



# Maritime Safety & Security Information System

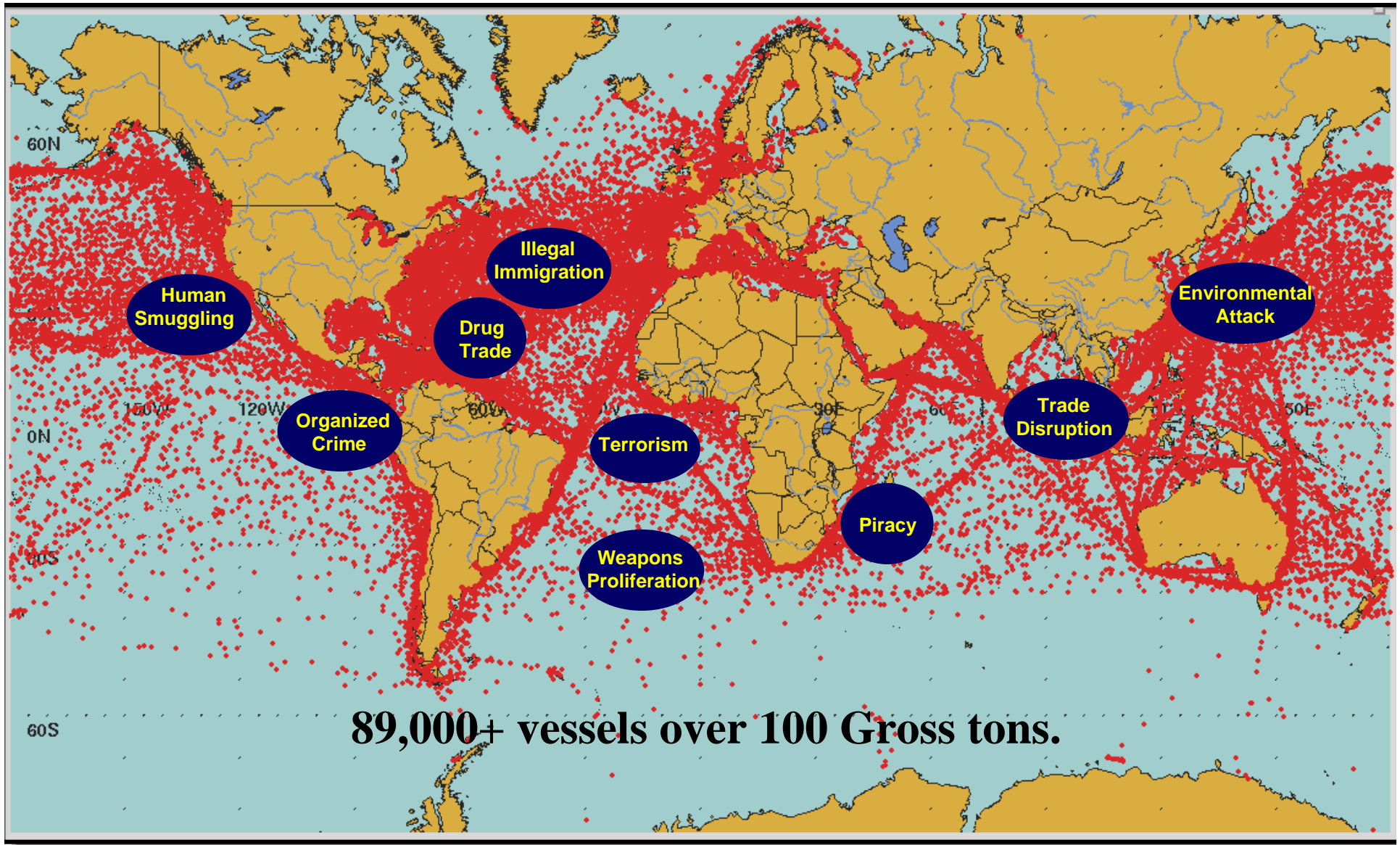


U.S. Department of Transportation  
Research and Innovative Technology Administration

