VTS Lower Mississippi River and AIS Implementation

- Captain Robert G. Ross -

U.S. Coast Guard

Office of Vessel Traffic Management

Providing navigation safety information for America's ports and waterways

Agenda

- Vessel Traffic Management - the Toolkit Approach
- AIS - the Automatic Identification System
  - System Overview
  - Standards
  - Display Options
  - Carriage Requirements
- Phased Implementation Plans
  - VTS New Orleans
  - AIS Carriage
- VTS Lower Mississippi River Overview

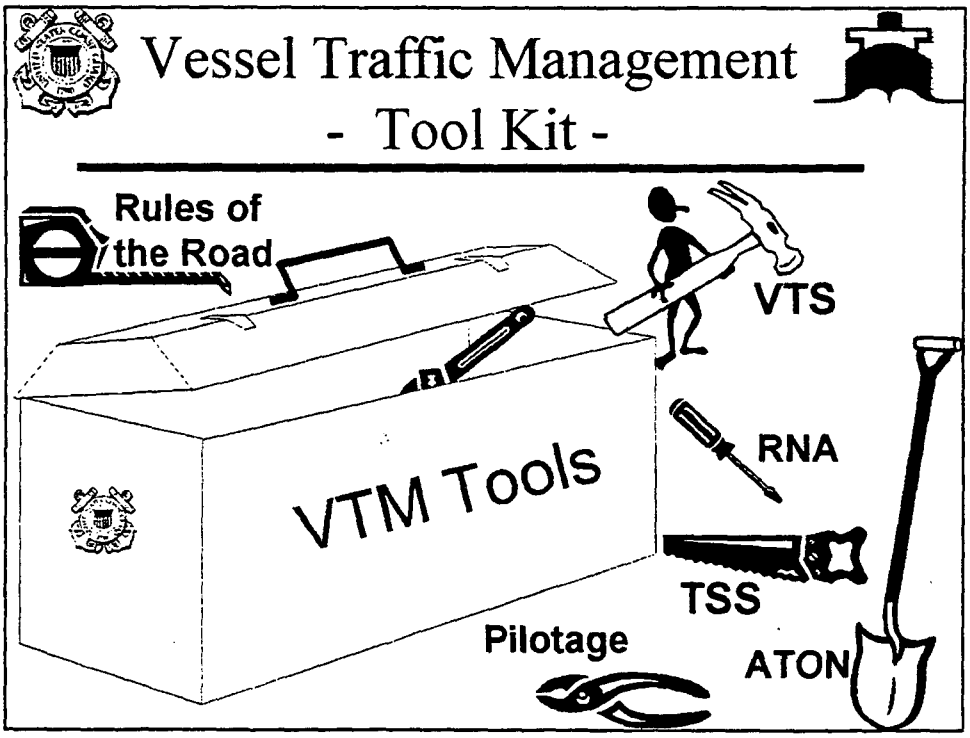
Vessel Traffic Management

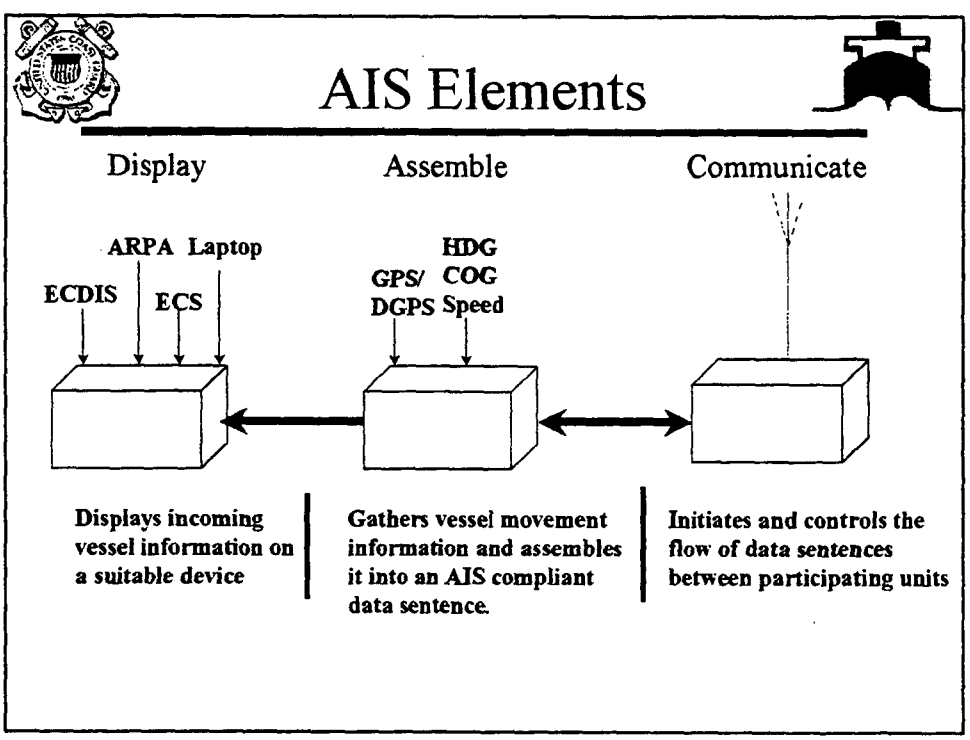
Good Order & Predictability Ensures Safety/Maximizes Thru-put

