Introduction to NSF X-Labs Funding Opportunity

Scientific Instrumentation for Sensing and Imaging

NSF Directorate for Technology, Innovation and Partnerships (TIP)

May 28, 2026

XLabs@nsf.gov

NSF X-Labs

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Agenda

1. **Opening Remarks**
   Erwin Gianchandani, NSF Assistant Director for TIP
2. **Introduction to NSF X-Labs**
   a) Rationale & Strategic Objectives
   b) Programmatic Structure
   c) OT Contracts
   d) X-Lab Teams
   e) Milestones
   f) Phase 0 Selection
3. **Topic Overview: Scientific Instrumentation for Sensing and Imaging**
4. **Live Q&A**
   We recommend waiting to ask your question until after the presentation

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Opening Remarks
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NSF Assistant Director for TIP

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Documents available on SAM.gov

[Other Transaction Agreement Solutions Offering (OTASO)]

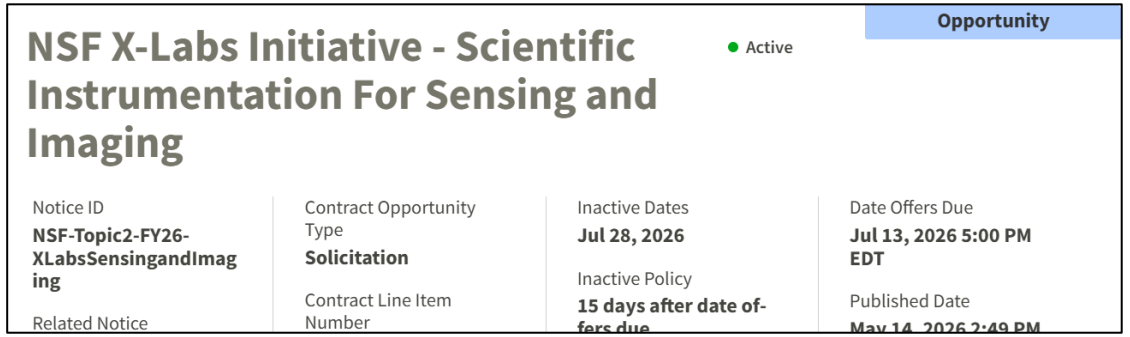
[Topic Announcement]

Opportunity

U.S. National Science Foundation (NSF) X-Labs Initiative

● Active

Notice ID	Contract Opportunity Type	Inactive Dates	Date Offers Due
NSF-OTASO-FY26-XLabsInitative	**Solicitation**	**May 29, 2028**	**May 14, 2028 3:00 PM EDT**
Related Notice	Contract Line Item Number	Inactive Policy	Published Date
(blank)	**(blank)**	**15 days after date of-fers due**	**May 14, 2026 2:44 PM EDT**



Opportunity

NSF X-Labs Initiative - Scientific Instrumentation For Sensing and Imaging

● Active

Notice ID	Contract Opportunity Type	Inactive Dates	Date Offers Due
NSF-Topic2-FY26-XLabsSensingandImaging	**Solicitation**	**Jul 28, 2026**	**Jul 13, 2026 5:00 PM EDT**
Related Notice	Contract Line Item Number	Inactive Policy	Published Date
		15 days after date of-fers due	**May 14, 2026 2:49 PM**

Summary

Objective
Provide the structure, resources, and flexibility necessary to develop innovative platform technologies that will accelerate breakthroughs and unlock new economic sectors

Key Features

- **Independent R&D teams** with the ability to adapt quickly to evolving technology
- **Operational autonomy** – flexible use of subawards and independent hiring
- **Other Transaction (OT) contracts** with milestone-based funding
- **Cross-sector collaboration** across academia, industry, and non-profits

Programmatic Structure

Phase 0	Phase 1	Phase 2
≤ $1.5M 9 Months	$10-50 M per year 24-36 Months	$10-50 M per year 24-36 Months

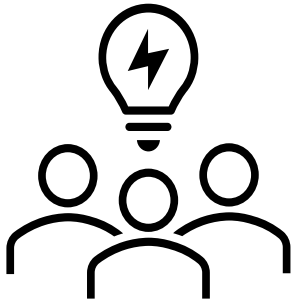
Introduction to NSF X-Labs

Rationale & Strategic Objectives

NSF X-Labs

Rationale & Background

NSF X-Labs addresses the national priority of sustaining U.S. leadership in critical science and technology fields by advancing early-stage research towards practical impact.



