United States Coast Guard
Marine Safety Alert
Assistant Commandant for Prevention
Department of Homeland Security

February 4, 2005 Alert 1-05
Washington, DC

GPS Receiver Manually-Entered Position Offsets May Cause Safety Hazard when Interconnected to Navigation Devices

It has come to the attention of the U.S. Coast Guard that certain Global Positioning System (GPS) receivers do not provide a proper indication to other connected equipment when manually-entered position offsets are entered into the GPS receiver. Even a small offset could result in danger of collision or other navigation safety hazard when the receiver is interconnected to devices such as an automatic identification system (AIS), Electronic Chart Display and Information System (ECDIS), integrated navigation systems (INS) or track control system (TCS).

The problem is caused by an error in the NMEA 0183/IEC 61162 data interface Datum Reference ("DTM") "local datum" field. Navigation systems interconnected to the GPS receiver use this field to determine whether the position received is referenced to World Geodetic System 84 (WGS84) or something different. AIS equipment, for example, disregards external position information for reasons of safety if the "local datum" field does not indicate WGS84. As a result, equipment that is interfaced to GPS receivers having this problem would act as if the position were referenced to the WGS84 datum, when in fact the position differs from the WGS84 datum by the manual offsets entered by the vessel's crew or captain.

The problem can be identified if own ship position displayed on an AIS changes in proportion to manually-entered offsets entered into the GPS receiver interconnected to the AIS. The GPS is operating correctly in such a situation if the AIS reverts to its integral GPS and disregards the manually-entered offsets sent from the externally-connected GPS.

<u>GPS Receivers identified having this problem:</u>

Furuno GP80
Furuno GP90

Mariners having these receivers are advised to either take steps to ensure that the manually-offset feature is never and can never be used, or to disconnect these receivers from the AIS, ECDIS, INS, TCS or other navigation or communications system.

Technical questions relating to this alert may be addressed to Mr. Lee Luft at (860) 441-2685 or LLuft@rdc.uscg.mil.

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United States Coast Guard
Marine Safety Alert
Assistant Commandant for Prevention
Department of Homeland Security

October 24, 2005 Alert 5-05
Washington, DC

Automatic Identification System (AIS) - Saab Transponder Timing Problem

It has come to the attention of the U.S. Coast Guard that there is a functional timing problem with Saab R3 and R4 Class A mobile AIS equipment. This timing problem creates a safety risk. This timing problem results in increased interference with other mobile AIS equipment, as well as the possibility that broadcasts of the R3 and R4 will not be received by other models of Class A equipment. Interference (slot collisions) can reduce the AIS communications quality, especially in regions with heavy use of AIS.

Saab TransponderTech AB recommends that owners of the R3 and R4 transponder products contact their dealers for a software and equipment upgrade to repair the timing problem.

Background: All AIS equipment uses UTC time for synchronizing transmissions. A leap second will be added to UTC time at midnight, 31 December 2005. The leap second was introduced in the internal GPS receiver module in the R3 and R4 when the announcement of the additional leap second was made in July. Due to the incorporation of the leap second, the timing of R3 and R4 transmissions is in error by one second and will remain that way until 31 December 2005.

This timing error causes each transmission to begin in the middle of a time slot rather than at the beginning of the time slot. This results in the use of two time slots. A normal transmission uses one time slot. Therefore there is a risk that AIS transmissions from these transponders will interfere with the transmissions of other AIS equipment. Also, because of variations in AIS receiver designs, these transmissions may not be received by certain brands of AIS equipment.

To view the announcement from Saab TransponderTech AB -
http://www.uscg.mil/hq/g-m/moa/docs/Saab505.pdf

Questions or comments regarding this safety alert may be addressed to Mr. Joe Hersey, Jr., Chief, spectrum Management Division at 202.267.1358 or jhersey@comdt.uscg.mil.