- Standards Setting
  - Rules of the Road
  - Navigation Equipment Requirements (technical & carriage)
- Operational Controls
  - Regulated Navigation Areas, Traffic Separation Schemes
  - Anchorage Management
  - Safety Zones / Security Zones (Prevention or Response)
  - Underkeel Clearance Guidance
- Vessel Traffic Services

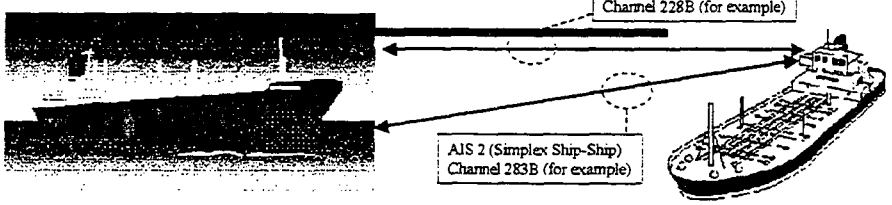
Vessel Traffic Services

- Shore-based activity
- 3 Basic Functions/Operational Modes
  - Information Source
  - Navigation Assistance
  - Traffic Organization
- Operational Mode Determined by Local Situation & Risks
- Traditional Focus is safety/accident prevention
- Traditional Tools: Radar/video/voice radio


Vessel Traffic Management
- Tool Kit -
Rules of the Road
VTS
VTM Tools
RNA
TSS
Pilotage
ATON


AIS Elements
Display
Assemble
Communicate
ARPA Laptop
ECDIS
ECS
HDG
GPS/ COG
DGPS Speed
Displays incoming vessel information on a suitable device
Gathers vessel movement information and assembles it into an AIS compliant data sentence.
Initiates and controls the flow of data sentences between participating units

