

# Telenor Maritime

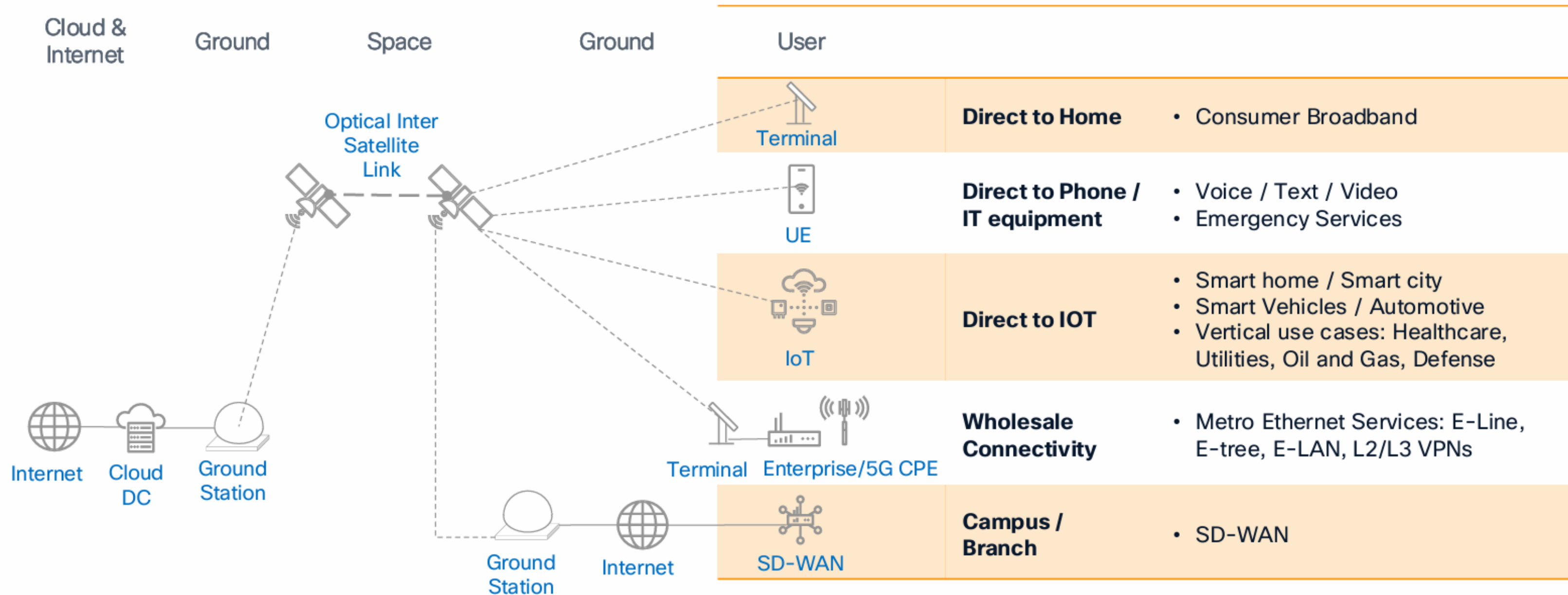
## Hybrid Connectivity enabling Autonomous Surface Ships (MAAS)

Knut Fjellheim  
CTIO  
Telenor Maritime



# Access technology across multiple existing market

and gaining adoption in next couple of years (2025-2027)





