How You Can Help: Spaceflight Safety Recommendations for SmallSats

Mission Design Considerations

- Consider human life: below the ISS is safer
- Higher inclination orbits are better tracked
- Is it big enough to be seen for tracking? (>1U is optimal) - check with us if you're not sure
- Use a unique name (check www.space-track.org for sat names already in use)

Prior to Launch

- Register on www.space-track.org
- Contact us (jspoc.ssasharing@us.af.mil)
- Tell us about your mission and the satellite

On Orbit

- If your satellite has propulsion, let us know before maneuvering (see our Handbook at https://www.space-track.org/documents/JSpOC_Spaceflight_Safety_Handbook_For_Operators.pdf)
- Keep us updated on satellite status, and let us know when your satellite has reached end of mission

Recommendations for CubeSat operations:
https://www.space-track.org/documents/Recommendations_Optimal_CubeSat_Operations_V2.pdf

Frequently Asked Questions

How soon after launch are TLEs available on Space-Track.org? TLEs are posted to Space-Track.org as soon as 18 SPCS collects enough data to generate an orbit determination (typically within 24 hours).

How long will it take to identify my satellite? Identification depends on many things, such as availability of tracking data, size and shape of the deployed objects, and how closely grouped the objects are. Large satellites can be identified within a few hours to days of launch, while multi-payload, small-object launches can take days to weeks to sort out. The more input we have from you before and after launch, the faster the process is.

How do I sign up for conjunction assessment alerts? Register on www.space-track.org, then email jspoc.ssasharing@us.af.mil and provide the name of your organization, the satellite(s) you operate, and your contact information. We'll make sure your satellite is linked up with your organization on Space-Track.org. Automatic email alerts pull this information from Space-Track.org.

Who approves ODRs? If you have an SSA Sharing Agreement with the United States Strategic Command (USSTRATCOM), 18 SPCS approves your ODR. If not, the ODR must be reviewed by USSTRATCOM, which can lengthen the decision process. For info on agreements, contact: stracom.offutt.js1.mbx.js13@mail.mil

SSA Sharing Goals

Promote safe, responsible, and peaceful use of space

✧✧✧

Promote safe spaceflight operations

✧✧✧

Strengthen cooperation and relationships with all spacefarers

SMALL SATELLITE SERVICES & COLLABORATION

Working With The 18th Space Control Squadron (18 SPCS)

Space Situational Awareness (SSA) Sharing

WWW.SPACE-TRACK.ORG
JSPOC.SSASHARING@US.AF.MIL

August 2018

18 SPCS

The Joint Force Space Component Command (JFSCC) serves as the central focal point for all U.S. military space operations. The USAF 18th Space Control Squadron (18 SPCS) is the unit under JFSCC responsible for tracking all man-made objects in space and providing Space Situational Awareness (SSA) to the global community.

- **Track/Identify/Catalog:** We collect more than 10 million observations per month from the global U.S. Space Surveillance Network to track, identify, and catalog all man-made objects in Earth orbit (currently about 23,000 objects).
- **Conjunction Assessment:** We screen all active payloads against everything else in the catalog to determine when any other object could come perilously close to them. In the case of a possible conjunction event, we notify the operator of the satellite involved. We provide this service at no cost for all satellite operators via our website, www.space-track.org.
- **Launch Screening:** Using data from the launch provider, we can screen the planned launch trajectory for potential close encounters with catalogued objects in space.
- **Reentry Predictions:** Based on observations, we provide predictions of time and location for objects reentering the atmosphere.
- **Human Space Flight:** We have a group dedicated to supporting NASA's International Space Station and any other space stations with humans on board.

Contact Information

18 SPCS SSA Sharing Team
jspoc.ssasharing@us.af.mil • (805) 605-5219

Engagement with Small Satellite Operators

Tracking, identifying, cataloging, and conjunction assessment are performed for SmallSats and CubeSats in the same way as the big satellites – at no cost. You, as a satellite owner/operator, can help lessen the risk to all spacecraft by providing information to 18 SPCS on your launch and deployment plans. We request the following information in the interests of spaceflight safety for all:

1. **Register on www.space-track.org:** anyone can register for a user account for free.
2. **Contact the 18 SPCS:** e-mail jspoc.ssasharing@us.af.mil. Let us know:
   - Your launch provider, tentative launch date, primary payload, any predicted orbit information
   - Tell us about your satellite: size, possible shape changes, propulsion, expected lifetime, etc.
   - Provide contact information for your operators
3. **Help us set up your account:**

The 18 SPCS SSA Sharing team will create an organization account for you on Space-Track, and link the appropriate people to it. Once your satellite is deployed and identified, we'll link it to your account as well. When/if any conjunctions are predicted, data will be sent automatically to the people on the account who are designated to receive it.

4. **Launch Coordination** 18 SPCS orbital analysts will work with you to identify your satellite after launch.
5. **On-Orbit Operations:** Once on orbit and catalogued, we'll track your satellite (as best we can) and you'll have 24/7 access to your TLEs along with conjunction assessment.

Questions? We're happy to help!
jspoc.ssasharing@us.af.mil • (805) 605-5219

Data You Can Receive From 18 SPCS

A variety of SSA data is available free of charge on www.space-track.org. Once you create a user account, you can access the following for all unclassified objects, from Sputnik to the International Space Station and beyond:

- Two Line Element (TLE) data
- Satellite Catalog (SATCAT) data (includes launch date and basic orbital information)
- Historic satellite re-entry dates and predictions of upcoming re-entries
- Conjunction predictions for your satellite(s)

18 SPCS Provides Positional Data & Emergency Conjunction Assessment to All Satellite Operators at No Cost

Beyond the basic services provided to everyone, advanced support services are available with an approved Orbital Data Request (ODR):

- Anomaly Resolution
- Advanced Conjunction Assessment (CA)
- Advanced Collision Avoidance (maneuver screening)
- Reentry Assessment
- Disposal/End-of-Life/Deorbit Support
- Launch Support (Launch Collision Avoidance screening and Early Orbit Determination)

ODR forms and submission instructions can be found on www.space-track.org.