

National Institute of Standards and Technology (NIST)
Acquisition Management Division
Notice of Intent for Sole Source Purchase

The National Institute of Standards and Technology (NIST) Acquisition Management Division, intends to negotiate with Dr. Marc Weiss, located in Aptos, CA, on a sole source basis under the authority of FAR Subpart 13.106-1(b), Soliciting from a single source, for providing scientific support services.

The unique technical specifications for the scientific support services are the services of a PhD contractor who has highly specialized, unique knowledge of time transfer and synchronization in networks, state-of-the-art GPS Time Transfer, vulnerability of US critical infrastructure to dependence on GPS timing, applicable experience working work with telecom standards, and experimenting and developing sync methods through telecom. In addition, the contractor must have experience running the NIST Workshop on Synchronization in Telecom Systems (WSTS) is the premiere workshop on telecom synchronization. The NAICS Code is 541690- Other Scientific and Technical Consulting Services, with a Small Business Size Standard of \$15.0 M. NIST anticipates negotiating and awarding a firm-fixed-price purchase order to Dr, Marc Weiss for this requirement.

Interested parties who can demonstrate they could satisfy the requirements listed above for NIST must clearly and unambiguously identify their capability to do so in writing on or before the response date for this notice. This notice of intent is not a solicitation. Information submitted in response to this notice will be used solely to determine whether competitive procedures could be used for this acquisition. If competitive procedures are not used it is estimated that an award will be issued by 5/27/16. Any questions regarding this notice must be submitted in writing via email to chendra.conklin@nist.gov. All responses to this notice of intent must be submitted so that they are received at chendra.conklin@nist.gov no later than 12:00 pm MST Monday, May 23, 2015.

Performance Work Statement (PWS)
Technology Development of
Synchronization in Networks and Research
of GPS Timing Vulnerability

05/17/2016

Performance Work Statement (PWS)

Technology Development of Synchronization in Networks and Research of GPS Timing Vulnerability

1 Vision Statement

NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. The Time and Frequency Division contributes to technology development for US industry through a number of activities in support of synchronization in networks: telecommunication networks as well as timing in the Internet of Things. Along with this, the division participates through US government activities to limit vulnerability of GPS timing in critical infrastructure.

1.1 Objectives

The contractor will support the NIST role with the technology development of synchronization in networks. The contractor will also support the effort to limit US critical infrastructure exposure to GPS timing vulnerability. This work will enable the NIST Time and Frequency Division to continue its world-class role in time transfer and synchronization techniques. Objectives include the division's efforts:

- To participate in government committees exploring options for limiting vulnerabilities of US critical infrastructure dependent on GPS for timing
- To host an annual industry workshop on synchronization in telecommunications systems
- To co-chair the timing subgroup of the NIST Cyber-Physical Systems Public Working Group
- To advance research in support of timing in the Internet of Things
- To support the role of synchronization in the NIST-NTIA Center for Advanced Communications Systems
- To develop applications of the theory of relativity for GPS and for primary frequency standards

As a result of this work, NIST will continue support of time and synchronization in US industry, and participation in generating TAI.

2 General Requirements

The Time and Frequency Division has spear-headed several initiatives supporting time transfer and synchronization. The contractor shall possess a unique knowledge of both state-of-the-art GPS time and frequency use and vulnerabilities and synchronization in communication systems. The contractor shall have demonstrated research in these areas, both in ultra-precise time and

frequency transfer, and in practical uses of these techniques. Statistical methods for processing time and frequency data are required knowledge. The contractor shall have experience and demonstrated leadership capabilities in working with government agencies on issues of GPS vulnerability for timing in critical infrastructure. The contractor shall also have demonstrated world-class leadership in developing synchronization in communications systems, particularly related to the standards development in this area, including standards based in the International Telecommunications Union, Telecom section (ITU-T), and in the Alliance for Telecom Industry Solutions (ATIS). In particular, the contractor shall lead the Workshop on Sync and Timing Systems (WSTS), a forum for timing in communications systems, and will participate on the Steering Committee of its sister conference, the International Timing and Sync Forum (ITSF).

2.1 Non-Personal Services

The Government shall neither supervise contractor employees nor control the method by which the contractor performs the required tasks. Under no circumstances shall the Government assign tasks to, or prepare work schedules for, individual contractor employees. It shall be the responsibility of the contractor to manage its employees and to guard against any actions that are of the nature of personal services, or give the perception of personal services. If the contractor believes that any actions constitute, or are perceived to constitute personal services, it shall be the contractor's responsibility to notify the Procuring Contracting Officer (PCO) immediately.

