भारत सरकार / Government of India
अंतरिक्ष विभाग / Department of Space
यू.आर. राव उपग्रह केंद्र / U.R.RAO SATELLITE CENTRE
एच.ए.एल. एयरपोर्टरोड, विमानापुराडाक / HAL Airport Road, Vimanapura Post,
बेंगलूरु/ BENGALURU – 560 017

Ref No.: **ISMW/2025-0-67563** **24.04.2026**

<u>विषय: डी एच एस एस एस ईथरनेट स्विच/रूटर के विकास हेतु इच्छा की अभिव्यक्ति (ई ओ आई) का आमंत्रण- के संबंध में</u>
<u>Invitation for Expression of Interest [EoI] for development of DHSS ETHERNET SWITCH/ROUTER</u>

अंतरिक्ष विभाग, भारत सरकार के अंतर्गत भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) का यू आर राव उपग्रह केंद्र (यू आर एस सी), भारत में निर्मित होनेवाले सभी उपग्रहों के अभिकल्पना, विकास, संविरचन तथा परीक्षण के लिए उत्तरदायी है। वर्तमान में यू आर एस सी **डी एच एस एस ईथरनेट स्विच/रूटर के विकास** हेतु उद्योग भागीदारों को आमंत्रित कर रहा है।

U.R. Rao Satellite Centre [URSC] (Formerly known as ISRO Satellite Centre), of Indian Space Research Organization [ISRO] under Department of Space, Government of India is responsible for Design, Development, Fabrication and Testing of all Indian made Satellites. URSC is currently inviting Industry Partners **for development of DHSS ETHERNET SWITCH/ROUTER.**

यह प्रस्ताव का उद्देश्य **डी एच एस एस ईथरनेट स्विच/रूटर के विकास** करने हेतु तकनीकी अवसंरचना तथा क्षमता प्राप्त भारतीय उद्योगों से इच्छा की अभिव्यक्ति आमंत्रित करना है।

The proposal is to invite Expression of Interest exclusively from Indian industries having technical infrastructure and capability to execute **development of DHSS ETHERNET SWITCH/ROUTER.**

ई.ओ.आई. दस्तावेज हमारे वेबसाइट www.isro.gov.in से डाउनलोड किए जा सकते हैं।
EOI documents can be downloaded from our website www.isro.gov.in

ई ओ आई का मूल्यांकन बोलीकर्ता के अनुभव, सेवा-क्षेत्र की समझ, सुविधा अवसंरचना, प्रस्तावित कार्यप्रणाली और कार्य योजना, दक्ष मानव संसाधन और उद्योग की वित्तीय शक्ति के आधार पर किया जाएगा।

The EOI will be evaluated on the basis of bidder's experience, its understanding of scope of services, facility infrastructure, proposed methodology and work plan, skilled manpower and the financial strength of the industry.

आवश्यकता पड़ने पर या आगे की जानकारियाँ/विवरण माँगने के लिए, यू आर एस सी ईओआई की प्रक्रिया रद्द करने/इसे पुनः जारी करने का अधिकार सुरक्षित रखता है।

URSC reserves the right to cancel/re-issue the process of EOI, if the necessity so arises or to seek further information/details.

कंपनियाँ/व्यावसायिक प्रतिष्ठान किन्हीं भ्रष्ट या धोखाधड़ीपूर्ण कार्यों में लिप्त पाए जाने पर, निविदा प्रक्रिया में भाग लेने से रोक दिए जाएँगे और उनके ईओआई दस्तावेजों पर विचार नहीं किया जाएगा।

Companies/Firms, if found to have indulged in any corrupt or fraudulent practices, will be debarred from taking part in the Tendering process and their EOI Document will not be taken up for consideration.

