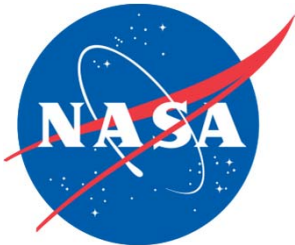




THE NASA COMMERCIAL CREW PROGRAM (CCP)
SHARED ASSURANCE MODEL FOR SAFETY



JAXA AQAS 2014
Paul Kirkpatrick
Deputy Chief S&MA
Officer for CCP



Greetings



- ❖ Mr. Terry Wilcutt
 - Chief, Office of Safety and Mission Assurance, NASA Headquarters

- ❖ Mr. Nathan Vassberg
 - Chief S&MA Officer, Commercial Crew Program, Johnson Space Center

- ❖ Ms. Kathy Leuders
 - Program Manager, Commercial Crew Program, Kennedy Space Center

Overview



- ❖ NASA established the Commercial Crew Program in order to provide human access to the International Space Station and low earth orbit via the commercial (non-governmental) sector.
- ❖ A particular challenge to NASA is how to determine the commercial provider's transportation system complies with Programmatic safety requirements while at the same time allowing the provider the flexibility to demonstrate compliance.
- ❖ This will be accomplished through the use of Shared Assurance and Risk Based Assessment by NASA thus shifting more responsibility to the Provider. This model will be the focus of this presentation.

Safety Requirements



- ❖ S&MA Agency requirements owned by the Technical Authority
 - Flow-down and implementation owned by CCP
 - Management of risks
 - Primary S&MA document is NPR 8705.2, “Human-Rating Requirements for Space Systems”
 - Basis of CCP Certification requirements
 - Developed through iterative process by both NASA and Space Industry
 - S&MA is a stakeholder not owner
 - 78 of approximately 300
 - CCP determines compliance with advice of S&MA
 - Disagreements
- ❖ Loss of Crew/Loss of Mission (LOC/LOM)
 - Consistent with NASA’s goals and thresholds
 - Part of overall certification process
 - Values represent effort to increase safety of the system relative to Space Shuttle
- ❖ Compliance with ISS requirements

Hazard Report Review Process



- ❖ Provides 45 day review process
 - Pre-defined review team to determine acceptability
 - Multi-discipline Core Review Team
 - Core Team comments consolidated, reviewed and coordinated with the ISS SRP
 - Results sent to Provider for updating of material prior to Review
 - Provider presents to STRB/SRP

- ❖ Delegated authority from PCB to approve Hazard Reports
 - Demonstrate compliance
 - No increase in Program risk

- ❖ Initial review of safety variances
 - Recommendation to PCB



Shared Assurance

- ❖ Once the Provider's Hazard Reports are approved, CCP will implement a Shared Assurance model

