

Nov 18th, 11:15 AM

Commercial space situational awareness (SSA) capabilities and their benefits for civilian space traffic management (STM)

Mark A. Skinner
Boeing

Follow this and additional works at: <https://commons.erau.edu/stm>



Part of the [Other Aerospace Engineering Commons](#), [Other Astrophysics and Astronomy Commons](#), and the [Space Vehicles Commons](#)

Skinner, Mark A., "Commercial space situational awareness (SSA) capabilities and their benefits for civilian space traffic management (STM)" (2016). *Space Traffic Management Conference*. 1.
<https://commons.erau.edu/stm/2016/presentations/1>

This Event is brought to you for free and open access by the Conferences at Scholarly Commons. It has been accepted for inclusion in Space Traffic Management Conference by an authorized administrator of Scholarly Commons. For more information, please contact commons@erau.edu.

Commercial space situational awareness (SSA) capabilities and their benefits for civilian space traffic management (STM)

Dr. Mark A. Skinner, The Boeing Company
4411 The 25 Way NE, Ste. 350, Albuquerque NM 87109
Mark.A.Skinner@Boeing.Com

Paralleling (but lagging) satellite development, SSA, long the sole domain of sophisticated militaries, now includes commercial providers. These commercial capabilities, identified as beneficial to the sustainable use of outer space¹, have demonstrated technical sophistication sufficient to positively contribute to the mitigation of satellite interference and provide actionable SSA information. Utilizing small optical telescopes, these entities are able to determine the orbits of objects in the geosynchronous orbit (GSO) to sizes as small as 1 m², with measured positional uncertainties of 10s of meters, on the order of the size of a modern communications satellite. These techniques can benefit satellite operators and STM providers in several ways:

- Removal of satellite “longitude bias” via absolute stellar reference frame measurements allows GSO satellite cluster members to avoid adjacent satellites.
- Measurement and incorporation of perturbative natural forces allows accurate conjunction analysis, further into the future, between GSO satellites and space debris and active satellites.
- Measurement of satellite ephemeris via these techniques (which are now more accurate than traditional radio-frequency methods) allows greatly reduced uncertainties when employing dual-satellite geolocation to determine the location of terrestrial satellite jamming² sites.

We describe the current state-of-the-art in commercial SSA, and possible benefits to civilian STM providers.

¹ United Nations Committee on the Peaceful Uses of Outer Space, *Report of the Scientific and Technical Subcommittee on its forty-ninth session*, UN Doc A/AC.105/1001 (2012).

² M.H. Chan, "Application of a Dual Satellite Geolocation System on locating sweeping interference," World Academy of Science, Engineering and Technology, Vol: 6, 2012-09-21