2.2 PERIOD OF PERFORMANCE

Period-of-Performance	From	Through
	5/27/16	7/26/16

2.3 PLACE OF PERFORMANCE

All work shall be reported to NIST, Boulder, Colorado, though work may be accomplished remotely. Normal duty hours are Monday through Friday, 8:00 a.m. to 5:00 p.m. with the exception of Federal holidays.

2.4 TRAVEL– Cost Reimbursable

- Travel to visit NIST, Boulder, at least quarterly, to collaborate with scientists and TPOC and provide training related to tasks specified in this work statement to NIST employees.
- Attend combined ITU-T standards meeting at ATIS in Washington DC, June 6-10, 2016, NIST support of sync in US telecom industry, as in tasks 1.3.
- Attend and chair the NIST-ATIS Workshop on Synchronization and Timing Systems (WSTS), June 13-16, 2016, San Jose, CA. Purpose: NIST support of sync in US telecom industry, as listed in tasks 1.1 and 1.2 above.
- Additional travel costs up to \$1,000 to support tasks in the Statement of Work, as determined necessary for fulfillment of the contract by the TPOC. All three of the Tasks

require the contractor to flexibly work with existing and potential NIST partners on issues such as synchronization in communications systems and protecting/backing up GPS timing in US critical infrastructure. Important meetings, conferences and workshops are often convened by NIST partners in these areas with little advance notice. Over the course of the contract, it is likely such meetings, conferences and workshops will be convened requiring the contractor to travel and participate, but the number and scheduling of these meetings cannot be predicted in advance. Potential trips include but are not limited to:

- Extra meetings at NIST Boulder to work with scientists in the labs and provide training related to tasks specified in this work statement to NIST employees.
- Meetings to attend face-to-face meetings of the IEEE 1588 update committee
- Meetings at NIST Gaithersburg , dates unknown, to discuss Timing in Networks
- Meetings in Washington, DC, dates unknown, to discuss GPS Vulnerability
- Precise Time and Time Interval (PTTI) meeting, January 2017, Monterey, CA

2.5 CONTRACTOR SUPPLIED MATERIALS - N/A

2.6 CONTRACTOR'S MINIMUM QUALIFICATIONS

PhD in Mathematics, Physics, or Electrical Engineering from an accredited college or university, plus a minimum of 20 years demonstrated experience in the following areas:

- Knowledge of the use of GPS receivers for precise time and frequency transfer
- Knowledge of synchronization issues, protocols, and standards in telecommunications systems
- Leadership capabilities and experience in creating an international workshop for synchronization and timing
- Leadership experience and knowledge in raising concerns in the US government about GPS timing vulnerabilities
- Knowledge of relativity and the use in GPS and for primary frequency standards
- An awareness of the importance of time-aware systems in the Internet of Things (IoT)
- Knowledge of statistics of time and frequency systems
- Demonstrated experience in leading international committees on time transfer

2.7 GOVERNMENT FURNISHED PROPERTY

All property, data and information provided by the Government in the performance of this task remains the property of the Government and shall be surrendered to the government upon completion or termination of this requirement. Likewise, all deliverables generated under this requirement remain the property of the Government.

Upon award of this requirement, the Government will provide the Contractor with a laptop for use offsite as needed in the performance of this requirement. The Government will also furnish the Contractor with an office, furnished with a desk, chair, and a telephone for use when visiting the Boulder site. The contractor shall use government-furnished computers and laboratory equipment when working at the Boulder site. The contractor shall have access to NIST GPS, timescale and time transfer data, as well as websites and data for the NIST Cyber-Physical Systems Public Working Group.

3 Scope of Work: Specific Requirements

Contractor is required to maintain eligibility for a Secret level security, clearance. The Government will be responsible for paying and processing this clearance if/when it is required.

Task 1 Synchronization in Communications Systems

- 1.1 Participate and lead teleconferences to develop agenda and marketing of WSTS conference
- 1.2 Attend and run WSTS conference
- 1.3 Develop ITU-T standards
- 1.4 Design and perform research on time transfer through CenturyLink (CTL) network using Microsemi equipment
- 1.5 Participate in IEEE 1588 update committee meetings
- 1.6 Organize research on Time Aware systems
- 1.7 Co-chair the NIST Cyber-Physical Systems Public Working Group

Task 2 US Critical Infrastructure GPS Timing Vulnerability

- 2.1 Participate in ATIS teleconferences on GPS vulnerability
- 2.2 Participate in and lead teleconferences on GPS vulnerability for timing
- 2.3 Present on GPS vulnerability for timing

Task 3 Scientific Research and Publications

- 3.1 Review papers (BERB)
- 3.2 Review external papers
- 3.3 Perform other research
- 3.4 Write papers and/or prepare presentations on NIST work

Task 4 Training NIST Employees

- 4.1 Provide training to NIST employees on all tasks above as deemed necessary by the TPOC.