

New York Consortium for Space Technology Innovation and Development

Funding Program Overview and Proposal Process

DRAFT

1. Key Dates

Project proposal submission open	4/9/2024 5:00 PM EDT
Informational webinar	4/16/2024 12:00PM EDT
Step 1 Quad Charts due	4/26/2024 5:00 PM EDT
Step 1 downselect proposers notified	5/15/2024
Step 2 white papers due	6/6/2024
Step 2 project pitches (day before symposium)	6/13/2024
Step 2 Selections announced at symposium	6/14/2024
Signed MOU/MOAs Due to NYCST	8/1/2024
Start Date:	8/1/2024 – 9/15/2024

2. Solicitation Point of Contact

Meghan Serdock
nycst@cornell.edu
106 Ward Hall, Ithaca NY 14853
(607) 255-2710

3. Proposal Selection Process

Proposals will undergo a two-step evaluation process designed to streamline project selection and funding:

Step 1 Initial Screening: This step is open to all members of the NYCST. The primary goal is to identify proposals that closely align with the NYCST mission and project objectives.

Step 2 Full Proposal and Project Pitch: Only those whose proposals pass the initial screening in Step 1 will be invited to participate in this final step. Each selected proposer will be asked to provide a more detailed plan for the proposed project, including a written description in the form of a white paper and a concise pitch to the selection committee.

4. Award Details

Period of Performance:	3 - 9 months
Expected Award:	\$0 - \$100,000 funding direct to the proposing organization Access to NYCST resources (facilities and staff) Facilitated access consultation for CCMR and CHES facilities.
Expected number of awards:	5 – 10

5. Proposal Submission

For Step 1, proposers must complete the [Quad Chart template](#) and email it to the Solicitation Point of Contact. An NYCST representative will then reach out to discuss any additional information needed and will provide instructions for Step 2 (if selected).

6. Focus Areas

The New York Consortium for Space Technology Innovation and Development (NYCST) aims to address the need for advanced defense space technology manufacturing and supply-chain capabilities by fostering collaboration among universities, research institutions, industry experts, and government agencies in New York State. This proposal opportunity endeavors to address these needs by supporting activities in three specific focus areas:

- 1) **Infrastructure Improvements:** Upgrades should aim to elevate our capabilities in spacecraft development, verification, and operations, including enhancements for fabrication, integration, and testing, and the establishment of a multi-user mission control center. Priority will be given to projects that enhance infrastructure to benefit the consortium broadly, especially enhancements to the NYCST facility at Cornell University.
- 2) **Workforce Development:** Projects that invest in training, upskilling, and consulting to enhance the skills and knowledge of our workforce and students are sought. These projects include activities like industry training, outreach programs, internships, scholarships, and workshops that inspire interest in space-technology careers and nurture talent, aiming to improve manufacturing capabilities for high-priority DoD space technologies.
- 3) **Research and Development:** We are looking for projects that drive technological research and development in critical areas such as autonomous systems for space, cybersecurity, advanced space-component manufacturing, optics, photonics for space applications, operations and supply-chain resilience related to next-generation space systems. The goal is to foster innovation and growth in these key domains, enhancing the capabilities of consortium members to supply DoD with cutting-edge space technologies.

Proposers shall request resources to achieve their objectives, which may involve any or all of these areas. Resources include funding that NYCST will provide directly to the proposing organization through a contract as well as allocation of facilities access, staff expertise, equipment time, and related resources at the NYCST site at Cornell University. These resources include world-class instrumentation within the Cornell Center for Materials Research ([CCMR](#)) and the Cornell High Energy Synchrotron Source ([CHESS](#)) which house a variety of instrumentation for compositional and structural materials analysis from the millimeter to sub-nanometer scales. The proposal will not include explicit costs for NYCST resources; instead, successful step 2 proposers will work with NYCST on the amount and timeline for this allocation.

Because Cornell engages in fundamental research and therefore does not provide defense services, any technical activities of Cornell staff (faculty, students, and others) in these proposals cannot be subject to ITAR, EAR, CUI, or other restrictions. Collaborators may bring restricted hardware and software to the NYCST facility in Ward Hall and will be responsible for its custody.

7. Step 1: Initial Screening – Quad Chart Submission

The initial screening requires submission of a single page Quad Chart that succinctly summarizes the project proposal. The Quad Chart is a vital tool that allows NYCST’s selection committee to quickly grasp the essence, potential impact, and feasibility of your project. Submissions that align with NYCST program mission and priorities may be invited to proceed to Step 2 of the proposal process. The following guidelines and Quad Chart Template are all that is required to complete a submission.

