



Proto-OKN Solicitation (NSF 23-571)

Building the Prototype Open Knowledge Network (Proto-OKN)

April 11, 2023

Directorate for Technology, Innovation and Partnerships (TIP)

Today's agenda

- Goals of Proto-OKN
- Proto-OKN Team
- The Three Themes
- Partner Agency Priorities & Use Cases
- Deliverables/Meetings
- Review Criteria
- Eligibility Information
- Stay in Touch
- Q&A



Open Knowledge Network (OKN)

OKN VISION: From NSF's **Harnessing the Data Revolution (HDR) Big Idea** – An interconnected network of public data that can help power the next wave of artificial intelligence exploration, while addressing various societal challenges.

FIRST STEP: NSF Convergence Accelerator - Track A

21 Phase 1 projects (2019-2020)

5 Phase 2 projects (2020-2022)

SECOND STEP: Innovation Sprint (Feb-Jun 2022)

Developed a **roadmap for a Prototype OKN**, driven by **USE-CASES** to help understand the scope of opportunities and challenges.

>>THIRD STEP: Building the Prototype Open Knowledge Network (Proto-OKN)

Solicitation to help build the Proto-OKN



Program Goals

- Build a prototype version of an integrated data and knowledge infrastructure called the Open Knowledge Network (OKN)
- Create a platform that would empower government and non-government users — fueling evidence-based policymaking, continued strong economic growth, and game-changing scientific breakthroughs, while addressing complex societal challenges from climate change to social equity.



Proto-OKN Team: Multiagency Effort



National Science Foundation

Directorate for Technology, Innovation and Partnerships

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National Aeronautics and Space Administration

Biological and Physical Sciences Division

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National Institutes of Health

Office of Data Science Strategy

Haluk Resat



National Institute of Justice

Elizabeth Groff



National Oceanic and Atmospheric Administration

National Centers for Environmental Information

Ryan Berkheimer



U.S. Geological Survey

National Geospatial Technical Operations Center

Dalia Varanka



Proto-OKN Program Structure

- **Theme 1 – Proto-OKN Use Cases:** Focuses on the creation of knowledge graphs, in collaboration with other federal agencies, to address specific societal challenges.
 - May request budgets up to \$1.5 million with durations up to three years.
 - Estimated number of awards is 8 to 10.
- **Theme 2 – Proto-OKN Fabric:** Focuses on the development and deployment of the platform/framework to interconnect the knowledge graphs to create the Proto-OKN and implement it on cloud-based infrastructure.
 - May request budgets up to \$1.5 million with durations up to two years.
 - Estimated number of awards is 1 to 2.
 - Can be potentially renewed for an additional two years for a budget up to \$2 million, with a goal of creating one overarching OKN fabric.
- **Theme 3 – Proto-OKN Education and Outreach:** Focuses on building education, training and outreach materials for Proto-OKN users, developers, and other constituents.
 - May request budgets up to \$1.5 million with durations up to three years.
 - Estimated number of awards is 1.

LIVE POLL: *Indicate your interest & willingness to serve as reviewers*



Theme 1 – Proto-OKN Use Cases

- Proposals should have already identified key public datasets.
- Data must come from more than one source and may include multiple types.
- Proposals should describe software tools, data workflows, ontology, and knowledge design and implementation methods for creating the knowledge graph infrastructure from underlying data.
- End-users and data providers should already have been identified and should be engaged in and committed to this effort.
- Solicitation especially seeks Theme 1 proposals that align with the priorities from the partnering agencies.
- Theme 1 projects will work in collaboration with Themes 2 and 3.



Theme 2 – Proto-OKN Fabric

- Focus on development and prototyping of robust, scalable, cloud-based technical infrastructure for Proto-OKN.
- Support and demonstrate use of the prototype infrastructure by Theme 1 projects in Year 2.
- Strongly encouraged to include industry partners as leads, co-PIs, or collaborators, or ensure that the project is able to adopt a production systems approach.
- Theme 2 proposals should be able to demonstrate:
 - i. **Technical skill**, i.e., technical expertise and experience in implementing large-scale data projects and systems;
 - ii. **Technical support capability**, i.e., the ability and willingness to provide technical support to assist Theme 1 projects; and
 - iii. **Open and collaborative approach**, i.e., the experience and ability to develop open systems and the ability to collaborate with other teams as peers.



Theme 3 – Proto-OKN Education and Public Engagement

- Create educational and training materials and tools addressing the broad range of users of the Proto-OKN.
- Goal of the education and training materials is to help explain how the Proto-OKN impacts society and help prospective users understand how to engage.
- Proposals should describe how they would develop materials to help:
 - i. Explain the underlying concepts and techniques of the Proto-OKN.
 - ii. Provide the conceptual information and functional details necessary for
 - users to effectively use the system; and
 - content and technology contributors to effectively contribute to the system.



