Early-Stage Innovation and Partnerships (ESIP) Overview

Jenn Gustetic, ESIP Program Director

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Our Story

The Space Technology Mission Directorate (STMD)'s Early Stage Innovations and Partnerships Portfolio (ESIP)'s mission is to empower a community of innovators pioneering aerospace research and transformative technology ventures to enable NASA's mission and invigorate our economic future.

Each ESIP Program taps into powerful communities of innovators from different places – small business, universities, NASA researchers, the general public.

We balance the spearheading of aerospace research with the encouragement of commercialization through ventures.

ESIP's Portfolio of Programs

ESIP was created to give more support to STMD's and NASA's early stage technology development and technology commercialization programs. The programs that make up ESIP engage a diverse community of innovators and provide investment and support throughout the innovation lifecycle.

CROSS-CUTTING ACTIVITIES
Early-Stage Investment and Commerce (ESIC) | I-Corps | Inclusive Innovation

Program Acronym	NIAC	STRG	CIF/ECI	PCC	SBIR/STTR	T2
Program Name	**NASA Innovative Advanced Concepts**	**Space Tech Research Grants**	**Center Innovation Fund / Early Career Initiative**	**Prizes, Challenges, and Crowdsourcing**	**Small Business Innovation Research / Small Business Technology Transfer**	**Technology Transfer**
Program Description	Nurtures **visionary ideas** that could transform future NASA missions by engaging America's innovators and entrepreneurs as partners in the journey.	Challenges the spectrum of **academic researchers** to making science, space travel, and exploration more effective, affordable, and sustainable.	Stimulate and encourage creativity and innovation within the **NASA Centers and Early Career leaders.**	Makes opportunities available for **public participation** in NASA research and technology solutions to support.	Engages **small businesses, research institutions, and entrepreneurs** in technology R&D that meet NASA needs and could be commercialized.	Ensures that innovations developed for exploration and discovery are maximizing the benefit to the Nation and enabling **spinoffs**.
TRL	Low	Low	Low	Low	Low/Mid	Low/Mid
Size	**30+** grants annually	**300+** grants with dozens of universities	**~140** projects across NASA Centers	**>80** projects across NASA	**>500 contracts** with hundreds of small businesses	**>1,500** Active Patents & **>700** Licenses
Primary Audience	Government, Industry, Academia	Academia	NASA Internal	General Public, Academia, Industry	Small Business, Research Institutions	Industry

How We Do Business

Through **contracts, grants, internal research and development awards, and public prize competitions and challenges**, ESIP programs assemble a diverse portfolio of ambitious, risk-informed technology investments. ESIP also invest in tools and processes to enable infusion and commercialization of that research, ultimately supporting US economic growth. ESIP and its programs are defined by a culture of experimentation and learning. The portfolio believes in the power of trial and error: of making bets in support of superlative innovation.

Contracts

Grants

Internal R&D Awards

Challenges

ESIP Portfolio of Solicitations/ Activities

	Solicitation/ Activity Title	Award Type	Topic Specificity*	Frequency of Award	Prerequisite or Eligible Applicants	Size ($ max) *(based on lifecycle $)*	Volume of Annual Awards
NIAC	NASA Innovative Advanced Concepts (NIAC) Phase I	Grant	Open	Annual	Government, Industry, Academia	Small (< $500K)	Few (<20)
	NASA Innovative Advanced Concepts (NIAC) Phase II	Grant	Specific	Annual	NIAC Phase I Awardees	Medium ($500K - $1M)	Few (<20)
	NASA Innovative Advanced Concepts (NIAC) Phase III	Contract	Specific	Annual	NIAC Phase II Awardees	Large (> $1M)	Few (<20)
CIF/ECI	Center Innovation Fund (CIF)	Internal Award	Open	Annual	NASA Centers NASA Early Career Researchers	Small (< $500K)	Many (>50)
	Early Career Initiative (ECI)	Internal Award	Open	Annual	NASA Centers NASA Early Career Researchers	Large (> $1M)	Few (<20)
STRG	NASA Space Technology Graduate Research Opportunities (NSTGRO)	Grant	Open	Annual	Graduate Students, US Universities	Small (< $500K)	Many (>50)
	Early Career Faculty (ECF)	Grant	Specific	Annual	Early Career Faculty at US Universities	Medium ($500K - $1M)	Few (<20)
	Early Stage Innovations (ESI)	Grant	Specific	Annual	US Universities	Medium ($500K - $1M)	Few (<20)
	Lunar Surface Technology Research (LuSTR) Opportunities	Grant	Specific	Annual	US Universities	Large (> $1M)	Few (<20)
	Space Technology Research Institutes (STRI)**	Grant	Specific	Every Other Year	US Universities	Large (> $1M)	Few (<20)

* "**Specific**" has a specified topic. "**Hybrid**" can be open within a broad topic or related to the original topic. "**Open**" has no specified topic

***Every-Other Year Cycle*

ESIP Portfolio of Solicitations/ Activities

	Solicitation/ Activity Title	Award Type	Topic Specificity*	Frequency of Award	Prerequisite or Eligible Applicatnts	Size ($ Range) *(based on lifecycle $)*	Volume of Annual Awards
I-Corps	NASA Innovation Corps (I-Corps) Pilot	Grant	Open	On-going	Academia / Higher-Ed / Non-Profit Research Institutions	Small (< $500K)	Few (<20)
SBIR/STTR***	SBIR/STTR Phase I	Contract	Specific	Annual	Small Businesses	Small (< $500K)	Many (>50)
	SBIR Phase II	Contract	Specific	Annual	SBIR Phase I Awardees	Medium ($500K - $1M)	Many (>50)
	STTR Phase II	Contract	Specific	Annual	STTR Phase I Awardees	Medium ($500K - $1M)	Medium (20 - 50)
	SBIR Ignite Phase I	Contract	Specific	Annual	Small Businesses	Small (< $500K)	Few (<20)
	SBIR Ignite Phase II	Contract	Specific	Annual	SBIR Ignite Phase I Awardees	Medium ($500K - $1M)	Few (<20)
	SBIR/STTR Sequentials	Contract	Specific	Annual	SBIR/STTR Phase II Awardees	Large (> $1M)	Few (<20)
	CCRPP	Grant	Specific	On-going	SBIR/STTR Phase II Awardees	Medium – Large ($500K - $2.5M)	Few (<20)