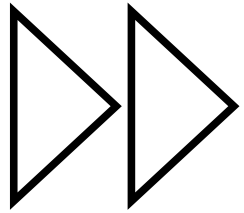
Accelerating Research to Impact

Global competition in S&T is fierce. A focused effort is needed to accelerate the translation of ideas into tangible impact.

There is a need for creative and flexible funding mechanisms with less administrative burden.

Driving Change… and Fast!

TIP is ready to rigorously test new ways to move ideas beyond the lab and create opportunities for U.S. talent to launch breakthrough platforms that can shape the next generation of science and technology.



Strategic Objectives

Build Sector-Defining Platforms

Develop novel platform technologies that foster the transformation of scientific breakthroughs beyond traditional outputs like publications

What are Platform Technologies?

- Serve as the foundation for future innovations, novel engineering solutions, and scientific breakthroughs
- Enable entirely new lines scientific inquiries and sectors of the economy

Examples – Polymerase Chain Reaction (PCR), Light-Emitting Diodes, AI models for protein structure prediction, Very Large Scale Integration (VLSI)

Strategic Objectives

Build Sector-Defining Platforms	Develop novel platform technologies that foster the transformation of scientific breakthroughs beyond traditional outputs like publications
Develop New Organizational Research Structures	Foster independent R&D organizations with the structure, resources, and flexibility necessary to tackle large-scale scientific advancements

NSF's Experimental Hypothesis

Independent teams of full-time, interdisciplinary experts, operating with flexibility and autonomy, will cultivate breakthrough technologies faster

Introduction to NSF X-Labs

Programmatic Structure

NSF X-Labs

Topics & Missions

Topics

Announced by NSF

- Focus areas where breakthroughs could create or reshape entire scientific fields and technology sectors where U.S. competitiveness is a priority

Missions

Proposed by Teams

- Tackles key challenge(s), gap(s), or bottleneck(s) within the Topic
- Motivated by practical use considerations that the proposing team is uniquely suited to tackle and that is currently unmet by existing funding