## Connectivity



## On-board access networks



## Operational digitalization

**500+**  
installations

**40+**  
million users  
telenor

**700+**  
million NOK  
revenues

**100+**  
employees

**5**  
market segments

**No. 1**  
European ferry  
market

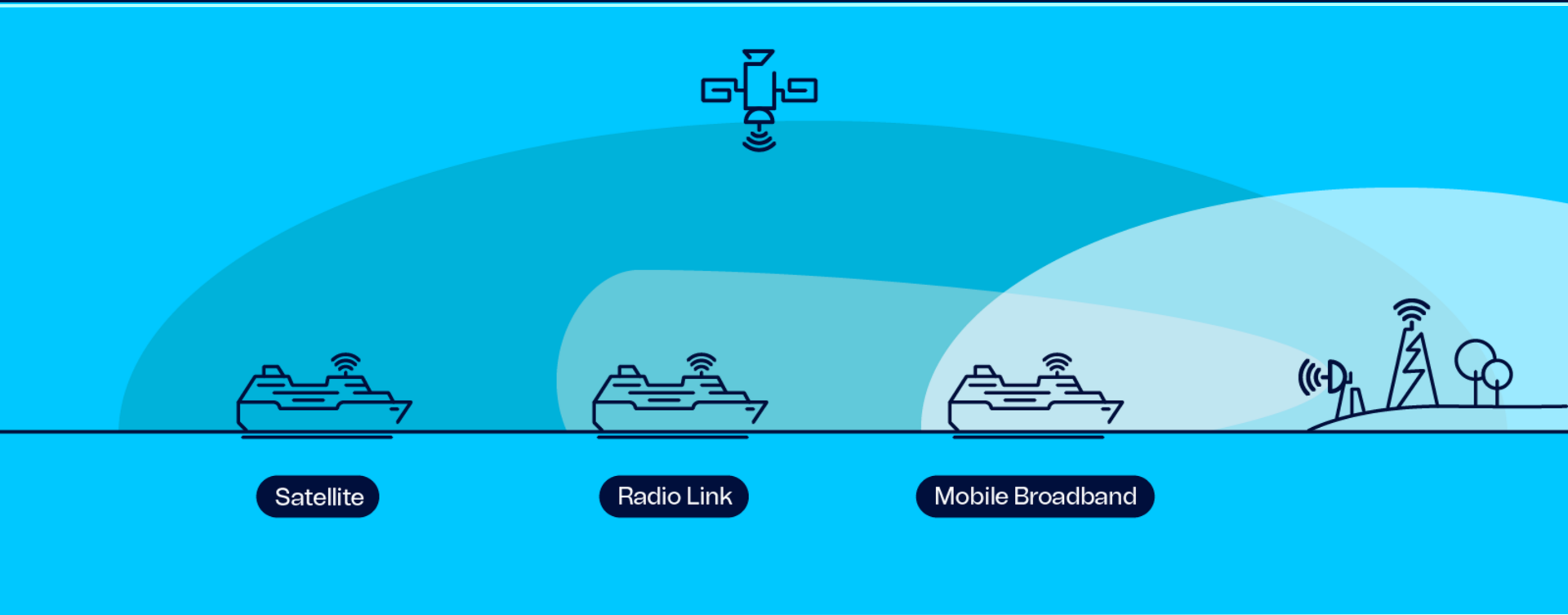


# Power of Collaborative Innovations - Research and Innovation Communities

Strategic focus	Partners and Cooperations	Deliverables
Technology & Innovation 	Leading Satellite Operators Oil & Gas, Wind, Aquafarms Shipowners and OEMs	Next Generation Satellites - LEO Standardized 5G for maritime network Digitalization and Integrated Solutions
Research & Academia 	European Space Agency (ESA) Norwegian Research Council Academia and EU programs	Standardized 5G for maritime network, 5G EMERGE Tamper Proofing, Smart Contract, Vidameco 5G-over-Satellite based communication, MIMO
Compliance & Regulators 	Class Societies and Regulators European Council for Communication (EU/ECC ) Norwegian Communications Authority (NKOM)	Next generation Cyber Security Solution Regulation of Maritime Mobile 4G/5G for Operators Privat 5G network licenses and solutions

