

FLIGHT OPERATIONS DIRECTORATE
EVA, ROBOTICS & CREW SYSTEMS
OPERATIONS DIVISION



External Payload Installation Challenges

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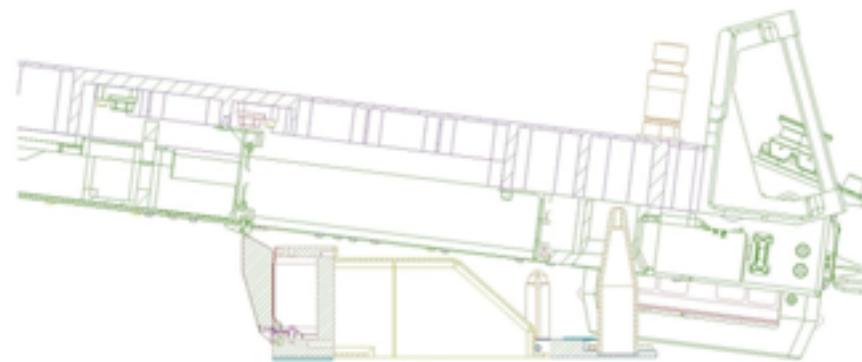
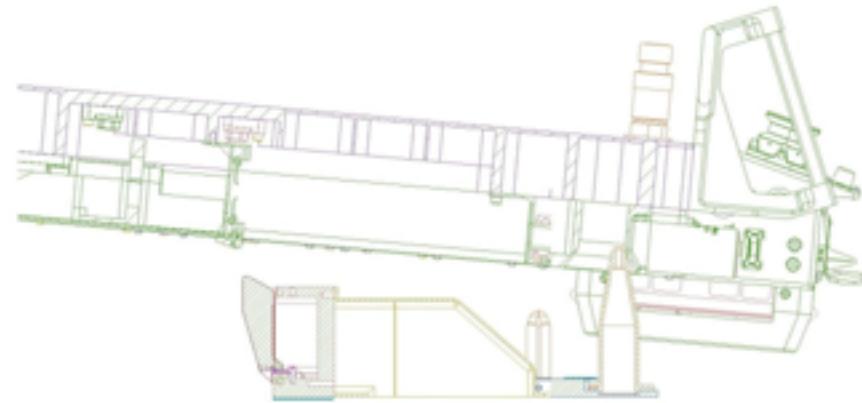
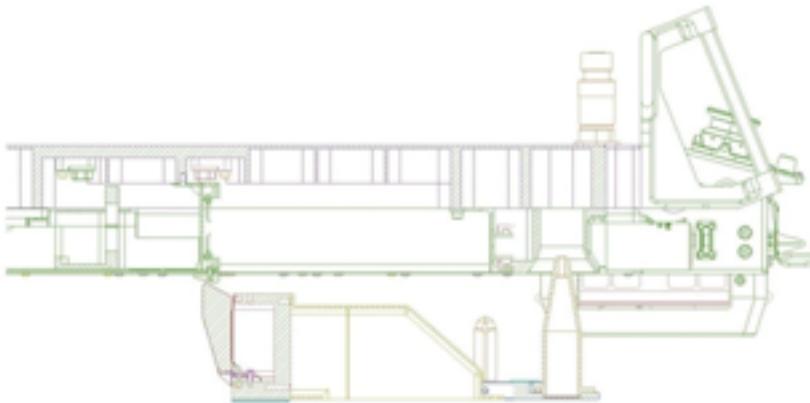
Robotic Operations Challenges

- Direct Install or Payload Handoff
- Payload Attachment Hardware
- Thermal Constraints
- Trajectory Constraints





FRAM (Flight Releasable Attachment Mechanism)





FRAM Fully Installed



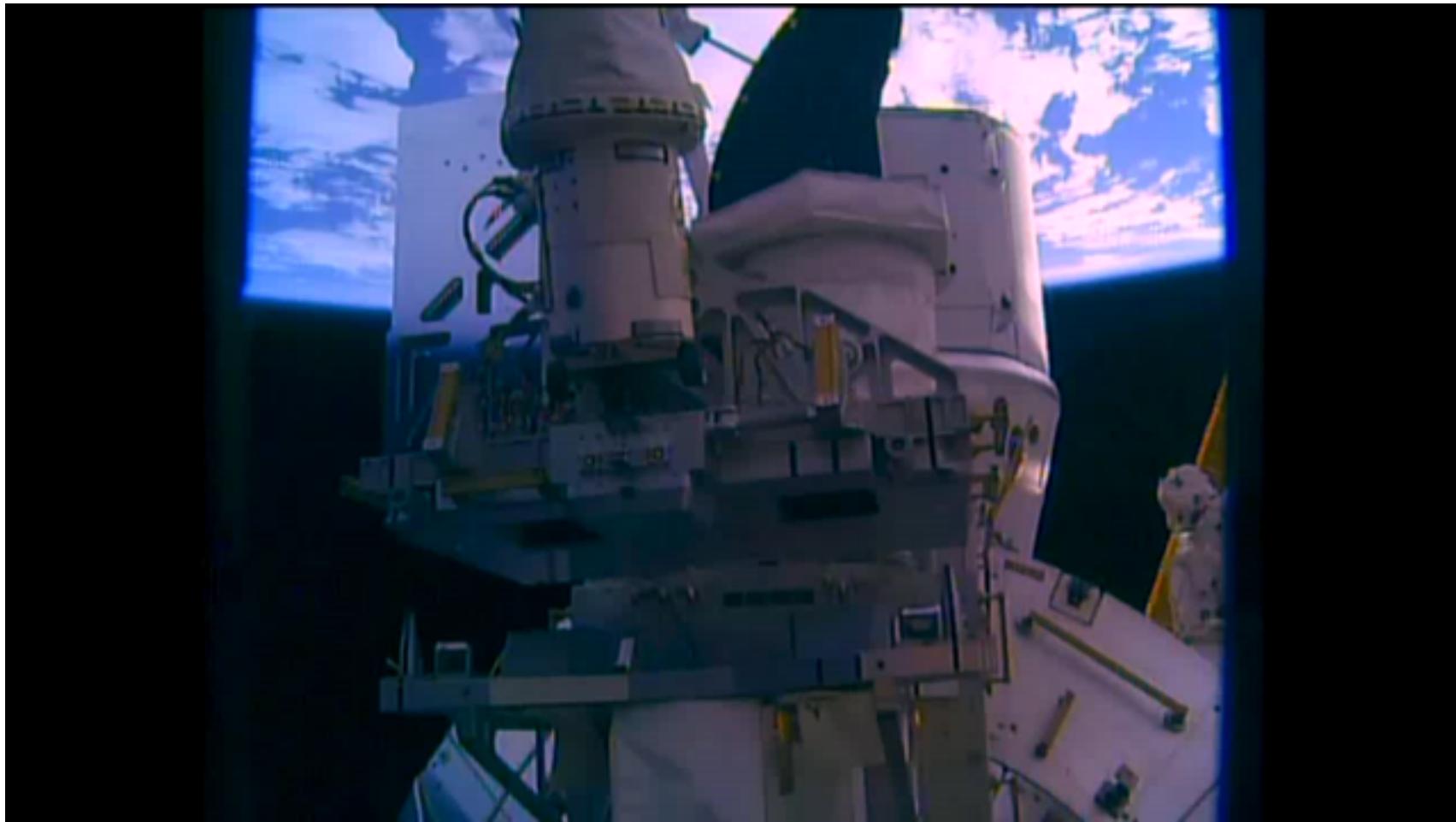


FRAM Fully Installed (Cont.)



