March 14, 2019 telecon
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Request for more information on 1) propulsion, 2) probe release, 3) expected conjunctions

1. The AC10 propulsion unit is identical to the one on the AC7a and AC7b satellites (license WI2XBG). When the AC10a and AC10b satellites are released on orbit, they have the usual CubeSat springs between then to separate them and consequently they will drift apart. The mission objective of one satellite to illuminate the other is practiced from different ranges, with a current mission plan of ranges from 1 km to 10 km, although it is possible that later in later phases of the experiment, a closer approach will be executed. Only the AC10b satellite has a steam propulsion unit, so that satellite will be tasked to change the range. The propulsion unit has been characterized in the laboratory and provides significant control for very low thrust to facilitate fine adjustments in orbit. We do not plan to exceed a closure rates of 10 mm per second. Both AC10a and AC10b satellites have GPS and they collect position data and we expect to know their location to within a sphere that will be substantially smaller than the closest approach that would be attempted, by a factor of 10. Any closer approach will use the techniques described for AC7.Thrust events are each planned individually. Once the event occurs, telemetry is downloaded and analyzed to confirm that the plan was successfully executed Our mission plans factor in the time between earth station passes such that there is ample time for a new thrust event to be planned and uploaded so that we maintain appropriate satellite position control.

2. The AC10a contains 28 identical probes. The plan for deployment is that AC10a and AC10b will be deployed from the NG-11 Cygnus resupply vehicle following its undocking from ISS, at an altitude of 500 km. NASA ISS safety reviews confirm that probes will be visible to the radars that track orbital debris. Based on agreements with NASA focused on ISS safety, no probes will be released at altitudes between 472 km and 393 km. The probe releases are individually planned events involving the release of one or two rapidly successive probes as a single release event. The Aerospace Corporation will coordinate release events with the CSpOC. The probes have no active means for providing their position so CSpOC will be used to identify and track the released probe(s) and provide radar sighting data to the mission scientists. CSpOC will have an advantage for properly tagging a probe(s) because they will know when and where it was released. Because this is new and there are many participants, the mission plan is to release one probe initially and verify that the probe is being tracked sufficiently that NASA can comfortably integrate it into ISS safety operations before proceeding with any more releases.

3. The AC10a probes are very lightweight with a large surface area. They will decay quickly. The CSpOC is aware of the ballistic coefficient and will fold this into their models that predict the orbit period so that custody of the probe will not be lost. All probe releases will be coordinated with the CSpOC who will place the probes on a list of objects with high priority. This means that additional care and resources will applied to tracking them. These combined actions are intended to reduce the covariance and prevent unnecessary conjunction warnings.