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****Universities are required partners for STTRs*

ESIP Portfolio of Solicitations/ Activities

	Solicitation/ Activity Title	Award Type	Topic Specificity*	Frequency of Award	Prerequisite for application or Eligible Applicants	Size ($ max) *(based on lifecycle $)*	Volume of Annual Awards
SBIR/STTR***	SBIR/STTR Phase II – E	Contract	Specfic	On-going	SBIR/STTR Phase II Awardees	Small (< $500K)	Medium (20 - 50)
	SBIR I-Corps	Contract	N/A	Annual	SBIR Awardees	Small (< $500K)	Medium (20 - 50)
	SBIR/STTR Phase III	N/A	Hybrid	On-going	Phase I/Phase II Awardees	N/A	N/A
PCC	Crowdsourcing Contenders	Award	Open	Annual	NASA Employees Propose Projects, Public participates in resulting challenges	Small (< $500K)	Few (<20)
	NASA Spark	Crowdsourcing	Open	Ad-Hoc	NASA Employees	N/A	Many (>50)
	NTL Projects	Prizes, Challenges, Crowdsourcing	Hybrid	Ad-Hoc	NASA Employees Propose Projects, Public participates in resulting challenges	Varies	Many (>50)
	Centennial Challenge Projects	Prize	Specific	Ad-Hoc	NASA Employees develop competitions, Public participates in resulting challenges	Large (> $1M)	Few (<20)
Tech Transfer	Invention Disclosure	Invention Disclosure	Open	Ad-Hoc	Internal Audience	N/A	N/A
	Software Release	Software Release	Open	Ad-Hoc	External and Internal Audiences	N/A	N/A
	Patent Licensing	Patent License	Open	Ad-Hoc	Industry	N/A	N/A

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****Universities are required partners for STTRs*

NASA Innovative Advanced Concepts (NIAC)

NIAC Goal

To support early studies of innovative, yet credible, visionary concepts that could one day "change the possible" in aerospace.

NIAC Approach

- **NIAC funds early-stage, high risk/high reward concepts to enable future NASA science and exploration capabilities**
  - Through grants and contracts, NIAC supports the development of transformational technologies through a 3-phase program (see below)
- **NIAC is open to ideas from all U.S. organizations across all technical disciplines**
  - Historically, approximately 1/3 of NIAC funds have gone to industry, 1/3 to academia, and 1/3 to NASA centers (including JPL)
  - NIAC projects are unlimited in scope, but must be proposed in a reference mission context to demonstrate potential benefits
- **NIAC projects are inspirational, generating significant public interest while advancing NASA capabilities**

NIAC Solicitation

PHASE I
9 Mos/$175k
Initial concept feasibility and preliminary analysis (12-16 awards/year)

PHASE II
2 Years/$600k
Advanced development, mission analysis, path forward, spin offs (6-8 awards/year)

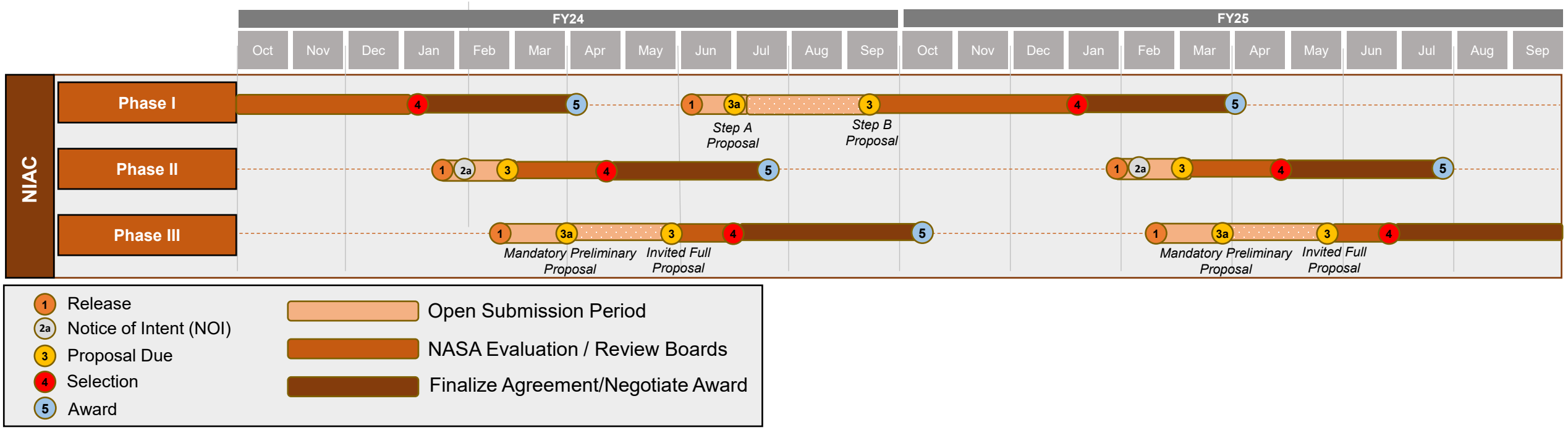
PHASE III
2 Years/$2M
Strategically fund projects with highest potential impact for future NASA missions (1 award/year)

How does NIAC work?

The NASA Innovative Advanced Concepts (NIAC) Program nurtures visionary ideas that could transform future NASA missions with the creation of breakthroughs — radically better or entirely new aerospace concepts — while engaging America's innovators and entrepreneurs as partners in the journey.

