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RECENT GEOEFFECTIVE SPACE WEATHER EVENTS AND TECHNOLOGICAL SYSTEM IMPACTS

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We review the state of the space environment for three recent intense geoeffective storms using NOAA observations and model predictions. On February 27, 2014, the US Wide Area Augmentation System (WAAS) navigation service over eastern Alaska and northeastern continental US was degraded due to a strong ionospheric storm. Similarly, on March 17, the St. Patrick's Day geomagnetic storm commenced, resulting in the most intense storm of the solar cycle to date with mid-latitude auroral sightings, intense ionospheric irregularities and WAAS degradation. On June 22, a strong (G4) geomagnetic storm commenced following the impact of 3 coronal mass ejections (CMEs). Late on June 22, solar protons entered the polar regions along open magnetic field lines producing intense radio absorption. We summarize, compare and contrast the space environmental state for each of these events from the perspective of NOAA observations and model predictions. We do so by leveraging GOES and POES/MetOp observations of the space radiation environment, DMSP observations of precipitating particles and bulk plasma parameters, OVATION Prime predictions of the auroral energy input and the US Total Electron Content (USTEC) and D-Region Absorption Prediction (DRAP) modeled response of the ionosphere. We discuss impacts to technological systems as available.