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CST-100 STARLINER: Boeing's Commercial Crew Program

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Boeing’s Commercial Crew Program
John Mulholland,
Vice President and Program Manager
2018 Space Congress
CST-100 Starliner Spacecraft
- Flight-proven systems with high-technology readiness level
- Re-usable crew module, expendable service module
- All test and flight spacecraft fielded or in build

United Launch Alliance Atlas V Rocket
- 75 successes and counting!
- Proven rocket significantly reduces system risk; unparalleled schedule assurance; 100% mission success
- Human-rating of Space Launch Complex 41 at Cape Canaveral Air Force Station nearing completion

Mission Operations
- Integrated with the world’s experts on mission control: NASA Flight Operations Directorate

Ground Processing Operations
- Commercial Crew and Cargo Processing Facility modernized at NASA’s Kennedy Space Center
- Lean production based on Boeing’s commercial approach
- Integration testing and quality processes based on space shuttle and International Space Station approaches
BUILDING: Flight crew modules and service modules in production at NASA’s Kennedy Space Center.

TESTING: Subsystem and system testing at Boeing and supplier facilities across the U.S.

TRAINING: Mission simulations and training taking place at NASA’s Johnson Space Center.

INTEGRATING: With NASA’s existing operational model for spacecraft visiting the International Space Station.
SPACECRAFT INTEGRATED BUILD AND TEST

Structural Test Article
- Modal survey; FEM validation
- Structural integrity
- Separation system performance

Service Module Hot Fire Test Vehicle
- Demonstrate integrated propulsion system performance and system dynamics

Pad Abort Test Vehicle
- Ground Verification Testing
- Demonstrate the abort system performance

Orbital Flight Test Vehicle
- Demonstrate complete orbital mission to International Space Station
- Processed for Post Certification Mission-1

Crew Flight Test Vehicle
- Electromagnetic compatibility
- Thermal vacuum and acoustic environment
- Demonstrate complete orbital mission to International Space Station with crew on board
- Processed for Post Certification Mission-2

Three Flight Test Service Modules in Build
LAUNCH VEHICLE AND INFRASTRUCTURE

- Major components for test flights and missions in production
- Crew Access Tower, Crew Access Arm and Emergency Egress System installed at launch site
TESTING

- Structural verification
- Wind tunnel
- Rescue and recovery
- Contingency water landing
- Land landing qualification
- Launch abort and reaction control system
- Parachute and deployment sequence
- Starliner docking system
- Autonomous docking and software
TRAINING

- Rehearsal simulations of all mission phases with NASA Flight Ops and Astronaut Corps
- Spacesuit production and testing
- Training system development, installation and implementation
- Paper and on-console simulations
FOCUS: Integrating with NASA as our flagship customer; detailed Verification and Certification process

FUTURE: Passenger flights to and from low-Earth orbit destinations, carrying international and corporate astronauts, scientists, researchers, educators and tourists