इच्छा की अभिव्यक्ति के साथ-साथ आपूर्तिकर्ताओं/व्यावसायिक प्रतिष्ठानों को निम्नलिखित जानकारियाँ भी विस्तार से प्रस्तुत करनी होगी:

Along with "Expression of Interest", Suppliers/ Firm[s]should furnish the following information also in detail:

1. फोन, फैक्स, ईमेल, वेब आदि के साथ कंपनियों के पंजीकृत पते,
   Registered address of the Companies with Phone, Fax, Email, Web, etc.
2. मालिक, भागीदारों, निदेशक मंडल आदि के नाम और पते के साथ कंपनी/संगठन की स्थिति (स्वामित्व/साझेदारी/निजी/सार्वजनिक लिमिटेड आदि)।
   Company/Organization Status (Proprietary/Partnership/Private/Public Ltd. etc.) with Name and Address of Proprietor, Partners, Board of Directors, etc.
3. सहयोगी: (ए) भारतीय (बी) विदेशी।
   Associates: (a) Indian (b) Foreign.
4. पूर्ण पते और संपर्क किए जानेवाले व्यक्तियों के विवरण के साथ पिछले 3 वर्षों के दौरान प्रमुख ग्राहकों की सूची
   List of Major Customers during the last 3 Years with full address and their Contact Persons.
5. स्वामित्व वाली/उपलब्ध अवसंरचना सुविधाओं का विवरण।
   Details of Infrastructure Facilities owned / available.
6. कंपनी के प्रमुख शेयरधारकों के नाम और पते तथा उनकी शेयर पूंजी का प्रतिशत।
   Names and addresses of the major Shareholders of the Company and the percentage of their share capital.
7. नवीनतम वार्षिक रिपोर्ट के साथ पिछले 3 लगातार वित्तीय वर्षों के लिए पूंजी और कारोबार।
   Capital and Turnover for the preceding 3 Financial Years with copy of latest Annual Report.
8. उपलब्ध वित्तीय क्षमता /क्रेडिट सुविधाएँ ।
   Financial Capacity/Credit facilities available.
9. बैंकरों के नाम और पते।
   Name and Address of Bankers.
10. व्यापार संघ, जिससे उद्योग जुड़ा/जुड़े हैं।
    Trade Association to which Industry/ies belong to.
11. संस्था/बिक्रि/सेवा कर पंजीकरण संख्या।
    Establishment/Sales/Service Tax Registration Number.
12. व्यापार का प्रकार।
    Nature of Business
13. कर्मचारियों की संख्या सहित संगठन की संरचना।
    Organization structure along with no. of employees
14. बैंकरों द्वारा जारी व्यावसायिक प्रतिष्ठान की ऋण-शोधन/वित्तीय क्षमता।
    Solvency/Financial capacity of the Firm issued by their Bankers.
15. उद्योग/उद्योगों की अन्य कोई प्रासंगिक जानकारियाँ।
    Any other information the Industry/ies consider relevant.
16. सामर्थ्य और कमियों के क्षेत्रों को स्पष्टतः प्रकट करते हुए कंपनी/कंपनियों के प्रोफाइल

The Profile of the Company/ies clearly bringing out the areas of Strength and Weaknesses.

17. ई ओ आई में भाग लेने के लिए तकनीकी और संगठनात्मक सामर्थ्य का स्व-मूल्यांकन।
Self-Assessment on Technical and Organizational Competence to take part in the EOI.

18. ई ओ आई में उल्लिखित प्रत्युत्तर प्रपत्र
Response forms as mentioned in the EoI.

<u>ईओआई प्रतिक्रिया को पूरा करना/Completion of the EOI Response:</u>

a. कंपनियों/व्यावसायिक प्रतिष्ठानों को ईओआई दस्तावेजों के सभी अनुदेश, निबंधन व शर्तें, प्रपत्र, आवश्यकताएँ और अन्य सूचनाएँ सावधानीपूर्वक पढ़ने की सलाह दी जाती है। ईओआई की प्रस्तुति तभी मान्य होगा, जब इसे ईओआई दस्तावेजों के सावधानीपूर्वक पठन और जाँच के बाद इसके निहितार्थों को समझते हुए प्रस्तुत किया जाए।
The Company/Firms are advised to study all the instructions; Terms and Conditions; Forms; Requirements and other information in the EOI documents carefully. The submission of EOI shall be deemed to have been done after a careful study and examination of the EOI documents with full understanding of its implications.

