# NTIA RFC comments

# Response to Questionnaire on Public Wireless Supply Chain Innovation Funding

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# 1. Introduction and summary

Open Valley highly appreciated the US initiatives to support and accelerate the Open RAN's development, adaptation, and maturity as a key technology for future sustainability and more diversity in the global 5G and 6G supply chain.

Open Valley welcomes the opportunity to respond to the Request for Comment in which the National Telecommunications and Information Administration ("NTIA") seeks comment on NTIA's development and implementation of the Public Wireless Supply Chain Innovation Fund ("Innovation Fund").

Open Valley fully understands the criticality and importance of Open RAN as a matter of national security for the US and its global allies. and the effect of a few vendors' current dominance, including Chinese vendors (Huawei and ZTE), on the future of the global wireless technology supply chain and digital infrastructure, particularly 5G and 6G.

Open Valley's comments below reflect our position as a leader in wireless solutions and as technology pioneers in the open networks and open RAN spaces. In fact, Open Valley is the only representative from the Middle East and Africa in the global alliances and standards bodies. and an active participant in a number of US-based organizations.

# 2. background

Open Valley is a specialized system integrator and SaaS platform provider in the Mobile Telco Cloud, Open Networks Space, and associated services for Radio Access Network (RAN), Core Networks and cloud infrastructure.

The company and since inception have built vast expertise in several network domains across the entire network lifecycle from Lab/Test environment to Production and network Operations with main focus into the advanced Telcom Technologies (5G, Open RAN, Open Core, Cloud Stack, End-to-end orchestration, MEC Platforms and Edge Cloud).

We believe that Open Valley is uniquely positioned in the Middle East and Africa region as the only player focused on the development and deployment of open networks (Open RAN and Open Core) with the following identified value drivers:

- Active member in the Global Eco-System and Contributor in all the major organization and standardization bodies.

  O-RAN alliance (https://www.o-ran.org/ ) for open RAN development and related technology advancements.

Meta TIP (https://telecominfraproject.com/ ) for open RAN and Open Core deployment and testing strategies.

ONF (https://opennetworking ) for Software driven network and 100% open-source platforms initiatives.

ATIS (https://www.atis.org/ ) For North America 5G Supply Chain and 6G Foundation projects.

3GPP (https://www.3gpp.org/ ).

And CSA (https://csa-iot.org ).

- In collaboration with the ONF (Open Network Foundation), a US-based organization, we established the region's first 5G Open RAN Lab facility based on 100% open-source platforms at Egypt.

- Open Valley is a channel system integration partner for Mavenir, Dell Technologies, IBM, Rakuten Symphony, Totogi, 6Wind, XENA, and others. It also works with a consortium of eco-system partners for Open RAN field trials and commercial deployments in the MENA region with key MNOs and CSPs. The goal is to promote Open RAN technology and swap the solutions of legacy vendors like Huawei and ZTE.

# 3. Responses

## I. QUESTIONS ON THE STATE OF THE INDUSTRY

***(1) What are the chief challenges to the adoption and deployment of open and interoperable, standards-based RAN, such as Open RAN? Are those challenges different for public vs. private networks?***

**Response:**

Open RAN, as a new technology, requires time to adapt and mature. And as an industry, we need more collaboration and funding to accelerate standard and specification development, lab/field trials, products life cycle management for go to market strategies, and ultimately Commercial deployment at scale. The following are the key challenges as we identified from our region perspective and globally.

- Standard development and technology technical specifications still under progress and need more collaboration between major standard bodies to accelerate the needed reference design, blueprints, technology architecture, interfaces

specifications, test cases, verification scenarios, implementation models and integration requirements.

For instance, more collaboration is needed between below organizations.

3GPP, O-RAN alliance, IEEE, ATIS, TIP, ONF, Open Air interface.

- Interoperability, compatibility, and End-to-end system integration is very Challenging due to the disaggregation nature of open RAN technology with huge diversity in the supply chain where each Open RAN components supplied by different vendor needs to be integrated together at one end-to-end solution and reference design.