*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**

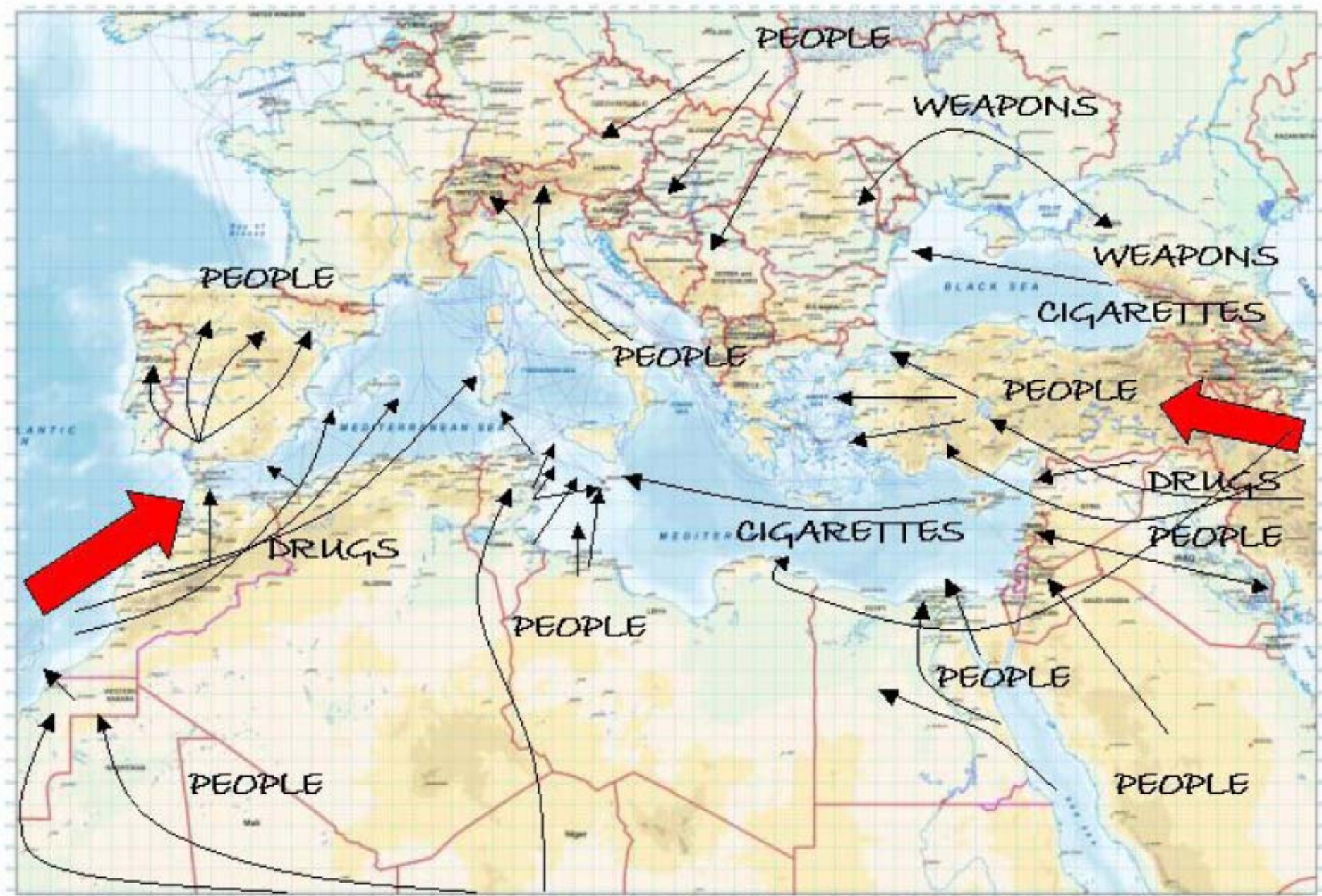
**Illegal migration**

**Search and Rescue**

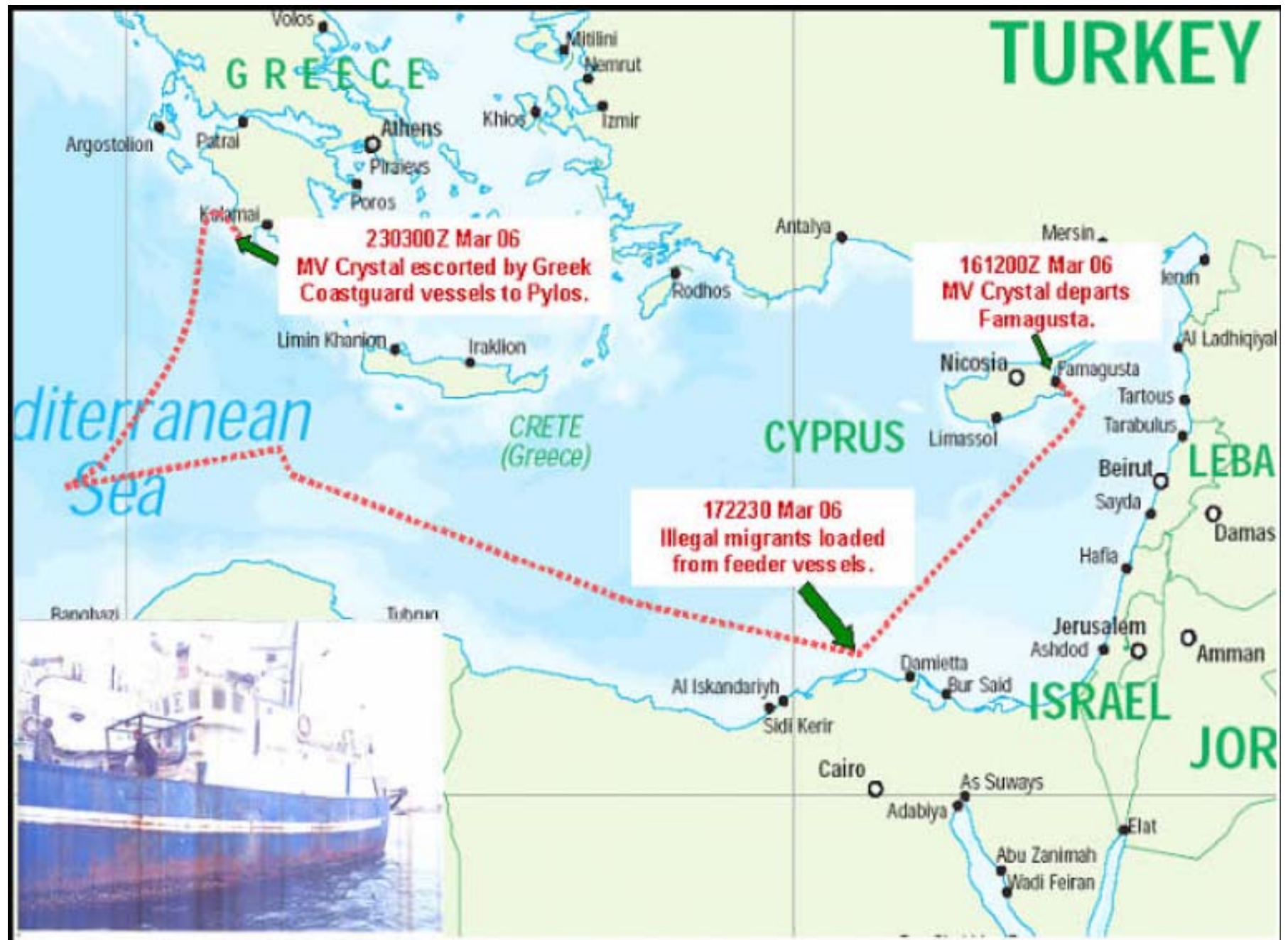
**Environmental issues**

***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.

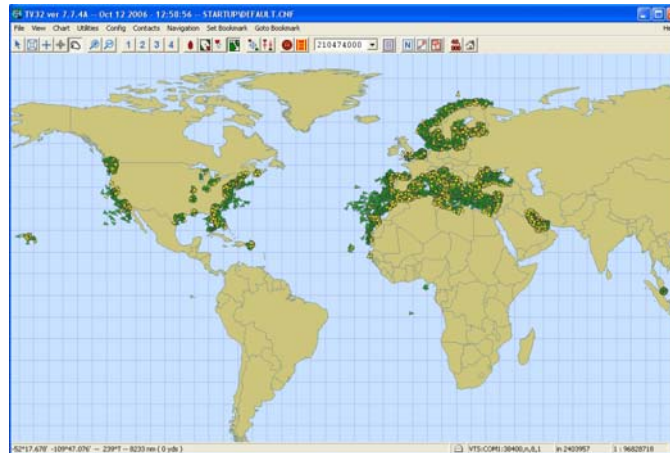
# MSSIS

## 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

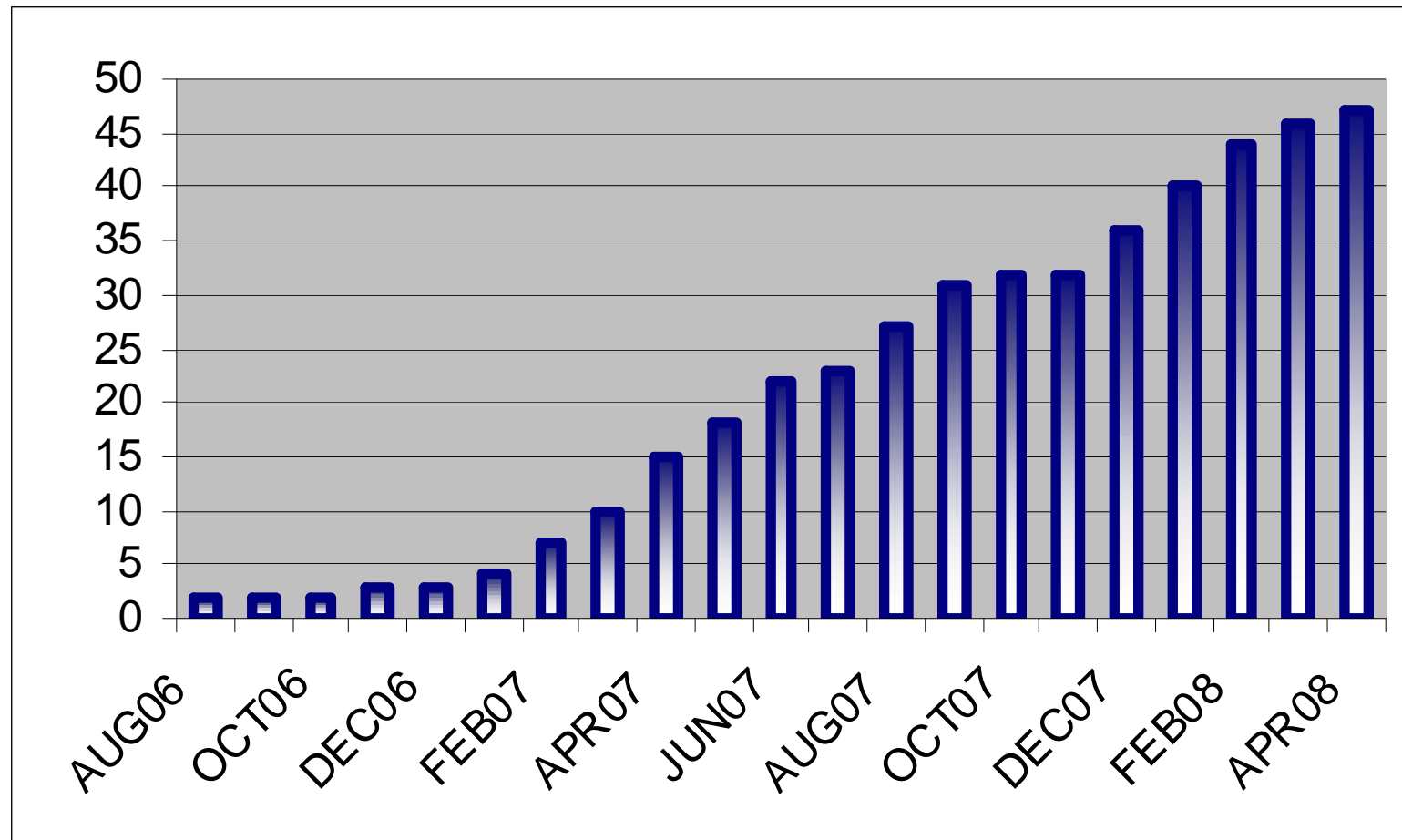
- **September 2005** – Demonstration of proposed AIS network, links the ports of Rota, Spain and Souda Bay, Greece. Concept presented to U.S. Navy Sixth Fleet Commander (C6F) and NATO representatives.
- **November 2005** – The Volpe Center continues demonstration for C6F and NATO aggregating feeds from 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  $\geq 500$  GT.
- Ships  $\geq 300$  GT on international voyages.

## Does not apply to:

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

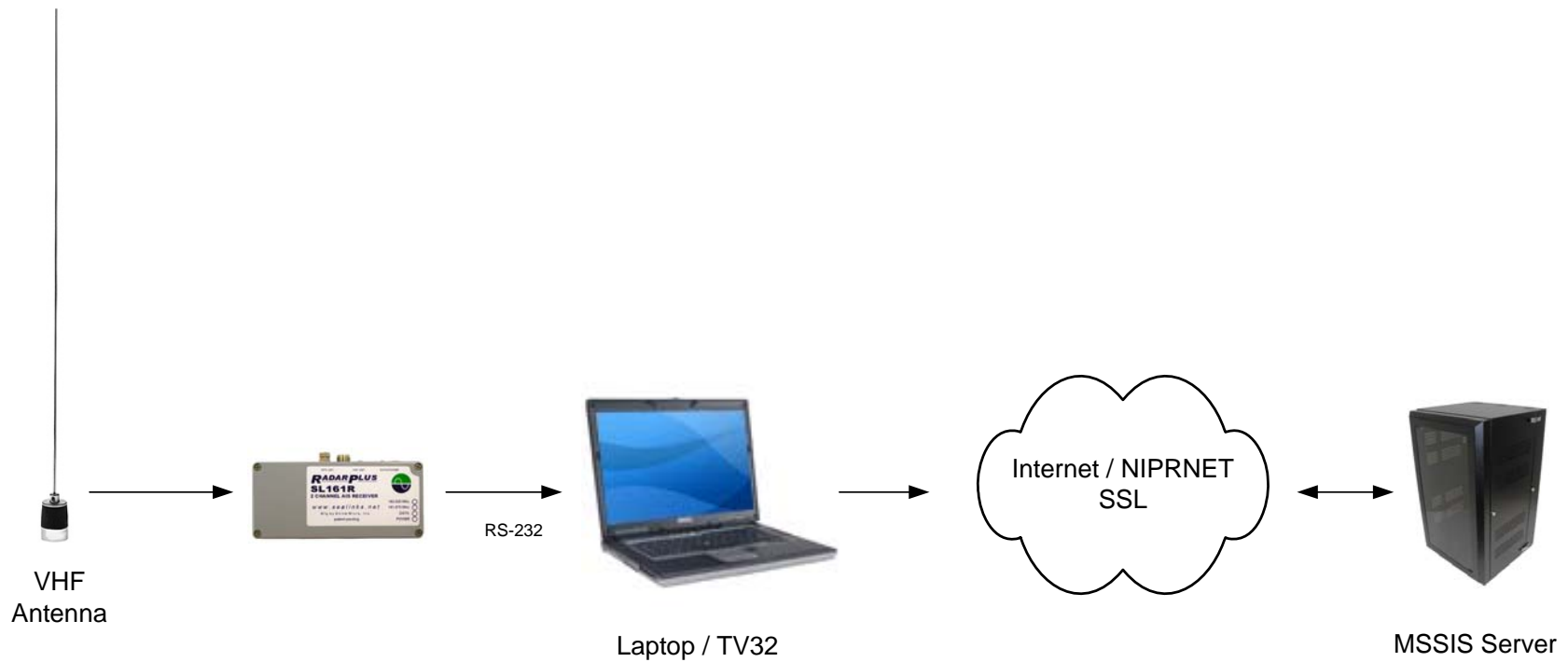
In U.S. Waters, a USCG amendment for Commercial vessels  $\geq 65$  feet.

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

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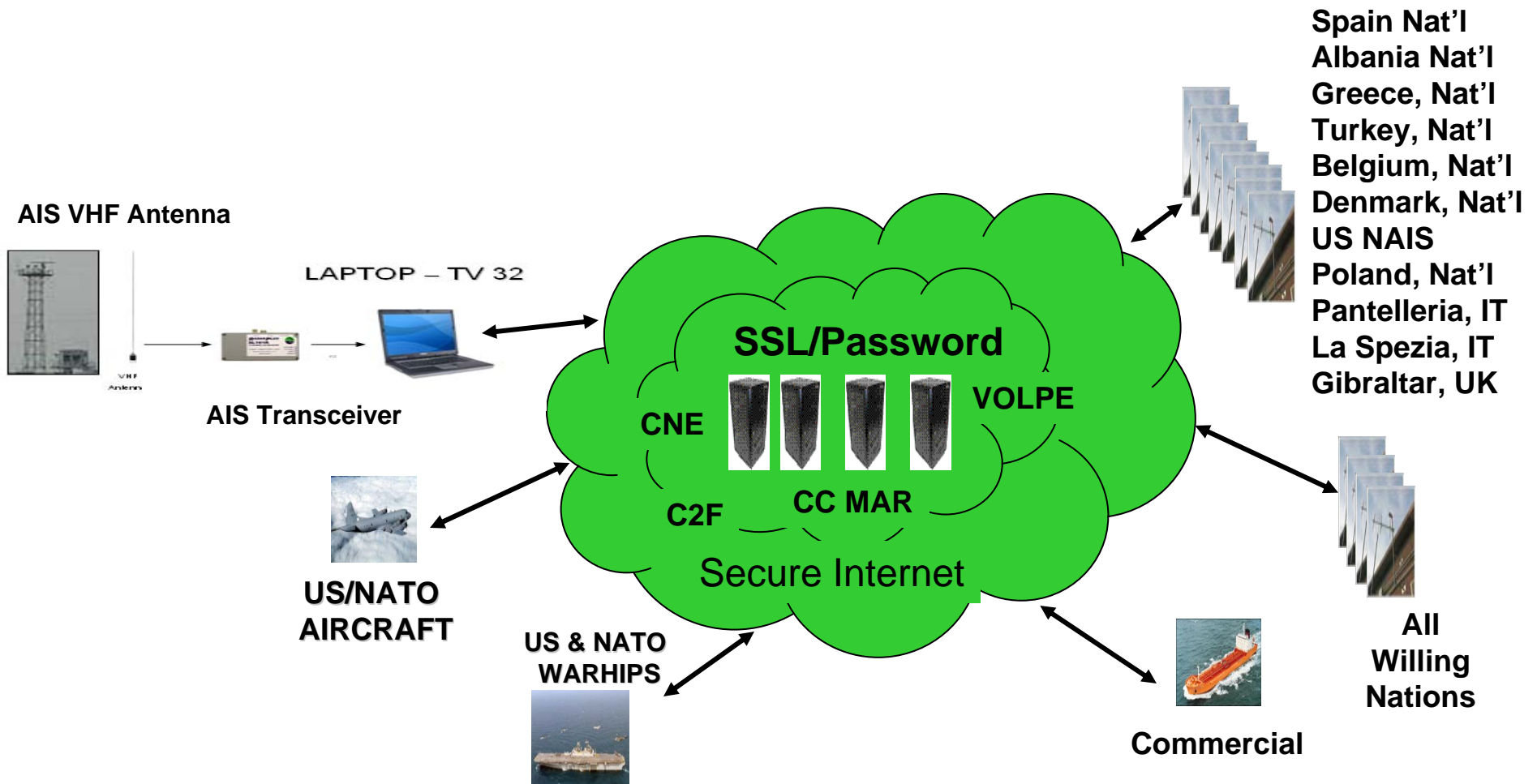
# Simple MSSIS - AIS Provider



