



# AIS Space RIN 2008

## Very Nearly There!

29th October 2008



# Benefits of AIS Space

- Global Coverage = GLOBAL
- Ability to validate position information
  - Course and speed within AIS message
  - Window of  $\pm 15$  minutes allows numerous AIS detections per ship - abnormal behavior apparent.
  - Backtrack stream of position reports of suspected vessels through point of incident.
  - Ideal information to assist prosecution - difficult to spoof - *other periodic reporting sources lack the ability to validate, and have insufficient information to show deviation of course or speed to avoid detection.*



# Benefits of AIS Space

- Complementary to LRIT
  - Future possibility to use information for composing message parts into the LRIT system.
- Single automatic ship source for Long Range Reporting
  - Working in parallel with Ship monitoring services such as SafeSeaNet and Port information Systems - able fuse AIS space information with more detailed Port, Cargo and passenger details.
    - Work needed here to allow competent authority access to global port network.
    - Single port window needed. Even better would be Single national window.



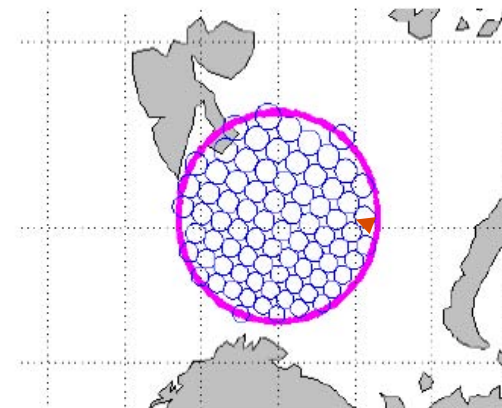
# Monitoring AIS signals from space

- Global coverage
- With Polar Orbiting Spacecraft – every pass provides Northern and Southern Hemisphere coverage
- We need constellation that can provide frequent updates with high probability of detection and real time vessel localization.
- Space Based Data can be merged and correlated with Ground Based AIS and Other Systems
- Data collection can be encrypted
- AIS deception attempts readily detected from space
- Inter-governmental Agency Co-operation?
  - Highly desirable



# Why it is hard to do from Space

- AIS signals, when seen from space encompass many AIS cells
- These messages can “collide” at the spacecraft resulting in messages being lost or garbled
- De-collision algorithms will cope for now.
- Prudent to think about third frequency for 2011 (WRC)

