National Aeronautics and Space Administration

NASA

EXPLORESPACE TECH

NASA Technology Portfolio Management System

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TechPort

https://techport.nasa.gov

Introduction

Technology is developed by thousands of people in diverse organizations with challenging goals.

TechPort is a web-based system that brings these technologies together, providing key insights on past and current investments.

TechPort Background

2010 — Authorization Act calls for NASA to maintain an Agency space technology database that helps align mission directorate investments.

2011 — NASA Performance Goal to develop a database to track technology investments.

2012 — TechPort 1.0 deployed. NRC requests that technology data made public.

2014 — TechPort 2.0 and public interface deployed. NASA independent review.

2015 — Public comments solicited. 2015 Technology roadmaps released.

2016 — NASA independent review. TechPort ownership transferred from OCT to STMD.

2018 — TechPort 3.0 deployed.

2019 — Strategic Technology Integration Framework module deployed.

2020 — 2020 NASA Technology Taxonomy released via TechPort.

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Key TechPort Users and Benefits

➢ NASA Leadership

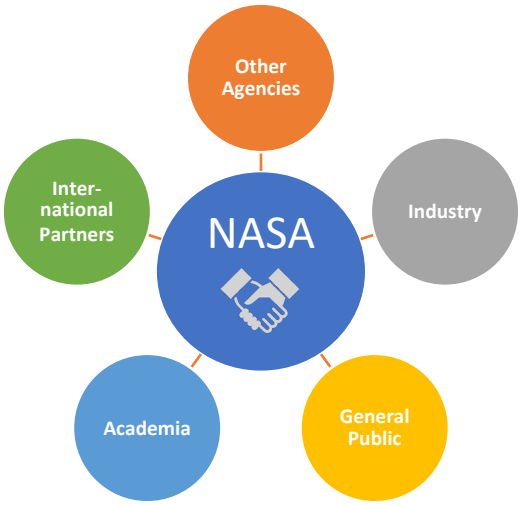
- Discover insights about NASA's technology portfolio across fiscal years.
- Quickly assess technology investments by mission destination, technology area, organization, and more.
- Create specialized analyses and understand trends.
- Quickly respond to inquiries and data requests (e.g. OMB, Congress).

➢ Technology Innovators and Collaborators

- Discover the technologies being developed at NASA.
- Create new technologies and evolve existing technologies by building off prior work.
- Build partnerships between NASA, industry, academia, other agencies, and international partners.
- Identify and contact potential partners with common challenges and complementary expertise.
- Identify similar efforts during proposal preparation and review cycles.

➢ General Public

- Engage on "what's new" with NASA technology.
- Visualize the results from the use of public funds.
- Realize the benefits of the Open Data policy for Federal Agencies.



TechPort

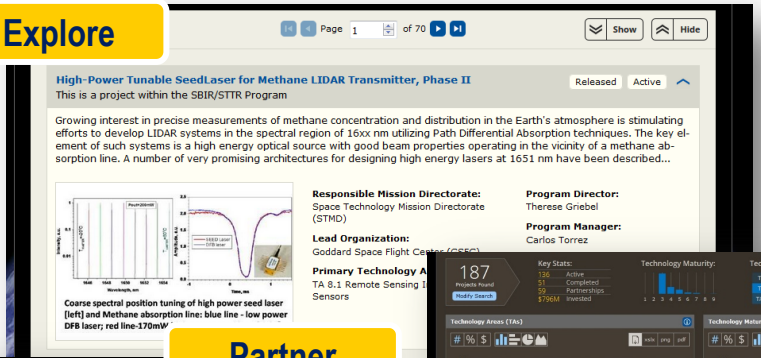
TechPort Overview

TechPort is a comprehensive resource for information about technology development activities.

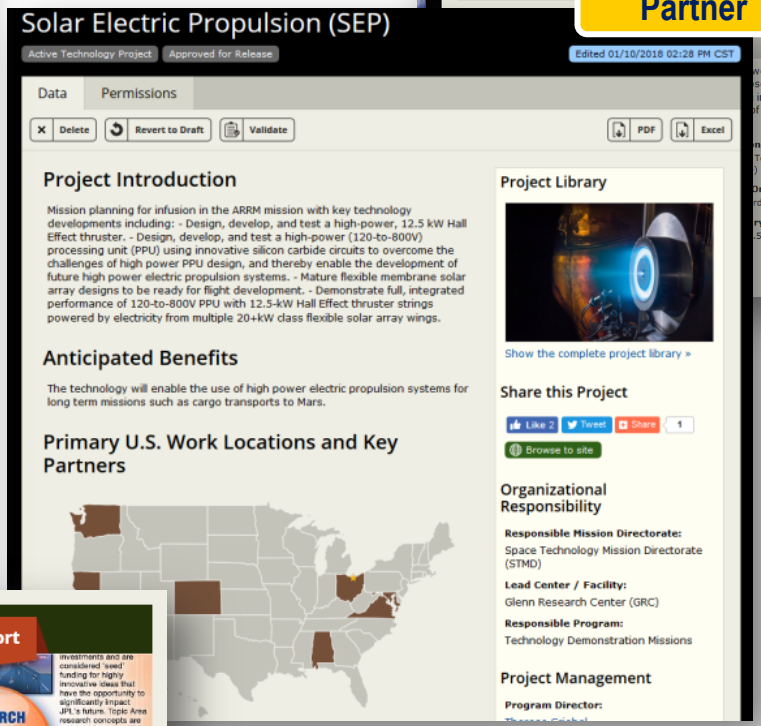
FIND IT. BUILD IT. SHARE IT.

