

SETP - SFTE Flight Test Safety Workshop

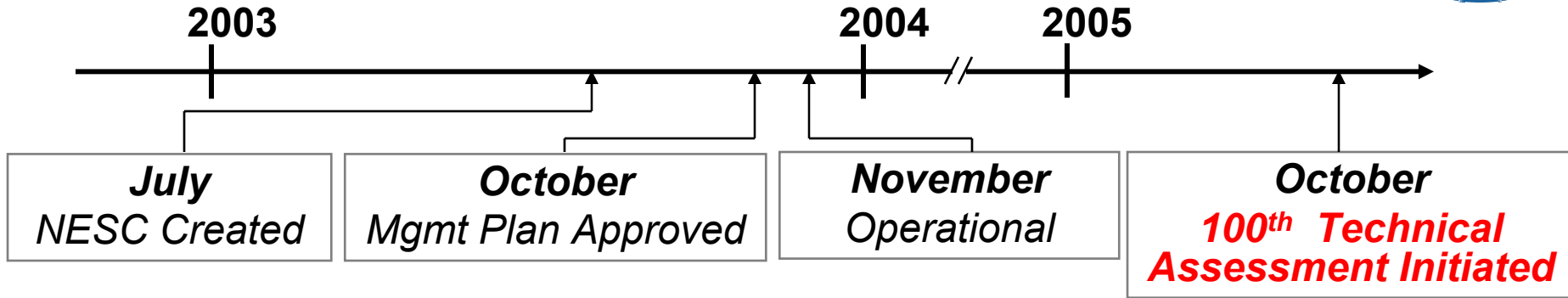
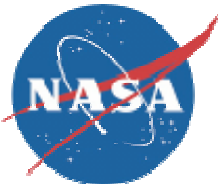
NASA Engineering & Safety Center (NESC)

**Kenneth D. Cameron
Deputy Director for Safety**

May, 2006

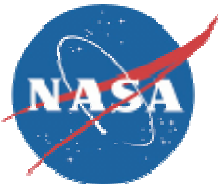


BACKGROUND



Initial NESC Leadership Team, Nov 2003

The NESC provides a strong technical team to coordinate and conduct robust, independent engineering and safety assessments across the Agency



BACKGROUND



Safety philosophy has 3 tenets:

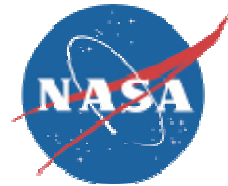
- Strong in-line checks and balances
- Healthy tension
- “Value added” independent assessment

NESC provides independent assessment of technical issues for NASA programs and projects

- Solving tough problems in a **reactive** mode
- Recognizing problems in **pro-active** mode

NESC is cultivating a Safety culture focused on **engineering and technical excellence**, while fostering an **open environment** and attacking challenges with **unequaled tenacity**

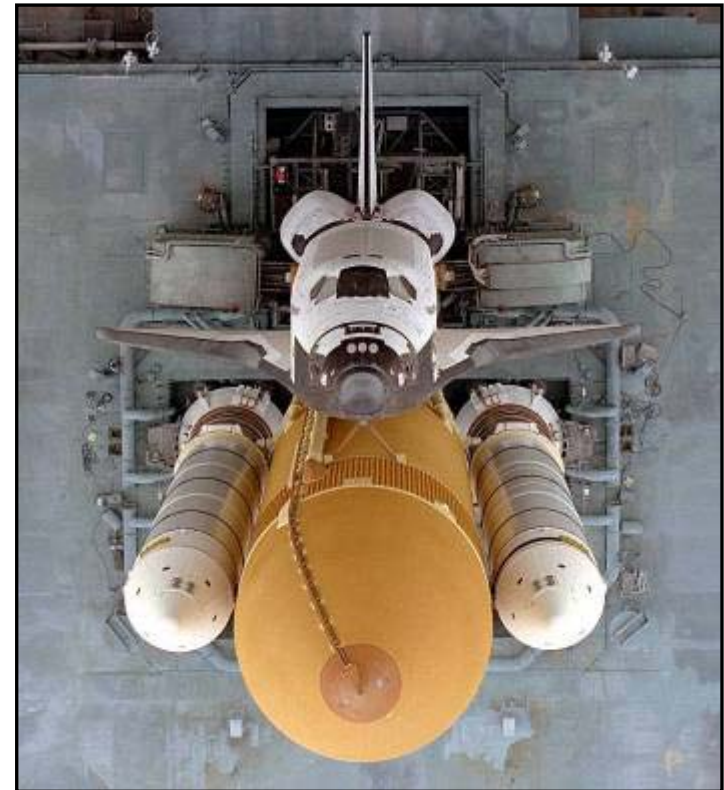
NESC MODEL



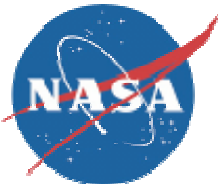
- Simple, straightforward concept – institutionalize the “Tiger Team” approach

Bring together some of NASA’s best engineers with experts from industry, academia, and other government agencies to address our highest risk, most complex issues

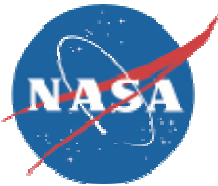
- Decentralized organizational structure across all Centers reporting to the NESC management office at LaRC
- Engineers need to be where the problems are to stay sharp
- **Be in touch** with Center Engineering, Programs & Projects, and S&MA
- Take **pro-active role** for NESC



Space Shuttle on Mobile Launch Platform



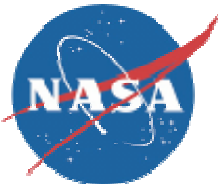
QuickTime™ and a
YUV420 codec decompressor
are needed to see this picture.



