

MARITIME

Ship connectivity – how current developments in communication technologies may impact shipping

Based on:

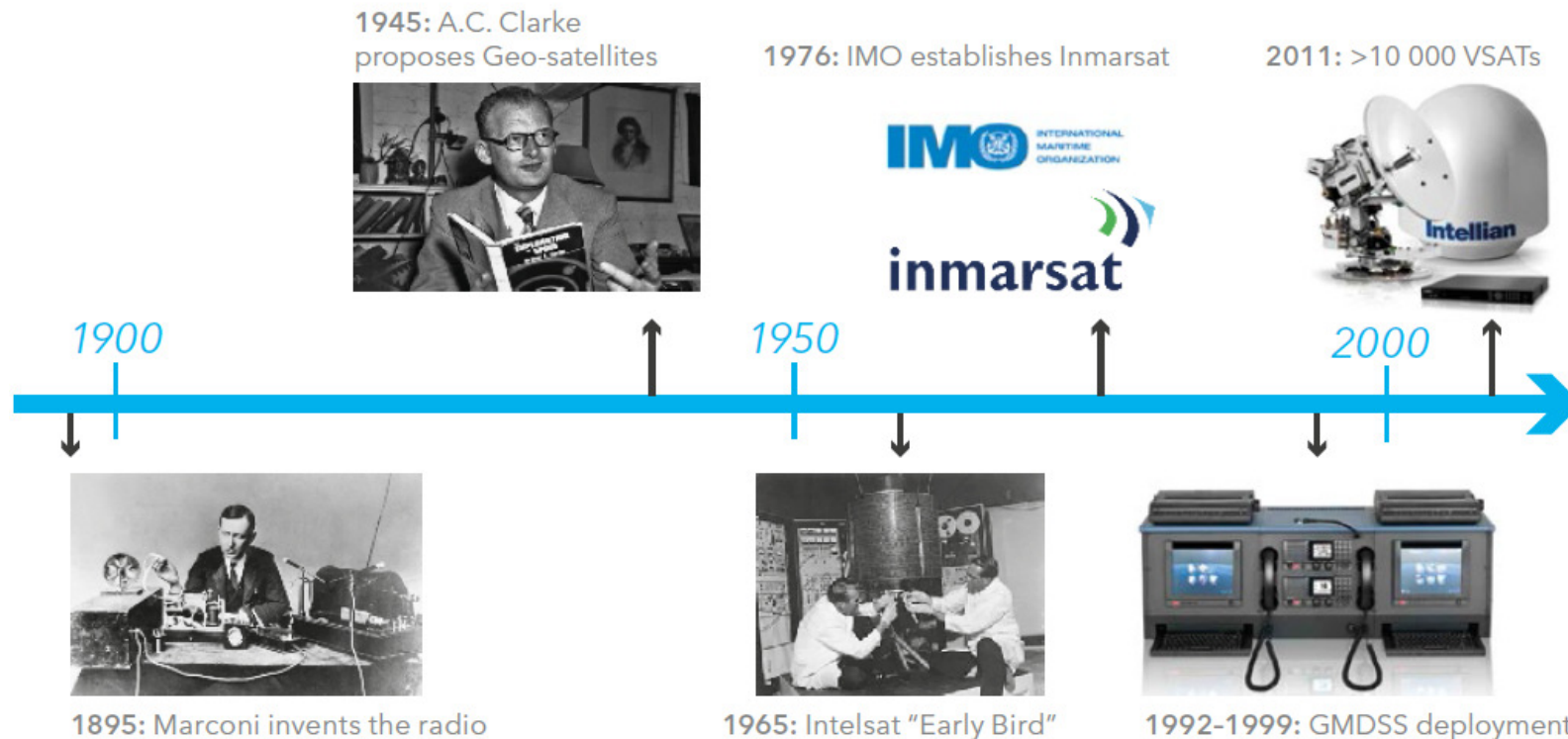
Ship Connectivity: New position paper from DNV GL Strategic Research & Innovation, Maritime Transport Program (GGRNO911)



Drivers

From must have to 'must have'

- Connectivity previously driven by regulatory requirements
- Now driven by business, vessel crews and passengers