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# MSSIS Architecture



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# MSSIS Server – Volpe Center

MSSIS Firewall/Router



AIS Collector (sources)



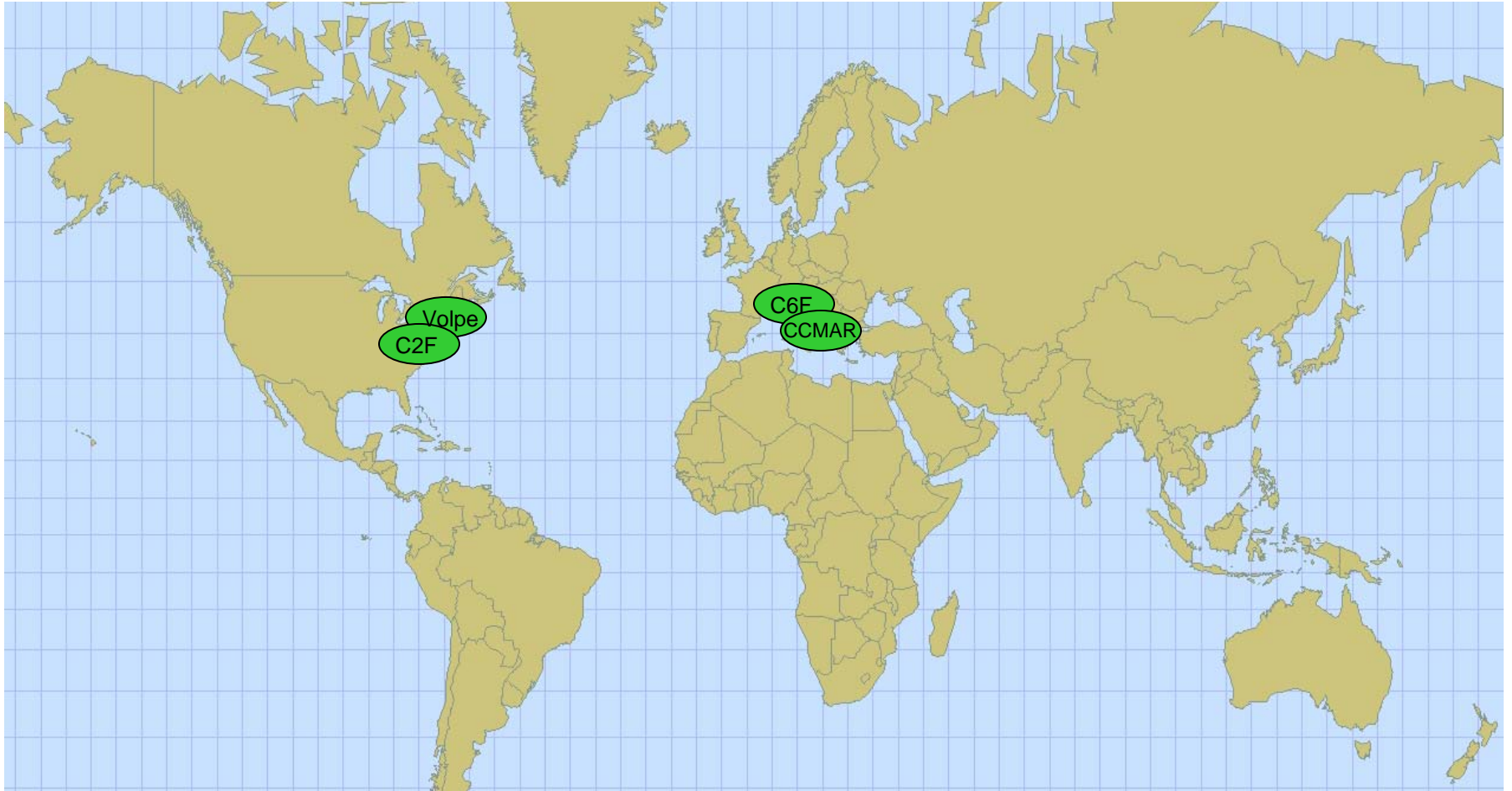
Data Thinner



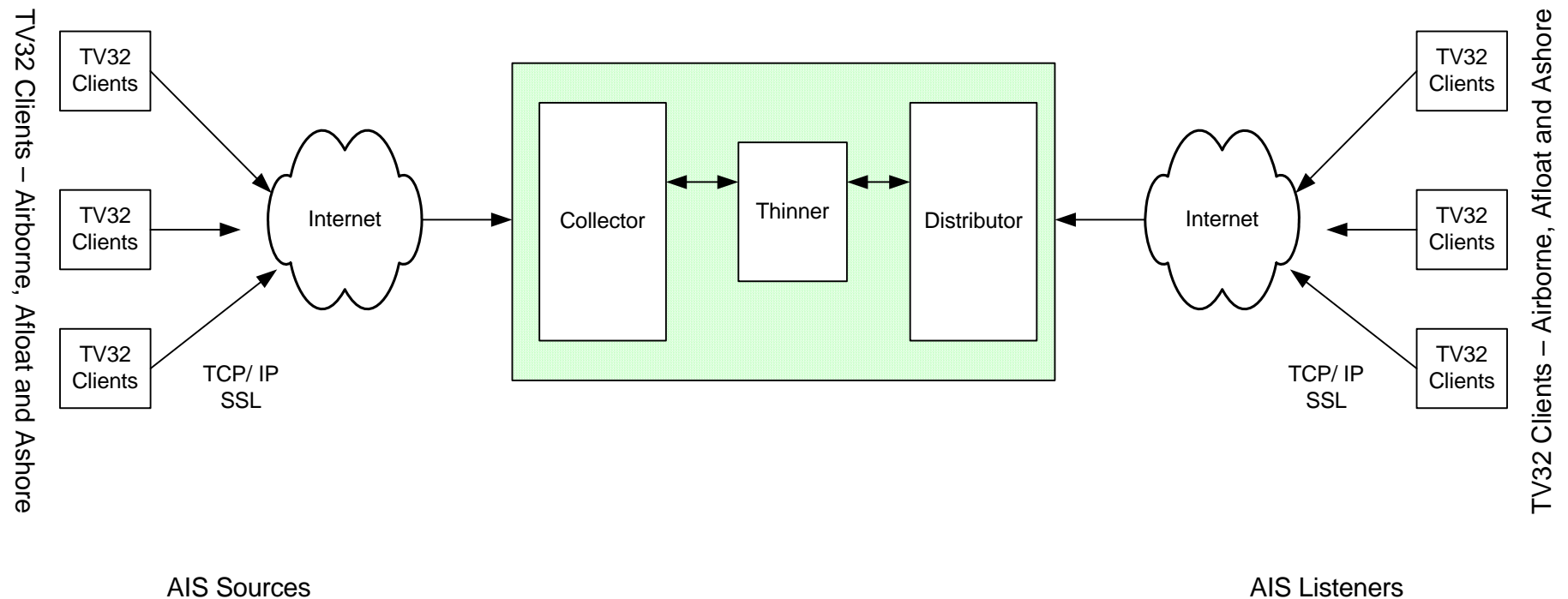
AIS Distributor (clients)