NESC MODEL (cont'd)

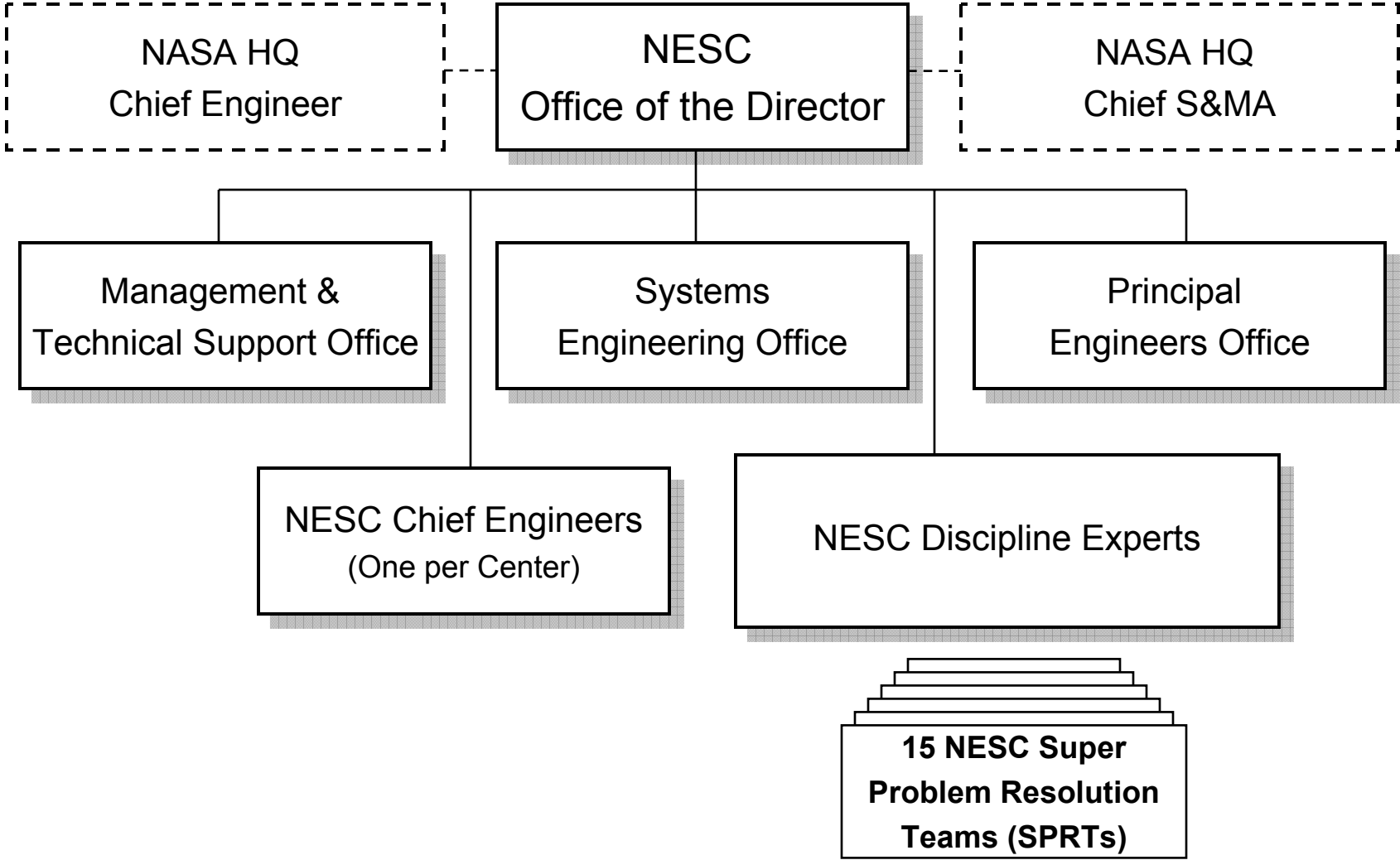
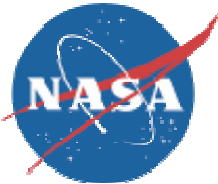
- Small core of engineering experts at Centers for insight into respective programs
- Recognized Agency discipline experts leading Super Problem Resolution Teams
- Use “ready” experts from across NASA, Industry, Academia and other government agencies to staff Super Problem Resolution Teams (SPRT)
- Tap “ready” experts to attack “trouble spots”. Institutionalize the Tiger Team approach - **Re-active Role**
- Strong Systems Engineering function for trending and identification of problem areas before failures occur - **Pro-active Role**



