# Background:

The *Public Wireless Supply Chain* is a US Innovation Fund of $1.5 Billion, aimed at accelerating the commercialization, adoption, and development of *Open Radio Access Network* (O-RAN).  
This year, the competitive grant is focusing on funding the development and commercial adoption of *Open Radio Units* (O-RU), which are the fronthaul of a RAN.  
The RUs are the greatest contributor to the total hardware cost of a RAN deployment, due to being installed in the largest quantities compared to other network components. As such, they have become a key focus for cost optimization in the network infrastructure.

# Research areas of interest

There are two *Specific Research Focus Area*s (SRFA):

* SRFA1: O-RU Commercialization (funding range: $25,000,000 to $45,000,000 , with a 2 year performance period)
* SRFA2: O-RU Innovation (funding range: $5,000,000 to $10,000,000 , with a 5 year performance period)

We (Aces) will be applying for SRFA1, by partnering up with a US-based RU manufacturer.

# SRFA1 technical agenda

The checkboxes indicate the objective's alignment with Aces' goals.

* Advance development of feature-rich, interoperable RU products from lab testing to the early-field trial stage.
* Focused on RU manufacturers/developers to allow new entrants into the ecosystem.
* Requires partnerships with MNOs to drive development of features and functions that currently don't exist.

# Application requirements for SRFA1

## Crucial eligibility requirements:

* Applicant must be an RU supplier (capable of production and commercial sale).
  + We already have a US-based supplier in mind for partnership.
* Applicant must provide a **minimum cost share** of 10%, which means that the 10% of the project's cost will come from the applicant's pocket, to ensure that they too have a financial stake in their research project.
  + We have to discuss the total cost sharing percentage with our RU partner, in addition to setting the boundaries of each corporation's contributions to the cost sharing.

## Excerpt from the [NOFO slides](https://www.ntia.gov/sites/default/files/File%20Uploads/2024-05/Innovation%20Fund/NOFO%202/nofo_2_pwscif_industry_day_clean_05162024.pdf)

* *Objective of SRFA1:* Accelerate the development of open RU products to the point where they meet carrier needs and are ready for commercial trials.
* *Funding Range*: $25,000,000-$45,000,000
* *Eligibility*: RU supplier partnered with MNO(s). Applicant and/or MNO must hold Ultimate Beneficial Ownership (UBO) in the U.S.
* *Period of Performance*: Not to exceed twenty-four (24) months
* *Place of Performance*: RU development must be performed in the U.S.; work in support of MNO testing can be outside the U.S.
* *Cost Share Requirement*: Minimum cost share of 10 percent of total project cost. Cost share of 16 percent or more is rewarded.
* *Partnership Requirement*: All applicants must demonstrate a partnership with at least one Mobile Network Operator (MNO) through a Letter of Partnership Intent

# Proposal requirements

* In the technical proposal:
  + Clearly indicate the *Specific Research Focus Area* (SRFA1 or SRFA2)
  + If SRFA2, then clearly indicate the radio innovation topic area(s) being researched.
* Name each document clearly to indicate what their contents are, and/or which project they are associated with.
* Each application should contain **only one** proposed project.
* Each applicant can apply for: **up to one SRFA1**, and/or **up to three SRFA2**
* Since we (Aces) will be applying as an MNO Partner to our US-based RU supplier, we will additionally need to fill out the *MNO Letter of Partnership Intent*.  
  Which includes the following important fields:
  + A brief explanation of the **form of the partnership**.
  + A **demonstrable commercial need** for the technology from both the MNO and open RU supplier perspective.
  + **Resources** invested by both parties.
  + A **post-award commitment** to deploying the open RU in a commercial setting.
  + A statement that the MNO is committed to executing its roles, responsibilities, and/or commitments.
  + The **proportion of federal funding** that would be utilized by the MNO.
  + **Voluntary committed resources** (if applicable), including those for any in-kind match.
  + One or more of the MNO's:
    - **System for Award Management** ([SAM.gov](https://sam.gov))
    - **Unique Entity Identifier** (UEI)
    - OR, a completed [SF-328](https://www.gsa.gov/reference/forms/certificate-pertaining-to-foreign-interests).
  + **Point of Contact** at the entity for any inquiries.
* Fill out **Letters of Commitment**. Each partner within the application will have to write a page, briefing their role and commitment to the project. ([sample template](https://www.transportation.gov/sites/dot.gov/files/2022-09/SMART%20Letter%28s%29%20of%20Commitment_508.pdf) and [sample guide](https://www.uvu.edu/osp/docs/letters-of-commitment.pdf))
* Fill out a **Commercial Transition Plan**, which should include details on how we plan on commercializing and scaling up our project, *after* the period of performance (of at most 2 years) is over.  
  It should include the following key points:
  + Customer and end-market demand
  + Awareness of project's commercial risks and mitigation strategies
  + An assessment of market position and key competitors
  + A program plan, specifying possible timing to move from advanced prototype to mass production

# Funding budget related

The following will **not** be accepted as a valid expense for the research funding:

* Any equipment or service purchased from a "*Foreign Entity of Concern*" ([FEOC](https://www.energy.gov/mesc/foreign-entity-concern-interpretive-guidance)),  
  such as China, Russia, Iran, North Korea, etc...
* Construction costs
* Prior expenses, before the submission of the application deadline (July 10th 2024)

Otherwise, valid expenses will need to be reported as:

* Support the dollar amounts identified in the SF-424 and SF-424(A)
* Organize costs according to the cost categories in the SF-424(A)
* Provide itemization for each cost and a full description, including the necessity and basis of each charge
* Explain the rationale for the applicant’s proposed cost share, as applicable.
* Include funding levels consistent with the project scope
* Only reflect allowable costs consistent with the project's scope
* Must provide a proposed cost-share breakdown
* Budgets must exactly match across: **SF-424**, **SF-424A**, and the **Budget Narrative and Justification**
* All items in the **Budget Narrative and Justification** must be within the categories specified in the SF-424A
* Total project cost must be aligned with the summation of itemized costs
* Supplies must **not** be categorized as equipment