Search

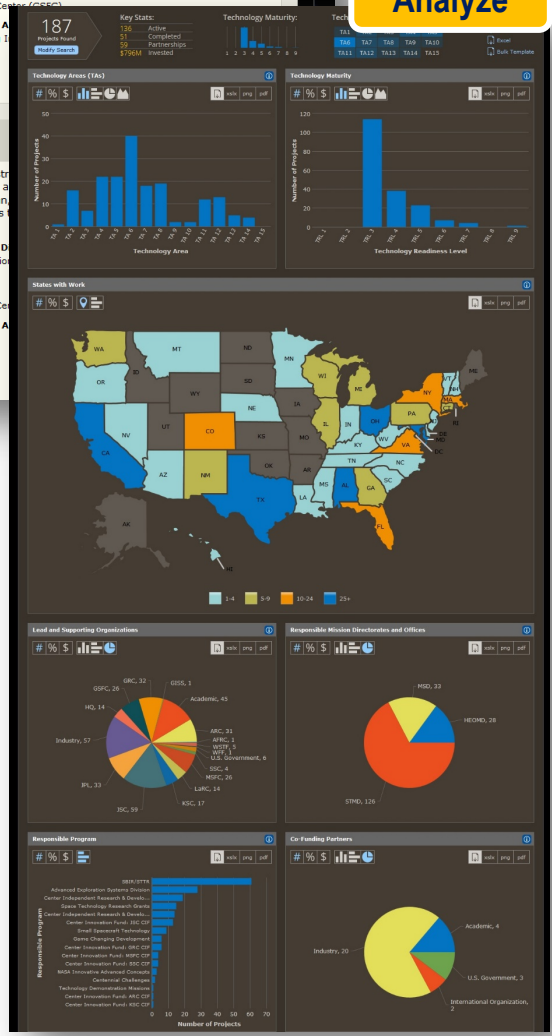
Explore



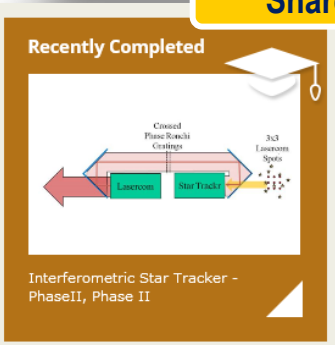
Partner



Analyze



Share



https://techport.nasa.gov

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The Power of TechPort – Communication to the Public, OGA, Academia, and Industry

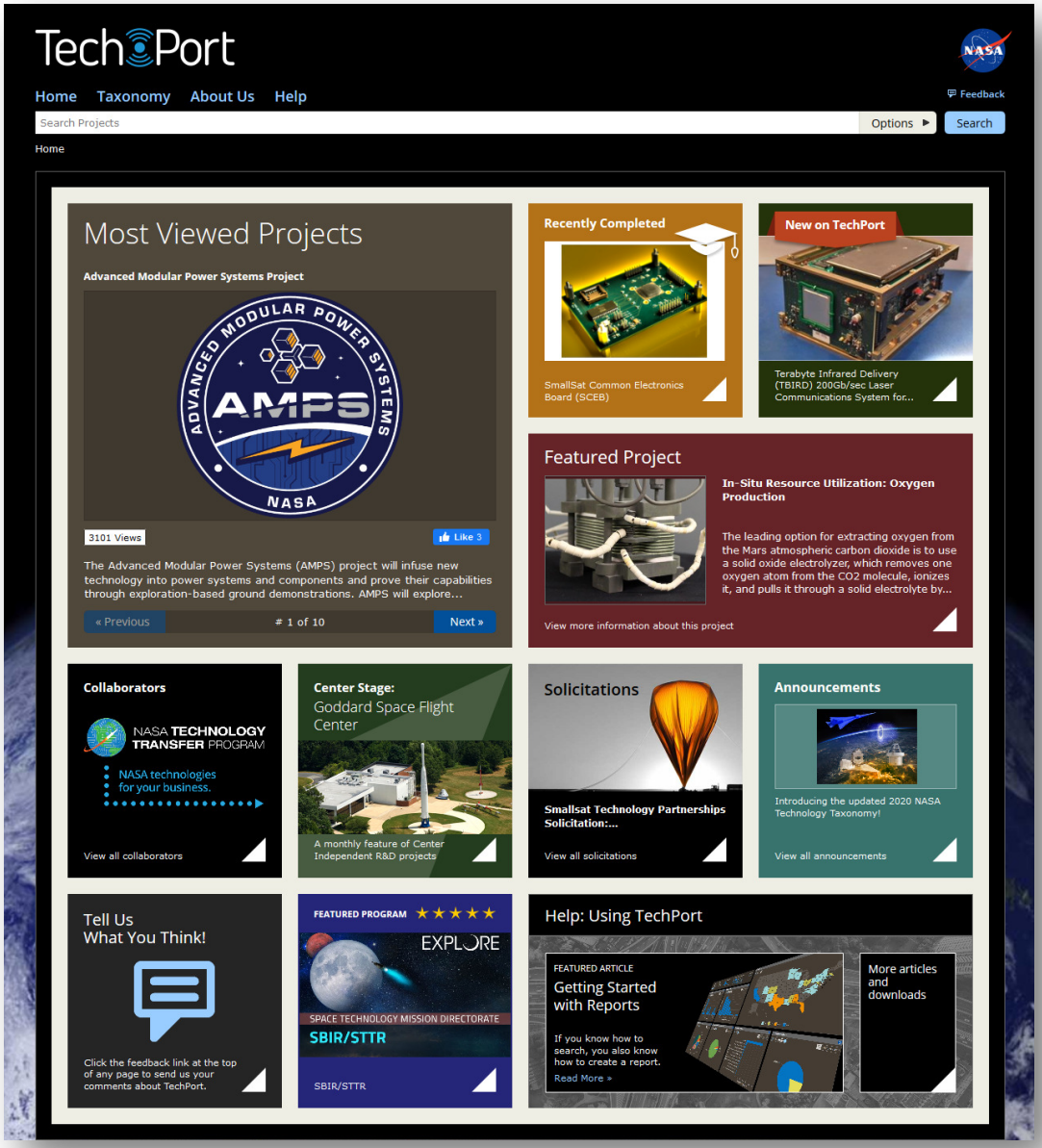
TechPort serves as both an internal analysis tool *and* a public communication tool.