The Quad Chart must be submitted as a single-page PDF document in landscape Format. Submit the Quad Chart as a single PDF by the date shown on the first page of this document.

Quad Chart Guidelines

TEMPLATE: https://nyspacetech.com/wp-content/uploads/2024/04/NYCST_Quad_Chart_Template.pptx

Header (Top):

- Title of project
- PI/Organization

Quadrant 1 (Upper Left): Program/Project Overview

- A brief summary
- State the goals, objectives, and the specific problem or need your project addresses.

Quadrant 2 (Upper Right): Approach/Technology

- Describe the methodology, technology, or approach you propose to use.
- Highlight the innovation or uniqueness of your project and how it differentiates from existing solutions.

Quadrant 3 (Lower Left): Performance Metrics/Results

- Outline the expected outcomes, results, and/or performance metrics that will demonstrate the success of your project.
- Include any preliminary results if available, or state the milestones you aim to achieve.

Quadrant 4 (Lower Right): Cost, Schedule, and Points of Contact

- Provide an overview of the project cost, funding requirements, start date, and project duration.
- List the main points of contact, including the project leader and any key team members.

General Guidance:

- Ensure that the Quad Chart is self-explanatory and can stand on its own without the need for additional documents or explanations.
- Late submissions will not be considered. On-time submission and compliance with the provided format and content guidelines are required.

8. Step 2 Proposal Content

Step 2 of the proposal process builds upon the initial screening, requiring proposers to provide explicit detail. This step consists of two activities: 1) Submission of a white paper and a pitch deck; 2) a project pitch (in-person or virtual presentation).

White Paper

Cover Page

- Title of the Proposal: A concise yet descriptive title that clearly conveys the essence of the proposed project.
- Proposer's Name(s): The name(s) of the individual(s) or organization(s) submitting the proposal, including the principal investigator (PI) or project lead
- Affiliation: The proposer's institutional or organizational affiliation, which could include the name of the university, company, research institute, or government agency.
- Contact Information: Detailed contact information for the principal investigator or project lead, including mailing address, email address, and phone number.
- Proposal Duration: The proposed start and end dates of the project, indicating the total duration.
- Total Budget: The total amount of funding requested direct to the organization, if applicable.
- NYCST Resources: summary of NYCST resources requested.
- Confidentiality Notice: If the proposal contains sensitive or proprietary information, a brief confidentiality notice may be included on the cover page. Do not include ITAR, EAR, CUI, or classified information. Any proposal so marked will not be considered for funding.

Summary (Limit: 200 Words)

This should capture the information contained in the Quad Chart in narrative format.

Technical (Page Limit: 2 pages)

State the objective(s) of the proposed work in terms of any combination of the three focus areas listed in **Section** Error! Reference source not found. of this document. They can include TRL advancement, capabilities enhancement, training goals, and any expected outcomes from studies. Explain the relevance of each objective to DoD priorities in space-related manufacturing in the region. Justify the resources required to achieve those objectives. Discuss any requirements for limiting access to materials kept at Cornell's NYCST site consistent with ITAR, EAR, CUI, or proprietary-data restrictions. No classified materials can be brought to Cornell's NYCST site.

Deliverables (Limit: 1 page)

The deliverables shall include a mid-term report (no more than 5 pages) and a final report (no more than 10 pages). Awardees are required to present a 5 minute summary of their proposed work at the Annual Symposium. At the proposer's discretion, additional deliverables may be described, such as IP licensing opportunities, publications, and training modules for repeated use.

Budget (Limit: none)

Provide a table in the following format, specifying resources in the "quantity" column.

Resource	Quantity	Units
Undergraduate Internship (400 hours)		# of interns
Graduate Internship (400 hours)		# of interns
Dedicated lab space (between 100 and 300 sf, depending on availability)		months
Class 10,000 cleanroom		days
3D Printing (ABS or PLA)		hours
Thermal-vacuum chamber (TVC)		days
TVC Technician		hours
Vibration Test		days
Vibration test technician		hours
Mission-Operations Center (high bay testing)		days
Mission-Operations Center (space operations)		days
Graduate Research Assistant (4 months = 1 semester; fall or spring only)		# of semesters
Faculty Research Time		hours
Direct funding to Proposer's Organization	n/a	\$

Refer to the [CHESS](#) website and the [CCMR](#) website for opportunities to incorporate those capabilities into the proposed projects.

Include a justification of any direct funding to the proposer's organization.

