



United Kingdom
Hydrographic Office

Concept development of Future Maritime Geospatial Capabilities

Simon Hampshire



Concept development & Experimentation



Who are we?

We meet national, defence and civil requirements for navigational and other hydrographic information.

- We consistently output high quality, safe products (digital and analogue) to meet SOLAS requirements
- We are part of the UK Government
- We have over 210 years' experience
- We focus on our customers



70% of world shipping use and rely upon our charts and publications



What do we do?

A world renowned organisation supplying navigational products and services.

- We produce and maintain a global series of charts and publications
- We advise the UK Government on policy formation
- We represent the UK at International Hydrographic Organisation (IHO) and other international forums



We produce over 3500 charts and 160 publications in digital and analogue



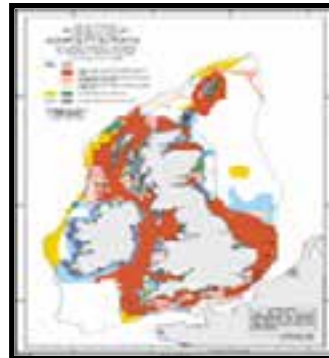
Our mission

To meet national, defence and civil requirements for navigational charts and other hydrographic information in the most efficient manner.

Commercial Programme



National Programme



Defence Programme





United Kingdom
Hydrographic Office

Mashups
WMS
Services
Shipping
WFS AIS
Data
Analysis
Products

Metadata





Interface

COLLECT

MANAGE/ANALYSIS

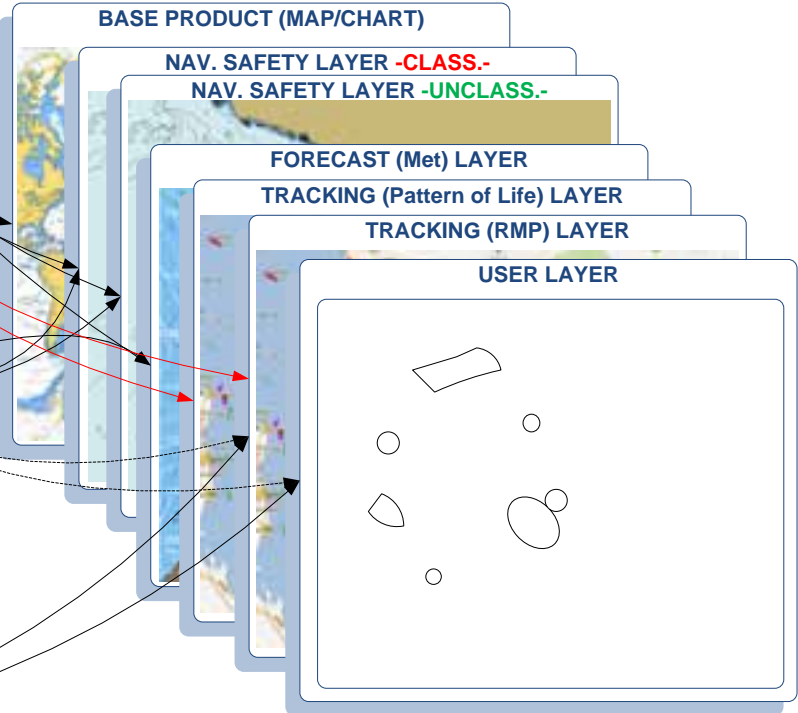
PROMULGATE

Existing Products/
Services

Vessel Tracking

- Requirements**
- Routeing
 - Reporting
 - IRTC
 - Q Route

- Threats**
- (Deconflict)
 - Mines
 - Pirates
 - Natural Disaster
 - Political
 - Armed forces