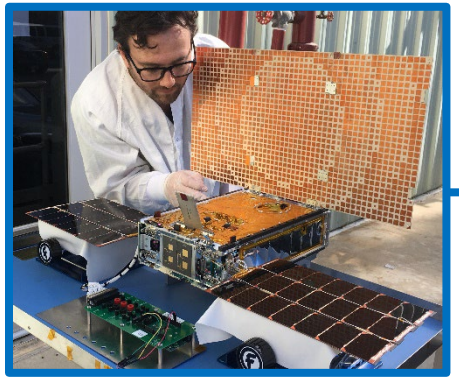
More information on the NIAC Program can be found at: [NASA Innovative Advanced Concepts (NIAC) | NASA]

Information on all NIAC active and future opportunities can be found at: [Apply to NIAC | NASA]

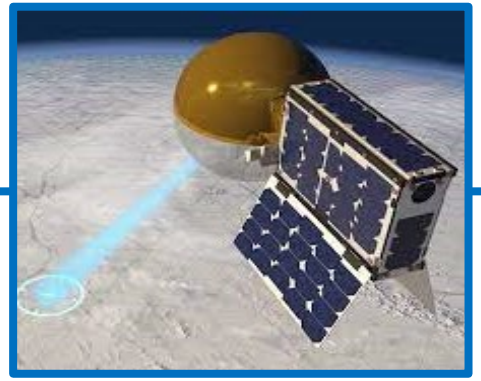


NIAC Impact

Program Successes



MarCO A & B
First inter-planetary CubeSat Comm Demonstration Mission



Cat Sat Mission
Student-led at the University of AZ; Demonstrate Increased Data Return (5G)

Ingenuity Helicopter
NIAC inspired design for the first Mars flight demonstration

Moon Ranger
Astrobotic CLPS infusion and Autonomous Rovers for Lunar Exploration

Center Innovation Fund / Early Career Initiative (CIF/ECI)

CIF / ECI Goal

Stimulate and encourage creativity and innovation within the NASA Centers and Early Career leaders in addressing the technology needs of NASA and the nation

CIF/ECI Approach

- **CIF - Support the development of emerging technologies and foster innovation within the NASA workforce**
  - By awarding funding to NASA centers, CIF fosters innovative technology development and partnerships between centers and with other agencies, academia, and private industry to enhance or enable new Agency capabilities
  - CIF provides the necessary seed funding to demonstrate project feasibility before technologies are transitioned and further matured within other NASA programs.

- **ECI - Enable the best and brightest of NASA's early career researchers to lead hands-on technology development projects**
  - ECI invigorates NASA's technology base with innovative management approaches by partnering early career NASA leaders with world-class external partners
  - ECI advances key Agency science and exploration technologies while training the next generation of NASA civil servant scientists, engineers and managers

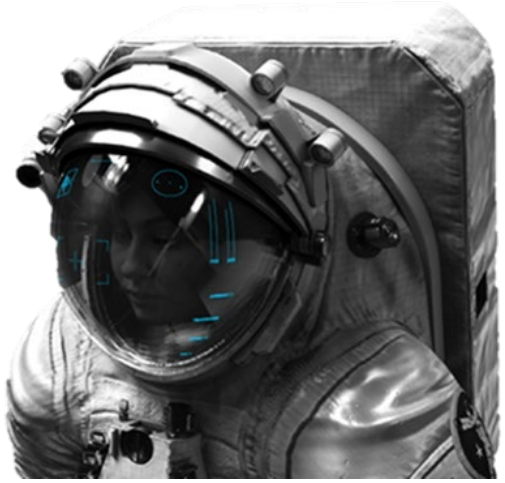
CIF/ECI Solicitations

Based on CIF and ECI solicitation guidelines, the Chief Technologist (or designee) at each center coordinates a competitive internal review and selection process, with proposed CIF and ECI projects submitted to NASA HQ for review and selection.

- CIF typically funds 10-15 projects per Center each year, with typical award amounts of 1-FTE and $50-100k per project
- ECI typically funds a total of 5 projects each year, awarding up to $2.5M per project over a 2-year project life cycle
  - Due to the limited number of ECI awards, only 2 proposals are submitted by each center annually for HQ consideration

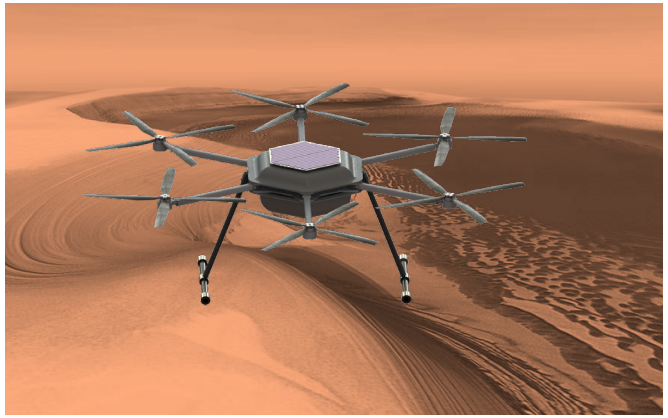
CIF/ECI Impact

Program Successes



ECI: JARVIS (Joint Augmented Reality Visual Informatics System)

- ECI project developed auxiliary display & controls for xEMU suit
- Received additional $2M in AES Polaris funding to continue development and integration



ECI: ROAMX (Rotor Optimization for the Advancement of Mars eXploration)

- 2021 ARC ECI investigated new high performance rotor designs
- Currently working with JPL on the next generation Mars rotorcraft and Sample Return Helicopter

CIF: PAPA (Print Assisted Photovoltaic Assembly)

- 2018 CIF project developed an automated assembly process for the additive manufacturing of thin-film solar panels
- U.S. Patent granted in 2021 (10,930,812)
- Recently executed a licensing agreement with Astrobotic Technology

For additional success stories, visit NASA.gov

Space Technology Research Grants (STRG)

STRG Goal

Tap into the spectrum of academic researchers, from graduate students to senior faculty members, to examine the theoretical feasibility of ideas and approaches that are critical to making science, space travel, and exploration more effective, affordable, and sustainable