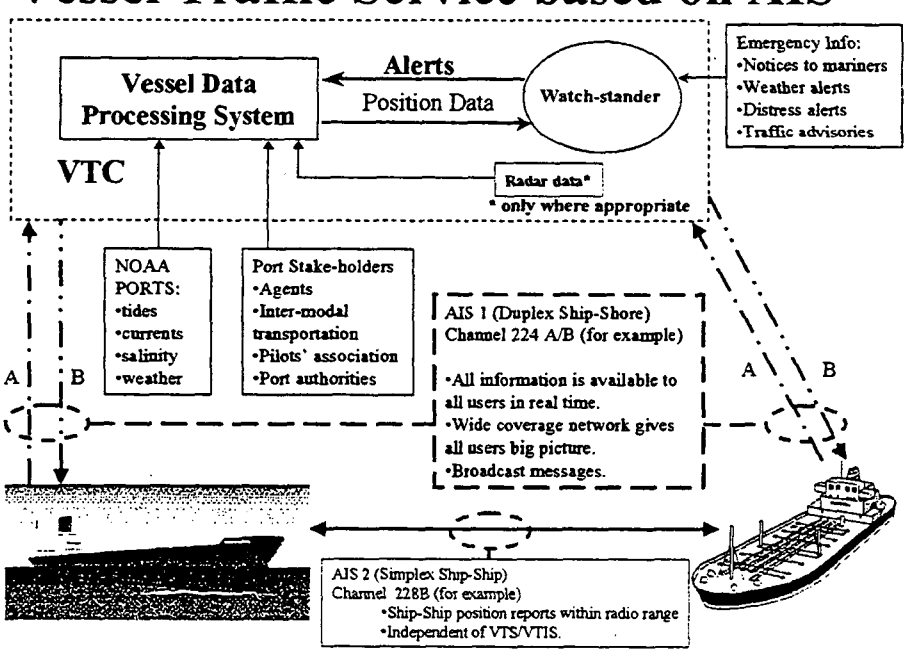
Ship To Ship AIS

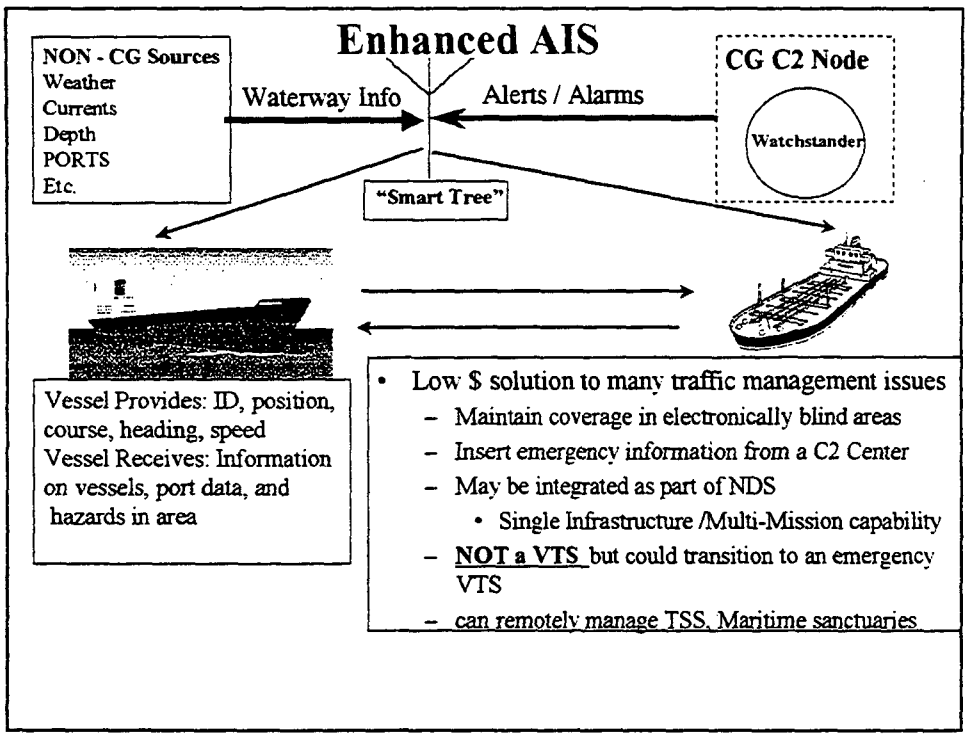


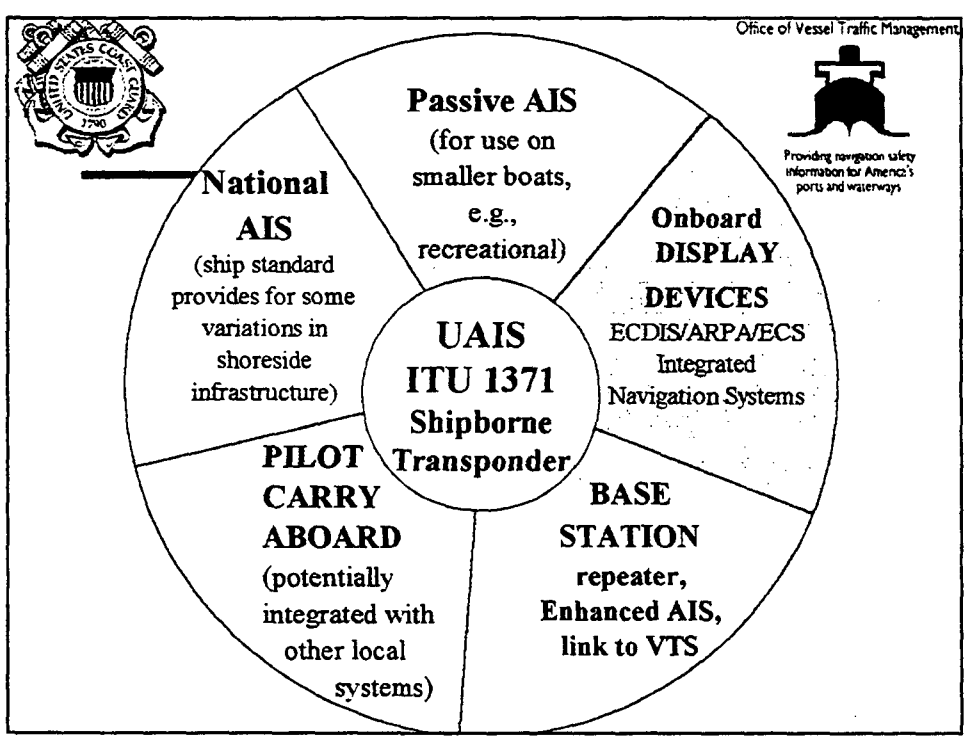
- Dual channel system:
  - > safe channel switching
  - > mitigates RF interference
  - > doubles capacity
- Self-organizing, randomized
- Independent of shore stations
- Situational awareness displays
- Automatic identification

- Ship-ship text messaging
- DCS compatible for frequency channel management
- Simplex & duplex channels
- Narrowband (12.5 KHz) compatible

