
International Civil Aviation Organization

Luc Lapene*^{†1}

¹Direction Générale de l'Aviation Civile - DGAC (FRANCE) (DGAC) – Direction Générale de l'Aviation Civile - DGAC (FRANCE), Ministère de l'Ecologie, du Développement Durable et de l'Energie – 50 rue Henry Farman 75720 Paris Cedex 15, France

Résumé

Navigation, communications, and radiation exposure issues, as affected by space weather, also extend to various degrees to other parts of the globe and to other applications. Satellite-based navigation, though most affected near the poles and the equator, can also be impacted at middle latitudes. A particularly significant space weather storm occurred during the October-November 2003 events when the FAA's WAAS system exceeded its vertical protection limit and was deemed un-useable for 15 hours and 11 hours on October 29 and 30, 2003 respectively. As satellite-based navigation has a key role in the NextGen and SESAR efforts, the need to monitor and predict space weather will grow.

Another impact of solar activity on GPS occurred in December 2006 when a solar radio burst in a solar flare was so strong that it overwhelmed the GPS signal at L-band, causing a several-minute-long interruption to geodetic-grade GPS receivers operating on the dayside of Earth.

High-Frequency (HF) communications, the primary and in some cases, sole, means of communicating over the poles, is well-known to be affected during space weather events. For aircraft at latitudes of roughly 82 degrees and higher, it is impossible to "see" geostationary communications satellites and to use the higher frequencies they afford. There are polar orbiting satellites available for use to mitigate the communication problems, but as yet most airlines are not equipped to take advantage of this option.

Radiation exposure is difficult to characterize. However, in general, the risk – and the dose – is greatest over the poles, and lessens at lower latitudes. It is also true that the higher the altitude, the more radiation is present, so the radiation conditions will be important for sub-orbital commercial space flights.

In order to minimize risks to civil aviation, including in cases of severe space weather events, the International Civil Aviation Organization is currently organizing global/regional space weather services for civil aviation, to be in place by November 2018.

*Intervenant

[†]Auteur correspondant: luc.lapene@aviation-civile.gouv.fr