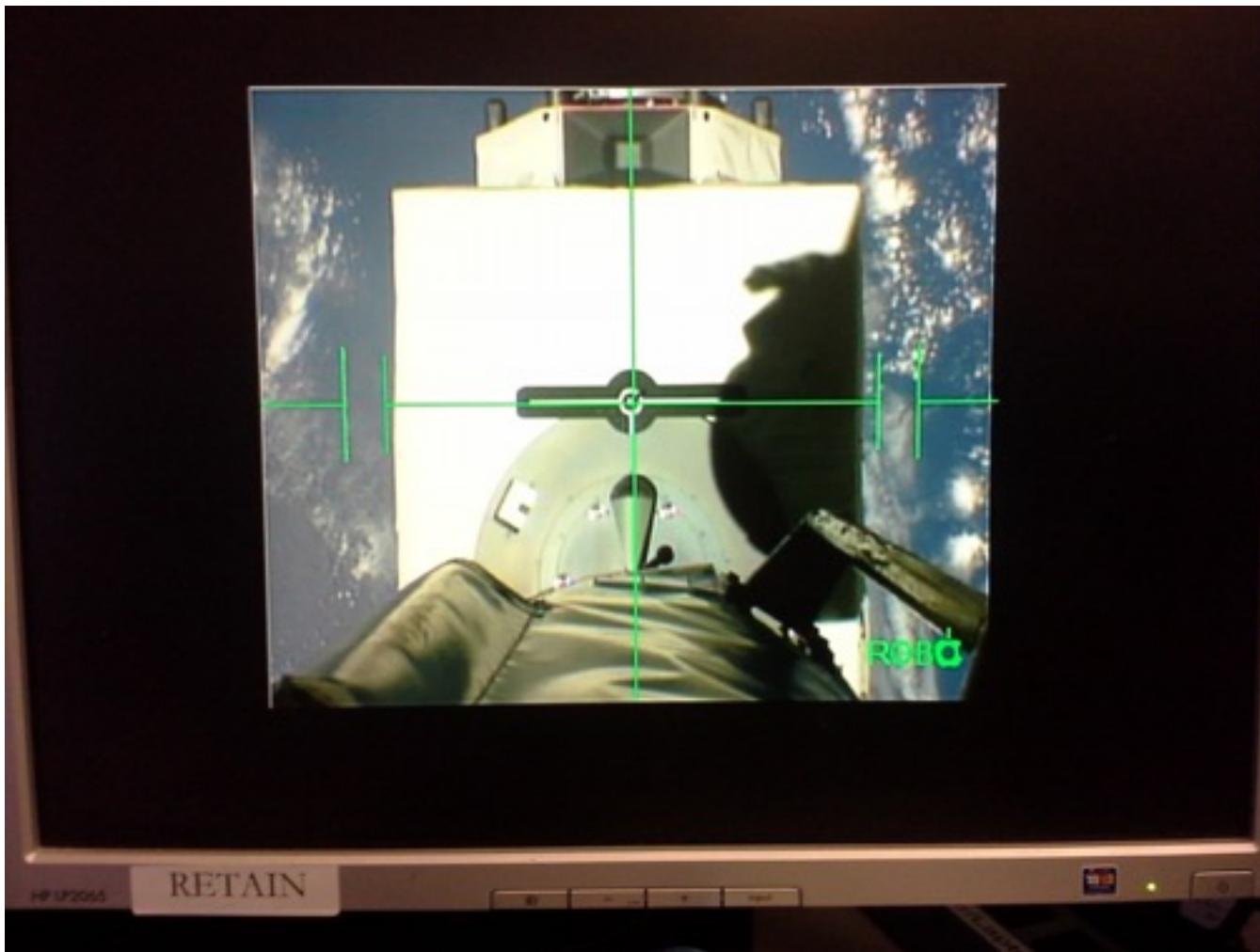


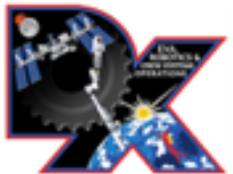
RapidScat Install



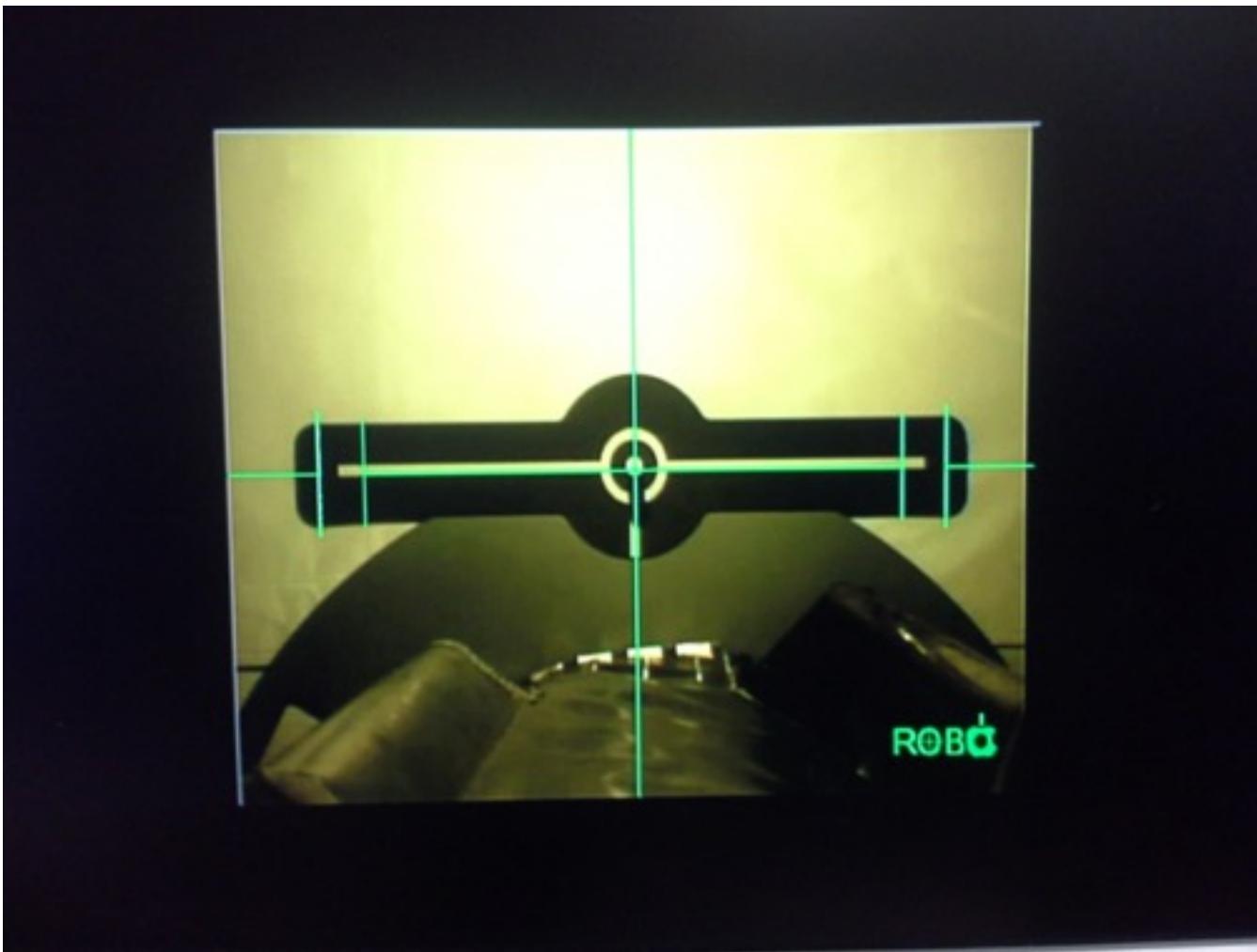


