“AIS from a Pilot’s Perspective”

Capt. Mike Morris
Houston Pilots, Presiding Officer
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AIS: From a Pilot’s Perspective…

AIS is valuable

However, AIS as installed on many ships has distinct limitations

AIS is significantly enhanced when combined with radar and charting displays

AIS, when combined with emerging technologies, may provide an important decision making tool in the future for all-weather navigation
AIS is Valuable: It Provides Vital Data to the Mariner

- Who they are?
- Where they are?
- Their speed and direction?
- Their size
- When and where will we meet?
AIS Limitations: Minimum Keyboard Display (MKD)

- Hard to read
- Provides distraction from pilot navigation duties
- Often mounted in inaccessible places
Our Piloting Solution to Minimum Shipboard Equipment: The Pilot Carry-Aboard

- Survey quality kinematic GPS with US Coast Guard differential accuracy and service
- Custom electronic charts based on recent US Army Corps of Engineer waterway surveys
- Interface with shipboard Automated Information System (AIS) transponder
- Our system is sub-meter accurate, displays other known vessels in the waterway and uses accurate charting designed especially for our local complex piloting.
Houston Pilots Kinematic GPS/AIS System
Examples of Turning the Valuable into the Invaluable: *AIS Enhanced*

**AIS**

It is possible to take this valuable tool and make it invaluable!

Add charting to provide spatial understanding of the AIS data...

Add prediction software to forecast the AIS data...

Add radar to verify the AIS data...
Pilot Carry-Aboard system dual DGPS antennas provide vessel position and heading.

AIS link displays other ships on the charting software.
AIS- Increased Value When Combined with Electronic Charting: Pilot Carry-Aboard Software
AIS Charting Close-up: AIS MKD Display v. Pilot Software…

Ship’s AIS Display Readout

Piloting Software AIS Readout
AIS Data with Navigation
Chart View
AIS Data with “De-cluttered View”
AIS with Radar Overlay: Close-up
AIS Display Standards:

• International and National AIS standards are still under construction!

• The AIS Minimum Keyboard Display “MKD” is not enough!

• Please support enhanced AIS displays and stricter carriage requirements.
What else needs to happen?

• Lack of training standards.
• Pilot plug integration problems.
What AIS is not?

• It is not a precision navigation system and we have seen an indication that some think it is.

• USCG base stations allow the tracking/recording of all movements and when there is an incident it only makes sense to use the playback feature to assess what happened; however, we all need to remember that AIS position accuracy is somewhat limited.
AIS Error

GPS/AIS Data Provided by
Capt. Tom Rudder, VA Pilots

Sequence showing reporting error of own ship AIS position
LOGGING
759 ft

Rte: 1 - Norfolk In
Dest: Norfolk Southern
Tag: 60

DGPS
THIMBLE
THIMBLE-1TS

TIME
14:16:54
SUN 12 DEC

ETA
15:22

SATS
BCN 289.0
SS 80
SNR 20
AGE 6

Ant. Off.: Port 51.8 ft
Vector: 3.00 min

HDG 287°
COG 289°
SOG 12.7 KT
BRG 287°

ROT Deg/Mil 2767.7°

DIST 2.943 NM

X R 340 FT
AIS Error

GPS/AIS Data Provided by

VTS Houston Galveston
AIS is Not A Precision Tool: Typical Ship Clearance Precision in the HSC

AIS alone cannot accurately record a ship meeting arrangement such as this example, it lacks the precision necessary to define the ship tracks.
Does AIS Allow for All Weather Navigation?

• Not yet! But-
  – AIS is a pivotal technology
  – If and when all-weather navigation becomes practical and safe, AIS will be an important part of it.
  – Emerging technologies will combine with AIS:
    • Infrared systems / night vision
    • Laser systems
We will get there!

• For AIS to be most effective, all vessels should participate.

• To that end I would encourage you to do as we have in the Houston community and send in letters to the USCG supporting carriage requirements for small passenger vessels and all commercial vessels over 26’. (screen shot of HOGANSAC letter)
HOGANSAC

Houston Galveston Navigation Safety Advisory Committee

Authorized by Public Law 102-241

April 25, 2005

Dear Admiral Duncan,

For the past two years HOGANSAC has played an active role in the development of
channel reopening protocols to facilitate the safe and secure movement of commerce
throughout the Houston Ship Channel (HSC). To that end, we seek your support in
expanding the AIS carriage requirements to include passenger vessels that are certified
to carry more than 6 but less than 151 passengers and all commercial vessels 26 feet or
greater in length. Our recommendation that the AIS carriage requirement be expanded
to include a greater population of vessels that ply the HSC is driven by the needs of a
24-hour-a-day, 7-day-a-week port complex and the expectation that advances in
electronic navigation permit the movement of vessels during periods of reduced visibility.

As a result of the recently enacted AIS carriage requirement, mariners have been
provided with enhanced situational awareness throughout the HSC and its approaches.
Given this reality, HOGANSAC chartered a reduced visibility work group under the
auspices of the deep draft entry facilitation subcommittee to explore the possibility of
mitigating the effects of vessel delays attributable to fog. Additionally, HOGANSAC’s
technology subcommittee participated in an effort to integrate AIS targets into a portable
navigation system that permits ship pilots to immediately identify any AIS-equipped
vessels transiting in the vicinity of the piloted vessel.

The initial focus of the reduced visibility work group was to examine the feasibility of moving selected
draft vessels (e.g., cruise ships, deep-and-wide tank vessels) in a controlled environment (e.g., no meeting or
overtaking). The group soon realized that - given the large numbers of vessels that were not required to carry
AIS (e.g., passenger vessels certified to carry less than 50 passengers; commercial fishing vessels less than
40 meters) - there was a possibility that these non-VTS users could not be identified in a timely fashion. Thus,
undercutting the effectiveness of Coast Guard-implemented vessel traffic management measures designed to
minimize conflicts between mariners in a low visibility setting.

From a risk-assessment perspective, it is understood that the decision to navigate a vessel in limited visibility
must err on the side of safety. Nonetheless, if it is possible to positively identify the name, course and speed of
a vessel from its AIS signal the risk associated with low visibility navigation can be better managed. Moreover,
in some cases, it would potentially eliminate the need to anchor vessels in the middle of the channel - a
measure that increases the risk of a collision with smaller vessels that opt to navigate past the anchored vessel.

In closing, any support you can lend to this recommendation would enhance navigation safety throughout one
of the most critical and congested waterways in our nation. We sincerely thank you for your ongoing support
of HOGANSAC’s efforts to improve navigation safety throughout the ports of Galveston, Texas City and Houston
and attribute our success and outstanding reputation to your dedication and commitment to our committee.
Synopsis

1. Current AIS as fitted on ships satisfies the minimum carriage requirement, but is generally ineffective for piloting.

2. Ship pilots recognized this and carry aboard high quality equipment to maximize AIS and GPS data.

3. Adding charting and/or radar correlation to AIS greatly improves the use of the data.

4. Emerging technologies are opening the doors to expanded port operations, AIS will be a large part of this change.
THANK YOU

Capt. Mike Morris

Houston Pilots, Presiding Officer

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