The external home page highlights:

- Most Viewed Projects
- Recently Completed Projects
- New Projects
- Featured Project of the Week
- Announcements
- Technology Solicitations

External users can search the database and run reports as well.

TechPort has been visited by agencies, industry, and academia around the world such as DoD, DHS, Princeton, Stanford, ESA, CSA, and many more…

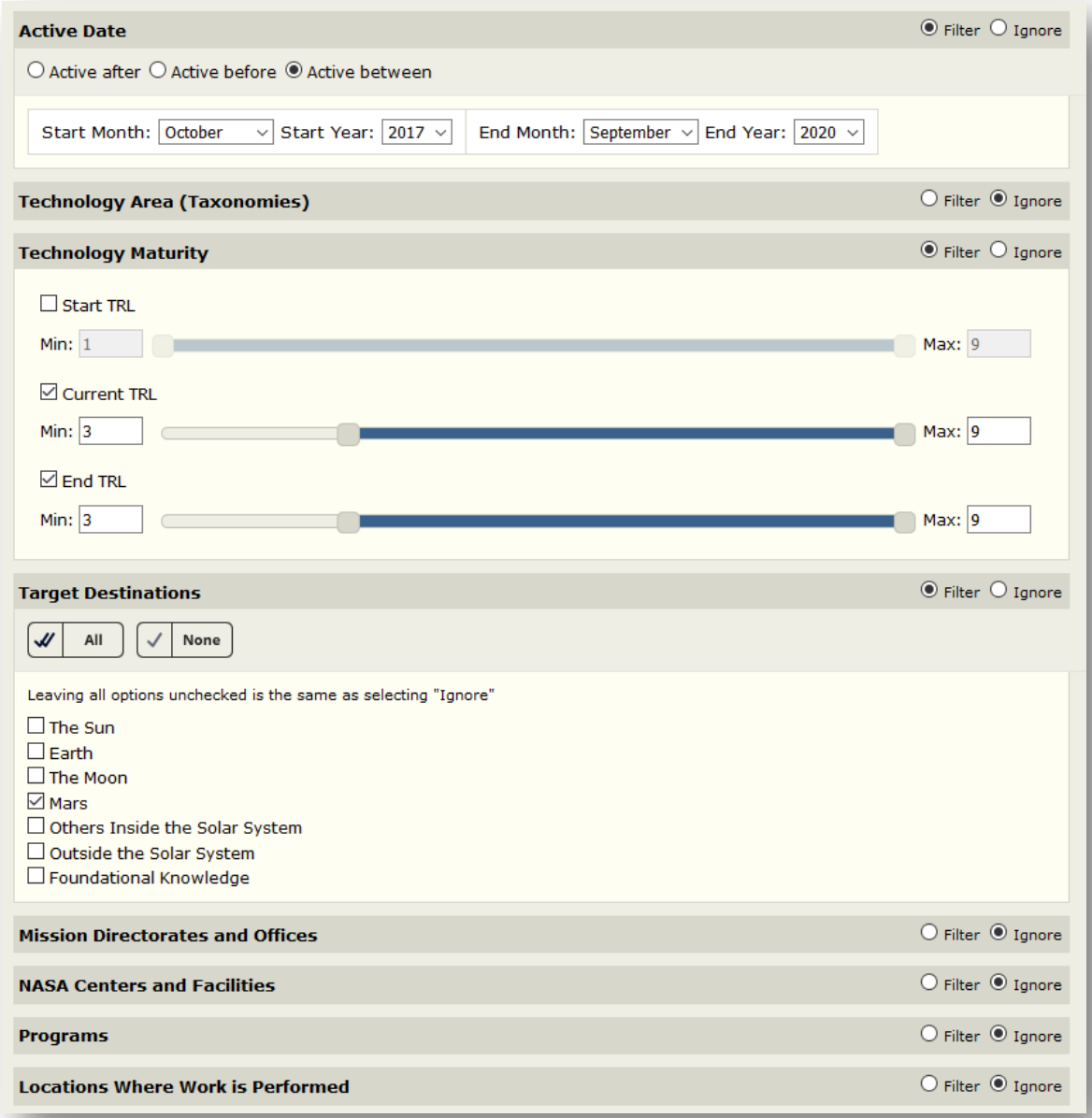


The Power of TechPort – Faceted Search

The TechPort search mechanism allows users to focus on their own area(s) of interest.