CATS Handoff





CATS Handoff



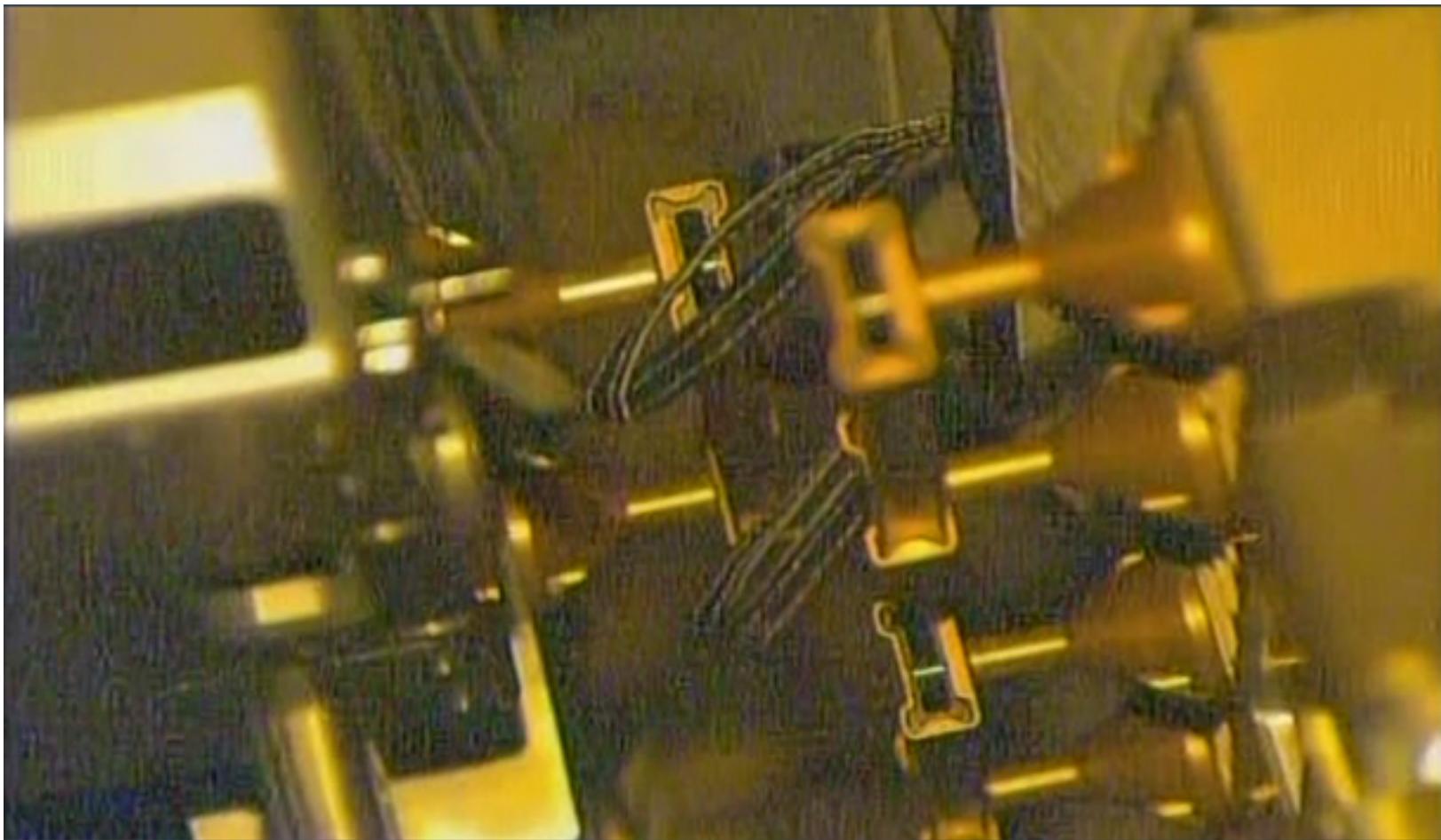


SpaceX Latch



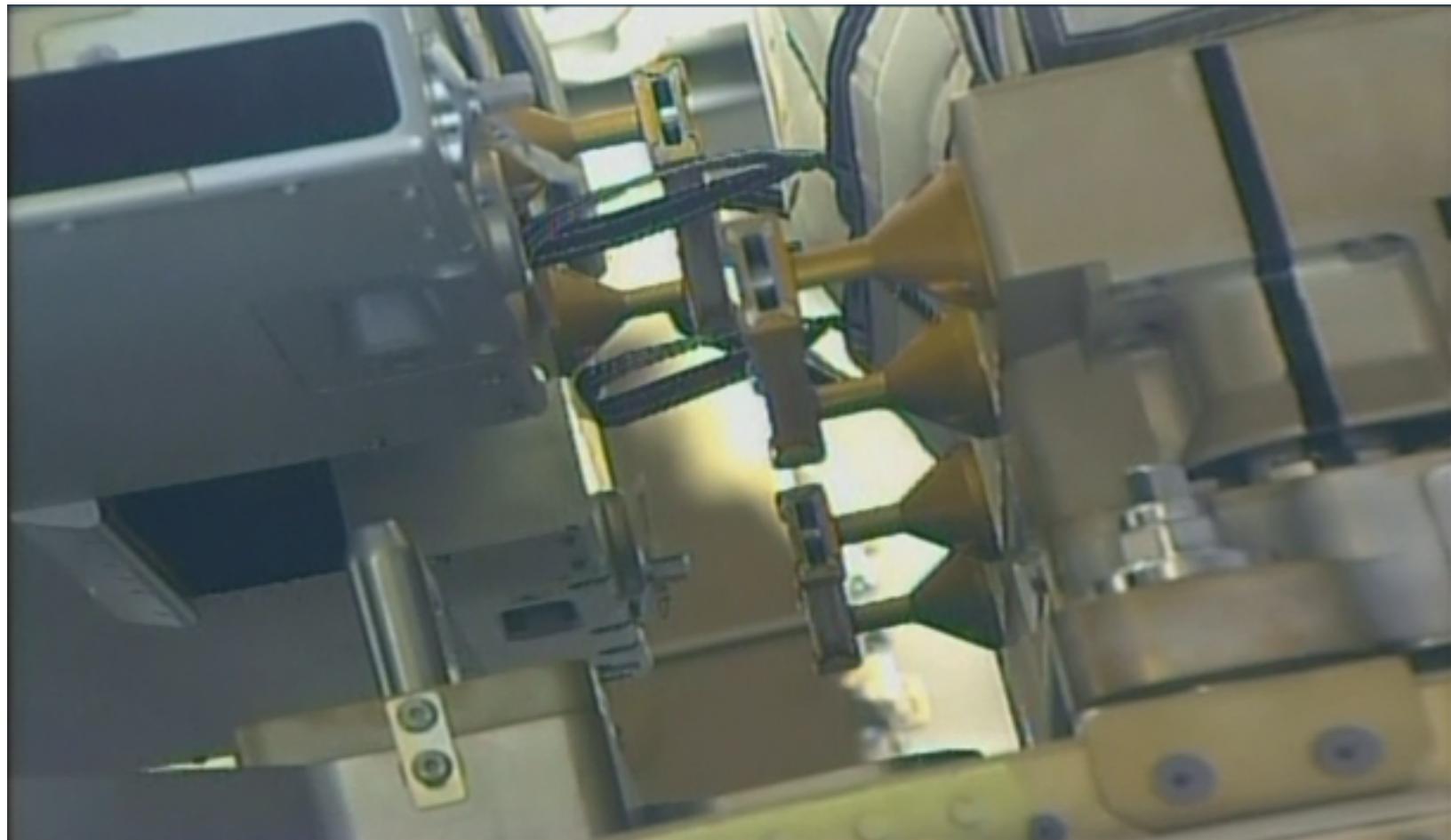


