Space Weather Action Plan

Items of Interest for the GPS/GNSS Community...and a SWPC Update

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Acknowledgements:

Mihail Codrescu

Dominic Fuller-Rowell
Space Weather Action Plan

Benchmarks for **Ionospheric Disturbances** (1.3) SWPC POC: Rodney Viereck
Benchmarks for **Solar Radio Bursts** (1.4) SWPC POC: Doug Biesecker
Benchmarks for **Upper Atmosphere Expansion** (1.5.1) POCs: Tim Fuller-Rowell, Mihail Codrescu

Improve Operational Impact **Forecasting and Communications** (survey of community - 4.4) SWPC POC: Bob Rutledge
Improve Assessment, Modeling, and Prediction of Impacts on **Critical Infrastructure** (4.2.6-8) POCs: Rodney Viereck, Bill Denig;
The following actions define requirements for real-time assessment and reporting of impacts to radio and satellite communications and space-based PNT systems:

4.2.6 DOC, in coordination with NSF and DOI, and commercial communication and PNT system stakeholders, will define requirements for real-time monitoring systems to assess atmospheric conditions that could affect these systems during ionospheric disturbances and geomagnetic storms.

Deliverable: Define requirements for a national operational network of real-time ionospheric monitoring stations

Timeline: Within 1 year of the publication of this Action Plan
Space Weather Action Plan

4.2.7 DOC, DOD, and DHS, in coordination with government and commercial communications and PNT system users, will define the scope and observational requirements for a system that provides near-real-time situational awareness of the space environment for communication and PNT systems.

Deliverable: Complete report with scope and observational requirements

Timeline: Within 1 year of the publication of this Action Plan
4.2.8 DOC and DOD will create and support a satellite-anomaly database to enable secure collection and analysis of satellite-anomaly data related to space weather.

Deliverable: Complete development of a satellite-anomaly database in a secure format at DOC

Timeline: Within 1 year of the publication of this Action Plan
SWPC Update

NATEC vs USTEC

USCG shutdown - impact and mitigation

CTIPe

Cooperative Research And Development Agreement with ASTRA

Questions for the Community
NATEC vs USTEC - an example from 23 August

0.8 TECU

3.7 TECU
USCG Shutdown - Impact and Mitigation
Approximate L1 Position Error ($m$) and TECu ($10^{16} \times m^{-2}$)

<table>
<thead>
<tr>
<th>Number of Stations</th>
<th>Value</th>
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<tbody>
<tr>
<td>CORS A/B</td>
<td>060</td>
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<tr>
<td>GPS/Met</td>
<td>001</td>
</tr>
<tr>
<td>RTIGS</td>
<td>000</td>
</tr>
<tr>
<td>WAAS</td>
<td>013</td>
</tr>
<tr>
<td>UNAVCO</td>
<td>000</td>
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</tbody>
</table>
Approximate L1 Position Error ($m$) and TECu ($10^{16} \cdot m^{-2}$)

Number of Stations

- CORS A/B 058
- GPS/Met 001
- RTIGS 000
- WAAS 036
- UNAVCO 000

25-Aug-2016 from 19:00 to 19:15 UT
NOAA/SWPC Boulder, CO USA (op.ver: 2.0)
CTIPe TEC is now available at http://www.swpc.noaa.gov/products/ctipe-total-electron-content-forecast
Cooperative Research and Development Agreement with ASTRA

ASTRA provides **AK receiver data** ($S_4$, sigma-phi, TEC) for evaluation & SWPC shares some NOAA sites with ASTRA for GPS installation

Joint product development of a **public GPS position accuracy product**

Joint product development which integrates ASTRA GPS scintillation data and **OVATION** model auroral boundary output (SWPC provides OVATION)

Joint design of an optimal distribution of sites for measuring scintillation and TEC data from **NOAA Buoys** for use in SWPC products

ASTRA **acknowledgement** on applicable products hosted on SWPC web site.
Questions for the GNSS Community

Do you use NATEC/USTEC? If so, how?

Is there interest in an ionosphere disturbance index derived from the comparison of position errors obtained from dual and single frequency PPP algorithms at reference stations?

How useful is a 3-6 hour forecast of an ionosphere disturbance?