LIVE POLL

Kindly specify the main Theme that you are interested in and inclined to submit a proposal on:

- **Theme 1 – Proto-OKN Use Cases**
- **Theme 2 – Proto-OKN Fabric**
- **Theme 3 – Proto-OKN Education and Public Engagement**

Are you interested in serving as a reviewer for Proto-OKN Program? (YES/NO)



Proto-OKN – Partner Agency Priorities

- Theme 1 proposals must demonstrate that they **have already identified and engaged with end users and other partners** prior to applying.
- This solicitation especially seeks proposals that align with the following priorities from the partnering agencies:
 - **(NASA) Space biology:** Integrate diverse data by creating a knowledge graph that would connect space biology terminology with the terminology used by the larger biological/biomedical research community.
 - **(NIJ) Tracking nonfatal firearm injuries:** Create a single source of information for nonfatal, interpersonal, and intentional firearm (i.e., gunshot) injuries to support the development of evidence-based firearm violence prevention policy that depends upon timely, accurate, and microlevel data.



Proto-OKN – Partner Agency Priorities, continued

- **(NIJ) Mining criminal justice insights from existing data:** Link the data sets in National Archive of Criminal Justice Data (NACJD) to support the exploration of cross-cutting questions, the provision of new insights and the promotion of knowledge development across the criminal justice system.
- **(NOAA) Environmental Data:** NOAA is interested in use-cases that leverage NOAA data to address challenges in areas related to climate and the Blue Economy, with an emphasis on ensuring equitable distribution and use of data.
- **(USGS) Topographic Data Integration:** USGS is interested in integrating topographic data from the USGS National Map and other related distributed datasets to serve a range of user needs.
- **(NIH) Proto-OKN Fabric:** NIH anticipates partnering with NSF on the Theme 2 Proto-OKN Fabric



Proto-OKN – Use Cases

- Other agency use cases:
 - (DARPA) Supply-and-Demand Networks
 - (DoT) Transportation Equity
 - (U.S. Army) DoD Innovation Ecosystem
 - (VA) Social Determinants of Health
- Additional applications/use cases emerged from the **OKN Innovation Sprint**
 - Equity, social care and justice issues
 - Climate change, disaster management and energy systems
 - Health communications and information accuracy
 - Innovation and research ecosystems
 - Supply chain, decision support and financial risk analysis