Vessel Traffic Service based on AIS




Enhanced AIS
NON - CG Sources
Weather
Currents
Depth
PORTS
Etc.
Waterway Info
Alerts / Alarms
CG C2 Node
Watchstander
"Smart Tree"
Vessel Provides: ID, position, course, heading, speed
Vessel Receives: Information on vessels, port data, and hazards in area
• Low $ solution to many traffic management issues
– Maintain coverage in electronically blind areas
– Insert emergency information from a C2 Center
– May be integrated as part of NDS
• Single Infrastructure /Multi-Mission capability
– NOT a VTS but could transition to an emergency VTS
– can remotely manage TSS, Maritime sanctuaries


Office of Vessel Traffic Management
Providing navigation safety information for America's ports and waterways
National AIS
(ship standard provides for some variations in shoreside infrastructure)
Passive AIS
(for use on smaller boats, e.g., recreational)
Onboard DISPLAY DEVICES
ECDIS/ARPA/ECS Integrated Navigation Systems
UAIS
ITU 1371
Shipborne Transponder
PILOT CARRY ABOARD
(potentially integrated with other local systems)
BASE STATION
repeater, Enhanced AIS, link to VTS

AIS Standards Compared

	ITU 825	ITU 1371
• Status	Approved	Approved*
• Transponder Availability	Available	No*
• Basic Design	DSC	SOTDMA
• Reports per minute	240	2250
• Update Rate	Fixed	Variable
• 12.5/25 kHz capability	Yes	Yes
• Number of TX & RX	1 & 2	1 & 3
• Testing	NOLA	No*

AIS Standards Status

Standard Type	Answers	Governing Body	Status	Notes
Functional	What is wanted	International Maritime Organization	Approved	May 98
Technical	How to do it	International Telecommunication Union-Radio	Approved	Nov 98
Certification	Does it do it	International Electrotechnical Commission	Work in Progress	
Frequency	How to communicate	World Radio Conference	Channel 87B and 88B selected for AIS operations	87B and 88B not available in U.S.
International				
National		FCC	Petition Approved	Auction held 12/98

UAIS Standards Timeline

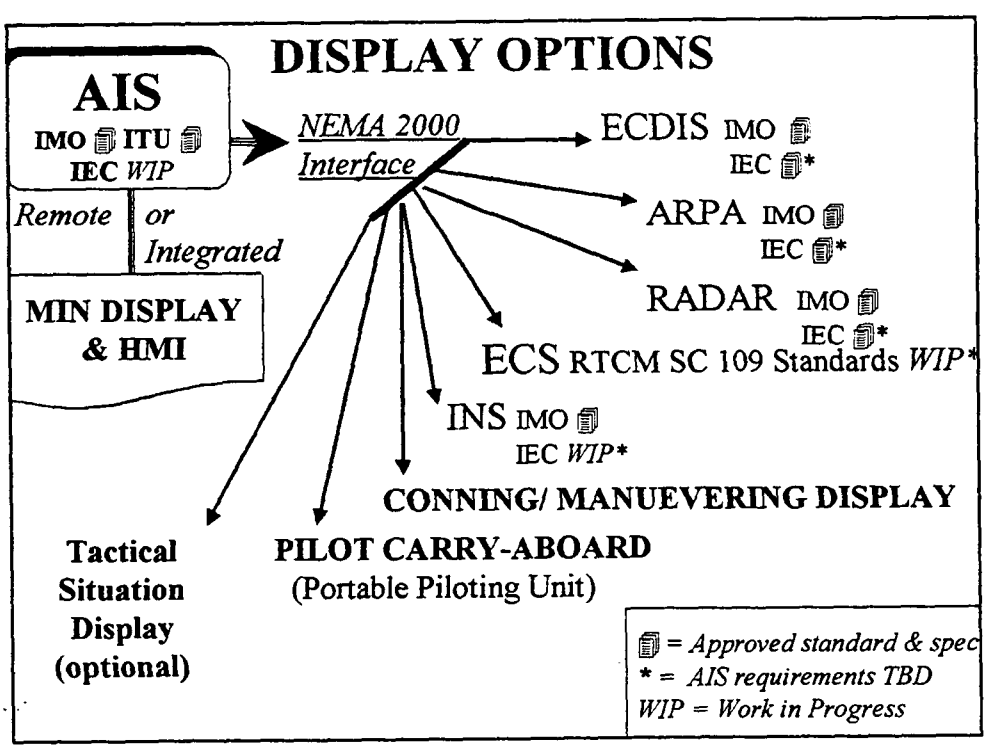
15 APR 00	Working Draft Completed/Distributed
13 MAY 00	8th mtg (San Diego) & finish Committee Draft
01 JUN 00	Committee Draft to TC80 Secretary & Geneva
15 AUG 00	U.S. consolidated input to International Telecommunication Union (ITU) for 1371-1
22 SEP 00	9th meeting (Ottawa) for review of comments
30 OCT 00	ITU (WP8B) reviews draft 1371-1 changes
08 DEC 00	10th meeting complete final document
20 DEC 00	Committee Draft for Voting (CDV) to TC80 Secretary and Geneva ***(Possibility for manufacturers to start using the CDV for production set-up)***