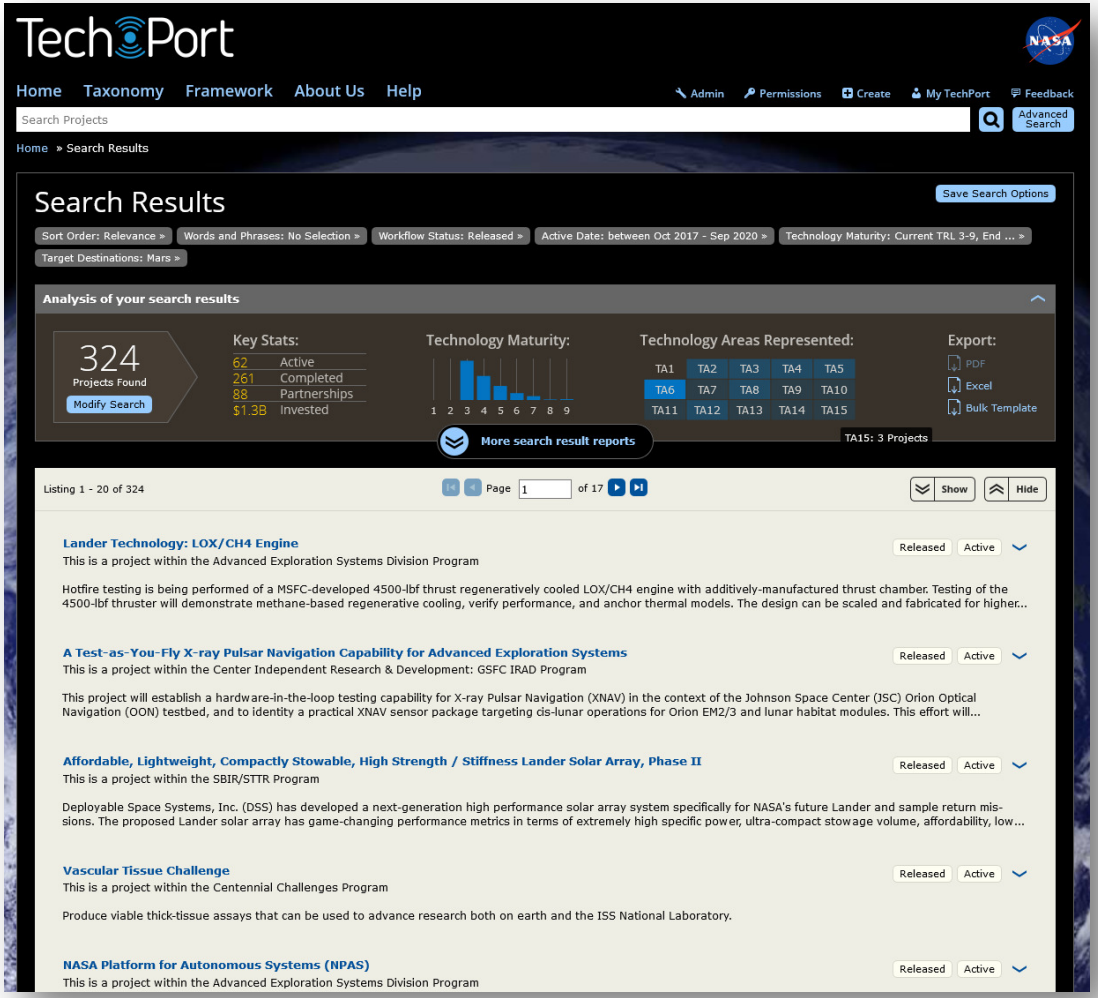
User can search based on:

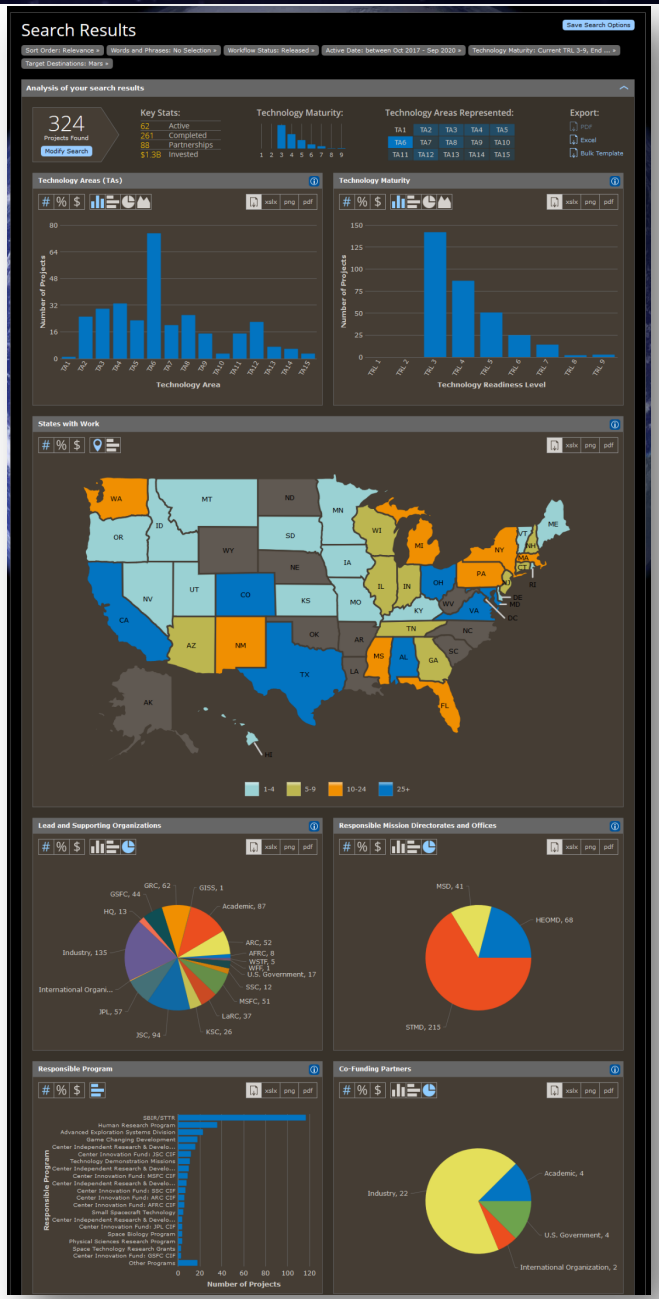
- Status (Active, Completed, or Canceled)
- Active Date (e.g. Between Oct 2015 and Sep 2018)
- Technology Area
- Technology Maturity (TRL 1-9)
- Target Destination (Earth, Moon, Mars, etc.)
- Responsible Mission Directorate
- Lead Center
- Responsible Program
- Work Location



