The Innovation Landscape @ NASA: Promising Practices, Framework, and Sustainability

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EXISTING TECHNOLOGY
EXISTING ORGANIZATION

CONTINUOUS

EXAMPLES of PROMISING PRACTICES

Blue Sky Events
Center Innovation Fund Program
Creativity & Innovation Initiative
Digital Learning Network
MissionSTEM
Early Career Initiative
Engineering Design Studio
Ethics Based Decision Framework
Digital Learning Networks
MissionSTEM

21st Century Civil Rights Technical Assistance for Science, Technology, Engineering, and Mathematics

Office of Diversity and Equal Opportunity

The MissionSTEM Web site is designed to assist NASA grant recipients with their civil rights compliance efforts. The Agency strives to provide a broad scope to its technical assistance in this arena.
NEW ORGANIZATION
EXISTING TECHNOLOGY

DISRUPTIVE

EXAMPLES of PROMISING PRACTICES

Centennial Challenges

Center of Excellence for Collaborative Innovation

Citizen Science and Open Innovation

Commercial Crew and Cargo Programs

Enterprise Cloud Computing Services for Engineering

NASA@Work

NASA Shared Services Center

NextStep Broad Agency Announcement
ISS Public-Private Partnerships

- Orbital ATK Cygnus
- SpaceX Dragon
- Russian Soyuz
- JAXA HTV
Citizen Science

https://www.diskdetective.org/#/classify
NEW TECHNOLOGY
EXISTING ORGANIZATION

REVOLUTIONARY

EXAMPLES of PROMISING PRACTICES

- Blended Wing Body Aircraft Design
- Computational Digital Transformation
- NASA’s Transformative Aeronautics Concepts Program
- James Webb Space Telescope
- UAS Traffic Management
The Future of Flight
James Webb Space Telescope
NEW TECHNOLOGY
NEW ORGANIZATION

TRANSFORMATIVE

EXAMPLES of PROMISING PRACTICES

Building and Operating the International Space Station

Studying Ocean Worlds and Extrasolar Planets

Expanding human presence in the solar system via Journey to Mars

Learning whether life exists in the solar system beyond earth

Enabling a transformation for safe and sustainable U.S. and global aviation

Understanding Global Climate Change

Minimizing the Impact of Space Debris
16 Years of Human Habitation on ISS
Like Luke Skywalker’s planet “Tatooine” in Star Wars, Kepler-16b orbits a pair of stars. Depicted here as a terrestrial planet, Kepler-16b might also be a gas giant like Saturn. Prospects for life on this unusual world aren’t good, as it has a temperature similar to that of dry ice. But the discovery indicates that the movie’s Isaac double-sunset is anything but science fiction.
All elements needed for a human Mars mission are in development now.

**EARTH RELIANT**
NOW - MID-2020s

- ISS & commercial development of LEO
- Deep space systems life support and human health

**PROVING GROUND**
2018-2030

- Crewed missions, spacewalks in cislunar space
- Deep space habitation; Shakedown cruise(s) for Mars
- Integrated human and robotic operations

**EARTH INDEPENDENT**
NOW – 2030s and beyond

- Science missions pave the way to Mars; Robotic roundtrip demonstration with sample return in the late 2020s
- Entry, descent, and landing & in-situ resources
- Send humans to orbit Mars in the early 2030s
INNOVATION VISUAL HISTORY

**BARRIERS TO INNOVATION**
- 7 THEMES
  - risk-averse culture
  - lack of opportunity
  - organizational inertia
  - communication challenges
  - short-term focus
  - process overload
  - instability
- 5 RECOMMENDATIONS
  - *Corporate time for creative thinking*
  - *Innovation labs & creative spaces*
  - *Process streamlining*
  - *Innovation investments*
  - *Shunkworks*

**AGENCY CULTURE STRATEGY**
- Recognize + Reward Innovation
- Develop Supervisors
- Connect people to each other and the mission

**SENIOR MANAGEMENT COUNCIL**
- Propose challenges that invite NASA community to solve small and large problems
- Provide opportunities for more employees to present innovative ideas and seek support to implement them
- Celebrate examples of innovation in program and project teams
- Encourage Program and Project teams to use innovation as a tool

**INNOVATION WORKSHOP**
- AUGUST 2015

**INNOVATION DAY**
- NOVEMBER 1, 2016

**LEAN FORWARD, FAIL SMART**

**INNOVATION DAY!**

**LICENSE TO INNOVATE**

**NOMA INNOVATION ACTIVITIES**