Desired Outcomes from NSF X-Labs Teams

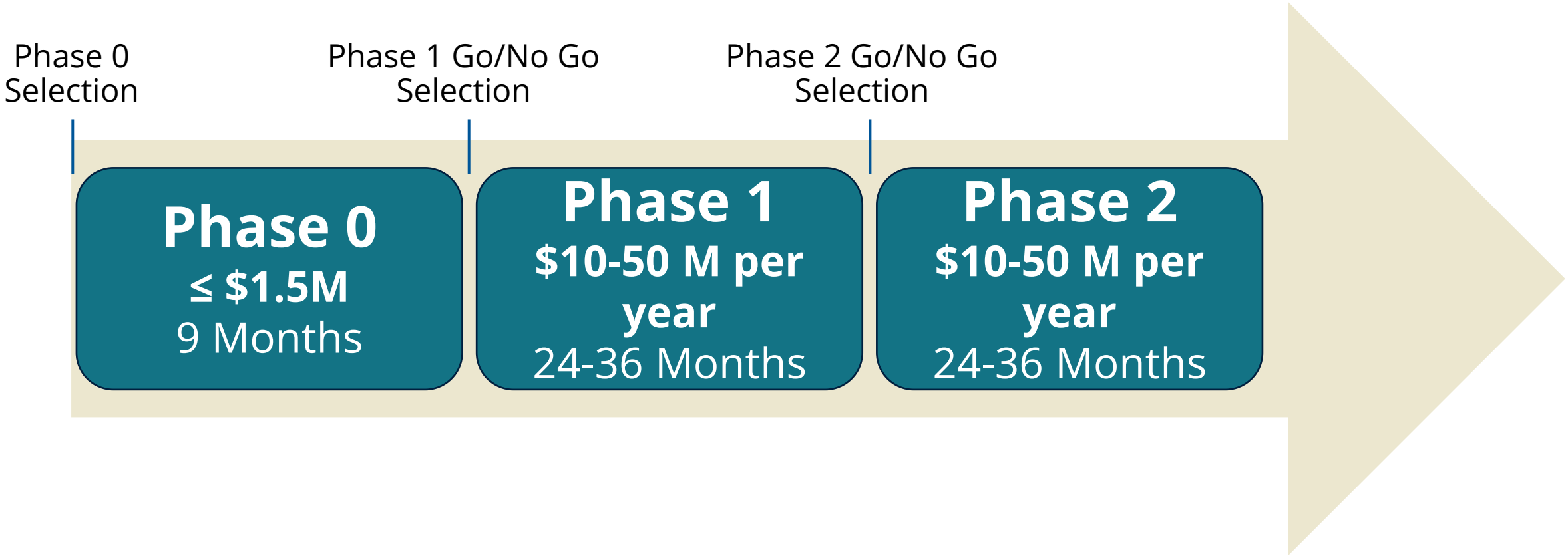
Significant R&D Breakthroughs

- Development of technologies that enable significant downstream breakthroughs
- Solving a specific technological challenge that creates or reshapes entire fields
- Early-stage prototypes not incentivized for private sector funding

Not Within Scope

- Advancement of multiple research arms of a technology sector without a clear Mission
- Incremental advancement of the state of the art
- Advancement of technologies that already demonstrate substantial private investment
- Development of testbeds or data centers as the primary focus of the proposal
- Missions where the sole challenges to be addressed are non-technical

Programmatic Structure & Funding



Introduction to NSF X-Labs

Funding Mechanism

Other Transaction (OT) Contracts

NSF TIP's OT Authority

- Other Transaction Authority (OTA) is NSF TIP's newest obligation authority.
- Provided to NSF in the CHIPS and Science Act of 2022.
- Other Transactions (OTs) are:
  - **Not** Grants, Cooperative Agreements, or FAR-Based Contracts.
  - **Not** subject to restrictions on or regulations implementing these other instrument types.

Learn more about NSF's contracting authority here: Contracting With NSF - About NSF | NSF - U.S. National Science Foundation

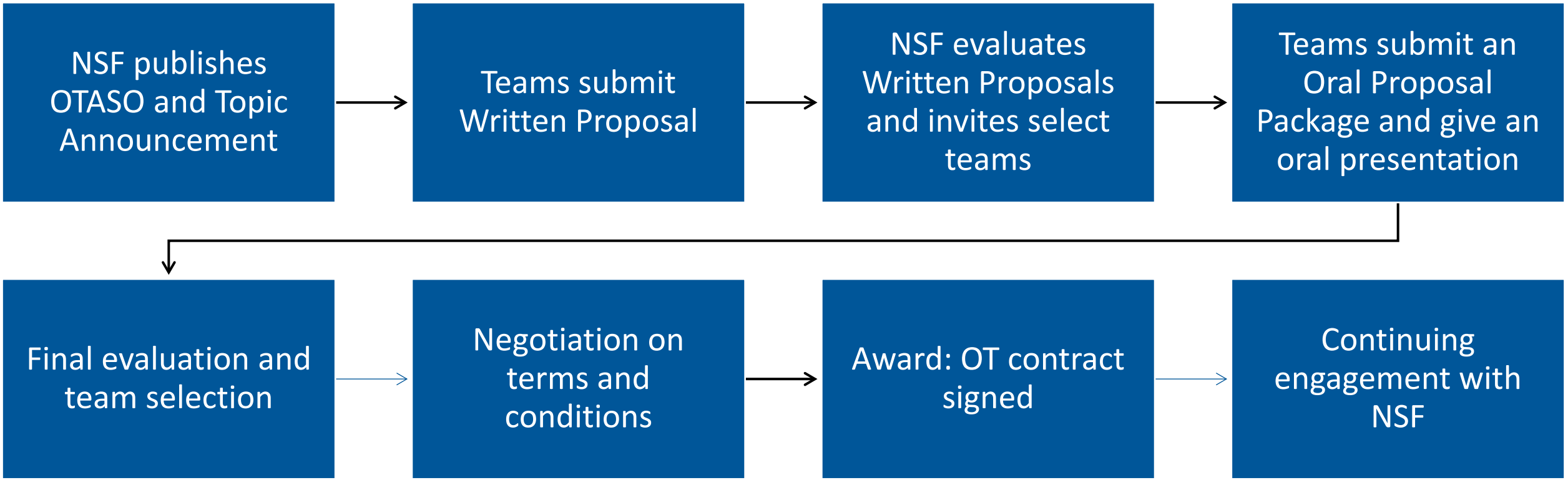
What is an OT Contract?

