



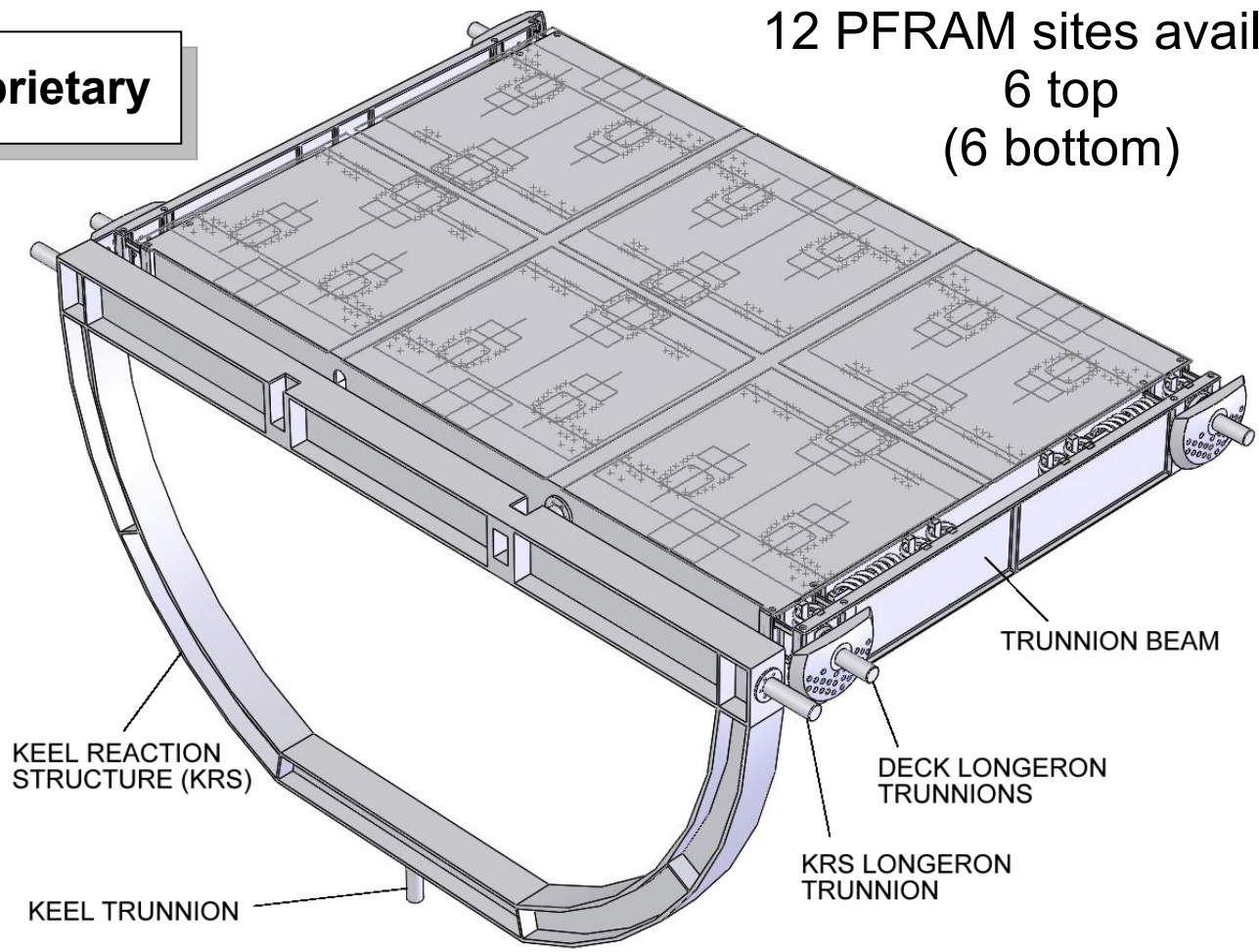
# ASD's Tranquility Isolated Carrier Concept