The Power of TechPort –Instant Reports

After searching, an instant rollup is provided with key statistics about matching search results. Detailed rollup reports are also available with an additional click.





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The Power of TechPort – Technology Project Details

Individual projects can also be analyzed for more information.

TechPort

Home Taxonomy Framework About Us Help

Admin Permissions Create My TechPort Feedback

Search Projects Advanced Search

Home » Search Results

Search Results

Save Search Options

Sort Order: Relevance » | Words and Phrases: No Selection » | Workflow Status: Released » | Active Date: between Oct 2017 - Sep 2020 » | Technology Maturity: Current TRL 3-9, End ... » | Target Destinations: Mars »

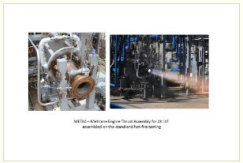
Analysis of your search results

Listing 1 - 20 of 324 Page 1 of 17 Show Hide

Lander Technology: LOX/CH4 Engine Released Active

This is a project within the Advanced Exploration Systems Division Program

Hotfire testing is being performed of a MSFC-developed 4500-lbf thrust regeneratively cooled LOX/CH4 engine with additively-manufactured thrust chamber. Testing of the 4500-lbf thruster will demonstrate methane-based regenerative cooling, verify performance, and anchor thermal models. The design can be scaled and fabricated for higher thrust levels (e.g. 100 kN / 22 klbf class engine). A parallel effort is underway witha 1000 lbf LOX/CH4 thruster with both additively-manufactured thrust chamber and injector.



Responsible Mission Directorate: Human Exploration and Operations Mission Directorate (HEOMD)

Lead Organization: Marshall Space Flight Center

Primary Technology Area: TA2 In-Space Propulsion Technologies

Start: Oct 2017

End: Sep 2020

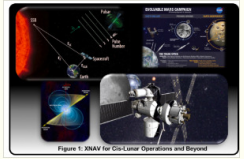
Program Director: Christopher Moore

Project Manager: Greg Chavers

A Test-as-You-Fly X-ray Pulsar Navigation Capability for Advanced Exploration Systems Released Active

This is a project within the Center Independent Research & Development: GSFC IRAD Program

This project will establish a hardware-in-the-loop testing capability for X-ray Pulsar Navigation (XNAV) in the context of the Johnson Space Center (JSC) Orion Optical Navigation (OON) testbed, and to identity a practical XNAV sensor package targeting cis-lunar operations for Orion EM2/3 and lunar habitat modules. This effort will leverage software developments from the Station Explorer for Navigation and Timing Technology (SEXTANT) and hardware concepts from the Neutron-star Interior Composition Explorer (NICER) mission.



Responsible Mission Directorate: Mission Support Directorate (MSD)

Lead Organization: Goddard Space Flight Center

Primary Technology Area: TA5 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems

Start: Oct 2017

End: Sep 2020

Program Manager: Peter Hughes

Project Manager: Jason Mitchell, Timothy Beach

Principal Investigator: Sean Semper

Advanced Exploration Systems Division

Near Earth Asteroid Scout (NEA Scout)

Active Technology Project

PDF

Project Introduction

Near-Earth Asteroid Scout, or NEA Scout, is a 6U CubeSat developed jointly between NASA's Marshall Space Flight Center and the Jet Propulsion Laboratory. NASA selected NEA Scout as a candidate secondary payload for Artemis 1, the first integrated (uncrewed) flight test of the Space Launch System and Orion Crewed Spacecraft. The NEA Scout mission is funded by the Advanced Exploration Systems Division of the Human Exploration and Operations Mission Directorate.

NEA Scout is a robotic reconnaissance mission that will fly by and return data from a near Earth asteroid. NEA Scout will deploy its main propulsion system, a solar sail, that will be used in conjunction with its other on-board systems to provide stable pointing for both science and optical navigation as well as for slewing and navigating the spacecraft to its predetermined destination

More »

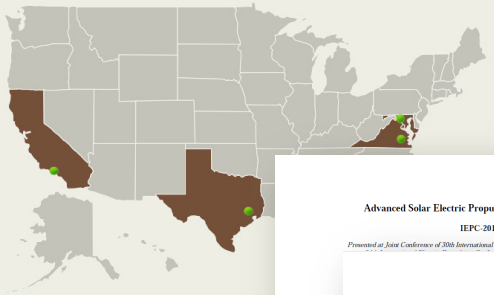
Anticipated Benefits

A solar sail will provide the primary propulsion for the NEA Scout mission. Solar sails provide a new capability for delivering science payloads to a variety of planetary bodies, the outer solar system, non-Keplerian orbits (where propulsive acceleration acts in addition to that of the effects of gravity), or high-inclination orbits (e.g., solar polar orbit). Using the continuous low thrust provided by a solar sail, spacecraft can achieve DV's that are impossible to obtain using chemical or even solar electric propulsion. As the technology matures, solar sails will increasingly be used to enable science and exploration missions that are currently impossible or prohibitively expensive using traditional chemical and electric rockets.

