From: Laura Stefani

To: Nimesh Sangani
Date: June 21, 2021

Subject: Additional Information Request

Message:

1) AST would never implement a 10 km altitude change because it is unnecessary and wasteful. AST would implement a small altitude change and allow the spacecraft to drift 10 km in the along-track direction as a result of the slightly different orbital period. This is a much more efficient way to use the propellant. These times required to achieve this have already been presented in the previous answers – specifically, Responses 5 and 6 of the Supplemental Orbital Debris Response (and updated version).

2) Initial processing of a new CDM can be done within a matter of minutes. However, the determination of whether a propulsive maneuver is required occurs over the course of multiple days and several CDMs. This is because the ephemeris information that goes into determining whether a CDM is provided by the Air Force has a level of uncertainty, and the farther in advance the CDM is provided relative to the predicted time of closest approach (TCA) the larger this uncertainty is. By tracking how the CDM data evolves over time, the collision probability can be evaluated as either increasing or decreasing, and then a decision to implement a maneuver is made early enough in advance for the maneuver to be executed. This is standard practice and can be confirmed with NASA.

3) As discussed above, the time to process a particular CDM is short (a matter of minutes), but there is a need to track the CDMs over the course of several days to evaluate the true level of risk and to make an informed decision. This is not only good practice, it is necessary because of the uncertainty in the ephemeris data; planning and executing a maneuver too early could actually result in an increase in the risk. As indicated previously, determination of whether a propulsive maneuver is an option will be made early enough in advance of the predicted TCA that a high drag maneuver could instead be used. See Responses to questions 2, 6 & 7 in Supplement Orbital Debris Response and pgs. 5-6 of initial Orbital Debris analysis.