



Maritime Safety & Security Information System

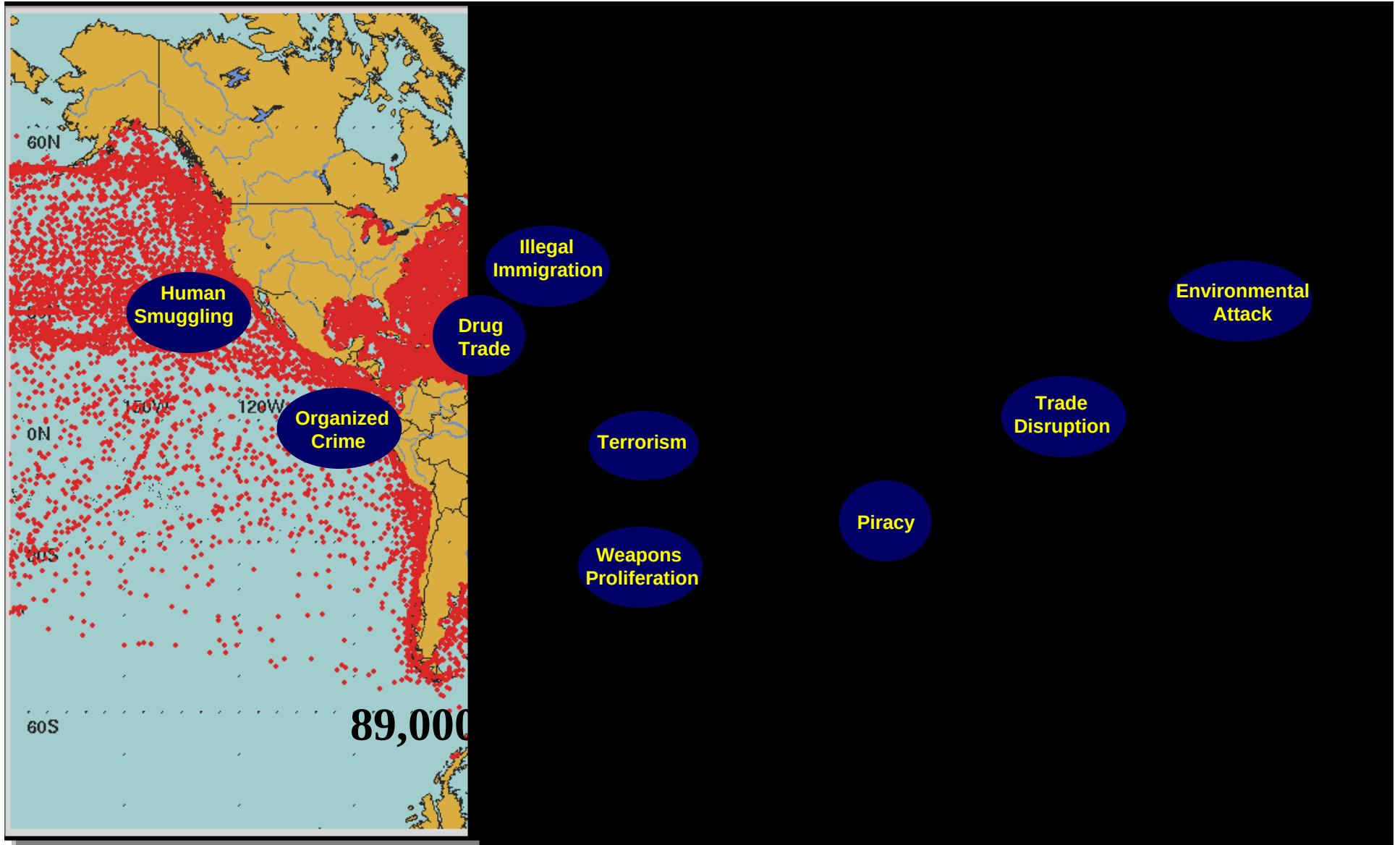


U.S. Department of Transportation
Research and Innovative Technology Administration

*Enabling Global
Maritime Situational
Awareness*

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Maritime Situational Awareness



Common Maritime Challenges

Organized crime

Piracy

Drug smuggling

**Human smuggling and
slavery**

**Illegal weapons
movement/proliferation**

Terrorism

**Exclusive Economic Zone
(resource) exploitation**

Illegal fishing

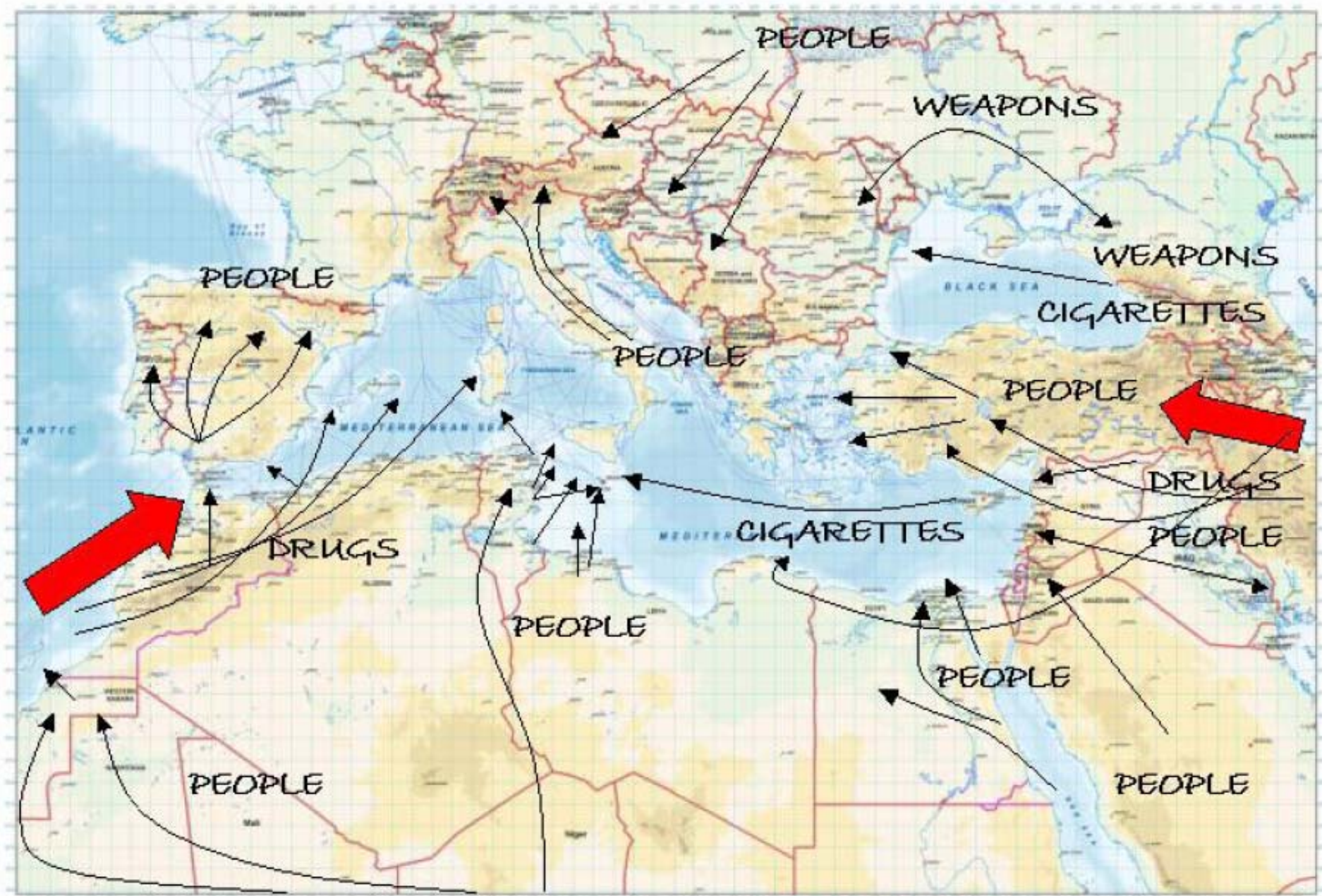
Trade disruption

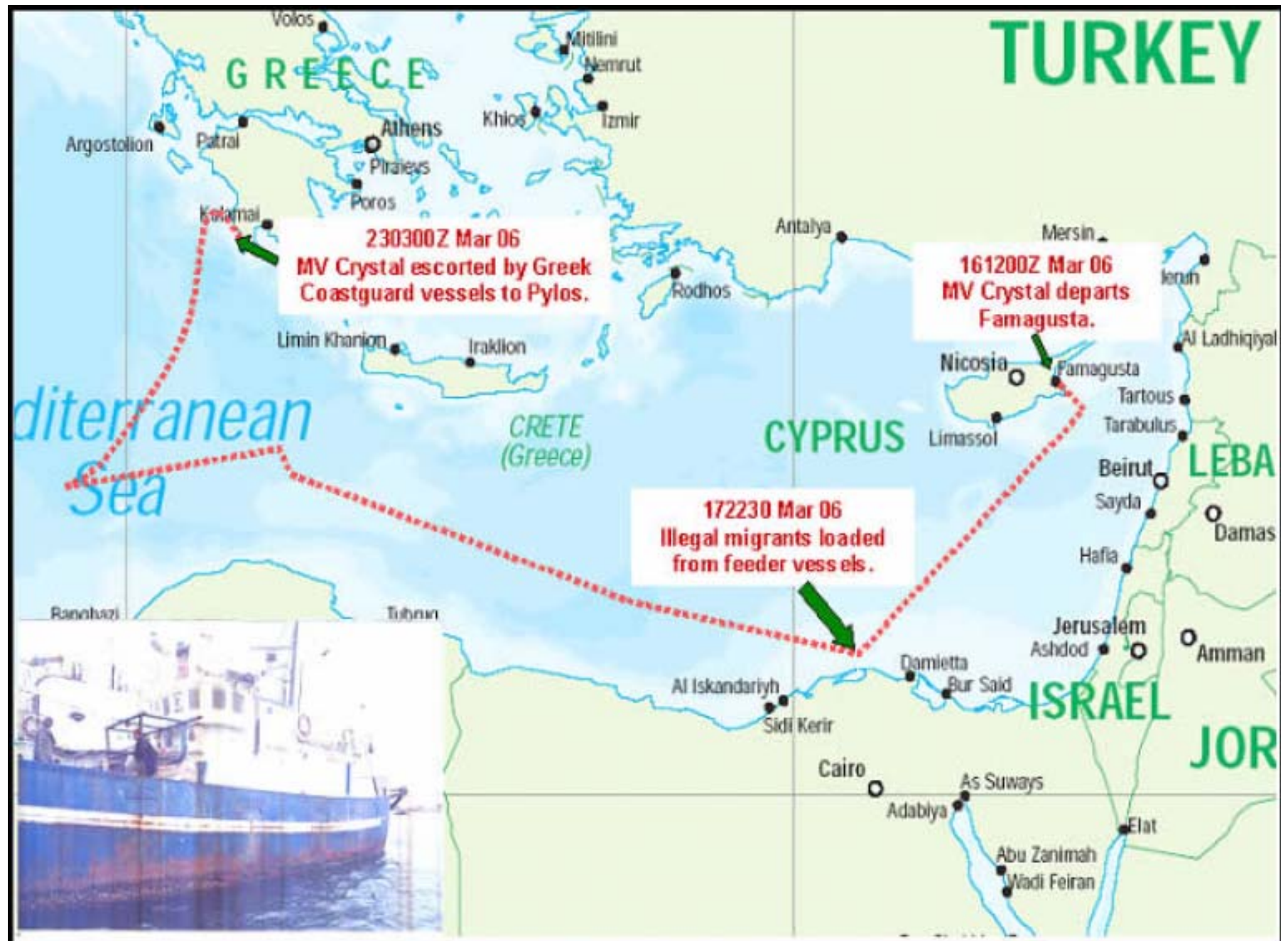
Illegal migration

Search and Rescue

Environmental issues

***Nations find their well-being challenged by these
common maritime issues.***





MDA Guiding Principles

- MDA is fundamental to maritime security – a common interest.
- Proliferate AIS. Apply the air safety/policing model. AIS = IFF at sea.
- It's ALL about the network – leverage the internet.
- Be transparent - share information widely.
- Work interagency.
- Be inclusive - invite new partners, and not just navies – coast guards, shipping and insurance companies, and international organizations all have a role.
- Provide an incentive to join – safety, economic, and security benefits.
- Keep it UNCLASSIFIED – needless classification only weakens network.