Existing communication options

- Terrestrial radio



- MSS on L-band



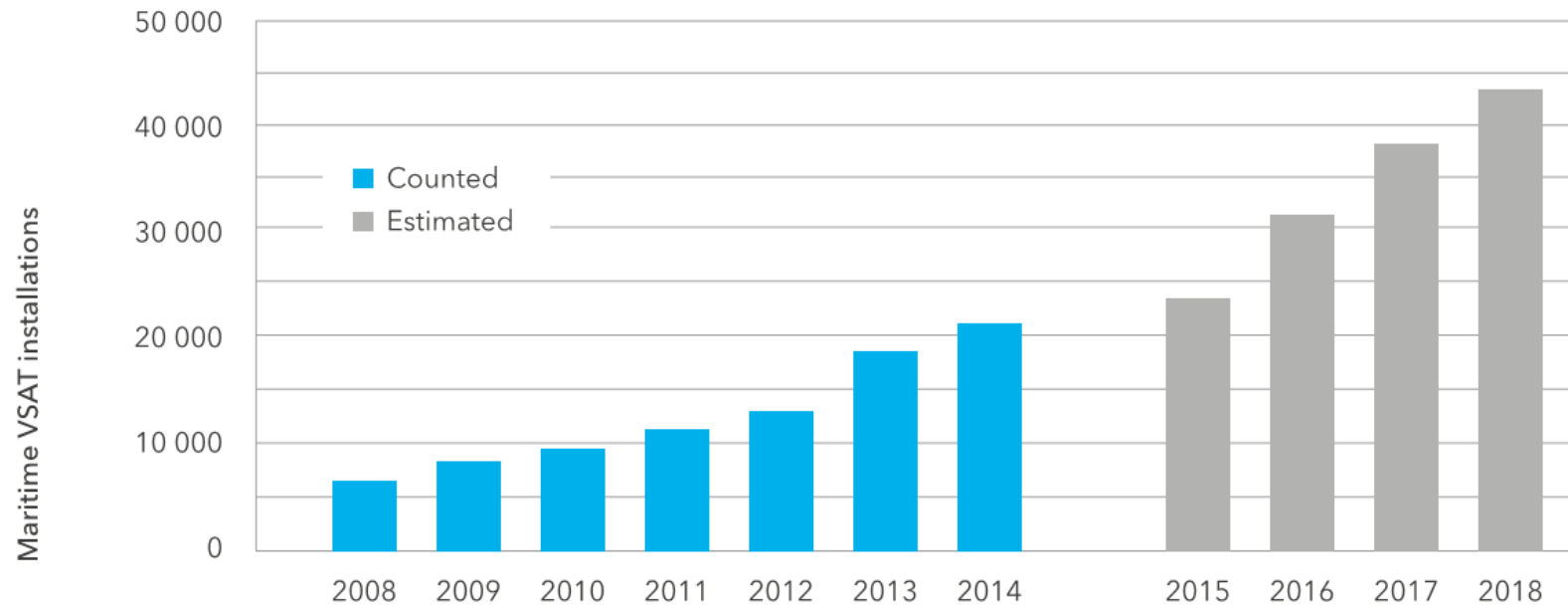
- Terrestrial mobile



- VSAT

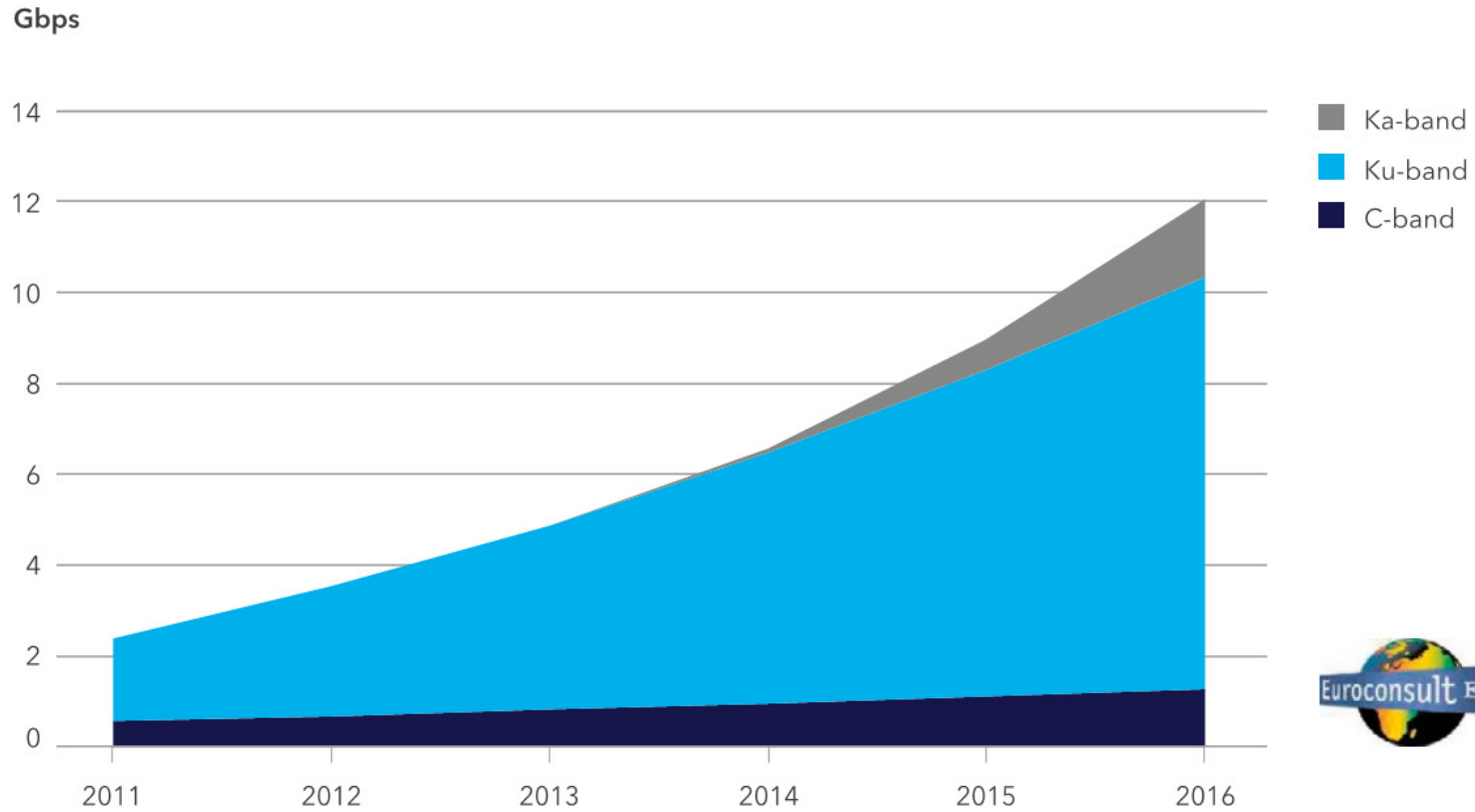


Boom! As connectivity demand rockets, VSAT vessel installations shoot skywards











Source: The COMSYS Maritime VSAT Report
4th Edition <http://www.comsys.co.uk>

....and so does the network capacity



Source: Euroconsult, Maritime Telecom Solutions by Satellite, 2014 edition

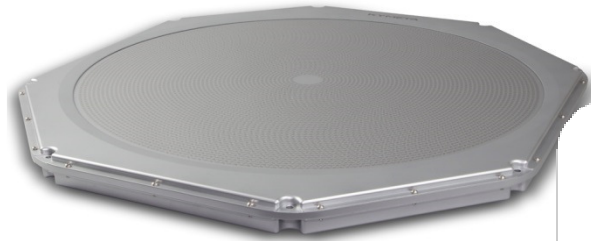
The connectivity boom is enabled by next generation VSAT systems

	In service	Data rate	
▪ Inmarsat GX	2015	5/50 Mbps	
▪ Intelsat Epic ^{NG}	2016	x10 existing sat	
▪ Iridium Next	2016	1.4 Mbps	
▪ O3B	2014	500 Mbps	
▪ Telenor's Thor VII	2015	2-6/> 10Mps	
▪ Telesat Vantage2	2016		
▪ WorldVu's OneWeb	2019/20		
▪ SpaceX	2020		