- A flexible funding mechanism available to TIP and NSF that allows for tailored terms and payment schedules
- OT Contracts can have a variety of payment types. NSF X-Labs will use milestone-based contracts
- Often well-suited for "relational contracting", allowing for joint exploration and a common understanding of complex long-term goals at the outset

Comparison of Instrument Types

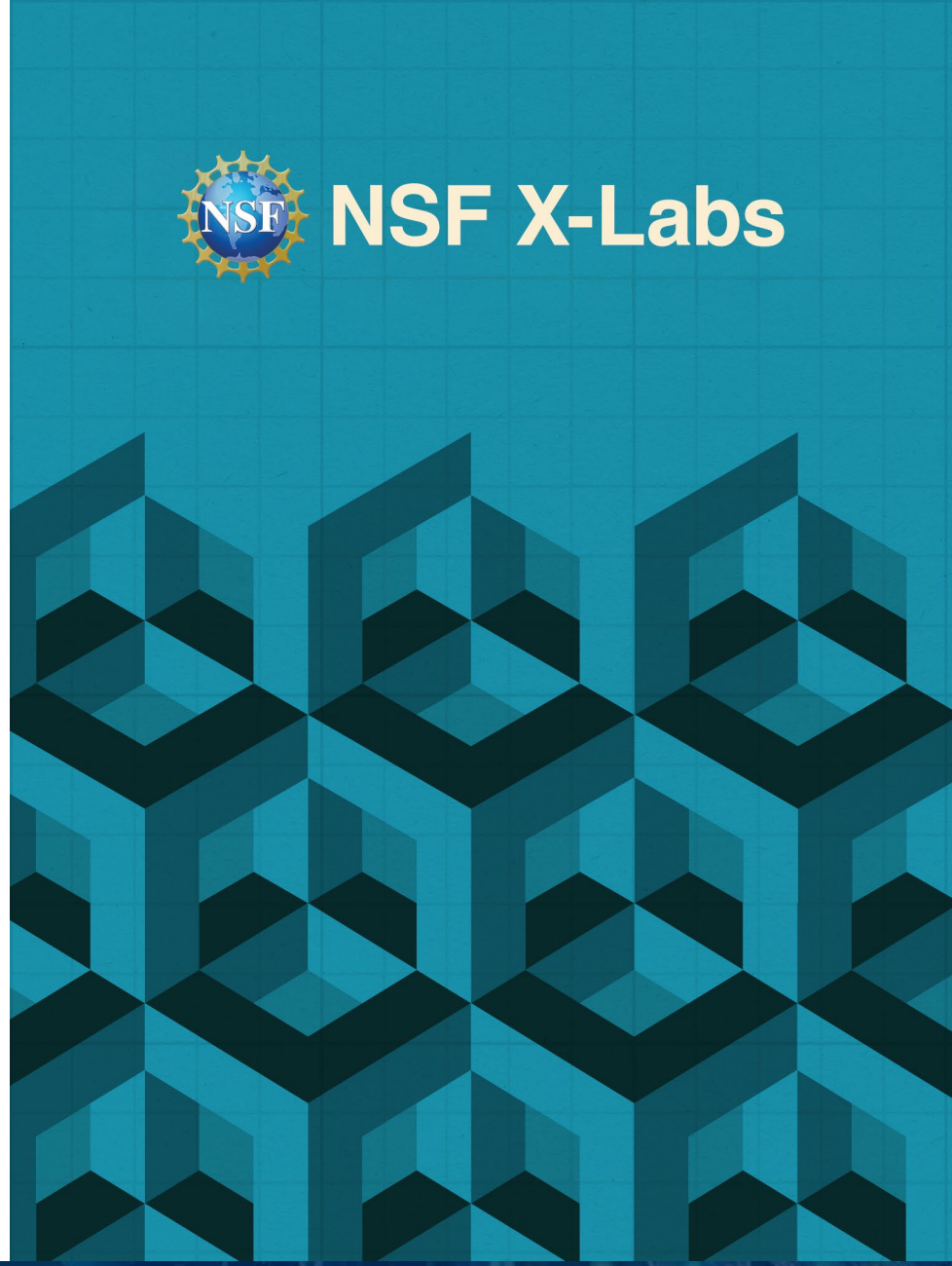
Grants *(Financial Assistance)*	**Cooperative Agreements** *(Financial Assistance)*	**Contracts**	**Other Transactions (OT)**
Legal instrument of financial assistance between federal agency and a non-federal entity. Transfer of anything of value to carry out a public purpose. Not to acquire property or services for the awarding agency's direct benefit or use Does not provide for substantial involvement of awarding agency	Legal instrument of financial assistance between federal agency and a non-federal entity. Transfer of anything of value to carry out a public purpose. Not to acquire property or services for the awarding agency's direct benefit or use Provides for substantial involvement of awarding agency	*Procurement Contract*: An instrument to acquire property or services for the direct benefit of the US Government. *R&D Program Contract*: advances scientific and technical knowledge to achieve goals. Typically directed towards objectives for which the work or method are difficult to know in advance	*Other Transactions* are a unique type of instrument that may be used for a variety of scientific and engineering activities. For NSF, use of OTs requires a nexus to the activities of the TIP directorate. **Intended to allow creation of win-win partnerships for all parties**