# 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

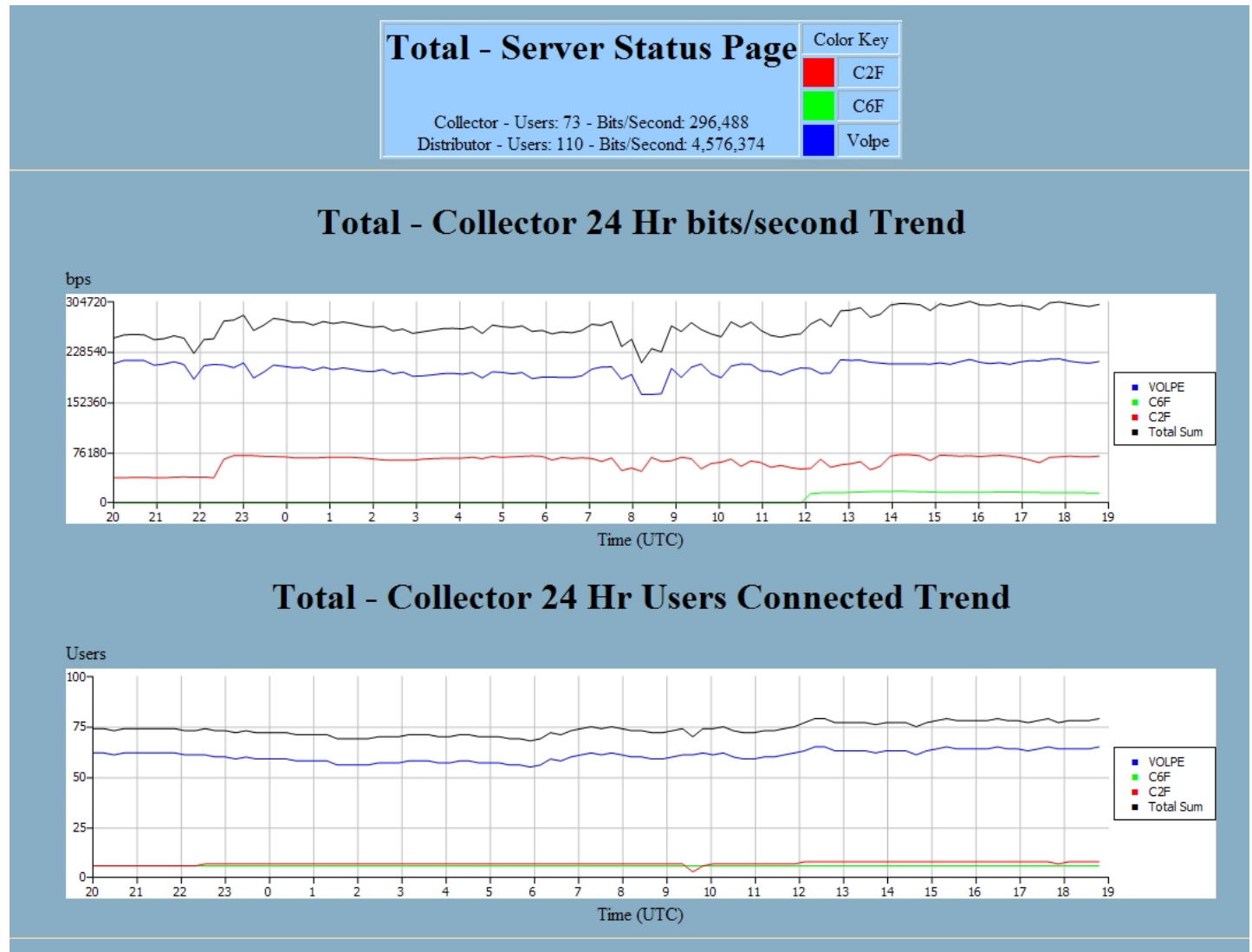
192050001

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

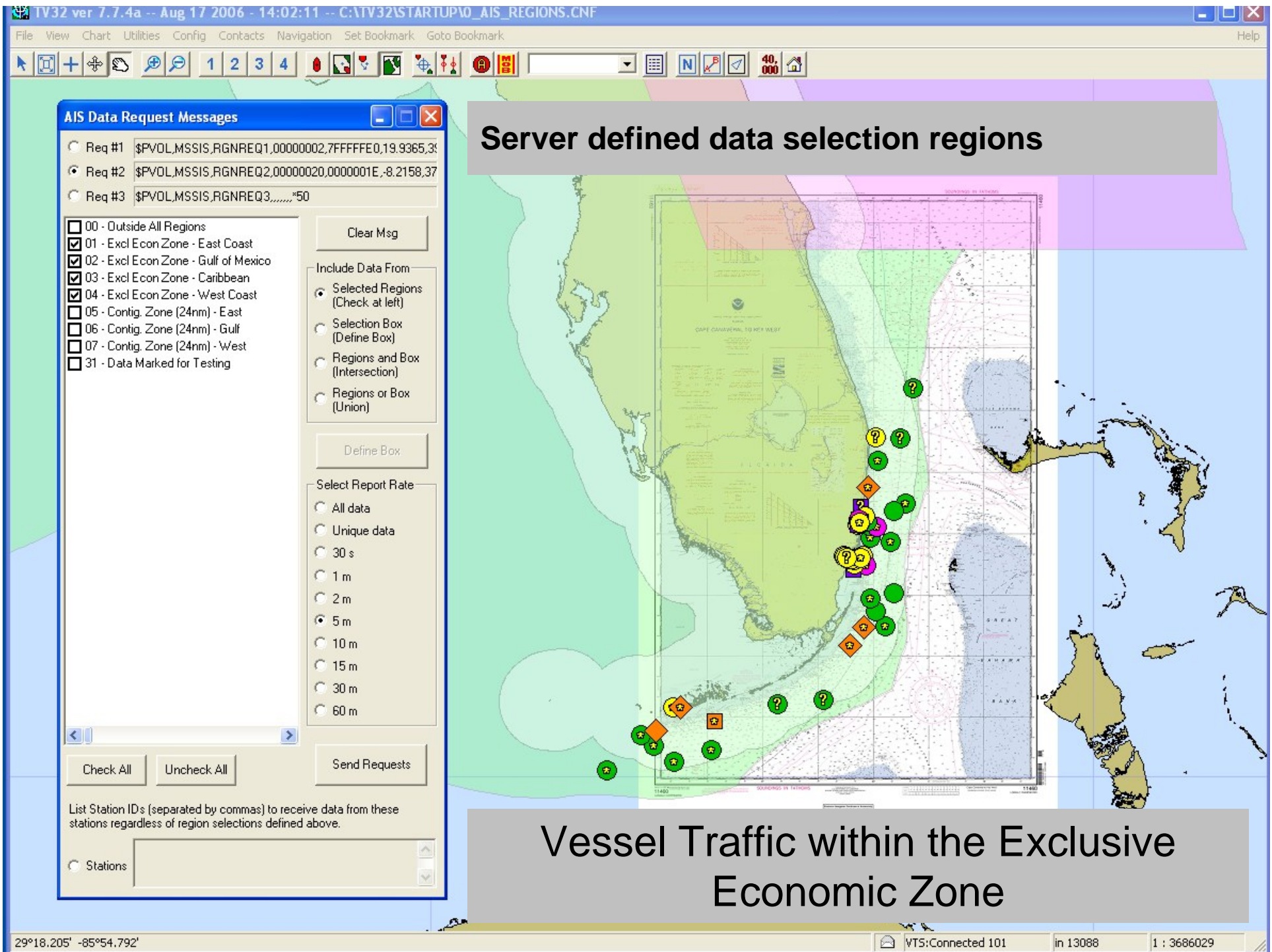
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Success
Day 1																									19%
Day 2																									7%
Day 3																									0%
Day 4																									0%
Day 5																									61%
Day 6																									98%
Day 7																									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