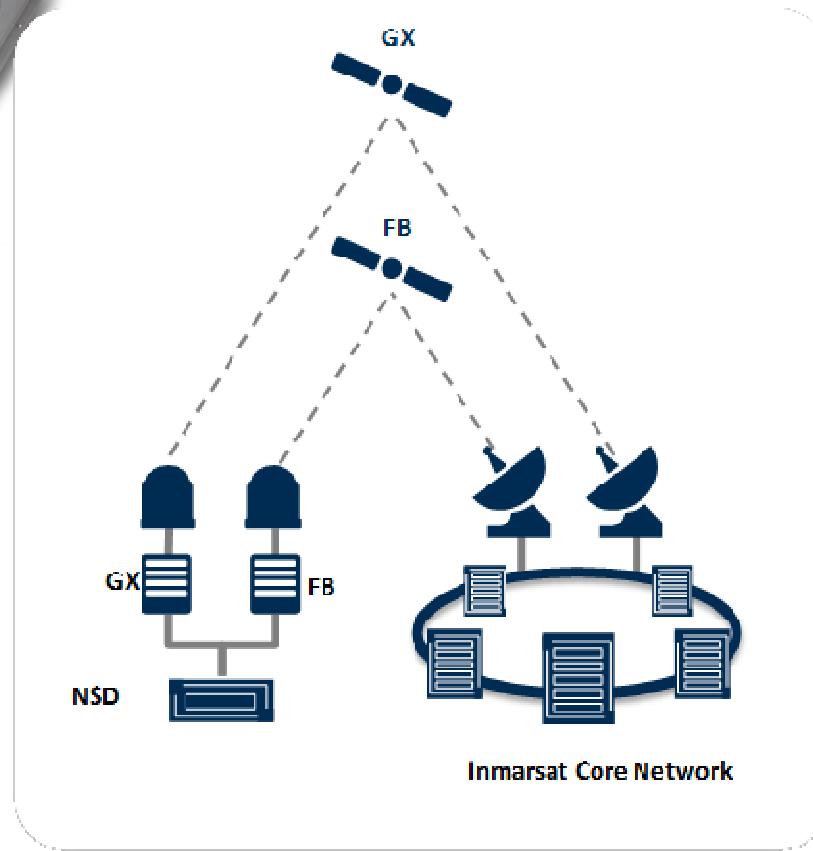
Increased capacity
 Higher data throughput
 More competition
 Reduced price/bandwidth