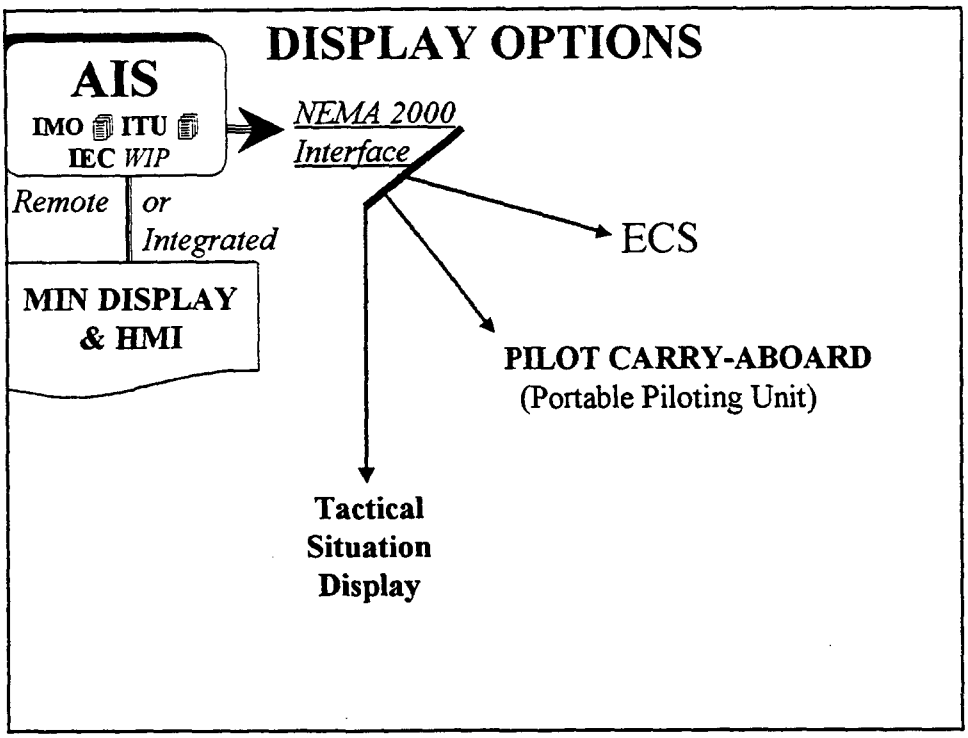
UAIS Standards Timeline (Con't)

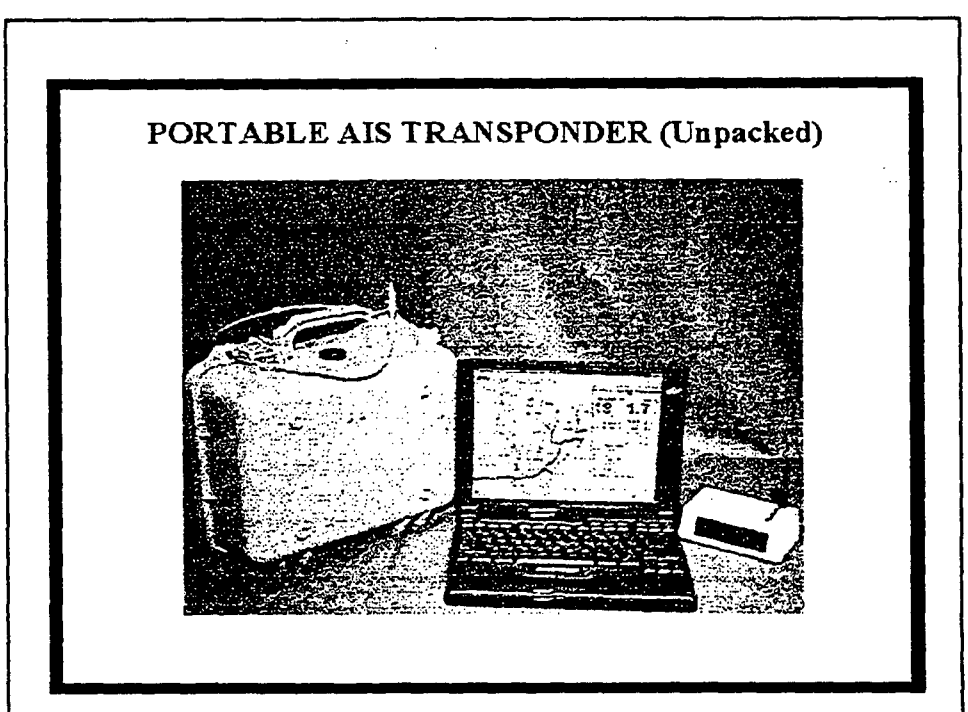
15 MAY 01	Resolution meeting
JUN 01	ITU (SG8) meets to accept 1371-2 changes from ITU (WP8B)
01 JUL 01	Final Draft International Standard to TC80 Secretary and Geneva ***(Safe possibility for a test house to start Technical Acceptance testing)***
31 DEC 01	1371 (Revised 1371-1) Approved Date
01 FEB 02	Draft International Standard Approved Technical Acceptance (TA-Test House) Authority Can issue a TA certificate
01 FEB 03	Publication of IEC 61993-2 International Standard