NSF X-Labs Flowchart for OT Award



Introduction to NSF X-Labs

X-Lab Teams



Team Structure

NSF will Bet on Nontraditional, Independent Teams

- Support for full-time, independent teams outside of traditional academia and industry settings
  - Teams are expected to operate as an autonomous entity by Phase 1
- Teams must demonstrate a clear mission, leadership, and innovative approach

Lead Organizations and Subcontractors

- One lead organization per NSF X-Lab team will sign an OT contract with NSF
- The lead organization may subcontract with partnering organizations. NSF X-Labs may subcontract with new organizations during the period of performance beyond those originally proposed

Team Independence & Autonomy

Eligible teams will meet all requirements of an **Autonomy Factor Test**

- Teams must demonstrate a leadership structure that allow decisions to be made quickly, efficiently, and independent of another organization.
- Teams must have full internal control of:
  - How funding is allocated
  - Research directions and partnership agreements
  - Intellectual Property (IP) produced by the X-Lab, including for licensing agreements
  - Hiring, salary negotiation, and contracting

Senior/Key Personnel Eligibility

Senior/Key Personnel are individuals who contribute in a substantive, meaningful way to the development and execution of the NSF X-Lab

- All Senior/Key Personnel are expected be dedicated full time to the X-Lab team by the beginning on Phase 1
  - Teams may still hire part-time employees, vendors, advisors, subcontractors, research labs, etc. These will not be Senior/Key Personnel
  - During Phase 0 only, X-Labs teams may support Senior/Key Personnel via subcontracts
- Senior/Key Personnel may be listed on only one proposal per Topic Announcement
- Senior/Key Personnel may not be citizens of China, North Korea, Russia, or Iran, parties to a Malign Foreign Talent Recruitment Program, foreign entities of concern, or U.S. proscribed parties *(OTASO; Sect. 6.3)*