Other trends and innovations

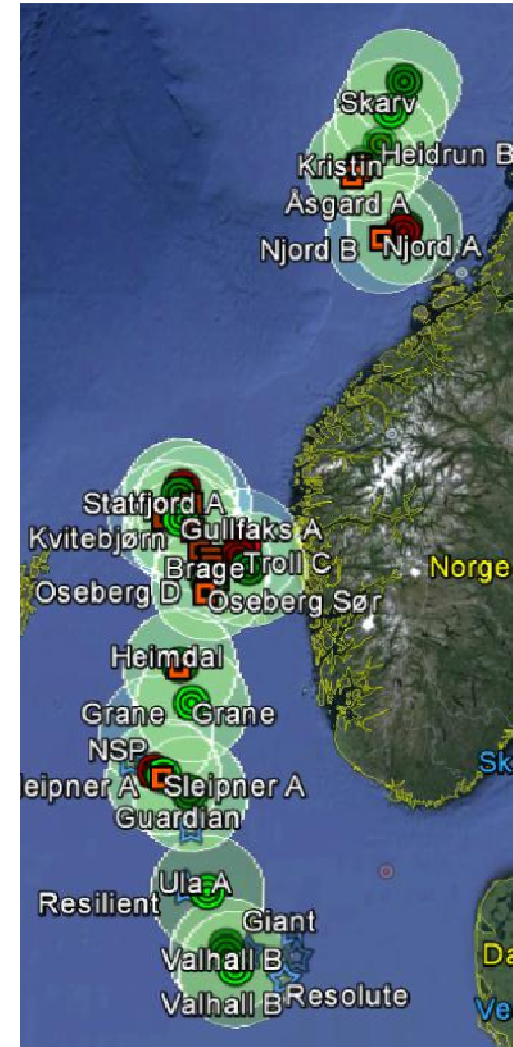


Source: Kymeta

VDES

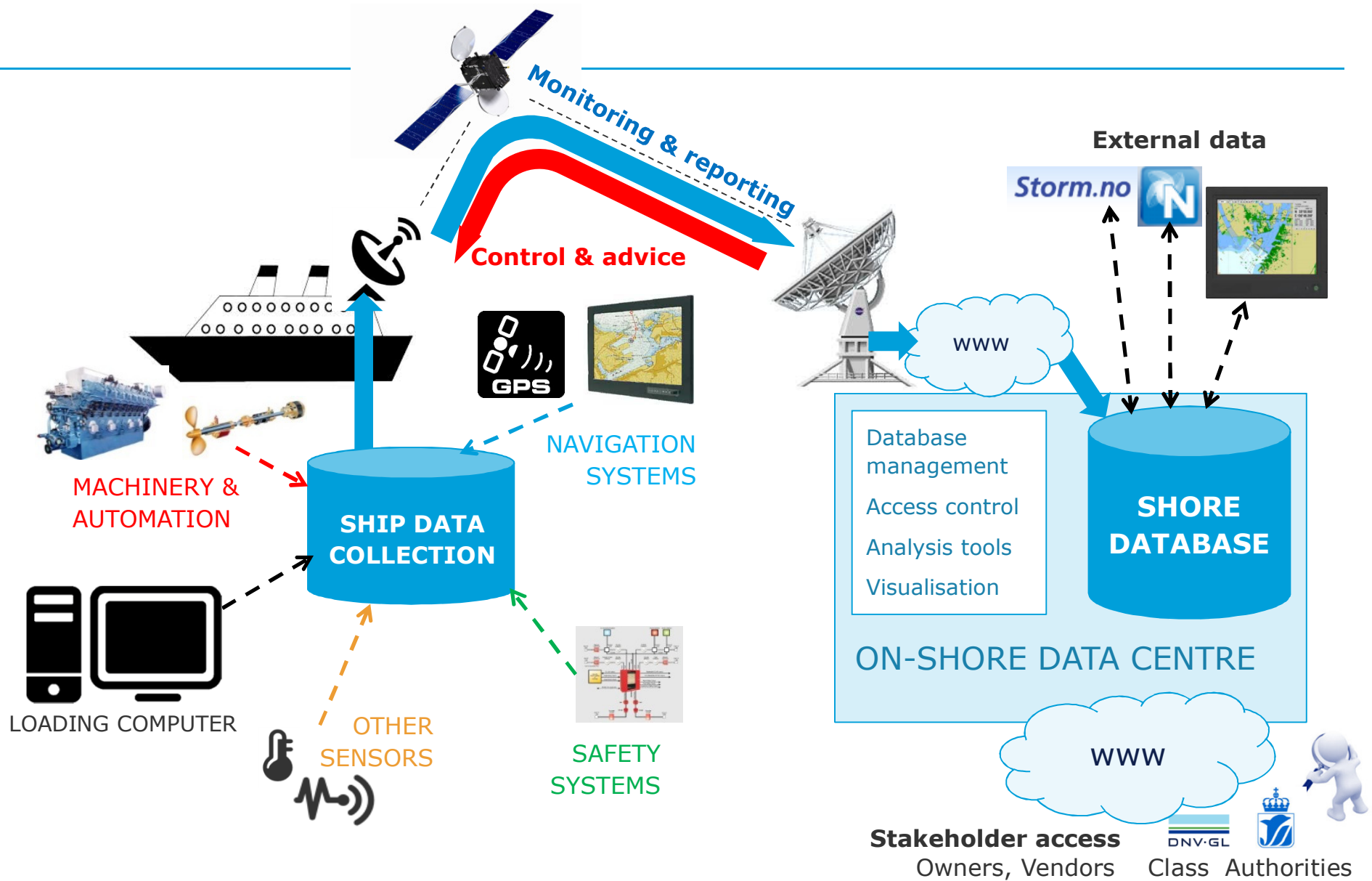


Source: Inmarsat



Source: MCP

How can ship connectivity enable new applications?