- Open RAN testing and verification are very time consuming and resources consuming that impacting the entire end-to-end product life cycle and go to market process. Also, financially consuming due to the mandatory needs for multi-vendor lab environment for testing and verification before commercial production.

- We can see a major challenge with brownfield networks, which are already well-established networks with legacy architecture and legacy infrastructure.

- New network deployment and operation models need to be introduced. as the Open RAN system stability and reliability still having a lot of issues even with the green field deployment references like (Rakuten Japan, DISH US, 1&1 Germany).

- System integration role and related SLA models needs to be clearly defined as industry level as a key element in the open ran value chain.

- More industry level collaboration is needed to develop a true open-source RIC “Radio intelligent controller” platforms rather than a vendor centric RICs. Which is critically needed for zero-touch operation and self-driven networks as promised by Open RAN technology for more intelligent and cost effect networks operation.

- Investing more on a start-ups who can create an interoperable 3rd party applications, AI/ML based solutions and services which can accelrate the entire provisioning, deployment, testing process and go to market of the open ran solutions.

- Regarding the private & public networks. The key challenges will remain the same only that the green field nature and deployment scale of the private network will make it more suitable and faster show case for open ran deployment rather than public brown field and deployment at large scale.

***(a) What are the challenges for brownfield deployments, in which existing networks are upgraded to incorporate open, interoperable, and standards-based equipment?***

**Response:**

Brownfield networks with legacy vendors and legacy infrastructure will have a number of challenges with open ran deployment.

- Till now most of the Open RAN ecosystem are providing a solutions stack supporting 4G/5G which is obviously an issue from brownfield Operators since they are looking for a full stack with 2G/3G/4G/5G in place.

- The interoperability between the Open RAN system and existing legacy network are a big challenge. From the technical perspective the legacy vendors don't want to open-up the interfaces which will be mandatory needed for the interoperability between the Open RAN and legacy.

- Some of the Legacy networks infrastructure are not cloud native by design/architecture which will need some investment from the operator's side to deploy open ran as a cloud native solution by nature. And that kind of extra investments raised a concern from the brownfield operators.

- Some operators having a long term contract with legacy vendors e.g (Huawei) and they are struggled to find a proper way to deploy the open ran with in their networks.

- For many Operators CAPEX comparison between legacy & Open RAN is a key for open RAN deployment. And till now they are not yet clear with the Open RAN CAPEX saving since some legacy vendors e.g.(Huawei) introducing a complete solutions Kit and services with very low and very competitive cost.

***(2) What ongoing public and private sector initiatives may be relevant to the Innovation Fund?***

**Response:**

Outside US, many public and Private initiatives are in place as following some of them.

- IN UK, November 2021, The UK government announced a major push around accelerating the deployment of open RAN in the country, upping its funding. In a statement, the UK Department of Culture, Media, and Sport (DCMS) explained it agreed with the four domestic operators to fulfill a goal to boost deployments so 35 per cent of the nation's mobile network traffic is carried over open RAN. It increased previous funding of £30 million to a total of up to £51 million.

- The German government's Federal Ministry of Transport and Digital Infrastructure (BMVI) recently awarded €32 million in subsidies to major manufacturers, operators testing firms and systems integrators in order to expedite Germany's development of open RAN technology and 5G inventions.

- In Japan, The Ministry of Internal Affairs and Communications will earmark JPY 66.2 billion ($450 million) in the second supplementary budget for fiscal 2023 for the initial establishment of this special fund. The 6G and open ran fund will be administered by the National Institute of Information and Communications Technology. It will aim to provide financial support for 6G and open ran research and development for a number of years.

- Japanese mobile network operators NTT Docomo, KDDI, SoftBank and Rakuten Mobile have collaborated on the formation of a new testing and certification facility, dubbed "Japan OTIC [open testing and integration center]", which will focus on Open RAN network elements that conform to O-RAN Alliance specifications.