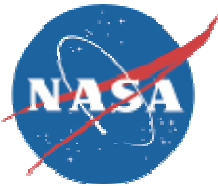


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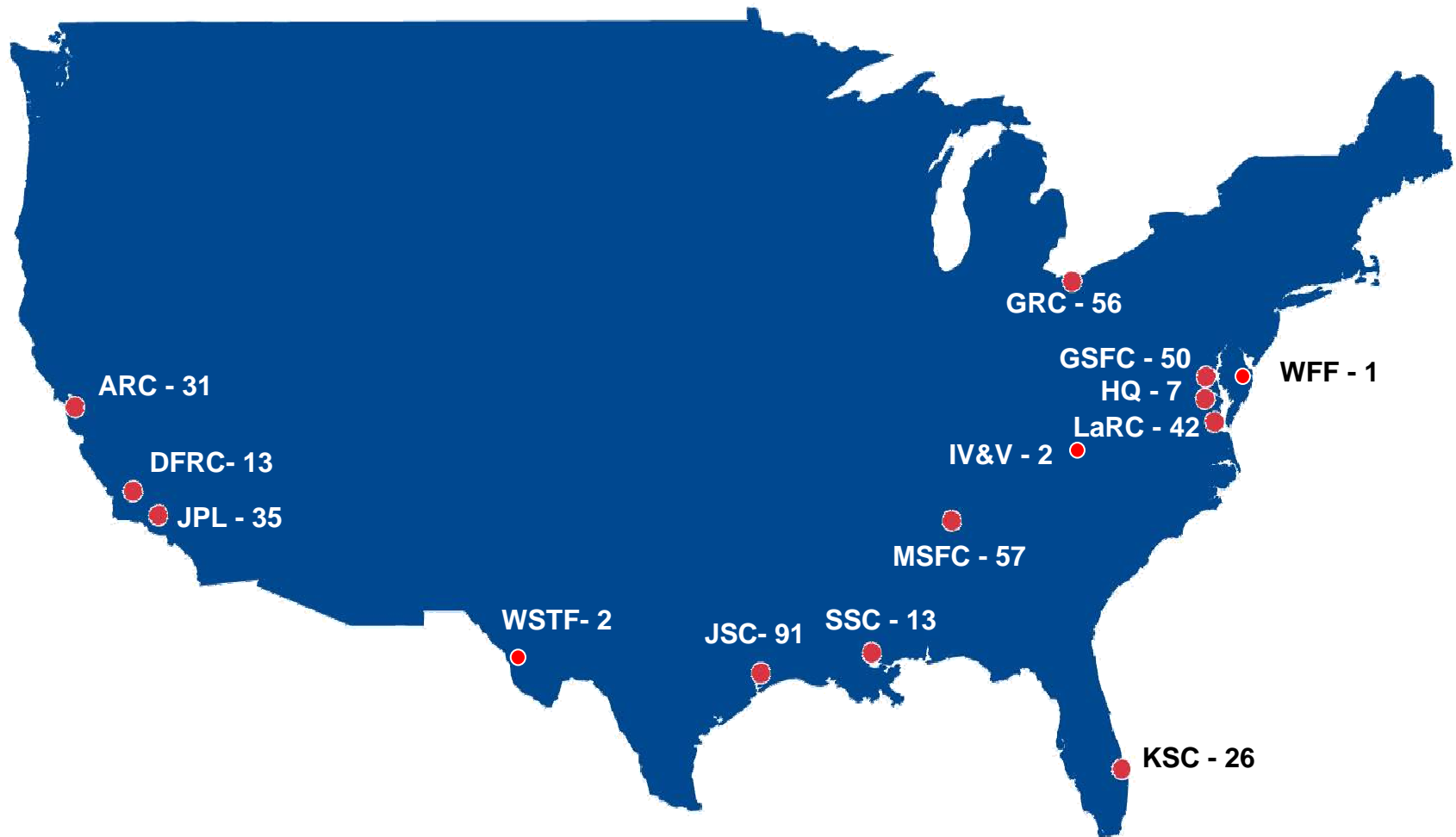
NESC ORGANIZATION



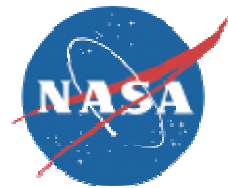
NESC ORGANIZATION (Continued)