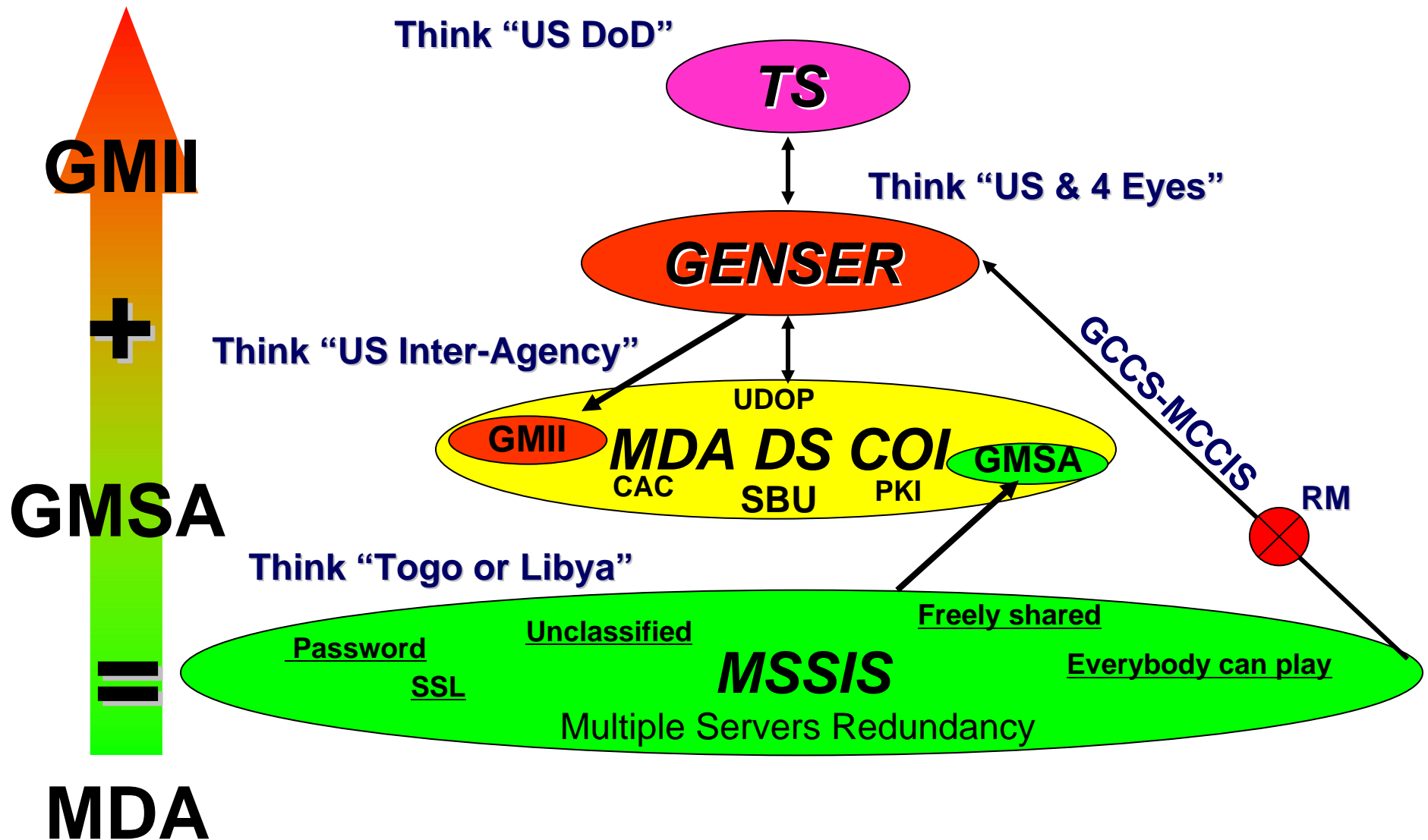








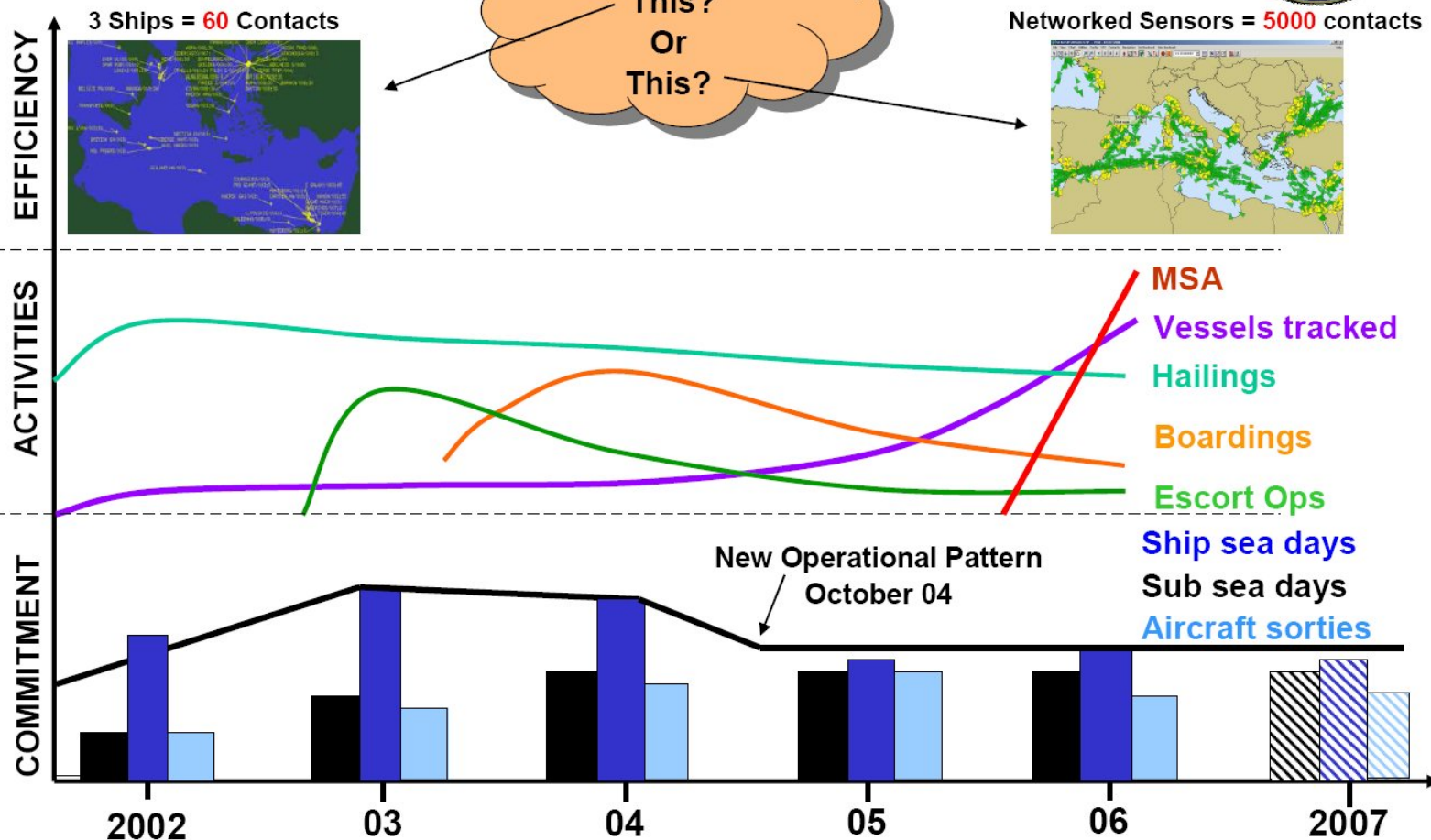
# How MSSIS Fits

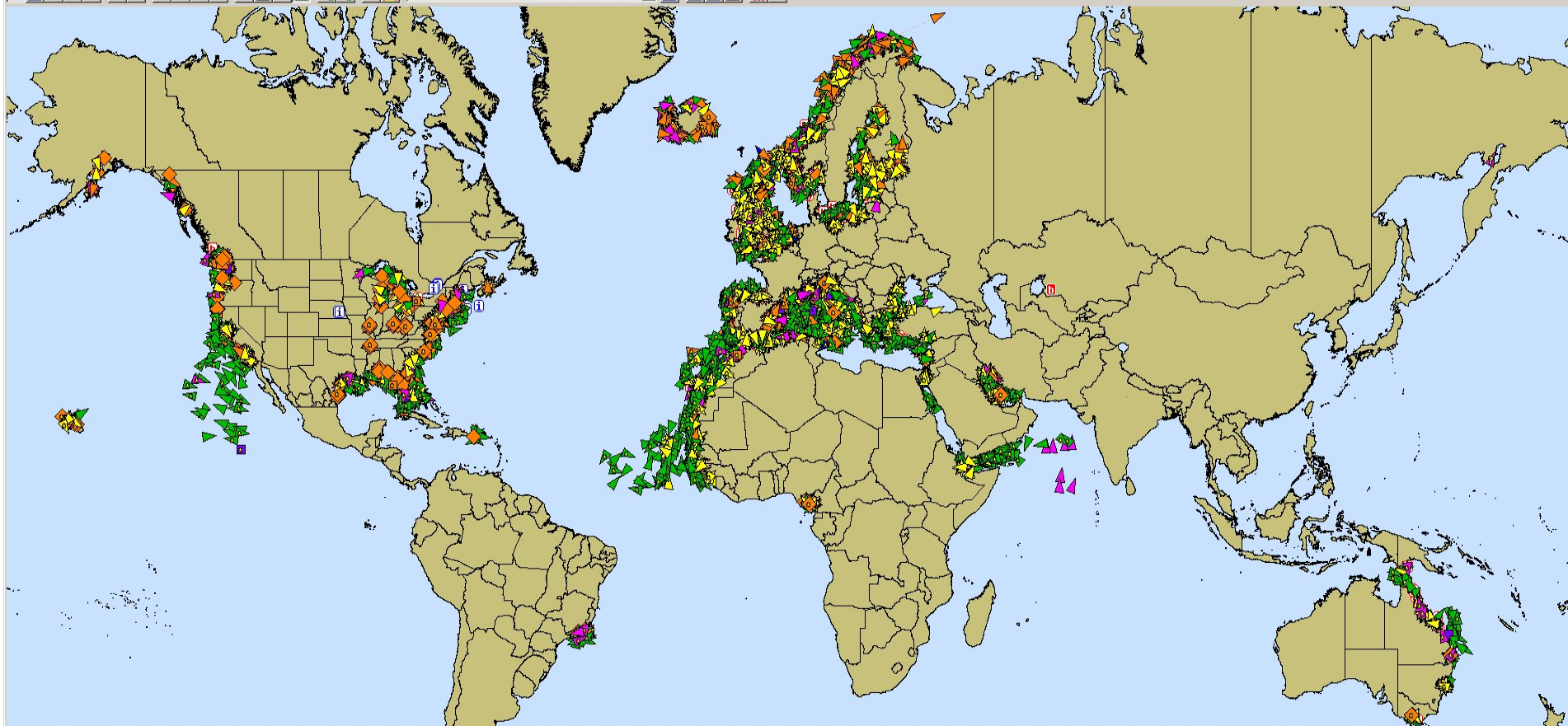


# MSSIS role in NATO Operations



## OAE EXECUTION





-17°08.093' -121°03.250'

VTS:Connected 1103

in 223237

1 : 80496123

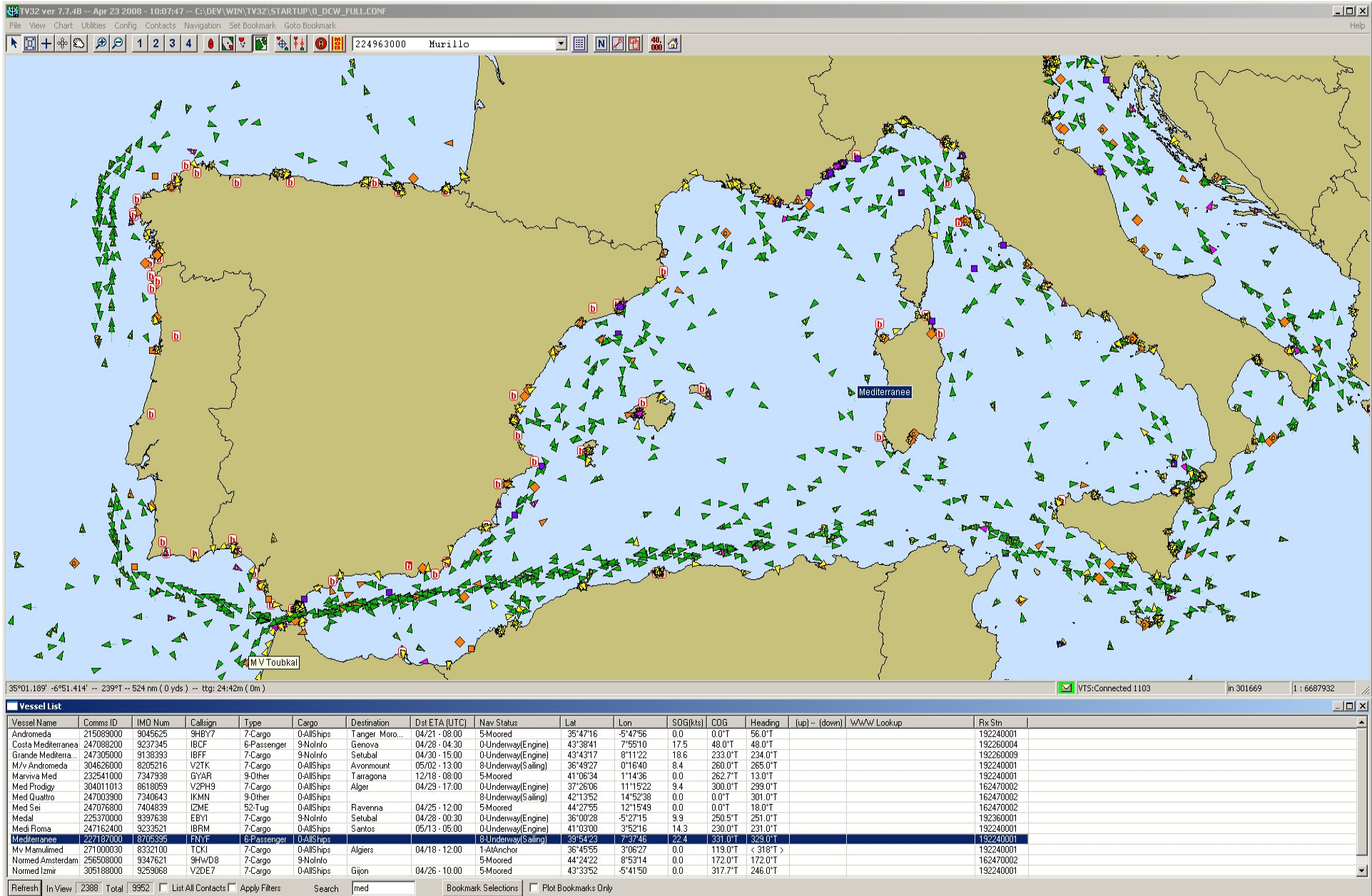
## Vessel List

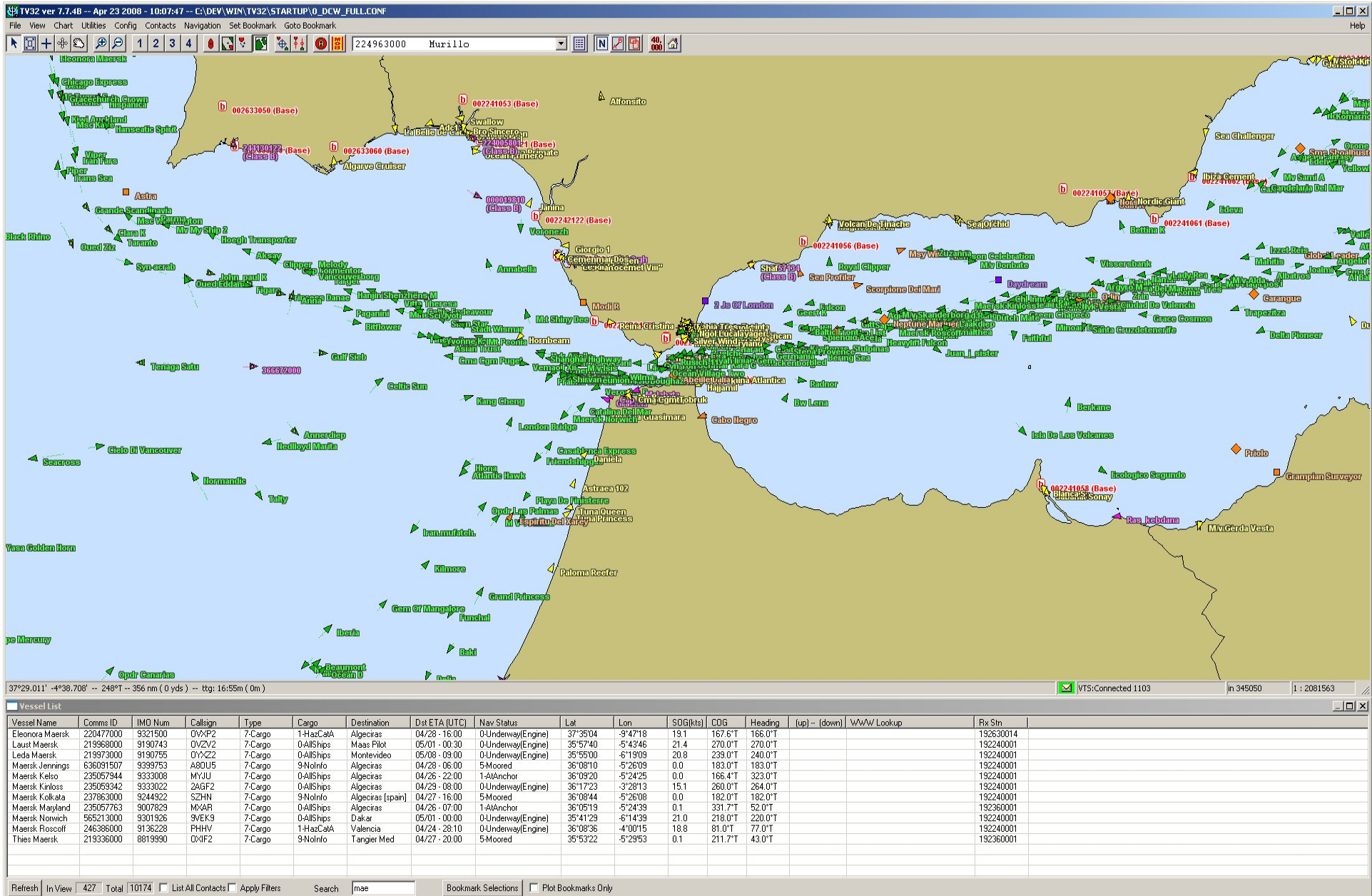
Vessel Name	Comms ID	IMO Num	Callign	Type	Cargo	Destination	Dist ETA (UTC)	Nav Status	Lat	Lon	SOG(kts)	COG	Heading	(up) - (down)	W/VW Lookup	Rx Str
Usns Mount Ba...	368781000	8337053	N2HN	35-MIDps	0>AllShips			5-Moored	40°27'20	-74°03'16	0.0	0.1°T	27.0°T			323380001
Usns Antares	367185000	7226897	NPE1	7-Cargo	0>AllShips			5-Moored	30°24'00	-81°31'21	0.0	0.0°T	< 0°T >			123380002
Usns Apache Tal...	367948000	8832653	NIGP	52-Tug	0>AllShips	Charleston det...	03:02 - 13:00	5-Moored	32°51'51	-79°57'52	0.0	0.1°T	< 0°T >			323380001
Usns Big Horn	367864000	8812162	NBIG	9-Other	0>AllShips	Norfolk	00:00 - 24:00	0-Underway(Engine)	58°58'39	-51°52'29	9.6	349.3°T	363.0°T			192320004
Usns Bidge	338956000	0	NGMV	9-Other	9-NoInfo	Local_ops	00:00 - 00:00	5-Moored	47°58'56	-122°13'41	0.0	20.7°T	34.0°T			323380001
Usns Comfort	368817000	7390478	NCOM	58-Medical	0>AllShips		00:00 - 00:00	15-NoDefined	39°15'32	-76°33'32	0.0	0.1°T	< 0°T >			323380001
Usns Kaiser	303849000	8302416	NHJK	8-Tanker	0>AllShips		00:00 - 24:00	5-Moored	32°42'22	-117°11'20	0.0	12.2°T	110.0°T			323380001
Usns Laramie	367861000	8906626	NLAR	35-MIDps	0>AllShips	There	00:00 - 00:00	5-Moored	36°52'57	-76°20'22	0.0	0.1°T	325.0°T			323380001
Usns Mercy	367816000	739045400	NMER	58-Medical	0>AllShips	Sea Trial	04:25 - 00:00	5-Moored	32°41'05	-117°08'06	0.1	319.3°T	< 319°T >			323380001
Usns Paul Buck	366705630	8220773	NBBO	8-Tanker	9-NoInfo		10:27 - 00:00	0-Underway(Engine)	40°51'31	2°12'20	13.5	282.0°T	285.0°T			192240001
Usns Pollux	368989000	7319632	NMVG	9-Other	0>AllShips		00:00 - 24:00	5-Moored	42°20'43	-71°01'48	0.1	194.8°T	< 190°T >			000006099
Usns Sisler	368734000	9117038	NZIX	7-Cargo	0>AllShips	Na	06:18 - 07:00	5-Moored	32°51'14	-79°57'07	0.0	0.0°T	53.0°T			323380001
Usns Soderman	367819000	9232254	NANL	7-Cargo	9-NoInfo	Norfolk	12:21 - 10:00	5-Moored	36°51'54	-76°18'51	0.0	0.0°T	227.0°T			323380001
Usns Waters	367851000	9301988	NVAA	0-Unknown	Unknown	Port Hueneme	00:00 - 24:00	5-Moored	34°08'57	-119°12'23	0.0	0.0°T	139.0°T			323380001