- In Europe, Open RAN is identified as a strategic priority, and at Madrid / 20 January 2021, Giant European operators - Deutsche Telekom AG, Orange S.A., Telefónica S.A., and Vodafone Group Plc are joining forces to support the rollout of Open Radio Access Network (Open RAN) as the technology of choice for future mobile networks to the benefit of consumer and enterprise customers across Europe and MOU (memorandum-of-understanding) has been signed at 18th of January 2021.

- In middle east, GCC leading telecom operators including e& formerly known as Etisalat Group, Zain Group, Mobily, Batelco and Omantel who have joined forces to accelerate the implementation of Open Radio Access Network (ORAN) signed an MoU as a consortium.

- the Saudi Ministry of Communications and Information Technology and the US Department of Commerce signed a memorandum of understanding to advance the rollout of 5G/open ran networks in Saudi Arabia.

***(a) What gaps exist from an R&D, commercialization, and standards perspective?***

**Response:**

Below some of the gaps which we identified

- R&D and standards gaps: more collaboration is needed between O-RAN alliance, 3GPP, IEEE and ATIS.
- R&D and standards gaps: more collaboration is needed between the Open Source communities to accelerate the development of the key open ran modules like RICs (Radio intelligent controllers). For instance (ONF" Open Network foundation", Open Air interface, ONAP "the LINUX foundation project")

- R&D and standards gaps: the standardization and the technology specifications taking into consideration the technical priorities which is identified by US and European operators and excluding some other regions deployment models and commercial use cases for instance middle east and Africa are fully missing at this equation till now.

- R&D gaps: Lab facility and test environments are mandatory needed to accelrate the solution verification and go to market, some regions already having a centralized lab facilities like US & Europe but some other regions like MEA has no such centralized lab facility available for open RAN.

- Commercialization gaps: most of the legacy vendors are providing their new solutions with FOC POC “Free of charge proof of concept” but open ran solutions owner and vendors usually providing the Open RAN as full paid POC due to the lack of funding. Which is a clear concern from the MNOs/CSP side and impacting the commercial deployment of the open ran.

***(b) How might NTIA best ensure funding is used in a way that complements existing public and private sector initiatives?***

**Response:**

- Obviously, the Open RAN ROI ("return on investment") will take some time, as a lot of development and testing work is still needed. Securing some funding for the ecosystem's Open RAN start-up companies will speed up development and commercialization.

- Centralized lab facilities and test environments are mandatory to accelerate the testing and verification of open RAN solutions for a quicker and faster go-to-market. Unfortunately, some key regions, like the Middle East and Africa, do not yet have a centralized Open RAN lab facility.

- Helping the eco-system with the needed funds for small scale open RAN FOC POC “free of charge proof of concept” with the MNOs/CSPs. as it is one of the key concerns from the MNOs/CSPs to accelrate the large-scale and commercial deployment of the Open RAN.

- Existing Open RAN projects for "small scale deployment" are ongoing, but they are moving slowly due to a lack of funding. So, the funds will be needed to accelerate these projects as a reference for successful deployment.

***(3) What kind of workforce constraints impact the development and deployment of open and interoperable, standards-based RAN, such as Open RAN and how (if at all) can the Innovation Fund help alleviate some of these workforce challenges?***

**Response:**

- Some Open RAN start-ups are playing a very key role in the development and deployment of Open RAN, but unfortunately, due to a lack of funding and the long ROI nature of Open RAN, they are not able to unleash the full potential.

- Open RAN requires an additional engineering skill set compared to legacy technologies. Investing in the existing talented resource hubs in some regions, like Egypt, will go a long way toward bridging the talent gap.

- Expending the Open RAN deployment at some critical regions Like Middle east and GCC will need a local presence from some Open RAN system integrator

companies from the region e.g. (Open Valley) having foots on the ground for faster deployment, on site network operations and R&D support.