# Complete list of required documents for the application

* SF-424, Application for Federal Assistance ([sample form](https://www.rd.usda.gov/files/sf424.pdf))
* SF-424A, Budget Information for Non-Construction Programs ([sample form](https://www.rd.usda.gov/files/sf424a.pdf))
* SF-424 (R&R), Project/Performance Site Locations Form ([sample form](https://grants.nih.gov/grants/funding/forms-h/RR_SF424_5_0-V5.0.pdf))
* CD-511, Certification Regarding Lobbying ([sample form](https://apply07.grants.gov/apply/forms/readonly/CD511-V1.1.pdf))
* SF-LLL, Disclosure of Lobbying Activities (if applicable) ([sample form](https://apply07.grants.gov/apply/forms/readonly/SFLLL_2_0-V2.0.pdf))
* SF-328 Certification Pertaining to Foreign Interests ([sample form](https://www.gsa.gov/system/files/SF328-18b.pdf))
* Budget Narrative and Justification ([sample guide](https://www.uvu.edu/osp/docs/how-to-prepare-a-budget-justification.pdf))
* Indirect Cost Rate Agreement (if applicable) ([sample guide](https://www2.ed.gov/about/offices/list/ope/trio/indirect-costs-guidance.pdf))
* Technical Proposal
* Work Plan
* Commercial Transition Plan
* Intellectual Property Plan (if applicable)
* Product Security and Cybersecurity Management Plan
* Letter(s) of Commitment for Consultants, Contracts and Subawards
* MNO Letter(s) of Partnership Intent (Required only for SFRA 1)
* Current and Pending Support Attachment (Required only for SFRA 2)
* Other Relevant Materials (Optional)

Note that all of these forms **must** be filled online at [grants.gov](https://www.grants.gov/applicants/workspace-overview/). In addition, the grant application will also be sent through [grants.gov](https://www.grants.gov/applicants/workspace-overview/). Also note that some of the sample forms are outdate, and some will require you to use Adobe Acrobat, as they make use of security features that are only implemented in Adobe’s pdf viewer. So, we cannot precisely know what is needed until we sign up using our UEI (from [SAM.gov](https://sam.gov)).

# Addressing FAQ

* How to apply:  
  For us, the best way to apply would be by registering on [SAM.gov](https://sam.gov/), and acquiring a **Unique Entity Identifier** (UEI) as a foreign MNO. This would be better than filling out form [SF-328](https://www.gsa.gov/reference/forms/certificate-pertaining-to-foreign-interests).  
  After acquiring our UEI, we would need to fill out our part of the grant application (as a partner MNO, listed in [Proposal requirements](https://file+.vscode-resource.vscode-cdn.net/d%3A/My%20works/2024/aces-co/oran-smallcells/notes/information_on_nofo.md#proposal-requirements)), while our US-based RU supplier partner (who will also be the primary applicant) will need to fill out the majority of what their development goals are.
* About IP rights:  
  The slides do not state that the US will hold the IP rights of any developed product. Instead, the slides mention that we (the applicant) will have to submit our IP-rights plan.  
  But it would be in our best interest not to be too restrictive if we wish to acquire the funding, especially when its agenda is about open interfaces.
* What conditions apply:  
  Some of the conditions are listed in the [budgeting section](https://file+.vscode-resource.vscode-cdn.net/d%3A/My%20works/2024/aces-co/oran-smallcells/notes/information_on_nofo.md#funding-budget-related).
* Maximum and minimum ranges of the RU being developed:  
  The slides do not specify the range at which the RU should operate in. But since the focus of the funding is to develop commercial O-RUs in the US, I think any acceptable range within the application's bounds will be fine.  
  For instance:
  + If small-cells were being developed for placement in buildings, then it would need high beamforming capabilities (for high penetration), with moderate power consumption (we don't want too much RF leakage from the building, since it would be wasteful energy).
  + If small-cells were being developed for placement outside in a metropolis, then it would need high MIMO capabilities, in addition to being able to create a few but extremely strong beamforming among peer small-cells in the neighborhood for sharing communication.

# Possible FEOC concerns

The US partner which we have in mind is [PROSE](https://www.prosetechnologies.com/companyIntroduce.html), which branches from a very well established German company called the [Rosenberger Group](https://www.rosenberger.com/).

As per [FEOC's definition](https://www.energy.gov/sites/default/files/2024-05/Final%20FEOC%20Guidance%204.18.2024_GS%20signed_website_0.pdf), we will need some clarification from PROSE about their operations in China to determine whether or not the parts manufactured in China will be considered as equipment from a FEOC (thereby become unqualified for grant expense).

Below is a list of criteria which PROSE checks off, so that it is not categorized as an FEOC affiliate:

* Not owned or controlled by a covered nation (China). (The business is German and US owned)
* Does not have its headquarters in a covered nation. (Their headquarters is in Ireland)
* China does not hold 25% or more voting rights across any of the company's managing boards.

Below is a list of criteria which make it difficult to determine if PROSE would be an FEOC affiliate:

* Has PROSE accepted Chinese subsidiaries? If yes, then it is being indirectly controlled by a covered nation.
* Is PROSE subjected to the jurisdiction or direction of China? (i.e. Can China take physical control of their manufacturing plant?)

To answer these questions, we will have to question PROSE directly about their involvement in China.

As a side note, the FEOC law was originally made to counteract the production of Chinese Electric Vehicle Batteries, and their installation in American cars.