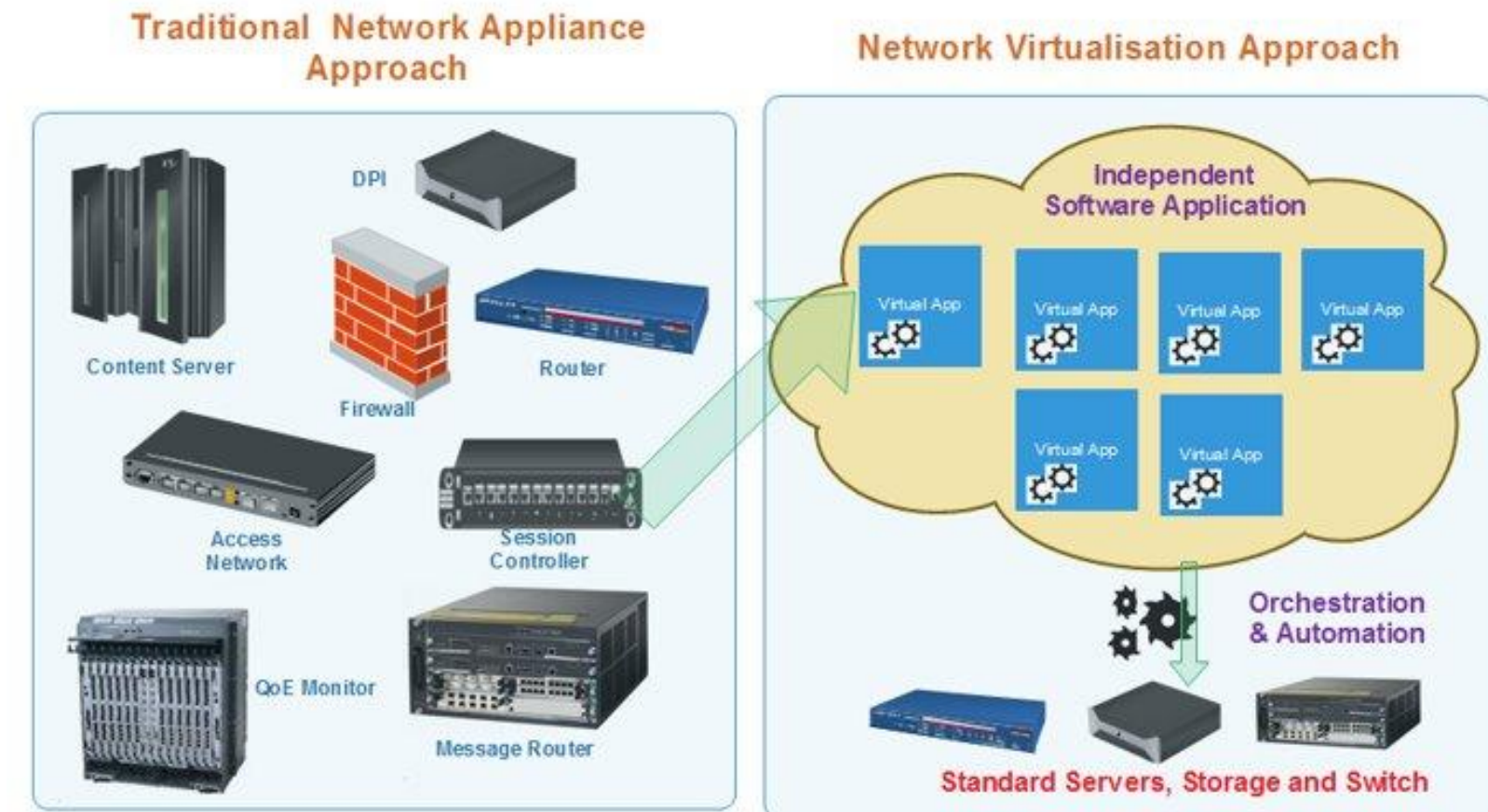


# Hybrid Connectivity Platform - combining connectivity sources

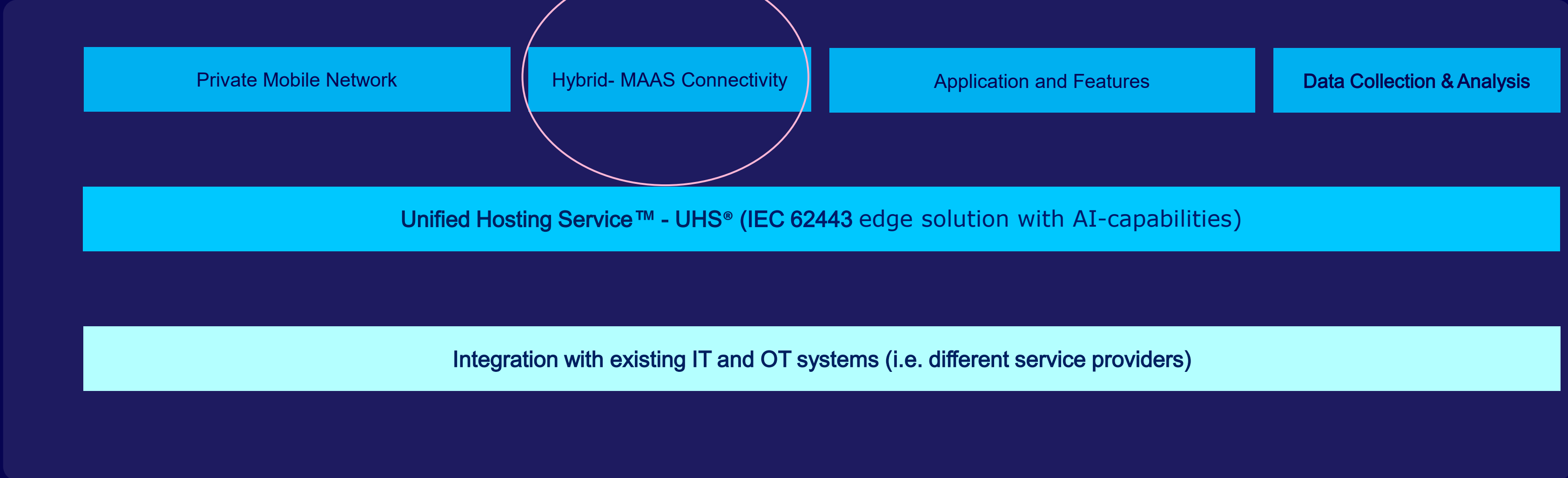


# Network Functions Virtualization (NFV)

- Virtualizes network services on COTS hardware using proprietary or open-source software
- Same hardware (servers) can run multiple network functions
- Moves the network functions from proprietary hardware and software components to scalable, configurable and COTS solutions

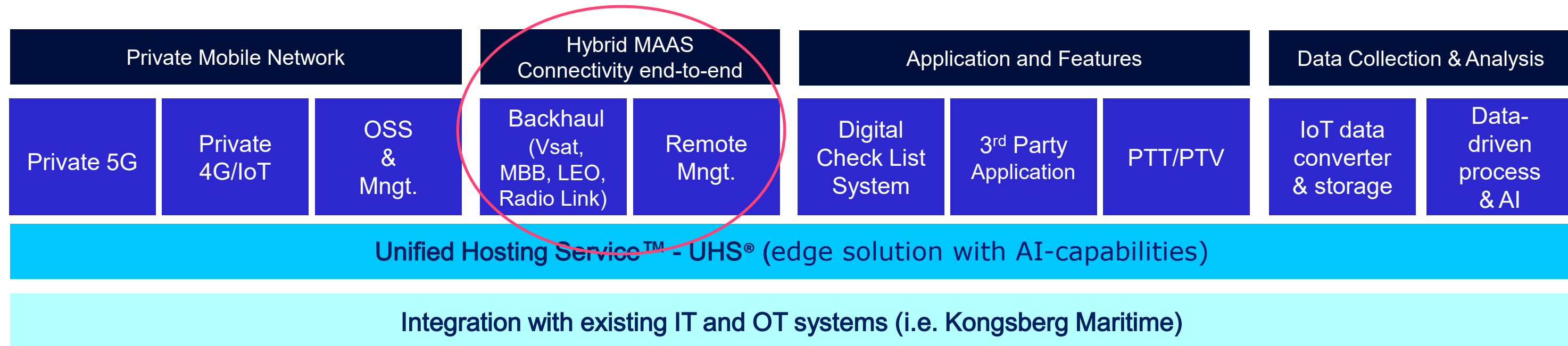


# One common service delivery platform



A modular digital service platform - supporting automation EDGE and big data analytics