Transponder Update

- LMR currently using 825-3 type transponder
- CG needed 1371 type transponder
  - Test ship to ship
  - Verify manufacturing capability to position mandatory carriage
  - Position 1371 standard for success
- Competitive procurement for 1371 awarded to:
  - SAAB Celsius, Solna, Sweden
  - Ross Engineering, Largo, FL
  - SEATEX Inc, Seattle, WA → Parent NAVIA Maritime, AS, Norway
  - Tideland Signal Corp, Houston, TX → Teamed with MDS, South Africa
  - RACAL NCS Inc, Houston, TX → Parent RACAL Electronics, PLC, UK
  - JJM Systems Inc, Jamison, PA → Teamed with Safe Marine, Fareham, UK

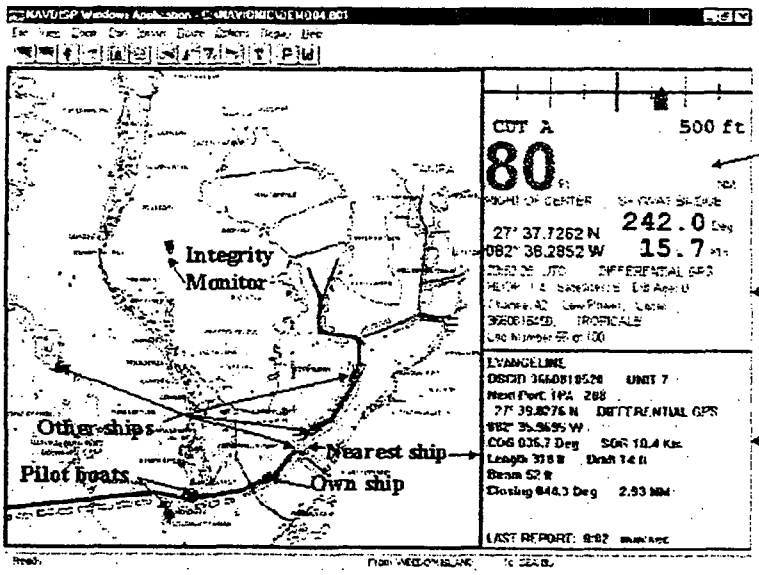



DISPLAY OPTIONS
AIS
IMO ITU
IEC WIP
NEMA 2000
Interface
Remote
or
Integrated
MIN DISPLAY
& HMI
ECS
PILOT CARRY-ABOARD
(Portable Piloting Unit)
Tactical
Situation
Display


PORTABLE AIS TRANSPONDER (Unpacked)