STRG Approach

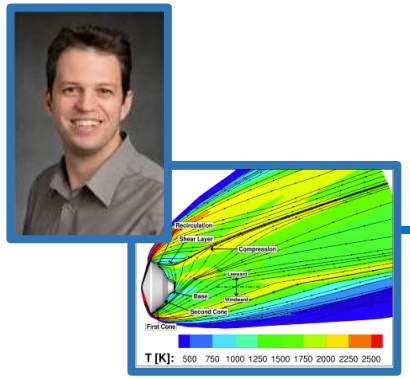
- **Provide Strong NASA Ties**: A NASA Research Collaborator (RC) is assigned to each grant. The RC serves as that grant's steward. RCs are SMEs who enjoy working with academia. They are the conduit between the technology being developed and NASA and are key to STRG's success. We perform grant administrative and funding actions *centrally to* allow research collaborators to focus solely on technical interaction.
- **Fund Early-Stage Research Appropriate for Academia**: Craft topics suited for academic research in 4 of 5 solicitations. Invite student driven research for NSTGRO, aligned with NASA's Technology Taxonomy. Make as many awards as possible in current year while not jeopardizing ability to meet commitments to existing grantees in future years.

STRG Solicitations

NASA Space Technology Graduate Research Opportunities (NSTGRO)	Early Career Faculty (ECF)	Early Stage Innovations (ESI)	Lunar Surface Technology Research (LuSTR) Opportunities	Space Technology Research Institutes (STRI)
Graduate student research in space technology; research conducted on campuses and at NASA Centers and not-for-profit R&D labs	Focused on supporting outstanding faculty researches early in their careers as they conduct space technology research of high priority to NASA's Mission Directorates	University-led efforts on early-stage space technology research of high priority to NASA's Mission Directorates. Paid teaming with other universities, industry, and non-profits permitted	University-led efforts addressing high priority lunar surface challenges. Short duration, high value grants with emphasis on potential infusion. Paid teaming with other universities, industry, and non-profits encouraged	University-led, integrated, multidisciplinary teams focused on high-priority early-stage space technology research for several years

STRG Impact

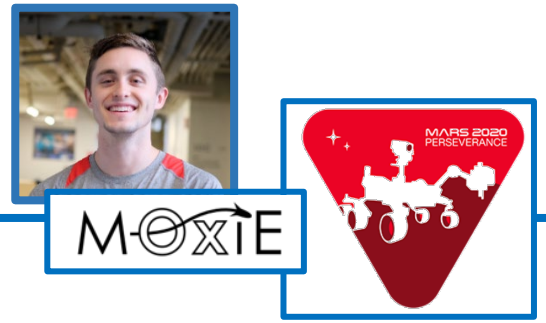
Program Successes



ECF15

Marco Panesi / University of Illinois

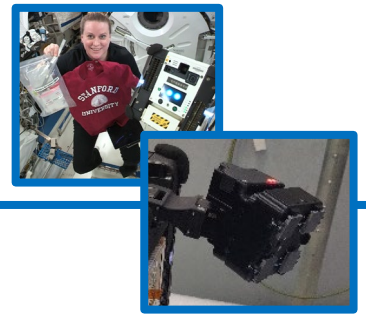
Developed new high-fidelity models of radiation on a planetary entry vehicles backshell. His model was used during aerothermal entry simulations of the Mars 2020 mission.



NSTRF17

Eric Hinterman / MIT

Created a high-fidelity model of the oxygen producing MOxiE experiment onboard Perseverance which is used extensively by the MOxiE team. Eric now serves as the MOxiE payload uplink lead during Mars surface operations



ESI15

Mark Cutkosky / Stanford University

The Gecko Gripper built, installed, and successfully tested onboard ISS in April through an extension to Prof. Cutkosky's ESI15 project which developed the underlying adhesive technology. The gripper allows the Astrobee robots to grasp or perch onto nearly any flat surface.

STRI16 (CUBES)

Peidong Yang / University of California, Berkeley

Dr. Yang developed a biohybrid artificial photosynthesis process which can be used to produce various carbon-based resources like methane fuel, polymers, and pharmaceutical precursors on Mars. The process doubles the previously reported photon efficiency for plants and has potential terrestrial applications. Dr. Yang won the 2020 Global Energy Prize for his work.

ADD STRG 1000 Story link if we have it by then…

Small Business Innovation Research (SBIR) / Space Technology Transfer Research (STTR)

SBIR / STTR Mission

Empowering all small business communities to imagine, build, and utilize revolutionary technologies to drive NASA and the national economy to reach new heights.

SBIR / STTR Approach

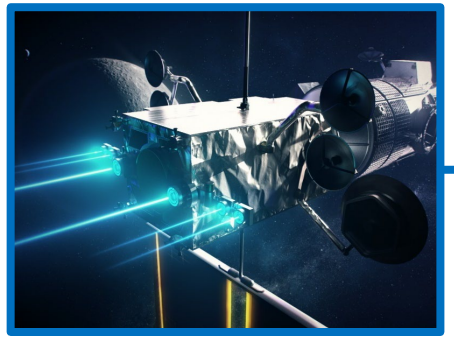
- **The Program funds small businesses to develop technology based on NASA needs for infusion and/or commercialization.**
- **SBIR:** A set-aside program for small businesses to engage in Federal R&D with potential for commercialization.
- **STTR:** A set-aside program to facilitate cooperative R&D between small business concerns and U.S. Research Institutions with potential for commercialization.

SBIR/STTR Solicitations

SBIR/STTR Phase I	SBIR/STTR Phase II	SBIR/STTR Post Phase II (II-E, CCRPP, Sequentials Phase II, Phase III)	SBIR Ignite
Establishes the scientific, technical, and commercial merit and feasibility of a proposed innovation. Phase I work is competitively selected and provides a sound basis for the continued development and demonstration of the proposed innovation.	Focuses on the development, demonstration, and prototyping of the innovation. Only those awarded a Phase I contract are eligible to submit a proposal for Phase II. These projects are chosen as a result of competitive evaluations.	The Agency currently has several additional funding opportunities to further de-risk technology developed earlier in the Program and unique sole source authority to support commercialization success.	An experimental solicitation for small businesses designed specifically to fund ideas that are relevant in the commercial market, while contributing to the goals of the Agency's mission directorates.