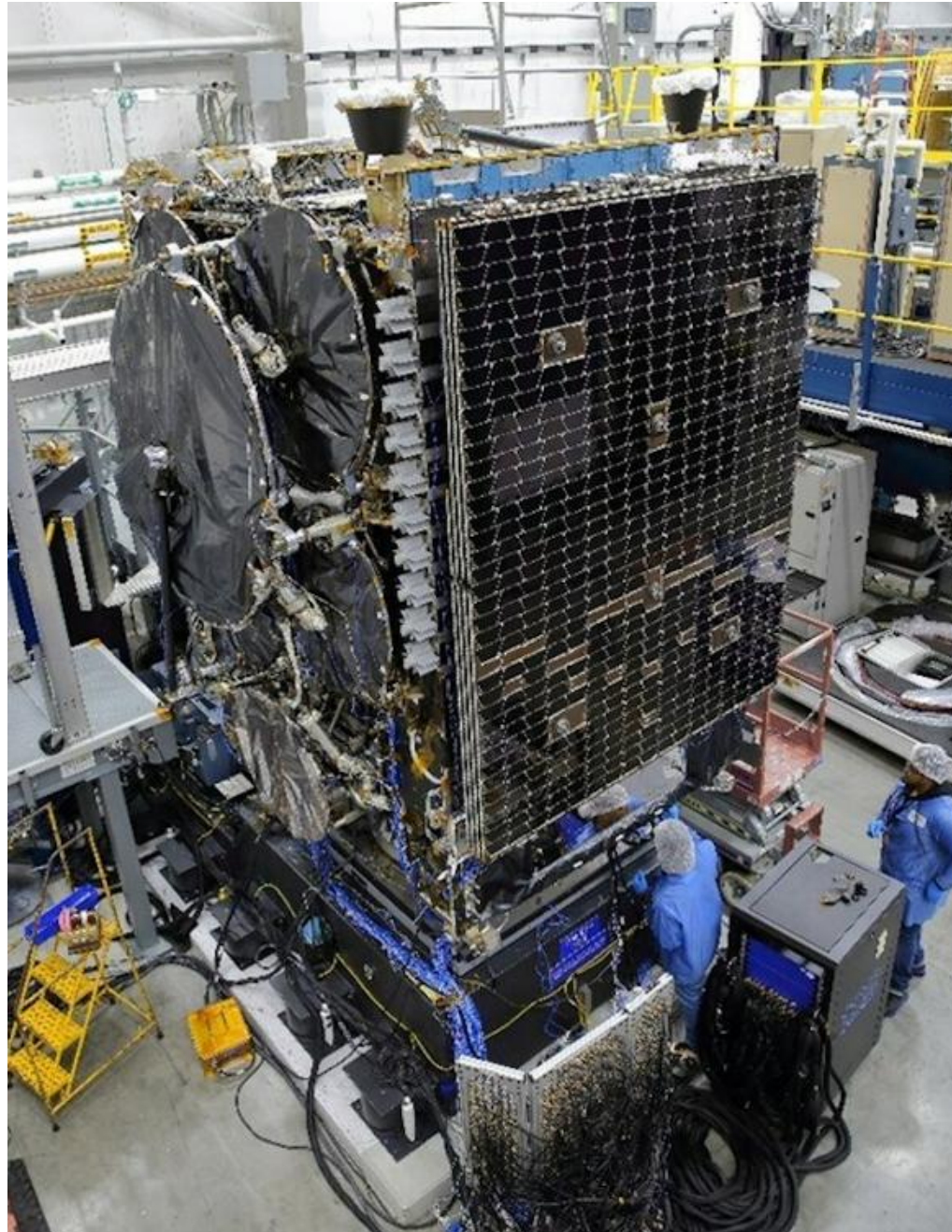




One common service delivery platform includes the connectivity service (on-premise and local data center cloud )

A modular digital service platform - integration to onboard network solutions and applications

# Introduction of LEO – TM tested LEO in 2020



Low Earth Orbit (LEO) satellites

What is **new** with LEO compared to existing technology?

High bandwidth? No

Low latency? No

Global coverage? No

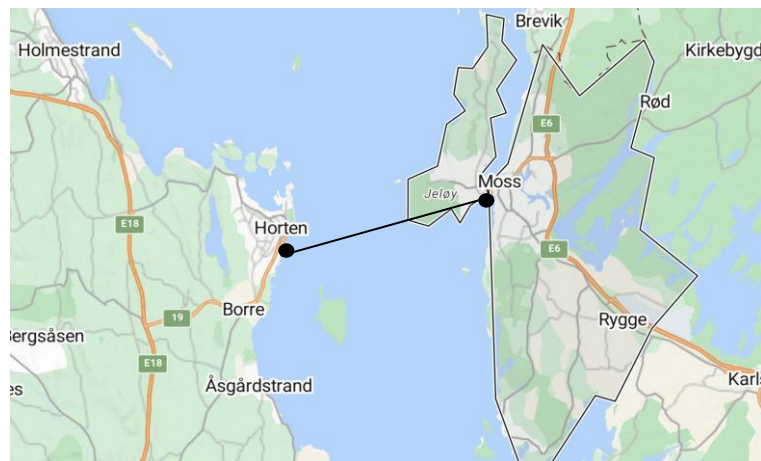
Cheap? Yes





### End customer solution

ASKO is one of Norway's largest transport companies, with more than 600 trucks on the roads, every day. Since 2022 ASKO has been operating trials with two battery-powered barges – also referred to as sea drones - to establish a more sustainable, cost-effective way of transporting cargo to distributors around the country. Each barge transports up to 16 trailers per journey and travels directly across the Oslo Fjord between Horten and Moss. Together, these vessels are reducing road haulage distances by a rate of two million kms per annum and cutting carbon emissions by 5,000 tonnes. Reliable, secure connectivity installed by Kongsberg and supplied by Telenor Maritime in partnership with Eutelsat OneWeb is required for barge operators Massterley to monitor and run safe services from a Remote Operations Centre inside Kongsberg Maritime's facility at Horten.



*LEO trials demonstrate new ways of reducing carbon emissions, with the introduction of enhanced automation, reduced infrastructure, and simpler installs.*

### End customer benefits

- **Enterprise-grade** connectivity for more cost-effective maritime operations and applications at scale.
- **Installations** that require less infrastructure onboard and simplify future builds.
- **Maritime industry commitments** to deliver more sustainable methods of distribution for customers.



## KONGSBERG

*“Overcoming the challenges of global connectivity and available bandwidth will unlock great potential and we look forward to working with Eutelsat OneWeb and Telenor Maritime to see how this project can advance the development of autonomous shipping solutions further.”*

**Pål André Eriksen, Senior Vice President, Remote & Autonomous solutions**

ASKO is a part of NorgesGruppen and is one of the largest Norwegian transport companies with more than 600 trucks on the roads, every day. ASKO ensures effective distribution of products to the grocery, retail convenience goods and institutional catering sectors.

