



Promoting Cooperative Solutions for Space Sustainability

Commercial Space Situational Awareness

Ian Christensen &
Brian Weeden, Ph.D.

Secure World Foundation

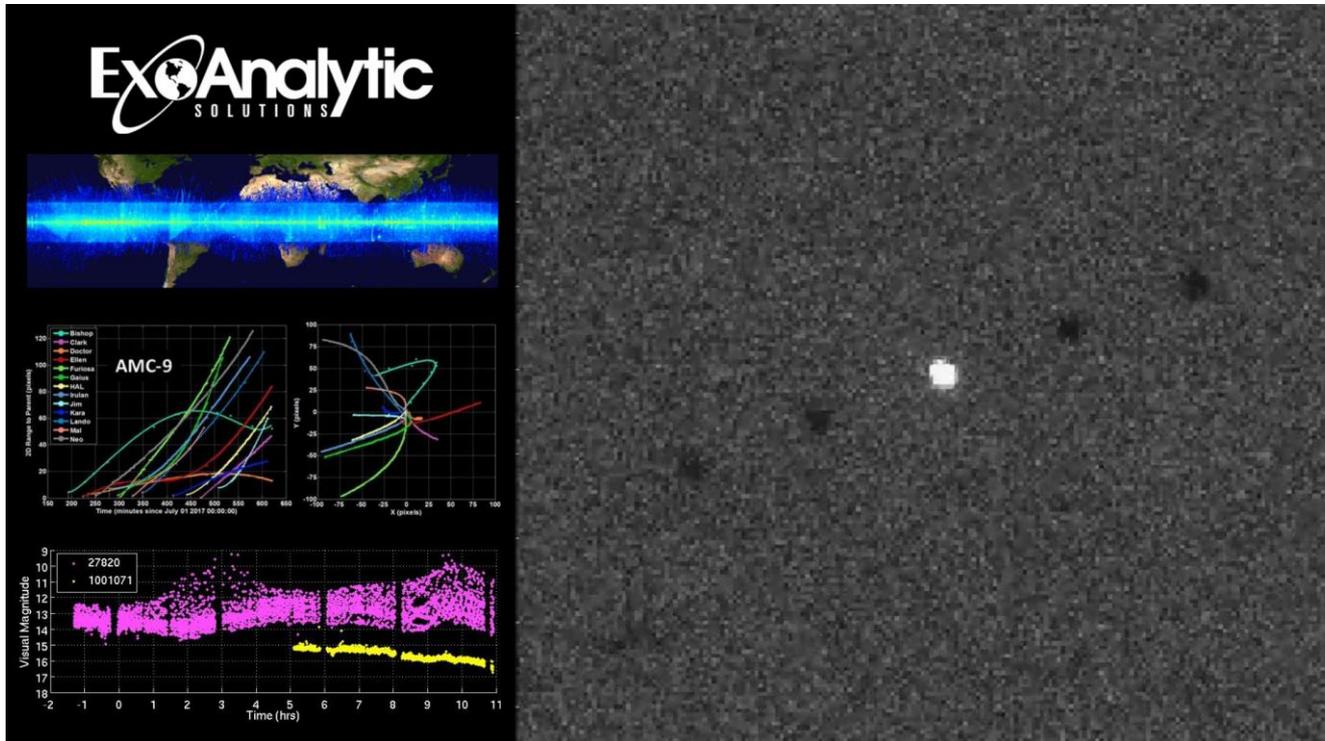
- Private sector is developing capabilities across the full spectrum of SSA operations
 - Raw data (ground and space-based, multi-phenomenology)
 - Data fusion
 - Analytics
 - Decision-making tools
- Currently have as good (or better) GEO catalog as the US military, likely to have as good (or better) LEO catalog within 5 years
- Commercial satellite operators are contracting with commercial SSA providers for operational SSA needs, as supplement to government catalogs

Space Data Association (SDA)