SBIR/STTR Impact

Program Successes



Gateway

Two SBIR/STTR awardees will contribute technology to the Power and Propulsion Element for Gateway

Rover Slip Estimation and Traction Control for Optimal Mobility in Lunar Environments Company

Company will improve NASA's VIPER mission's rover locomotion performance, particularly for traversing terrain with uncertain terramechanical properties and hazards.

Mango Materials' founders Dr. Molly Morse, Dr. Allison Pieja, and Dr. Anne Schauer-Gimenez are developing systems to convert methane into usable material

Methane Bioreactor System Offers Sustainable Plastic Alternative for Earth and Space

Awardee adapted a bioreactor system to convert methane into bioplastic for low-gravity environments leveraging matching funds from fashion investors seeking alternatives to plastic-based textiles.

For more SBIR/STTR Impact and Success Stories, visit: https://sbir.nasa.gov/success-stories

Prizes, Challenges and Crowdsourcing Program (PCC)

PCC Goal:

Create opportunities for diverse and non-traditional sources in NASA research and technology solutions to support NASA missions and inspire new national aerospace capabilities using open innovation tools and approaches

PCC Approach:

- **Maximize NASA's open innovation toolkit capabilities.** The PCC Program actively works to understand, evaluate, and use new crowdsourcing methods as they emerge and mature.
- **Integrate open innovation into NASA programs, practices, and culture and infuse resulting technologies to meet Agency needs.** The PCC Program works with other NASA directorates, programs and Centers to integrate and infuse open innovation solutions.
- **Enhance the end-to-end engagement and support of the solver community.** The PCC Program seeks and attracts diverse participants for PCC Program opportunities, supporting and enabling them through their participation, and informing and sustaining communications and relationships afterward.
- **Expand and enhance a network of external partners.** The PCC Program creatively partners with other NASA Mission Directorates (MD), Centers, NASA programs/projects, and external organizations (such as non-profits, academic institutions, industry, and other US federal agencies) to formulate, invest in, and promote the use of open innovation projects.
- **Strengthen program stewardship.** The PCC Program continually assesses internal processes to increase its impact and cultivate operational best practices.

PCC Activities:

NASA Tournament Lab projects	NASA Spark	Centennial Challenges
NTL challenges and crowdsourcing projects allow NASA and other government agency researchers, scientists and engineers to seek novel ideas or solutions to accelerate research and development efforts, improve algorithm performance, and seek new ideas and approaches in support of their work.	The NASA Spark platform enables NASA employees and leaders to solicit innovative ideas and solutions from the NASA civil-servant and contractor workforce in support of agency needs.	Centennial Challenges competitions stimulate research and technology solutions to support NASA missions and strategic NASA technology gaps, build community, conduct targeted outreach, and ensure follow-on activities.

PCC Impact

Program Successes

Photo: Phase 3 winner, AI. Space Factory

3D Printed Habitat Challenge

The challenge incentivized the development and demonstration of processes and equipment for large-scale vertical autonomous construction, diversity and innovation in viable designs for realistic planetary habitats, and new software and control algorithms for depositing material in a non-two-dimensional layer. Post-challenge, several teams have continued to contribute to NASA through projects such as the CHAPEA analog at JSC and contracts with KSC and MSFC to continue to explore additional applications for future space missions.

PCC Facts and Figures

PCC conducts public-facing challenges in support of all NASA mission areas, addressing several agency priorities.

10.8K solutions

Public competitions in FY22 yielded 10,751 solutions across 43 projects, with $4.6M awarded in prizes.

Solutions in FY22 came from at least 47 of the 50 U.S. States. The SOHO Comet Challenge alone attracted participants from 81 countries.

Added 13 new NOIS2 vendors in FY22 and executed task orders with 19 commercial crowdsourcing platforms.

74% of total NOIS2 awards were to small business vendors, which accounted for 60 task orders, approximately $13M in value.

25 NASA@WORK projects

PCC ran 25 projects on NASA Spark (previously NASA@WORK), NASA's internal crowdsourcing platform, in FY22 with 6,000 participants.

98%

98% of NASA challenge owners were satisfied with the results of PCC challenges they ran in FY22.

NASA Technology Transfer

Tech Transfer Goal

To bring NASA technology down to earth. NASA Technology Transfer (T2) ensures that innovations developed for exploration and discovery are broadly available to the public, maximizing the benefit to the Nation, and enabling spinoffs.

Tech Transfer Approach

- **T2 encourages technology-driven economic growth by offering commercialization pathways for NASA technologies**
  - T2 licenses and transfers technologies to companies, universities, and federal labs all over the nation, executing over 900 patent licenses and over 30,000 software usage agreements in the last decade
- **A component of T2, T2X, accelerates high-tech startups through regional partnerships and entrepreneurial workforce activities, increasing NASA's regional presence and stimulating the US economy**
  - T2X hosts commercialization boot camps that reach more than 250 NASA employees and engages in more than 48 university partnerships across 25 states
  - T2X offers specific research and accelerator partnerships specifically for minority entrepreneurs and HBCU alumni and students
  - Engaging entrepreneurs through the T2X program helps increase venture creation, strategic partnership, university partnerships, and entrepreneurial opportunities through regional collaborations

Patent Licensing	Software Release	Spinoff	Technology Transfer University	Engagement
NASA maintains a portfolio of patents with commercial potential and makes them available to the public through the patent licensing program	Offers hundreds of new software programs businesses can download for free to use in a wide variety of technical applications	Spinoff highlights NASA technologies that benefit life on Earth in the form of commercial products, with 2,000 spinoffs profiled since 1976	This program connects universities with NASA-developed technology to give students the opportunity to work with federal government technology	T2X engages with regional economic development agencies, incubators and accelerators around the US

NASA Technology Transfer Success

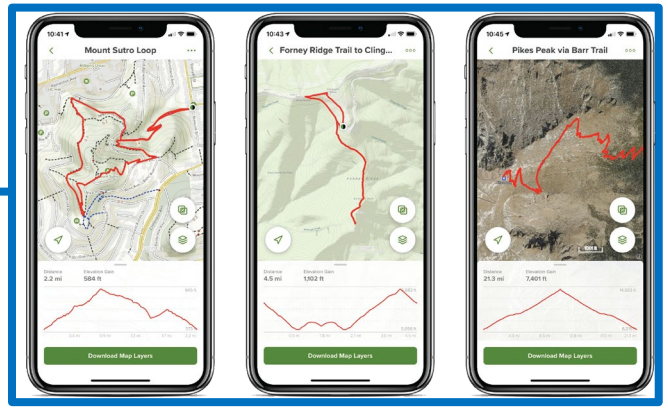
Commercialization Successes

JWST Tech Improves Eye Surgery

A system for guiding Lasik eye surgery is a by product of early research on the James Webb Space Telescope mirrors. Now, the tech has been incorporated in Johnson & Johnson's iDesign.