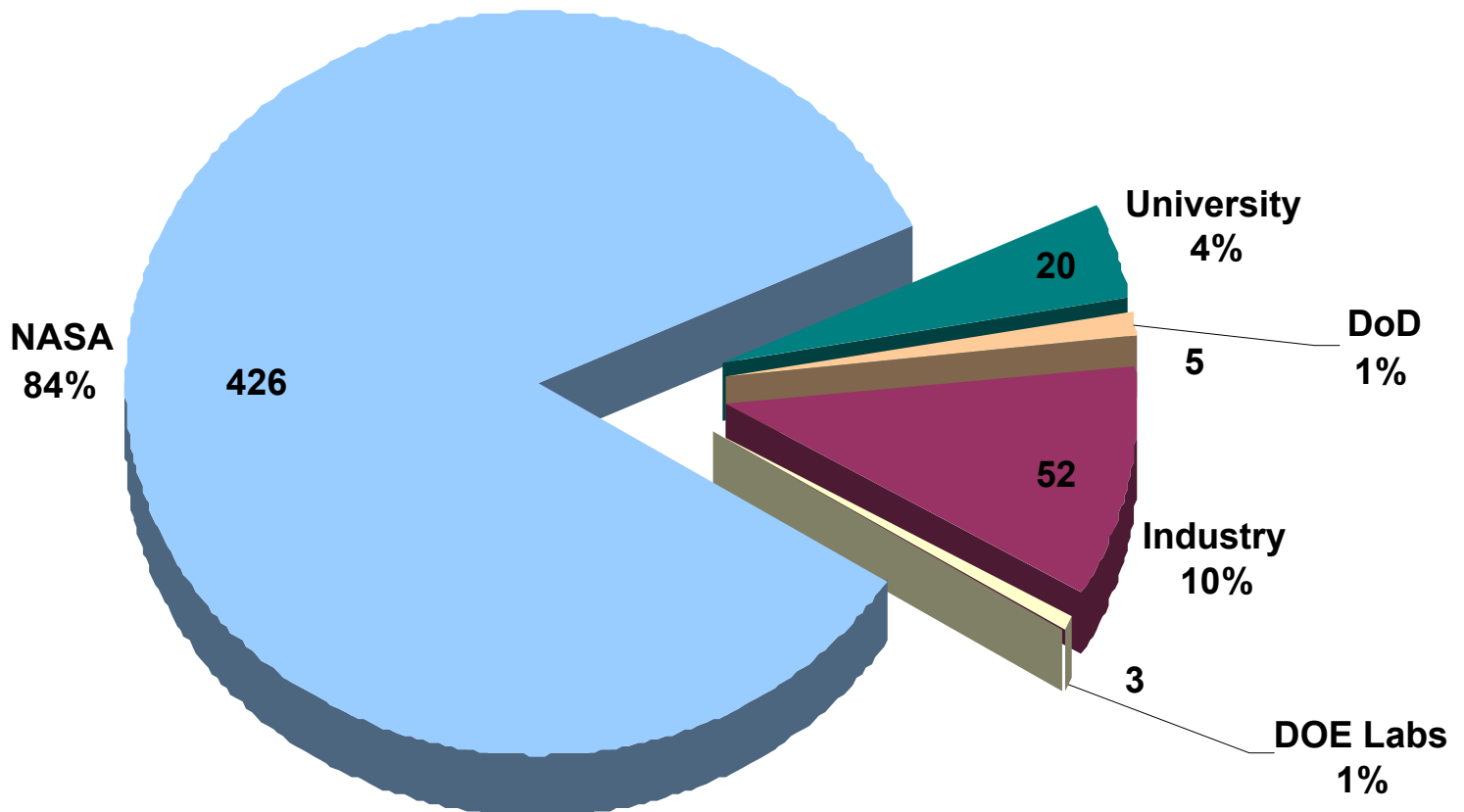
Locations of NASA Personnel Providing Matrix Support to the NESC



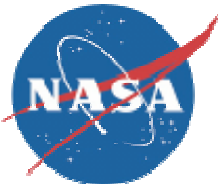
NESSC ORGANIZATION (Continued)



Composition of NESSC's Extended Network of Experts



PARTNERSHIPS / COLLABORATIONS



National Institute of Aerospace



Lawrence Livermore National Laboratories



Wedeven Associates, Inc.