The new camera system, avionics, and solar sail designed and developed by the NEA Scout project for a robotic mission to a planetary body can enable future commercial development of CubeSat class payloads. Industry and other government agen-

More »

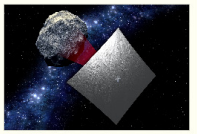
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role
Marshall Space Flight Center (MSFC)	Lead Organization
Goddard Space Flight Center (GSFC)	Supporting Organiza
Jet Propulsion Laboratory (JPL)	Supporting Organiza
Johnson Space Center (JSC)	Supporting Organiza
Langley Research Center (LaRC)	Supporting Organiza

Primary U.S. Work Locations	
Alabama	California
Maryland	Texas

Project Library



Show the complete project library »

Share this Project

Like 1 Tweet Share 2

Browse to site

Organizational Responsibility

Responsible Mission Directorate: Human Exploration and Operations Mission Directorate (HEOMD)

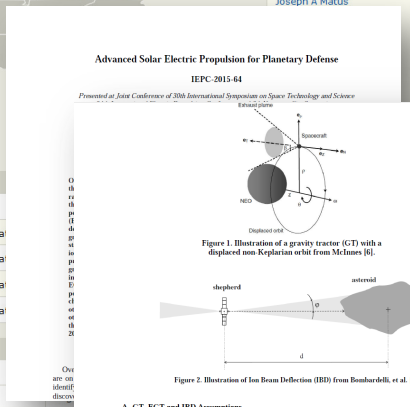
Lead Center / Facility: Marshall Space Flight Center (MSFC)

Responsible Program: Advanced Exploration Systems Division

Project Management

Program Director: Christopher L Moore

Project Manager: Joseph A Matus



Advanced Solar Electric Propulsion for Planetary Defense

IEPC-2015-64

Presented at Joint Conference of 30th International Symposium on Space Technology and Science

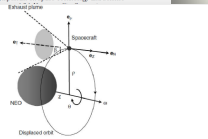


Figure 1. Illustration of a gravity tractor (GT) with a displaced non-Keplerian orbit from McInnes [6].

Figure 2. Illustration of Ion Beam Deflection (IBD) from Bombardelli, et al. [8].

A. GT, EGT and IBD Assumptions

To calculate the effectiveness of slow-push planetary defense techniques, we adopt the approximation used by the NRC [2] in which the deflection distance is approximated by,

$$\Delta s = \frac{3}{2} a t_a (t_a + 2t_c)$$

where a is the asteroid acceleration during time t_a when the deflecting force is applied, and t_c is the time spent coasting after completion of the force application. In addition, we adopt the required deflection distance used in the NRC report of 15,000 km. The total deflection time is the sum of t_a and t_c. To minimize the total deflection time we set the coasting time, t_c, to zero and solve for the required acceleration that minimizes t_a within the constraints of the propulsion system. Note, this approach is

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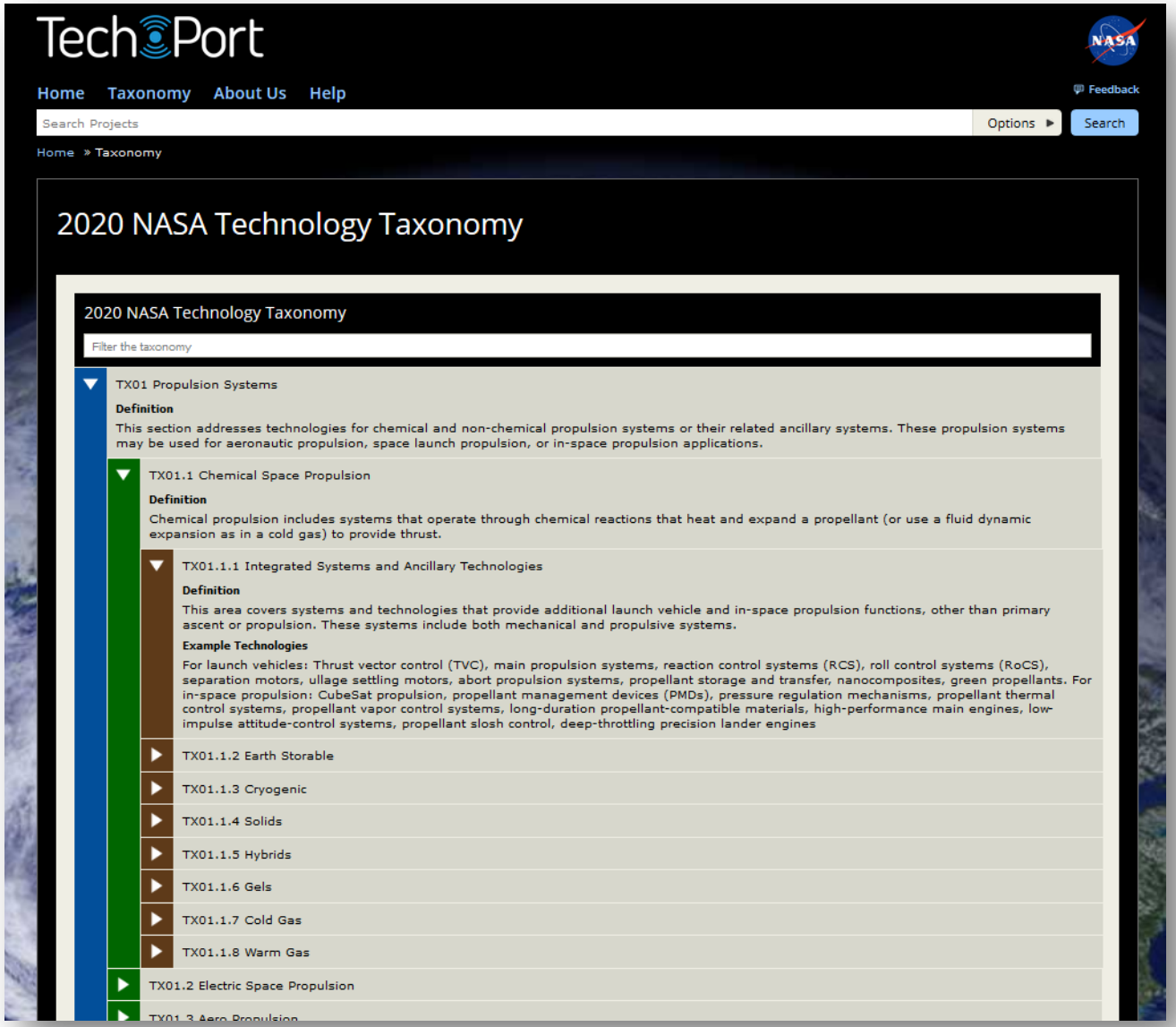
The Power of TechPort – Technology Taxonomy