b. इस ई ओ आई का जवाब सभी संदर्भों में पूर्ण होना चाहिए। ई ओ आई दस्तावेज द्वारा माँगी गई आवश्यक सभी जानकारियाँ प्रस्तुत करने में विफलता या ईओआई दस्तावेजों के हर पहलू का ठोस उत्तर न देने वाले प्रस्ताव की प्रस्तुति कंपनियों/व्यावसायिक प्रतिष्ठानों के जोखिम पर होगी और इसके परिणामस्वरूप दस्तावेज अस्वीकृत किया जा सकता है।
The response to this EOI should be full and complete in all respect. Failure to furnish all the information required by the EOI document or submission of proposal not substantially responsive to the EOI documents to every aspect will be at the risk of the Company/Firms and may result in rejection of the document.

c. प्रस्तुत की गई ईओआई के सभी पृष्ठों पर क्रमांक अंकित होने चाहिए और प्राधिकृत हस्ताक्षरकर्ता के हस्ताक्षर होने चाहिए।
All the pages of the EOI submitted must be numbered and signed by the authorized signatory.

d. ई ओ आई के संबंध में किसी भी प्रकार की सिफ़ारिश करना/प्रभाव डालना सख्त वर्जित है और एजेंसी द्वारा प्रस्तुत इस प्रकार से सिफ़ारिश की गई/प्रभावित ईओआई को अस्वीकृत कर दिया जाएगा।
Canvassing in connection with the EOI be strictly prohibited and such canvassed EOI submitted by the Agency are liable to be rejected.

उपर्युक्त सभी जानकारियों के साथ इच्छा की अभिव्यक्ति नीचे दिए गए पते पर, उपर्युक्त संदर्भ संख्या का उल्लेख कर, नियत तिथि एवं समय तक या उससे पहले पहुँच जानी चाहिए।
"Expression of Interest" with all the above information shall reach the address given below, quoting the above Reference Number on or before the due date & time.

वरिष्ठ प्रधान, क्रय व भंडार/**Sr. Head, Purchase & Stores**
यू आर राव उपग्रह केंद्र/**U R Rao Satellite Centre,**
एचएएल एयरपोर्ट रोड/**HAL Airport Road,**
विमानपुरा पोस्ट, बेंगलुरु/**Vimanapura Post, Bengaluru – 560 017,**
कर्नाटक, भारत/**Karnataka, India**

कृपया ई ओ आई संख्या का उल्लेख करते हुए अपने स्पष्टीकरण ई-मेल **pso_a@ursc.gov.in** पर भेजें। ई ओ आई-पूर्व बैठक में सभी प्रश्नों के उत्तर दे दिए जाएँगे। ई ओ आई बैठक में भाग लेने के लिए अनुरोध **05.05.2026** को 16:00 बजे IST तक या उससे पहले यहाँ उल्लिखित ई-मेल पर पहुँच जाना चाहिए। तथापि ई ओ आई का जवाब (हार्डकॉपी) केवल ऊपर उल्लिखित डाक पते पर भेजा जाएगा। ईमेल और फैक्स के जरिए प्राप्त मूल्य-प्रस्ताव स्वीकार्य नहीं हैं। नियत तिथि और समय के बाद प्राप्त मूल्य-प्रस्ताव स्वीकार्य नहीं हैं।
Please address your clarifications quoting the EOI number to E-mail: pso_a@ursc.gov.in. All queries related to EOI will be addressed in the Pre-EOI meeting. Request for participation in Pre-EoI meeting shall reach on or before 05.05.2026 @ 16:00 Hrs IST to the Email mentioned herein. However, response to EOI (hardcopy) shall be sent to above mentioned postal address only. E-mail & Fax quotations are not acceptable. Quotation received after due date & time are not acceptable.

स्पष्टीकरण प्रस्तुत करने की अंतिम तिथि
Last date of submission of Pre-EOI clarification : 05.05.2026 16:00 Hrs IST.

पूर्व-ईओआई बैठक (पी डी एम जी,सम्मेलन कक्ष, इन्सेट भवन, यू आर एस सी में)
Pre-EOI meeting (at PDMG Conference Hall, INSAT Building, URSC) : 12.05.2026 10:00 Hrs IST.

