



read file / copy to 700D
821

RTCA, Inc.
1140 Connecticut Avenue, N. W., Suite 1020
Washington, D.C. 20036

AND-1/700

Telephone 202-833-9339
Facsimile 202-833-9434

August 5, 1998

Mr. Steven Zaidman
Associate Administrator for Research and Acquisitions
ARA-1
Federal Aviation Administration
800 Independence Avenue, SW
Washington D.C. 20591

Dear Mr. Zaidman:

RTCA, acting in its capacity as a Federal Advisory Committee, recommends the timely implementation of a protected, coded, second civil GPS signal with characteristics similar to those of the L1 signal. This enhancement will increase the robustness of GPS, a key element of ICAO's planned Global Navigation Satellite System (GNSS), and thereby improve aeronautical navigation and safety worldwide.

More specifically, the addition of a second civil frequency will:

- Permit users to directly measure ionospheric errors and make appropriate corrections.
- Mitigate the effects of radio frequency interference through:
 - The availability of an alternative signal and
 - Increased received signal power which will enhance protection against interference and signal fading.
- Provide the opportunity to implement advanced techniques.

Direct measurement of ionospheric errors will benefit all GPS users by improving system accuracy and availability. Currently, ionospheric errors are only measured by ground reference stations using the existing L2 carrier signal. This system characteristic restricts to a geographic area near the reference station the service volume in which Category I and other precision approaches can safely be made. This service volume is further reduced during periods of intense solar activity when ionospheric perturbations increase. Implementation of a second civil signal will permit user equipment to reliably and continuously monitor ionospheric errors, provide an autonomous alert of an unsafe condition, reduce the dependence on external augmentation for precision approaches and increase the size of the precision approach service volume.

Since GPS uses very low power radio signals, system performance is vulnerable to radio frequency interference caused by in-band or adjacent-band radio frequency signals and/or

Mr. Steven Zaidman
August 5, 1998

Page 2

signal fading. The desire for increased use of current and new radio frequency devices will exacerbate potential GPS radio frequency interference problems and could serve to limit the use of GPS and its augmentations as a replacement for ground-based radio navigation systems. A second civil frequency, located in radio frequency band allocated worldwide for Aeronautical Radionavigation Service (ARNS) and the Radionavigation Satellite Service (RNSS), will alleviate this problem by providing signal redundancy.

The aviation community, as represented by RTCA Special Committee 159, *Global Positioning System*, recommends the timely implementation of an appropriate second civil frequency to support worldwide GPS operations.

Sincerely,

A handwritten signature in black ink, appearing to read "David S. Watrous". The signature is fluid and cursive, with a large initial "D" and "W".

David S. Watrous
President