NASA Ventilator Helps Save Lives

During the Pandemic, engineers at JPL designed a ventilator that could be produced quickly and cheaply. It has been licensed by companies worldwide and provides aid in countries with inconsistent medical infrastructure.



The View from Space Keeps Getting Better

Mapbox, a $1B company with dozens of household names among its customers, provides a platform and data for developers to build map-based applications using Landsat data.

For more Technology Transfer Impact and Success Stories, visit:https://technology.nasa.gov/

Early Stage Innovation and Commerce (ESIC)

ESIC Goal

To increase the impact of ESIP Programs working across NASA and industry as they work towards audacious outcomes that no one Program could achieve singlehandedly. Early Stage Innovation and Commerce (ESIC) supports the ESIP Portfolio in achieving objectives that can only be accomplished through the strength of all Programs working together.

ESIC Approach

ESIC addresses several ESIP/STMD gaps complementing other existing Programs, including for example:

- Expands emphasis on Inclusive Innovation and participation by underrepresented and underserved communities across STMD programs.
- Increasing the rate of transition from university labs to market by actively supporting entrepreneurship in university-based research.
- Building capability for evidence-driven evaluation and technology transition.
- Initiates new partnerships and methods for early-stage research and transition.

ESIC Activities:

Pilots and Entrepreneurship	Inclusive Innovation	External Engagement
NASA I-Corps Short Course: A grant with funding up to $10k to support development of entrepreneurial skills. **NASA I-Corps National Course**: Following completion of the Short Course, an opportunity to apply for additional funding, up to $40K.	**Inclusive Innovation Prize**: Awarding $500k to up to 20 awardees to engage and celebrate individuals and organizations who amplify capabilities of underrepresented space technology innovators and researchers.	**Events and Outreach**: ESIP engages external audiences at relevant industry events, such as SACNAS or NSBE, with the goal of building and nurturing diverse communities throughout the ESIP portfolio.

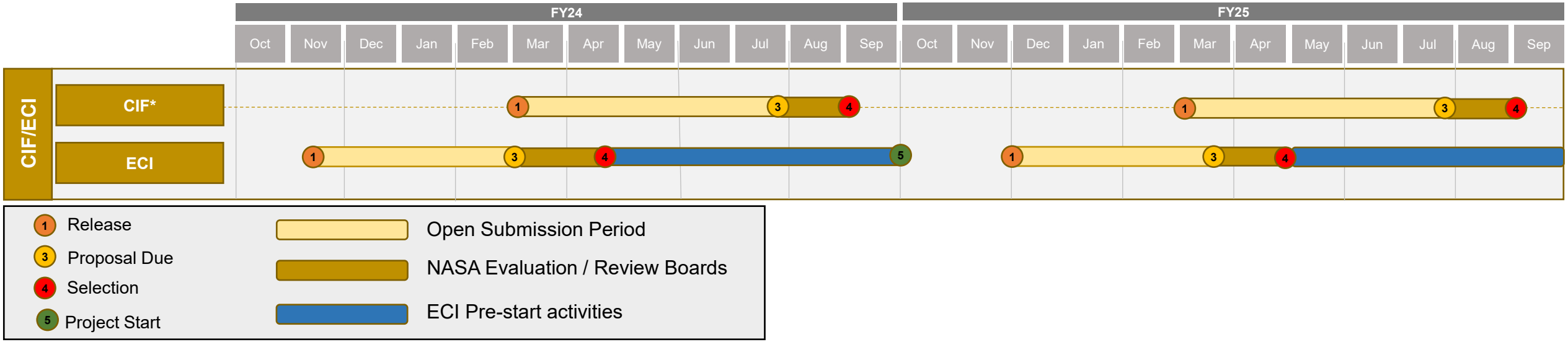
List of Acronyms

- **CCRPP** – Civilian Commercialization Readiness Pilot Program
- **CIF** – Center Innovation Fund
- **ECF** – Early Career Faculty
- **ECI** – Early Career Initiative
- **ESI** – Early-Stage Innovations
- **I-Corps** – Innovation Corps
- **LuSTR** – Lunar Surface Technology Research
- **NIAC** – NASA Innovative Advanced Concepts
- **NSTGRO** – NASA Space Technology Graduate Research Opportunities
- **NTL** – NASA Tournament Lab
- **PCC** – Prizes, Challenges, and Crowdsourcing
- **SBIR** – Small Business Innovation Research
- **STRG** – Space Technology Research Grants
- **STRI** – Space Technology Research Institutes
- **STTR** – Small Business Technology Transfer

How does CIF/ECI work?

The Center Innovation Fund (CIF) stimulates and encourages creativity and innovation at NASA centers while addressing technology needs. The Early Career Initiative (ECI) enables early career researchers to lead hands-on technology development projects meaningful to NASA.