ईओआई प्रस्तुत करने की अंतिम तिथि
Last date for submission of EOI : **11.06.2026 14:00 Hrs IST.**

ई ओ आई खुलने की तिथि
Opening date of EOI : **11.06.2026 14:30 Hrs IST.**

उपर्युक्त सभी जानकारियों के साथ इच्छा की अभिव्यक्ति **11/06/2026 को 14:00 IST** बजे तक या उससे पहले उपर्युक्त संदर्भ संख्या का उल्लेख करते हुए, अधोहस्ताक्षरी के पास पहुँच जानी चाहिए। यह प्रस्ताव पूर्व-ईओआई अर्हता के रूप में आरंभ किया गया है। यूआरएससी बिना कोई कारण बताए सभी या किसी भी इच्छा की अभिव्यक्ति को स्वीकृत या अस्वीकृत करने का अधिकार सुरक्षित रखता है।
"Expression of Interest" with all the above information shall reach the undersigned, Quoting above Reference Number on or before **11.06.2026 @ 14:00 Hrs IST**. This proposal is initiated as a Pre-EOI Qualification. URSC reserves the right to accept or reject all or any such "Expression of Interest" without assigning any reasons what so ever.

Sd/-
वरिष्ठ प्रधान, क्रय एवं भंडार
Sr. Head, Purchase & Stores

Expression of interest for development of DHSS-ETHERNET SWITCH/ROUTER

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1. Introduction

The scope of this document is to provide the basic information related to Data Handling and Storage system (DHSS)-Ethernet Switch/Router, and EOI process. It further specifies criteria for vendor selection.

URSC is seeking expressions of interest (EOI) from vendors to design and develop a ruggedized 1G/10G Ethernet Switch/Router. Proposers must demonstrate technical expertise across the full development lifecycle—from initial block-level design and PCB layout to mechanical packaging, component procurement, and flight-model realization. The scope includes embedded software/IP core development, comprehensive verification and validation of throughputs, and the delivery of both prototype and flight-qualified hardware.

2. EOI process

Expression of Interest (EOI) for identifying a suitable vendor for development of DHSS-Ethernet switch/router will have a Pre-EOI meeting where interested vendors will be briefed regarding the process as detailed in figure 1.

A detailed vendor selection criterion is provided in this document, for which prospective vendors are required to provide all the documentary proofs as per the list. All responses will be evaluated by URSC and a list of probable vendors will be selected.

Package specifications required to make a proposal is provided in this EOI. Based on the data, vendor is expected to give an engineering proposal with all technical details along with project execution plan. A presentation from vendor may be sought to understand the proposal.

All received proposals will be evaluated based on a pre-defined criterion mentioned in this document, and list of selected vendors will be generated. An indenting process will be initiated in a Limited tender mode only on those vendors whose EOI is selected. A flow chart of the process is as shown in Figure 1.

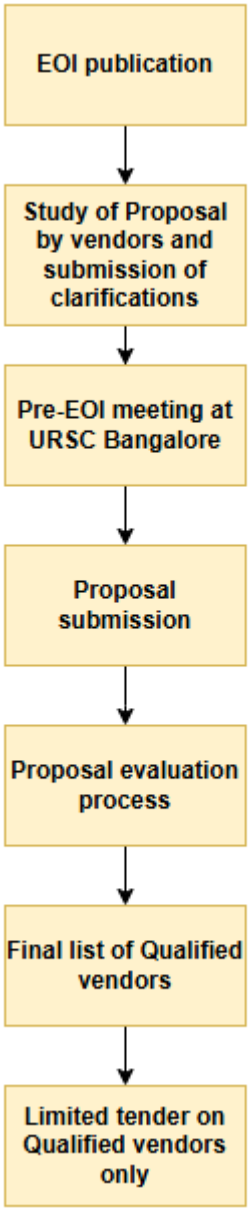

Figure 1: EOI process

3. Functional description of package

3.1. Introduction

To meet the BAS data, ingest and distribution requirements for processing and storage, a modular, scalable Ethernet Switch/Router package has been envisaged. The proposed architecture supports the following:

- Integrated Power module
- 20 x 1G Ethernet ports (copper) – data ingest
- 4 x 10G Ethernet ports (optical/copper) – data distribution

15 ports (or better) of 1G and 4(or better) 10G ports to be provided with ruggedized MIL-std 883B/space-grade Ethernet connectors. A few ports of 1G to be provided with RJ-45 connectors to connect with an external rugged laptop.