***4) What is the current climate for private investment in Open RAN, and how can the Innovation Fund help increase and accelerate the pace of investment by public and private entities?***

**Response:**

- After decades of dominance by the giant legacy vendors, Open RAN provided a great opportunity for start-ups, software, IT, and infrastructure companies to begin contributing to Telcom technology advancements. And it is clear that a number of active start-ups in the ecosystem add significant value to the development of the open ran standards and deployment. And we as open valley contributing a lot in the Open RAN related development and deployment across the MEA region.

- As an industry, the climate is very suitable now for the investment, as the industry really looking forward to an innovative approach and technology to address the future needs of telecom industry with fare and accepted diversity in the supply chain for more sustainability and less domination at telco market. Private and public investment references are mentioned in some details at Question (2).

***(5) How do global supply chains impact the open, interoperable, and standards-based RAN market, particularly in terms of procuring equipment for trials or deployments?***

**Response:**

- Intensive collaboration and transparency are mandatory required between all Open RAN ecosystem players and stakeholders for instance (CU/DU SW stack vendors, RU vendors, HW and Infrastructure vendors, platform and SW orchestrator vendors, System integrators and Silicones/ semiconductors).

- Obviously, the system integration will play a very key role in bringing all these components together at one end-to-end Open RAN solution for trials and commercial deployment and will play a very key role in priming the overall project progress and vendors orchestration.

## II. QUESTIONS ON TECHNOLOGY DEVELOPMENT AND STANDARDS.

***(6) What open and interoperable, standards-based network elements, including RAN and core network elements, would most benefit from additional research and development(R&D) supported by the Innovation Fund?***

**Response:**

- A lot of development work and associated funds will be needed for RICs platforms (RAN intelligent controller) and SMO (Service management and orchestrator modules). For many uses cases related to energy saving, traffic steering, admission control, power control, load balancing and others.
- A lot of development work still needed at the O-Cloud, virtualization, and related network component for (fault management, performance management, configuration management, logging).
- Another import point, As the network-based element switch to Software Defined Network (SDN). We believe that it's time to bring the Software Defined Radio (SDR) to the commercial RU products, which accelerate the innovation for the RU functionalities.
- Standardized many of the RU functionalizes which gives the operator to change the use case of the RU as well as adding management interface with the network orchestrator.
- Basically, the industry telecom R&D efforts should continue open the fronthaul interface so that breakout any vendor lock-in. However, the open fronthaul interface one of the keys for the interoperable and openness RAN features. It's worth noting that the tricky thing that challenge the openness of the fronthaul interface coming under the vendor "optional feature".
- The Critical features which need to be supported by the RU units e.g. (Dynamic spectrum sharing, high layer carrier aggregation, beam forming for some frequency bands).

***(7) Are the 5G and open and interoperable RAN standards environments sufficiently mature to produce stable, interoperable, cost-effective, and market-ready RAN products?***

**Response:**

- We believe that the basic 5G and Open RAN functionality and related features are already developed and matured enough for commercial and large-scale deployment, and we can refer to some large-scale deployment projects e.g. (Rakuten Japan, DISH US, 1&1 Germany) however the system performance, stability and reliability still having some concerns.
- But regarding the advanced capabilities and features like mMIMO, high layer carrier aggregations, AI/ML based RICs, SMO and management systems still need a lot of development work and not yet matured for large scale commercial deployment.

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***(a) What barriers are faced in the standards environment for open and interoperable RAN?***

**Response:**

- As we see it, It is more into join forces and standards bodies alignment in terms of the Open RAN standard specifications release process, technical releases review and contribution by different standard bodies. Mainly O-RAN alliance, 3GPP, IEEE and ATIS. And we believe that ATIS should contribute more and take a leadership role as one of the key standard bodies at North America.
- In general, unsuccessful trials for the open interfaces tells us that telecoms has experienced many open, standardized interfaces which do not ensure interoperability. That's because while open in principle, they sometimes do not provide enough specificity of detail, leaving implementation options vague and open to interpretation enabling vendors to include proprietary extensions.
- Another point is faced to openness the RAN is simply the "optional features" including the interface standards. If we are talking for the fronthaul interface, this "optional features" coming from the non-standardized for the RU functionalities and capabilities.