Paper Charts

Digital Charts

Paper Publications

Digital Publications

SRIMS

Radio Navigational Warnings

Guidance bulletins



Design

exactEarth
AIS

WFS

Custom Web
Handler

CSV/HTTP

GeoEvent
Processor

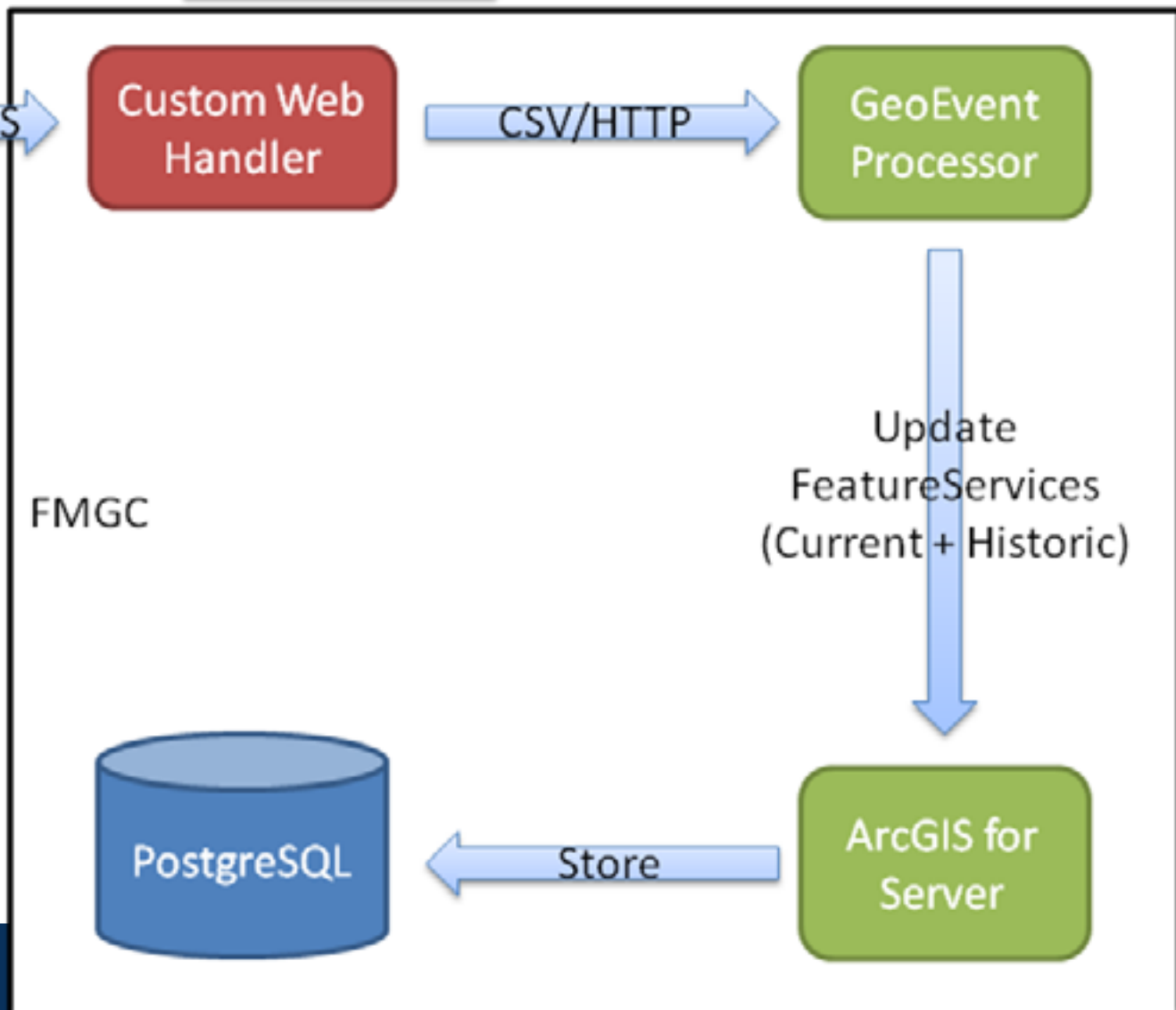
FMGC

Update
FeatureServices
(Current + Historic)

PostgreSQL

Store

ArcGIS for
Server





Architecture

Amazon Web Services – Esri UK account

EC2 - Classic

EIP




Spatial Server 10.2.1

Esri ArcGIS 10.2.1 Server with SQL Express AMI – m1.xlarge
Windows Server 2012
IIS 8
ArcGIS 10.2.1 for Server
ArcGIS 10.2.1 for Desktop
Maritime Chart Service (MCS)

UKHOAGS Security Group

Inbound Rules :
Open ports : limited for services access
Allowed IP Range/Security Groups : Esri UK network, UKHOAPP

EIP



Spatial Database 10.2.1

Esri ArcGIS 10.2.1 Server with PostgreSQL AMI – m1.xlarge
Ubuntu Linux
PostgreSQL
Apache
ArcGIS 10.2.1 for Server

UKHO08 Security Group

Inbound Rules :
Open ports : limited for database access
Allowed IP Range/Security Groups : Esri UK network, UKHOGEF, UKHOAGS