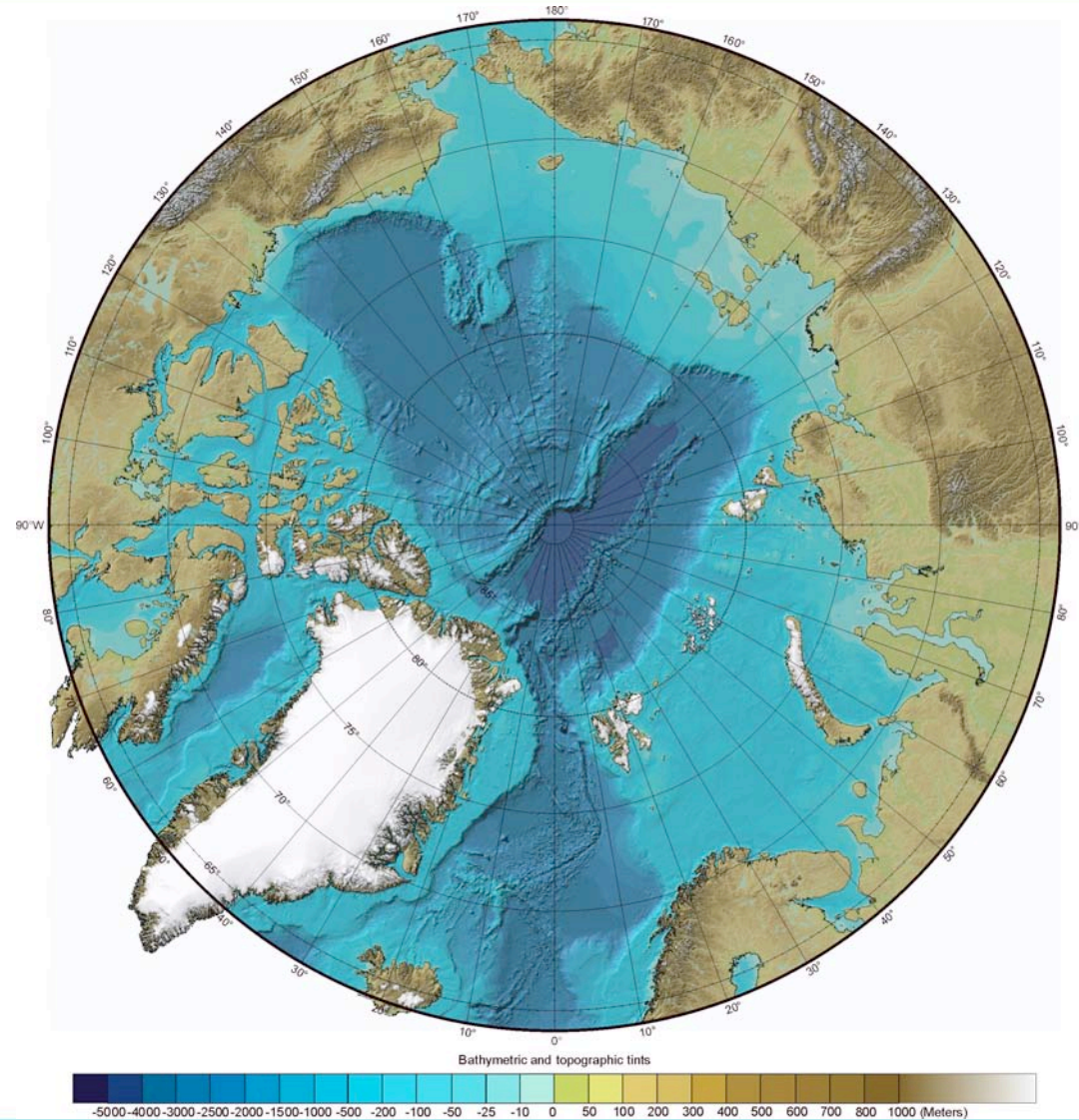


Typical  
satellite field  
of view

Many  
SOTDMA cells



# Short term drivers Ice Free - Exploration & Exploitation



# Economically Viability of ARCTIC Transportation

- 30-50000 Euro per day, 10 days saving!!!!
- 1 trip more per month!!!!