***(b) What is required, from a standards perspective, to improve stability, interoperability, cost effectiveness, and market readiness?***

**Response:**

- More collaboration and transparency is clearly required between the eco-system partners who are already members of the O-RAN alliance and other standard bodies, mainly more collaborative R&D work, Lab testing and knowledge exchange. With more investment at the Open-Source communities and define a clear framework to join effort in developing a global Open Source platforms for commercial use.
- More focus and investment needed for defining a clear Lab certification and testing process for open ran solutions for faster go to market. And a mandatory need to increase the number of the centralized lab facilities across the globe. For instance, no Lab facility is avalibile at MEA region for example.

- Design and Enhance the Interoperability testing documents with a clear objective and a detailed procedure as well as enrich the test case with a different signaling and configuration.
- Increase the Technical Reports (TRs) that tackle a load balancing and nodes utilization mechanisms and procedures which benefited from the nature of the cloudification and virtualization of the RAN.
- Define protocols for a full network's architecture e.g., Multi-CU/Multi-DU that needs to enhance stability with the overall network performance in such disaggregation.
- Enhance RU implementation using enable a management interface for controlling and reporting from there.

***(c) What criteria should be used to define equipment as compliant with open standards for multivendor network equipment interoperability?***

**Response:**

- The multi-vendor interoperability test cases should be passed but in the one of the trusted interoperability lab environments like Open Testing and Interoperability Center (OTIC) initiative was launched in September 2019. OTIC provides a controlled and managed environment where multiple equipment providers and system integrators can integrate and test their open RAN products and verify compliance with the O-RAN Alliance specifications.

- O-RAN alliance and meta-TIP have done a good effort to define the badging and certification process with the related detailed tests strategy, test cases, and detailed test procedures. Open RAN complaint solutions badging, and certification should be provided by the certified Labs only.

- TIP Community labs already distributed across the globe, but it needs to be more as some regions are missing like MEA region.

- System integrators is the best place to establish an end-to-end certified lab environment and provided LaaS (Lab as a services) to the Open RAN community to accelerate the lab testing and field trials.

***(8) What kinds of projects would help ensure 6G and future generation standards are built on a foundation of open and interoperable, standards-based RAN elements?***

**Response:**

- 6G standardization is still in the very early stages of development and many uses cases still not very clear however we can see many 6G initiatives has been started across the globe for instance, ATIS (Next G Alliance) for north America and NGMN alliance.
- Early engagement and collaboration between these initiatives (NGMN, NextG alliance) and O-RAN alliance, 3GPP will be required for early development of the 6G standard as open and interoperable technology.

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## III. QUESTIONS ON TECHNOLOGY DEVELOPMENT AND STANDARDS.

***(9) How can projects funded through the Innovation Fund most effectively support promoting and deploying compatibility of new 5G equipment with future open, interoperable, and standards-based equipment?***

**Response:**

From our perspective, the funding areas listed below are critical and must be addressed as soon as possible.

- Establishing more centralized Open RAN lab facilities across the regions with focus at the Key regions as first phase to address each region solution requirements and accelrate the go-to market strategy.
- Sponsor some open RAN PoCs with some key/giant MNO/CSPs across the globe to be a reference projects for faster commercial deployments.
- Funding the Open RAN start-ups to unleash the full potential and accelrate the Open RAN development and deployment.
- funding the running Open RAN projects to accelrate the delivery and increase the success stories and reference projects.
- Fund the potential talent pools and resources hubs across the globe to build the foundation for the needed deep technical R&D teams who can help at the entire life cycle of open RAN development and deployment.
- More Industry level collaboration is needed through the existing organizations and initiatives .e.g. ORAN alliance, Meta TIP and others. And funds are needed to increase the eco-system engagement and collaboration.