References (Page Limit: none)

Include any references, e.g. to DoD technology-strategy documents, academic publications, press releases, _____ or _____ websites.

Pitch Slides

1. Title Slide: Project name, Presenter's name and title, Date of the presentation, Logo of your organization or the project (if available)
2. Problem Statement: Describe the problem you are addressing. Highlight the need or gap in the NY Space Technology ecosystem.
3. Solution: Introduce your solution to the problem identified. Explain how your project addresses the problem effectively. Discuss the potential for impact.
4. Technology or Methodology: Overview of the technology or methodology you're using. Highlight any innovative aspects.
5. Roadmap and Milestones: Outline the project's current status and planned milestones. Provide timelines for critical development stages or phases.
6. Team: Introduce the key team members and their roles. Highlight relevant experience or expertise.
7. Financials: Summarize the budget, funding requirements, and financial projections. Include information on any existing financial support or partnerships.
8. Summary Quad Chart: Provide an updated quad chart. This is the final slide of your presentation.

Each slide should be designed to be visually engaging and straightforward, using graphics, charts, and bullet points to convey information clearly and concisely. Remember, the goal is to tell a

compelling story about your project that resonates with the selection committee, persuading them of its value and viability.

Project Pitch

As part of Step 2, proposers will deliver a ten-minute project pitch to the selection committee. The pitch is a crucial opportunity to showcase the uniqueness of their project, its innovative solutions, and the team's capability to execute the vision. Details on pitch time and location will be provided to Step 2 applicants at a later date.

9. Selection Criteria

- Relevance to national priorities in space technology (30%)
- Prospects for advancing the region's capabilities for DoD-relevant space manufacturing (30%)
- Cost Realism (40%)

Proposals that request resources at NYCST that are unavailable, i.e. not listed in Section 10, will not be selected.

10. Resource Allocation for Proposal Budgets

This section explains the resources available at the NYCST site.

- Undergraduate Internship (400 hours)

The proposer may request one or more undergraduate interns to work on their project. A single internship is meant to represent 400 hours of effort, for which NYCST will pay the intern a stipend of \$8000. The proposing organization may select an individual, or the selection may be performed by NYCST staff. In either case, the proposing organization will be expected to provide guidance and mentorship to that student in the performance of their duties on the project and will be expected to comply with export-control regulations. When the internship is complete, the proposing organization will be requested to provide a letter documenting the approximate value of this mentorship (staff time, access to proposer's equipment, and/or other value) to be reported to NYCST's sponsor.

Typical tasks for an undergraduate intern include fabrication, detailed design, coding, testing, and mission operations for spaceflight hardware and software.

- Graduate Internship (400 hours)

The proposer may request one or more graduate-student interns to work on their project. A single internship is meant to represent 400 hours of effort, for which NYCST will pay the intern a stipend of \$9000. The proposing organization may select an individual, or the selection may be performed by NYCST staff. In either case, the proposing organization will be expected to provide guidance and mentorship to that student in the performance of their duties on the project and will be expected to comply with export-control regulations. When the internship is complete, the proposing organization will be requested to provide a letter documenting the approximate value of this mentorship (staff time, access to proposer's equipment, and/or other value) to be reported to NYCST's sponsor.

Typical tasks for a graduate intern include systems architecture, analysis, modeling, simulation, software engineering, and task leadership (e.g. supervising undergraduate interns) for spaceflight hardware.

- Dedicated lab space (between 100 and 300 sf, depending on availability)

NYCST can offer one or more lab spaces on site at Ward Hall at Cornell University for the exclusive use of the proposing organization during the period of performance. Each such room is uniquely keyed and access limited through either card readers or hard keys. There are two types: 1) ESD-safe assembly and test labs, which can include a class 10,000 soft-wall clean room of about 200 sf, ESD-compliant lab benches, flooring, and basic tools; 2) mechanical assembly and rest labs, which include lab benches but are not suitable for intensive fabrication. Fabrication can occur in a neighboring shared space, the use of which requires only coordination (not necessary to specify in this proposal). 7 are expected to be available for the use of NYCST members to support activities proposed here. These labs are allocated on a first-come, first-served basis. While access can be provided to Cornell's network, any export controlled materials must be maintained on the proposer's own devices, not connected to the network.

General equipment available in these spaces includes lab benches (Figure 1), power supplies, oscilloscopes, multimeters, mechanical tools, and basic metrology devices. Specialized equipment includes solar simulators (for replicating the sun's spectrum, as shown in Figure 2) and microscopes (Figure 3).