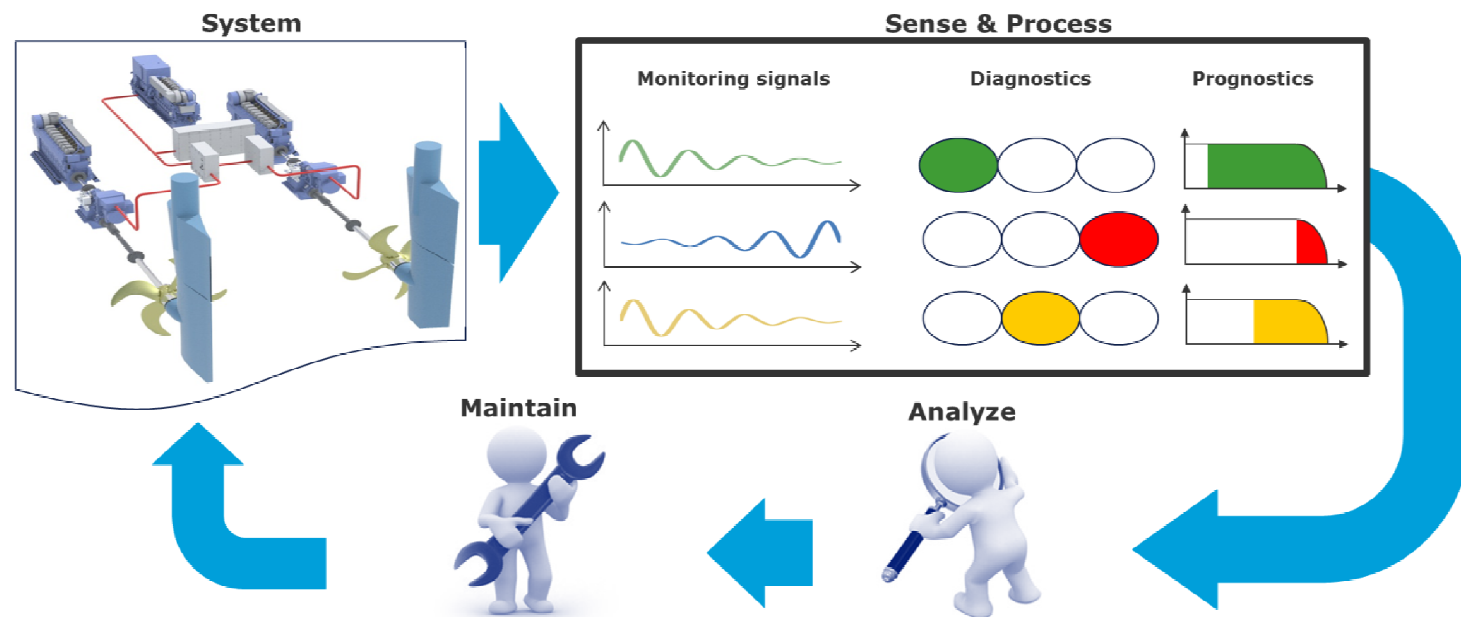


Enabling applications: welcome to a world of possibility

- Vessels already collect data
- Sharing that data onshore will create new applications

New applications

- Condition monitoring



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New applications

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- Autonomy & Remote control



A very modern Mayflower: Hi-tech autonomous yacht will sail across the Atlantic in 2020 to monitor changing ocean conditions