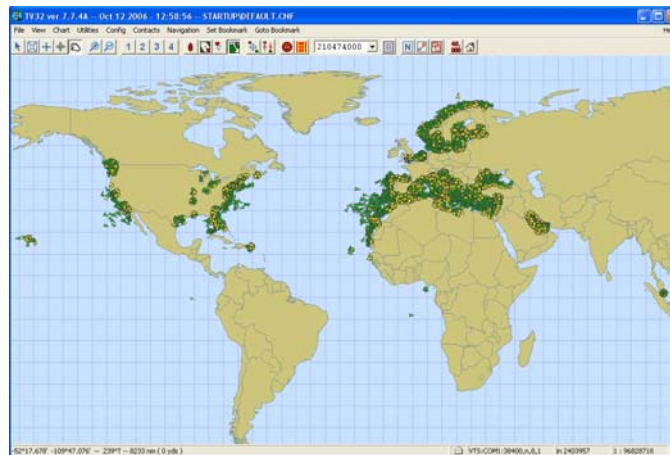
MSSIS

Maritime Safety & Security Information System

Conceived by the U.S. Department of Transportation, NATO, and US Navy as an:

Unclassified, multinational, freely shared, Automatic Identification System (AIS) network

The MSSIS provides clients with real-time AIS data derived from shore side, waterborne, and airborne platforms.



The MSSIS Encourages Participation by all countries through data sharing in order to achieve the universal goal of a safer, more secure, global marine environment.

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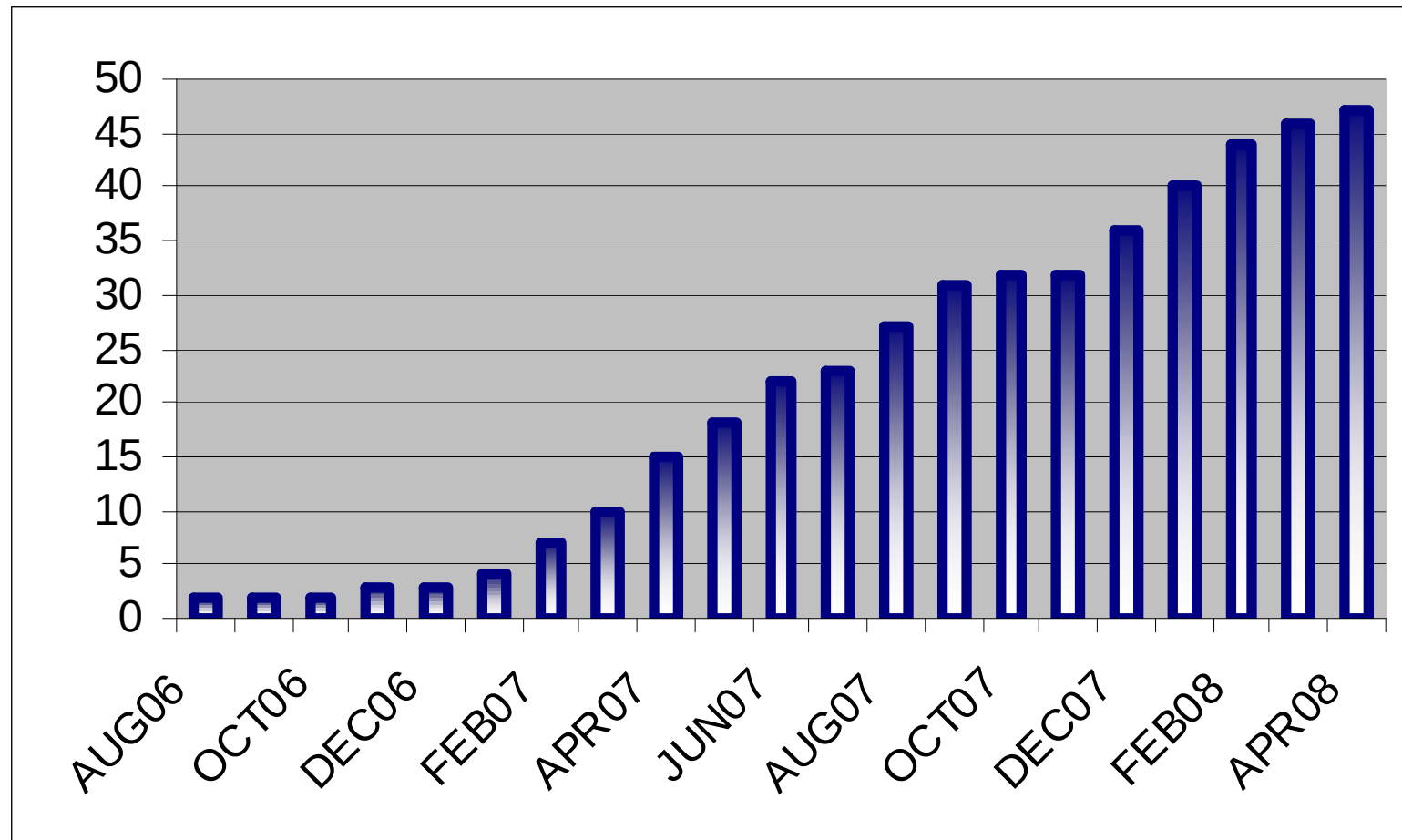
MSSIS: Timeline

- **September 2005** – Demonstration of proposed AIS network, links the ports of Rota, Spain and Souda Bay, Greece. Concept presented to U.S. Navy Sixth Fleet Commander (C6F) and NATO representatives.
- **November 2005** – The Volpe Center continues demonstration for C6F and NATO aggregating feeds from NATO AIS systems in the Mediterranean (coastal systems in Spain, Italy, Greece, Turkey, and shipboard systems). A single desktop computer in Cambridge, MA acts as the network backbone.
- **March 2006** – Kick off meeting and start of the Maritime Safety and Security Information System. Design of the eventual network commences while the demonstration network continues to operate
- **August 2006** – Transition from the demonstration system to the operational MSSIS design laid out over the course of the summer. MSSIS servers at Cambridge, MA operational

MSSIS: Timeline

- **September 2006** – Turkey, Greece, Spain officially join MSSIS
- **October 2006** – USA officially joins MSSIS
- **December 2006** – MSSIS servers installed at Norfolk, VA
- **March 2007** – MSSIS servers installed at US Sixth Fleet HQ, Naples, Italy
- **December 2007** – MSSIS servers installed at NATO Command Component Maritime HQ, Naples Italy. At a Maritime Domain Awareness conference in Santiago Chile, a panel of South American navy admirals recommend joining MSSIS.
- **February 2008** – Middle East and Arabian Gulf nations are introduced to MSSIS at the Maritime Infrastructure Protection Symposium in Bahrain.
- **April 2008** - MSSIS has over 50 member nations.

MSSIS: Country Participation



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MSSIS Participating Countries

Albania

Australia

Bahrain

Belgium

Bulgaria

Cameroon

Canada

Cape Verde

Chile

Croatia

Denmark

Estonia

Finland

France

Gabon

Gambia

Georgia

Germany

Ghana

Greece

Iceland

Iraq

Ireland

Israel

Italy

Jordan

Liberia

Lithuania

Malta

Mauritania

Montenegro

Morocco

Mozambique

Netherlands

New Zealand

Nigeria

Norway

Poland

Portugal

Romania

Sao Tome & Principe

Senegal

Serbia

Singapore

Slovenia

Spain

Togo

Tunisia

Turkey

Ukraine

United Kingdom

United States

Yemen

Automatic Identification System (AIS)

Mandated by IMO

“to improve the maritime safety and efficiency of navigation, safety of life at sea and the protection of the marine environment”

IMO *International Convention for the Safety of Life at Sea (SOLAS) Chapter V, Safety of Navigation, Regulation 19, 1974/1980*



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Who is required to have AIS?

Per the IMO SOLAS Convention

- All passenger ships.
- All cargo ships ≥ 500 GT.
- Ships ≥ 300 GT on international voyages.

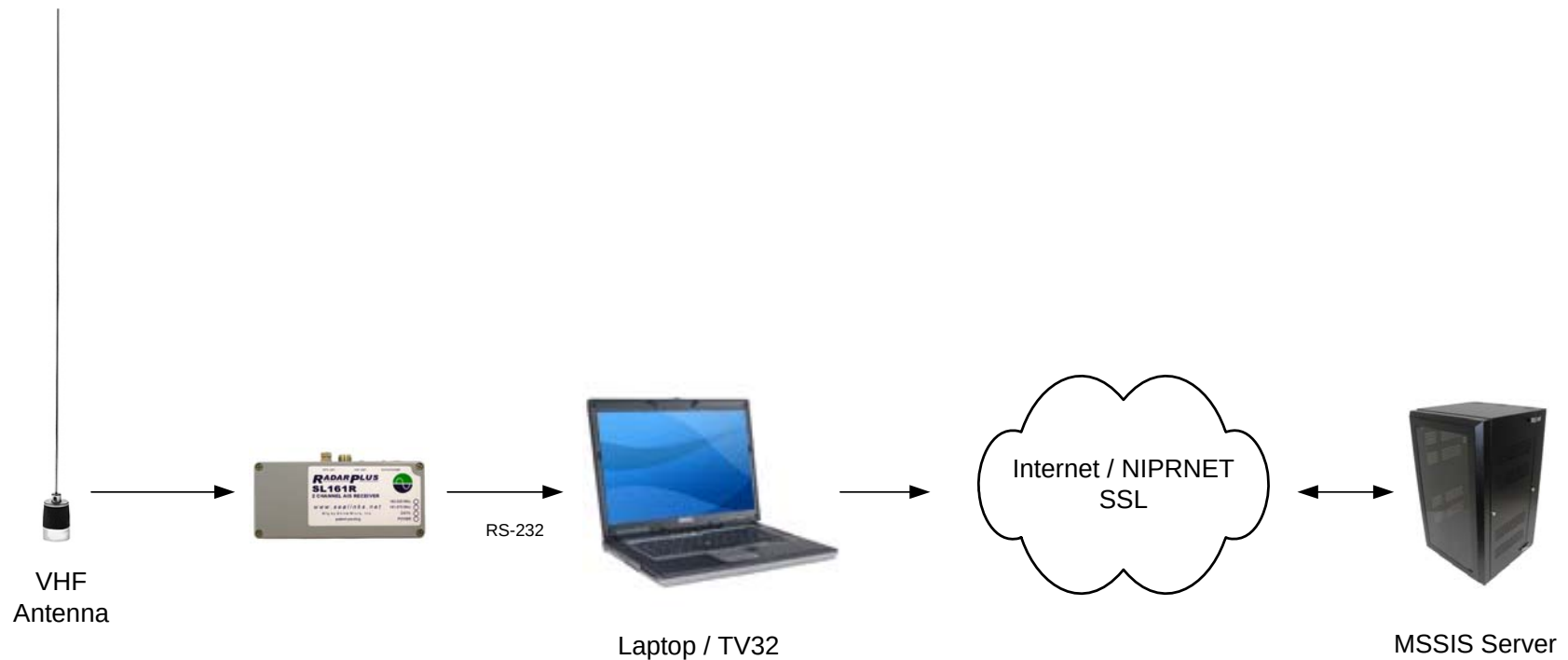
Does not apply to:

- Warships / Naval auxiliary.
- Vessels owned/operated by government and used on government non-commercial service.