***(a) Are interoperability testing and debugging events (e.g., "plugfests") an effective mechanism to support this goal? Are there other models that work better?***

**Response:**

*Plug fests is good initiative but we have some concerns as below.*

- *Not all regions are participating at the Plug fest for instance middle east and Africa are completely missing in the global plugfests activities.*
- *The plug fests usually hosted by the Mobile network operators and for some reasons not all the eco-system are invited to the plug fests, it seems only the MNO's partners are invited and others not.*
- *Plugfests should be more agnostic and all eco-system should be invited.*
- *Sponsorship is required for the pugfests as many company from the small tier are not participated due to the cost related to the needed resources and travel locations and related expenses.*

*Overall the plug fests and related activities for testing and showcases will need more funds to be more efficient and organized.*

*A parallel approach can be that NTIS sponsors and works with the eco-system at Open RAN showcases at global and regional technology events, e.g. (MWC Africa, Africa Tech, LEAP in Saudi Arabia, Gitex in the UAE, and others.*

***(10) How can projects funded through the program most effectively support the "integration of multi-vendor network environments"?***

**Response:**

- as mentioned earlier, centralized open RAN lab Facilities is the key to accelrate the overall life cycle of development and deployment so NTIS need to fund these labs across the main regions and insure the full mesh alignment between all these Labs in the development and deployment efforts. These labs can be 3rd party labs along with the existing TIP community & ORAN-alliance labs.

- The System integrators are playing a very key role of the Open RAN value chain and the open RAN end-to-end solutions integration, which by nature required a very talented resources and engineering team, so NTIS need to fund the promising system integrators to be able to hire and skill-up the needed resources pool.

***(11) How do certification programs impact commercial adoption and deployment?***

**Response:**

The certification and badge process is, of course, very important to certify the ORAN compliant products and solutions to minimize the testing efforts and eliminate the possible replication of solution validation but it does not guarantee the end-to-end interoperability of the solutions; hence, usually additional testing is required by the MNOs/CSPs to ensure the Open RAN solution's compatibility with their networks.

***(a) Is certification of open, interoperable, standards-based equipment necessary for a successful marketplace?***

**Response:**

Certified Open RAN Products and Solutions is indeed important as a proven and complaint Open RAN solutions that is ready for commercial deployment as fully compliant with O-RAN alliances and standard specifications, but not necessary as some of the open RAN products can be fully complaint and tested at the Operators labs for commercial use without these kind of certifications.

***(b) What bodies or fora would be appropriate to host such a certification process?***

**Response:**

The ORAN Alliance and Meta TIP have already established an excellent framework for the certification and badge processes, but this should not be limited to these two organizations. Other organizations should also participate in the badge and certification criteria. For instance, ATIS and CSA "Connectivity standard alliance" should play a leadership role, but unfortunately, they are not very active. Also the government and regulatories should also participate.

***(12) What existing gaps or barriers are presented in the current RAN and open and interoperable, standards-based RAN certification regimes?***

**Response:**

- The certification process is very time consuming and covering mainly the product functionally aspects and other end-to-end aspects is not fully covered.

- The test setup and environment for certification need to be a full replica of commercial and production environments. And not really on test simulations and traffic generators. In other word, full end-to-end commercial setup, not simulators.

- the certification process should consider the deployment model of the product not only the functionality aspects and compliancy badge.

***(A) Are there alternative processes to certification that may prove more agile, economical, or effective than certification?***

**Response:**

- the end goal is to certify the end-to-end Open RAN product compatibility and compliance, not only a product as a standalone. So, the existing process need to be enriched and include the vendors labs in the testing procedure to ensure the end-to-end compatibility and more efficient software upgrades and release management of the ORAN complaint products. that should be more efficient in terms of go to market and commercial deployment at scale.

