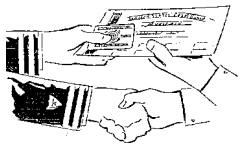
PE SpeedGram



Number 2000-04 June 2000 John VanOsdol, DC-E

Instructors should include the following ADDENDA in the ***Navigating with GPS*** course. These changes update the text to reflect the recent change in the GPS system. Distributing a copy of this SpeedGram to each student would be one way to handle the update.

Addenda

Navigating with GPS

(Second Edition 1999)

A Significant Change.

On Monday, 1 May 2000, President Clinton ordered the US Department of Defense (DoD) to reduce the Selective Availability (SA) feature of the GPS to zero error. This order was implemented at 2000 EDT (0000 2 May 2000 UCT) and by 2359 EDT the positional accuracy of the system had improved from better than 100 meters to better than 15 meters (95% of the time). The order does not remove the US DoD capability of degrading the accuracy of the GPS signal. However, unless situations of greatly increased world tension arise in the future, civilian users can expect the maximum positional accuracy to be available from their GPS receivers. GPS signals will still remain affected by normal atmospheric factors.

The ***Navigating with GPS*** document is affected in the following sections:

Navigation Fundamentals
Waypoints
Page 4, last two paragraphs

The description of SA and its effect upon overall system positioning accuracy remains valid. However, non-military users can now expect to obtain the full position accuracy of better than 15 meters (95% of the time). The accuracy obtained is influenced only by atmospheric distortions, as long as SA error remains set to zero.

Global Positioning System (GPS)
What is GPS?
Page 10, third paragraph

Although GPS is a military system, the USA has provided assurance that it will continue to be available for civilian use for at least the next ten years. Civilian users can be limited by something called "Selective Availability" (SA). However, as of 1 May 2000, the SA error has been set to zero by Presidential decree. When implemented, SA introduces intentional error into the signals sent by the satellites, which will result in position errors guaranteed not to exceed 1/4 nautical mile, under worst case conditions. Usually it is much more accurate.

Global Positioning System (GPS)
Dilution of Precision (DOP)
Page 12, first paragraph

The removal of the SA induced error means the *normal* position accuracy has improved to less than 15 meters (95% of the time). It is expected that any reintroduction of the SA signal degradation would be preceded by warnings from the US Government. It is prudent to remember that the SA *degraded* positioning is "less than 100 meters (95% of the time)."

Global Positioning System (GPS)
GPS Accuracy
Page 13

This section remains valid, with the exception that the *normal* operating environment for the GPS is now with SA set to zero error. SA has not been "removed", as some sources have indicated, and could be reinstated in times of world tension if deemed necessary by the US Government.

Global Positioning System (GPS)
Differential GPS (DGPS)
Page 15

DGPS will continue to operate in exactly the same way; however, the DGPS correction will be refining a considerably more accurate series of basic GPS data. Thus DGPS positions will be less than 5 meters (95% of the time), providing only a very slight refinement of GPS positions.

Global Positioning System (GPS)
Multi-Channel
Page 17, first paragraph

The more satellites used to generate a position the more accurate the position will be, as atmospheric signals will also tend to offset each other, depending upon the satellite distribution overhead.

Performance Evaluation (of GPS Receiver)
Autopilot
Page 44, first paragraph

When using a GPS coupled autopilot, navigators are cautioned to maintain critical supervision of its performance, as a matter of good seamanship. With the considerably improved accuracy of the non-degraded GPS, the allowance for system error can be reduced to a circle of 15 meter radius, with some confidence.

The change in operational status of the GPS from a “normally degraded” Standard Positioning Service (SPS) to a “full system capability” SPS will dramatically improve the piloting skills of the recreational boater. However, the main sources of navigational accidents among the boating community are not attributed to the GPS accuracy, or lack of accuracy, but to the many other factors described within the text of the *Navigating with GPS* document. Failure to know and recognize the many pitfalls of partial or inadequate understanding of these factors will not be overcome by improved GPS positioning accuracy.

6 May 2000

Distribution: DCO, VCO, DCPs, FCs (FCs please copy for FSO-PE and FSO-MA)