- Improving Our Vision (2006-2010)
 - Set of conferences and workshops to discuss SSA and relationship between US military and satellite operators
 - Growing frustration by satellite operators over lack of “customer service” from the US military
- SDA formally created in 2009
 - Intelsat, SES, Inmarsat, and Eutelsat as founding members
 - “Added value” conjunction screenings for members
 - Radio Frequency Interference (RFI) geolocation
- SDA 2.0 announced in 2017
 - Using commercial SSA data to feed their own catalog
 - Moving towards being completely independent from US military data and services

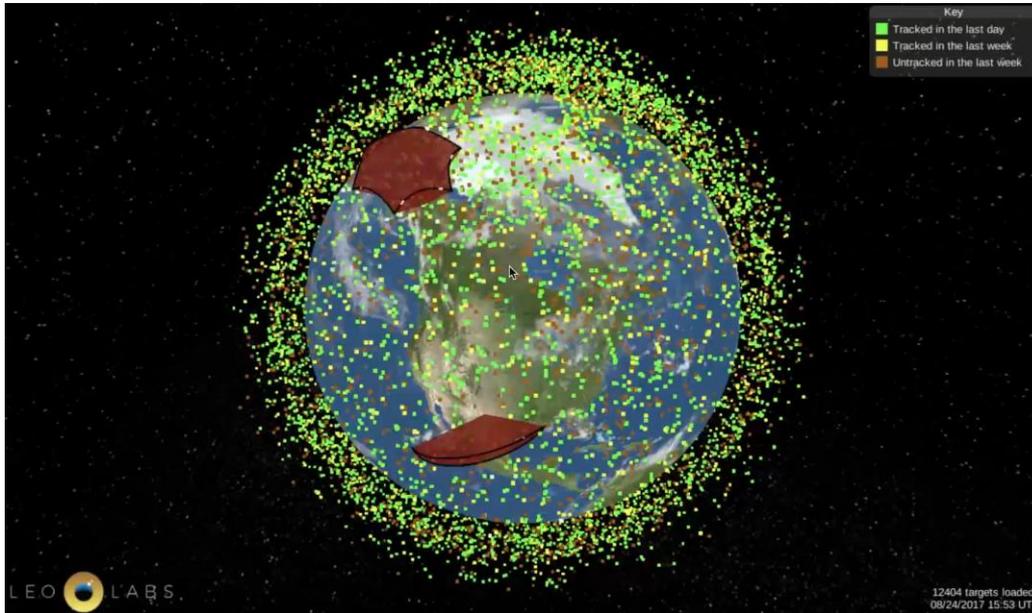
The Beginnings of Commercial SSA

- Commercial software and analysis tools have been around for decades
- September 2013, Advanced Maui Optical and Space Surveillance Conference
 - Deputy Assistant Secretary of Defense for Space Policy Doug Loverro
 - “We need help from industry, we’re not doing this well”
- March 2014, AGI announces the Commercial Space Operations Center (ComSpOC)

