ITEM #	DESCRIPTION	Response
2	**ODAR includes a rights notice that is inappropriate for FCC submission. Please remove.**	**(Legal team to respond)**
3	**The ODAR is internally inconsistent on whether parts survive re-entry. The summary compliance table indicates "no parts" while the ODAR at page 19 indicates a surviving part, based on a DAS analysis.** **a. The applicant should either undertake additional modelling in DAS or using higher fidelity methods in order to determine whether any parts survive re-entry.** **b. If a part or parts are expected to survive re-entry, the applicant will need to provide a detailed justification for the choice of materials.**	Analysis shows that the Solar Array Wing will survive re-entry and impact with a kinetic energy of 92.440338 Joules and a debris casualty area of 1.797272m^2 or a risk of human casulty of 1 in 49700. This meets NASA Technical Standard 8719.14 Requirement 4.7-1 which limits the risk of human casualty from surviving debris to within 1 in 10000 for any object with an uncontrolled re-entry (which is how TYVAK-0129 will passivate and re-enter). The Solar Array Wings consist of a carbon-carbon graphite material that serves as a stiff, lightweight material solution for the triple-wing deployable array. The ODAR summary compliance table has been updated to capture that solar array wings will survive re-entry in the TYVAK-0129_ODAR_v2 document.

The ODAR indicates a propulsion system that utilizes an ionic liquid. Please indicate whether the liquid, if released into space, can be expected to evaporate, or whether it would persist in droplet form. If it would persist, please provide a detailed analysis concerning possible system failure modes, and containment measures, etc. The ODAR suggests a possible failure mode involving battery combustion resulting in melting of plastic containment vessel. Please specifically address this possible failure mode. Does this particular system have any flight heritage?

The propellant that will be used is not expected to evaporate if it were to be released into space. Accion has performed thorough containment testing on the system that will be flown: during numerous environmental tests, Accion's TILE 500 tanks have not shown propellant leaking. These tests included 3-axis vibration while depressurizing, humidity and thermal vacuum testing. Nearly all tests simulated worst case, and in some instances, beyond worst case, conditions. Those results are attached in a test summary from December 2017 until July 2018. A very similar Accion propulsion system, with a similar propellant, is currently onboard the IRVINE02 spacecraft that was previously vetted by the FCC and was approved – the launch date was December 3, 2018 on a SpaceX Falcon 9 vehicle. The propellant in the system is contained within a rigid, sealed subtank which is housed inside an outer rigid tank. A barrier of sublimation material is used within the thruster chips to prevent propellant leaking through the thruster chips prior to operation. The summarized tests included flight-like hardware containing the same sublimation material.

Battery protection elements including fuse and voltage comparator overcurrent protection circuitry mitigate the likelihood of a battery thermal runaway. Additionally, the batteries and the payload propellant tanks are separated by at least three layers of spacecraft components that serve as barriers. These include Aluminum 7075 enclosures and a FR4 printed circuit board (which itself acts as a flame-resistant barrier). The layout further mitigates the risk of potential energy resulting from a battery failure from propagating to the propellant tanks. Similar structural and circuit board elements have been flown in the past on several TYVAK 3U and 6U nanosatellites.

	Please provide information concerning maneuver plans for the spacecraft. Is any raising of the satellite above its initial injection orbit contemplated? Will the satellite be maintained at a specific altitude, and with what tolerance, if any? Will propulsion be used solely to lower altitude and reduce orbital lifetime? Will any maneuvers be assessed for collision risk and coordinated with space situational awareness organizations?	Spacecraft will perform experimental demonstrations of the propulsion payload system so as to lower and raise the spacecraft orbit up to 100m while maintaining an orbit altitude of 500km. Upon completion of all spacecraft demonstration operations, the vehicle will be decommissioned though not with the use of the propulsion system (as it is not expected that there will be excess propellant remaining post-demonstrations). On a case-by-case basis, propulsion demonstration maneuvers will be evaluated for risk of collision and associated steps will be taken with relevant organizations. **(Pending Chris response on coordination with space situational awareness organizations)** Propulsion maneuvers will be coordinated in advance with relevant space situational awareness organizations.
5		***Update ODAR/Narrative for updated launch dates?