Learn more  
Connect with Eutelsat OneWeb  
[oneweb.net/contact-us](https://oneweb.net/contact-us)



# Autonomous Surface Ships MAAS

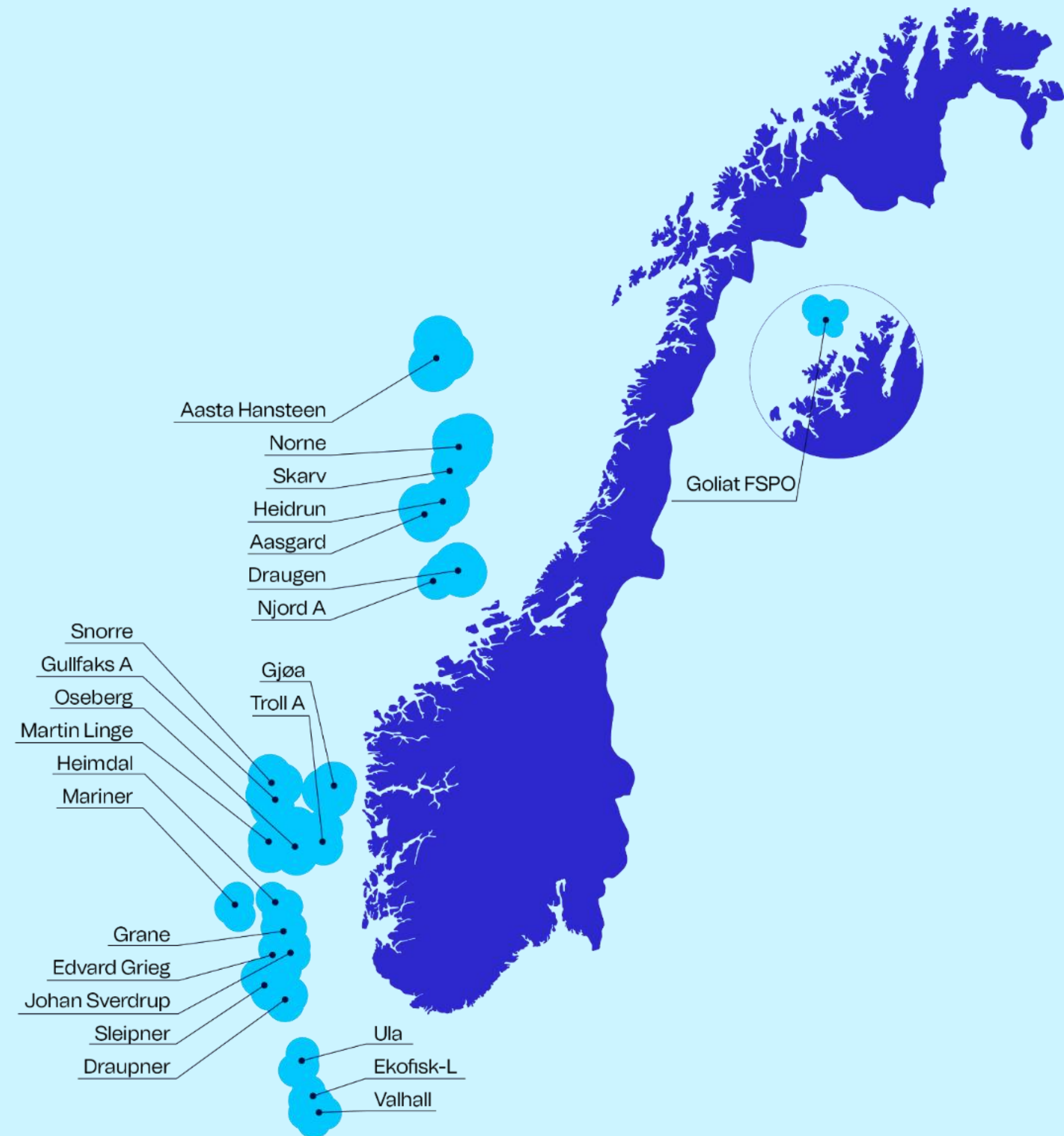


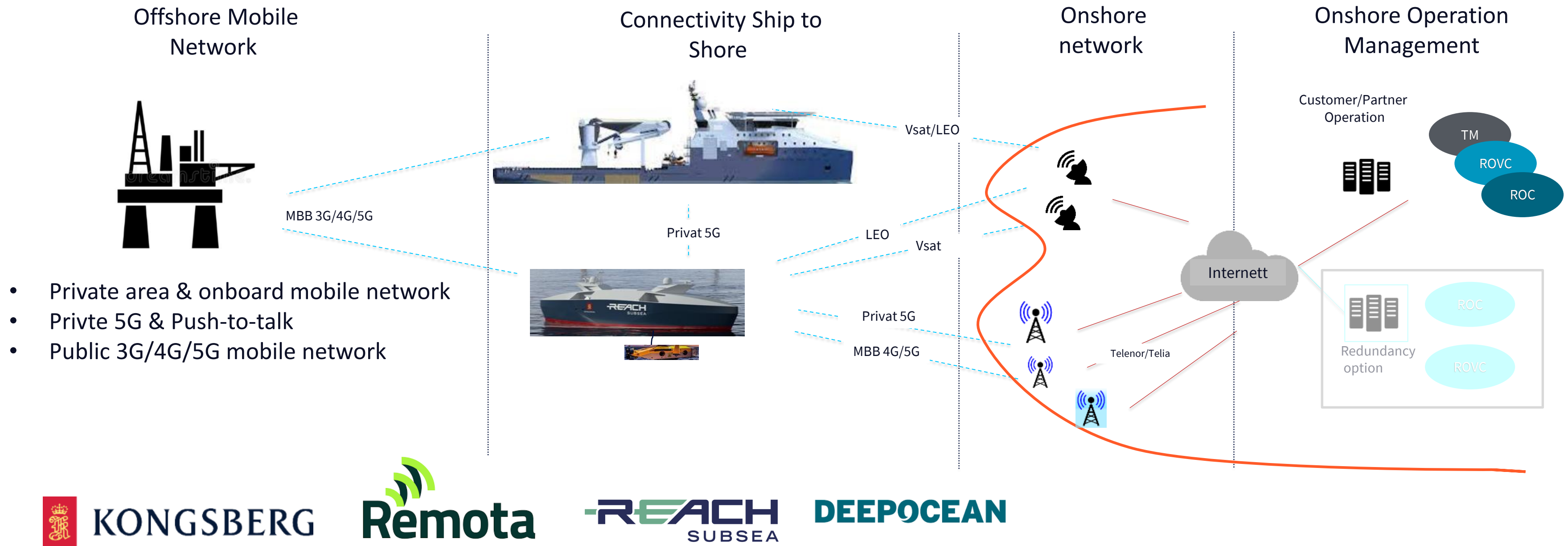
Next generation shipping  
Maritime Autonomous Surface Ships ( MAAS)