In U.S. Waters, a USCG amendment for Commercial vessels ≥ 65 feet.

Augmented in some cases by local regulations (as example, Singapore requires a transponder on any and all water craft).

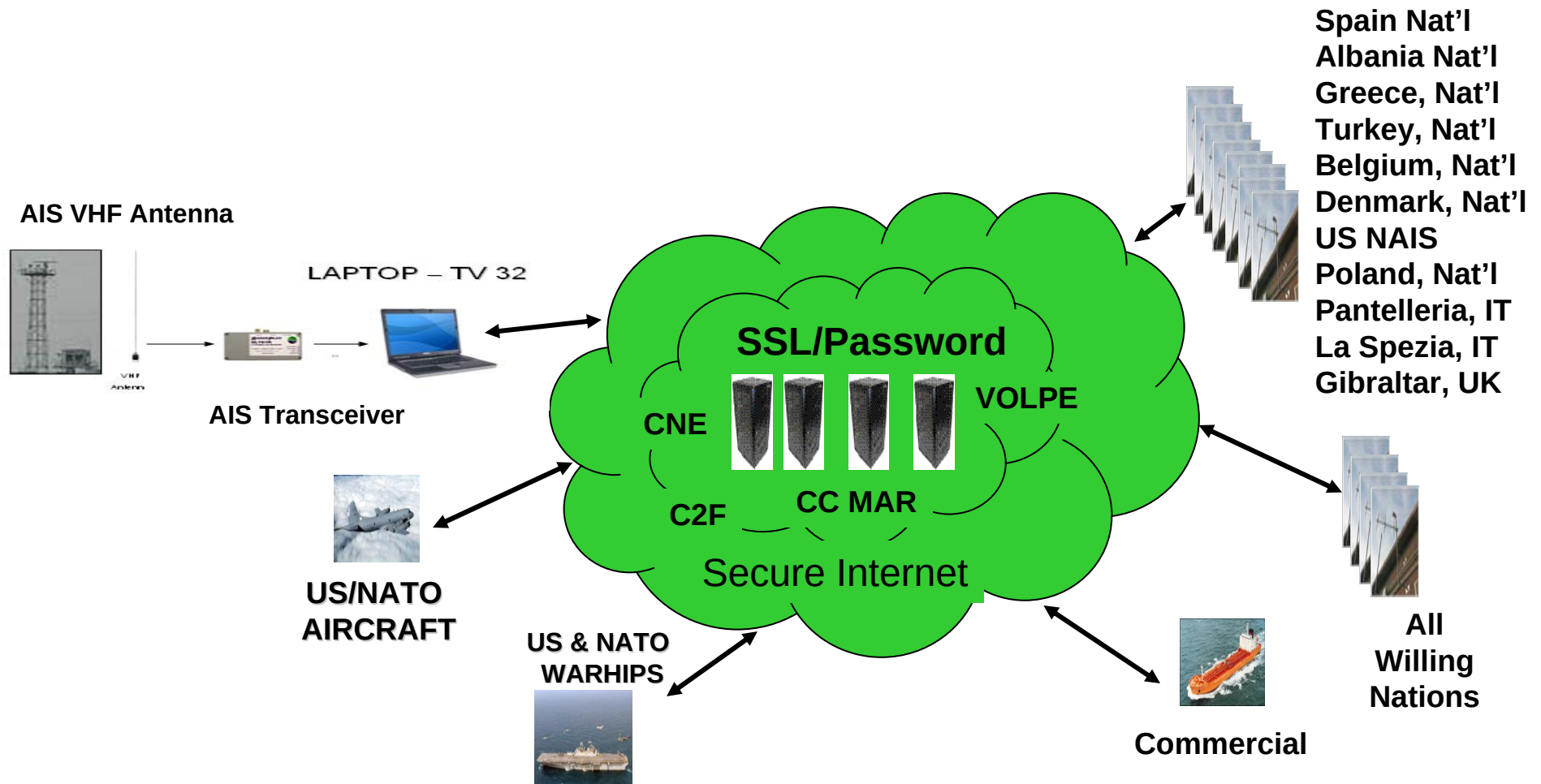
Simple MSSIS - AIS Provider



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MSSIS Architecture



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MSSIS Server – Volpe Center

MSSIS Firewall/Router



AIS Collector (sources)



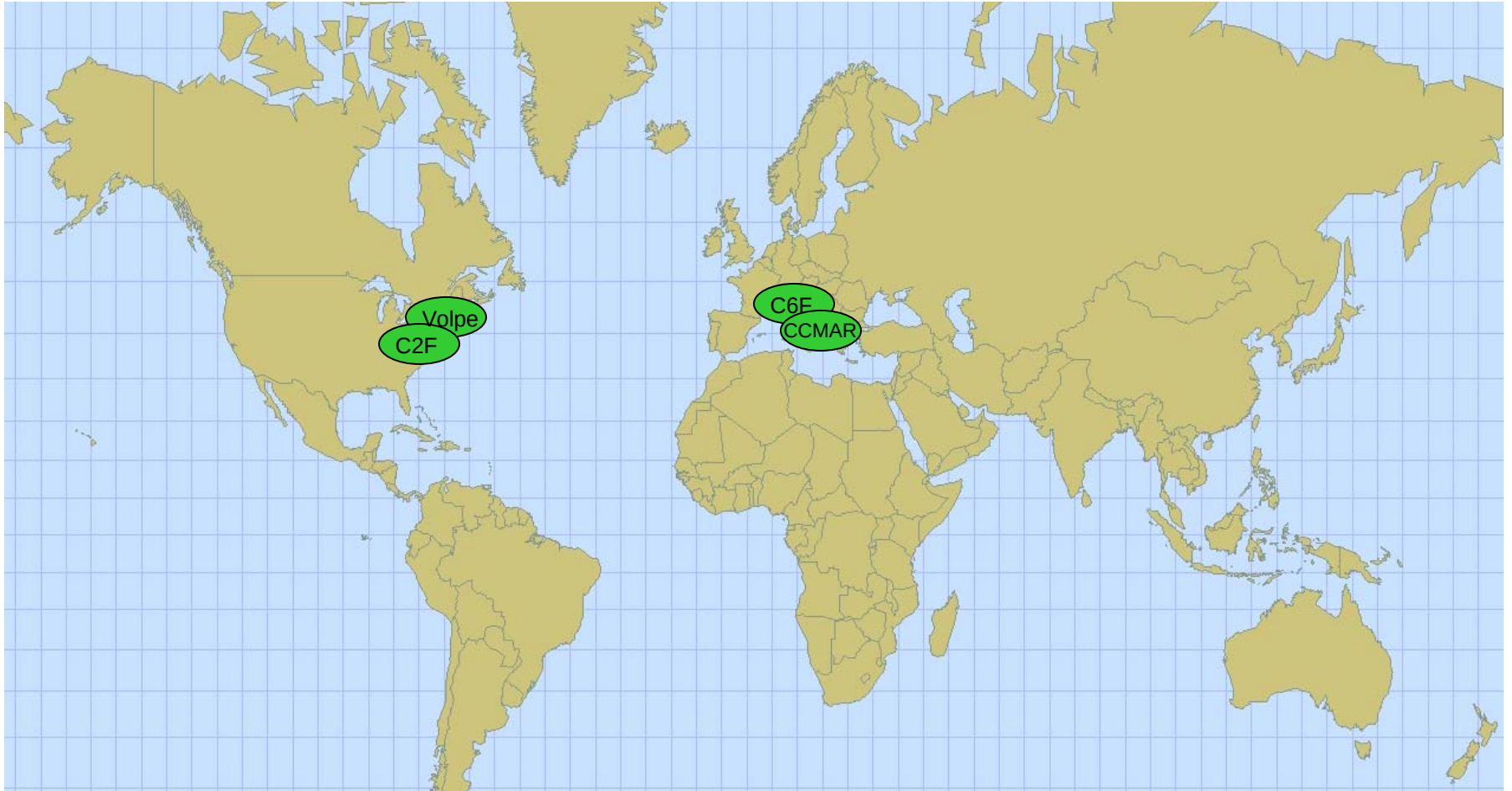
Data Thinner



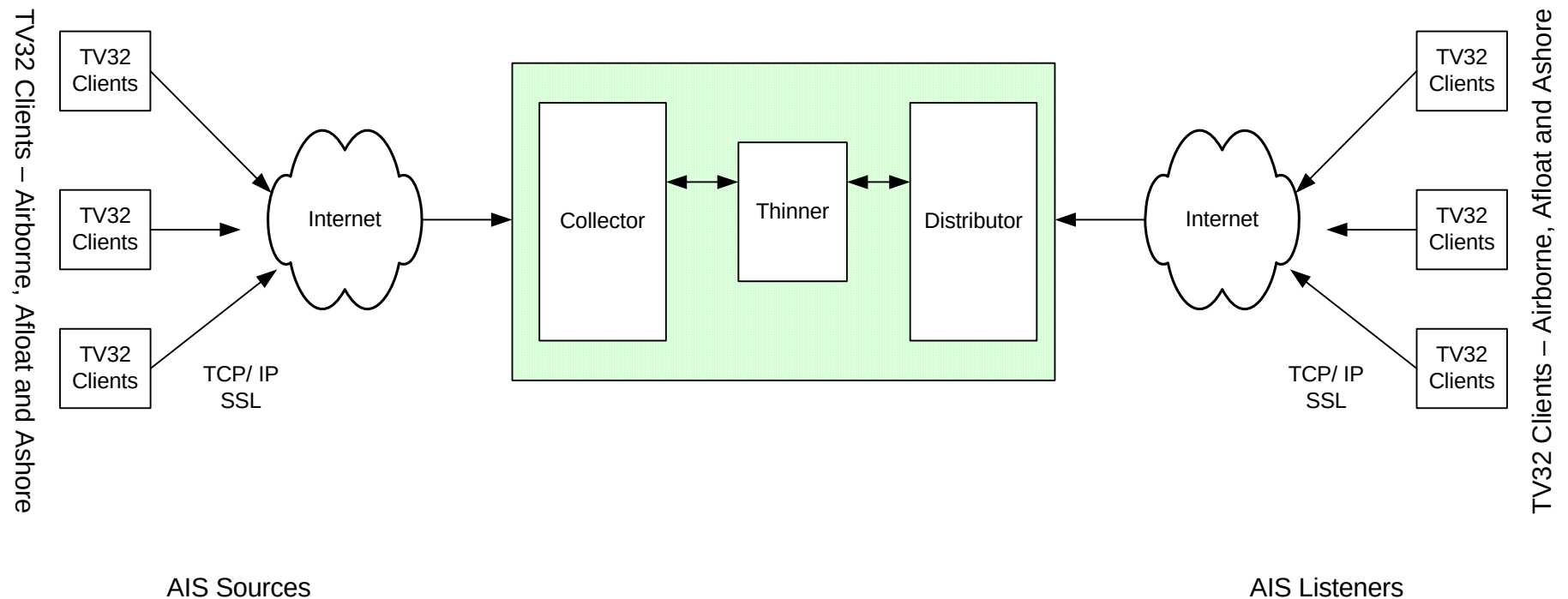
AIS Distributor (clients)



MSSIS Server Locations



MSSIS Server Suite



Note: Some clients might be both sources and listeners

MSSIS Administration

Email notification of Receiver outage

✉ root	Mon, 20 Aug 07 10:17:35 +0000-- Belgium (192050001) Status: RESET	Mon 8/20/2007 6:19 AM	11 KB ▾
✉ root	Mon, 20 Aug 07 10:07:35 +0000-- Belgium (192050001) Status: DOWN	Mon 8/20/2007 6:09 AM	11 KB ▾

