

**INTERNATIONAL ASSOCIATION OF INSTITUTES OF NAVIGATION
(IAIN)**

**POSITION PAPER ON LIGHTSQUARED -v- GLOBAL
POSITIONING SYSTEM**

Introduction:

The unexpected establishment of LIGHTSQUARED ground transmitters in the USA has caused concern within international circles. Essentially LightSquared uses frequencies adjacent to GPS frequencies with a serious risk of interference. This paper explains IAIN's concerns. It is not a scientific paper but is based on scientific facts currently available from the US experiences.

[IAIN membership includes institutions of navigation from USA, UK, (including branches in Ireland and Croatia), Germany, France, Italy, Netherlands, Nordic countries, Spain, Switzerland, Czech Republic, Austria, Poland, Egypt, Russia, Japan, China, South Korea and Australia].

GPS

The radio spectrum allocates to GPS' L1 signal 1,559 MHz to 1,591 MHz. This allocation is shared by other Global Satellite Navigation Systems of the European Union (Galileo) and China (Compass), with Russia (GLONASS) using 1,598 MHz to 1,605 MHz. Between them, GNSS frequencies occupy the 1,559 MHz to 1,605 MHz band.

The signals transmitted from GNSS satellites are low-powered and vulnerable to deliberate or accidental interference. They are sensitive to frequencies outwith the L1 signal. GNSS is good in its priority ranging mode but is not as spectrum efficient as previous radio navigation systems. GNSS satellite-to-earth signals were compatible with low-powered space-based systems in the adjacent Mobile Satellite Services (MSS), but proved incompatible when terrestrial base stations were set up.

LightSquared (LS)

LightSquared has worked on the proposition that the portion of the MSS band it 'owns' can be converted from satellite to terrestrial use. LS have two 10 MHz bands below GPS: Low 10 (1,525 MHz – 1,535 MHz) and High 10 (1,545 MHz – 1,555 MHz) and two above GPS/GLONASS (1,627 MHz – 1,637 MHz and 1,646 MHz – 1,656 MHz). It is the two lower bands that are used to transmit high-powered broadband signals.

The US National Broadband Plan seeks to allocate 500 MHz of spectrum to broadband over 10 years. LS's plan in USA would use 40 MHz of the 500 MHz.

The Problem:

Within USA, the FCC allocates the MSS band in accordance with international agreements by the ITU. FCC gave conditional approval (conditions not known) to LS to use Low 10 and High 10 in early 2011. These signals interfere with GPS, especially when adjacent to the planned

40,000 base stations. All GPS receivers would be seriously affected, perhaps as much as 15 miles from the base station. It would appear that the FCC's normal process of Notice of Proposed Rulemaking, which seeks extensive public comment, has not identified the interference problem in a timely manner. Meanwhile LS has apparently pressed ahead.

If LS's approach prevails, possibly at only Low 10 frequencies, then it is likely that there will be a need to replace receivers in the military, aviation, survey, maritime and road transportation, safety of life, construction, agriculture, scientific research and many other social and commercial applications, which undoubtedly will be expensive.

It may be possible to alleviate the interference problem by developing a suitable filter for GNSS receivers but this will cost time and money.

International Dimensions: All signals from GNSS passing over the USA would be affected by the LS system. The benefit of multiple GNSS in the US will be lost near base stations.

LS have ambitions for a global system. International bodies and national governments should learn the lessons from the US experience.

The radio signal spectrum is a finite source and should be husbanded carefully.

Recommendation: Addresses are requested to note this position paper.

The US Authorities are requested to keep international bodies and the worldwide navigational community informed on the outcome of the LightSquared situation.

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