EIP




GEP Server 10.2.1

Esri ArcGIS 10.2.1 Server with SQL Express – m3.xlarge
Windows Server 2012
IIS 8
ArcGIS 10.2.1 for Server
ArcGIS 10.2.1 for Desktop
ArcGIS GeoEvent Processor

UKHOGEF Security Group

Inbound Rules :
Open ports : limited for services access
Allowed IP Range/Security Groups : Esri UK network, UKHOAPP

EIP



Web Server/Test Client

Windows Server 2008 AMI - large
Windows Server 2008 R2 Datacenter
IIS 7.5
ArcGIS 10.2.1 for Desktop

UKHOAPP Security Group

Inbound Rules :
Open ports : limited for remote desktop access
Allowed IP Range : Esri UK network, UKHO network (RDP Only)

Internal Security Group Rules :
limited for services access



Use Case

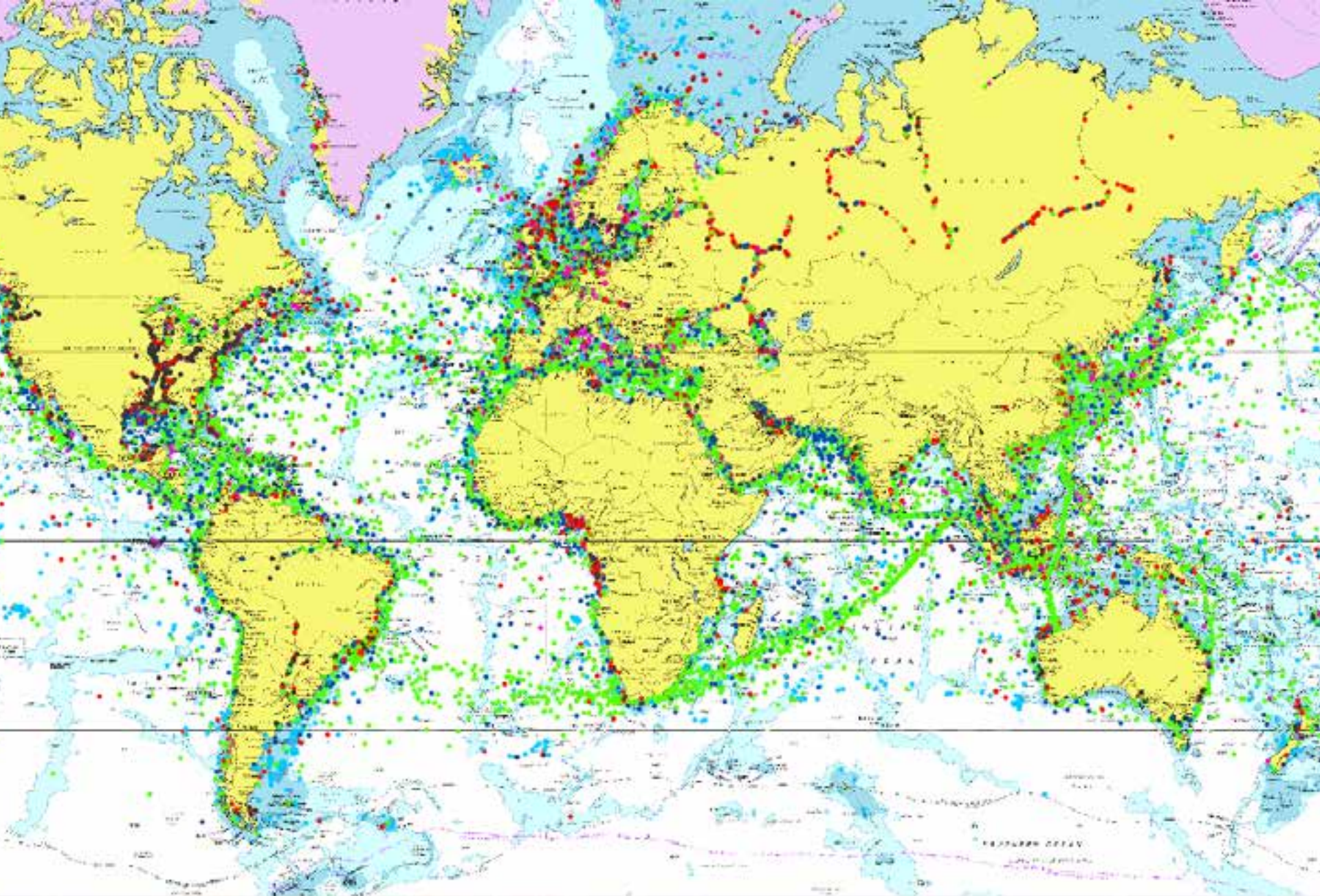
n **Ships tracks against customer records against charts and comms capability**