For interoperability and rapid deployment, the following protocols will be implemented:

- 1G Ethernet standard 802.3
- 10G Ethernet standard 802.3
- Time Sensitive Networking (TSN) standard 802.1
- UDP/TCP transport layer protocols

It shall be a managed Layer 2 (with TSN support)/Layer 3 switch/router.

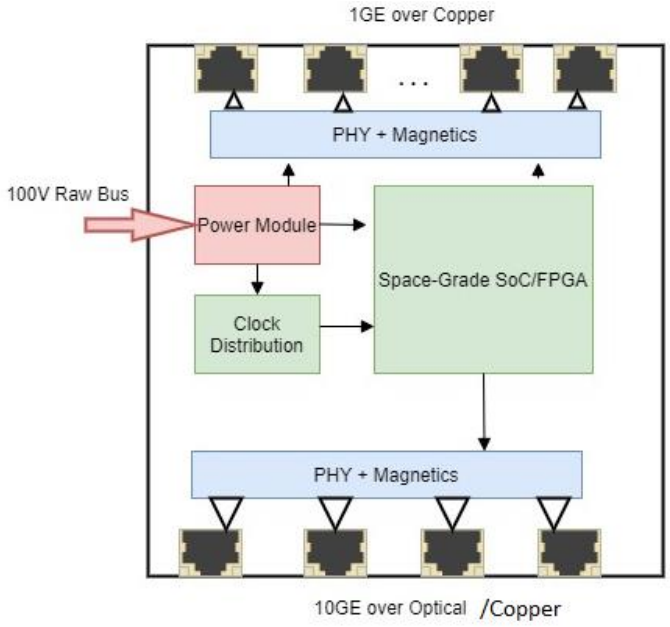

Figure 2: Ethernet switch architecture

3.1.1. Mechanical specifications for the package:

- **Form Factor:** The ethernet switch / router can be a VPX chassis mountable 3U/6U form factor card or a standalone package of approx. 160mm x 233mm x 45mm accommodating space-grade ruggedized connector.
- **Thermal management:** Conduction-cooled frame design optimized for vacuum environments/Micro heat pipes for thermal transfer to package chassis.
- **Component selection**: All components selected for the Prototyping (Proto) model must have a pin-compatible, space-grade equivalent available for the flight model.
- **Operating Humidity**: The system shall operate reliably in a Relative Humidity range of 30 to 70%.
-

3.1.2. Radiation Reliability Strategy in Flight model

- **Radiation tolerance** of space-grade components on the card for Flight Model:
  - **Total Ionizing Dose (TID):** 10 krad(Si)(or better).
  - **Single Event Latch-up (SEL):** Immune upto a Linear Energy Transfer (LET) of 60 MeV-cm²/mg (or better)**.**
- **Radiation Mitigation Techniques:**
  - **SEU/SEFI Protection:** The solution must employ SEU (Single Event Upset) and SEFI (Single Event Functional Interrupt) mitigation techniques e.g. EDAC protected memories, scrubbing etc.
- **Fault Management:** The package shall issue autonomous reset or power-cycle the mal-functioning device. It shall manage the Fault Detection, Isolation and Recovery (FDIR) for events like processor (if used) WDT etc.

3.2. Brief introduction of Package modules:

3.2.1. Integrated Power Supply Module

The Power Supply Module shall be an integrated part of the switch/router package. It shall house high-efficiency radiation-hardened isolated DC-DC converters generating required device power supplies from Satellite Raw bus of 100V.

Secondary Power requirement: ~50W

Input Signals:

Table 1: Power supply card - Input signals

Sl No	*Description*	*Remarks*
1.	Satellite Bus Voltage	100V ±3 V
2.	Discreet commands (5V,64ms) OPTO-ISOLATION	5V CMOS lines for ON 5V CMOS lines for OFF 5V CMOS lines for SELECT 5V CMOS lines for DESELECT

Output Signals:

Table 2: Power supply card - Output signals

Sl No	*Description*	*Remarks*
1.	Bit monitoring	Power supply card On /off status for all the output voltages
2.	Analog Voltage Monitoring	For all output voltages
3.	Thermistor monitoring	10k thermistor (2 nos.)