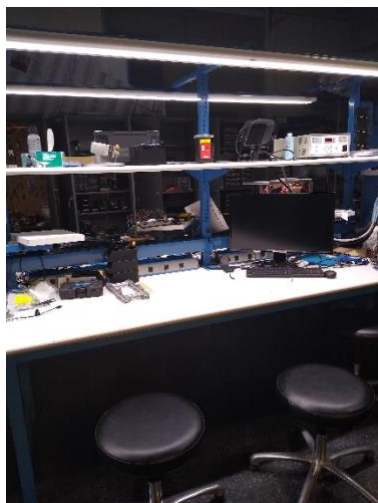


Figure 1.
ESD Compliant Lab Benches



Figure 2.
Figure 2. Solar Spectrum Simulator



Figure 3.
Microscope

- Class 10,000 cleanroom

NYCST houses two small, class 10,000 soft-wall clean rooms of about 200 sf each. Two of the ESD-safe assembly labs include one of these clean rooms. Each clean room has a gowning area, ESD-safe tables, and basic cleanroom supplies. Figure 4 shows a clean room with gowning vestibule.



Figure 4. Class 10,000 clean room

- 3D Printing (ABS or PLA)

There are two basic 3D printers available for NYCST member use. Each is a “Longer” brand LK5 Pro 3D printer with a 300*300*400mm (11.8"x11.8"x15.7") print volume. Multiple filaments are available.



Figure 5. 3D Printers (2)



Figure 6. Thermal-Vacuum Chamber

- Thermal-vacuum chamber (TVC)

NYCST's Thermal Vacuum Chamber is shown in Figure 6. It has a roughly cylindrical usable internal volume 0.889 m (35 in.) in diameter and 0.71 m (28 in.) deep. It achieves approximately $1e-6$ Torr vacuum, offers a cold plate and a Xenon heater to for thermal-cycling, and multiple feed-throughs (notably a USB interface) for data and power.

- TVC Technician

It is likely that proposals involving use of the TVC will require the expertise of an NYCST staff member trained in the operation of that equipment. A typical test campaign consists of at least 16 hours' staff time to set up and verify the performance of the TVC. If required, 24-7 monitoring the test may be best assigned to an undergraduate intern.

- Vibration Test

NYCST's Vibration-Test Facility is designed for test articles less than 50 kg. Specifics on this facility are not currently available, but detail will be offered before the Step 2 announcements if possible.

- Vibration test technician

It is likely that proposals involving use of the vibration test facility will require the expertise of an NYCST staff member trained in the operation of that equipment. A typical test campaign consists of at least 16 hours' staff time to set up and verify the performance of the TVC.

- Mission-Operations Center (high bay testing)

When the Ward Hall high bay has been remodeled to include a spacecraft simulator and large-scale docking interface, this mission-operations center will overlook that testing environment, allowing NYCST members to develop and refine conops with hardware and mission control in the loop. For the present opportunity, this MOC can be used for general-purpose mission simulations.

- Mission-Operations Center (space operations)

When the Ward Hall communications capabilities are in place, this mission-operations center can serve as the focus for in-orbit test of spaceflight hardware, allowing NYCST members to raise the readiness of their technology to TRL 7 through successful mission operations. For the present opportunity, this MOC can be used for general-purpose mission simulations.

- Graduate Research Assistant (4 months = 1 semester; fall or spring only)

The proposer may request one or more graduate research assistants to work on their project. A graduate student conducts research with the guidance of a Cornell faculty member (the GRA's research adviser), for which NYCST will pay the graduate student's tuition and fees (approximately \$25,000/semester). Each graduate student must be a U.S. citizen, per the terms of the DoD sponsor. The proposing organization may select an individual from among current Ph.D. students at Cornell, or the selection may be performed by NYCST staff. In either case, the proposing organization will be expected to collaboratively task the GRA through their research adviser.

Typical tasks for a GRA include basic or applied research, systems architecture, analysis, modeling, simulation, software engineering, and task leadership (e.g. supervising undergraduate interns) for spaceflight hardware.

- Faculty Research Time

The proposer may request some number of hours of Cornell faculty research. The proposal should specify the faculty member explicitly or merely summarize the required areas of expertise. In the latter case, NYCST staff will work to identify an appropriate faculty member to contribute to the project. Areas of expertise include spacecraft thermal engineering, guidance/dynamics/controls for attitude and orbits, dynamics simulation, materials science and manufacturing, space structures, mission operations, spacecraft systems architecture, optical engineering, and spacecraft propulsion. More information on areas of faculty expertise is available here: <https://www.mae.cornell.edu/mae/faculty-directory>