More information on CIF/ECI processes can be found at: [CIF/ECI | NASA]



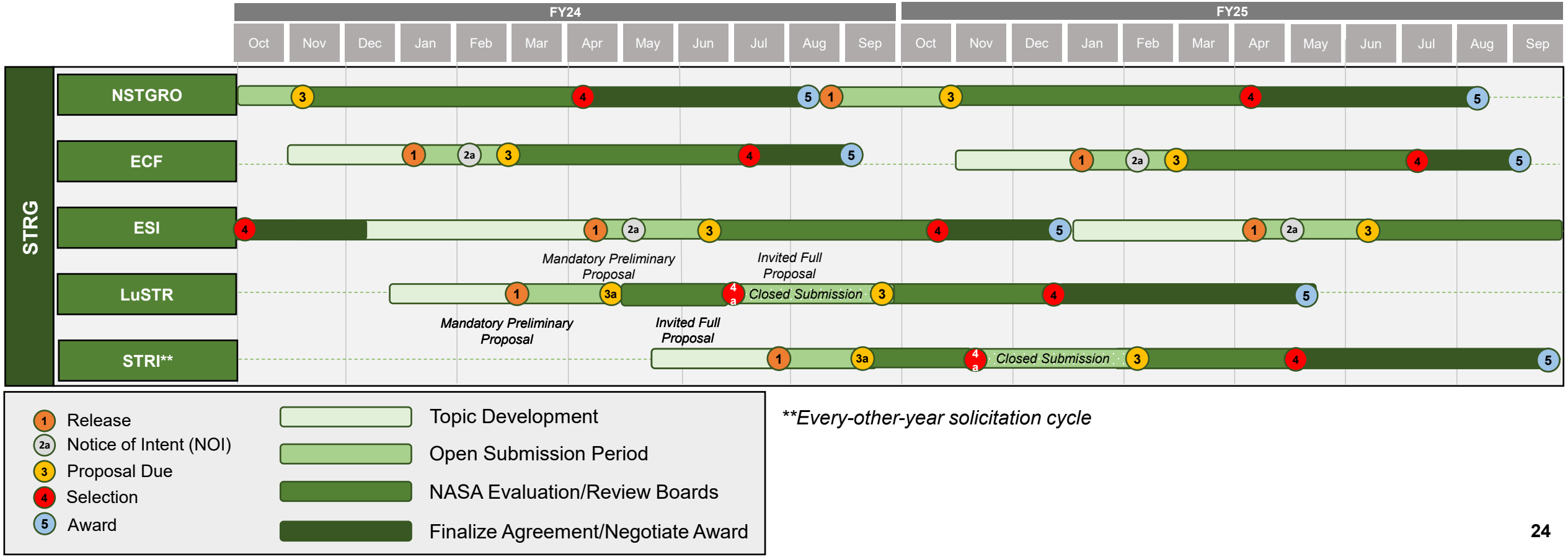
*Aggregate representation of solicitation process across 10 centers, timing may vary

How does STRG work?

STRG's five grant programs (NSTGRO, ECF, ESI, LuSTR, and STRI) accelerate the development of low TRL space technologies to support future space science and exploration needs of NASA, other government agencies, and the commercial space sector.

More information on STRG can be found at: [Space Technology Research Grants (STRG) | NASA]

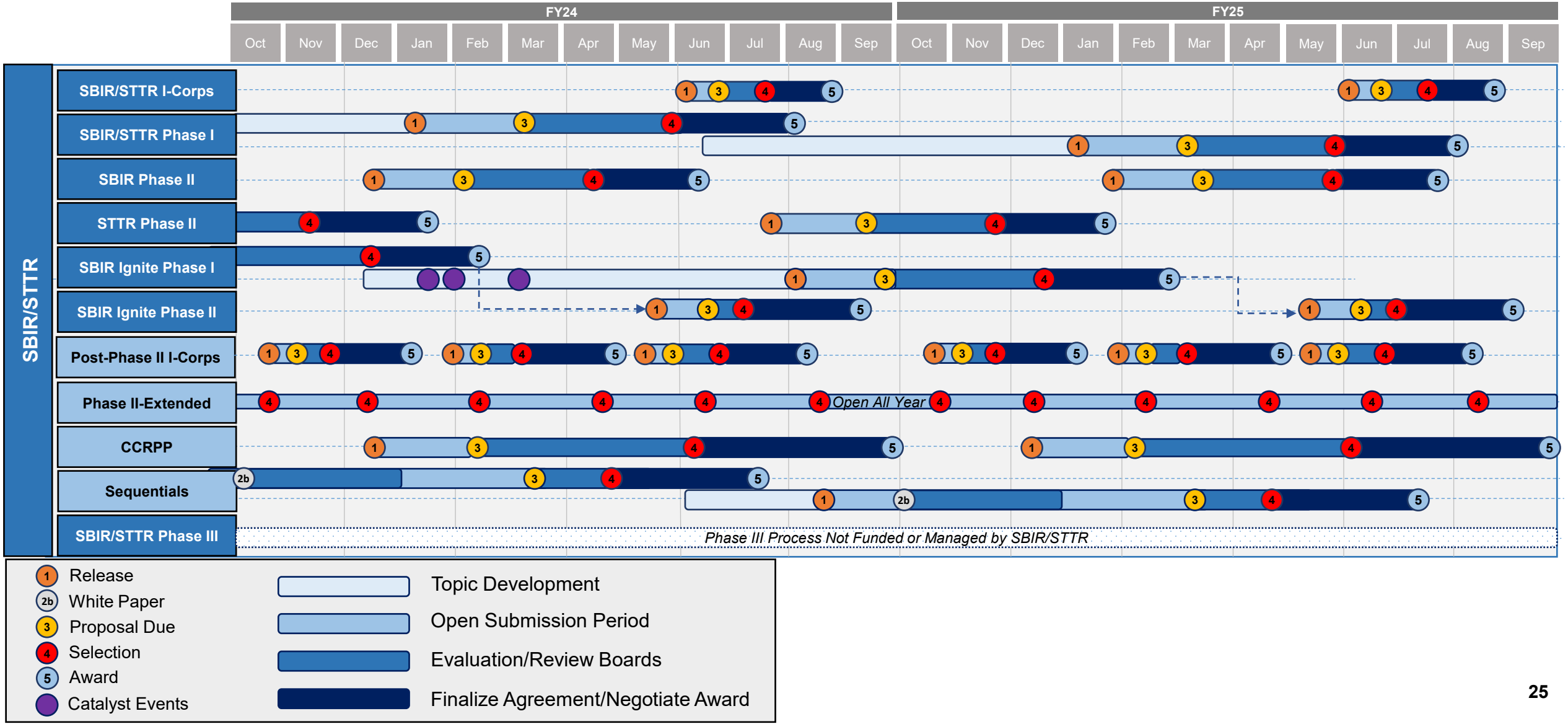
Information on all STRG grants can be found in the NSPIRES database at: [NSPIRES - NASA Research Opportunities Online]



***Every-other-year solicitation cycle*

How does SBIR/STTR Work?