Container ship planning to transit northern sea route next year





Need special Precautions

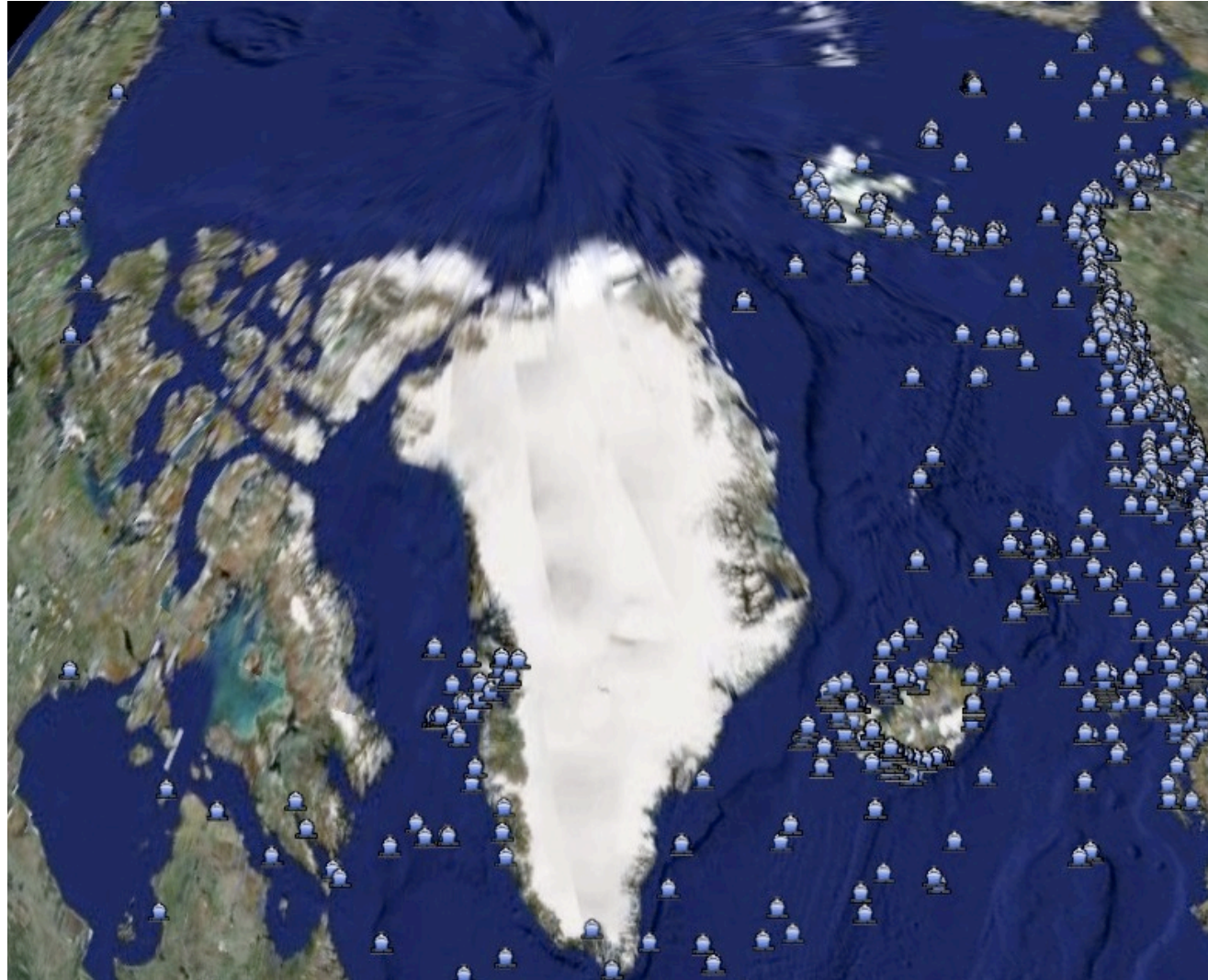




# Situation Awareness - Critical SAR



# AIS ARCTIC



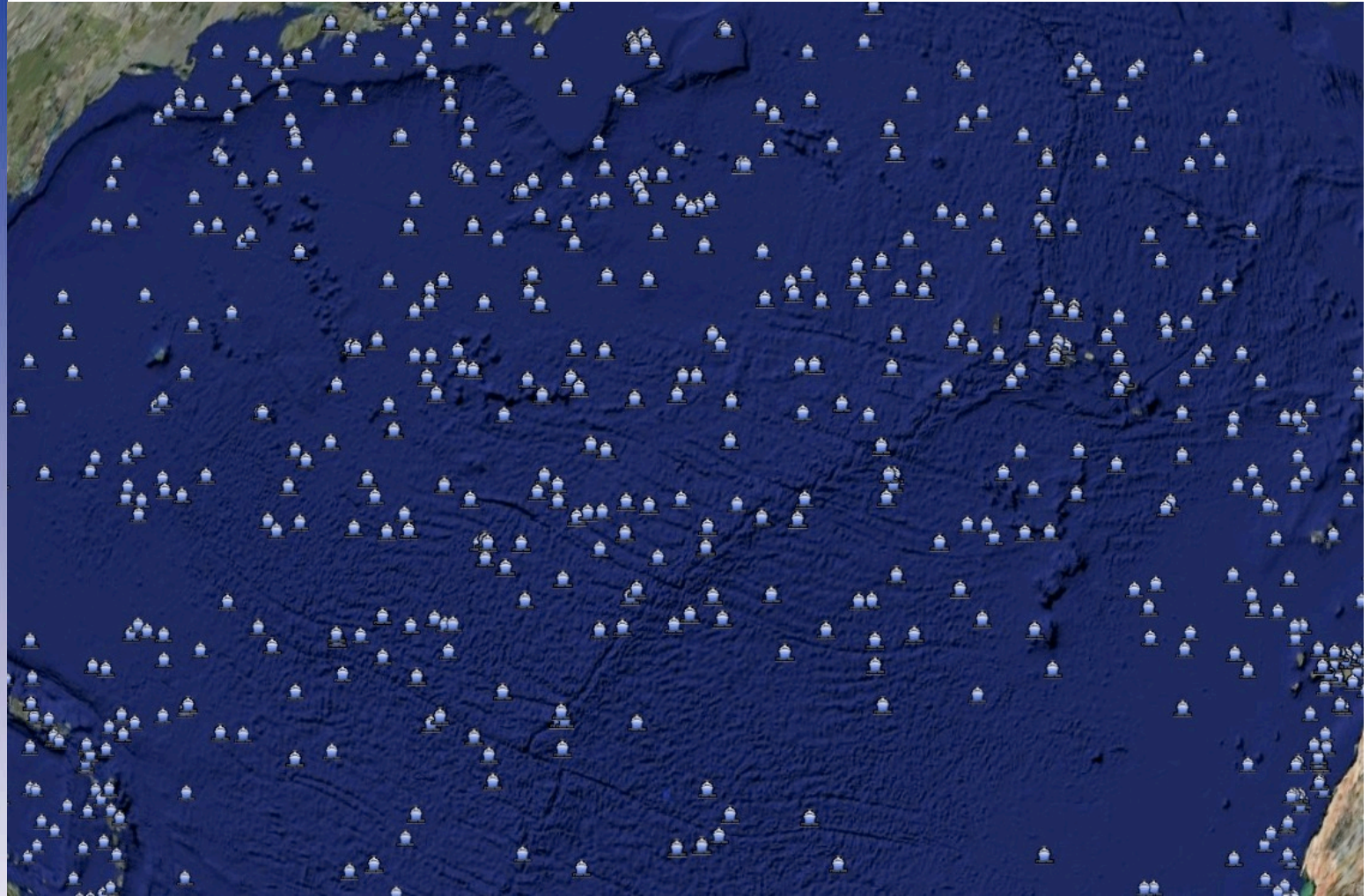


# Vessels West Coast Greenland





# AIS Atlantic





SURNAV (REUNION, CALEDONIA, FRANCE)  
 MANCHEREP (FRANCE)  
 OUESREP (FRANCE)  
 COASTAL CONTROL (GREENLAND)  
 GREENPOS (GREENLAND)  
 GOFREP (FINLAND & LATVIA)  
 ADRIREP (ADRIATIC)  
 GEOREP (GEORGIA)  
 AUSREP  
 GBT REP (GREAT BELT)  
 SHIPPOS (DENMARK)  
 BAREP (BALTIC - HELSINKI)  
 SOUCENCORSAU (MADAGASCAR)  
 REEFREP (AUSTRALIA)  
 NZAR (NEW ZEALAND)  
 CHILREP (CHILE)  
 SISTRAM (BRAZIL)  
 GIBREP (GIBRALTER)  
 FINREP (FINLAND)  
 WHALESNORTH (USA)

QUARANTINE  
 QPAR

ALIEN (12 stowaways/month)

ALIEN Migrants  $\pm$  8000/yr

DG, HS, MP

WMO DISASTER (Tsunami)

WMO Storm Force 10 or above

INSPIRES (INDIA)  
 INDSAR (INDIA)  
 ISLEREP (ANDEMAN, NICOBAR ISLANDS)