Multi-layer Insulation straps



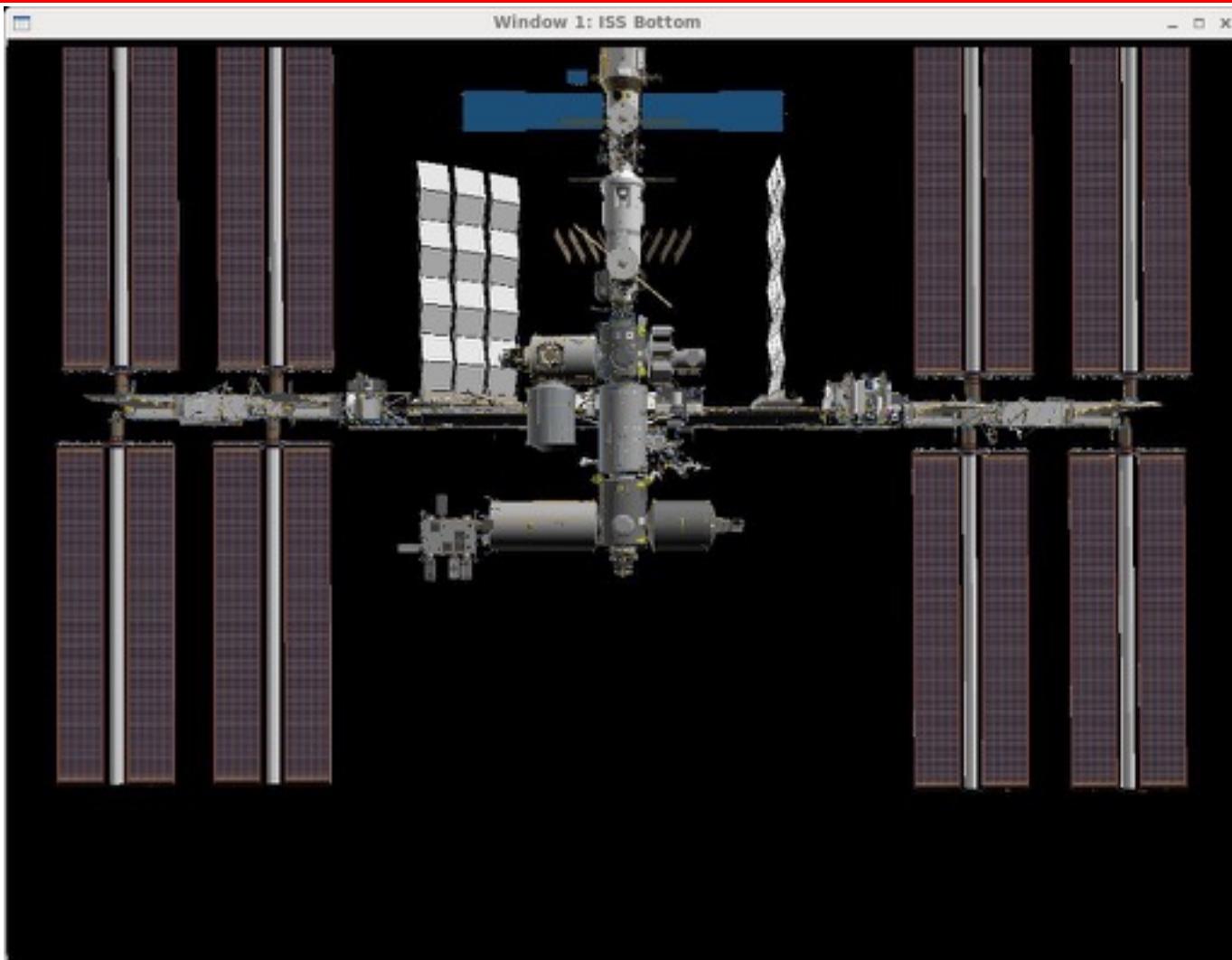


Multi-layer Insulation straps (cont.)