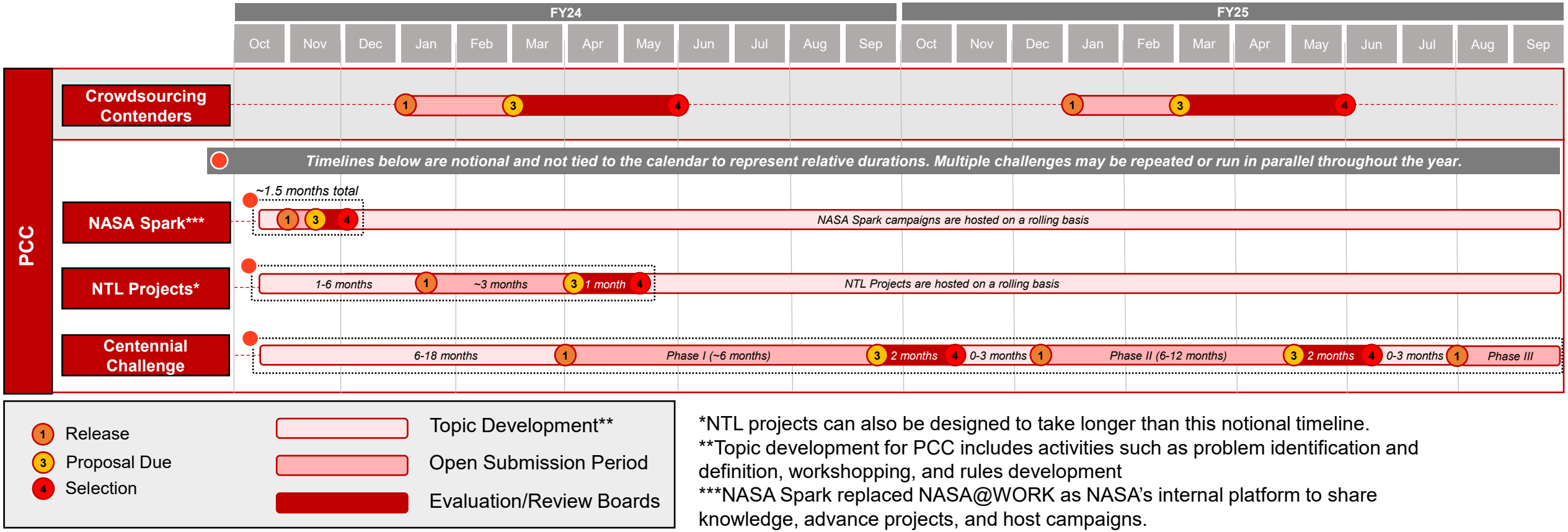
See more information on SBIR/STTR processes here and information on all SBIR/STTR solicitations here.



How does PCC work?

Prizes, Challenges, and Crowdsourcing makes opportunities available for public participation in NASA research and technology solutions to support NASA missions and inspire new national aerospace capabilities. PCC's two elements (NASA Tournament Lab and Centennial Challenges) support a structure that invites the participation of universities, small businesses, students, individual inventors, and others on an ongoing basis.

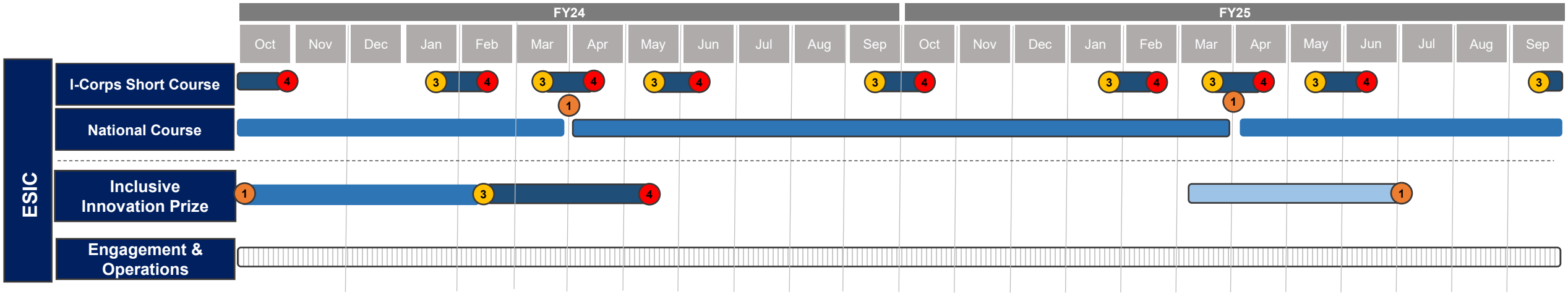
Information on all PCC active and future challenges can be found at: [Participate with NASA Solve | NASA]



*NTL projects can also be designed to take longer than this notional timeline.
**Topic development for PCC includes activities such as problem identification and definition, workshopping, and rules development
***NASA Spark replaced NASA@WORK as NASA's internal platform to share knowledge, advance projects, and host campaigns.

How does ESIC work?

The Early Stage Innovation and Commerce (ESIC) objective is to advances ESIP priorities through pilots and initiatives to drive technology-based economic growth by addressing inclusive innovation barriers to secure American leadership in space technology by promoting engagement and evidence-based implementation.



Timelines below are notional and not tied to the calendar to represent relative durations.

- 1 Release
- 3 Proposal Due
- 4 Selection

Topic Development

Open Submission Period

Evaluation/Review Boards

Execution and Development

~1.5 months total