# How Telenor Maritime offshore solutions supports next generation Autonomous Surface Ships (MAAS)

- Area & onboard public 3/4/5G mobile coverage supporting:
  - Autonomous Surface Ships (MAAS) connectivity
  - Mission critical communication (MCX services)

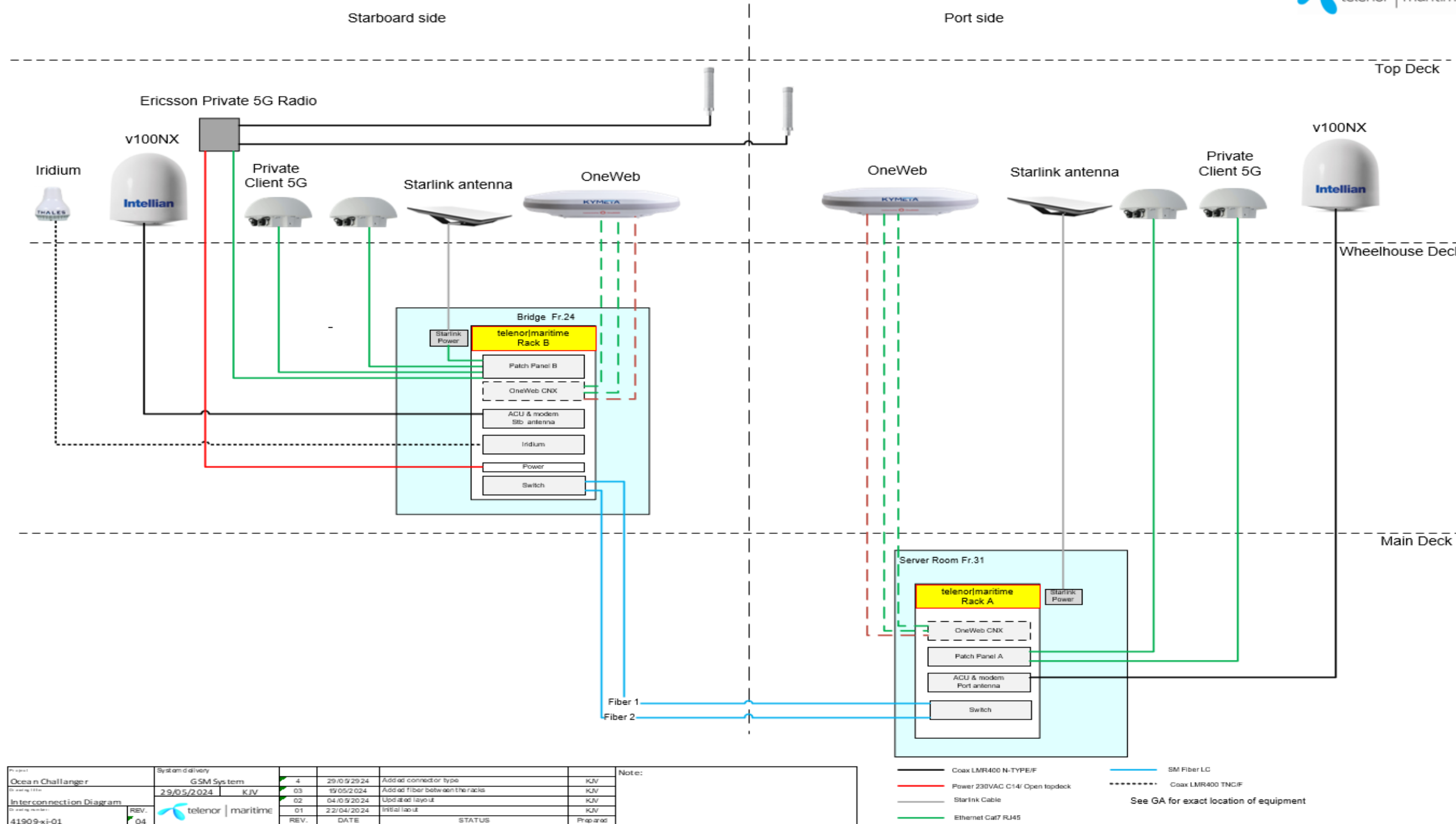




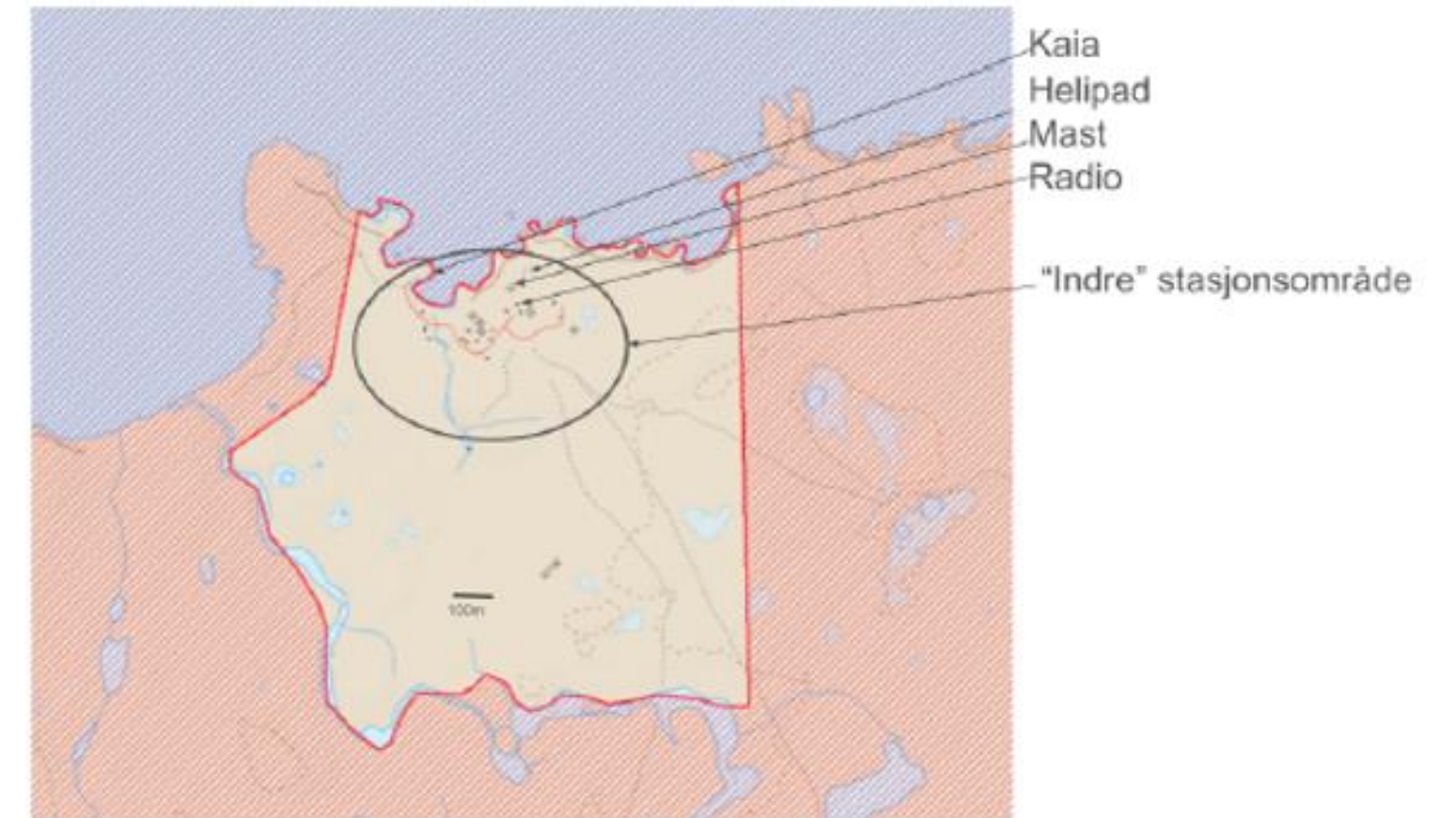
- Private area & onboard mobile network
- Private 5G & Push-to-talk
- Public 3G/4G/5G mobile network

Use case: Connectivity services to support the next generation autonomous ship operations