Example X-Lab Structure Models

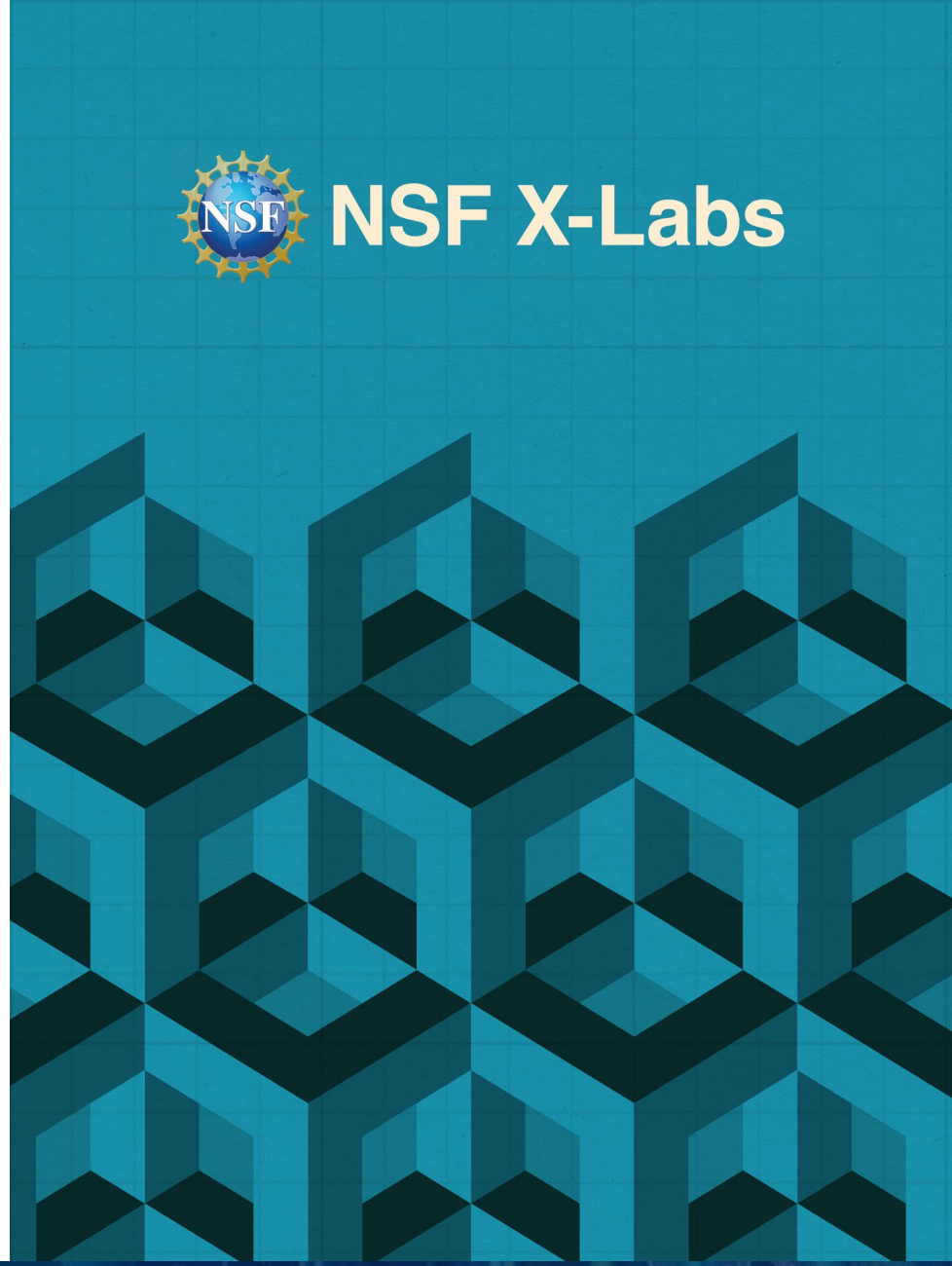
Team Structure	Proposal	Phase 0	Phase 1
Lead org. **is** the NSF X-Lab team	A new or existing team proposes as the lead org. Some SKP are affiliated with a different org.	The lead org. signs an OT contract and sets up subcontracts to pay some SKP	All SKP transition to be full time on the X-Lab team. Some are employed by the lead org., others take leave from their home institution and are supported through a subcontract
Lead org. **hosts** the NSF X-Lab team through all phases	A team forms from staff/faculty of different orgs. One org. plans to host the X-Lab as the lead org.	Lead org. signs an OT contract and sets up subcontracts to pay some SKP. The X-Lab team and lead org. coordinate to establish the X-Lab as appropriately autonomous	The X-Lab team is established as autonomous and affiliated with the lead org. All SKP transition to full time. Some are lead org. employees; some are supported via subcontracts
Lead org. **temporarily hosts** the NSF X-Lab team during Phase 0	A team forms from staff/faculty of different orgs. One org. plans to host the X-Lab temporarily as lead org.	Lead org. signs an OT contract and sets up subcontracts to pay some SKP. During Phase 0, the X-Lab creates its own governance structure separate from the lead org.	The X-Lab spins out from the Phase 0 host. NSF novates the OT contract so that the X-Lab becomes the new lead org. All SKP transition to full time. Many are employees of the new lead org; some are supported via subcontracts.