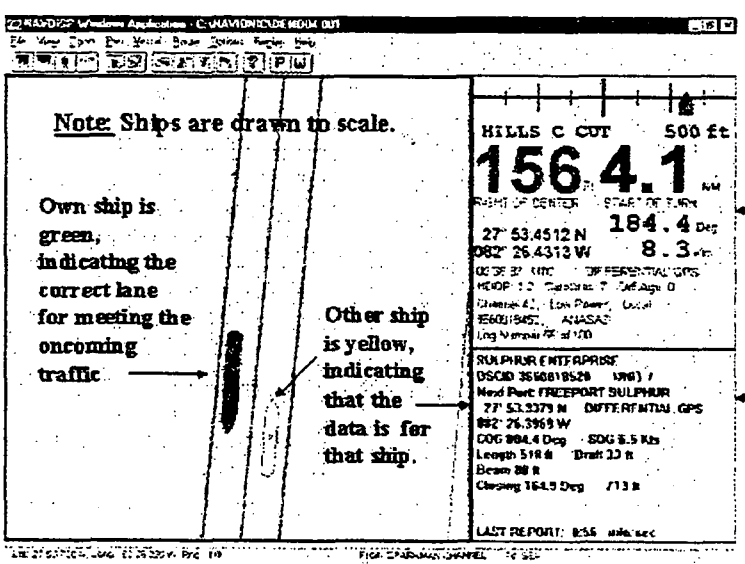
LAPTOP PC DISPLAY SCREEN

THE BIG PICTURE, SHIPS INBOUND & OUTBOUND IN THE CHANNEL



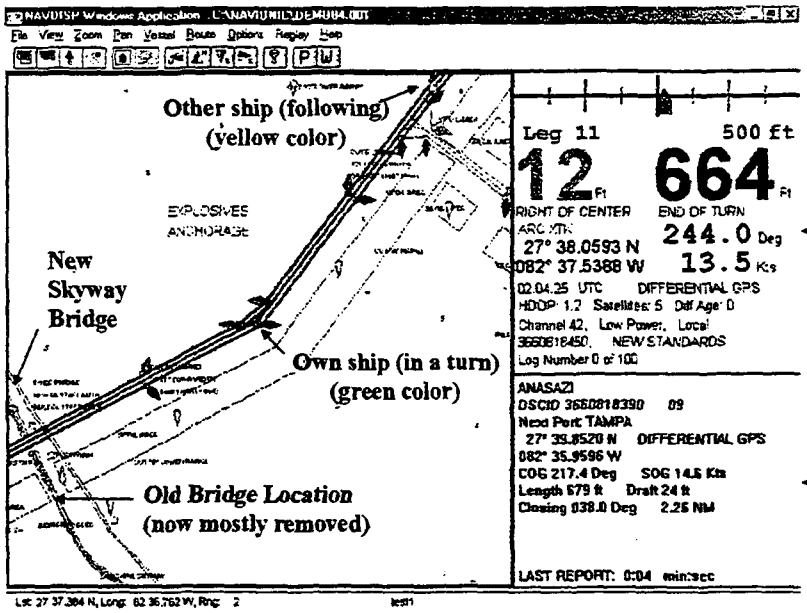
LAPTOP PC DISPLAY SCREEN

SHIPS ARE MEETING IN THE "HILLSBORO CUT C" CHANNEL



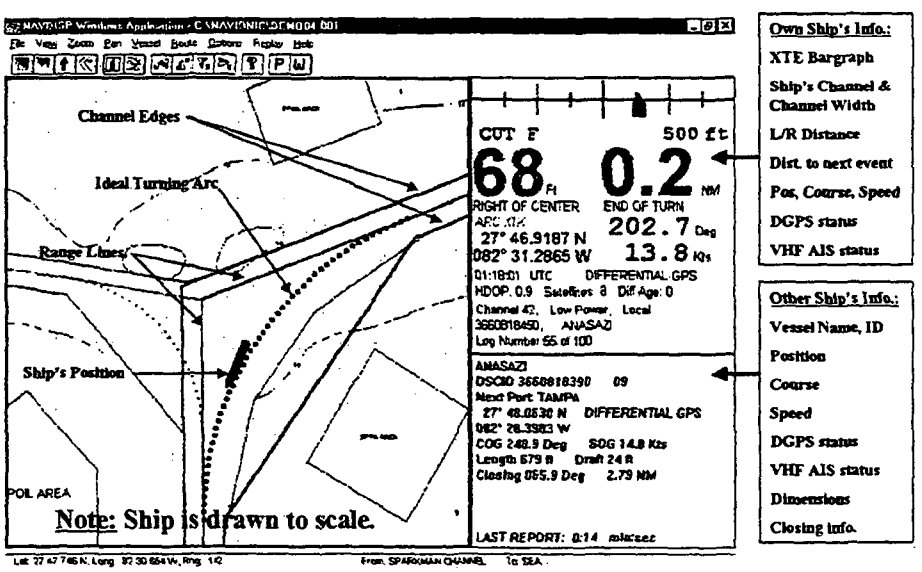
LAPTOP PC DISPLAY SCREEN

SHIPS ARE FOLLOWING OUTBOUND, NEAR THE SKYWAY BRIDGE

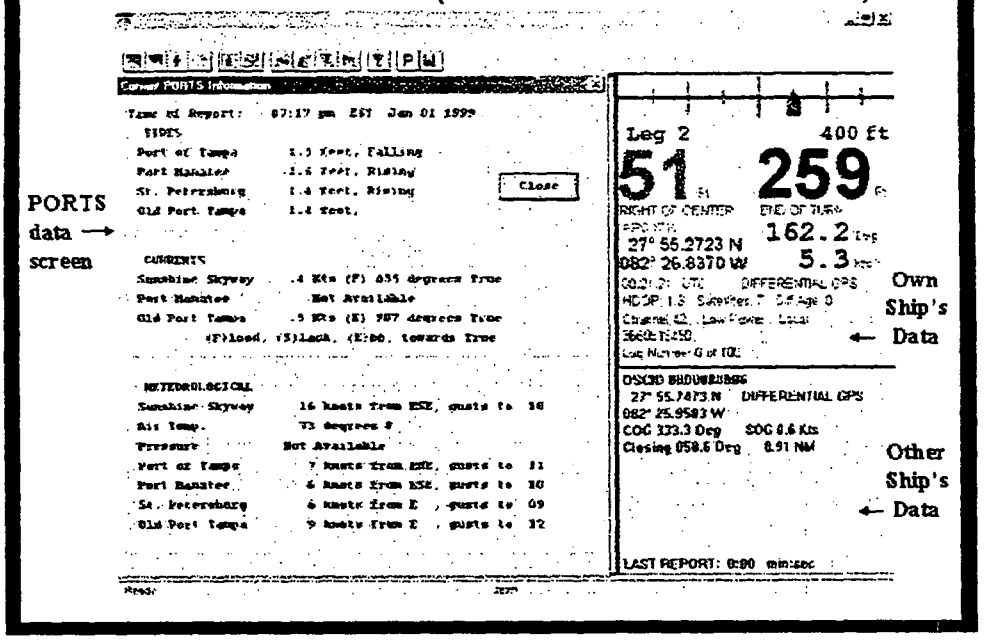


LAPTOP PC DISPLAY SCREEN

SHIP IS FOLLOWING THE CONSTANT-RADIUS TURNING ARC



LAPTOP PC DISPLAY SCREEN
NOAA PORTS DATA (AVAILABLE TO ALL USERS)



Carriage Requirement Options

- Local/Regional
- National (all waters)

Unilateral

- International/Universal

AIS Carriage:

- All passenger ships, other ships of 300+ GT on Int'l voyages
- Cargo ships of 500+ GT *not* on international voyages

- Ships constructed on or after 1 Jul 2002 - required

•Ships on Int'l voyages & built before 1 Jul 2002 - phased-in requirements:

  * Passenger Ships & Tankers..... by 1 Jul 2003
  * Other than Tankers, 50K+ GT.....by 1 Jul 2004
  * Other than Tankers, 10K-50K GT.. by 1 Jul 2005
  * Other than Tankers, 3K-10K GT.....by 1 Jul 2006
  * Other than 300 - 3000 GT.....by 1 Jul 2007

- Ships *not* on Int'l voyage & built before 1 July 2002:
  ...required.....by 1 Jul 2008

Target End-States

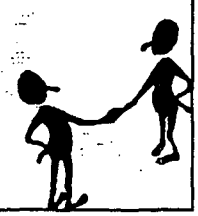
- *SOLAS Vessels (IAW SOLAS, Chapter V)*
  - *All Passenger Ships and Tankers*
  - *Other Ships Phased in by GT*
  - *Ships over 300 GT on International Voyage.*

- *Non-SOLAS Vessels (domestic)*
  - *Towing Vessels.*
  - *Small Passenger Vessels over 49 passengers.*
  - *Vessels over 40 meters in length.*
  - *Others?*

