WP 2.4 – Data Use and Application

Data Loss Automated Check

A new project focusing on the acquisition of missing occultations began at the start of the last quarter. The goal of this project was to create an automated framework to detect data loss and analyze which occultations were affected by this missing data, as well as which ground station was attributed based on missing files corresponding to planned ground station contacts. This will allow the SOC to detect missing occultations on a day-to-day basis while also facilitating the search for missing occultations throughout the mission.

Users

There have been fifteen new data user sign-ups in the quarter, totalling thirty-five new data users for the past four quarters. Figure 4 shows the number of data users for the past eight quarters, by quarter. The breakdown of new users by country may be found in Table 1.

**Figure 4: Number of new data users for the past eight quarters**

Table 1: ACE new data users breakdown by country

|  |  |
| --- | --- |
| **Country** | **Number of new users** |
| Canada | 4 |
| China | 1 |
| Ethiopia | 1 |
| Germany | 1 |
| Japan | 2 |
| New Zealand | 1 |
| USA | 5 |

Website

The development of a new main website (working title ‘ace.scisat’) continues. Built using the Django framework, and employing a PostgreSQL backend, it is more modular than the current ACE websites (‘ace.uwaterloo’ and ‘databace.scisat’). The first application to be integrated into the new website is the ‘Publications’ application, followed by a ‘Data Plot’ and ‘Scenario’ application. A data plot and publications application has been added to the website with further development of features required, as well as a ‘current scenario’ application showing the satellites near real time position.

Last quarter saw 1011 total website sessions, with a new session rate of 47.68%. *Table 2* shows the location information for the countries with the most visits to the ACE public site.

*Table 2: ACE public website statistics for the first quarter of 2017/18 Source: google analytics*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Country** | **Sessions** | **% New Sessions** | **New Users** | **Bounce Rate** | **Pages/Session** | **Avg. Session Duration** |
| Canada | 403 | 36.23% | 146 | 44.42% | 2.93 | 0:03:41 |
| United States | 196 | 56.63% | 111 | 65.31% | 1.71 | 0:01:22 |
| China | 86 | 43.02% | 37 | 61.63% | 2.36 | 0:01:53 |
| Germany | 47 | 48.94% | 23 | 42.55% | 2.55 | 0:02:50 |
| Iran | 33 | 36.36% | 12 | 36.36% | 5.36 | 0:09:24 |
| Sweden | 32 | 25.00% | 8 | 65.62% | 1.75 | 0:01:43 |
| Japan | 29 | 41.38% | 12 | 55.17% | 3.41 | 0:04:00 |
| United Kingdom | 27 | 85.19% | 23 | 70.37% | 1.78 | 0:01:10 |
| India | 23 | 73.91% | 17 | 82.61% | 1.52 | 0:00:44 |
| South Korea | 20 | 100.00% | 20 | 95.00% | 1.1 | 0:00:01 |

Publications

There have been six new publications this quarter for a total of twenty-seven publications in the last four quarters. The following graphic shows the number of publications per quarter for the past two years.

**Figure 5: Paper publications for the past eight quarters**

The papers are:

1. A Near-Global Atmospheric Distribution of N2O Isotopologues
2. An update on ozone profile trends for the period 2000 to 2016
3. Comparison of the GOSAT TANSO-FTS TIR CH4 volume mixing ratio vertical profiles with those measured by ACE-FTS, ESA MIPAS, IMK-IAA MIPAS, and 16 NDACC stations
4. Critically Evaluated Spectral Data for Neutral Carbon (C (I))
5. Merged SAGE II, Ozone\_cci and OMPS ozone profile dataset and evaluation of ozone trends in the stratosphere
6. The SPARC water vapor assessment II: intercomparison of satellite and ground-based microwave measurements

Science on-time

The monthly minutes of allowed science-on-time (SOT) for the last quarter saw a rise in available and planned SOT while maintaining a similar percentage of used SOT over the previous year. This is most likely a consequence of the new automated scripts and algorithms used in the planning process, as well as the use of SOT forecasts to predict periods where an above-average number of occultations exist.

Table 3: Planned versus Allowed Science On-Time [minutes]

|  |  |  |
| --- | --- | --- |
| **Planned/Allowed SOT [minutes]** | **2016** | **2017** |
| **October** | 2464 / 2718 = 90.7% | 2953 / 3256 = 90.7% |
| **November** | 2450 / 2594 = 94.4% | 2687 / 2927 = 91.8% |
| **December** | 1932 / 2315 = 83.5% | 2070 / 2533 = 81.7% |

*Figure 6: Average monthly on time minutes for the mission by year*

The average amount of monthly SOT has increased significantly over the previous year while usage perecentages over the previous year dropped slightly. These increases are predominantly the direct result of the painstaking efforts that went into the development and improvement of the scripts and algorithms used by the planning process. Since the last quarterly report, the use of the new ‘FTS Sunrise’ macro allowed for 93 occultations to be taken during high beta periods that would not have been otherwise possible.

An automated script has been developed to detect gaps in received data files and has gone into daily use as of December. This script finds missing data packets and attributes any potential missing files to a ground station when possible. The end goal of this script is the daily monitoring of data loss as well as finding missing occultations over the entire mission.

Development of a website app to give near real-time mission scenario information is currently under development using CesiumJS and STK. This app should provide current satellite metrics and location while accepting user input by loading daily ephemeris data from STK.