Features:

- Compliance to MIL-STD-461 (EMI/EMC)
- Load regulation ±1%
- Isolation between Primary (Input) and Secondary (Output/Chassis) grounds.
- UVLO- Under voltage lockout, Over-voltage Protection (OVP), Over-current Protection (OCP) capability

3.2.2. Ethernet Switch/Router Package

This package is designed to serve as the central payload data ingest and distribution hub for the Data Handling and Storage System (DHSS). The high throughput Ethernet switch/router shall act as a bridge between external high-speed payload interfaces and the main processing system. It shall be capable of receiving/transmitting data over Ethernet 1G/10G ports supporting an instantaneous throughput of at least 45 Gbps. It shall also be capable of relaying the incoming/outgoing data as required to a global Ethernet switch/router in both point-to-point and multi-hop scenario.

It shall have the capability to de-multiplex input data streams, provide buffering to maintain QoS, perform TSN compliant priority based queueing and further multiplex and distribute the data traffic over Ethernet 1G/10G ports as required.

Core Responsibilities:

- **Ingest:** Capture high-speed payload data via multiple Ethernet ports.
- **Distribution:** Relay incoming/outgoing data to processing system or other switch/routers.
- **Process:** Perform buffering, queueing, priority management for TSN compliance in both UDP/TCP protocols.
- **Management:** Maintain a strict assigned QoS data transfer with self-recovering feature for the package itself. The Ethernet switch/router shall retain the configured port setting across power cycles and resets. Manual reconfiguration provision shall be provided.

Interfaces:

- **External:** The system shall support simultaneous collection/distribution over:
  - **20(or higher) ports x 1G:** 1G Ethernet (Copper PHY).
  - **4(or higher) ports x 10G:** 10G Ethernet (Optical/Copper PHY).

Features:

- **TSN Implementation:** The switch/router must support TSN implementation. This requirement should be user configurable as per port.
- **Acceleration:** The architecture must include dedicated hardware engines for Ethernet packet multiplexing/de-multiplexing, buffering, queueing and offloading to support the required 45 Gbps ingest/distribution rate across all active ports without any packet loss.
- **WebPage Access:** Dedicated user WebPage access for configuration and debug accessible for development and system health monitoring. WebPage shall be viewable and editable without the necessity to install additional device drivers.
- **Routing Support:** The switch/router must be capable of data distribution to point-to-point direct connection static destinations as well as multiple-hop static/dynamic destinations. It must also be capable of routing the same traffic to multiple destinations on the same switch/router.

4. Vendor selection

The vendor selection is a process to ensure that only industries with the capability to carry out high-speed digital and mechanical designs are part of the further process.

Prospective vendors must provide documentary proof (Purchase Orders, Completion Certificates, Datasheets, or Design Reports) for the following criteria. A detailed list of the vendor qualification criterion is provided in the table 3 which needs to be provided by all the interested industries. These responses will be evaluated by URSC and those vendors who are able to provide all the data and proofs for meeting all the criterion only will be selected for further process.

Based on EOI received and organization's requirement, URSC committee reserves the right for approval/rejection of any criteria.

Table 3: Vendor qualification Criteria

Sl. No.	Criterion Area	Specific Requirement	Evidence
1	High-Speed Networking (1G/10G Ethernet)	Proven capability in designing boards with 1G/10G interfaces and implementing TCP/UDP offload engines in FPGA or SoC.	Demonstration/ Design reports or Test logs showing 10Gbps throughput with BER < 10^{-12} for a period of 24 hr.
2	Interfaces capabilities	Capability to interface with Payloads over interfaces like TSN Ethernet	Demonstration/ Design report
3	IP core capabilities	Experience in designing with IP cores (hard/soft) related to Ethernet MAC, TCP/UDP offload engine, memory controllers etc.	Demonstration/ Design report
4	Software capabilities	Experience in design and development with softwares at various layers – 1. device driver development for Networking etc. 2. Working experience with RTOS e.g. VxWorks/Linux etc. 3. Application software	Demonstration/ Design report
5	Time Sensitive Networking (TSN)	Capability to implement TSN stack for time critical applications.	Demonstration/Design reports
6	Client-Server based Networking	Experience in design and development of client-server-based systems for Networking.	Demonstration/Design reports