- Disaster support & ship notifications
- Effects of shipping on marine mammals and therefore avoidance by Navy Vessels of negative effect
- Who is using our products on certain routes or areas of the world that need coverage improvement/more bespoke products and support.
- Where product coverage needs to improve
 - New ports/legislation/ship-types

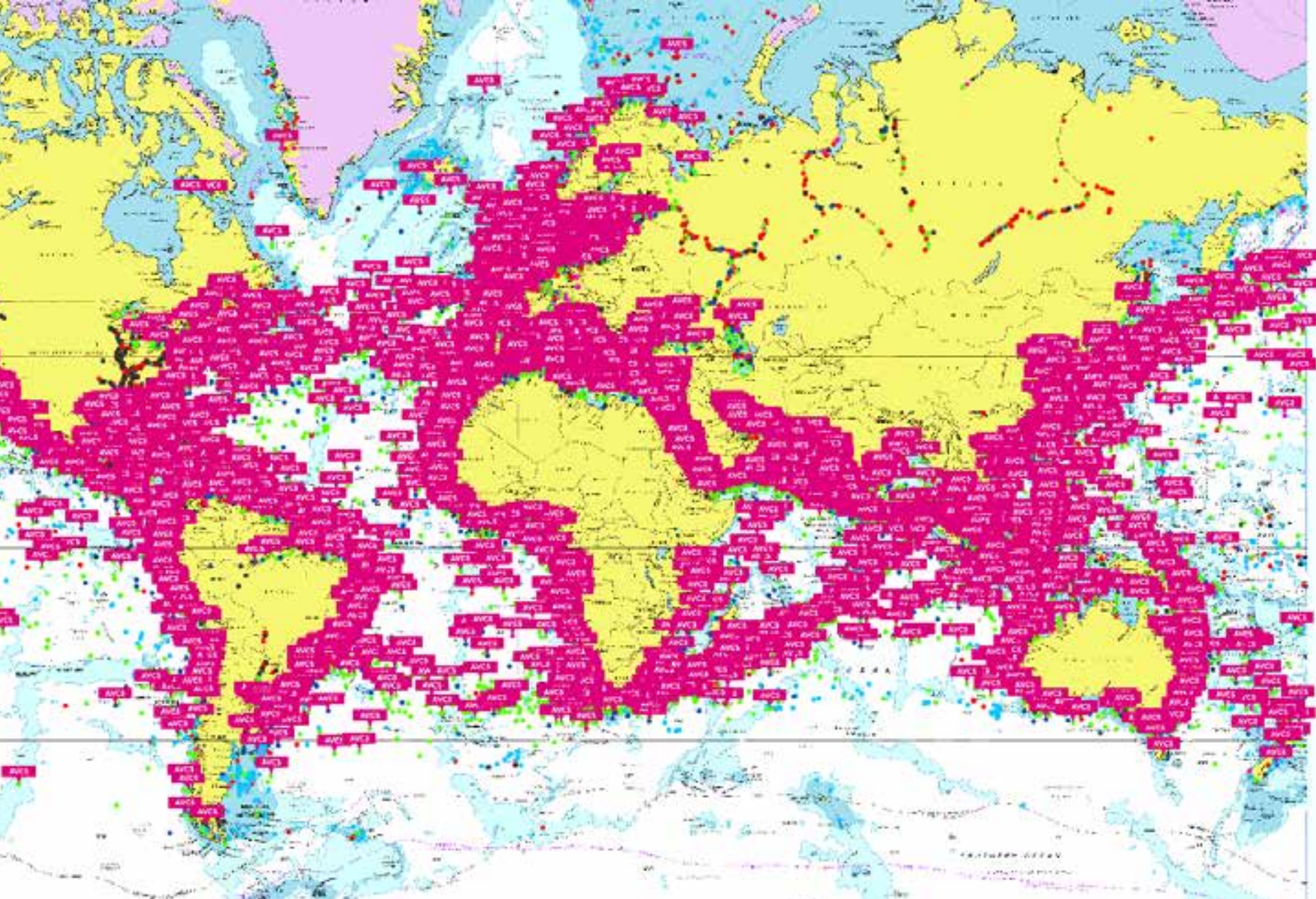


esri UK

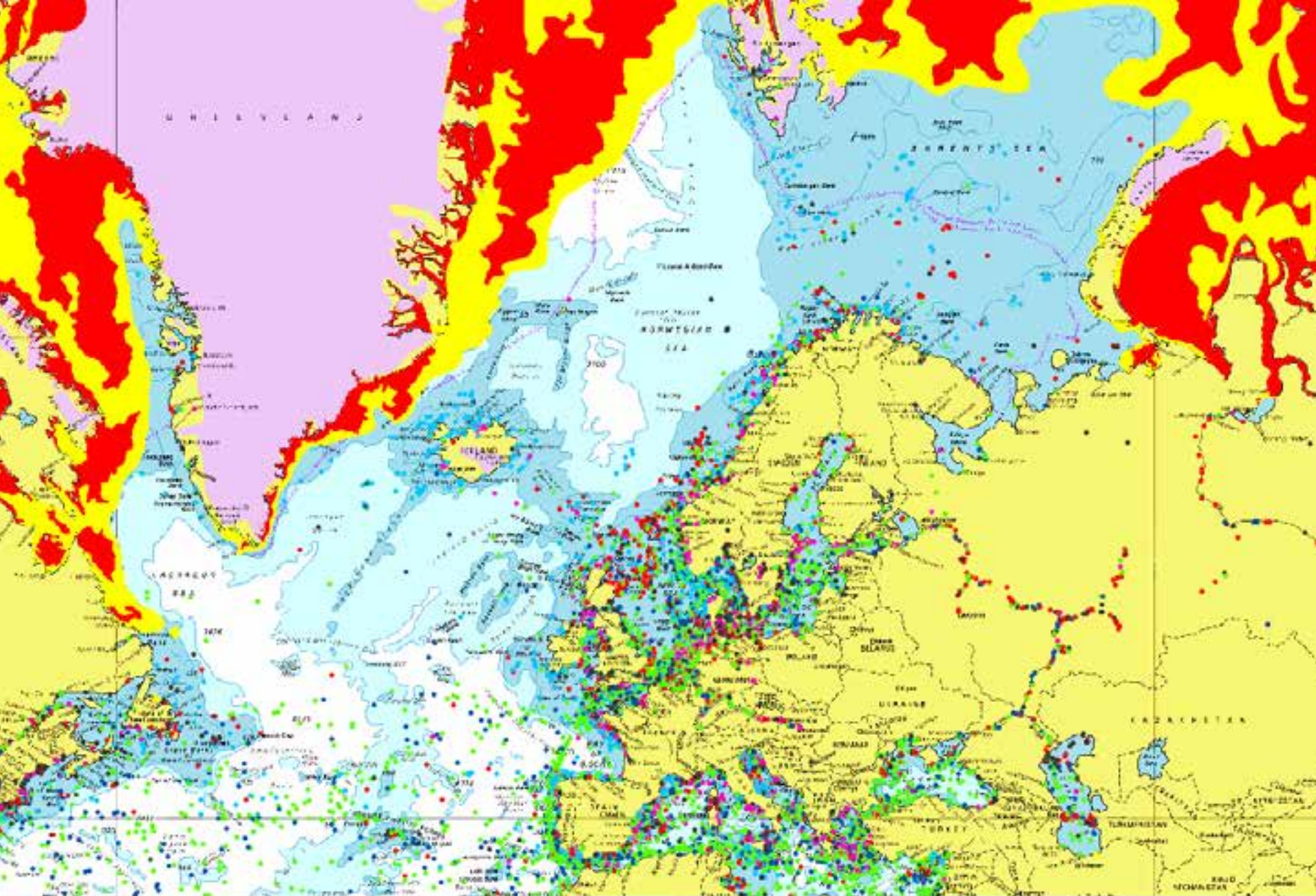




Worldwide Live Satellite & Terrestrial AIS



Customers using our flagship product



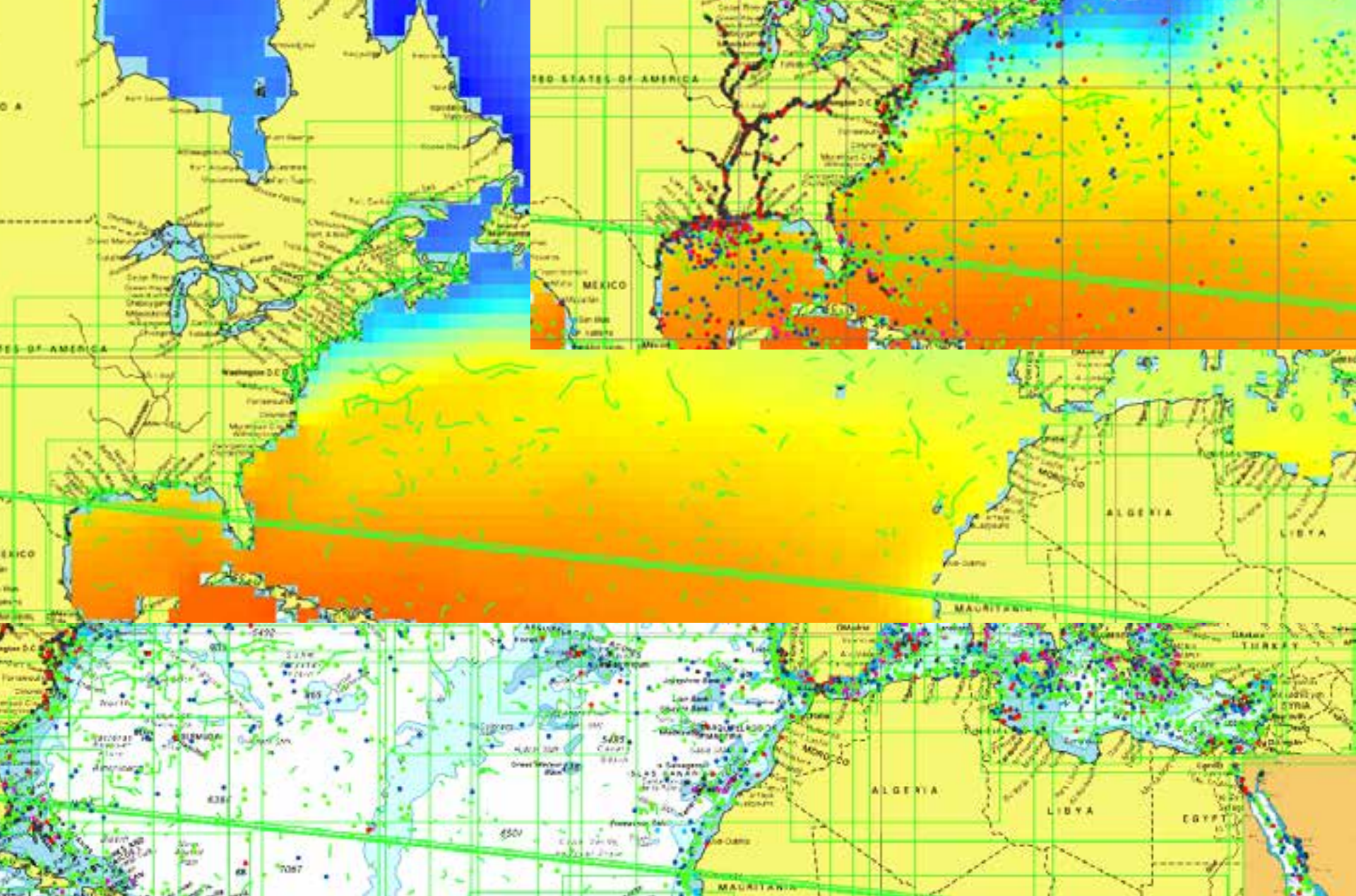
Ice-margins that can affect shipping



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Significant weather events that affect shipping



Bringing together ARGO buoy tracks, sea temperature model, shipping and then running analysis using standard grid formation



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Kernel Density Analysis Application



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Creating the tool



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Using the tool



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Enforcement of MARPOL & SOLAS restrictions



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#name



Problems

n **Worldwide data processing**

- slight detachment from GEP original mandate of multiple sensor feeds to an operation whereupon mass data drops had to be run through a cache to drip-feed the data into the database.

n **'Purchased' Amazon WS EC2 capability**

- We had a package that delivered the core functionality with data processing and analysis capability
 - We broke it when attempting multi-point geofence trigger processing and analysis.



Future Work

n Network Analysis

- Route analysis
- Traffic density/type/noise

n Scenario planning

- Choke point analysis
 - Event-driven Tracking
 - Effects
 - Contingencies

n Hook-up into BAU products



Summary

n **#one**

n **#two**