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UNITED STATES COAST GUARD
U.S. Department of Homeland Security

MARINE SAFETY ALERT

Assistant Commandant for Marine Safety, Security and Stewardship

October 30, 2008 Alert 10-08
Washington, DC

NEW AUTOMATIC IDENTIFICATION SYSTEM (AIS) DEVICES MAY NOT BE DISCERNIBLE WITH OLDER AIS SOFTWARE

The U.S. Coast Guard is pleased to announce the availability of type-approved Automatic Identification System (AIS) Class B devices. These lower cost AIS devices are interoperable with AIS Class A devices and make use of expanded AIS messaging capabilities. Unfortunately, not all existing Class A devices are able to take full advantage of these new messaging capabilities. All existing AIS stations will be able to receive and process these new messages from a Class B device. However, they may not be able to display all Class B information on their Minimum Keyboard & Display (MKD) or other onboard navigation systems. In most cases, a software update or patch will be required to do so. Therefore, the **U.S. Coast Guard cautions new AIS Class B users to not assume that they are being 'seen' by all other AIS users** or that all their information is available to all AIS users. Further, the **U.S. Coast Guard strongly recommends that all users of out-dated AIS software update their systems as soon as practicable.**

The new Class B devices have the same ability to acquire and display targets not visible to radar (around the bend, in sea clutter, or during foul weather). They differ slightly in their features and nature of design, which reduces their cost and affects their performance. They report at a fixed rate (30 seconds) vice the Class A's variable rate (between 2-10 seconds dependent on speed and course change). They consume less power, thus broadcast at lower strength (2 watts versus 12 watts), which impacts their broadcast range; but, they broadcast and receive virtually the same vessel identification and other information as Class A devices, however, do so via different AIS messages.

Class A devices by design will receive the newer Class B AIS messages and their MKDs should display a Class B vessel's dynamic data (i.e. MMSI, position, course and speed), unfortunately, there are a few older models that do not. Although these older devices might not display the new AIS messages, they are designed—and tested—to receive and process these messages and make them available to external devices (e.g. electronic chart systems, chart plotters, radar) via a Class A output port. These external devices may also require updating in order to discern Class B equipped vessels.

AIS automatically broadcasts dynamic, static, and voyage-related vessel information that is received by other AIS-equipped stations. In ship-to-ship mode, AIS provides essential information that is not otherwise readily available to other vessels, such as name, position, course, and speed. In the ship-to-shore mode, AIS allows for the efficient exchange of information that previously was only available via voice communications with Vessel Traffic Services. In either mode, AIS enhances a user's situational awareness, makes possible the accurate exchange of navigational information, mitigates the risk of collision through reliable passing arrangements, facilitates vessel traffic management while simultaneously reducing voice radiotelephone transmissions, and enhances maritime domain awareness. The U.S. Coast Guard encourages its widest use.

The **U.S. Coast Guard advises mandated AIS users that Class B devices do not meet current AIS carriage requirements**—either the International Convention for the Safety of Life at Sea (SOLAS V/19.2.4) or U.S. regulations (33 CFR 164.46). The Coast Guard is in the process of expanding the current carriage requirements to include most self-propelled commercial vessels which navigate U.S. waters, and the use of Class B devices will be permissible on some of these commercial vessels. Prospective buyers, particularly those operating commercial vessels that are highly maneuverable, travel at high speed, or routinely transit congested waters or in close-quarter situations with other AIS equipped vessels should consider, albeit more expensive, AIS Class A devices in order to meet forthcoming requirements.

All users are reminded to maintain their AIS in effective operating condition at all times, including the information the AIS device broadcasts. Improper operation of AIS or inaccurate information could subject a person to civil penalties not to exceed $25,000 (46 USC §70119). For general information on AIS, carriage requirements, future AIS rulemakings and a listing of Coast Guard type-approved AIS Class A devices which require a software update in order to display AIS Class B information, visit http://www.navcen.uscg.gov/enav/ais .

This safety alert is provided for informational purposes only and does not relieve any domestic or international safety, operational or material requirement. Developed by the Office of Waterways Management, United States Coast Guard Headquarters, Washington, DC, cgnav@uscg.mil.

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UNITED STATES COAST GUARD
U.S. Department of Homeland Security

MARINE SAFETY ALERT

Assistant Commandant for Marine Safety, Security and Stewardship

May 27, 2010
Washington, DC

Alert 05-10

AIS TEXT MESSAGING CONCERNS: USAGE DURING NAVIGATION AND EMERGENCIES AND ENSURING ACCURATE AIS DATA

Automatic Identification System (AIS) is an internationally adopted radio-navigation protocol to exchange pertinent navigation-related information amongst its users, either afloat, ashore or airborne. AIS facilitates vessel traffic management while simultaneously reducing the need for voice radiotelephone transmissions. AIS provide vessel information, including the vessel's identity, type, position, course, speed, navigational status and other safety-related information. It receives automatically such information from similarly fitted ships; monitors and tracks ships; and exchanges data with shore-based facilities.