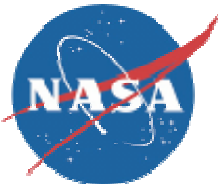


Institute of Nuclear Power Operations



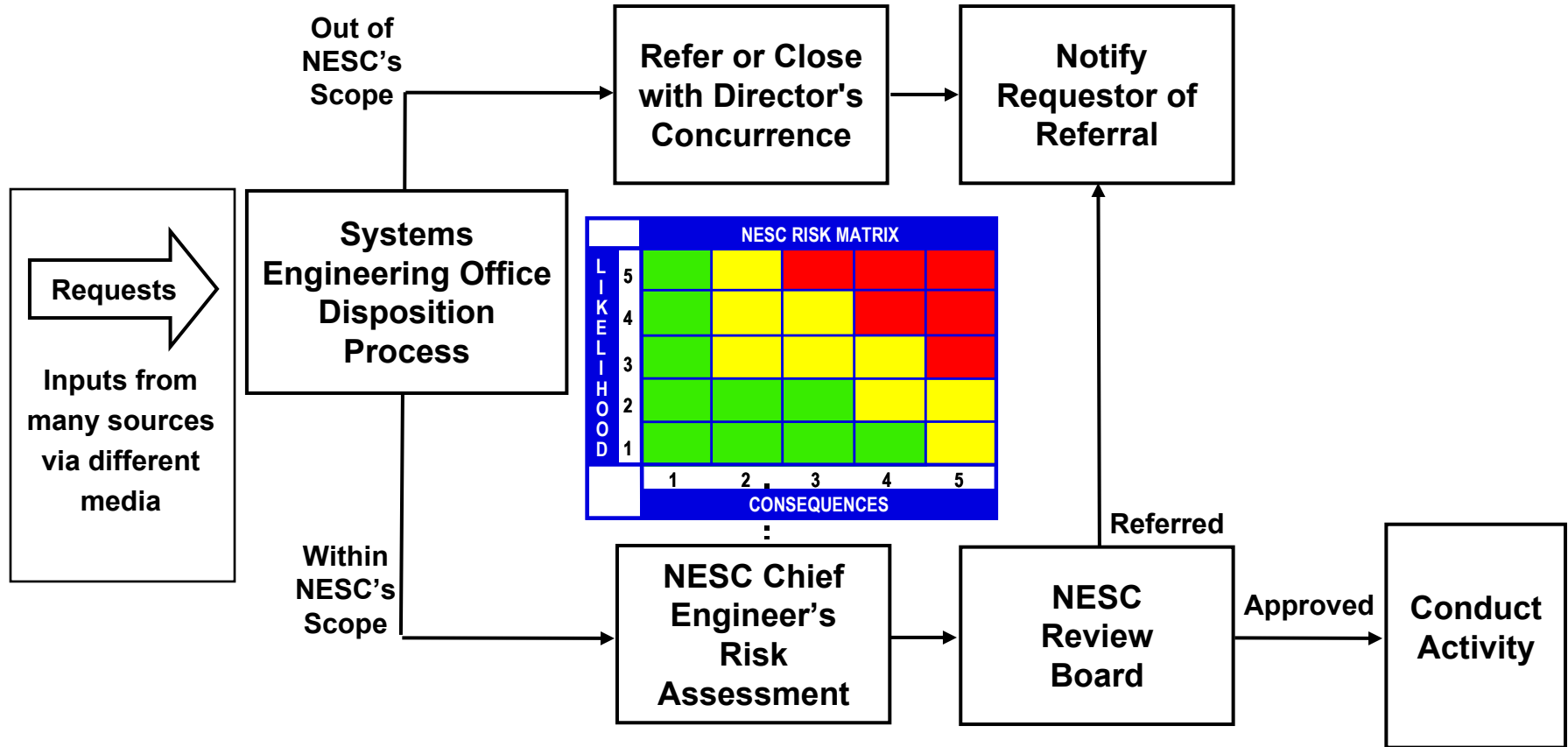
National Transportation Safety Board



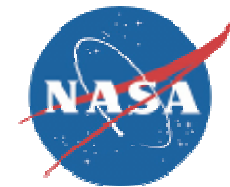


REQUESTS for NESC SUPPORT

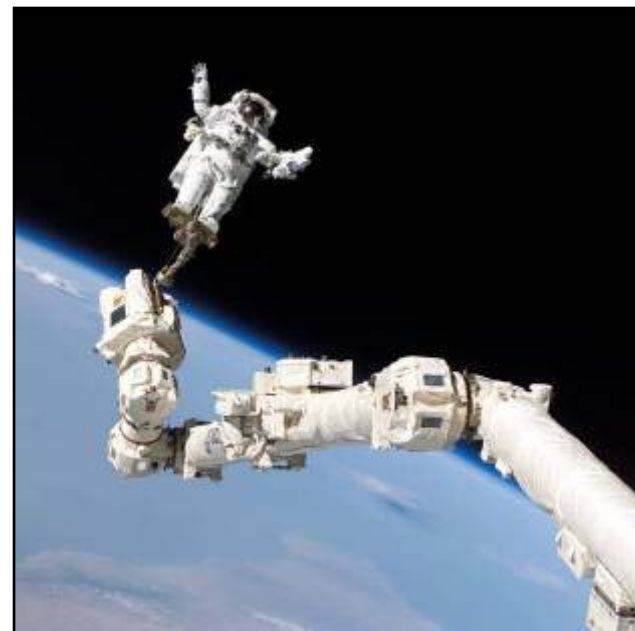
Selection and Approval Process



NESC CONTRIBUTIONS

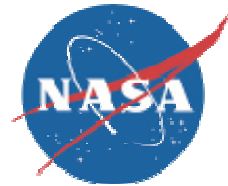


- The Agency has made a \$65M investment in the NESC
- NESC has contributed substantially to the mission success of NASA programs through many value-added technical assessments
- The most significant contribution of the NESC is the immeasurable benefit of bringing together NESC experts, from across all Centers, to assist Program experts in solving complex problems
- The results are:
 - Well-informed decision making
 - Stronger checks and balances
 - Better technical solutions



Steve Robison on 3rd EVA of STS-114 Flight

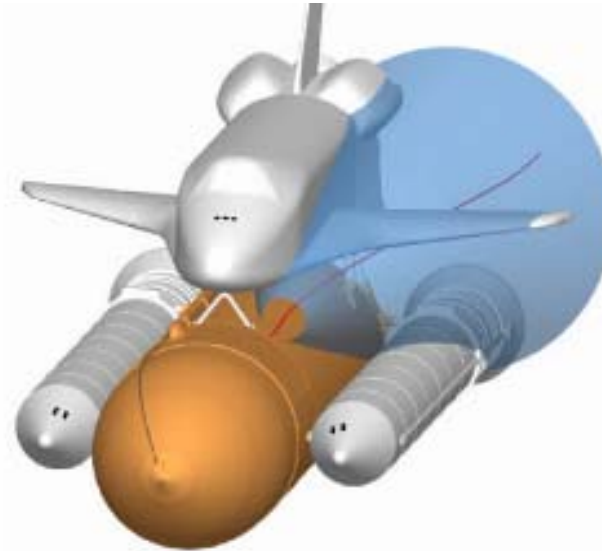
EXAMPLES OF NESCS VALUE-ADDED Return to Flight



