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Ionospheric Characterization Using Automatic Dependent Surveillance Broadcast (ADS-B) Signals

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Radio waves propagating through plasma in the Earth's ambient magnetic field experience Faraday rotation; the plane of a linearly polarized wave changes as a function of the distance travelled through a plasma. Linearly polarized radio waves at 1090 MHz frequency are emitted by ADS-B devices which are installed on most commercial aircraft. These radio waves can be detected by satellites in low earth orbits, and the change of the polarization angle caused by propagation through the terrestrial ionosphere can be measured. This work will discuss how these measurements can be used to characterize the ionospheric conditions.

Authors: KABIN, Konstantin (RMC); Dr NOËL, Jean-Marc (Royal Military College of Canada); CUSHLEY, Alex

Presenter: CUSHLEY, Alex

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