Usage During Navigation - AIS enhances user's situational awareness, and can mitigate risk of collision by providing vessels with more reliable information upon which to base their passing arrangements. This can be accomplished via an AIS safety related text message of up to 156 characters long. However, the Coast Guard **strongly reminds operators** that use of AIS text messaging does not relieve the vessel of other requirements, such as the Vessel Bridge-to-Bridge Radiotelephone regulations or of the requirements to sound whistle signals and display lights or shapes in accordance with the International or Inland Navigation Rules.

Usage During Emergencies - With respect to using AIS safety related text messages in emergency situations, **users must be aware** that they **may not be received, recognized or acted upon** as Global Maritime Distress Safety Systems (GMDSS) messages would be by the Coast Guard, other competent authorities or maritime first responders. Thus AIS must not be relied upon as the primary means for broadcasting distress or urgent communications, nor used in lieu of GMDSS such as Digital Selective Calling radios which are designed to process distress messaging. Nonetheless, AIS remains an effective means to augment GMDSS and provides the added benefit of being 'seen' (on radar or chart displays), in addition to being 'heard' (via text messaging) by other AIS users within VHF radio range.

Operators Must Ensure Accurate Data -The Coast Guard has noted a high percentage of inaccurate and improper AIS messaging data. AIS requires operators to routinely update their data as it relates to navigation status, draft, origination and destination ports, and eta. Other pertinent static data is to be maintained accurately. Dynamic Data, such as that from positioning sources like GPS via external sensors must always be operational, accurate and continuously updated. See http://www.navcen.uscg.gov/enav/ais/USA_AIS_Data_Entry_Guidance_v5.pdf for additional details. AIS is **only as good as the information provided and exchanged**, therefore, users must ensure their unit is always in effective operating condition and broadcasting accurate information.

This safety alert is provided for informational purposes only and does not relieve any domestic or international safety, operational or material requirement. Please visit www.navcen.uscg.gov/enav/ais/AISFAQ.htm for further information on AIS or on how to program and properly use AIS messaging. Developed by the Office of Waterways Management, U. S. Coast Guard Headquarters, Washington, D.C., cgnav@uscg.mil.

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UNITED STATES COAST GUARD
U.S. Department of Homeland Security

MARINE SAFETY ALERT

Assistant Commandant for Marine Safety, Security and Stewardship

August 28, 2010
Washington, DC

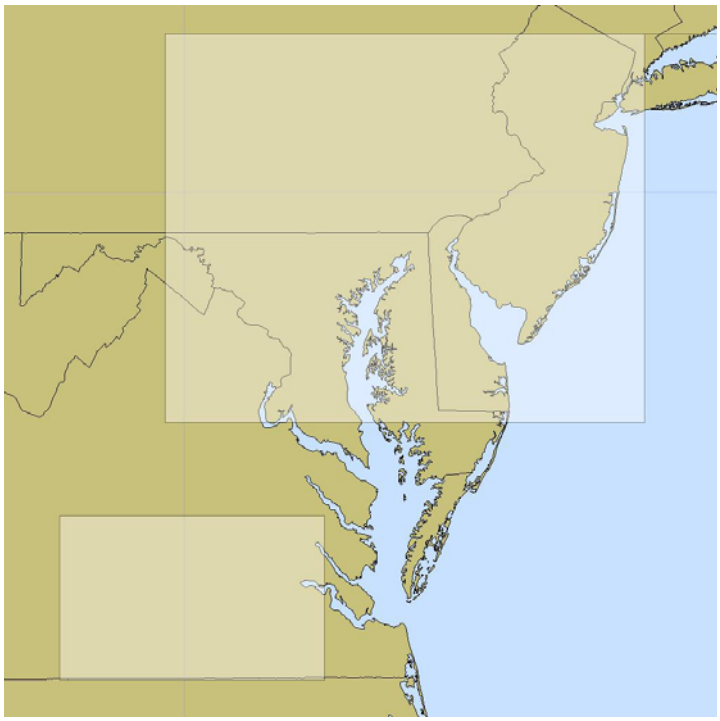
Alert 7-10

CAUTION TO AIS USERS

NAVIGATING THE JAMES RIVER, YORK RIVER, UPPER CHESAPEAKE BAY, DELAWARE BAY, NEW JERSEY SHORE, AND, NEW YORK HARBOR AND APPROACHES