Refresh In View 9380 Total 9382 List All Contacts Apply Filters Search usn

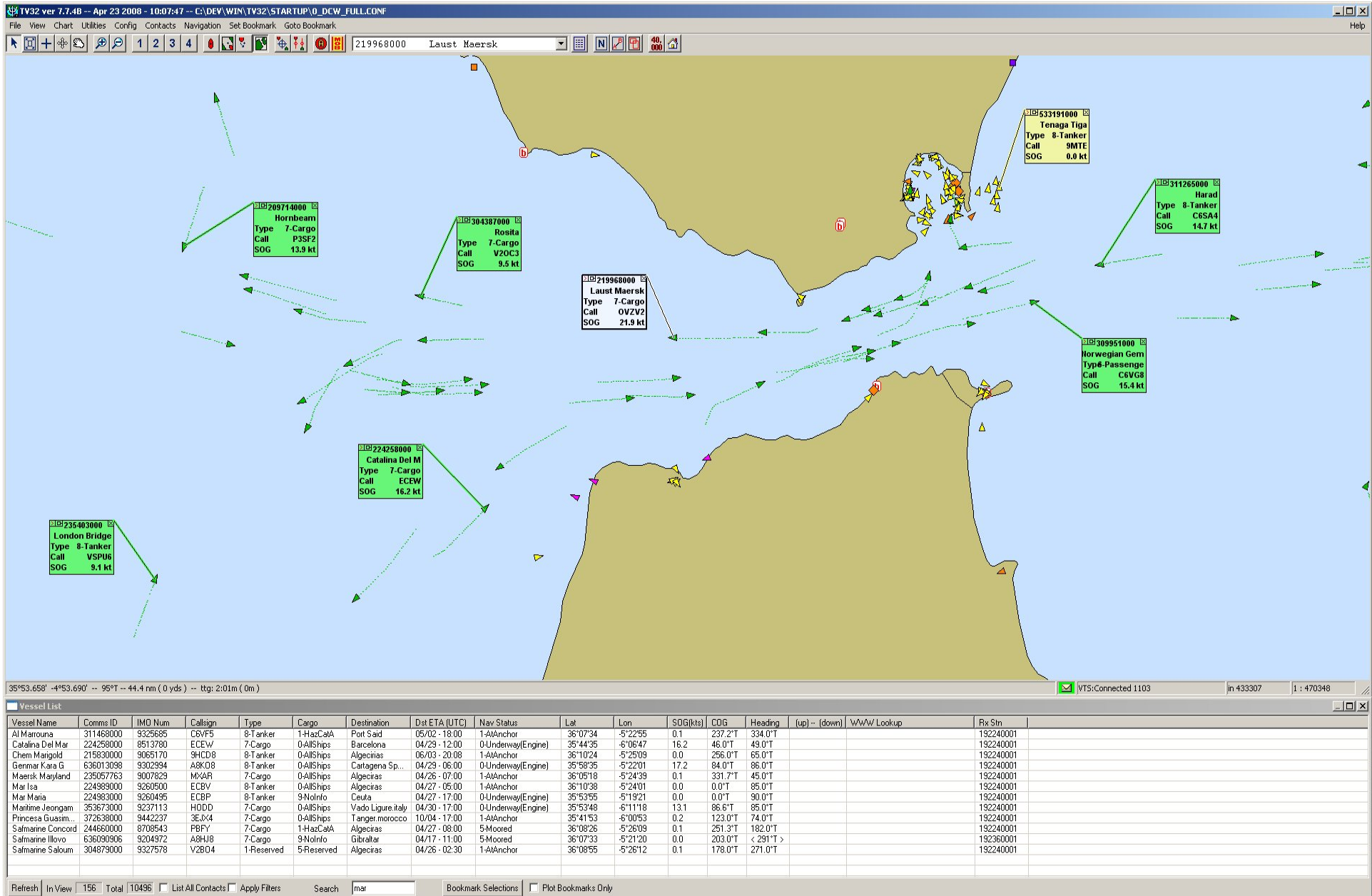
Bookmark Selections Plot Bookmarks Only



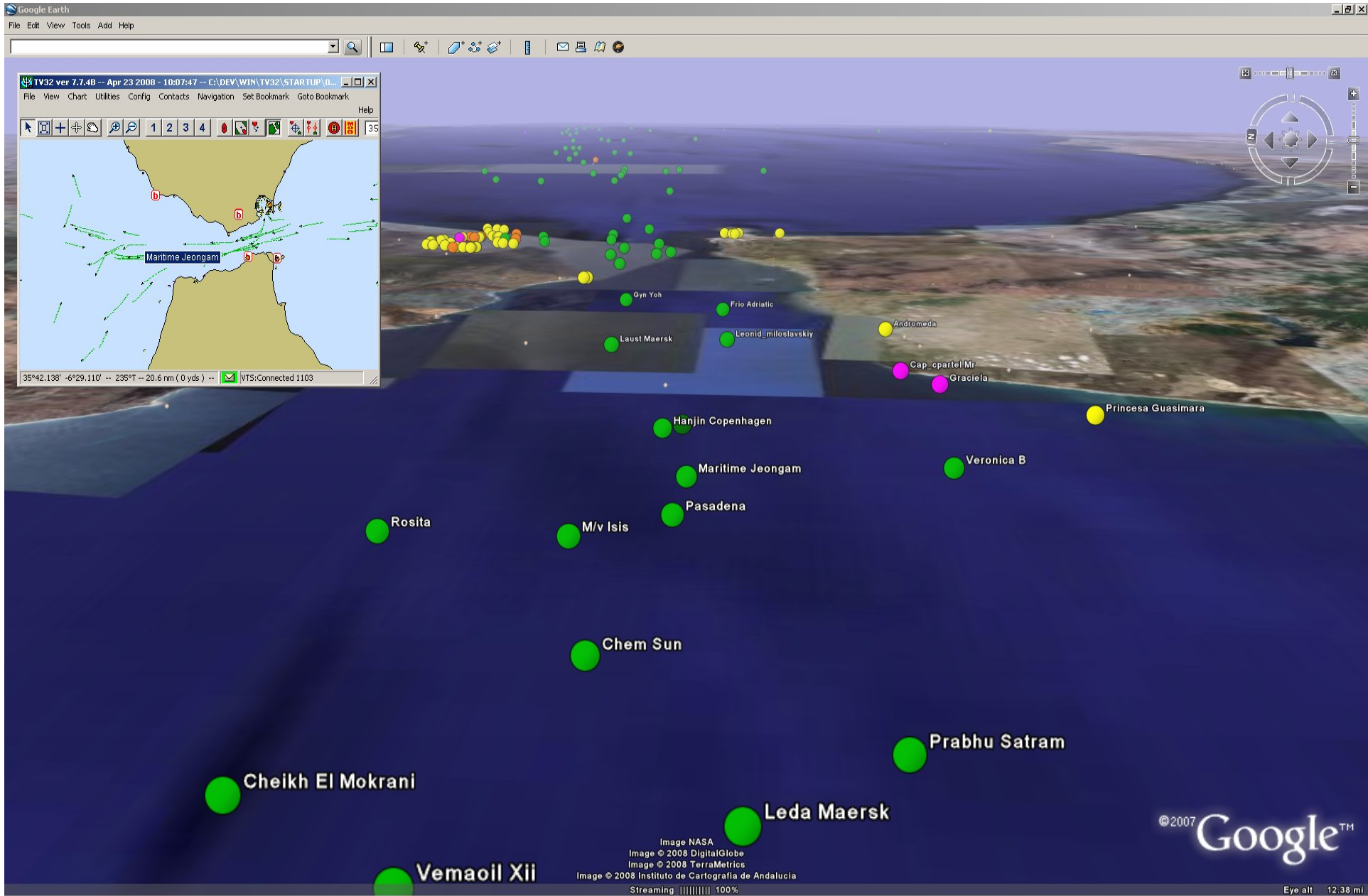












TV32 ver 7.7.4B -- Nov 26 2007 - 11:33:14 -- STARTUP\DEFAULT.CONF

File View Chart Utilities Config Contacts Navigation Set Bookmark Goto Bookmark Help