ISS External Hardware



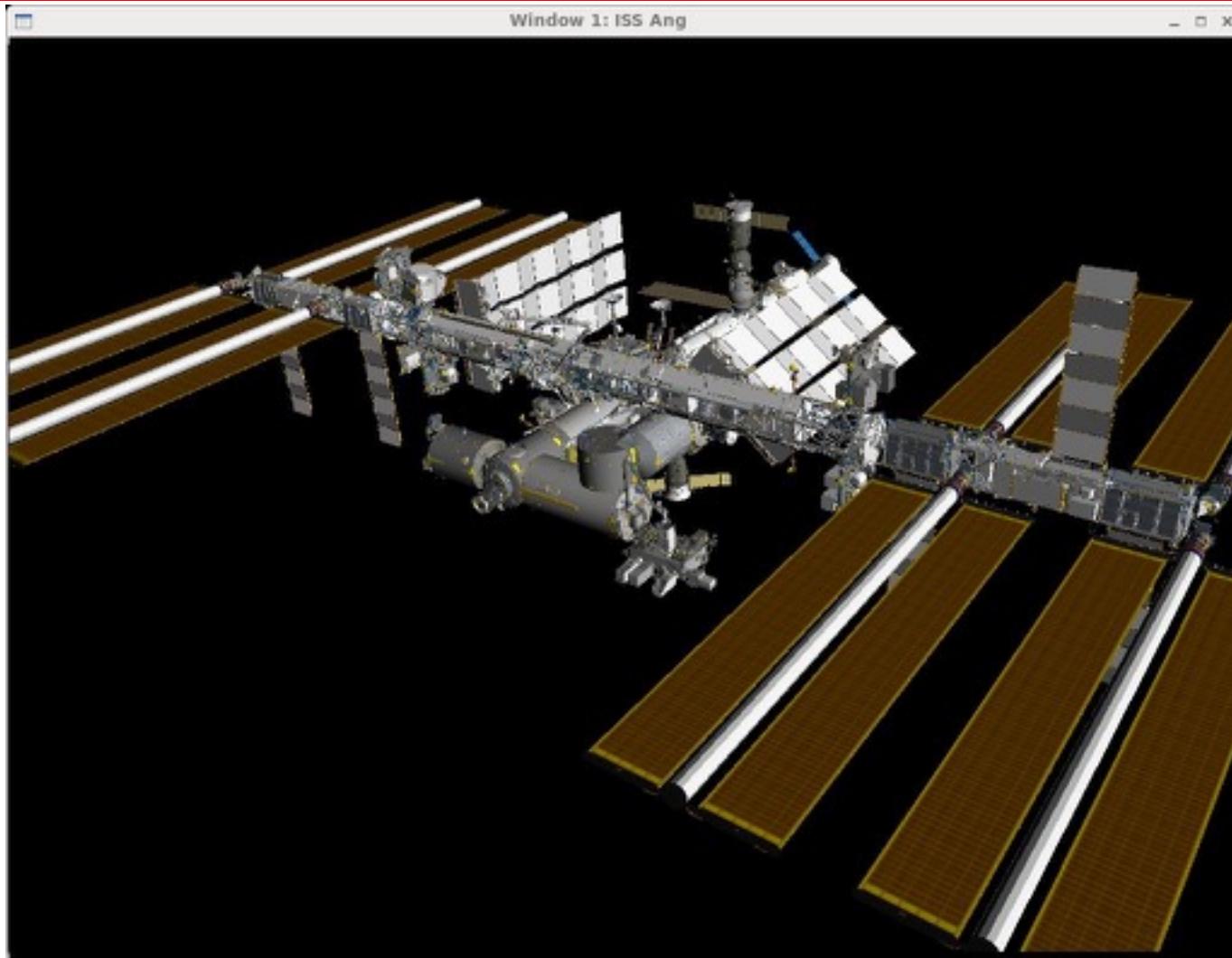


ISS External Hardware (cont.)



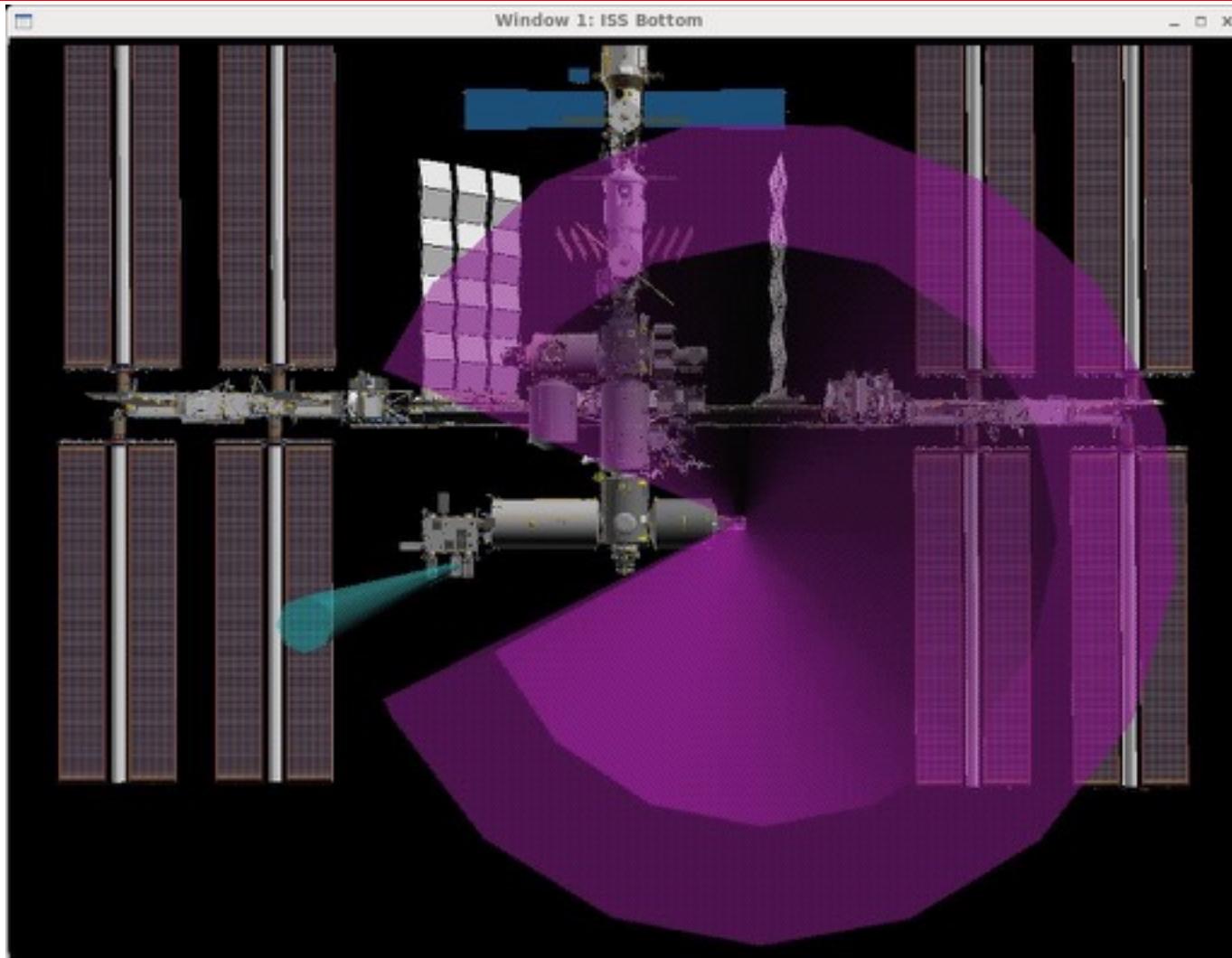


ISS External Hardware (cont.)