SKP = Senior/Key Personnel

This list is **not comprehensive**. Teams should think outside the box when it comes to structuring their X-Lab.

Introduction to NSF X-Labs

Milestones



Milestones & Milestone-Based Payments

Milestones are discrete, predefined performance checkpoints specified in an OT contract that an awardee must satisfy and document to NSF before payment is released

- Payment after demonstration of progress
- Allows NSF X-Labs to be **outcomes driven**, not just activity driven
- Should have a measurable exit criteria

Collaborative Development

- Developed collaboratively between teams and NSF during proposal and negotiations
- Can be renegotiated to support rapid innovation

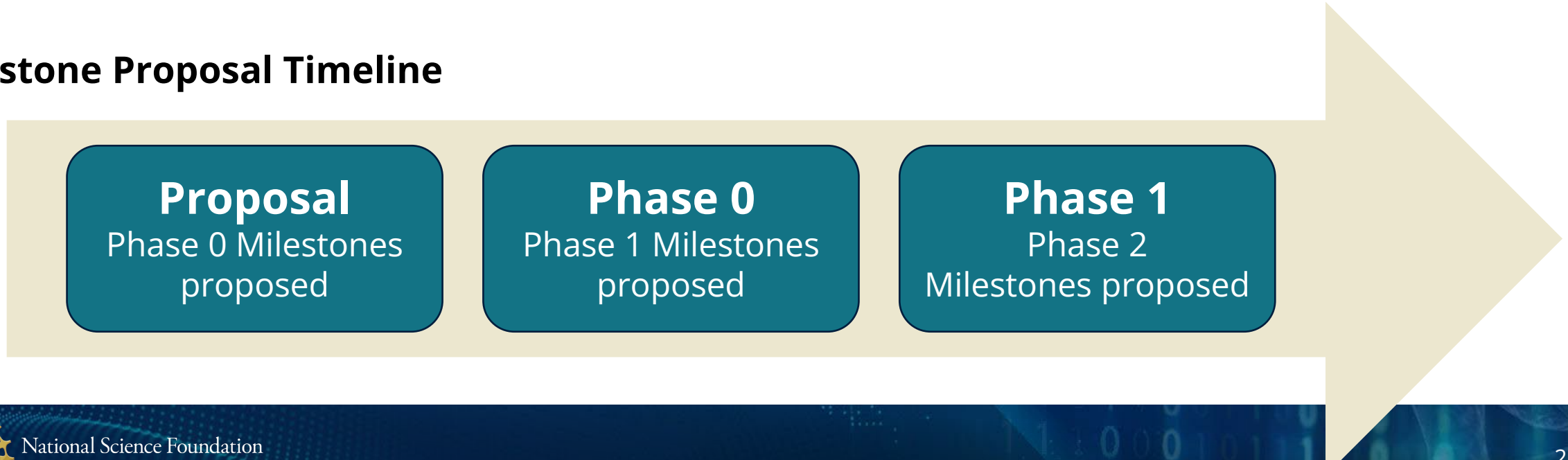
High-risk, High-reward Focus

- Teams are encouraged to propose ambitious, measurable milestones. NSF will reward significant, transformative progress even if not all milestones are achieved

Creating a Milestone Plan

- Teams will propose milestones for each phase, specifying each milestone's task, deliverable and payment.
- Milestones plans and payment schedules will be negotiated before the OT contract is signed (Phase 0) or amended (Phase 1 & 2)

Milestone Proposal Timeline



Phase 0 Milestones

- Phase 0 Milestones will be proposed by teams invited to submit an Oral Proposal Package
  - No need to propose specific milestones in the Written Proposal
- During Phase 0, teams will produce planning documents for their Phase 1 proposal
- Teams will receive guidance during Phase 0 to develop appropriate Phase 1 Milestones