Regulatory Timelines

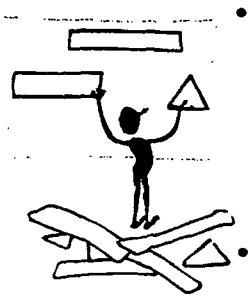
- NPRM VTS LMR - April 2000
  - Final Rule - September, 2000
- NPRM AIS Carriage - May 2000
  - Final Rule - December, 2000

- Two Workplans with distinct timelines .....which converge to create the first AIS-based VTS.
- Phased Implementation.



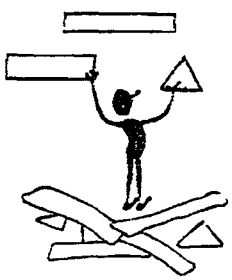
VTS LMR Workplan

- *Phase One*
  - Establish *Algiers Point* VTS Special Area
    - Modifies existing RNA (33 CFR 165.810).
    - Codifies VHF radio procedures.
- *Interim Phase(s)*
  - VTS development: hiring, training, SOPs.
  - VTS Area expanded as capability permits.
  - VTS Area fine-tuned to AIS capability.
  - Voluntary AIS use.
- *Final Phase*
  - Mandatory AIS.



AIS Carriage Workplan

- *Phase One*
  - Designate the AIS Standard (ITU-R M.1371).
  - AIS Carriage in VTS LMR.
- *Subsequent Phases*
  - SOLAS Carriage Schedule.
  - Additional AIS-based VTSs - PAWSS.
  - Non-VTS areas.
  - Non-SOLAS Carriage Schedule.



Projected VTS LMR Timeline

- **March/April 2000 - VTS LMR NPRM**
- **Spring-Summer 2000 - Staff VTS, Commence Shadow Ops & Transition to VTC**
- **Summer-Fall 2000 - Universal AIS Testing Begins**
- **VTS LMR effective w/ limited service - Sept 2000**
- **Voluntary 825 AIS Use in VTS AOR - thru Sept 2001**
- **AIS-based VTS SOP Development - thru Sept 2001**
- **825 to 1371 AIS Transition - Sept to Dec 2001**
- **Voluntary 1371 AIS Use in VTS AOR - Jan 2002**
- **Mandatory 1371 Carriage in VTS AOR - Jul 2002**

Lower Mississippi River (LMR)

- Vessel Traffic Center New Orleans Completed
- Radar Sites (6) Acquired for IOC
- Initial Operating Capability (IOC) 4QFY00

VTS LMR SERVICE AREA