Peer Review of Flight Rationale for Expected Debris



Debris Sources



Debris Transport

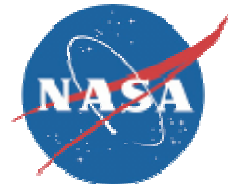


**Orbiter Thermal Protection
System Damage**

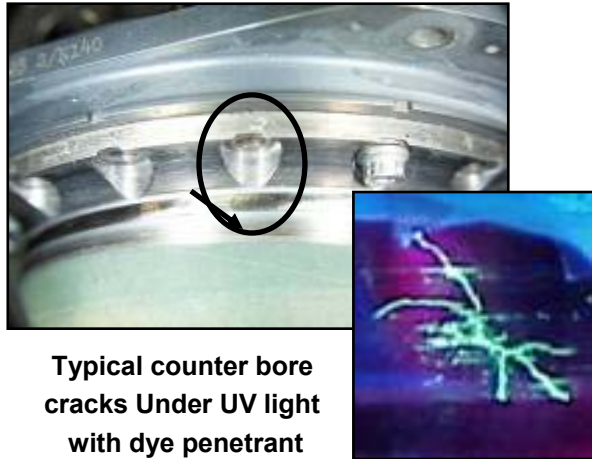


**Damage Assessment
Math Models**

EXAMPLES OF NESCS VALUE-ADDED Space Operations



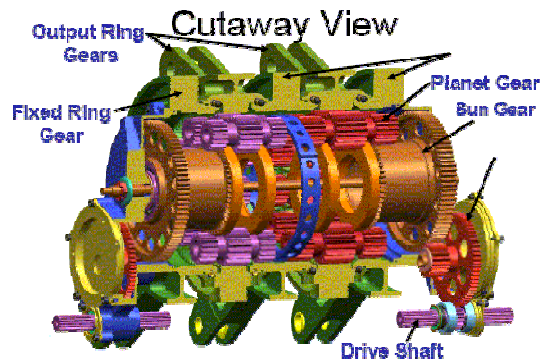
Reaction Control System Thruster Cracks



Wing Leading Edge (WLE) Attach Hardware Integrity



Rudder Speed Brake Actuator

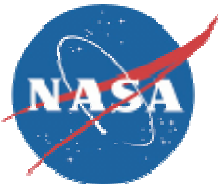


Cure-in-Place Ablative Applicator Tile Repair



EXAMPLES OF NESCC VALUE ADDED

Aeronautics, Exploration, Science, External



NASA Stratospheric Observatory for Infrared Astronomy (SOFIA) 747SP Aircraft



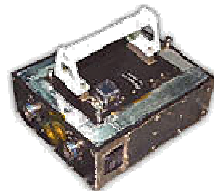
Cavity Acoustic Resonance

Advanced Seal Delivery System



Design of Flow Control Device to Eliminate Rudder Fatigue Cracking Due to Unsteady Flow and Loads

