Space Weather and Civil Aviation

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Résumé

Space weather impacts civil aviation. On October 2003, during the so-called " Halloween Storms ", radiation alerts were emitted by the US Federal Aviation Administration, some flights avoided flying over the North pole, others flew across the Atlantic at lower than normal altitudes.
The International Civil Aviation Organization (ICAO) has organized a space weather service for international civil aviation.

The ICAO space weather service provides for the 24/7 issuance of advisories to aviation stakeholders (notably airspace users, air navigation services providers) in cases of moderate or severe space weather events which have been observed and/or are forecast to affect international civil aviation within the next 24 hours. 4 domains are addressed, namely aircraft occupants radiation, satellite-based navigation (GNSS) and surveillance, HF communications and communications via satellite (SATCOMs).

Solar flares impact HF communications. Solar wind (Coronal mass ejections or high speed solar wind streams) may disturb the Earth's magnetosphere and ionosphere with resulting impacts on GNSS, SATCOM and HF communications. High energy protons may trigger ionising particle showers at aircraft altitude and degrade HF communications in polar areas. Radio emissions by the Sun may impact systems on Earth operating in the same radio frequencies.
Three global centers were appointed by the ICAO Council on 13 November 2018 for the provision of these ICAO services to aviation: an Australia-Canada-France-Japan consortium (the ACFJ consortium), a consortium led by Finland and comprising 8 other European States (the PECASUS consortium), and the United States.

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