***(B) What role, if any, should NTIA take in addressing gaps and barriers in open and interoperable, standards-based RAN certification regimes?***

**Response:**

Efficient and Proper Products certification would require more Lab facilities and more collaboration between the existing lab initiatives e.g. (TIP labs) and vendors labs. So NTIA to help with funds for new labs and ensure the full alignment and clear framework between all Lab facilities including the vendors labs.

It is worth to mentioned that ATIS should play a leadership role.

## IV. Questions on Trials, Pilots, Use Cases, and Market Development.

***(13)*** **What are the foreseeable use cases for open and interoperable, standards-based networks, such as Open RAN, including for public and private 5G networks? What kinds of use cases, if any, should be prioritized?**

**Response:**

- 4G/5G Open RAN FWA & eMBB use cases for Macro sites and indoor deployment should be on top priority for both public and private networks. However full 2G/4G/5G stack should also considered as many deployment are brown field and MNOs/CSPs already raising a lot of concerns regarding the open RAN full stack availability (2G/4G/5G).
- ZTO, Zero-touch operations and provision use cases are very critical for operators' OPEX savings targets as promised by the Open RAN. RICs platforms still need a lot of work and investment, and NTIS can dedicate some funds for RICs-related use cases as immediate industry needs.
- Unleashing the full potential and capabilities of the start-ups will be a kind of game changer to promote the open ran globally.

***(14)*** **What kinds of trials, use cases, feasibility studies, or proofs of concept will help achieve the goals identified in 47 U.S.C. 906(a)(1)(C), including accelerating commercial deployments?**

**Response:**

From our point of view below are the main focusing are to accelrate the commercial deployment of the Open RAN.

- Centralized reginal Labs.
- initiate a free-of-charge PoCs with group companies (MNOs and CSPs) that primarily operate in multiple countries, so that one successful PoC can serve as a reference for many OpCos and coordinated deployment rather than a PoC per country per operator.

  As example: STC “Saudi telecom”, Zain Group, e@ “etisalat Group”, Orange Group, Vodafone Group…etc.

- really on a local system integrators partner with foots on the ground for faster global expansion, deployment, and operations.
- Regional R&D hubs with a good and talented resources will be required for faster engagements and more customer's trust.
- Release some funding to support the running open ran field trails and PoCs.
- Startups will always be the game changer, and NTIS can help with funds.

***(A) what kinds of testbeds, trials, and pilots, if any, should be prioritized?***

**Response:**

- Centralized reginal Labs (in middle east and Africa region).
- initiate a free-of-charge PoCs with group companies (MNOs and CSPs) that primarily operate in multiple countries, so that one successful PoC can serve as a reference for many OpCos and coordinated deployment rather than a PoC per country per operator.

  As example: STC "Saudi telecom", Zain Group, e@ "etisalat Group", Orange Group, Vodafone Group…etc.

***(15)* How might existing testbeds be utilized to accelerate adoption and deployment?**

**Response:**

- many testbeds already in place, like TIP community labs, mobile operator labs, vendor labs, and system integrator labs, but a lot of coordination work is required to join forces to eliminate the duplication and accelerate the end-to-end Open RAN product maturity and adaptation, which unfortunately is a clear gap as of now.

***(16)* What sort of outcomes would be required from proof-of-concept pilots and trials to enable widespread adoption and deployment of open and interoperable, standards-based RAN, such as Open RAN?**

**Response:**

A lot of promises have been introduced by the Open RAN technology and related architectures compared to the legacy RAN, so the outcome of the PoC should clearly address the below items as a show case.

- Truly open and interoperable RAN systems with a clear diversity on the vendors and supply chain. On other word no vendor lock-in or proprietary implementation.
- Open RAN System performance, stability and reliability should be better or similar to the Legacy vendors solutions and systems. (Open RAN Solutions should be a competitive).
- A true cost savings in TCO (CAPEX and OPEX), this is one of the key factors in the proposition of the open ran to MNOs and CSPs.