Hubble Space Telescope Life Extension



Rate Sensor Unit

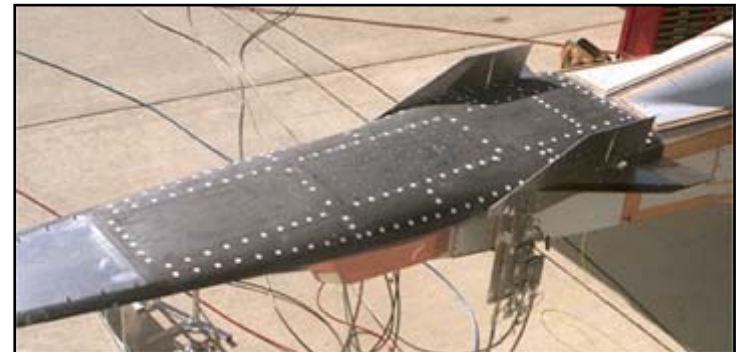


Nickel Hydrogen Battery Ground Test Unit



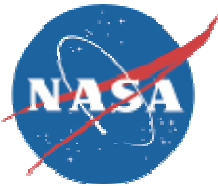
Fine Guidance Sensor

X-43A Research Vehicle

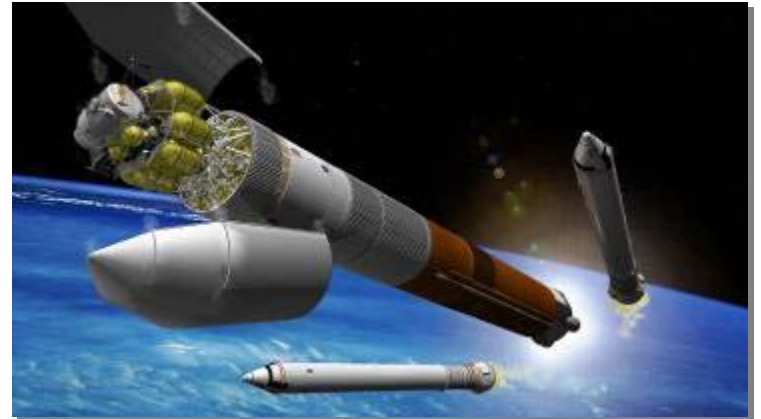


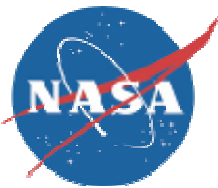
X-43A Rudder Shaft Incident

SUMMARY



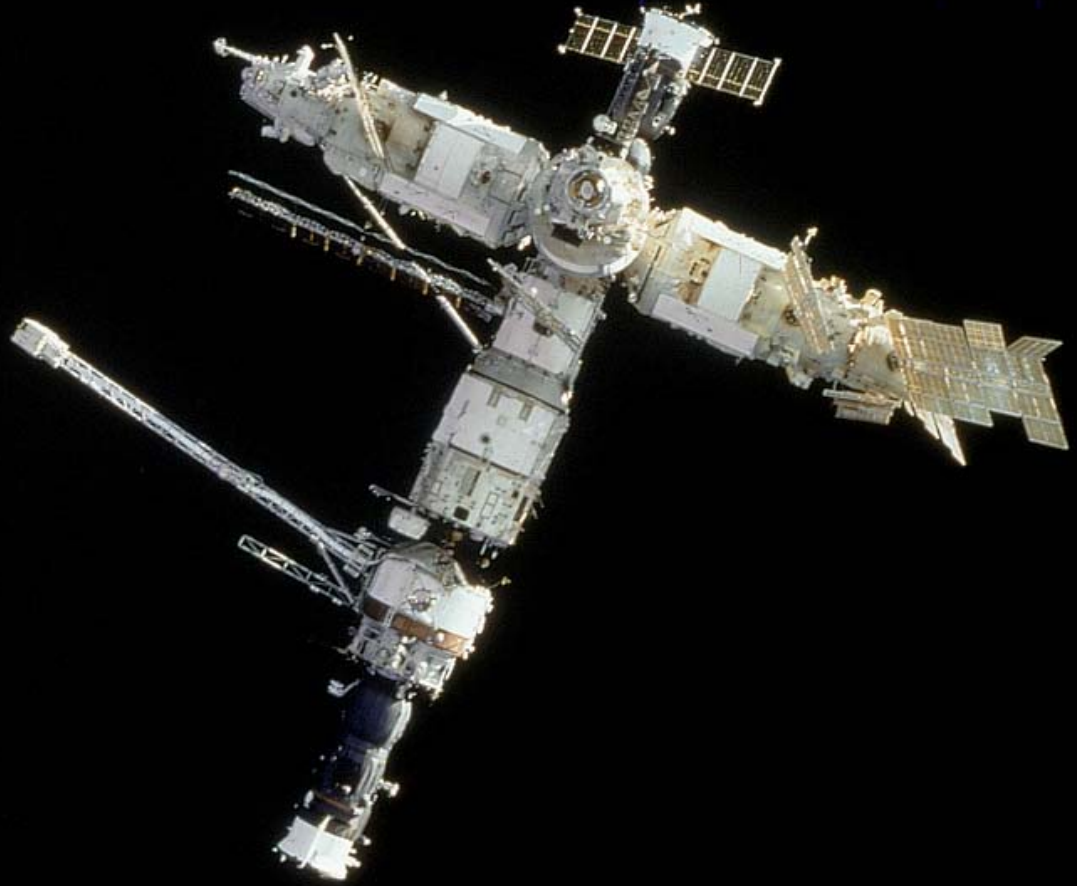
- The NESC has built a strong technical team to be used as a NASA-wide technical resource.
- The NESC is an investment in technical excellence and safety.
- NESC would like to encourage broad participation from national experts on our teams.
- Learn more about NESC @ ***nesc.nasa.gov***



