MEMO

TO: Samuel Karty, FCC (Samuel.Karty@fcc.gov)

FROM: John Springmann, BlackSky Global (johns@spaceflightindustries.com)

SUBJECT: Update to Global-3 orbit and station keeping plans

DATE: August 21, 2018

BlackSky previously submitted a memo "Station keeping plans for Global 1-4 satellites" dated May 17, 2018, which discussed the station keeping plans for the Global-1, -2, -3, and -4 satellites and provided the expected operational altitude range of each satellite. Since that memo, there has been a change to the Global-3 orbit. Global-3 is being launched as a secondary payload on a PSLV rocket. It was originally planned to be launched to a 45° inclination, 460 km circular orbit. The launch has changed and the satellite will now be deployed into a 42° inclination, 555 km circular orbit. The launch date has also delayed to January 2019.

Given this new initial orbit, the expected natural altitude change versus time is shown in Figure 1. This is the altitude change without using any propulsion, and was estimated using the NASA DAS software, which is the same methodology used for Orbital Debris Assessment Reports. The satellite orbit will decay completely within 14.4 years. The planned operational lifetime of the satellite is three years. Within the first three years of the mission, the natural orbital decay is limited to approximately 10 km.

Global-3 has an onboard propulsion system. No orbit raising is planned for the mission. It is desired to lower the orbit to improve the image quality. The operational plan is to lower the Global-3 orbit by approximately 20 km over the first year of its mission. This lowering will be accomplished by a large number of very small thrust maneuvers over the first year of the mission. This lowering, combined with the natural decay of the orbit, and with some additional uncertainty added, means that the expected operational altitude of the satellite is between 565 km and 515 km. Note that the upper limit is 565 km early on rather than its injection altitude of 555 km because some oscillations of the apogee and perigee between 555 and 565 km are expected; see Figure 1.

The summary of the expected operational orbits for all four satellites is shown in Table 1. The information for Global-1, -2, and -4 is unchanged since the last memo. Even though Global-3 has changed, it is still within the envelope of operational altitudes of the other satellites.

BlackSky does not have insight into the reasons for the orbit change for Global-3. As a secondary payload, we do not have control of the orbit, but instead follow the needs of the launch vehicle provider, which is driven by the primary payload. There is a chance that the orbit for Globlal-3 could change again. If a change happens, we will provide another update.

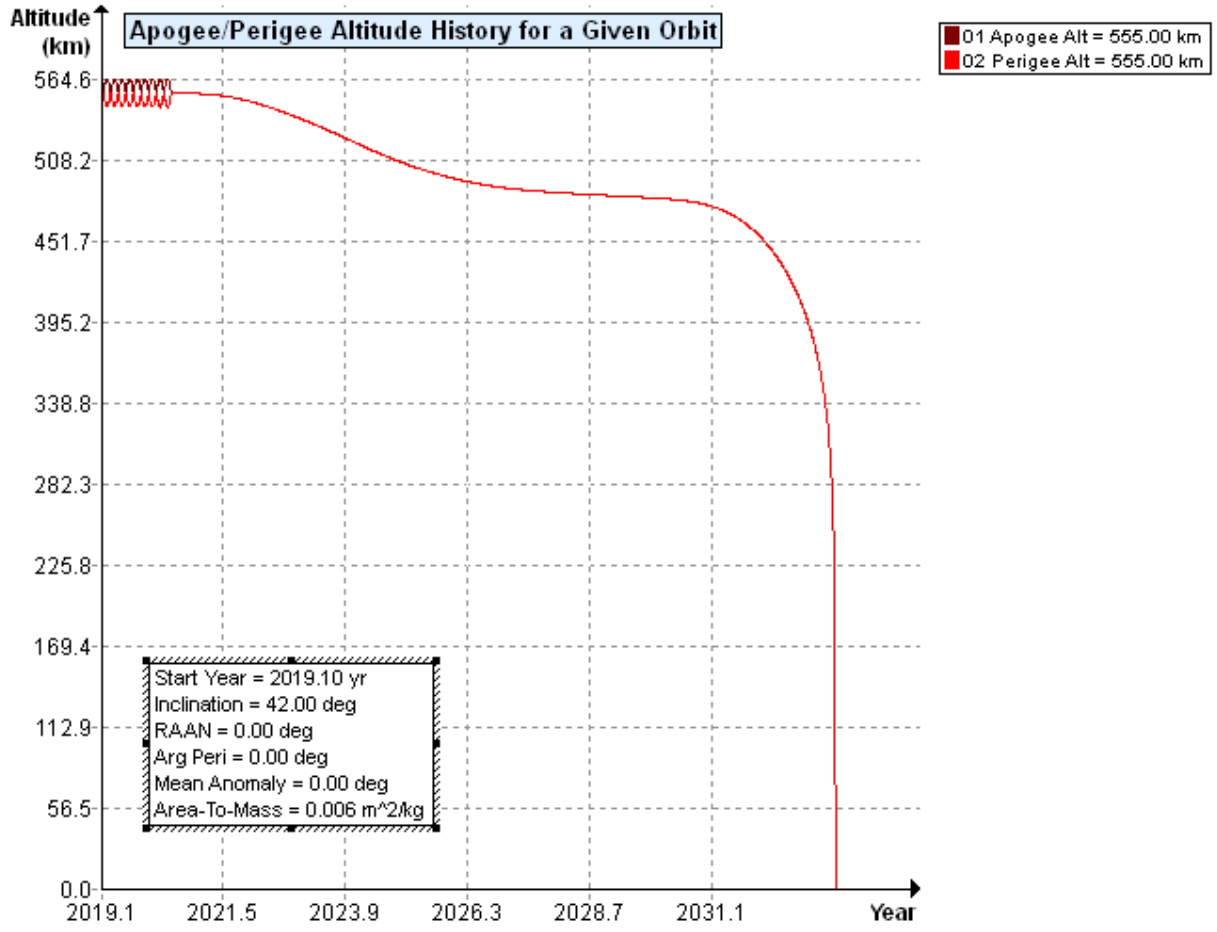

Figure 1. Global-3 altitude over time in the case of no propulsion use (natural orbit decay, only).

Table 1. Initial operating altitudes for each satellite

Satellite Name	Initial Altitude	Inclination	Expected Operational Altitude
Global 1	505 km circular	SSO	470 – 505 km
Global 2	575 km circular	SSO	555-575 km
Global 3	555 km circular	42°	515 – 565 km
Global 4	475 km circular	45°	440 – 475 km

.