea
- Small satellites can provide part time global coverage sufficient for many of the MSPs defined in the IMO eNAV strategy
- Coastal administrations active support is needed to ensure ITU WRC-19 frequencies for satellite component
- M2M innovation opportunities
- Get in touch if you would like contribute to VDES or need more info: hans.christian.haugli@spacenorway.no



Mission: AIS reception and two way VHF Data Exchange System testing

Primary coverage area:	Norwegian Arctic regions
Launch:	Soyuz 2.1 Q2 2017
Bus manufacturer:	UTIAS SFL
Antenna manufacturer:	UTIAS SFL
AIS payload manufacturer:	Kongsberg Seatex
VDES payload manufacturer:	Kongsberg Seatex
Satellite owner:	Norwegian Space Centre
AIS payload user:	Norwegian Coastal Authority
VDES payload owner:	Space Norway

Key technical parameters:

Polar orbit:	600 km SSO
Attitude control:	3 axis stabilized
Solar power generation:	56 W peak
Mass:	16.7 kg
Satellite body size:	200 x 300 x 440 mm
AIS payload weight:	1.3 kg
VDES payload weight :	1.5 kg
Antenna weight:	0.3 kg
VDES transmit duty cycle:	10% of orbit, adjustable
VDES receive band:	157.1875-157.3375 MHz
VDES transmit RF power:	1 W linear (28 dB C/I ₃)
VDES transmit duty cycle:	10% of orbit, adjustable
VDES transmit band:	161.7875-161.9375 MHz
Feeder link:	S-band, 1 Mbps in both directions
Payload technology:	Software Defined Radio (initial software is Arbitrary Waveform Generator)
Yagi antenna size:	800 x 975 mm
Peak antenna gain:	8.0 dBi