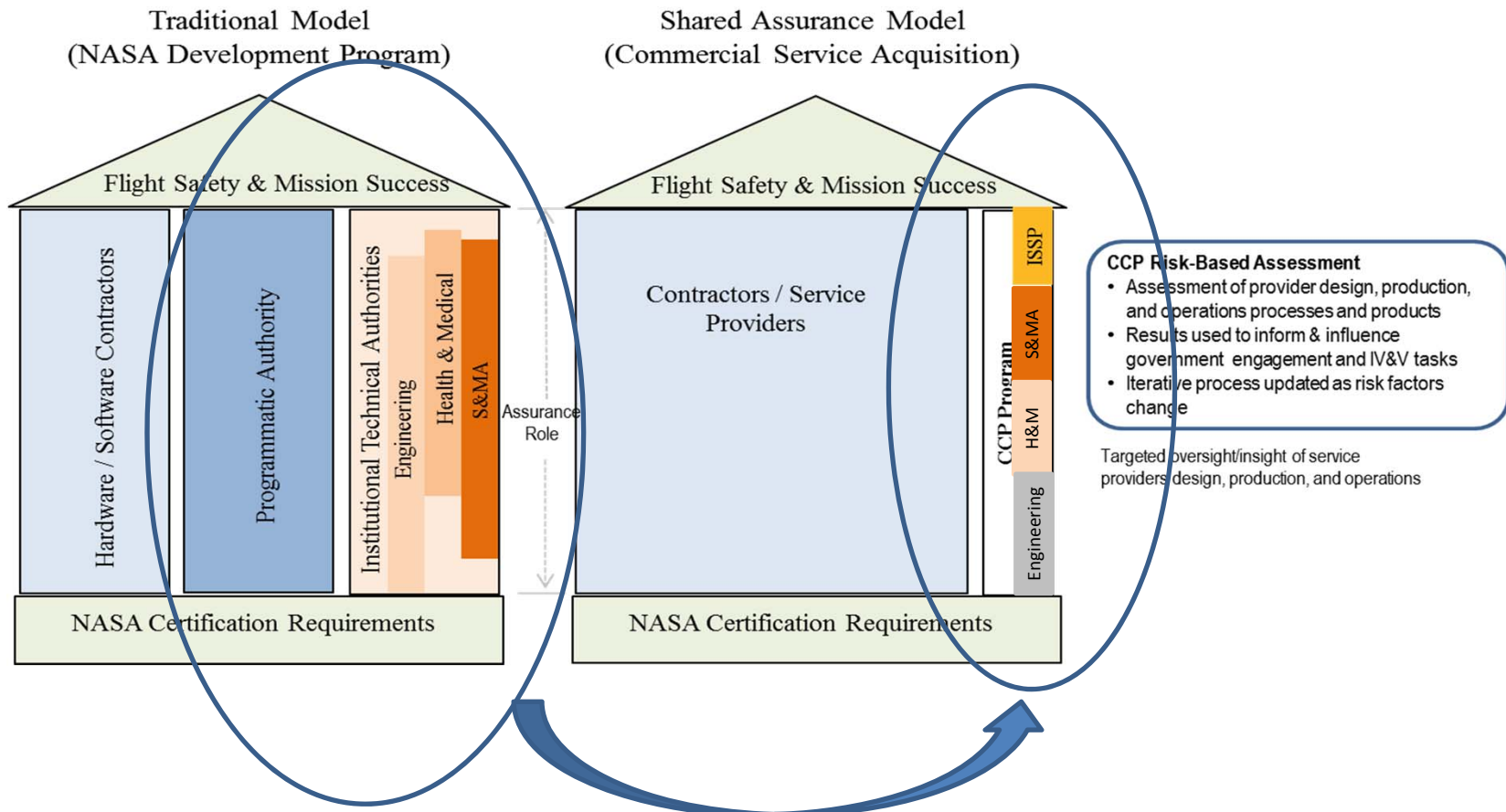
- ❖ Shared Assurance
 - Risk based decision making
 - Identify and allocate resources
 - Minimize organization overlap

 - Relies on other organizations for assurance
 - Eliminates duplication of effort
 - Confidence in other organization's personnel

 - Does not replace S&MA
 - Allows S&MA to focus limited resources in higher risk areas

- ❖ Shifts role of certification more to Provider
 - Away from traditional NASA "approval"
 - Service not hardware

Traditional Assurance vs. Shared Assurance



How to get from Traditional to Shared Assurance Model:
Risk Based Assessment





So how does RBA really work?

- The RBA uses “scoring sheet” to assess the risk related to each hazard report verification statement
- The scoring considers many aspects of risk:
 - Likelihood of Failure
 - Design Complexity
 - Design Maturity
 - Past Performance
- Once the risk assessment is done as part of the HR review, the output is a Risk Ranked Verification List
- The Surveillance activity will then be grouped
 - Witness Process (GMIP)
 - Examine Product
 - Audit
 - Record Review
- Using the risk ranking and the surveillance designation, the real surveillance activity can then be distributed across organizations – not all done by S&MA
- Informed by the RBA, Shared Assurance will result in two things
 - Risk driven Surveillance Activity
 - Elimination of Overlap between S&MA and other organizations

Risk Based Assessment (RBA)



❖ Risk Based Assessment Methodology

- Based on approved verifications in Phase II Hazard Reports
 - This makes the safety review process critical to the success of RBA
- Risk ranking of each verification
 - ??????
- Drives surveillance model
 - Insight?
 - Oversight?

Summary



We feel with the processes here the Commercial Crew Program and the Safety & Mission Assurance Technical Authority will be well positioned to assure that the Commercial Providers are complying with the applicable safety requirements including LOC/LOM.

Q U E S T I O N S ?