Receiver 31 day status page

192050001

Last Updated (UTC): Mon August 20 19:39:38 2007

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Success
Day 1																									19%
Day 2																									7%
Day 3																									0%
Day 4																									0%
Day 5																									61%
Day 6																									98%
Day 7																									100%
Day 8																									35%
Day 9																									70%
Day 10																									100%
Day 11																									95%
Day 12																									100%
Day 13																									100%
Day 14																									99%
Day 15																									100%
Day 16																									100%
Day 17																									100%
Day 18																									100%
Day 19																									100%
Day 20																									78%
Day 21																									0%
Day 22																									100%
Day 23																									98%
Day 24																									98%
Day 25																									99%
Day 26																									90%
Day 27																									99%
Day 28																									100%
Day 29																									100%
Day 30																									96%
Day 31																									23%
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Success

MSSIS Administration

Monitoring System
data rates across
multiple servers

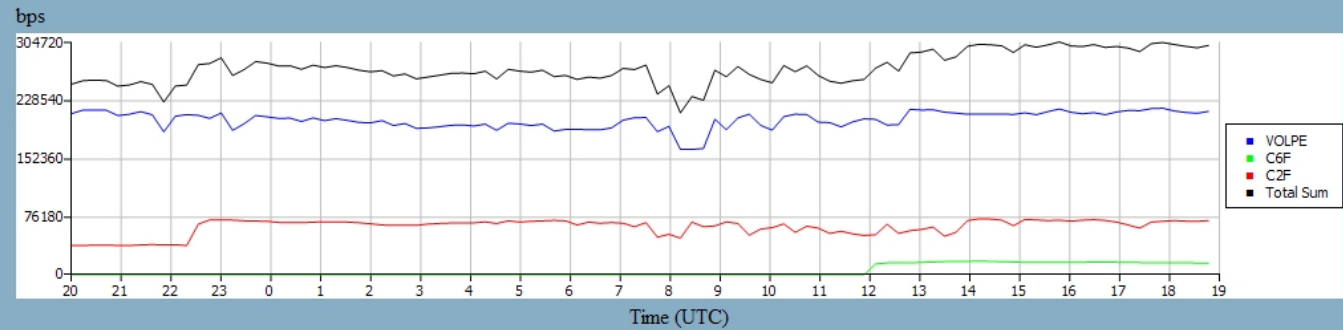
Total - Server Status Page

Collector - Users: 73 - Bits/Second: 296,488
Distributor - Users: 110 - Bits/Second: 4,576,374

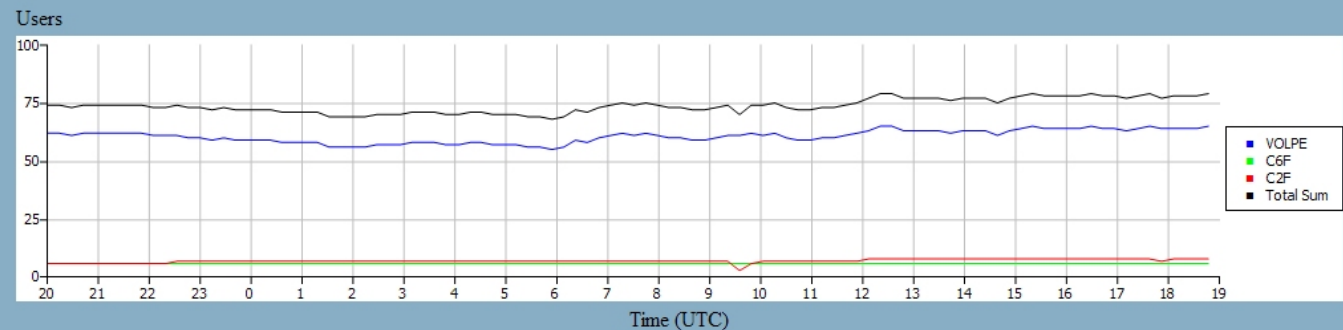
Color Key

■	C2F
■	C6F
■	Volpe

Total - Collector 24 Hr bits/second Trend



Total - Collector 24 Hr Users Connected Trend





AIS Data Request Messages

- ☐ Req #1 \$PVL,MSSIS,RGNREQ1,00000002,7FFFFFFE0,19.9365,3
☒ Req #2 \$PVL,MSSIS,RGNREQ2,00000020,0000001E,-8.2158,37
☐ Req #3 \$PVL,MSSIS,RGNREQ3,,,,,*50

- ☐ 00 - Outside All Regions
☒ 01 - Excl Econ Zone - East Coast
☒ 02 - Excl Econ Zone - Gulf of Mexico
☒ 03 - Excl Econ Zone - Caribbean
☒ 04 - Excl Econ Zone - West Coast
☐ 05 - Contig. Zone (24nm) - East
☐ 06 - Contig. Zone (24nm) - Gulf
☐ 07 - Contig. Zone (24nm) - West
☐ 31 - Data Marked for Testing

Clear Msg

Include Data From

- ☒ Selected Regions
(Check at left)
☐ Selection Box
(Define Box)
☐ Regions and Box
(Intersection)
☐ Regions or Box
(Union)

Define Box

Select Report Rate

- ☐ All data
☐ Unique data
☐ 30 s
☐ 1 m
☐ 2 m
☒ 5 m
☐ 10 m
☐ 15 m
☐ 30 m
☐ 60 m

Check All

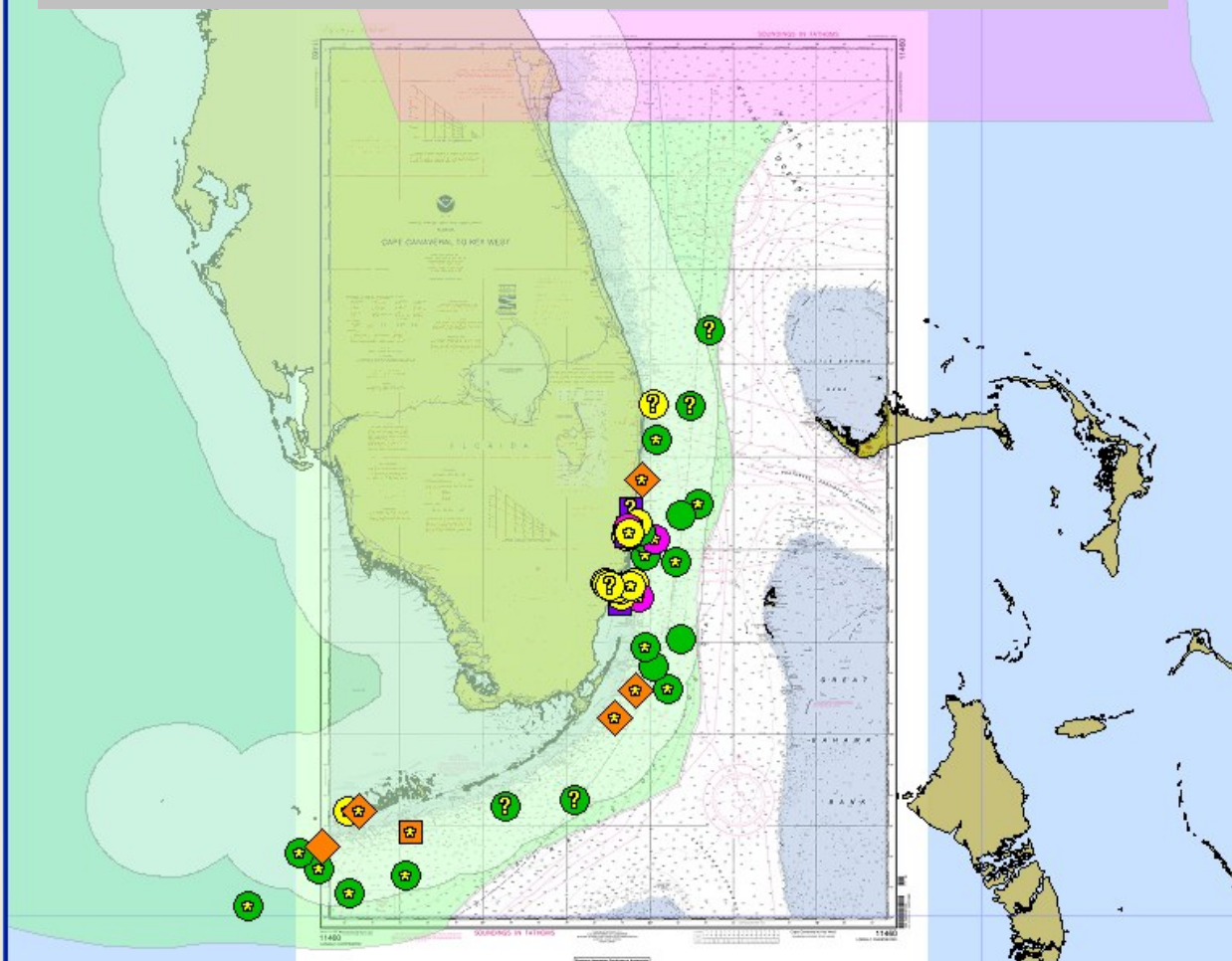
Uncheck All

Send Requests

List Station IDs (separated by commas) to receive data from these stations regardless of region selections defined above.

