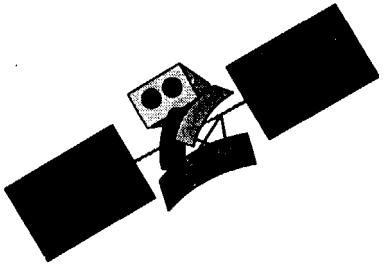
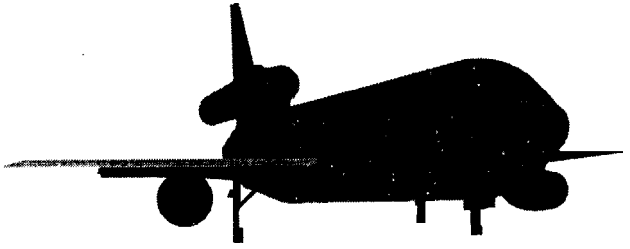
Toward the Future

GPS Radio Spectrum Issues





Gerald J. Markey
HQ FAA/ASR-1
Director, Spectrum Policy and Management
September 14, 1998

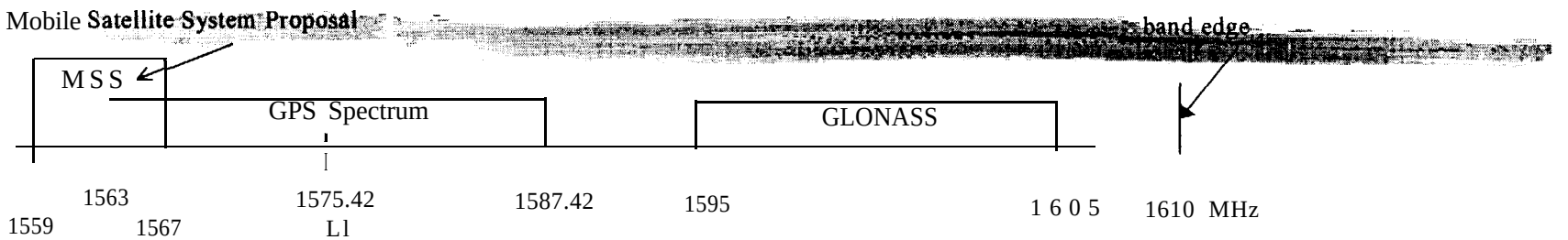
Discussion Issues

- The band 15594610 MHz must continue to be reserved for the exclusive use of GNSS and its augmentations

- Both the international and U.S. civil aviation communities have a requirement for a second civil GPS frequency

- For civil aviation to use a second civil GPS frequency, this frequency must be in a band allocated to the aeronautical radionavigation service/radionavigation satellite service (ARNS/RNSS)

Issue: GNSS Frequency Protection

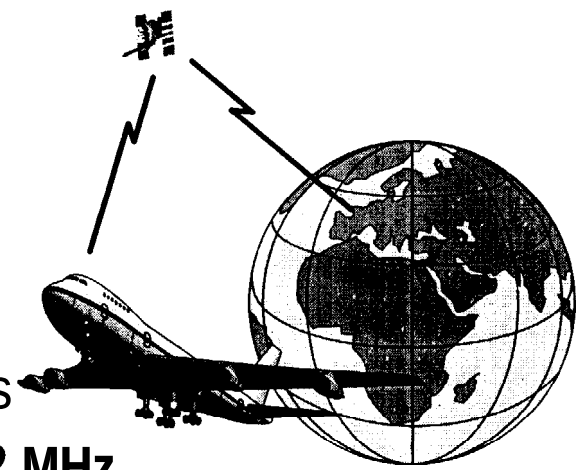


- WRC-97 proposal that MSS "share" GNSS spectrum from 15594567 MHz
  - 27 European/20 Asian States supported
- U.S. and ICAO strongly opposed
  - MSS will interfere with aeronautical signals
  - jeopardize GNSS implementation
- WRC-97 recommended studies.. .decision at WRC-00
- U.S. remains opposed to any sharing of the 1559-1610 MHz band used by GNSS and encourages a similar position by other civil aviation authorities

Global Positioning System

...current activities

- SCAT-I/LAAS
  - spectrum criteria development
  - airspace analysis study
  - type acceptance (SCAT-I)
- WAAS
  - radio frequency interference analysis
  - protection of spectrum: L1/1575.42 MHz
  - uses L2/1227.6 MHz which is protected on “site-by-site” basis
- CAT-II/III
  - support developmental studies
  - LAAS/pseudolites
  - radio frequency interference analysis



Second Civil GPS Signal... **The Civil** Aviation **Requirement**

- FAA Administrator letter, dated September 1, 1998, states that...
  - the global aviation has an operational requirement for an additional signal on GPS
  - this signal must be in an aeronautical radionavigation service frequency band
- RTCA letter, dated August 5, 1998, recommends the timely implementation of a second protected civil GPS signal
- ICAO has also stated a requirement for a second civil GPS frequency to support GNSS...
  - must be in an aeronautical radionavigation service frequency band
  - preferred band is 9604215 MHz...globally allocated for ARNS

Second Civil GPS Signal...
The ARNS Requirement

In order for civil aviation to use the new GPS signal, it must be provided in a frequency band with an exclusive ARNS/RNSS allocation.

- FAA Spectrum Policy -

RNSS makes the signal "legal" and gives it regulatory status.with regard to interference

- ARNS gives civil aviation control (to protect) the band
- In accordance with ICAO spectrum management policies
  - ICAO policy on GPS second civil aviation frequency: MUST BE ARNS
- ITU: "...the safety aspects of radionavigation... require special measures to ensure their freedom from harmful interference.. ."

NTIA "Red Book"*

- Describes regulatory authority over Federal agencies' use of spectrum in the U.S.
- Establishes AAG
  - Chaired by FAA
  - Engineers and protects all government/non-government frequency assignments for designated bands including all ARNS bands (e.g., 960-1215 MHz)
- Establishes FAA as authority for coordinating all frequency assignments in designated radar bands (including 1215-1400 MHz) .

* NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management

Exclusive ARNS Bands

Frequency Band	Systems	Assignment
108-I 17.975 MHz	Localizer, VOR, SCAT-I	ARNS exclusive worldwide
328.6-335.4 MHz	Glide Slope	ARNS exclusive worldwide
960-1215 MHz	Tacan, DME, ATCRB, Mode S	ARNS exclusive worldwide'
1559-1610 MHz	GPS	ARNS/RNSS
4200-4400 MHz	Radio altimeter	ARNS exclusive worldwide
5000-5 150 MHz	MLS	ARNS (NOTE: 5091-5150 MHz shared with MSS feeder links)

'In the United States the Joint Tactical Information Distribution System (JTIDS) is authorized by footnote to operate on a non-interference basis. Internationally no explicit JTIDS allocation exists.

Summary

- International civil aviation has identified the 15594610 MHz band as the sole frequency band to support the future GNSS. This band must remain exclusive so that the future spectrum needs of GNSS are satisfied and civil aviation authorities must oppose sharing of the band with other users.

- In order for civil aviation to use the new GPS signal, both FAA and ICAO policy agree that it must be provided in a frequency band with an exclusive ARNS/RNSS allocation