YOU MAY BE INADVERTENTLY OPERATING ON DIFFERENT AIS CHANNELS

Between July 27th and August 19th, 2010, while conducting development testing of its Nationwide Automatic Identification System (NAIS), the Coast Guard inadvertently tele-commanded most AIS users transiting the Eastern United States between lower Connecticut and North Carolina to switch to AIS frequencies other than the AIS default frequencies (161.975 MHz - Channel 87B - 2087 and 162.025 MHz - Channel 88B - 2088). As a result, those users within uniquely defined channel management regions (as shown in the picture) will neither see nor be seen by vessels operating on the default AIS channels when within these regions. Similarly, vessels operating on default frequencies will not see or be seen by those vessels that were inadvertently switched to other frequencies. No other AIS users or areas are impacted.



One of the lesser known and potent features of AIS is its ability to operate on multiple channels within the VHF-FM marine band. This frequency agility ensures AIS can be used even when the default channels are otherwise unavailable or compromised. In such conditions, competent authorities, such as the Coast Guard, can use an AIS base station to tele-command shipborne AIS devices to switch to other more appropriate channels when within defined regions of 200 to 2000 square nautical miles. This can be done automatically (and without user intervention) through receipt of the AIS channel management message

(AIS message 22) or manually entered via the AIS Minimal Keyboard Display (MKD) or similar input device. Once commanded or manually entered, the channel management information will stay in memory for 5 weeks or until an affected vessel moves more than 500 nautical miles from the defined region. AIS channel management commands can only be manually overridden or erased by the user via the unit's channel (regional frequencies) management function[1] or automatically overridden via another channel management message for the same defined region. Reinitializing or resetting your AIS or transmission channels will not necessarily reprogram your unit back to the default channels.

Commencing September 1st and continuing for the subsequent 5 weeks, the Coast Guard will broadcast new channel management messages that will telecommand all AIS users back to default channels. This broadcast will occur each hour between hh.05:30 and hh.05:59, but may change as needed. To ensure that these messages are received, they will be broadcast on Channel 70--Digital Selective Calling (DSC), which is also monitored by all type-certified shipboard AIS. While this will ensure all AIS users will get the message regardless of what AIS channel the unit is operating on, it could however cause a minor inconvenience to owners of older DSC radios who may receive an alert (tone) upon receipt of this message. It will have no other effect on DSC radios.

AIS users are encouraged to inform others whom they believe may be affected and are therefore not being seen by others. All AIS users are reminded to maintain their AIS in effective operating condition and to validate their AIS data prior to each voyage and as needed.

This safety alert is provided for informational purposes only and does not relieve any domestic or international safety, operational or material requirement. The Coast Guard has developed policy and procedures to ensure such inadvertent broadcast do not happen again and we apologize for any inconvenience this may have caused. For further information on AIS Channel Management or reprogramming your unit read our Frequently Asked Question #19 at www.navcen.uscg.gov/?pageName=AISFAQ#19 or contact cgnav@uscg.mil. Developed by the Office of Waterways Management, U.S. Coast Guard Headquarters, Washington, DC

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Office of Investigations and Analysis: http://marineinvestigations.us
To subscribe: kenneth.w.olsen@uscg.mil

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[1] The following settings, if found in your AIS Channel Management / Regional Frequency pane, should be overridden (as denoted) prior to navigating therein; if you do not find these settings / regions in this pane you are not affected and need do nothing.

Setting / Region X (MD, DE, PA, J, NY Area)
NE Corner: 41º 07.60 N, 073º 49.10' W (41.1266667 -73.8183333)
SW Corner: 38º 21.90' N, 078º 10.40 W (38.3650000 -78.1733333)
Channel 1/ A / AIS1: 1022 / Ch.22B [should be change to 2087 / 87B]
Channel 2 / B / AIS2: 2022 / Ch.22 [should be change to 2088 / 88B]

Setting / Region Y (VA Area)
NE Corner: 37º 42.00' N, 76º 43.80' W (37.7000000 -76.7300000)
SW Corner: 36º 32.00' N, 79º 8.00' W (36.5333333 -79.1333333)
Channel 1 / A / AIS1: 1027 / Ch.27B [should be change to 2087 / 87B]
Channel 2 / B / AIS2: 2006 / Ch.6 [should be change to 2088 / 88B