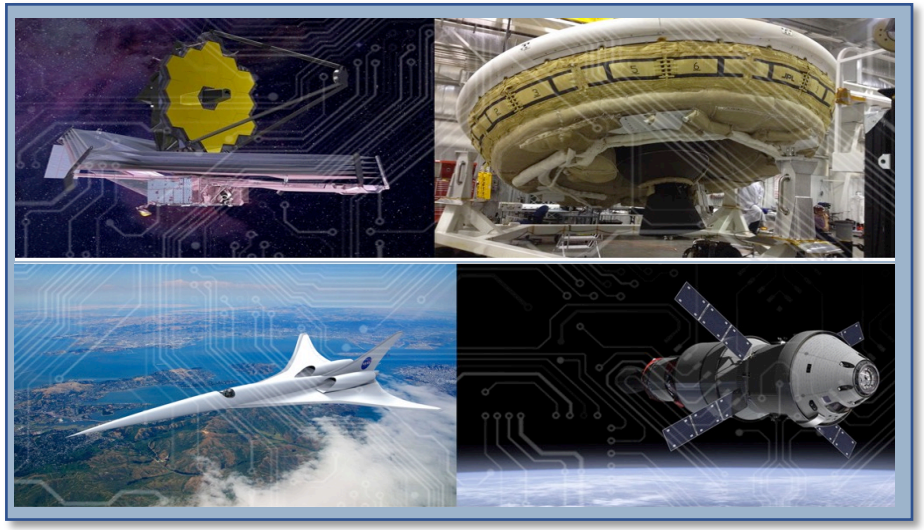
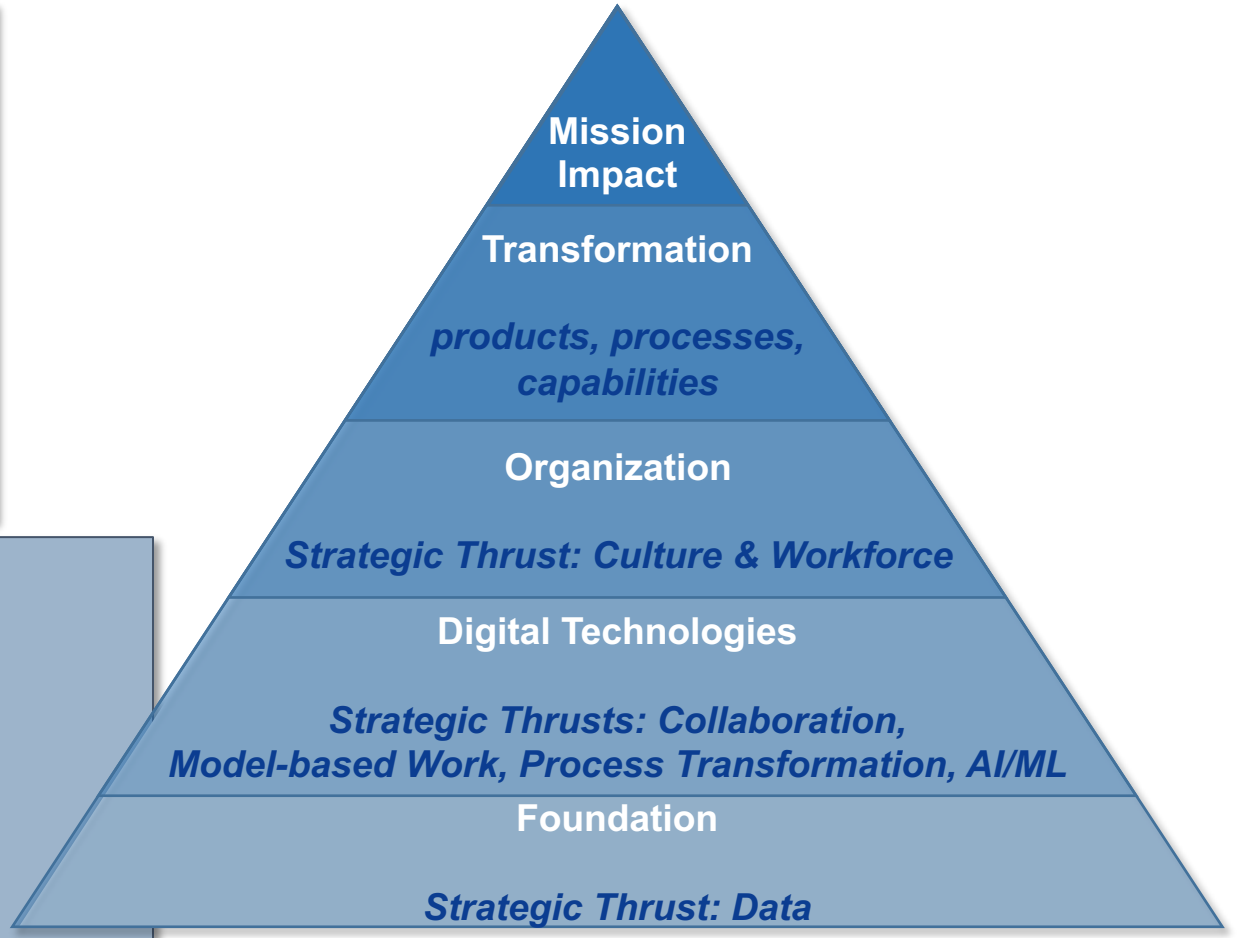
NASA Digital Transformation and Digital Twin
AIAA SciTech