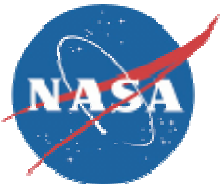




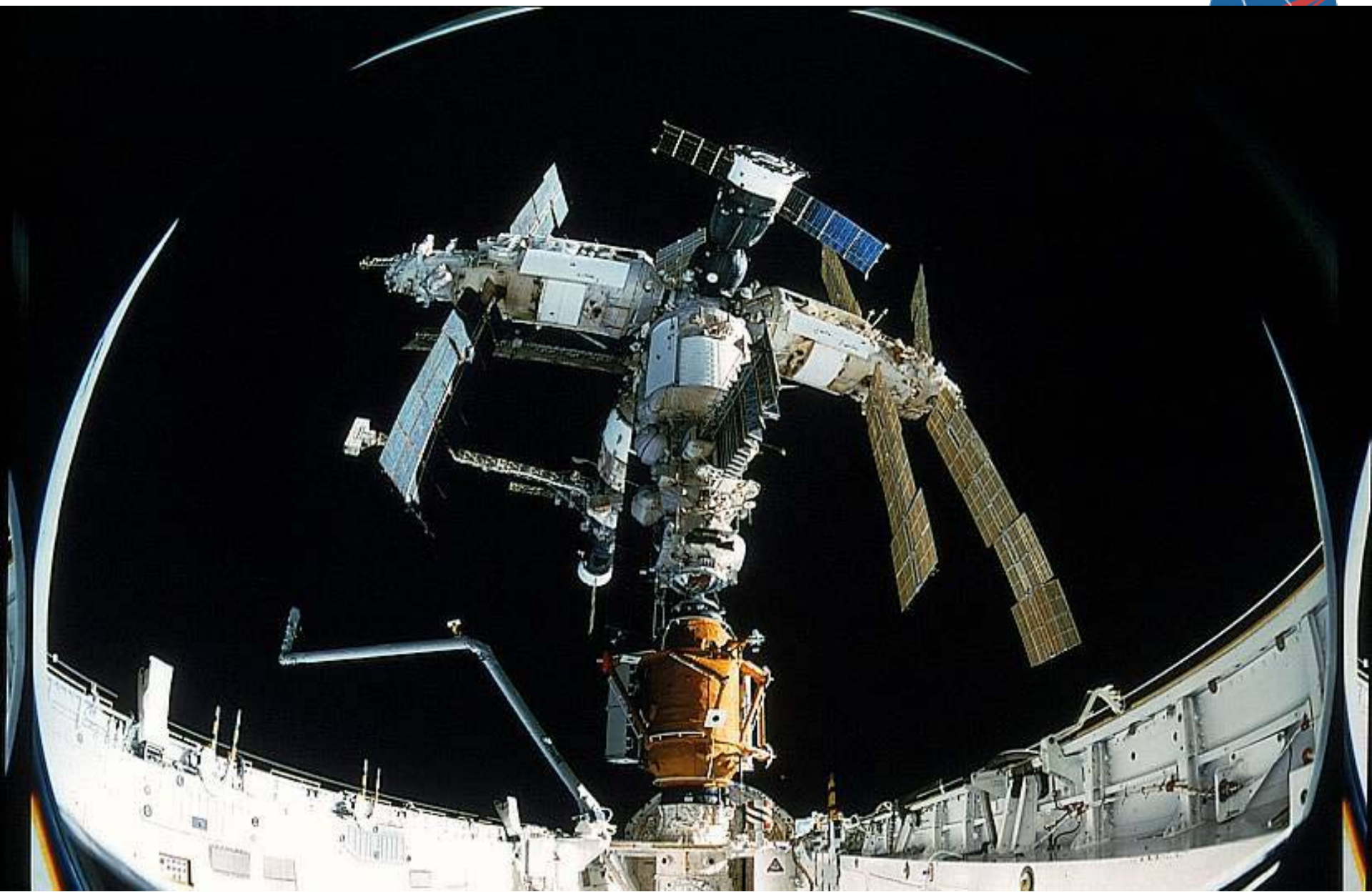


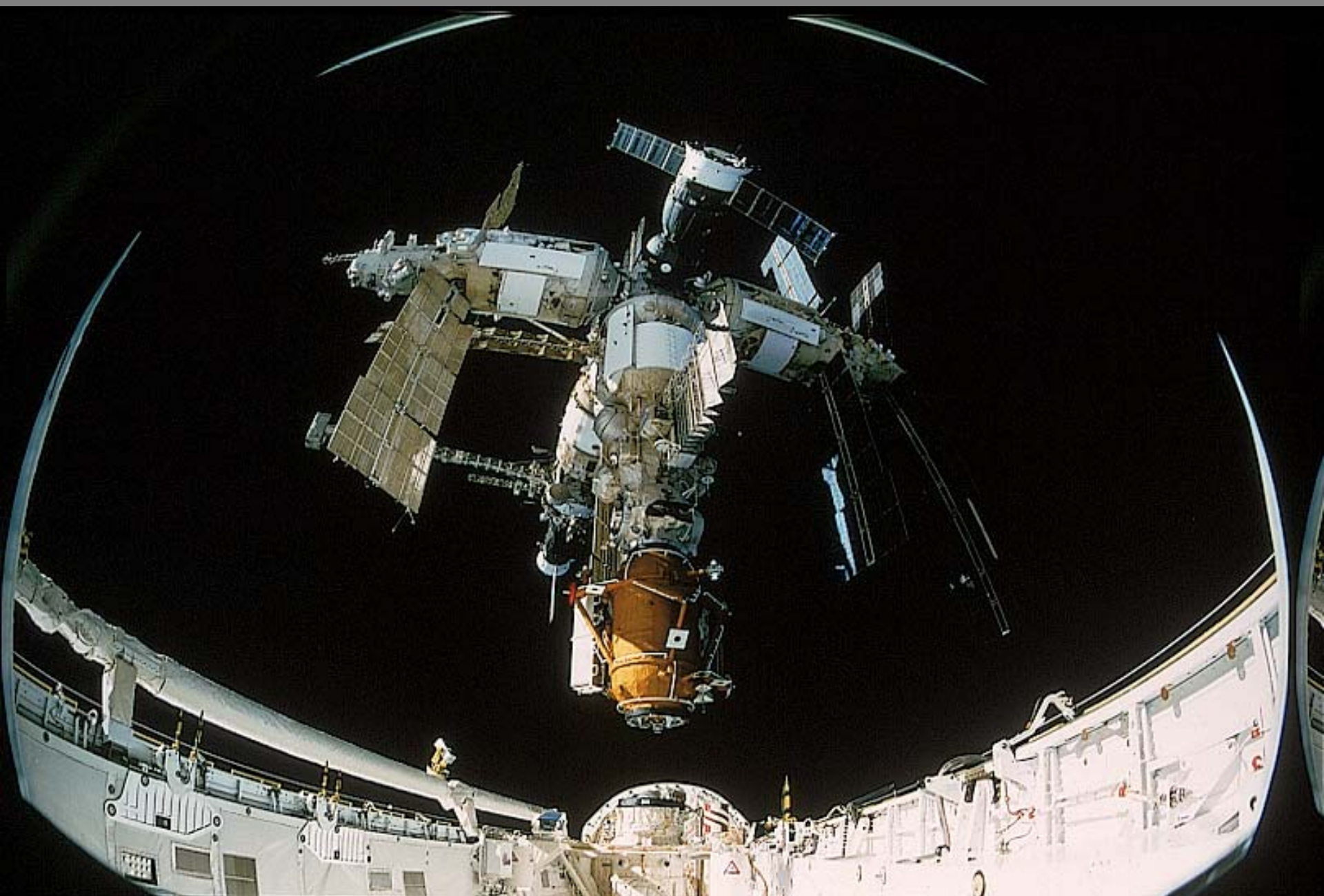




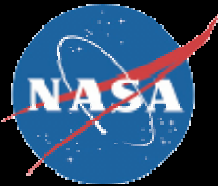












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