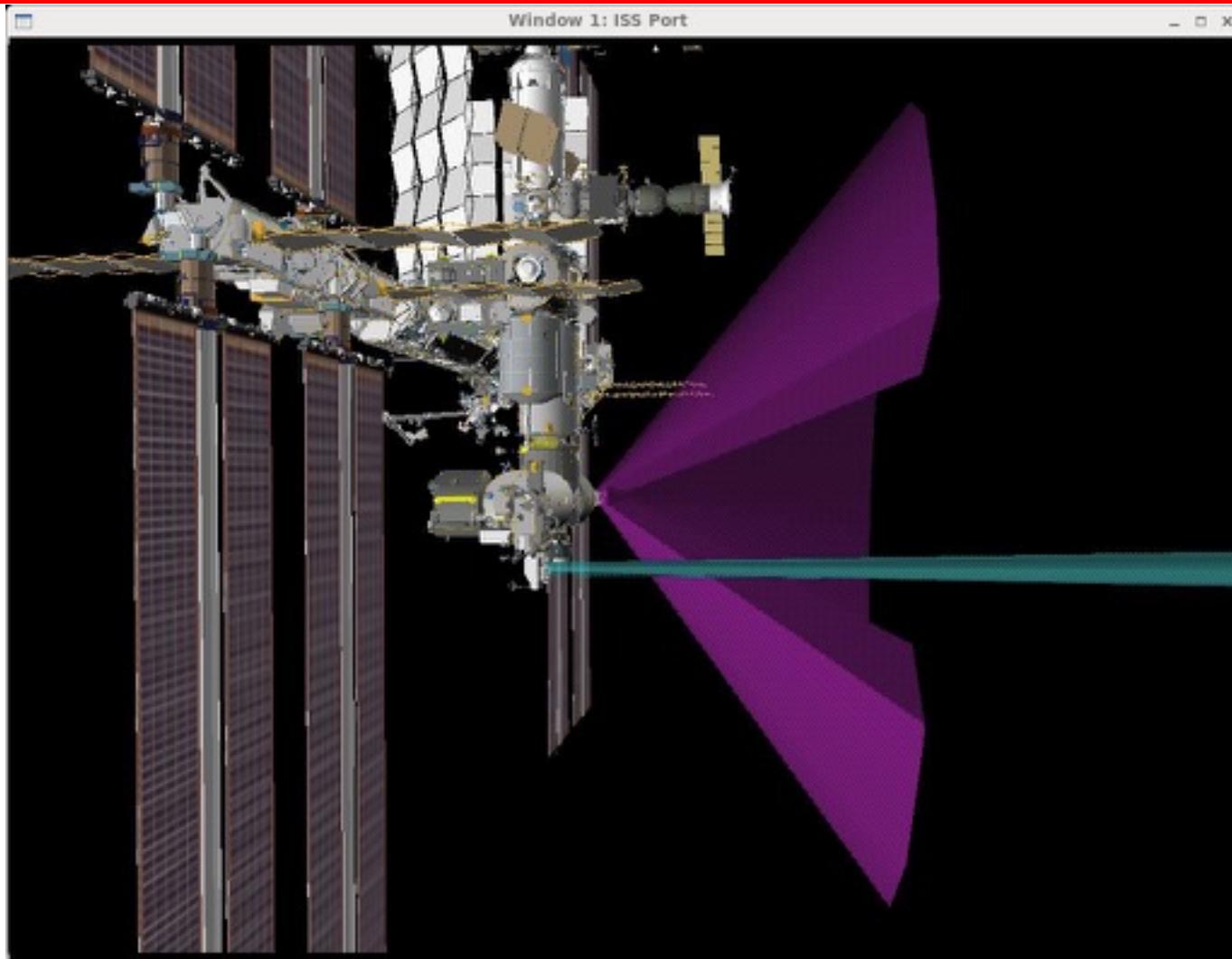


ISS External Hardware (cont.)