IMOT (ISREAL)  
 ARES (ITALY)  
 PASREP (PAKISTAN)

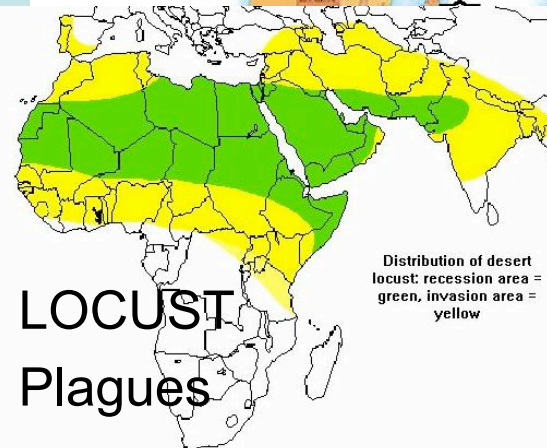
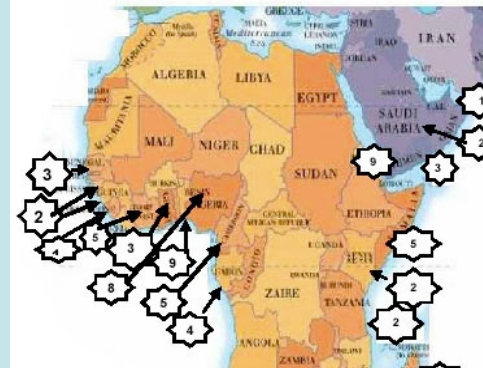
BELOYE MORE  
 SSRS (SAUDI)  
 SAMSA (S.AFRICA)  
 SAFREP (S.AFRICA)  
 TUBREP (TURKEY)  
 SECOSENA (ARGENTINA)  
 ECAREG (CANADA)  
 NORDREG (CANADA)  
 CVTS (CANADA)  
 RMIC (CANADA)  
 CHISREP (CHINA)  
 COGUAR (ECUADOR)

STAMREP (UK FRANCE)  
 FIJWETREP (EUROPE)  
 KOSTRAITREP MALACCA & SINGAPORE  
 STREP (STRAIT BONIFERO)

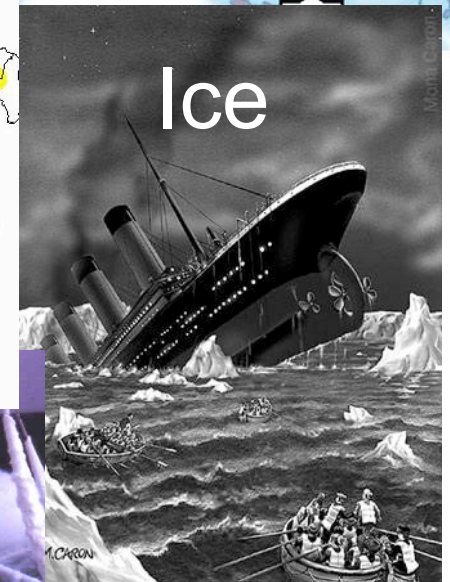
P (Pakistan)

EP (Peru)

Saudi)

