SUMMARY

ICAO has introduced a new requirement for the issuance of standardized space weather advisory information to support international air navigation. The advisories, which will be provided by ICAO-designated “global space weather centers,” are designed to be similar to existing advisories issued for volcanic ash clouds and other weather hazards to aviation. These ICAO designated centers will begin issuing three new advisory products effective Nov. 7th, 2019 for space weather effects.

1 Introduction

1.1 Space Weather Advisories, which will be provided by ICAO-designated “global space weather centers,” are designed to be similar to existing advisories issued for volcanic ash clouds and other weather hazards to aviation. In addition to airline operators, how aware are the various ANSPs to this new product?

2 Discussion

2.1 Amendment 78 to ICAO Annex 3 “Meteorological Service for International Air Navigation” introduced a new requirement for the issuance of standardized space weather advisory information in conjunction with space weather events to support international air navigation. The advisories were designed to be similar to existing advisories issued for volcanic ash clouds and other weather hazards to aviation. As part of the amendment, ICAO began a process to identify and commission a set of designated “global space weather centers” to provide the new space weather products and services.

2.2 The ICAO Air Navigation Council officially selected three global centers in November 2018. The US NOAA Space Weather Prediction Center (SWPC) in Boulder, CO was selected along with two centers consisting of a consortium of states in Europe (led by Finland) and Australia (Australia, Canada, Japan, France).

2.3 The ICAO designated centers will begin issuing three new advisory products effective Nov. 7th, 2019 for the following space weather effects:
• HF COM (HF Voice/Data and Satellite Communications)
• RADIATION (Radiation Exposure to Crew and Passengers)
• GNSS (GPS/GNSS Based Navigation and Surveillance)

The advisory template contains a provision for MOD (“Moderate”) and SEV (“Severe”) categories to be used to describe the intensity of the effects as shown in the following example from ICAO Annex 3 Amend. 78:

Example A2-4: Space weather advisory message (RADIATION effects)

<table>
<thead>
<tr>
<th>(communication header)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SWX ADVISORY</td>
<td></td>
</tr>
<tr>
<td>DTG:</td>
<td>20161108/0000Z</td>
</tr>
<tr>
<td>SWXC:</td>
<td>(to be determined)</td>
</tr>
<tr>
<td>SWX EFFECT:</td>
<td>RADIATION MOD</td>
</tr>
<tr>
<td>ADVISORY NR:</td>
<td>2016/2</td>
</tr>
<tr>
<td>FCST SWX:</td>
<td>20161108/0100Z HNH HSH E18000 – W18000 ABV FL350</td>
</tr>
<tr>
<td>FCST SWX +6 HR:</td>
<td>20161108/0700Z HNH HSH E18000 – W18000 ABV FL350</td>
</tr>
<tr>
<td>FCST SWX +12 HR:</td>
<td>20161108/1300Z HNH HSH E18000 – W18000 ABV FL350</td>
</tr>
<tr>
<td>FCST SWX +18 HR:</td>
<td>20161108/1900Z HNH HSH E18000 – W18000 ABV FL350</td>
</tr>
<tr>
<td>FCST SWX +24 HR:</td>
<td>20161109/0100Z NO SWX EXP</td>
</tr>
<tr>
<td>RMK:</td>
<td>RADIATION LEVELS HAVE EXCEEDED 100 PERCENT OF BACKGROUND LEVELS AT FL350 AND ABOVE. THE CURRENT EVENT HAS PEAKED AND LEVELS ARE SLOWLY RETURNING TO BACKGROUND LEVELS. SEE <a href="http://WWW.SPACEWEATHERPROVIDER.WEB">WWW.SPACEWEATHERPROVIDER.WEB</a></td>
</tr>
<tr>
<td>NXT ADVISORY:</td>
<td>NO FURTHER ADVISORIES</td>
</tr>
</tbody>
</table>

2.4 United Airlines has identified the following (preliminary) hazard(s):

• The classifications and thresholds of the NOAA Space Weather Scales are fundamentally different than those established by ICAO for the new advisories.

• It is entirely likely that we will encounter a scenario in which SWPC’s current products will materially conflict with the ICAO-initiated advisories.

• The inconsistency, uncertainty, confusion and potential overreaction generated by such a scenario is a real and unacceptable risk to our operations.
2.5 Here are some talking point bullets summarizing the Space Weather issue:

- It is important to note that the FAA has no plans to issue any new regulations or changes to current regulations in conjunction with the new ICAO advisories.
- US Part 121 carriers are permitted to continue operating using their existing approved policies and procedures and Operations Specifications.
- The FAA will also continue to recognize the NOAA Space Weather Prediction Center and their existing products and services as an official source for operational use.
- United and other carriers have partnered closely with SWPC for many years and continue to rely extensively on its products and expertise to ensure safe and efficient operations.
- United Airlines’ current policy for mitigating the risk of space weather events incorporates aviation-specific information issued by the SWPC based on the existing NOAA Space Weather Scales
  - [https://www.swpc.noaa.gov/noaa-scales-explanation/](https://www.swpc.noaa.gov/noaa-scales-explanation/) and disseminated via advisory products issued by our approved weather provider, IBM-The Weather Company.
- The classifications and thresholds of the NOAA Space Weather Scales are fundamentally different than those established by ICAO for the new advisories
  - It is entirely likely that we will encounter a scenario in which SWPC’s current products will materially conflict with the ICAO-initiated advisories

3. Recommendations

3.1 It is imperative that United and other interested airlines get out in front of this risk by leveraging our previous studies on radiation exposure to crewmembers and our vast experience in polar operations. There is a concern that there may be a lack of understanding by operators and ANSPs concerning the ICAO Space Weather Advisories which could result in inconsistency, uncertainty, confusion, and the potential overreaction generated by such a scenario is a real and unacceptable risk to our operation, as well as other operators.

3.3 We suggest that everyone review the ICAO Annex 3 Draft SARPs “Manual on Space Weather Information in Support of International Aviation.”

3.4 We desire consistent data to be used by operators with a better definition of Moderate and Severe Radiation scenarios.

3.5 IATA represents over 250 operators world-wide and the implications of these ICAO SARPs on operations can be significant. We have requested IATA to urgently review the materials and evaluate the issues and concerns voiced in this paper.
4. Conclusion

4.1 The Meeting is invited to note the information provided in this paper.