BLACKHAWK  
Management Corporation

ASD Proprietary

12 PFRAM sites available  
6 top  
(6 bottom)

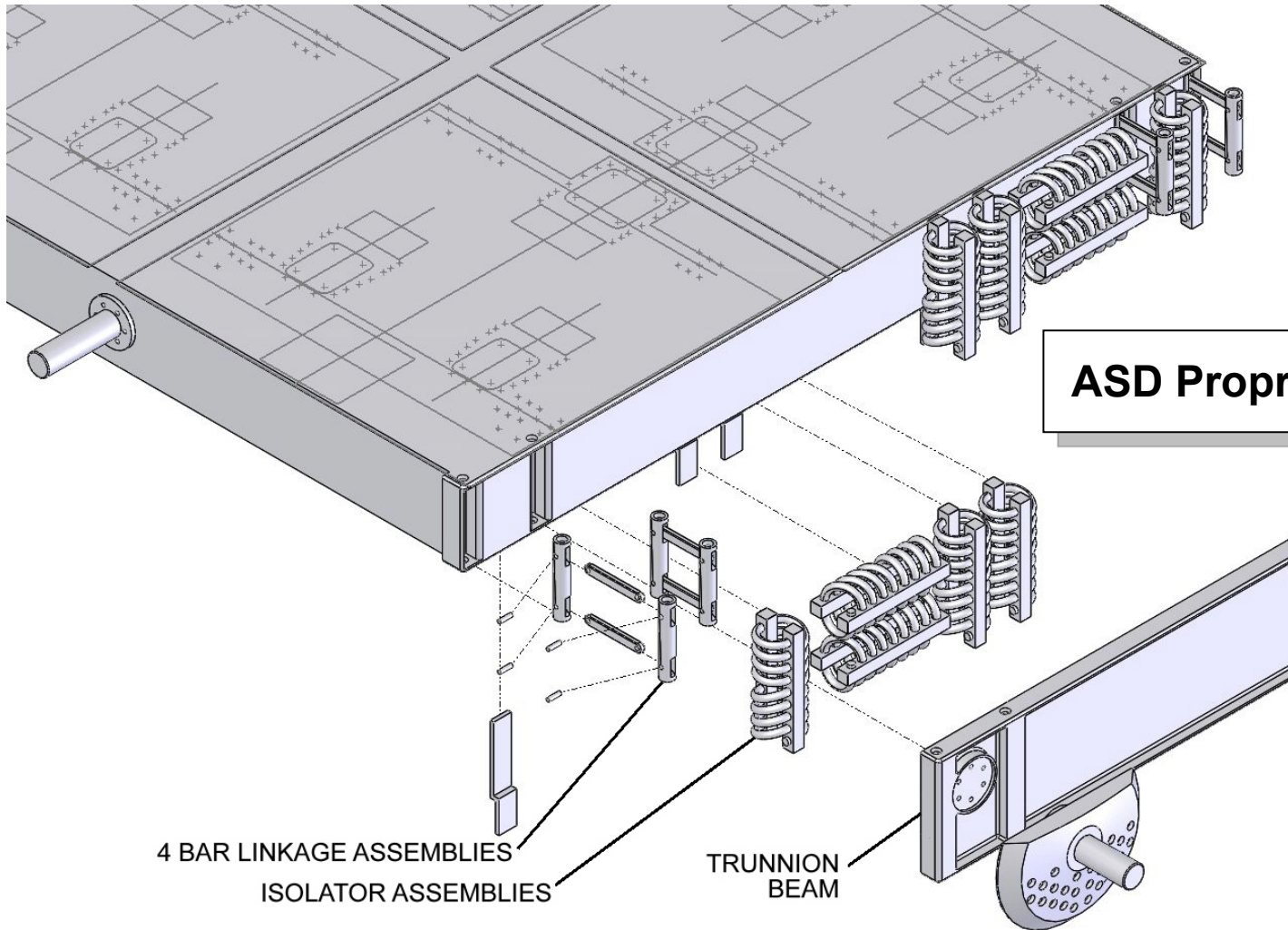




# ASD's Tranquility Carrier Isolation Detail



BLACKHAWK  
Management Corporation



**ASD Proprietary**

4 BAR LINKAGE ASSEMBLIES  
ISOLATOR ASSEMBLIES

TRUNNION  
BEAM



# Tranquility Isolated Carrier – Benefits Summary

- Program dedicated Unpressurized Logistics Carrier (ULC)
  - Alternative to present available carriers (saves \$\$\$\$ , manifest flexibility)
- Reduction of liftoff and landing transient loads and mitigation of structural borne random vibration via isolation
  - Easier certification for flight (saves \$\$\$\$)
    - Especially germane to station Orbital Replacement Units (ORUs)
  - Lower loads environment equals reduced spaceflight risks
- Reduced sensitivity of cargo elements and cargo items to late manifest and/or de-manifest of other cargo elements or items
  - Potential avoidance of Verification Loads Analysis (VLA) re-executions (saves \$\$\$\$)
    - Especially germane to late Launch on Need (LoN) ORUs
    - Reduces risks of not flying LoN ORUs due to analysis schedule or manifest specific LoN ORU load response



## Tranquility Isolated Carrier – Benefits Cont'd

- Integral Passive Flight Releasable Attach Mechanism (PFRAM)
  - Easier physical integration of cargo items (saves \$\$\$\$)
- Possible mitigation of cargo item math model correlation to modal test (saves \$\$\$\$)
  - Majority of energy “absorbed” by isolation suspension modes
- Complete cargo item structural response characterization via variational analyses (saves \$\$\$\$)
  - Easier LoN ORU certification for flight
- Robust (stiffness designed) carrier primary structure
  - No manifest specific carrier structural margins to address (saves \$\$ \$)