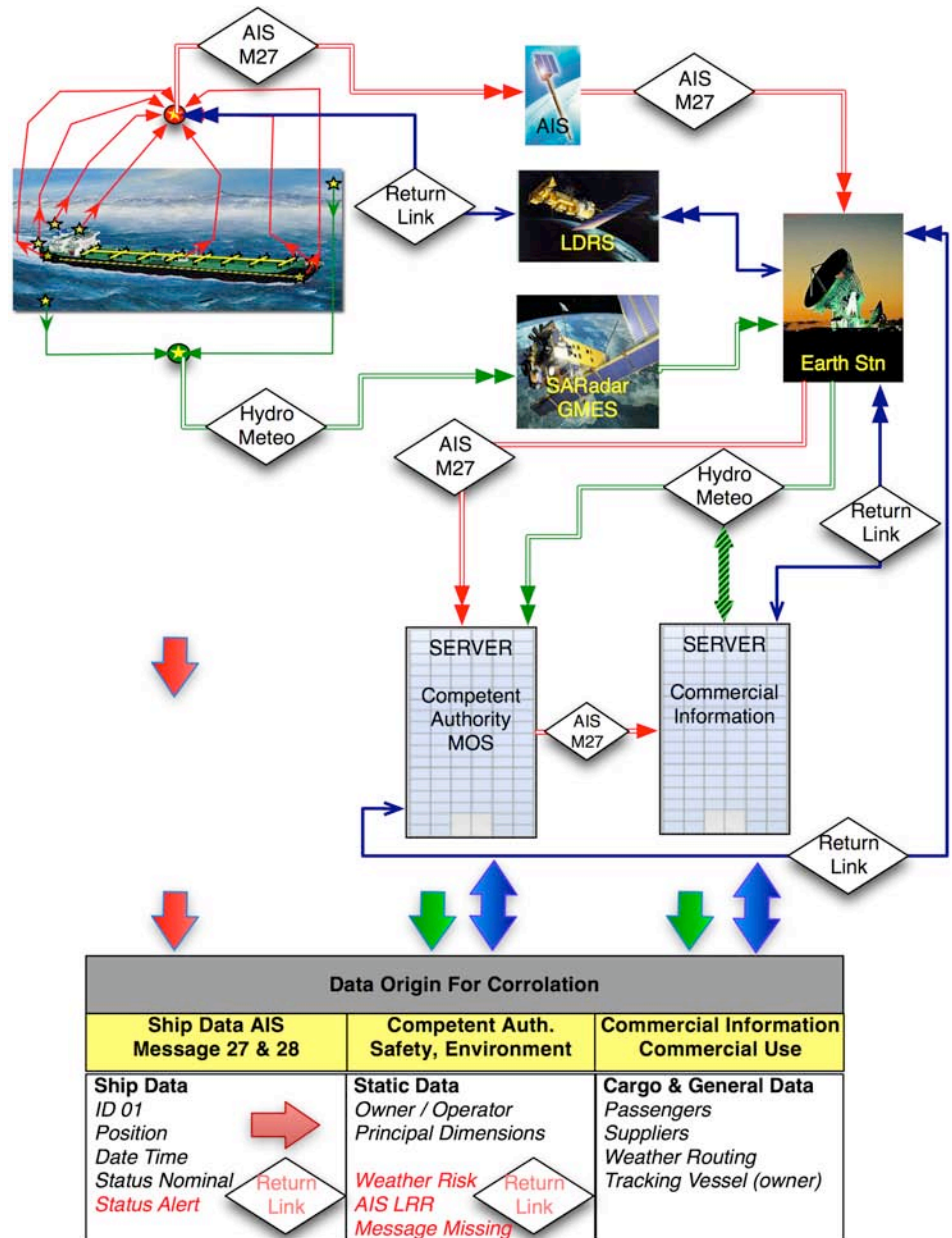


Distribution of desert locust: recession area = green, invasion area = yellow



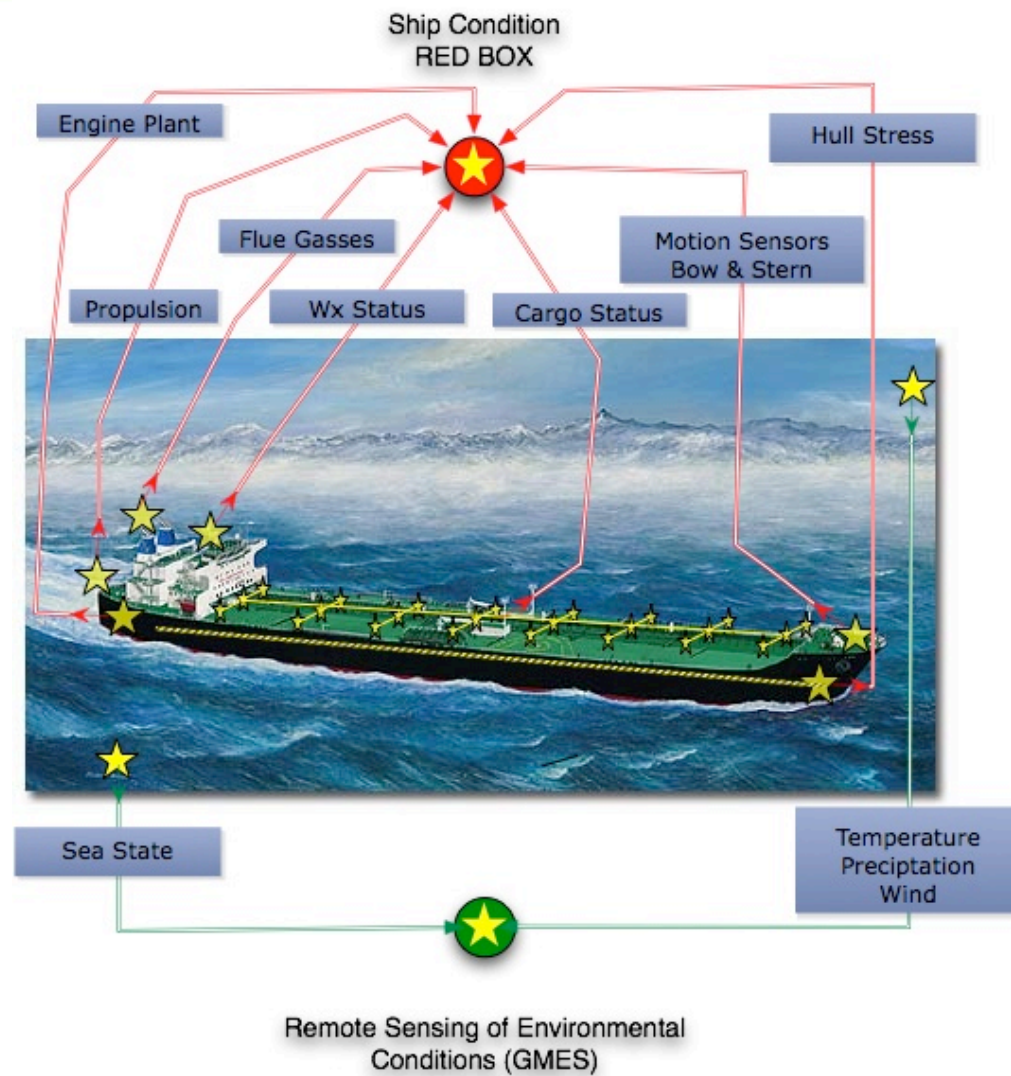
# Enabler to Evolution of Long Range Reporting

- AIS Satellite combined with LEO or MEO Low data rate communication services.
- To provide a complete suite of Maritime communications for:-
  - Global maritime Distress Service System (GMDSS)
  - Long Range Identification and Tracking (LRIT - IMO)
  - Vessel monitoring Systems (Fishery VMS EU & UNFAO)
  - Traffic Monitoring
  - Evolution of Long Range reporting to suite Environmental issues
  - GMDSS Area 4 - Polar Areas





# Wide Area and Ship -Situation Awareness



# The Future and next steps

- If we consider AIS from space as a likely future candidate to provide **all** ship reporting ID, position and status information needs.
  - Then should we have new AIS messages?
    - LRR, VMS, Degradation of seaworthiness?
  - If so for which applications?
  - Do we want AIS SARTS to be detected from space and what about AIS EPIRBS?
  - Considering the certain expansion of AIS population What frequency and messages do we need?



# Can AIS or LRIT be spoofed

- VMS experience

If LRIT or LRR information is spoofed, will this have consequence on regulatory use of the information?

- Falsification of VMS Position Reports.

- Cases of Vessels reporting false position information

AIS Provides its own PVT solution

- Which is more robust - AIS Space or Commercial Communications?

