

## OPINION ITU-R 96\*

**FUTURE USE OF THE GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)  
FOR HIGH-PRECISION TIME TRANSFER**

(Questions ITU-R 103-1/7 and ITU-R 152-1/7)

(1997)

The ITU Radiocommunication Assembly,

*considering*

- a) that the signals within the navigation allocation bands have also been used simultaneously for the distribution of time and frequency;
- b) the decision by the United States of America, Europe and Japan to introduce, as from 1998 to 1999, an operational system known as GNSS using geostationary Satellite Based Augmentation Systems (SBAS):
  - Wide Area Augmentation System (WAAS) in the United States of America,
  - European Global Navigation Overlay Service (EGNOS) in Europe,
  - Multi-Functional Transport Satellite (MTSAT) in Japan;
- c) that the navigational payload of these satellites will transmit a signal in conformity with the specifications of the appropriate satellite navigation systems as referenced in Annex 1;
- d) that, for the WAAS, EGNOS, and MTSAT systems, the positions of SBAS satellites will be determined to within a few metres;
- e) that time-oriented navigation receivers have been used in clock comparisons which showed an uncertainty below 10 ns as referenced in Annex 1,

*is of the opinion*

- 1** that the organizations responsible for the realization of this GNSS facilitate the study and development of time-oriented GNSS receivers;
- 2** that precise calibration methods should, at the same time, be developed to enable measurement of future GNSS receiver delays and their stability with an uncertainty less than 1 ns; and
- 3** that these receivers be used in experiments for remote clock comparisons.

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\* This opinion should be brought to the attention of Radiocommunication Study Group 8, and:

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- European Space Agency (ESA), Attn.: Mr. Steciw,  
8-10, rue Mario Nikis, 75015 Paris – France.
- Ministry of Transportation, Air Traffic Services Department, Civil Aviation Bureau  
1-3 Kasumigaseki 2-chome, Chiyoda-ku, Tokyo – Japan.
- International Civil Aviation Organization (ICAO)  
99 University Street, Montreal, Quebec H3C 5H7 – Canada.

**Documents related to the Opinion**

- Global Positioning System Standard Positioning Service Signal Specification, 2nd Edition, 2 June 1995.
- Standard GPS Assumptions, Appendix B of MOPS RTCA/DO229, 16 January 1996.
- GLONASS Signal Specification, Proceedings of the International Conference on Space Communication Systems, Moscow, 25 September 1996.
- System Definition Manual for Inmarsat Geostationary Overlay Service, Document Inmarsat, Issue 1, 15 March 1995.
- LODDO, S., FLAMENT, D., BENEDICTO, J. and MICHEL, P. [September 1996] EGNOS, the European Regional Augmentation to GPS and GLONASS. Proc. ION GPS-96, Kansas City, MO, United States of America.
- LOH, R. and WINKLER, G. M. R. [September 1996] UTC Time Reference from WAAS in Real Time. Proc. ION GPS 96, Kansas City, MO, United States of America.
- UHRICH, P., JUOMPAN, B., TOURDE, R., BRUNET, M. and DUTREY, J. F. [1994] Time aspect of the European Complement to GPS; Continental and transatlantic experimental phase. Proc. 26th PTTI, Reston Virginia, United States of America.
- UHRICH, P., JUOMPAN, B., TOURDE, R., BRUNET, M. and DUTREY, J. F. [March 1995] Time aspect of the European Complement to GPS: Summary of the experimental results. Proc. 9th EFTF, Besançon, France.
- GOUNI, Ph., BRUNET, M., SECRETAU, H. and UMRICH, P. [March 1997] Time and frequency aspects in Euridis. Proc. 11th EFTF, Neuchâtel, Switzerland.
- KLECZYNSKI, W. and WINKLER, G. M. R. [March 1997] The Architecture of WAAS Network Time. Proc. 11th EFTF, Neuchâtel, Switzerland.
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