OKN Roadmap Report: <https://bit.ly/OKNroadmap>

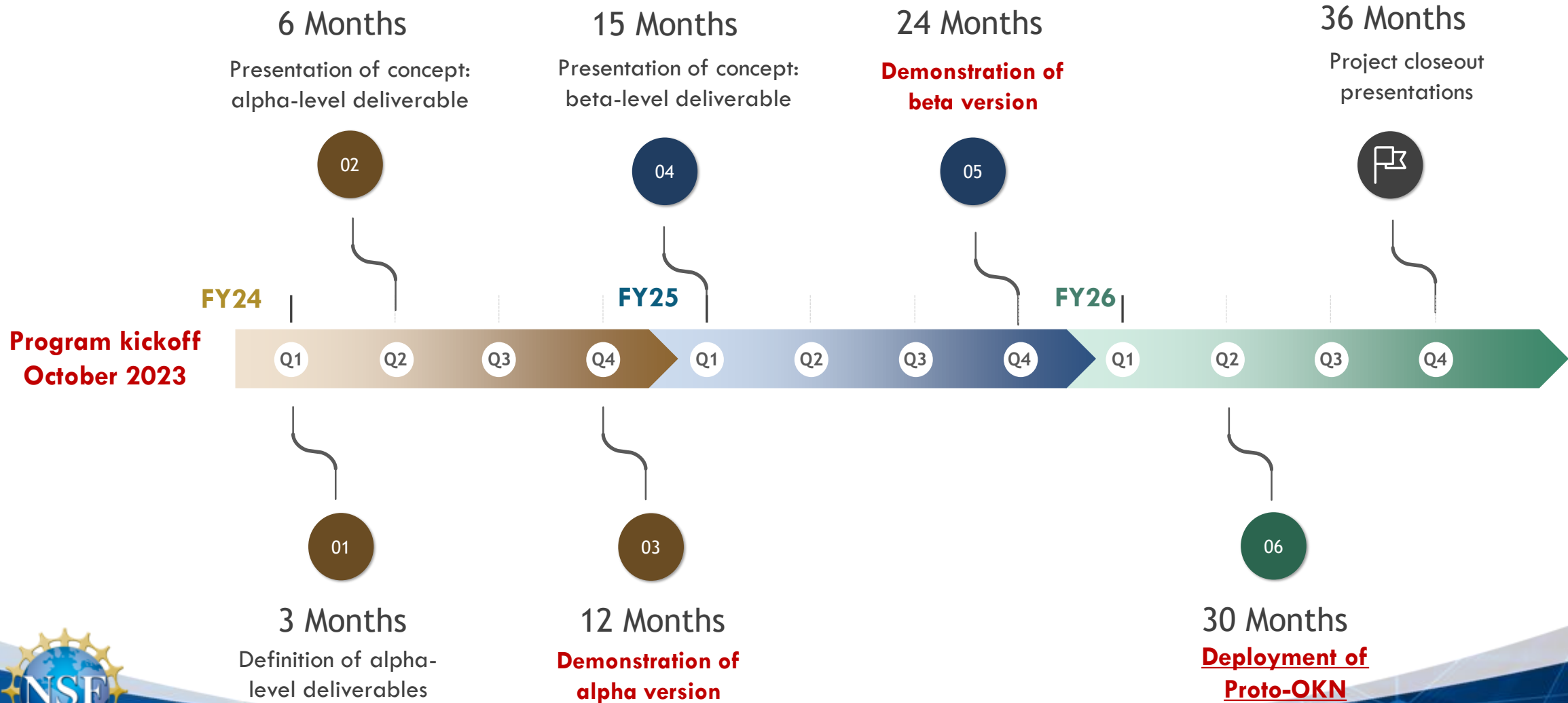


Program Deliverables

- Proposals should clearly identify project deliverables and quarterly timeline.
- Project Timeline should include intermediate milestones associated with
 - data access and ingestion,
 - development and deployment of knowledge graphs,
 - testing, validation and evaluation plan
 - related curation and analytical tools, and training materials.
- Theme 2 projects must also include a plan for testing the system at scale.



Program Deliverables



Proto-OKN Team Meetings

All Proto-OKN Projects must plan for at least the following meetings:

- Proto-OKN Year 1 Project Kickoff meeting.
 - In-person, to be held soon after project awards have been announced.
- Quarterly meetings (every 3 months).
 - In-person and/or remote
 - Goal is to monitor progress and make adjustments if/where needed.
 - Could be held among subgroups of projects
- Year 2 and Year 3 Kickoff meeting.
 - In-person
 - Lead investigators from each subaward institution and various community users are expected to participate.



NSF Merit Review Criteria

- Two criteria are given full consideration during the review and decision-making processes: Each criterion is necessary, but neither, by itself, is sufficient.
 - **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge.
 - **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.



Additional Solicitation Specific Review Criteria

1. **Impact** on identified user community or communities

- i. What is the potential for the proposed effort to profoundly impact one or more end user community or communities?
- ii. Will the activity provide a specific benefit(s) to the user community/communities and help them achieve their desired outcomes?

2. **Partnership**

- i. Does the Project Description make a strong case that partners and end users from multiple sectors are poised to form a deep and diverse partnership?
- ii. Does the proposed use case support and contribute to the mission of at least one identified end user federal agency?



Additional Solicitation Specific Review Criteria, continued

3. Deliverables

- i. Does the overall effort, as described in the Project Description, Collaboration Plan, and Deliverables and Management Plan indicate a high probability of deliverables within a 36-month period that will ultimately benefit society?
- ii. Are there clear, achievable goals and objectives provided for the 12-month alpha release, the 24-month beta release and the final release at the end of the effort?

4. Use Case Integration

- i. Is the proposed project appropriate, i.e., is there a close match to one of the Themes in this solicitation?
- ii. Is there convincing evidence of how the effort will contribute to the success of the Proto-OKN effort and support potential use case integration efforts?



Additional Solicitation Specific Review Criteria, continued

5. Adherence to **Data/AI Ethics Standards and Guidance**

Does the Project Description clearly identify how the project will adhere to data/AI ethics standards and guidance such as

- i. 2021 Executive Order 13960: Trustworthy AI Principles
- ii. VA Ethics Principles for Access to and Use of Veteran Data (Regulations.gov)
- iii. OSTP Blueprint for an AI Bill of Rights



Award Information

Anticipated Type of Award:

- Cooperative Agreement

Estimated Number of Awards: 10 to 13

- Theme 1: 8 to 10 awards at \$1.5 million for three years
- Theme 2: 1 to 2 awards at \$1.5 million for 2 years
 - Potentially renewed for an additional two years for a budget up to \$2 million
- Theme 3: 1 award at \$1.5 million for three years

Anticipated Funding Amount: \$20,000,000*

*subject to the quality of proposals received and availability of funds



Eligibility Information

Eligible Organizations:

- For-profit organizations:
- Non-profit, non-academic organizations:
- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges)

Who May Serve as PI:

- There are no restrictions or limits.

Limit on Number of Proposals per **Lead** Organization:

- 1 - An organization may serve as the lead organization on at most one proposal to this solicitation

Limit on Number of Proposals per PI or co-PI:

- There are no restrictions or limits



Stay in touch

- General inbox: OKN@nsf.gov
- Our Website: <https://beta.nsf.gov/funding/opportunities/building-prototype-open-knowledge-network-PROTO>

Proposal Deadline is June 20, 2023

(due by 5 p.m. submitter's local time)

Upcoming events: **Office Hours**

- April 27, 2023, from 3:00-4:00 PM ET
- May 04, 2023, from 3:00-4:00 PM ET
- May 18, 2023, from 3:00-4:00 PM ET



Thank you for your attention.

Please post your questions in Q&A





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