7	Heterogeneous Computing (SoC + FPGA)	Experience in designing complex boards integrating Space-grade or equivalent SoCs with 64-bit processor (e.g., ARM Cortex / RiSCV), operating @ 1.2 Ghz or better and having required peripherals and running with RTOS like Linux/Vxworks etc with High-Performance FPGAs (e.g., Xilinx UltraScale/Versal/Polar Fire SOC) sharing high-bandwidth interconnects.	Demonstration/ Design report of in-house developed boards utilizing similar architectures.
8	Data Security	Experience in handling data security protocols like AES-256	Demonstration/ Design report
9	Power supply Electronics	Experience in Isolated DC-DC converters (better than 50W).	Demonstration/ Design report
10	Thermal Management	Expertise in Conduction/ radiation-cooled chassis design for high-power packages (better than 50W per package)/micro heat-pipe implementation in vacuum environments.	Thermal analysis reports of high-power dissipating avionics packages.
11	Signal & Power Integrity Analysis	Capability to perform and validate Signal & Power Integrity Analysis for high speed designs like 1G/10G Ethernet.	Signal & Power Integrity Analysis reports for high-speed interfaces.
12	Radiation Hardening & Reliability	Experience/ understanding in Radiation Mitigation techniques (eg. TMR, Scrubbing, EDAC etc) .	Design reports
13	Package level testing	Experience in package level testing of Digitals systems in a single package/card.	Demonstration/Test report
14	ESD safe lab	Vendor should have an ESD safe laboratory and of minimum space > 100 square meter, which can be inspected.	Supporting documents
15	PCB assembly	Experience in PCB assembly with passives 0402 style, BGA packages etc	Demonstration/report
16	Mechanical package design	Experience in mechanical package design qualified for Aerospace standard.	Demonstration/Design report
17	Structural Analysis	Experience in the following structural analysis • Static Analysis • Free Vibration/Modal Analysis	Analysis reports

		• Frequency Response Analysis • Transient Response analysis • Random Vibration Analysis • Shock Response Analysis	
18	Components sourcing	Experience in sourcing EEE parts from OEM/Authorised Distributors.	Provide POs placed by the vendor on OEM/distributor for the AMD/Microsemi FPGAs, microcontroller, memories related chips
19	EMI-EMC	Organisation should have experience in designing for EMI-EMC specification, conducting EMI-EMC tests and qualifying products as per MIL-STD 461C/E/F/G	EMI/EMC Analysis reports
20	Vibration specification	Organisation should have experience in designing for vibration specification as per Mil-STD-810/DO-160G and conducting vibration tests	Supporting Analysis Reports
21	Tools experience	Experience in working with the following tools: PCB development: Cadence or equivalent Thermal & Structural: Seimens NX tool or equivalent SI/PI: Hyperlynx/ Allegro FPGA: Vivado/Vitis (AMD), Libero SoC (Microsemi) Only Licensed tools to be used for development	Supporting tool reports.
22	Certification support (Desirable)	Experience in certification of hardware and software to DO-254 and DO-178 standards resp.	Supporting certifications
23	Standard Compliance	ISO9001 / AS9100	Valid certificates
24	URSC requires all technical data to be shared by vendor for review and documentation.	Compliance required.	
25	Vendor shall sign a Non-Disclosure agreement with URSC after EOI-finalization.	Compliance required.	

5. Format for vendor proposal submission

Vendor shall submit the proposals in the below format:

5.1. Company Profile

Table 4: Company Details

Sl No.	Document name	Remarks
1	Organisation structure	
2	Vendor's Project structure	This shall include roles and responsibilities.
3	Vendor Compliance	Compliance for vendor qualification criterion as per table 5
4	Project plan	Shall contain the following • Work break down structure • schedule for proto model • Gantt chart & critical path • suggestions to reduce the critical path
5	List of organisations	Details of organisations/companies who will be collaborating or vendor will be sub-contracting to, for various activities. Vendor should be responsible for final project and product outcome.

5.2. Compliance Matrix

Vendor selection is based on the compliance matrix.

Table 5: Compliance Matrix

Sl. No.	Criterion Area	Specific Requirement	Evidence	Compliance (yes/no)	Reference documents (mandatory)
1	High-Speed Networking (1G/10G Ethernet)	Proven capability in designing boards with 1G/10G interfaces and implementing TCP/UDP offload engines in FPGA or SoC.	Demonstration/ Design reports or Test logs showing 10Gbps throughput with BER < 10^{-12} for a period of 24 hr.		