# MASS - hyper connectivity architecture



# Bjørnøya – Private 5G & LEO connectivity



- Masta er 33 m høy og gir fri sikt i alle retninger i minimum 10 km. Det er en utstyrsbu i tilknytning til masta. Masta sees lengst til venstre på bildet under. (Se bort i fra Alt. 1, 2 og 3. Ikke relevant for denne saken)



# Push-to-talk/Push-to-video

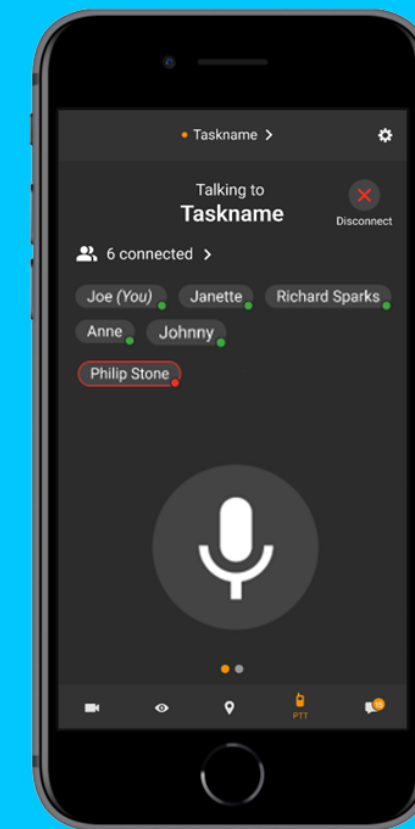
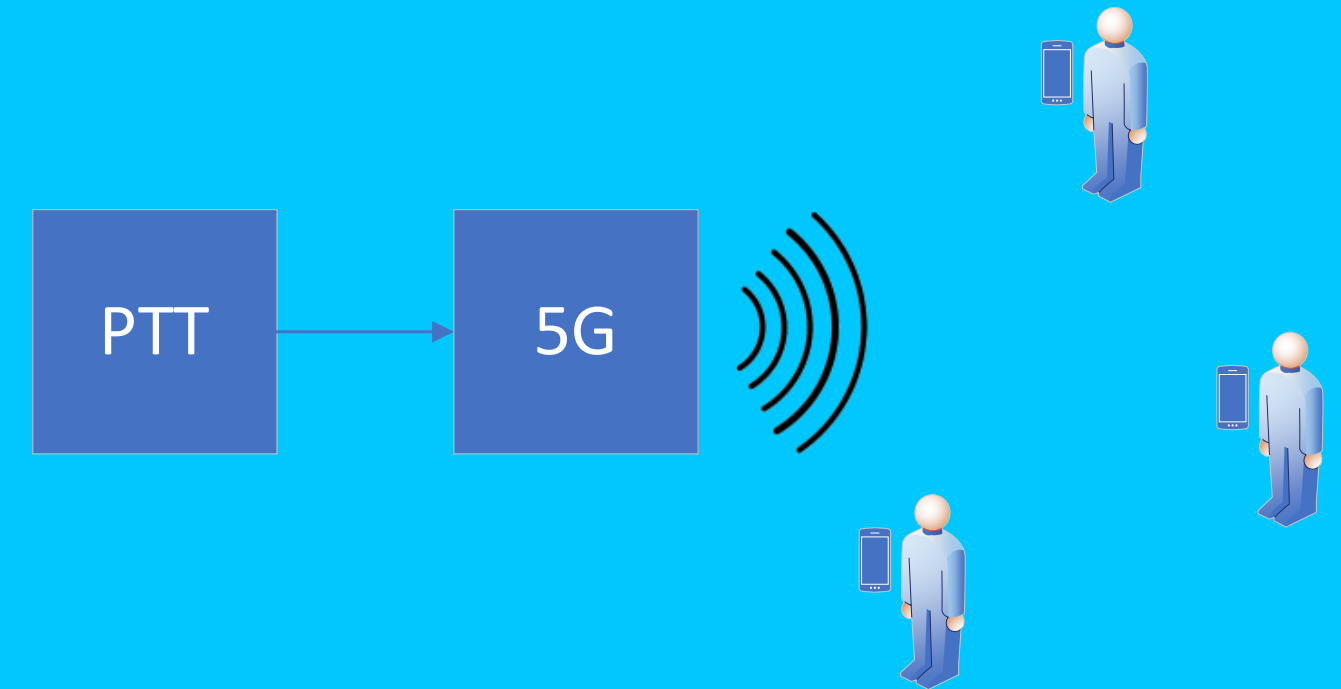
Several added services optional on private network solutions from TM