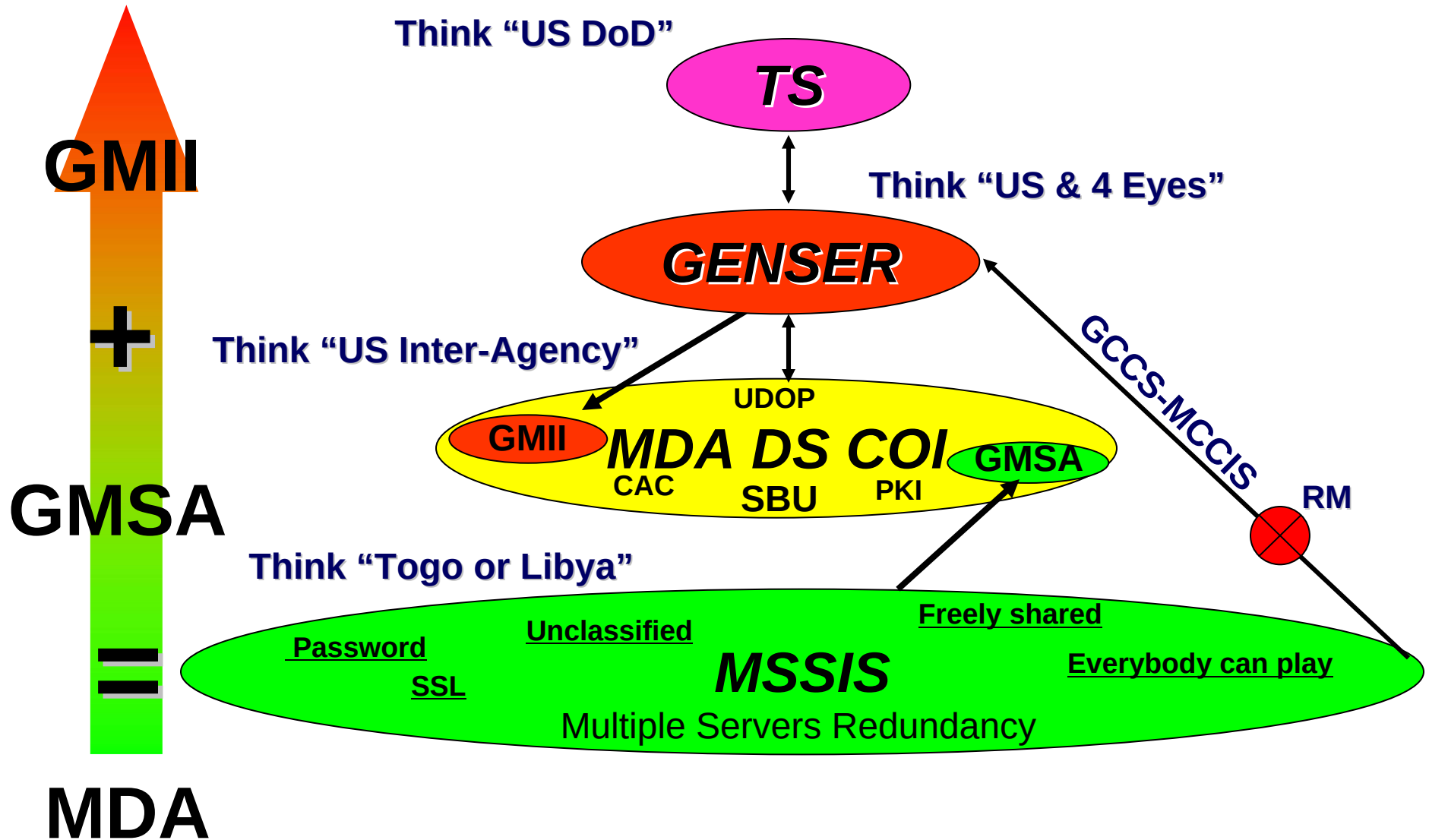
☐ Stations

Server defined data selection regions



Vessel Traffic within the Exclusive Economic Zone

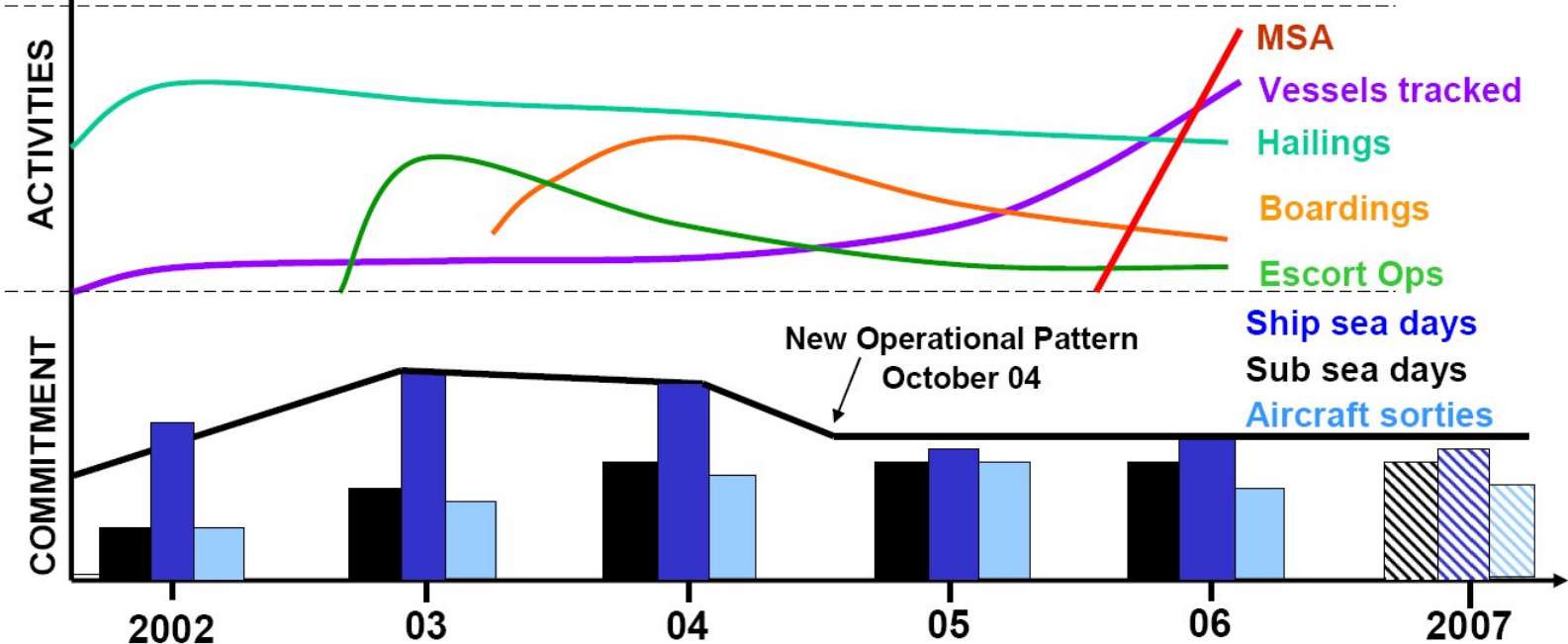
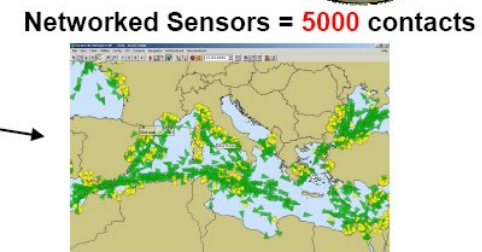
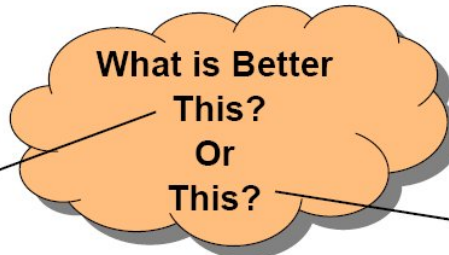
How MSSIS Fits

