Charting a Course for the Future of Robotics in Space

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Paths Converging Towards Increased Autonomous Robotic Solutions

- Removes human error in production
- Reduces injury from repetitive activities
- Eliminates human exposure to manufacturing dangers
- Achieves affordability

- Costs
- Complexity
- Danger
- System limitations

Unmanned Systems:
- Mitigate danger
- Lower costs
- Increase endurance
- Remove physical limitations
Pioneering Critical Robotics Autonomy With UAVs Today

Triton & Global Hawk: Truly Autonomous

UCAS X-47B: Autonomous Carrier Operations & inflight refueling today
Aerospace & Medical Industry Advancing Robotics

Robotic F-35 Fuselage Assembly Stations

Photo Credit: John R. Chew, Medical Photograhper, WRNMMCBethesda

http://www.army.mil/media/279617
The James Webb Space Telescope
Largest Self Assembling Space System Ever
Future Astrophysics Need Bigger Mirrors

- Incremental assembly enables early utility
- Progressively evolved enlarged mirrors increases capability
Manufacturing & Assembly In Space

- Reduces exposure to atmosphere, moisture and gravity
- Avoids launch loads
- Remove size restrictions

On Orbit Manufacturing & Assembly

All Robotic in Situ Production

Human / Robotic in Situ Production Mix
Blending Autonomous Air/Space Systems to Achieve Maximum Exploration Effectiveness

LEAF
Lifting Entry / Atmospheric Flight vehicle
• Use of robotics in space is accelerating due to:
  - Significant investments in robotics that are converging in Aircraft, Medical systems and Manufacturing & Assembly arenas and are being leveraged by space
  - Mission requirements
  - Affordability
THE VALUE OF PERFORMANCE.

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