- Show case the great capabilities of the open ran as a key technology driving the mobile network transformation as below.

  The Cloud native capabilities of the Open RAN.
  The disaggregation and software centric solutions.
  Fully automated based on AI/ML platforms for Zero touch services and zero touch operations (self-driven networks concept).

## V. QUESTIONS ON PROGRAM EXECUTION AND MONITORING.

***(21) Transparency and accountability are critical to programs such as the Innovation Fund. What kind of metrics and data should NTIA collect from awardees to evaluate the impact of the projects being funded?***

**Response:**

From our perspective, NTIA should collect and study the other running initiatives and the other Open RAN funds programs across the globe to define clear KPIs and success metrics based on the lessons learned from the other initiatives. Most importantly, existing efforts and initiatives should be supported rather than duplicated or interfered with.

***(22) How can NTIA ensure that a diverse array of stakeholders can compete for funding through the program? Are there any types of stakeholders NTIA should ensure are represented?***

**Response:**

We believe that the global stack holders from the eco-system who are strongly supporting and promoting the Open RAN in various regions should be invited as key players outside of the US. Includes (active start-ups, technology companies, SMEs..etc )

***(23) How (if at all) should NTIA promote teaming and/or encourage industry consortiums to apply for grants?***

**Response:**

We would recommend that NTIA contact the global alliances, e.g. (O-RAN , TIP and others) on some kind of joint press release or announcement within this community so that the whole eco-system from different regions is aware of this initiative and very important program.

***(24) How can NTIA maximize matching contributions by entities seeking grants from the Innovation Fund without adversely discouraging participation? Matching requirements can include monetary contributions and/or third-party in-kind contributions (as defined in 2 CFR 200.1).***

**Response:**

We have no opinion for that, but as a start-up, we will be very agnostic and flexible in terms of the way that NTIA wants to regulate the funds.

***(25) How can the fund ensure that programs promote U.S. competitiveness in the 5G market?***

**Response:**

Fund program should focus inside and outside US market. As it is very important to Promote the Open RAN in the global market and increase the U.S. competitiveness in the 5G market and helping the US allies to expand and promote the Open RAN in the global market. With focus into developing, testing, deployment , field trials, and PoCs.

***(a) Should NTIA require that grantee projects take place in the U.S.?***

**Response:**

No, as we think that will limit the project potential and the end goal. Telcos is a global market by nature and no point to focus only inside U.S.

***(b) How should NTIA address potential grantees based in the U.S. with significant overseas operations and potential grantees not based in the U.S. (i.e., parent companies headquarteredoverseas) with significant U.S.-based operations?***

**Response:**

We have no opinion for that, but as a start-up, we will be very agnostic and flexible in terms of the way that NTIA wants to regulate the funds.

***(c) What requirements, if any, should NTIA take to ensure ''American-made'' network components are used? What criteria (if any) should be used to consider whether a component is ''American-made''?***

**Response:**

We have no opinion for that, but as a start-up, we will be very agnostic and flexible in terms of the way that NTIA wants to define a specific criteria to ensure the American-made.

***(26) How, if at all, should NTIA collaborate with like-minded governments to achieve Innovation Fund goals?***

**Response:**

We have no opinion for that,

## VI. additional questions

***(27) Are there specific kinds of initiatives or projects that should be considered for funding that fall outside of the questions outlined above?***

**Response:**

There is no specific recommendation, but we believe that some questions about who the current global key players in the eco-system are and what kinds of contributions they are making, both inside and outside the United States, were missing.

***(28) In addition to the listening session mentioned above and forthcoming NOFOs, are there other outreach actions NTIA should take to support the goals of the Innovation Fund?***

**Response:**

Yes, we believe that NTIA should contact and coordinating with the global ORAN alliances and organization e.g.(O-RAN alliance, TIP, ONF , ATIS , Open RAN Policy Coalition and other) for better program announcement.