Source: <http://www.dailymail.co.uk/sciencetech/article-3412480>



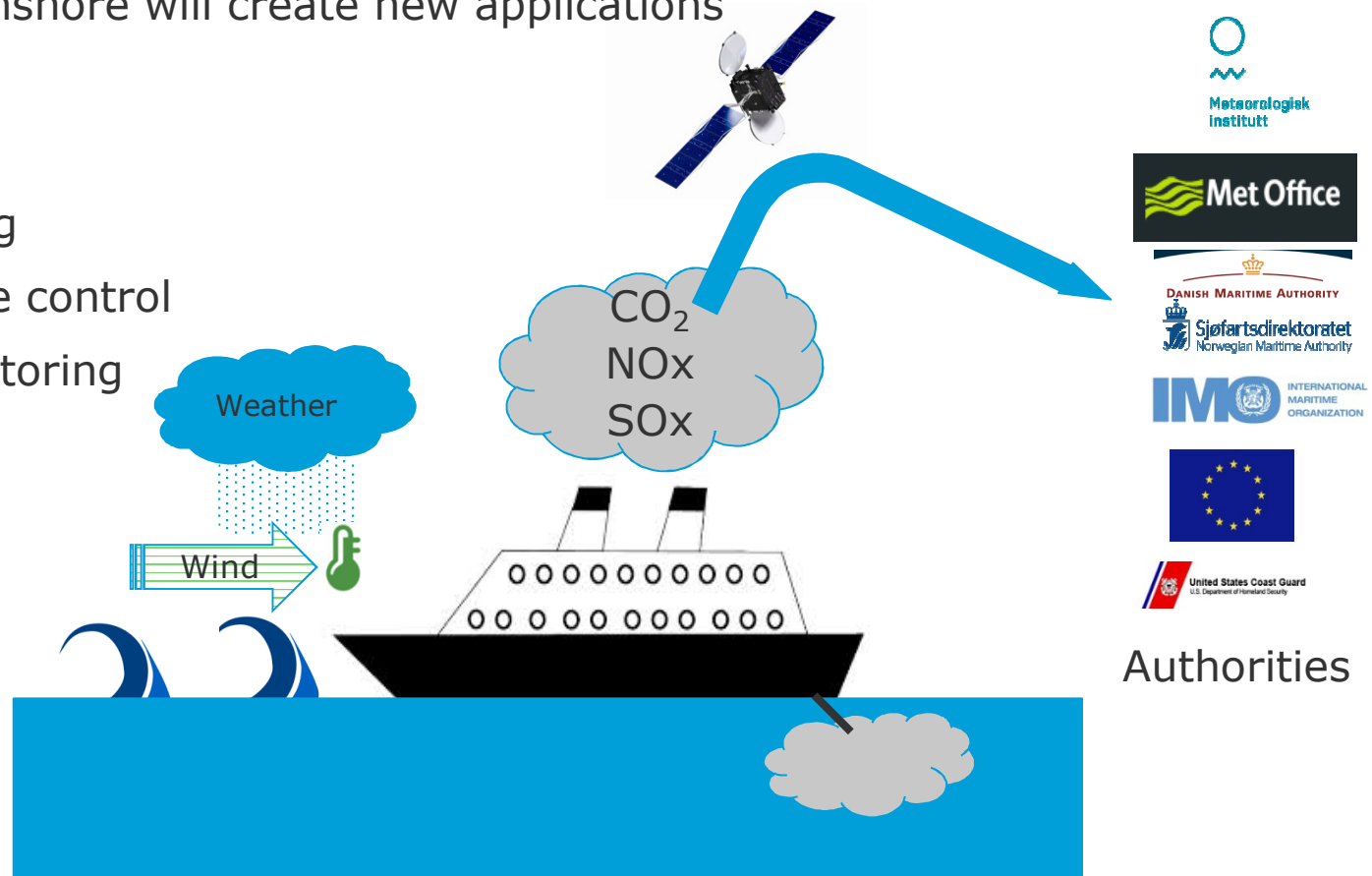
DNV GL's ReVolt
<https://youtu.be/rhYaNHx5D00>

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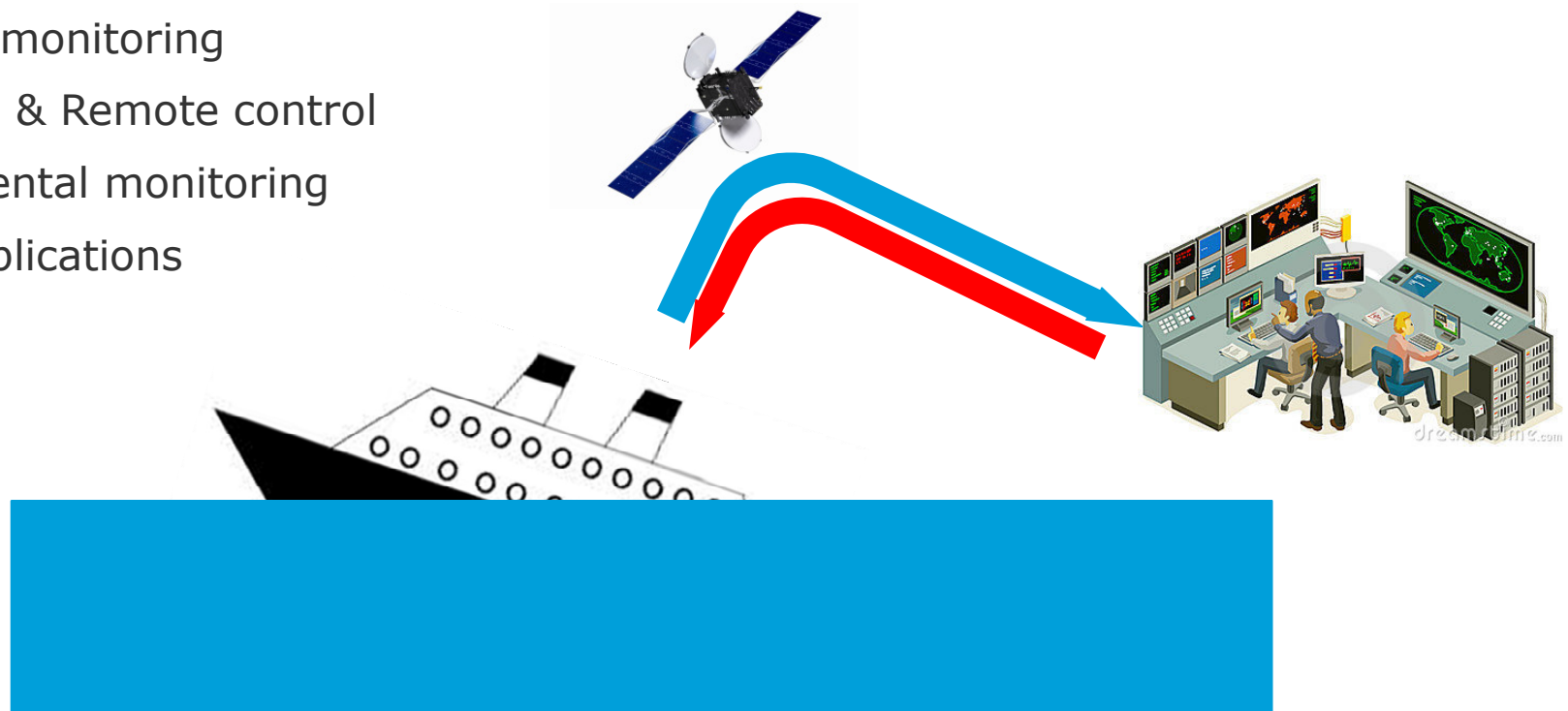