## PTT/PTV-application provided by third party for critical communications

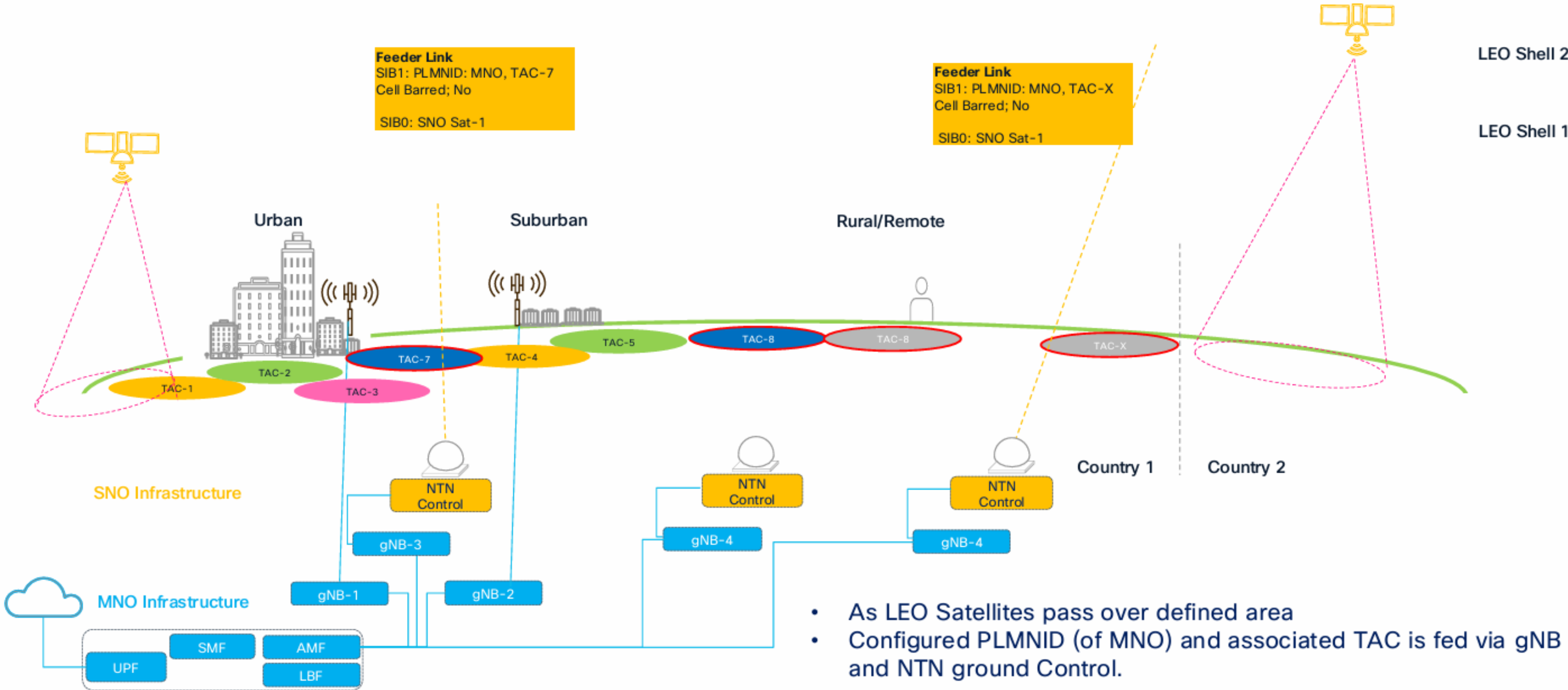
- PTT service runs locally
- Allows users to communicate using voice and/or video
- Local solution: data is only transmitted within the ecosystem
- Compared to VHF communication systems, the PTT application alerts if a crew member disconnects. Latency is also significantly reduced.

## Can be used by all mobile devices and PC's

- Users are either added to an operation permanently or for a period
- Can be integrated with existing VHF systems



# NTN Architecture: 3GPP R17 Direct to Device (D2D)





**Thank you**

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