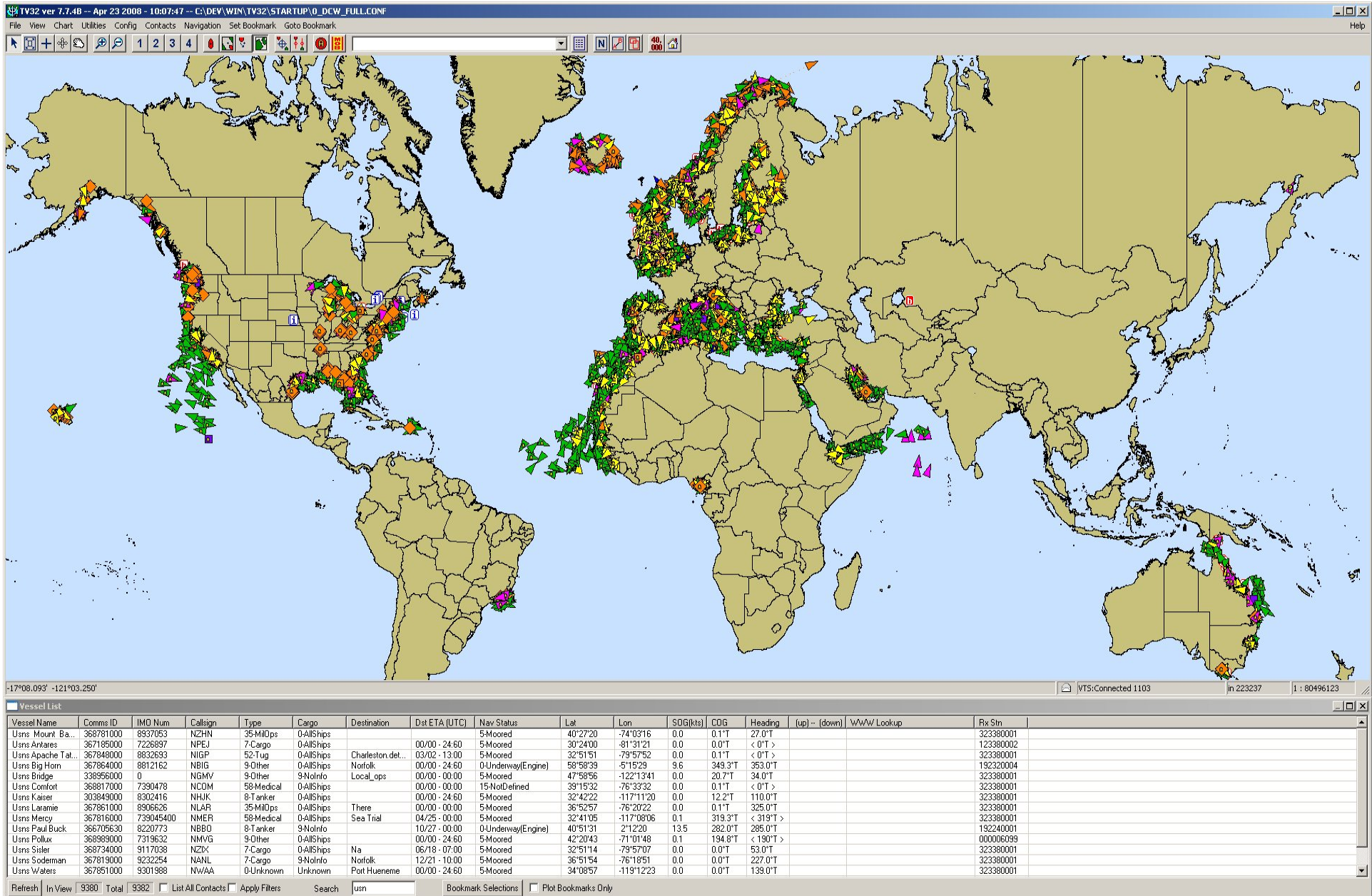


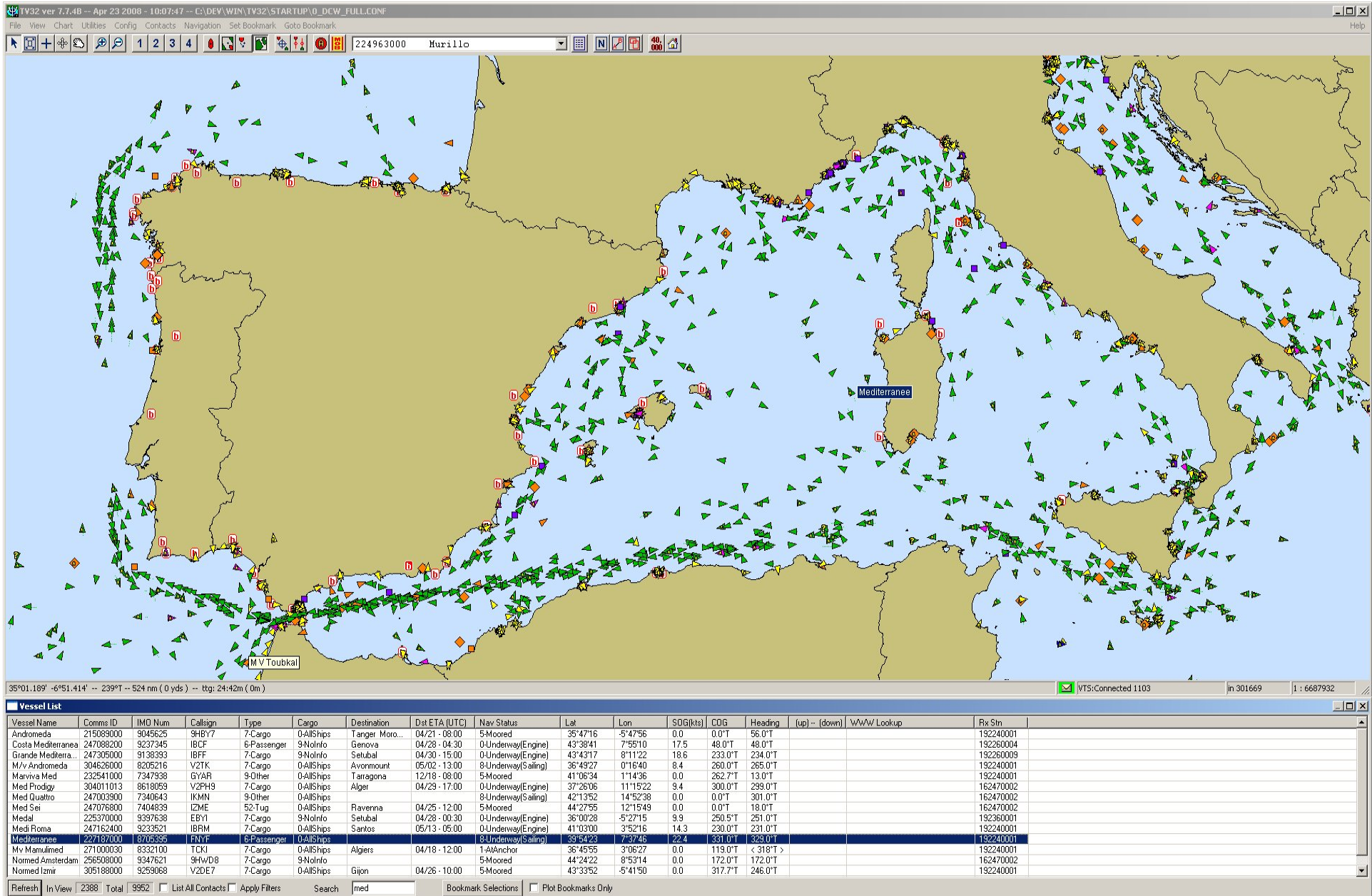
MSSIS role in NATO Operations

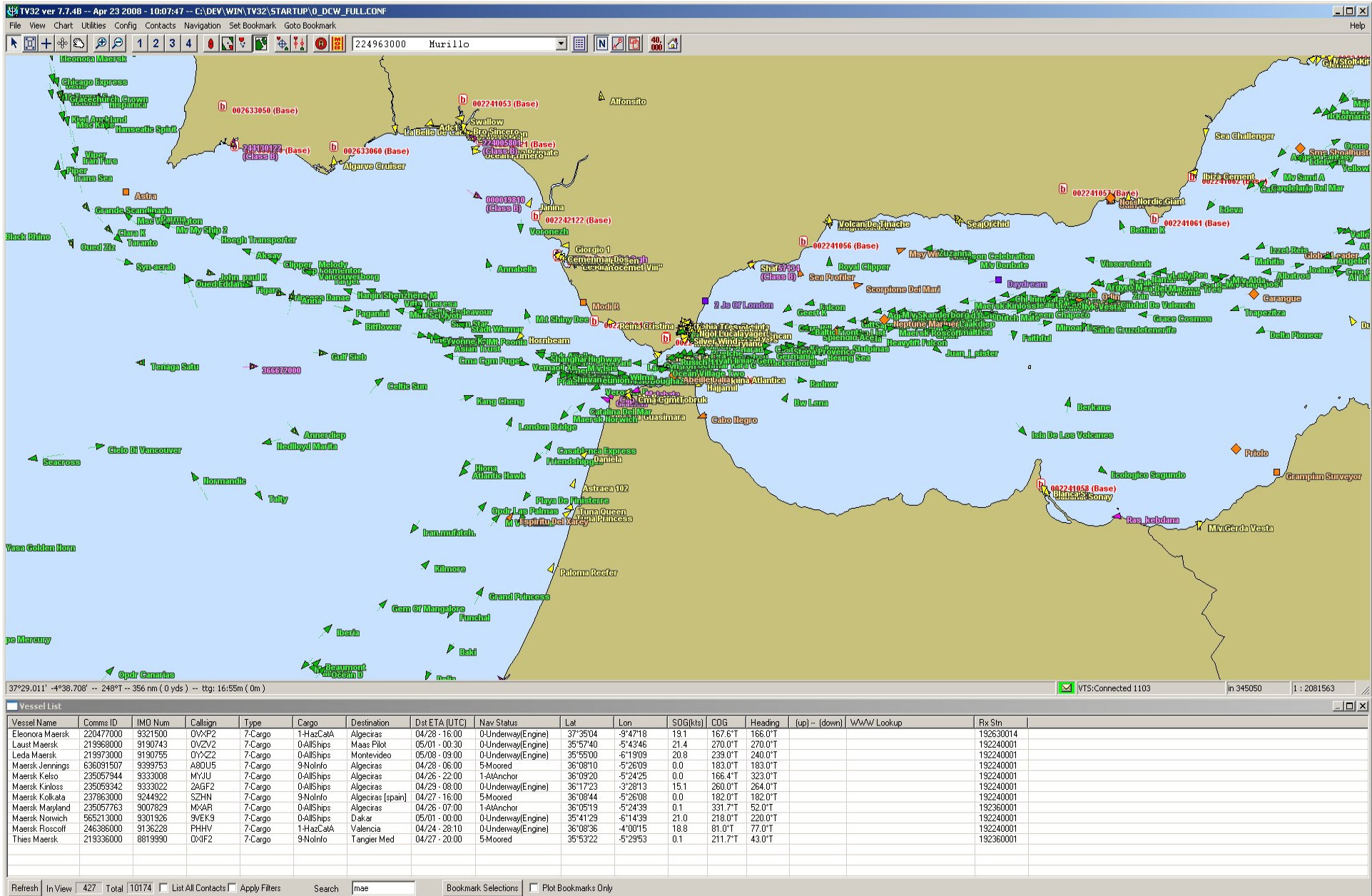


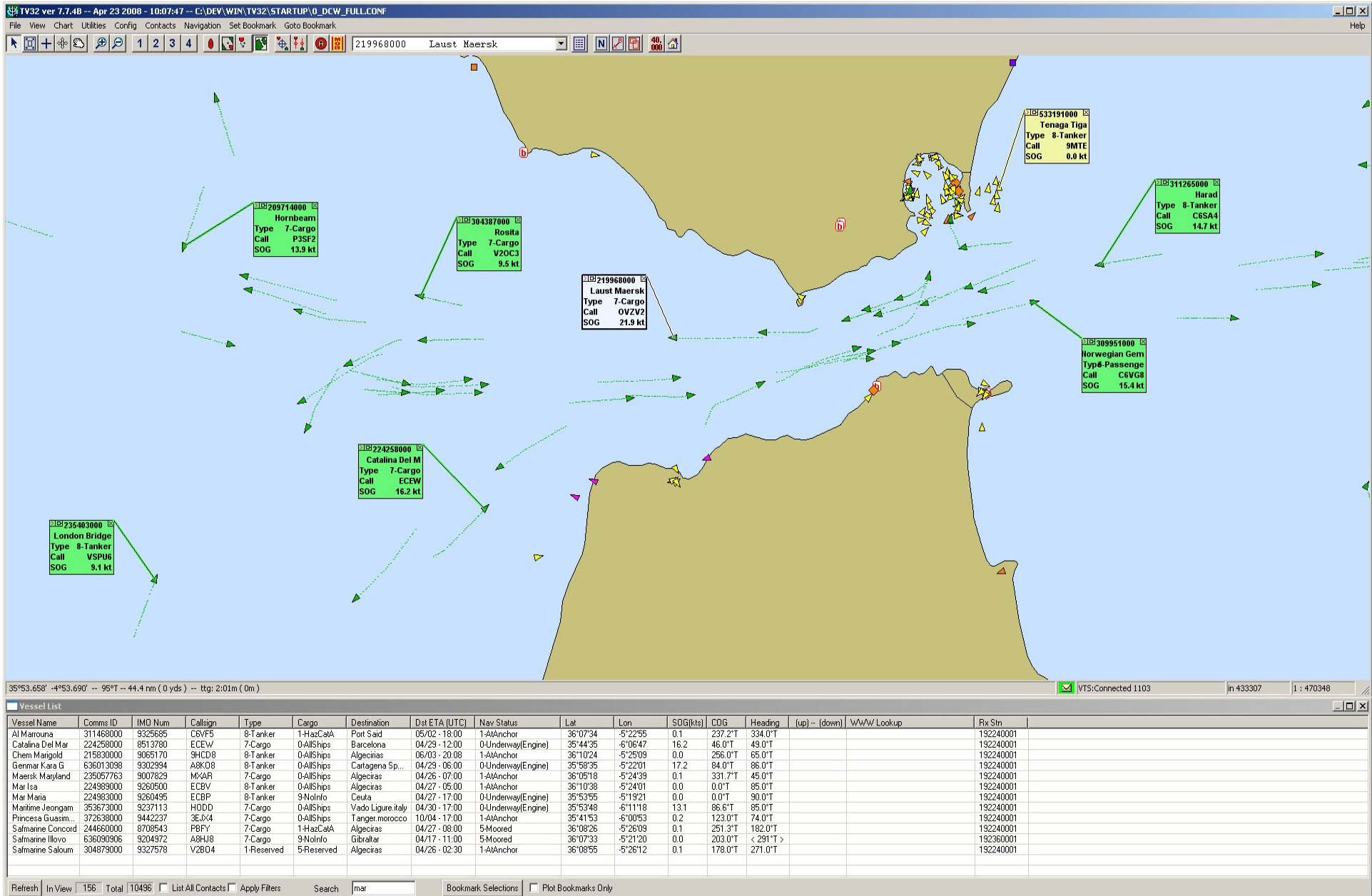
OAE EXECUTION

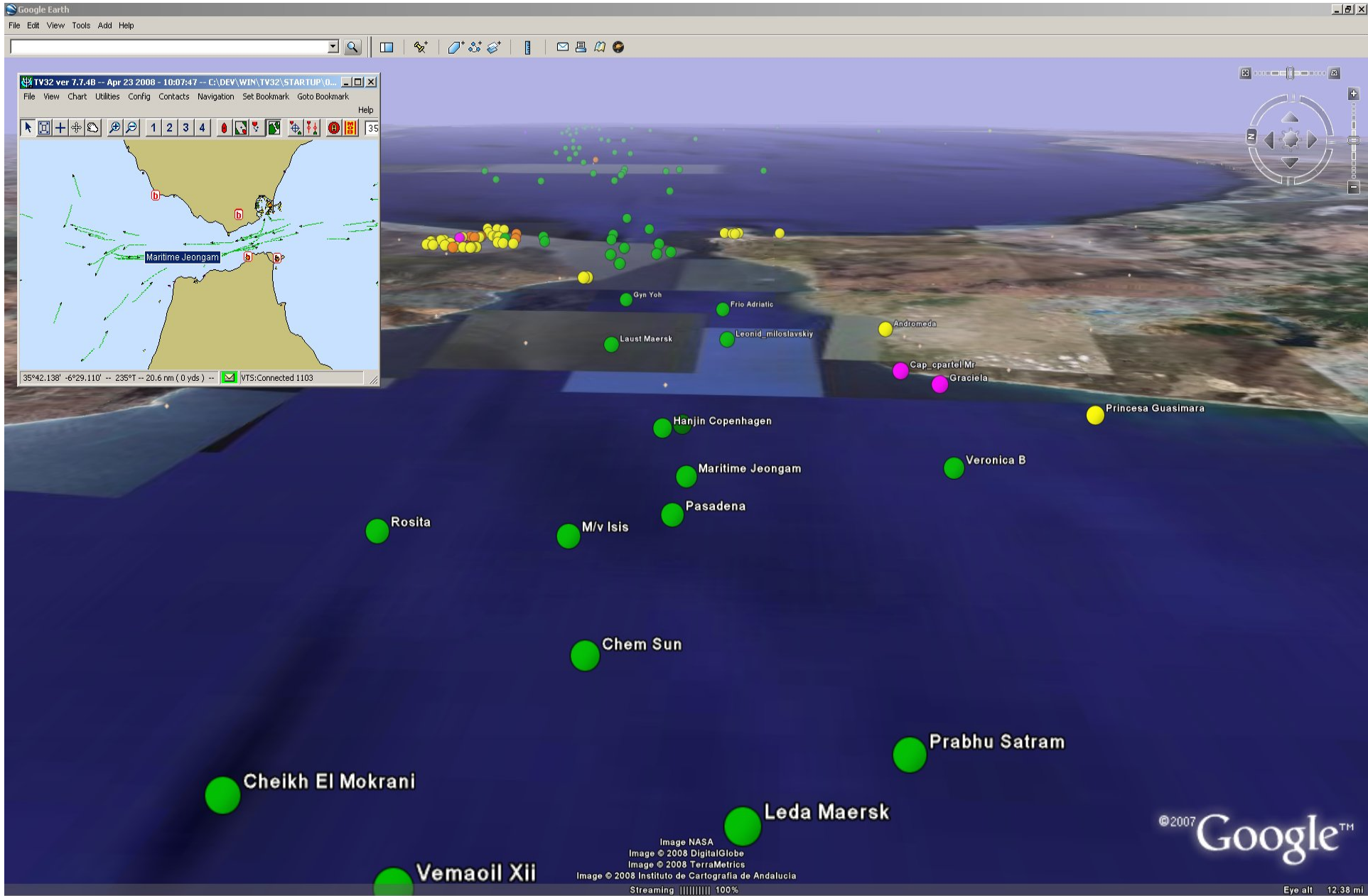


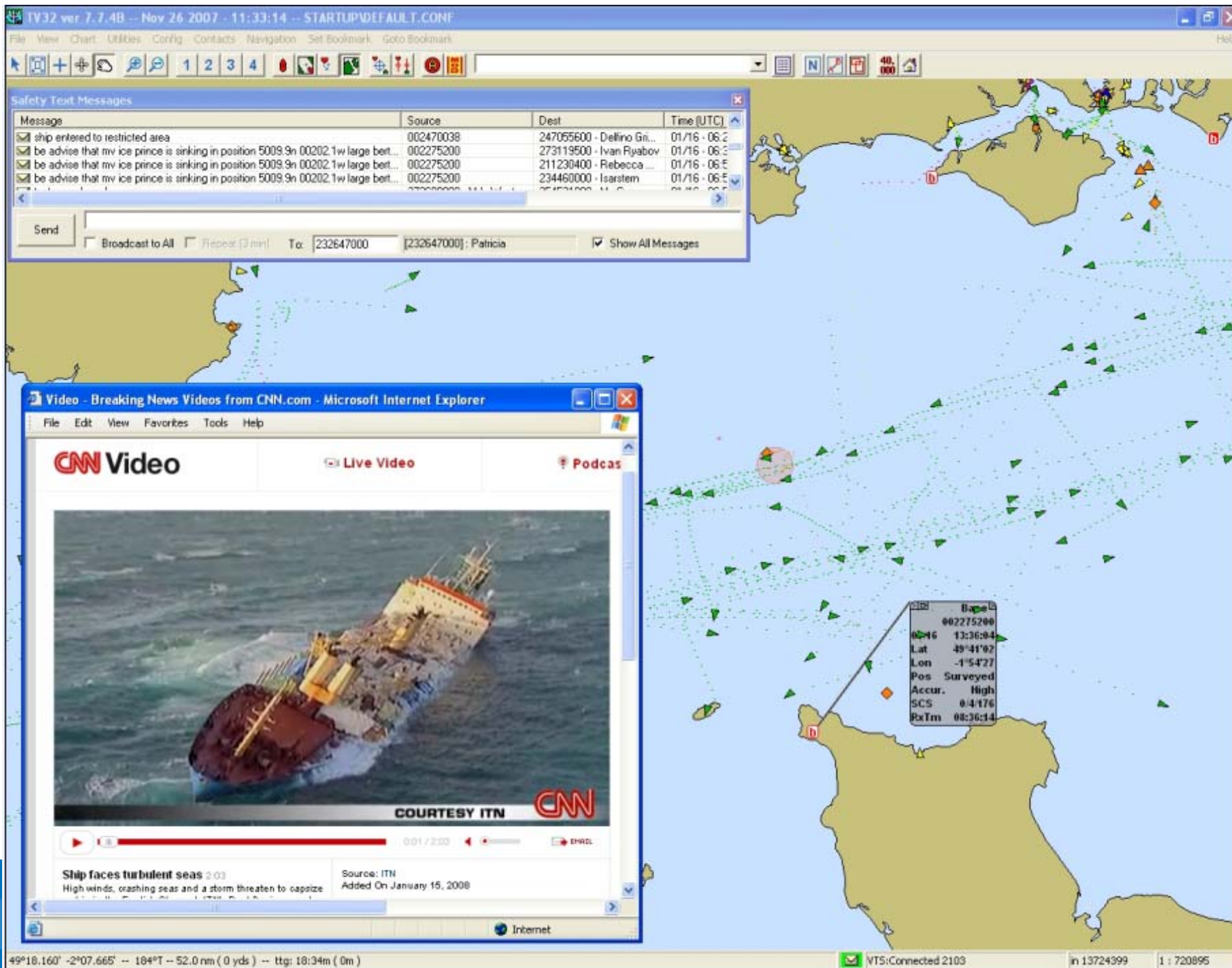












Google Earth

File Edit View Tools Add Help

warren st. georgetown, ma



Cosco Busan

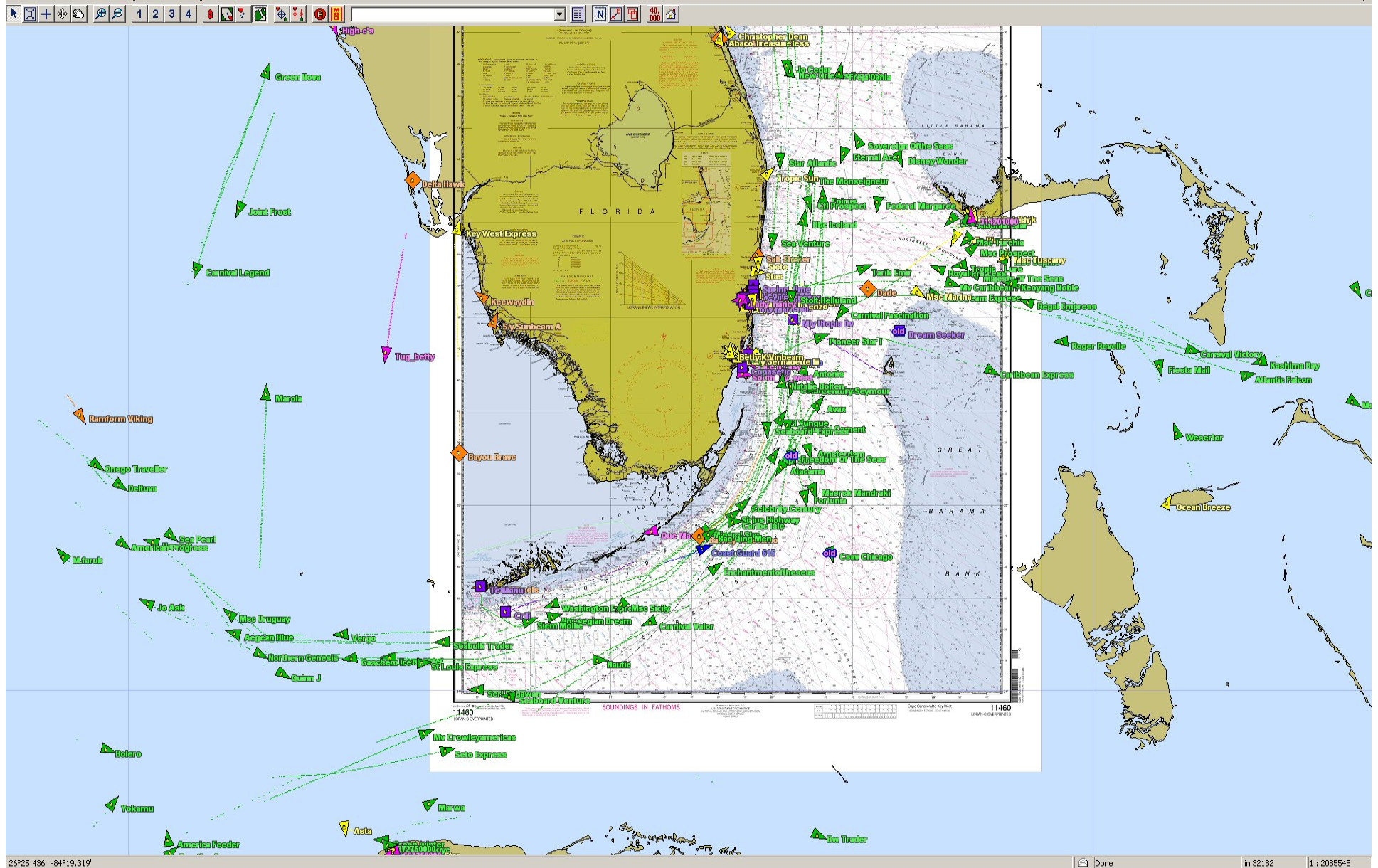


MMSI	477968900
IMO Num	9231743
Callsign	VRDI6
Type	7-Cargo
Destination	Pusan S Korea
ETA	11/15 - 22:00
Status	0-Underway(Engine)
SOG / COG	9.2 kts / 304
Report Time	16:29:58 (UTC)
Size	275m x 40m x 12.3m

[TV32 Supplied Webpage](#)
[USCG Maritime Information Exchange](#)
[Shipspotting \(photos\)](#)

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Image © 2007 TerraMetrics
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The value of MSSIS has been demonstrated both in terms of CNE-C6F operations and NATO's Operation Active Endeavour. In several cases, high