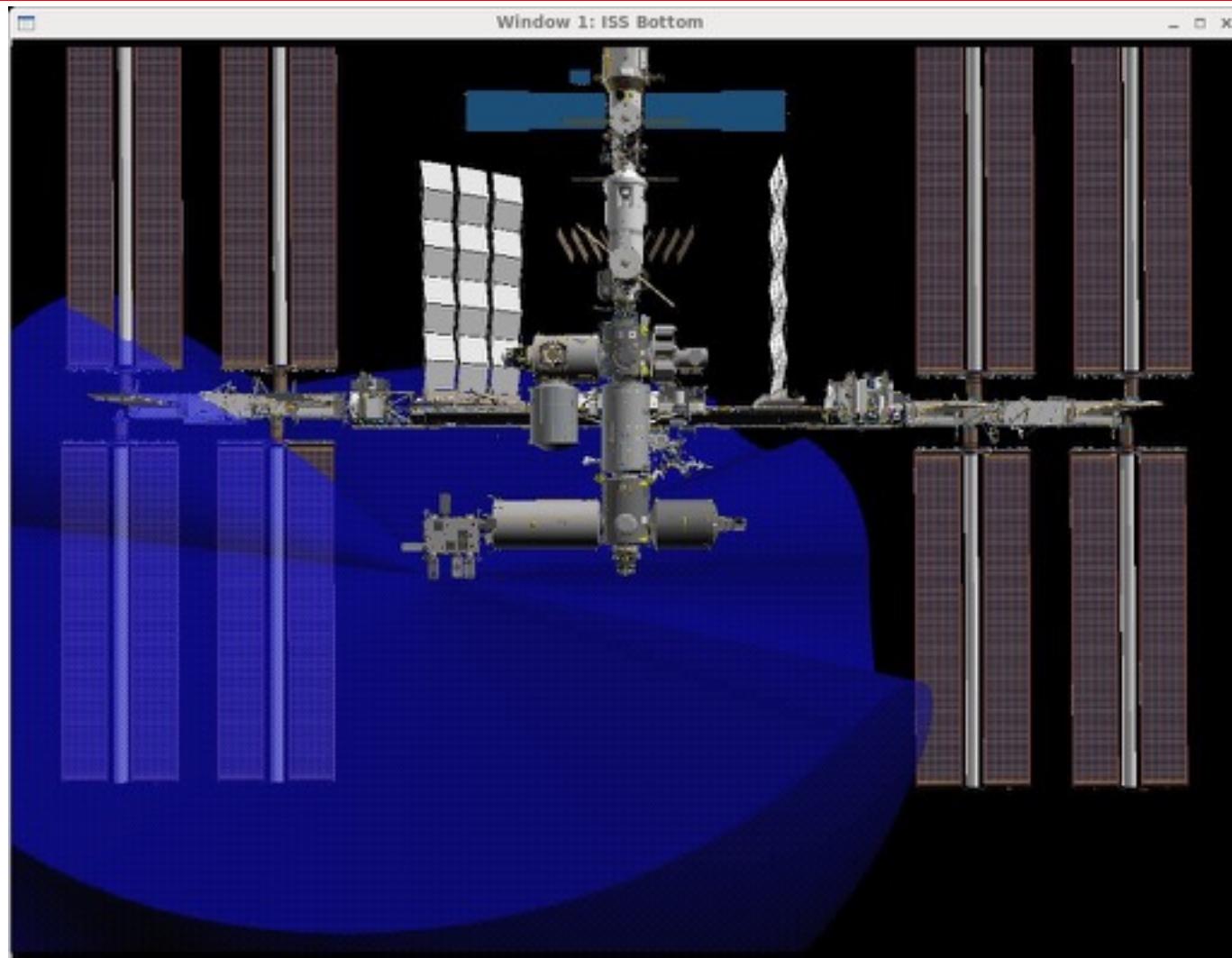


ISS External Hardware (cont.)



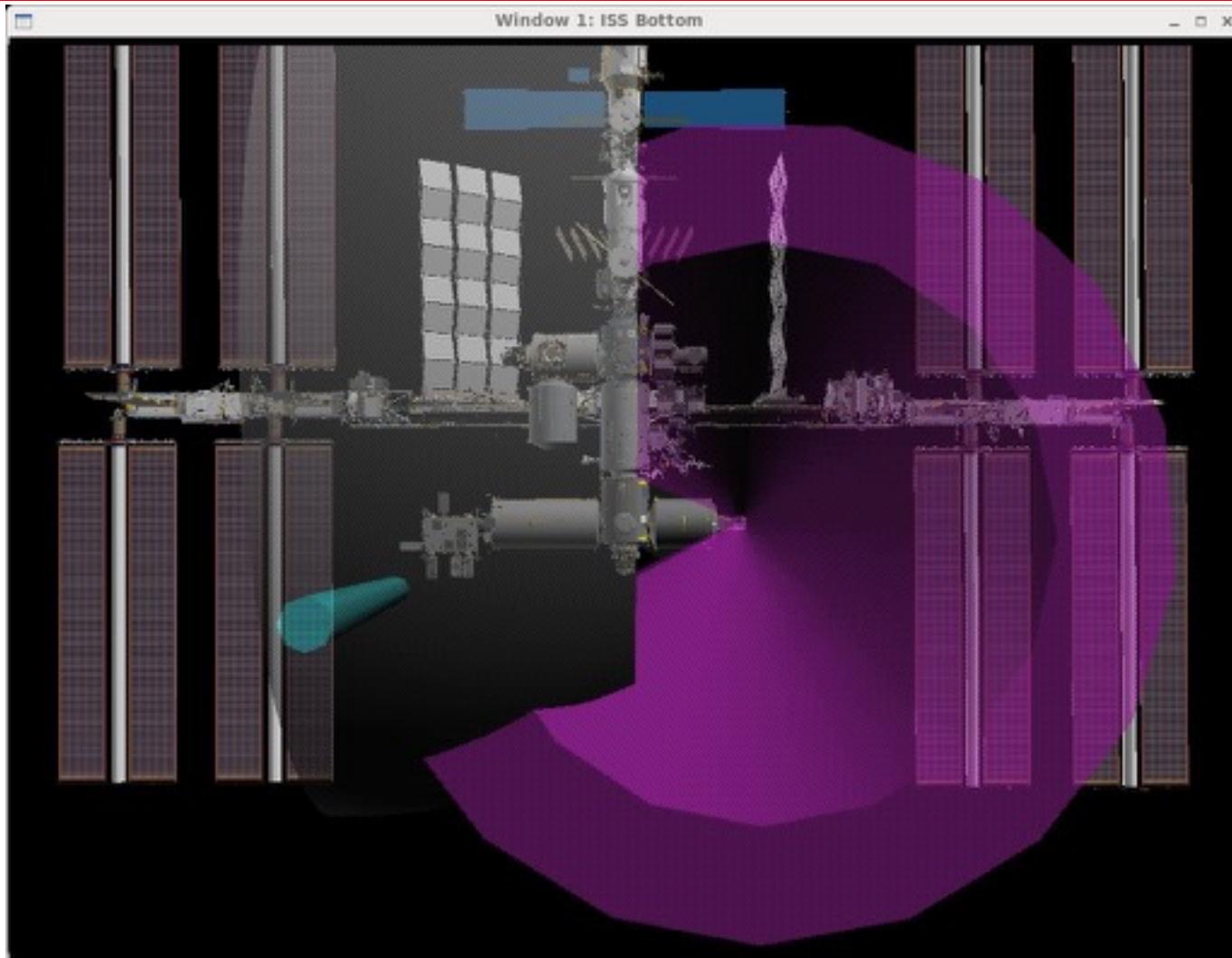


ISS External Hardware (cont.)