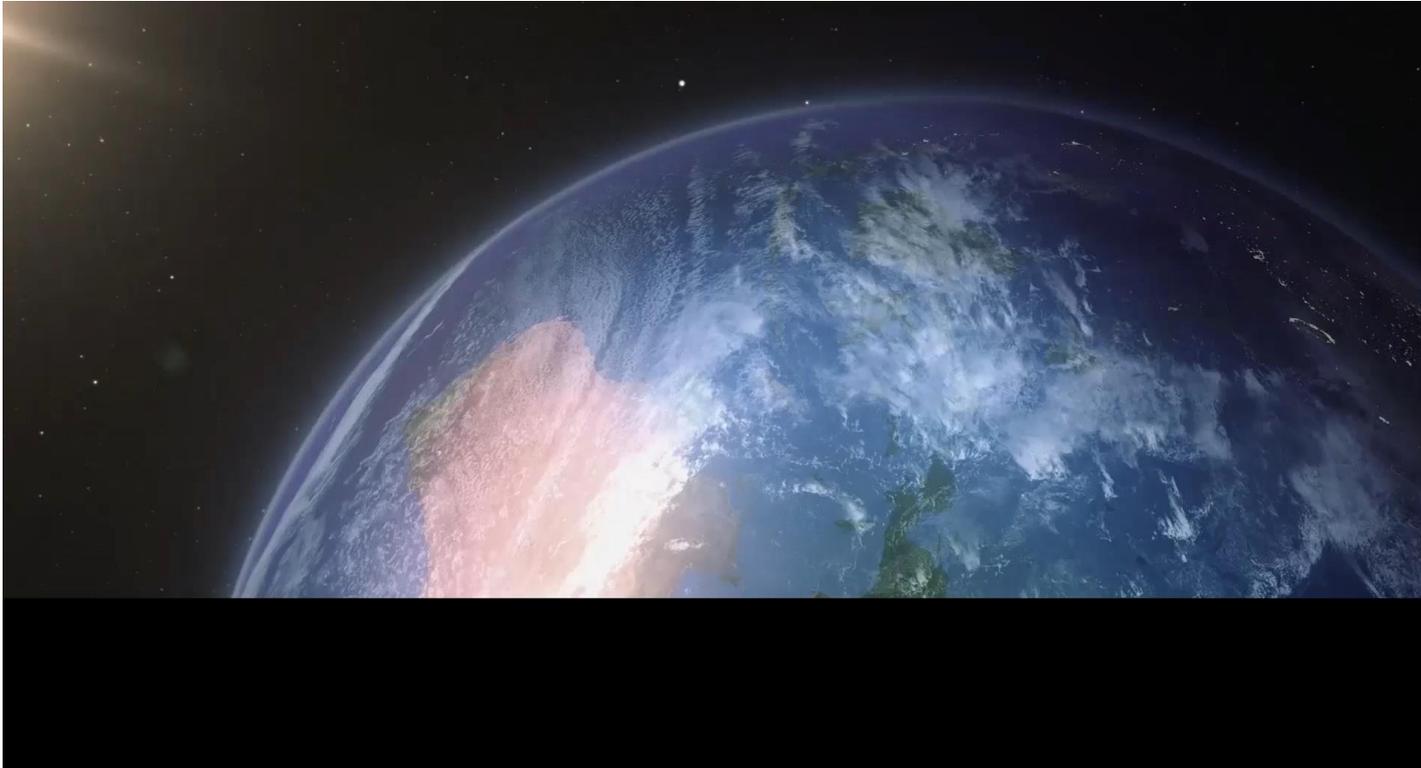


AMC-9 Anomaly

- More than 25 observatories and 275 telescopes deployed worldwide
- Tracking nearly all objects >10 cm in GEO, can also do photometrics and persistence



- Ground-based phased array radars for tracking LEO space objects
- Currently operating radars in Alaska and Texas, with a 3rd under construction in New Zealand
 - Tracking over 14,000 objects
 - <https://platform.leolabs.space>
- Plan to roll out next-gen of S-Band radars globally



- Canadian start-up company
- Plan to do LEO constellation for Earth remote sensing and space-based optical SSA

Additional Companies



- Continually monitors the entire visible Geosynchronous (GEO) belt
- Six sites located around the world: 2 in the US, 2 in Europe and 2 in Australia
- Awarded pilot contract in 2016 to provide non-governmental SSA data to U.S. DoD



- Commercial Space Operations Center (ComSpOC)
- Fuse data from multiple commercial sensors
- Tracks over 9,000 public catalog objects in LEO, MEO, HEO and GEO
- Planned updates to SDA Data Center will utilize ComSpOC

Commercial Deep Space Radar

- In May 2018, AGI announced partnership with Thoth Technologies to develop commercial deep space radar
- Installed transmitter in the 46-meter antenna at the Algonquin Radio Observatory in Ontario, Canada
- Can track objects out to distances of 50,000 kilometers, and can detect objects about two meters across on GEO



Algonquin Radio Observatory

Big Policy Questions

- Should the government continue to develop its own SSA capabilities or purchase commercial services?
 - How should commercial SSA data be integrated with government data?
- Where do we want the commercial innovation to occur?
 - Example: weather data
- How to incent continued creation of public goods?
 - Open access to SSA data for scientific research
 - Public access to data for transparency
 - Open algorithms and standards



Promoting Cooperative Solutions for Space Sustainability

Thank you. Questions?

ichristensen@swfound.org