interest vessels were located and tracked using the network. The ability to share this information enabled us to work the end game with national authorities where we otherwise would have been unable to investigate a suspicious vessel. MSSIS has enabled seizures of contraband and illegal immigrants, as well as rescues at sea.

MSSIS represents a repository of trust, and this trust is what keeps nations in the network. And while we seek to share the burden of running it, all of the participants look to us for the leadership and ideas to develop it further. We must be careful not to shortchange this role, allow MSSIS to degrade, or give the impression that we value classified and bilateral arrangements over unclassified multilateral exchange, as it would be perceived as a betrayal of trust and set back our efforts to build maritime partnerships.

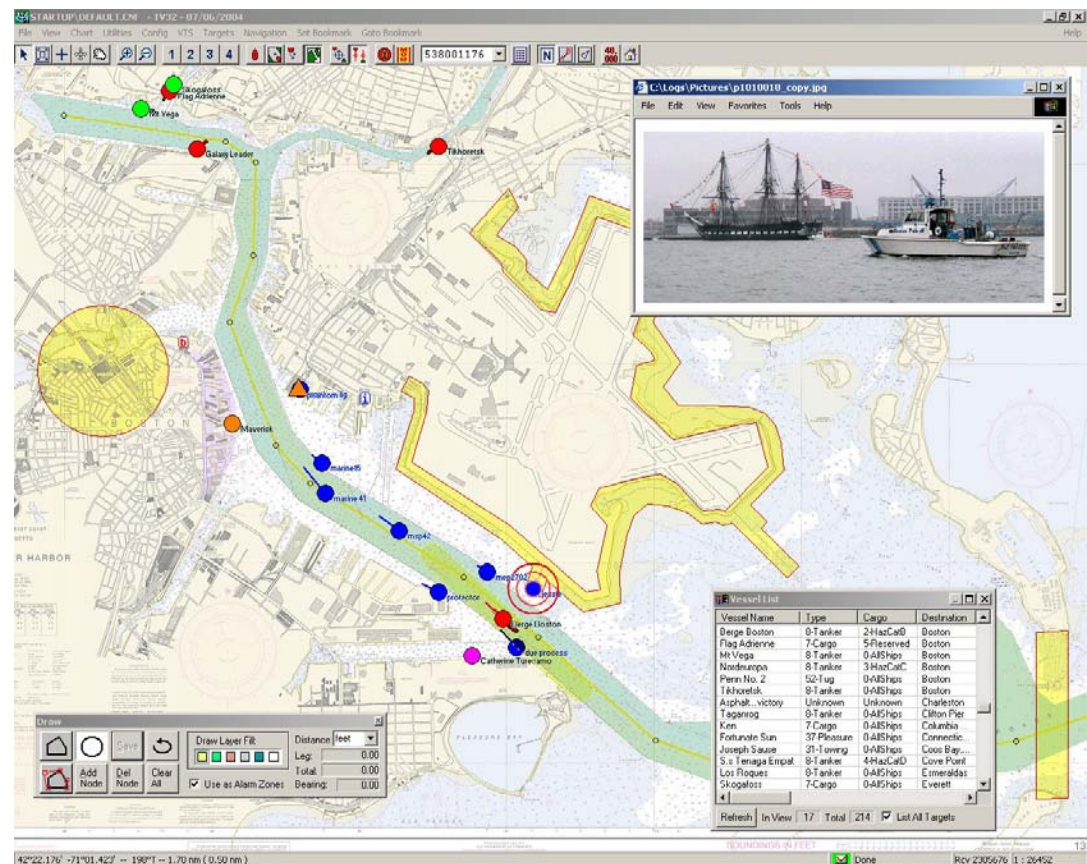
Excerpt from Admiral Ulrich, Commander U.S. Naval Forces Europe, letter to Admiral Roughead, Chief of Naval Operations

