

Breakout Group 4 **"The Navvies"**



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Summary Report

Full infrastructure means launch assets, in-orbit supply depots and service stations, and ground control centers.

We must bring down launch costs. One way is to use less-reliable launchers for supplying on-orbit depots with low-value items. Such items include propellants and other fluids used on satellites. Eventually reusable launchers will be available for servicing missions.

In some cases, the ISS can be used for servicing. One example may be the recent failure of a Proton upper stage to insert an Astra 1K satellite into GTO. The satellite is stranded in an orbit compatible with the ISS. Thus, it is possible that Astra 1K can be maneuvered to rendezvous with the ISS. Another Proton could launch a new upper stage to ISS for coupling to Astra 1K.

It is clear that a demonstration on-orbit servicing mission is needed to focus on the benefits of automation and robotics in space. A first-mover flight demonstration option would be the extension of life of a GEO communications satellite. This is a mission being sought after by Orbital Recovery Corp. and is one that appears commercially viable. A satellite operator would be willing to pay for this service because the revenue base can be extended for a number of years beyond normal life times. In order to carry out such a flight, an entrepreneur will have to take the initial rise of finding a customer



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and raising the necessary funding. The first flight is risky in terms of financial exposure and technical challenges. Such a demonstration flight could be carried out in two years.

A second demonstration flight option would be an end-to-end systems mission such as servicer and satellite combination launch. In such a case, a single launch would loft both vehicles into orbit and then execute cooperative and non-cooperative exercises. This would demonstrate technology readiness through a series of maneuvers, including close approach, fly around, inspection and manipulation. The DLR TECSAS mission would be a good example of this kind of mission.

**THE VISION FOR ENABLING OOS ARCHITECTURE:
“Full Launch & Ground Infrastructure”**