PHASE 0 MILESTONE AND DELIVERABLES TABLE TEMPLATE

Milestone #	Milestone Name	Brief Milestone Summary	Deliverable	Expected Delivery Date [Month(s) after award]	NSF Payment	Expected Invoice Date [Month(s) after award]
1	Team Kickoff Meeting	A virtual briefing on the plan for Phase 0 to include the team structure, milestone schedule and path to prepare for Phase 1 proposal material	Kickoff Meeting Slide deck	1	$	1
2	Data Management and Privacy Plan	Teams will describe their plans for data-sharing across their team, with NSF, and with the general public. Plans will describe how the team will create, protect and disseminate research results during the period of performance.	Data Management and Privacy Plan	1	$	1
3	IP Management Plan	The IP Management Plan describes how IP controlled by the team and/or generated during the period of performance will be identified, protected,	IP Management Plan	≤7	$	≤7

Introduction to NSF X-Labs

Phase 0 Selection

NSF X-Labs

The Two-Step Evaluation Process

Written Proposal

- Maximum 8-page proposal describing the proposed team's Mission, Technology landscape, desired outcomes, qualifications of Senior/Key Personnel, and Team capabilities.

Oral Proposal

- Only invited teams advance to an oral proposal and submit an oral proposal package
- Package includes more details – budget, Milestone plan, Senior/Key Personnel disclosures, etc.
- Additional guidance will be provided to invited teams.

Topic Overview

Scientific Instrumentation for Sensing and Imaging

NSF Tech Labs

Topics & Missions

Topics

Announced by NSF

- Focus areas where breakthroughs could create or reshape entire scientific fields and technology sectors where U.S. competitiveness is a priority

Missions

Proposed by Teams

- Tackles key challenge(s), gap(s), or bottleneck(s) within the Topic
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Rationale & Background

A New Era of Discovery Requires a New Era of Measurement

- Current scientific instrumentation is hitting physical, computational, and materials limits
- Recent breakthroughs signal a new era of measurement
  - quantum sensing
  - super-resolution of biological tissues
  - adaptive AI sensing and imaging algorithms

Topic Objectives

- Unlock new scientific fields—enabling direct visualization, precision characterization, and real-time dynamic measurement across biology, chemistry, materials science, and more
- Create foundational tools that catalyze entire industries

Topic Scope

What technologies are in scope?

- Foundational, platform technologies in sensing, imaging, and supporting areas
- Systems that are not currently commercializable and require early-stage R&D investment

High-Risk Novelty: Does your team's technology expand the frontier of scientific instrumentation beyond an incremental improvement of the state of the art?

Ambition: Does your team's technology accelerate breakthrough R&D and have the potential to create or reshape new lines of research and new sectors of the economy?

Timeline & Submission

JUNE 23, 2026 | Q&A Webinar for Scientific instrumentation for Sensing and Imaging Topic

JULY 13, 2026 | Written Proposal Submission
Deadline for receipt of Phase 0 Written Proposals

AUG 17 – 21, 2026 | Oral Presentations
Teams present live before a review panel

NOVEMBER 2026 | Beginning of Phase 0
Kickoff of 9-month Phase 0. Project planning, refinement, and team organization begin.

JUNE 2027 | Beginning of Phase 1 Go/No Go Selection
NSF evaluation of Phase 0 progress to determine which teams transition to Phase 1

AUGUST 2027 | Beginning of Phase 1
Full-time teams work with urgency and purpose to realize their Mission

U.S. National Science Foundation
Directorate for Technology, Innovation and Partnerships

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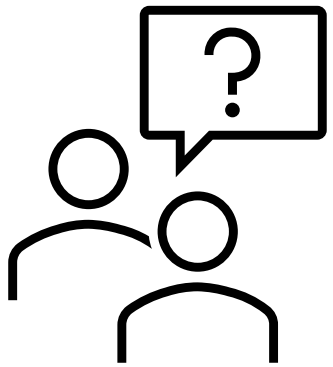
Q&A Guidance

Click the Q&A button to type and submit questions for response during the webinar.



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