October 2007

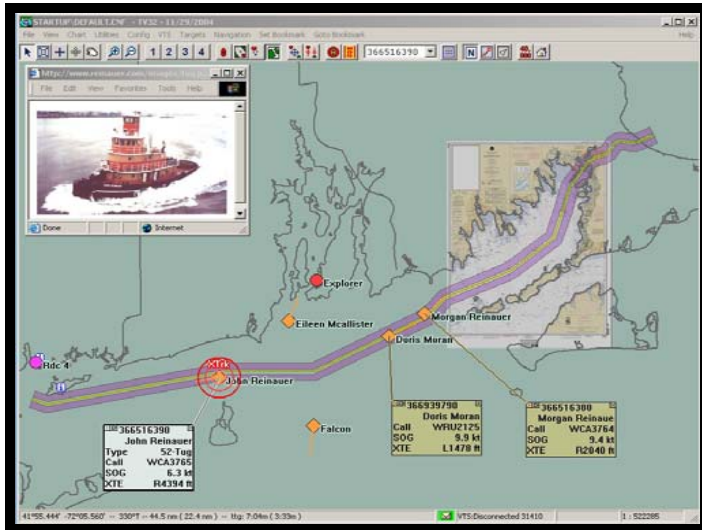
Transview (a.k.a TV32)

TV32 is a windows application developed by the Volpe Center for use in a number of vessel tracking and navigation related projects. Currently, it is used as the primary communications and chart display client for the MSSIS network and is generally provided for free as Government-off-the-shelf (GOTS) software. It has been used for:

- Pilot Navigation
- Vessel Traffic Management
- Oil Spill Modeling
- Accident Investigation
- Buoy Positioning
- Network Monitoring
- Analysis Tool
- Data Logging
- Data Translation/Exchange
- Port/Harbor Security
- Force Protection Display

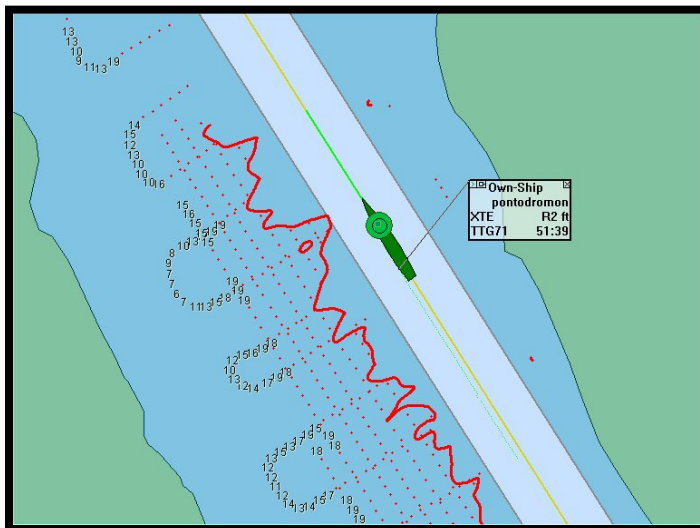


Transview Other Applications:



Cape Cod Canal

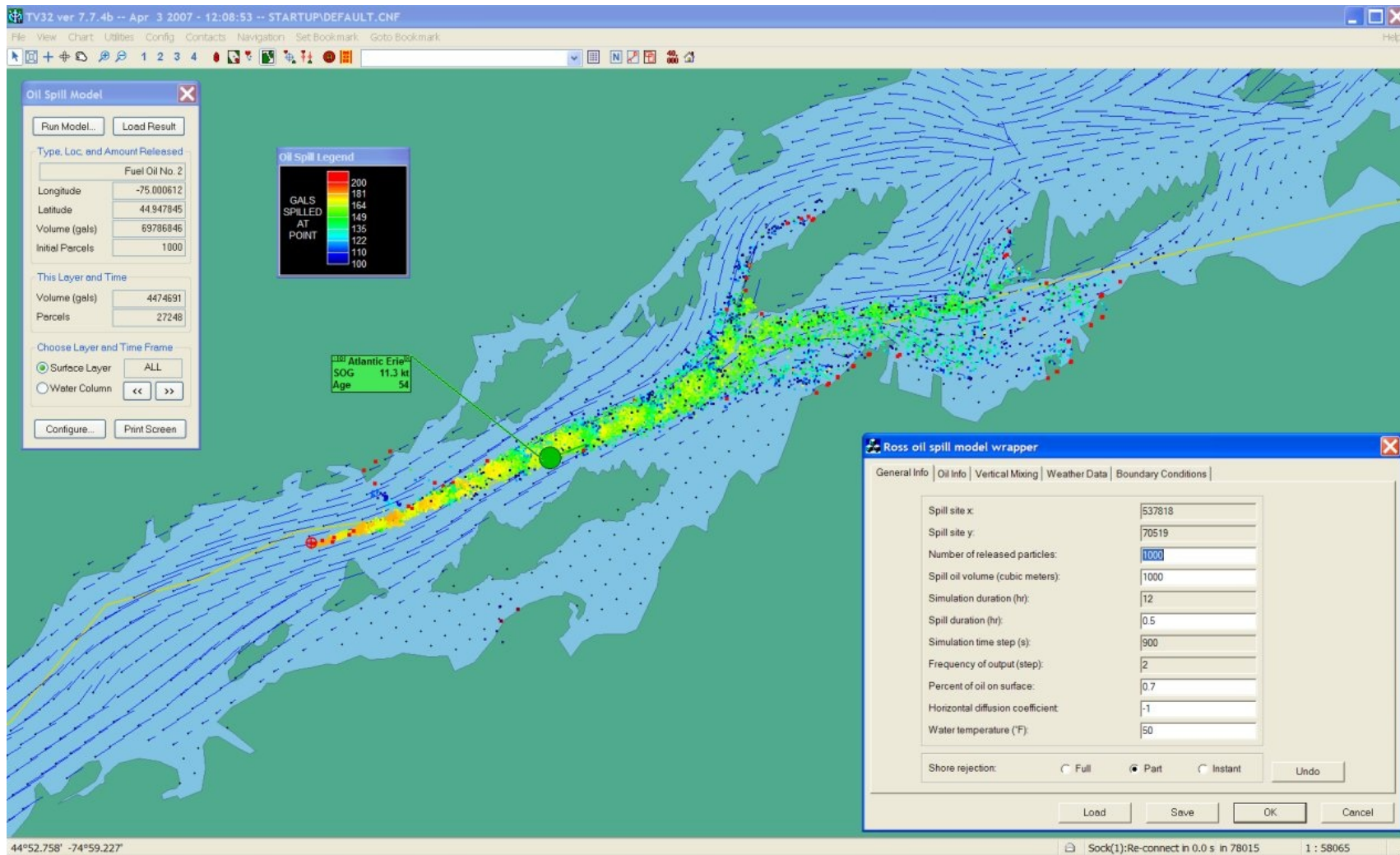
- Army Corp of Engineers
- Oil Spill Prevention

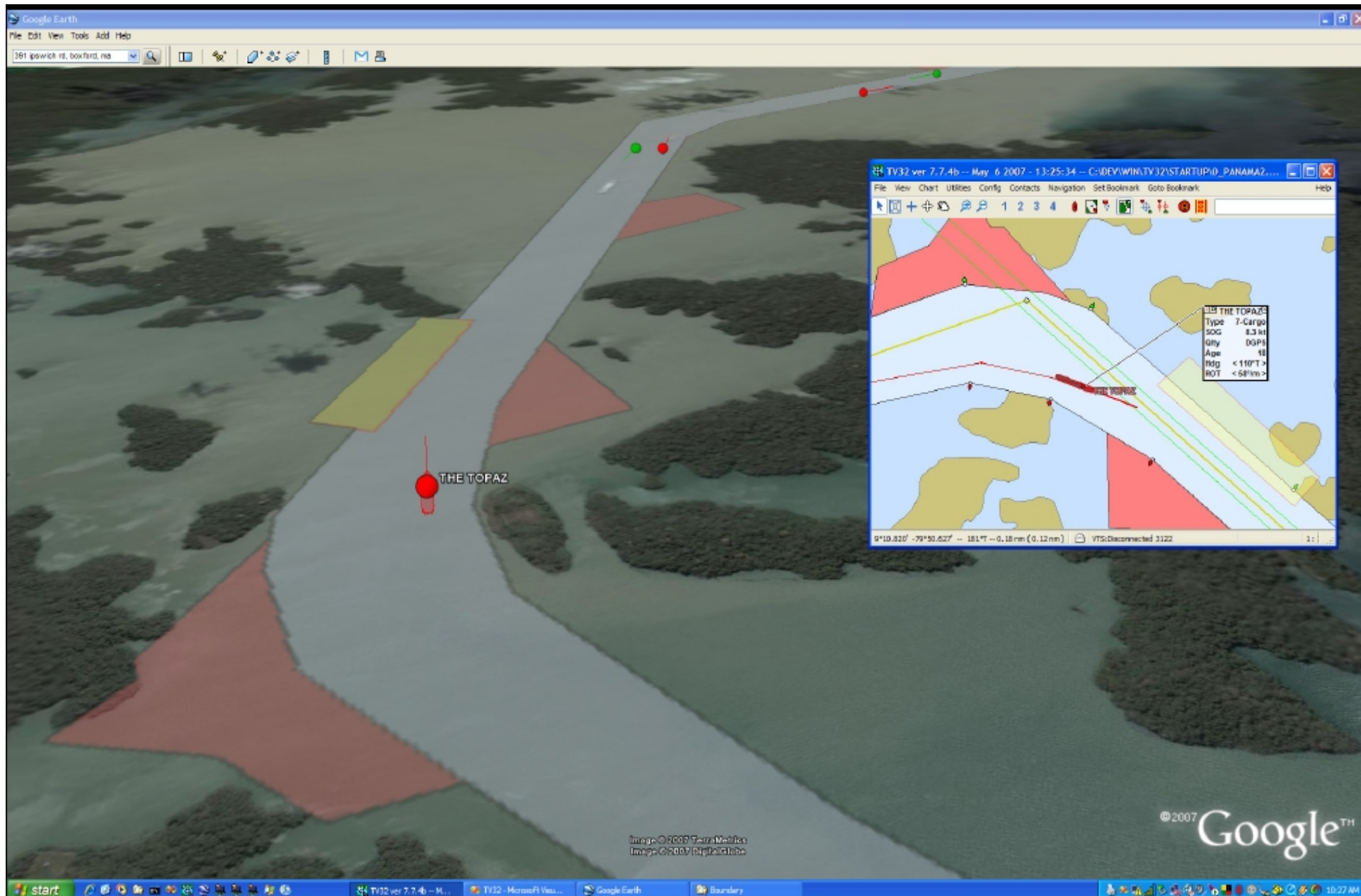


Columbia River Pilots

- Pilot Display
- Hydro Graphic Survey

Transview Other Applications: Oil Spill Model Display





MSSIS Future Vision

MSSIS+, AIS, Radar, ADSB, ...