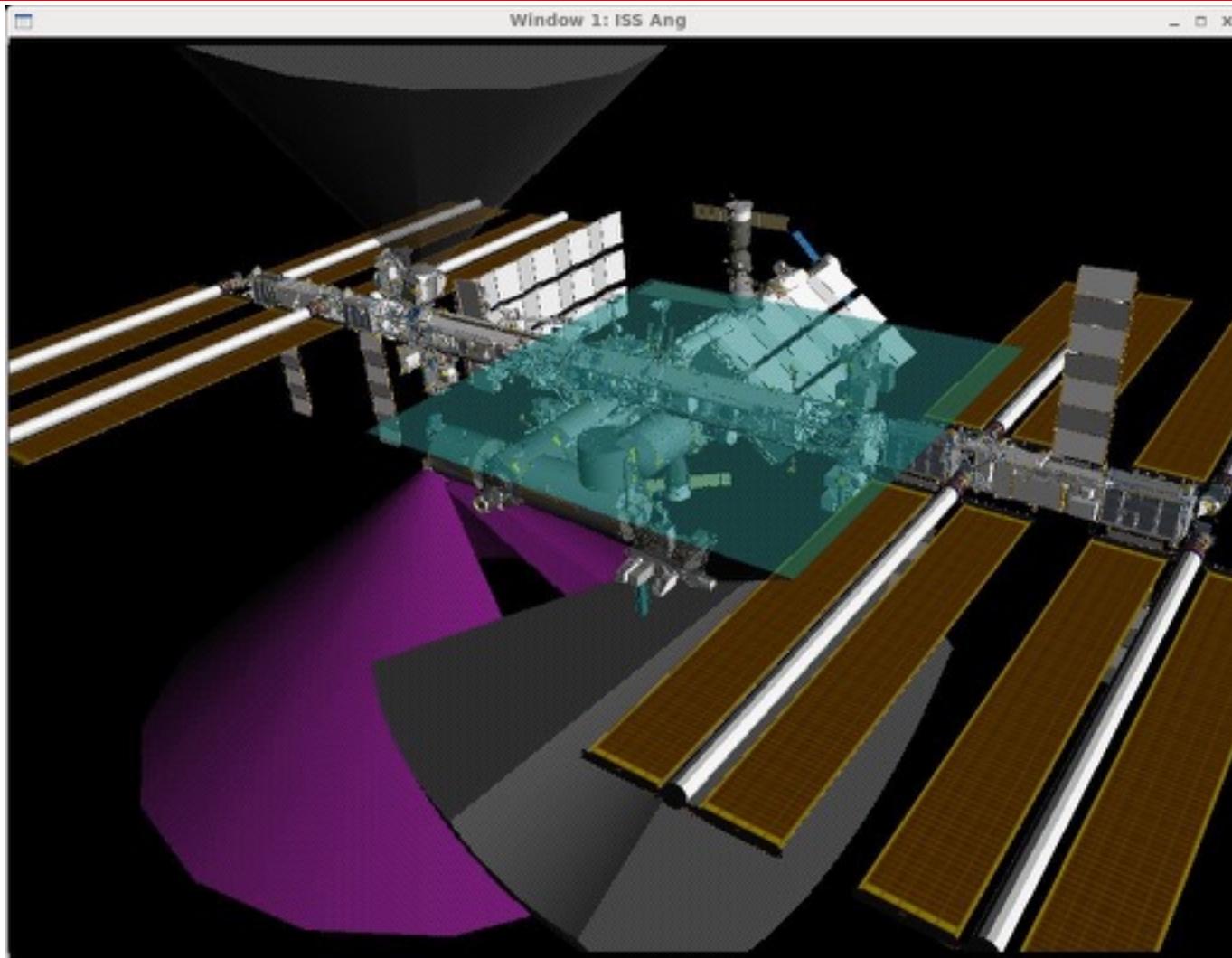


ISS External Hardware (cont.)





ISS External Hardware (cont.)





ISS External Hardware (cont.)



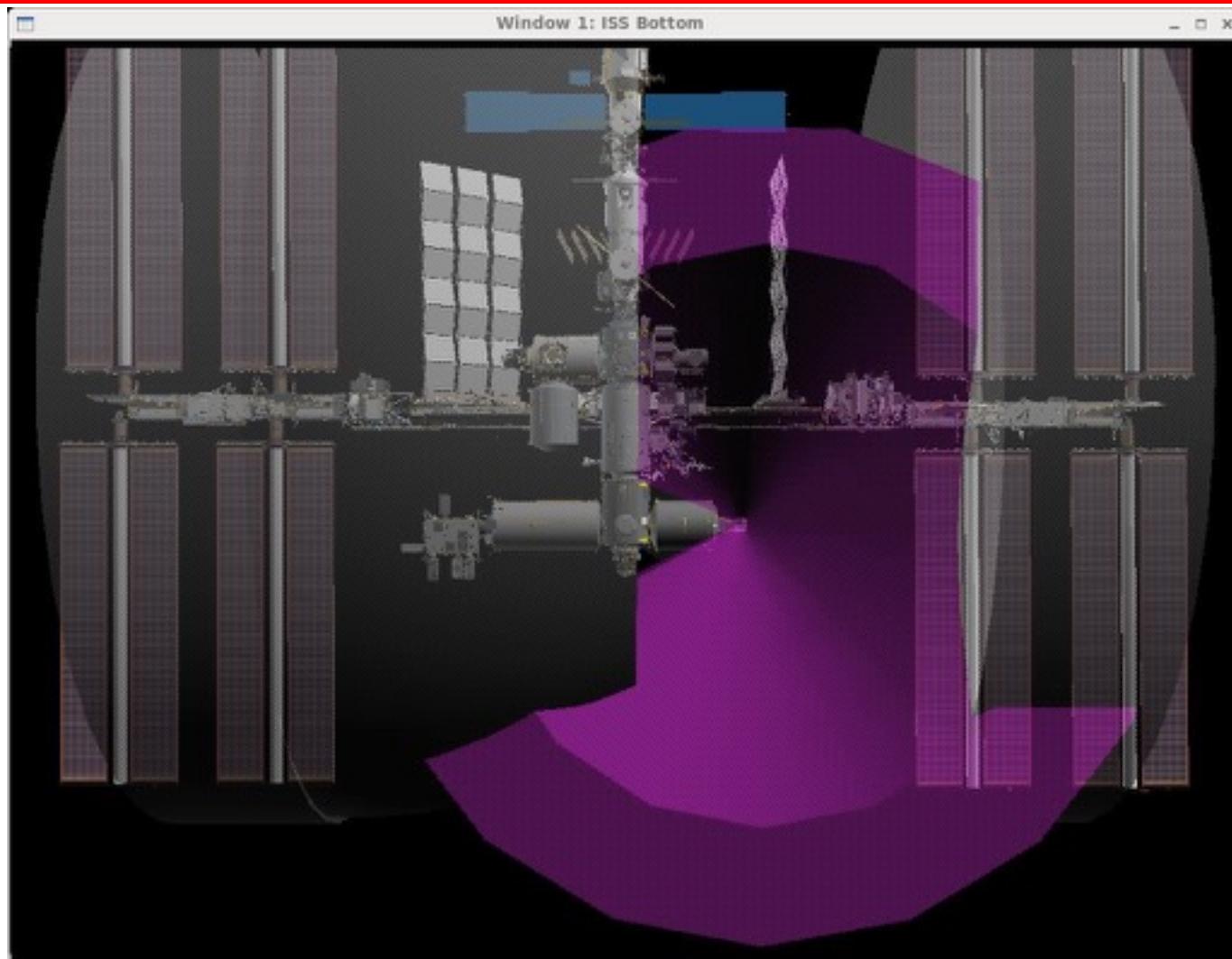


ISS External Hardware (cont.)





ISS External Hardware (cont.)





ISS External Hardware (cont.)

