Opportunity Title: Terahertz Radio Frequency (THz RF) Transmission for Wideband Atmospheric Communications
Opportunity Reference Code: ICPD-2021-28

Organization Office of the Director of National Intelligence (ODNI)

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How to Apply **Create and release your Profile on Zintellect** – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not exceed 2 pages.**

Complete your application – Enter the rest of the information required for the IC Postdoc Program Research Opportunity. The application itself contains detailed instructions for each one of these components: availability, citizenship, transcripts, dissertation abstract, publication and presentation plan, and information about your Research Advisor co-applicant.

Additional information about the IC Postdoctoral Research Fellowship Program is available on the program website located at: https://orise.orau.gov/icpostdoc/index.html.

If you have questions, send an email to ICPostdoc@orau.org. Please include the reference code for this opportunity in your email.

Application Deadline 2/26/2021 6:00:00 PM Eastern Time Zone

Description **Research Topic Description, including Problem Statement:**

Satellite communications are continually challenged by both data volume and co-channel interference; one solution to these issues has been to move higher into the radio frequency spectrum (more than a few GHz). However, as frequencies approach 100 GHz and beyond, atmospheric distortion and attenuation challenges can degrade data quality. One advantage to the Terahertz (THz) bands is the emergence of extremely long-wave infrared (IR) light (10 um; 30 THz) versus extremely high-frequency radio frequency energy (3 THz; 100 um). By employing these extremely high bands for increasingly larger data loads, based on much higher bandwidths, what challenges in transmission (both free space and atmospheric) must be overcome and what benefits can be achieved?

Example Approaches:

Inter-atmospheric, exo-atmospheric and free-space data transfer modeling and analysis to handle 1,000x current data loads.

Relevance to the Intelligence Community:

Intelligence data loads are growing exponentially, driving the use of terrestrial fiber to process the increasing data and to enhance security. Security concerns can be resolved as the bandwidths and interference are addressed. Terahertz transmission, especially in the 500 GHz (mm wave) to 10 THz range (long wave infrared or LWIR), could revolutionize the data capacity for free-space transmission while increasing security and enabling quantum applications.

Key Words: Terahertz, Satellite Communications, Atmospheric Distortion

Qualifications **Postdoc Eligibility**

- U.S. citizens only
- Ph.D. in a relevant field must be completed before beginning the appointment and within five years of the application deadline
- Proposal must be associated with an accredited U.S. university, college, or U.S. government

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laboratory

- Eligible candidates may only receive one award from the IC Postdoctoral Research Fellowship Program

Research Advisor Eligibility

- Must be an employee of an accredited U.S. university, college or U.S. government laboratory
- Are not required to be U.S. citizens

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Communications and Graphics Design** (2 👁)
  - **Computer, Information, and Data Sciences** (17 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)
  - **Life Health and Medical Sciences** (45 👁)
  - **Mathematics and Statistics** (10 👁)
  - **Other Non-Science & Engineering** (2 👁)
  - **Physics** (16 👁)
  - **Science & Engineering-related** (1 👁)
  - **Social and Behavioral Sciences** (27 👁)