

## KEY FINDINGS

# 4<sup>TH</sup> Annual International SSA Data Operator Exchange Workshop 2019 AMOS Conference

Presented by



In partnership with



# 2019 International SSA Data Operator Exchange Workshop

## **EXECUTIVE SUMMARY**

The long-term sustainability of space is an issue critical to the global community. Space delivered services such as GPS are essential for global prosperity, however the increasing congestion of space due to on-orbit debris poses a risk to active satellites that underpin much of the world's activity. Acknowledging this issue, an international workshop (the 4th such event) consisting of space subject matter experts was convened in connection with the September 2019 AMOS Conference to identify priority areas that need to be addressed by the international community to promote the responsible use of space to mitigate this risk.

Five priority areas were identified at the event that form our recommendations. The highest priority recommendation is the need for a regulatory framework pertaining to the safe and responsible operation of satellites licensed at a national level as part of a wider Space Traffic Management (STM) initiative. Action is required from policymakers to enable the development of a national STM regulatory framework that can evolve into an international framework. Any industry driven voluntary, consensus-based STM standards may be necessary, but they are not sufficient to fully mitigate the risk of unintentional collisions on orbit that pose the greatest risk to the sustainability of space.

The organizers stand ready to support the international community in establishment of appropriate frameworks for protecting the long-term sustainability of space. In parallel we will build upon these findings and engage with the wider space community at Space Symposium 2020.

## **BACKGROUND**

The Maui Economic Development Board (MEDB) and the Aerospace Corporation led the 4<sup>th</sup> Annual International SSA Data Operator Exchange Workshop on 18 September 2019. This was the fourth invitation-only International SSA Data Operator Exchange workshop held in conjunction with the Advanced Maui Optical and Space Surveillance Technologies (AMOS) Conference, on the Hawaiian island of Maui. This year's workshop included government, industry and non-governmental organization (NGO) representatives from Australia, Canada, France, Germany, Japan, Philippines, Republic of Korea, Thailand, Switzerland, the United Kingdom, and the United States of America.

The enduring goal of the International SSA Data Operator Exchange workshop is to provide an opportunity to develop and advance insights and relationships among key international SSA data stakeholders including military, academic, civil, and commercial entities. To accomplish this, the workshop chooses timely topics relevant to the global SSA community and allows each participant time to present their views. This year's session was cohosted by the UK Defence Science and Technology Laboratory (DSTL), the UK Space Agency, the Deutsches Zentrum für Luft- und Raumfahrt (DLR) and the Centre National d'Etudes Spatiales (CNES).

## **PURPOSE**

The 2019 SSA Data Operator Exchange workshop's purpose was to inform and shape national and international activities from an SSA operator's view. Workshop aims included (1) using a scenario-based event to foster 100% active participation among attendees, (2) facilitate relationship building across the international operator community, (3) generate a comprehensive view of SSA needs across key stakeholder groups regarding STM best

practices, (4) generate a manageable list of best practices to start discussions, (5) identify key organizational mechanisms useful in addressing high priority needs, and (6) identify next steps and key participants needed going forward. Ultimately, the workshop's goal was to identify, from an operator's perspective, areas for further discussion at a policy level.

## **SYNOPSIS**

The session began with introductions, an overview of workshop aims, and a description of the operational scenario being considered. The scenario was based on an initial deployment of 100 satellites of a 1000 satellite constellation into LEO. The participants were assigned to one of four "stakeholder" work groups. Participants were assigned to the workgroup based on two criteria; level-of-expertise in a related area and ensuring a diversity of perspectives. The stakeholder workgroups were: Owner/Operators of the constellation; Government SSA Operators; Commercial SSA Operators; and Regulator. Each stakeholder group was given some basic roles and responsibilities. The aim of each stakeholder group was to identify their top five SSA operational needs that require enabling standards, guidelines, and best practices. The groups were prompted to consider operational processes, procedures, regulations, technology and information needs, and asked to identify urgent and critical gaps in those areas. In addition, each work group was assigned a subject matter expert as group leader to guide their group's discussion, keep the group on task, and report back the work group's findings to the larger group.

When the large group reconvened, Kevin O'Connell, Director of the Office of Space Commerce at the U.S. Department of Commerce, provided a keynote address in which he provided his perspective.

Then each stakeholder group presented their top five SSA/STM operational needs. Post-event (due to running out of time) the results were collated by the event staff into a top five list. The collated, top five priority needs to improve international SSA/STM operations are:

1. Operationally useful, consensus-based standards for timely, transparent, trustworthy, secure, SSA/STM data sharing (data base/data repository/data exchange) that is capable of automation.
2. A reliable, 24/7/365 system of rapid communication among operators that enables transparency and coordination for the operational community.
3. A national SSA/STM regulatory framework that can evolve into an international framework.
4. Operationally useful standards for on-orbit operations.
5. Methods for incentivizing positive behavior.