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- Remote diagnostics & maintenance



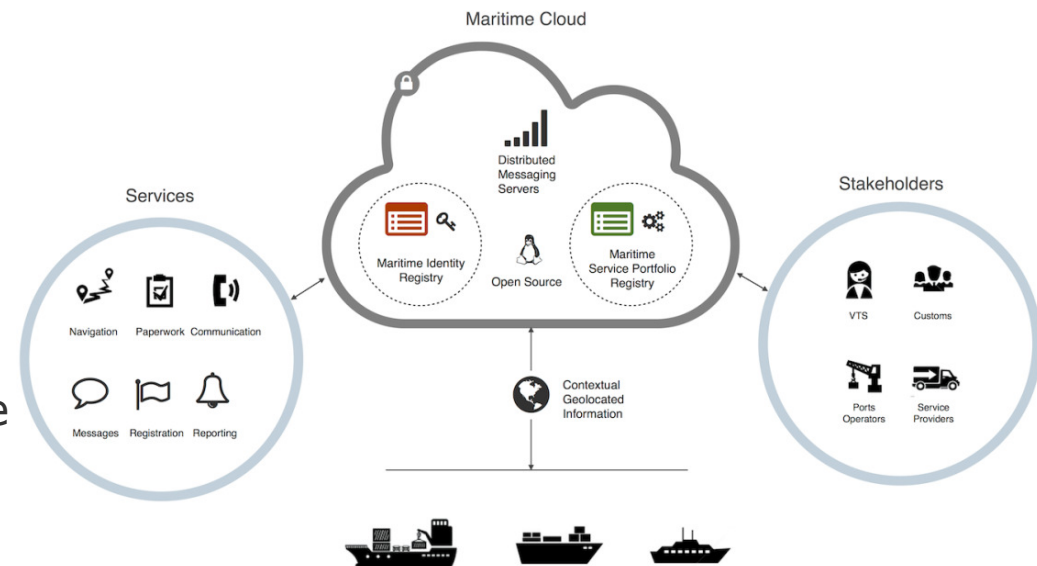
DAQRI's smart helmet - www.daqri.com

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- VTS / e-Navigation



Source: DMA

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- Environmental monitoring
- Safety applications
- Remote diagnostics & maintenance
- VTS / e-Navigation
- Risk based classification & surveys
- Energy efficiency optimisation
- Applications we haven't yet thought of



Everyone's a winner: Connected ships benefit all industry players and promote transparency

- Ship owners and operators
- Crew
- Yards and equipment vendors
- Marine authorities and regulators
- Classification societies
- Charterers and cargo owners
- Insurers
- Communication operators/vendors
- Academia
- New players



...but, with all new opportunities comes challenges

- Capacity limitations
- Reliability
- System integration
- Data quality
- Cyber security
- Lack of standards
- Legal and commercial



Conclusions

- The era of ship connectivity is here
- New applications will be enabled
- New opportunities will be created



- Download DNV GL's Position Paper "Ship Connectivity" at www.dnvgl.com

Thank you for the attention!

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www.dnvgl.com

SAFER, SMARTER, GREENER