John Vickers, Principal Technologist | 01.07.20

NASA Digital Transformation Initiative

Dramatically enhances NASA's mission impact by engaging digital convergence by reinventing mission and mission support processes, products, and capabilities





Approach: Catalyze DT

- Developing enterprise DT strategy and roadmaps
- Supporting stakeholder implementation of roadmap projects
- Sponsoring/co-sponsoring pilot projects
- Brokering DT partnerships
- Advocating for DT and disseminating DT knowledge
- Tracking the state of DT across Agency

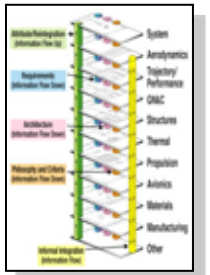
Digital Twin

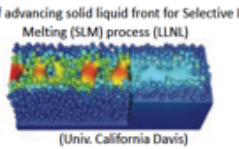
Desired Future State

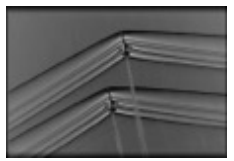
- Data <u>Can Be</u> Integrated and Automatically Couple the Virtual and Physical
- Digital Twin – Digital representation of a physical process/system/object
- Digital Pipeline – Communication framework that allows a connected data flow

Digital Transformation Major Trends

- ✓ Industry 4.0
- ✓ MGI/ICME
- ✓ Digital Twin / Digital Thread
- ✓ Big Data / Data Analytics
- ✓ AI / VR / AR
- ✓ Robotics / Autonomous Systems
- ✓ Model-based Engineering (MBx)
- ✓ 3D Printing
- ✓ Discipline Physics-based Models
- ✓ Integrating Science / Engineering
- ✓ Biomimetics
- ✓ Collaboration environments
- ✓ *And more…*



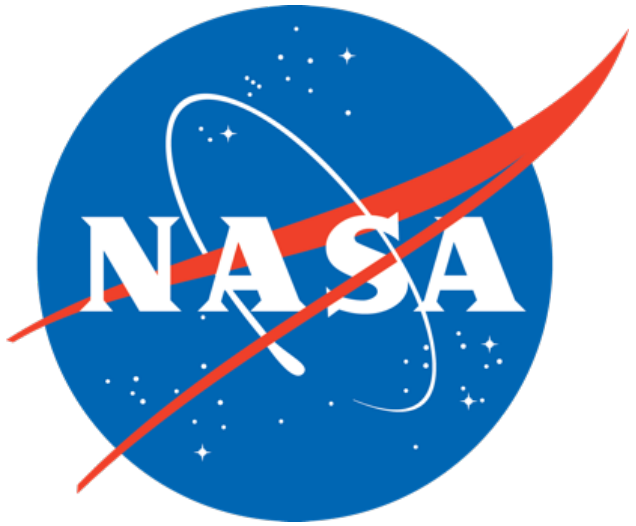




Digital Twin

Requirements ↻ Materials ↻ Design ↻ Analysis ↻ Manufacturing ↻ Operations ↻ Maintenance & Repair

Digital Integration Allows Predictive, Detective, and Corrective – Real Time Accurate Decisions



Thank You

john.h.vickers@nasa.gov