The complete top five list from each of the four stakeholder groups - from which this collated list is derived - can be found in Annex A.

## **DISCUSSION**

Operators and policymakers should find the top needs identified in the workshop to be useful in informing investment and resource allocation decisions. Indeed, the workshop revealed two priorities that may be achievable in the relatively short/medium term. Priority 2 above should be achievable with focused effort and relatively small investments. Priority 5 is currently being explored along several lines of effort, including the U.S. Orbital Debris Mitigation Standard Practices (ODMSP) update; the World Economic Forum's Space Sustainability Rating initiative; insurance industry-based incentives; the standup of the 2019 Space Safety Coalition; the continuing development of the Space Safety Institute; and the evolution of industry consortia such as CONFERS. The 2019 SSA operator workshop results reinforce the importance of these initiatives and should drive policymaker decisions to strengthen these lines of effort.

Policymakers should also note the priority given to development of a national SSA/STM regulatory framework that can evolve into an international framework. This finding implies that SSA operators acknowledge the need for the government to be fully involved in framing the future of national and international SSA/STM operations. Voluntary, consensus-based SSA/STM standards, guidelines, and best practices may be necessary, but they are not sufficient.

In addition, the workshop emphasized the high priority placed upon the need for standards for on-orbit operations. Policymakers and stakeholders should point more investment and resources in this direction. Even incremental progress in this area would be useful.

Finally, another top priority concern is development of operationally useful standards for SSA data sharing. This finding is consistent with the 2018 SSA operator workshop key finding that a unified data strategy is a must. U.S. Government efforts to develop an Open Architecture SSA Data Repository gets at this priority, as does the SSA data sharing architecture/database the European Union Space Surveillance (EU SST) uses. Policymakers should continue emphasizing these data sharing initiatives and developing needed standards.

## **ANNEX A**

### **A. GOVERNMENT SSA STAKEHOLDER GROUP PRIORITIZED NEEDS**

Note: Group tried to put aside the security aspects.

1. Regulation
2. Funding
3. Security
4. Timely, accurate, actionable, available protected data and information
5. Predictive ephemeris including planned maneuver profiles.
6. Utilization and definition of minimum international standards regarding operations.
7. Available channels of communications.
8. Resilient, redundant 24x7 functionality of operations centers infrastructure.
9. Mechanisms for attracting government resources and funding to get at key needs

### **B. COMMERCIAL SSA STAKEHOLDER GROUP PRIORITIZED NEEDS**

Note: Group thought in terms of what is needed to be commercially viable and provide a service that was viable for the customer set. A key concern for commercial SSA operators was being wrong, getting or providing bad data or being spoofed.

1. Consistent regulatory support to incentivize operators to make safe decisions.
2. A basic level of government-provided SSA data and information for all users that commercial SSA providers could build open. Like U.S. weather data/information model.
3. An open (but secure), trusted data base/data exchange with verifiable, standards-based data, with understanding that some information cannot be shared.
4. International, consensus-based standards to support sharing
5. Mechanisms to verify and validate decision-quality data being put into the data base/data exchange

### **C. COMMERCIAL SATELLITE OWNER/OPERATOR STAKEHOLDER GROUP PRIORITIZED NEEDS**

1. Timely, trustworthy, transparent data from multiple secure and qualified centers

2. Agreed upon common system of rapid communication that enables transparency and coordination of the operational community.
3. Agreed set of quality, trusted, transparent standards for space operations throughout lifecycle.
4. Industry seat at the table during decision making
5. A data repository for SSA and O/O data exchange with quality standards that is transparent, trusted, and enables automation.
6. Means to reward good behavior and discourage bad.

#### **D. REGULATOR STAKEHOLDER GROUP PRIORITIZED NEEDS**

1. Requirements and standards to place upon operators. Also consider norms of behavior.
  - a. Access to:
    - i. End of life, end of business plans.
    - ii. Timely SSA data access.
    - iii. Timely, o/o maneuver plans access.
    - iv. Access to SSA data
    - v. Involve insurance industry
    - vi. Financial responsibility
2. A national SSA/STM regulatory framework that can evolve into an international framework
3. An enforcement mechanism that does not squash innovation.
4. Means to reward good behavior and discourage bad
  - a. Access to Collision Avoidance services, maneuver planning services, etc.
  - b. Incentives for complying with system/vehicle reliability standards.
5. Identification of funding sources to manage regulatory enterprise. For example, A2
  - a. License fees
  - b. User fees