TechPort houses the 2020 NASA Technology Taxonomy, a tool used by the Agency to identify, organize, and communicate technology areas relevant to advancing the Agency's mission.

The Taxonomy is comprised of 17 distinct technical discipline-based taxonomy elements. It uses a three-level hierarchy for grouping technologies.



The Power of TechPort – Available Anywhere, Anytime

TechPort can be accessed anywhere! – https://techport.nasa.gov

TechPort is *reliable* and *secure*. TechPort was one of the first Agency cloud-based systems, and the OCIO has benchmarked our documentation and security posture.

TechPort

The Power of TechPort – Open Data

The Techport Application Programming Interface (API) provides a machine-readable endpoint for data mining and the use of local business intelligence and analytics tools.

Many academic organizations and other agencies around the world currently harvest NASA TechPort public data *monthly*. The data are used in their own systems for various types of analyses.

The TechPort dataset is also available through https://data.nasa.gov.

Recent Usage Statistics

Internal Site Highlights
(Since March 2015)

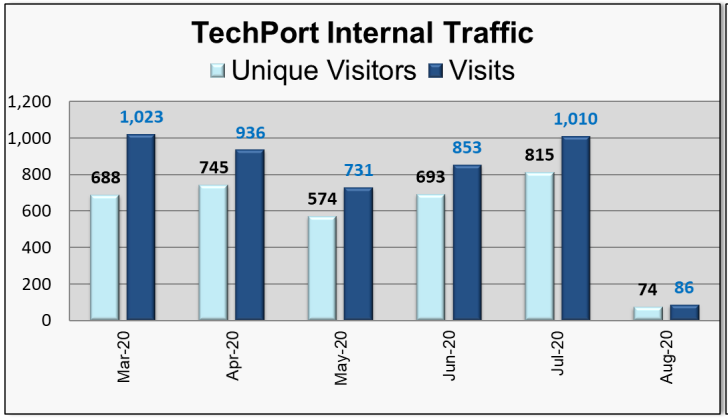
- Over 51k visits by over 41k unique visitors
- What did they do on our site?
  Visitors have generated
  24,797 reports
  66,725 searches
  and on average stayed for
  32 minutes

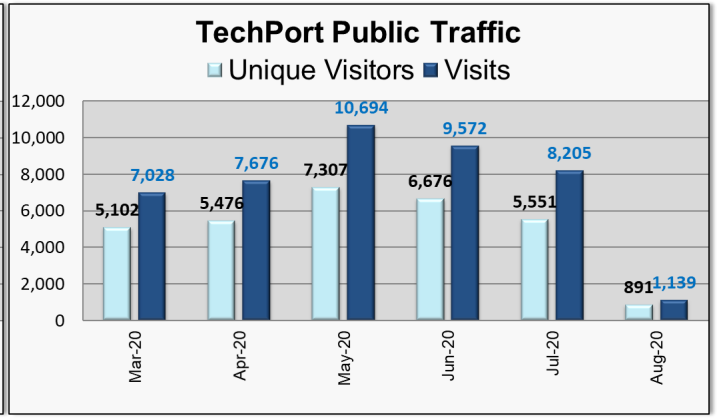
Public Site Highlights
(Since March 2015)

- Over 429k visits by over 334k unique visitors
- What did they do on our site?
  Visitors have generated
  144,178 reports
  38,787 searches
  and on average stayed for
  5 minutes

TechPort has been visited by industry and academia from across the globe. Recent examples include:

- Arizona University Network
- Aerospace Corporation
- European Space Agency
- Japan Aerospace Exploration Agency
- University of Illinois
- Johns Hopkins University Applied Physics Laboratory
- Korea Atomic Energy Research Institute
- Massachusetts Institute of Technology
- University of Leicester (UK)





Recent uses of TechPort:

- Monthly OMB requests for reports related to the Industries of the Future initiative.
- Cross-Agency team developing technology portfolio management system requirements (DHS, AFRL, AFC, DTRA, DOE).
- Senior leadership requests for historical partnership information with organizations such as APL and OAI.