1 2 3 4

**Safety Text Messages**


Message	Source	Dest	Time (UTC)
ship entered to restricted area	002470038	247055600 - Dellino Gri...	01/16 - 06:2
be advise that my ice prince is sinking in position 5009.9n 00202.1w large bert...	002275200	273119500 - Ivan Ryabov	01/16 - 06:2
be advise that my ice prince is sinking in position 5009.9n 00202.1w large bert...	002275200	211230400 - Rebecca ...	01/16 - 06:5
be advise that my ice prince is sinking in position 5009.9n 00202.1w large bert...	002275200	234460000 - Isarstem	01/16 - 06:5

Send ☐ Broadcast to All ☐ Repeat (3 min) To: [232647000] [232647000]: Patricia ☒ Show All Messages

**Video - Breaking News Videos from CNN.com - Microsoft Internet Explorer**

File Edit View Favorites Tools Help

**CNN Video** [Live Video](#) [Podcas](#)



**COURTESY ITN** **CNN**

0:01 / 2:03

**Ship faces turbulent seas 2:03**  
High winds, crashing seas and a storm threaten to capsize

Source: ITN  
Added On January 15, 2008

Internet

49°18.160' -2°07.665' -- 184°T -- 52.0 nm ( 0 yds ) -- ttg: 18:34m ( 0m )

VTG:Connected 2103 in 13724999 1 : 720895




Google Earth

File Edit View Tools Add Help

warren st. georgetown, ma

**Cosco Busan**



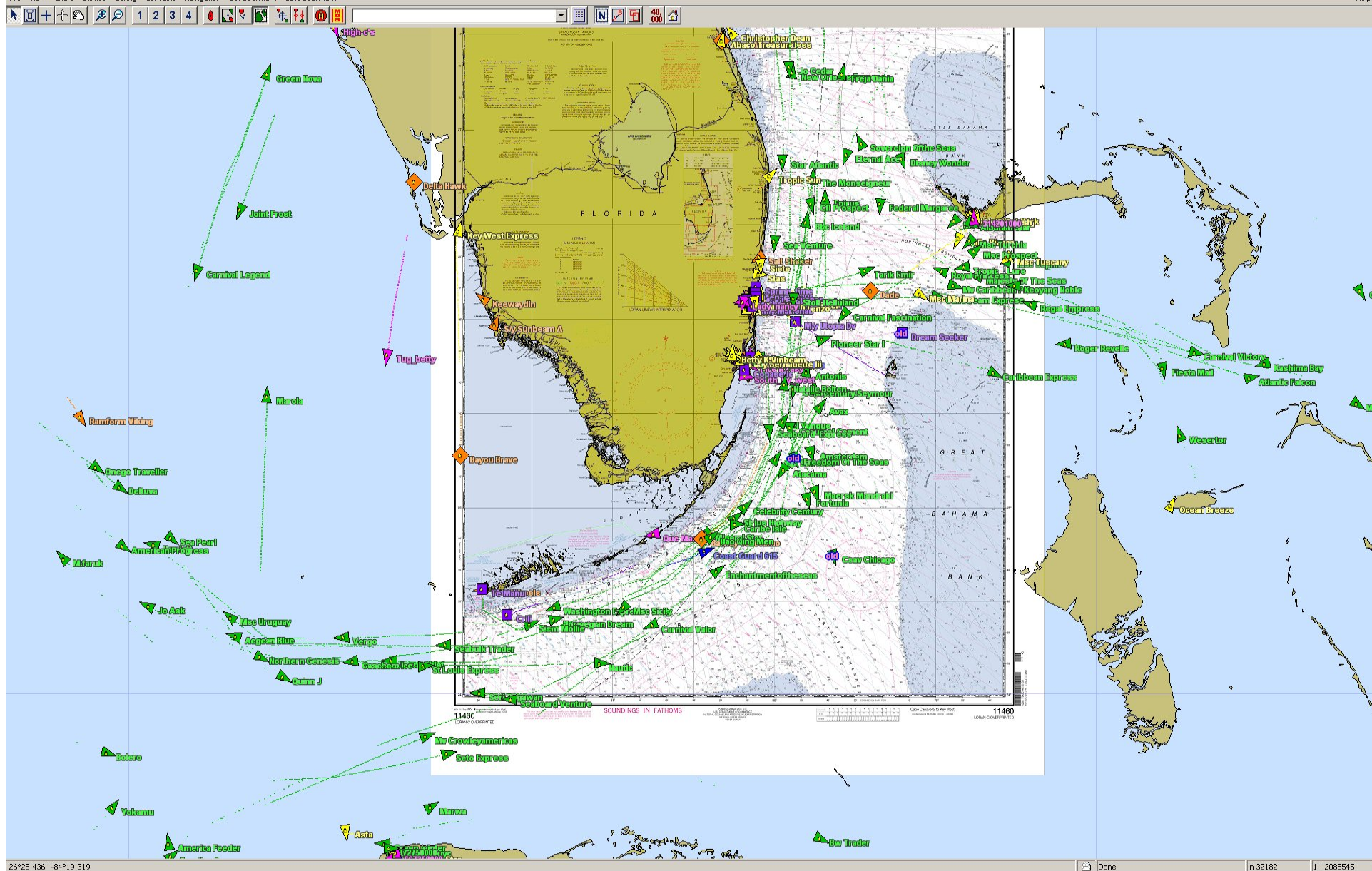
MMSI	477968900
IMO Num	9231743
Callsign	VRDI6
Type	7-Cargo
Destination	Pusan S Korea
ETA	11/15 - 22:00
Status	0-Underway(Engine)
SOG / COG	9.2 kts / 304
Report Time	16:29:58 (UTC)
Size	275m x 40m x 12.3m

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

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Image © 2007 TerraMetrics  
© 2007 Tele Atlas  
Image © 2007 DigitalGlobe

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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.

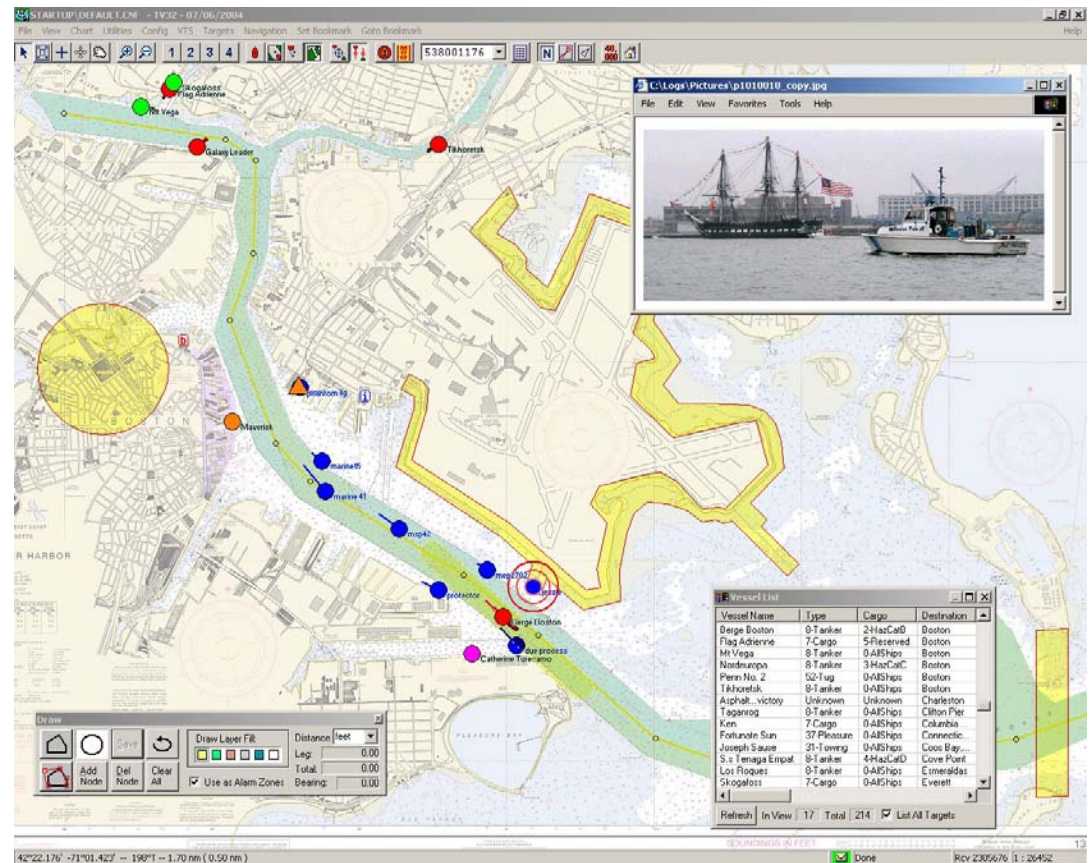
Excerpt from Admiral Ulrich, Commander U.S. Naval Forces Europe, letter to Admiral Roughead, Chief of Naval Operations

October 2007

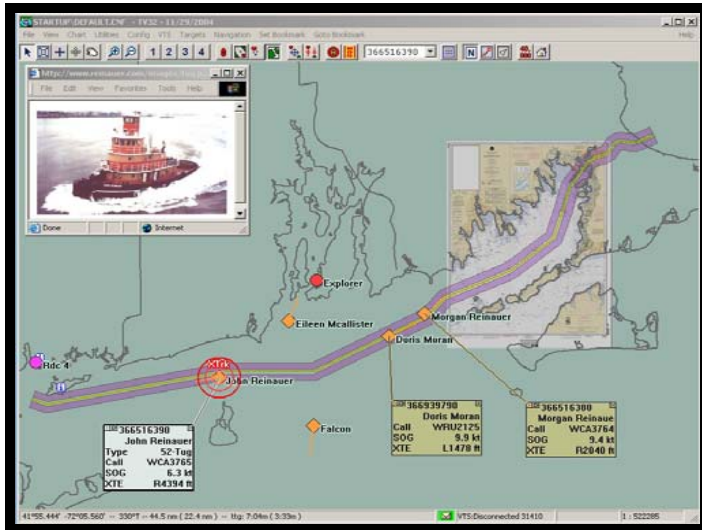
# Transview (a.k.a TV32)