2	Interfaces capabilities	Capability to interface with Payloads over interfaces like TSN Ethernet	Demonstration/ Design report		
3	IP core capabilities	Experience in designing with IP cores (hard/soft) related to Ethernet MAC, TCP/UDP offload engine, memory controllers etc.	Demonstration/ Design report		
4	Software capabilities	Experience in design and development with software at various layers – 1. device driver development for Networking etc. 2. Working experience with RTOS e.g. VxWorks/Linux etc. 3. Application software	Demonstration/ Design report		
5	Time Sensitive Networking (TSN)	Capability to implement TSN stack for time critical applications.	Demonstration/Design reports		
6	Client-Server based Networking	Experience in design and development of client-server-based systems for Networking.	Demonstration/Design reports		
7	Heterogeneous Computing (SoC + FPGA)	Experience in designing complex boards integrating Space-grade or equivalent SoCs with 64-bit processor (e.g., ARM Cortex / RiSCV), operating @ 1.2 Ghz or better and having required peripherals and running with RTOS like Linux/Vxworks etc with High-Performance FPGAs (e.g., Xilinx UltraScale/Versal/Polar Fire SOC) sharing high-bandwidth interconnects.	Demonstration/ Design report of in-house developed boards utilizing similar architectures.		
8	Data Security	Experience in handling data security protocols like AES-256	Demonstration/ Design report		
9	Power supply Electronics	Experience in Isolated DC-DC converters (better than 50W).	Demonstration/ Design report		
10	Thermal Management	Expertise in Conduction/ radiation-cooled chassis design for high-power packages (better than 50W per package)/micro heat-pipe implementation in vacuum environments.	Thermal analysis reports of high-power dissipating avionics packages.		

11	Signal & Power Integrity Analysis	Capability to perform and validate Signal & Power Integrity Analysis for high speed designs like 1G/10G Ethernet.	Signal & Power Integrity Analysis reports for high-speed interfaces.		
12	Radiation Hardening & Reliability	Experience/ understanding in Radiation Mitigation techniques (eg. TMR, Scrubbing, EDAC etc) .	Design reports		
13	Package level testing	Experience in package level testing of Digitals systems in a single package/card.	Demonstration/Test report		
14	ESD safe lab	Vendor should have an ESD safe laboratory and of minimum space > 100 square meter, which can be inspected.	Supporting documents		
15	PCB assembly	Experience in PCB assembly with passives 0402 style, BGA packages etc	Demonstration/report		
16	Mechanical package design	Experience in mechanical package design qualified for Aerospace standard.	Demonstration/Design report		
17	Structural Analysis	Experience in the following structural analysis • Static Analysis • Free Vibration/Modal Analysis • Frequency Response Analysis • Transient Response analysis • Random Vibration Analysis Shock Response Analysis	Analysis reports		
18	Components sourcing	Experience in sourcing EEE parts from OEM/Authorised Distributors.	Provide POs placed by the vendor on OEM/distributor for the AMD/Microsemi FPGAs, microcontrol-		

			ler, memories related chips		
19	EMI-EMC	Organisation should have experience in designing for EMI-EMC specification, conducting EMI-EMC tests and qualifying products as per MIL-STD 461C/E/F/G	EMI/EMC Analysis reports		
20	Vibration specification	Organisation should have experience in designing for vibration specification as per Mil-STD-810/DO-160G and conducting vibration tests	Supporting Analysis Reports		
21	Tools experience	Experience in working with the following tools: PCB development: Cadence or equivalent Thermal & Structural: Seimens NX tool or equivalent SI/PI: Hyperlynx/ Allegro FPGA: Vivado/Vitis (AMD), Libero SoC (Microsemi) Only Licensed tools to be used for development	Supporting tool reports.		
22	Certification support (Desirable)	Experience in certification of hardware and software to DO-254 and DO-178 standards resp.	Supporting certifications		
23	Standard Compliance	ISO9001 / AS9100	Valid certificates		
24	URSC requires all technical data to be shared by vendor for review and documentation.	Compliance required.			
25	Vendor shall sign a Non-Disclosure agreement with URSC after EOI-finalization.	Compliance required.			

5.3. Annexures/References

Supporting documents to be put as part of this section.