TechPort was recently featured on the NASA Small Steps, Giant Leaps Podcast

https://appel.nasa.gov/podcast/episode-24-techport/

TechPort

Live Demo

1. *Search + Reports Scenario (Small Satellite Technologies)*
2. *Project Library*

Backup and Reference

The TechPort Community

The TechPort community consists of technology managers, developers, and innovators across the Agency.

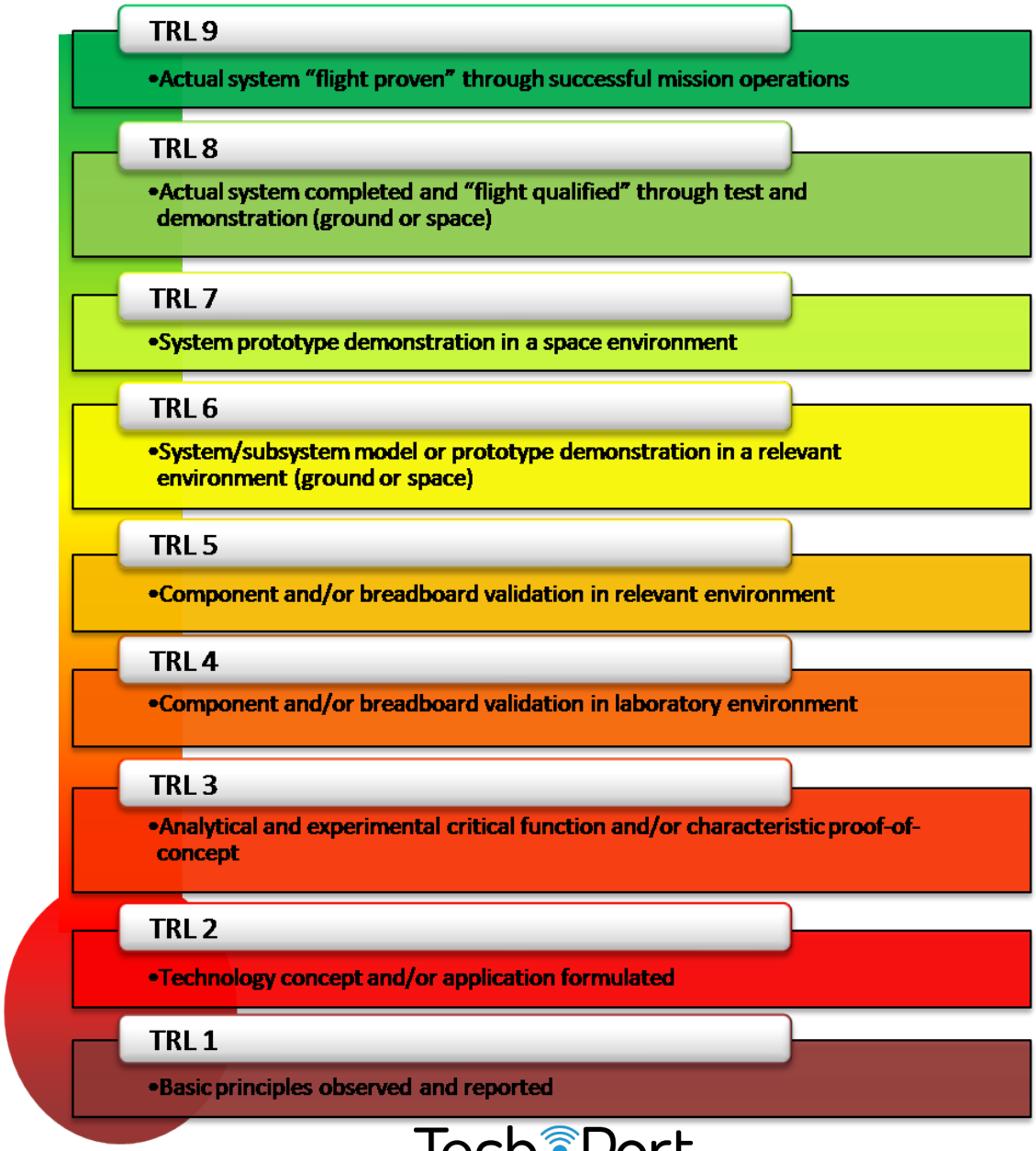
The TechPort community:

- ✓ Meets quarterly as part of the "Community of Practice" to discuss updates, brainstorm, and provide feedback.
- ✓ Provides data updates twice per year in April and October.
- ✓ Identifies new automated data transfer connections from other NASA IT systems.
- ✓ Vets the system data quality.
- ✓ Participates in quarterly user acceptance tests, training, and feedback sessions.
- ✓ Support outreach activities across the NASA Centers and Facilities.

The TechPort Team maintains an open line of communication with key stakeholders such as the NASA Technology Executive Council and the Office of the Chief Technologist.

TechPort data is provided by NASA technology managers directly involved with the work.

Technology Readiness Levels



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Definition of Technology

What belongs in TechPort – What is a technology project?

NASA Technology Definition:

A solution that arises from applying the disciplines of engineering science to synthesize a device, process, or subsystem to enable a specific capability.

Government-Wide Office of Management and Budget Circular No. A-11 **Conduct of Research and Development****	
6.1 Basic Research:	A study directed toward fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products.
6.2 Applied Research:	Systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.
6.3 Development:	Is directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

*** http://www.whitehouse.gov/omb/circulars_a11_current_year_a11_toc*

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