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

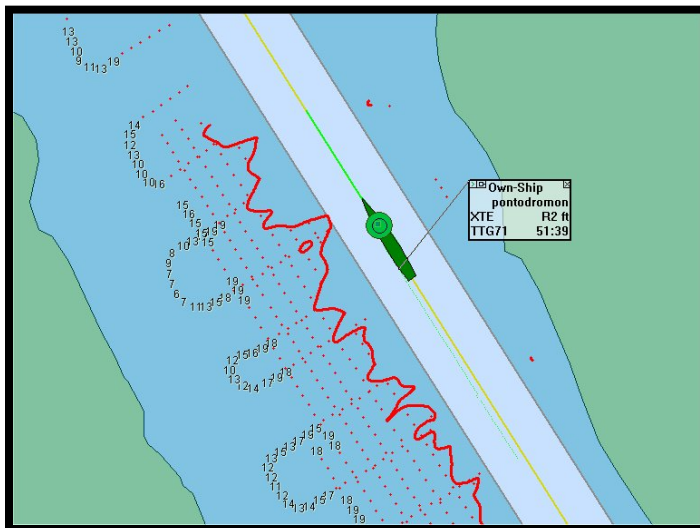


# Transview Other Applications:



## Cape Cod Canal

- Army Corp of Engineers
- Oil Spill Prevention

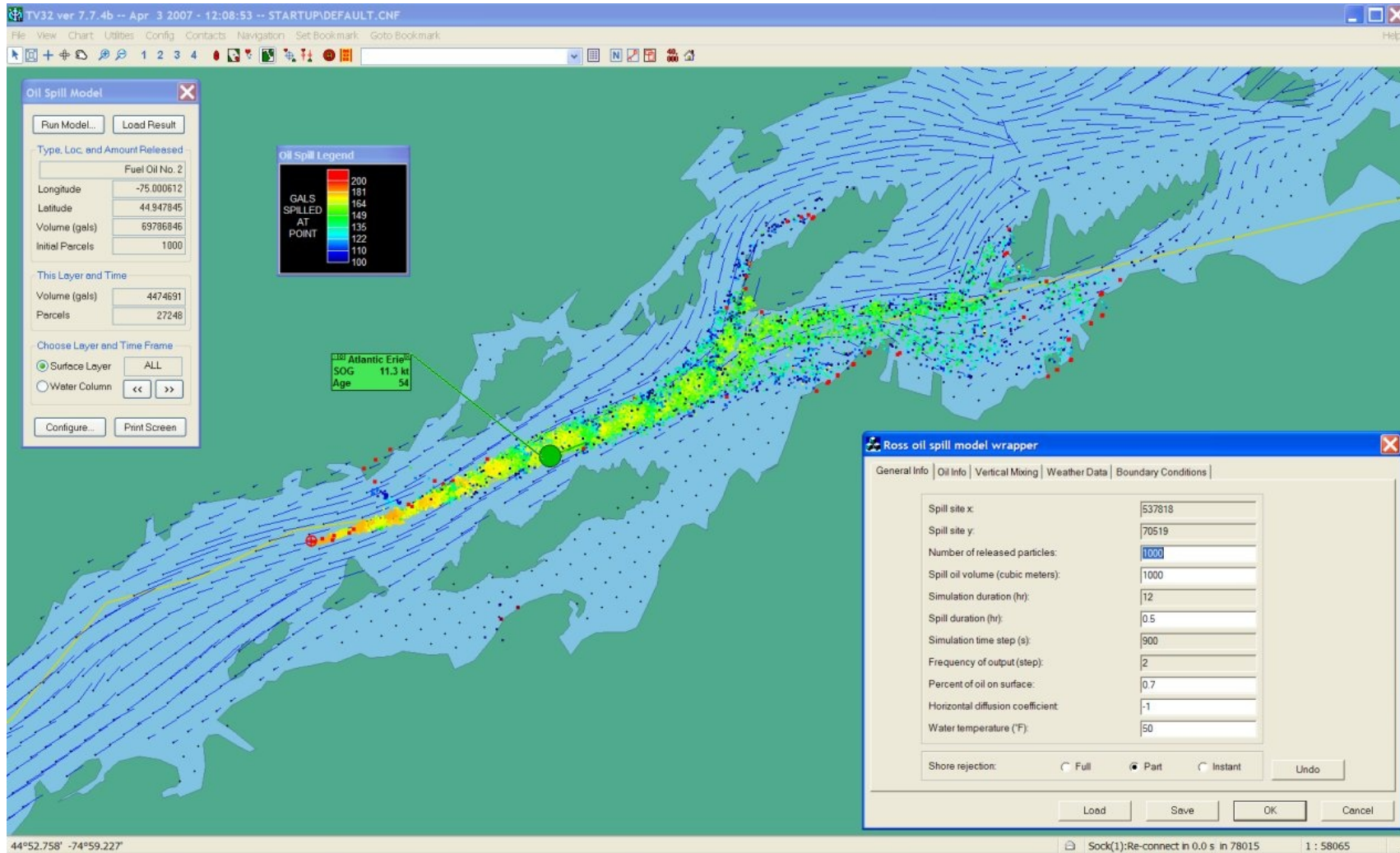


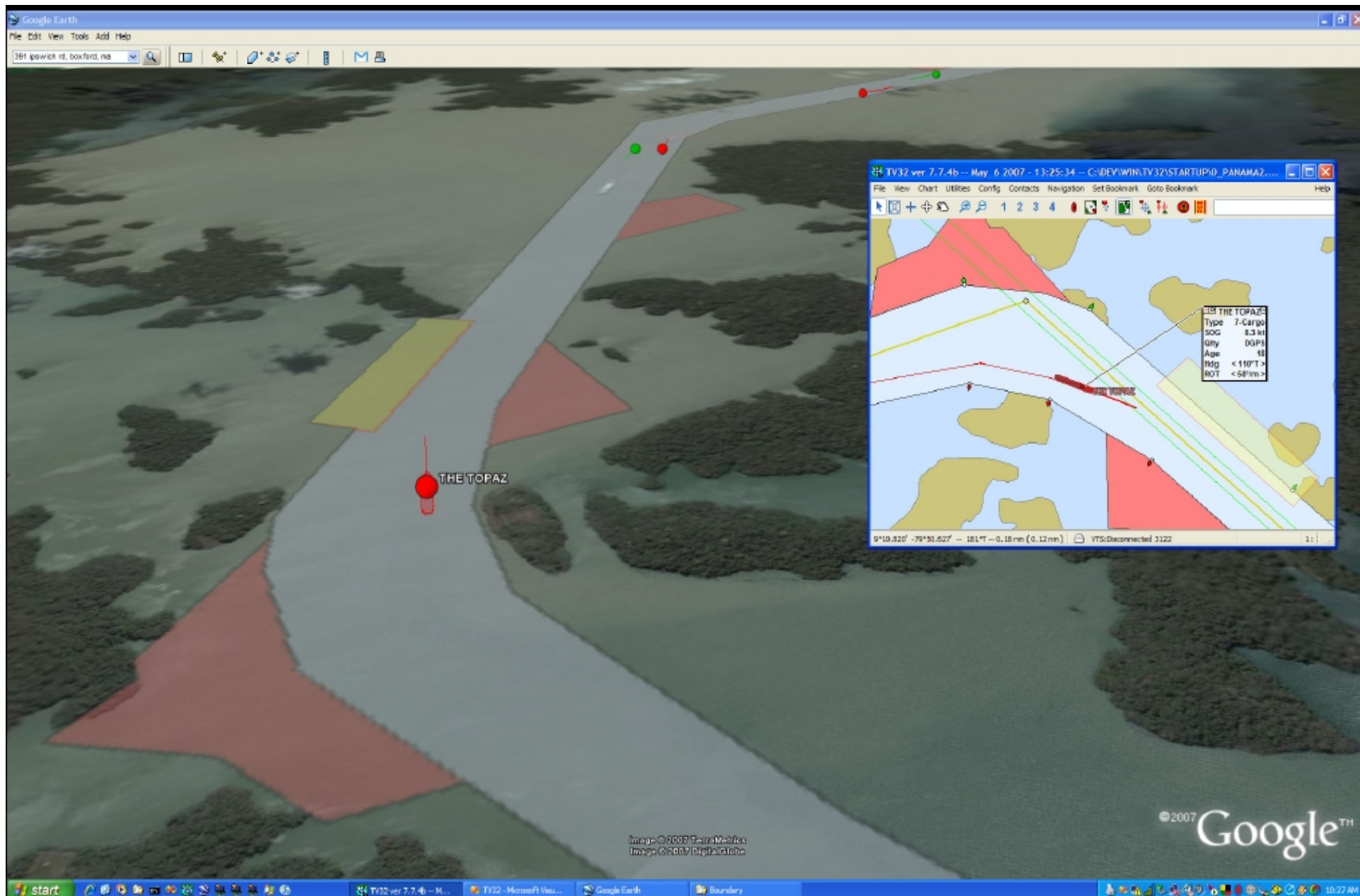
## Columbia River Pilots

- Pilot Display
- Hydro Graphic Survey



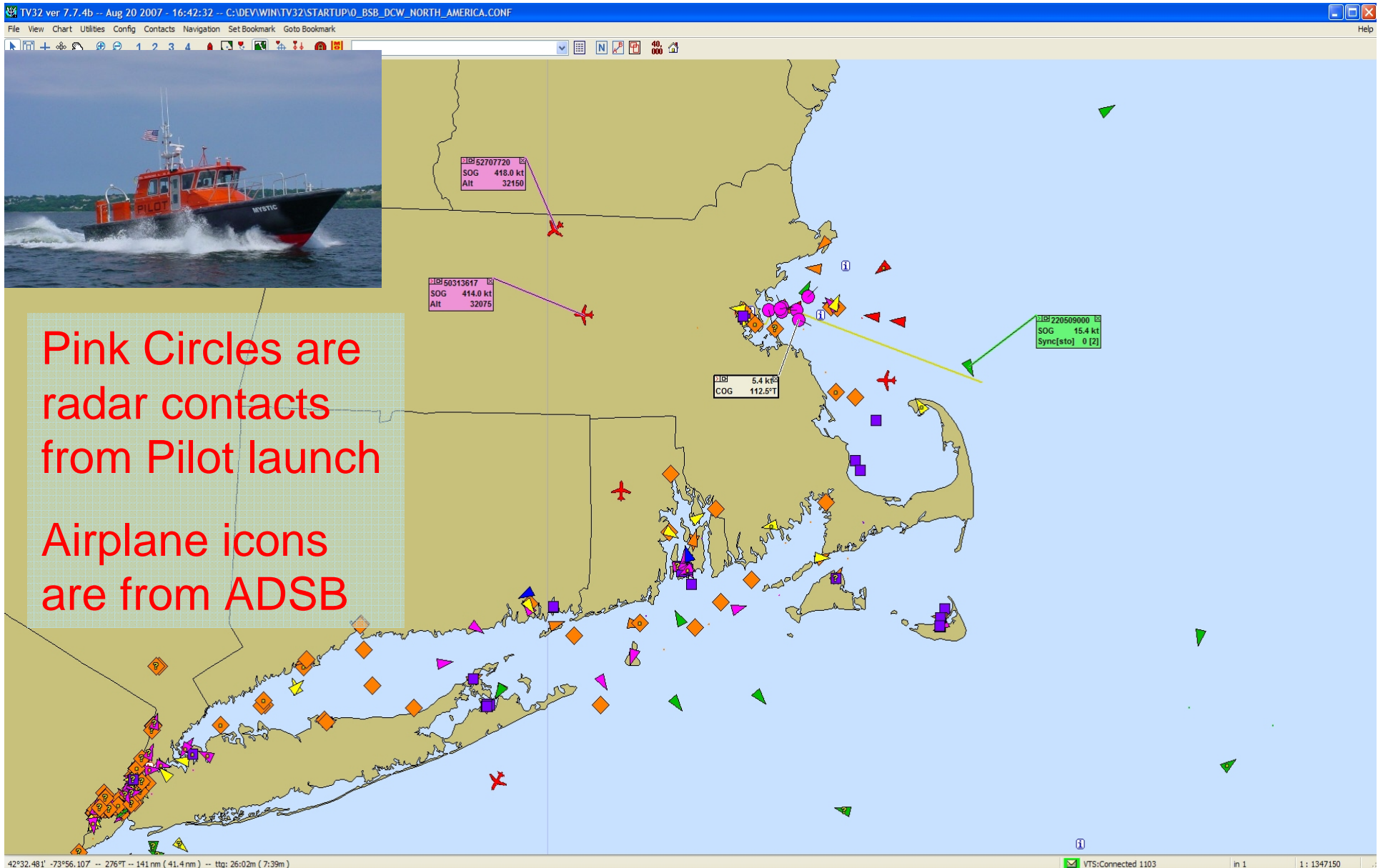
# Transview Other Applications: Oil Spill Model Display





# MSSIS Future Vision

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



Pink Circles are  
radar contacts  
from Pilot launch

Airplane icons  
are from ADSB