

Establishment of Hybrid Communication circuits from Ships at Pacific Ocean and North Atlantic Ocean to MOX-ISTRAC Bangalore and SCC-ISTRAC Bangalore (INDIA)

Request for Proposal



**ISRO TELEMETRY TRACKING AND COMMAND NETWORK (ISTRAC)
INDIAN SPACE RESEARCH ORGANISATION
BANGALORE**

1.0 Introduction:

ISRO is planning for Gaganyaan Mission (HSP), an unmanned mission from Sriharikota (SHAR). To support the mission, Two Ships from two different locations viz. Pacific Ocean (Ship 1) and North Atlantic Ocean (Ship 2) are planned to support TTC operations, Audio and Video operations of Crew.

Towards supporting this requirement, Hybrid Full Duplex Communication circuits need to be established between

- a) **Circuit 1:** Ship 1 and MOX-ISTRAC Bangalore
- b) **Circuit 2:** Ship 1 and SCC-ISTRAC Bangalore
- c) **Circuit 3:** Ship 2 and MOX-ISTRAC Bangalore
- d) **Circuit 4:** Ship 2 and SCC-ISTRAC Bangalore

2.0 Scope of Work:

- 2.1 Vendor to provide full duplex Hybrid communication circuits with capacity of 768 kbps from each Ship to MOX-ISTRAC and SCC-ISTRAC as mentioned in Section 1.0.
- 2.2 Each Ship shall have two circuits; one to MOX-ISTRAC and another to SCC-ISTRAC. For more details on the Configuration of Hybrid links, refer Section 4.0.
- 2.3 Vendor to provide the Satellite Bandwidth from a C-Band Satellite dedicated to ISTRAC-ISRO services from the Satellite Service Provider for the establishment of Satellite links from each Ship. This Bandwidth shall be used by ISTRAC throughout the Contract period. The details of the Bandwidth required and the Terms and Conditions are provided in Section 6.0.
- 2.4 Vendor shall obtain the Regulatory licenses for Uplink and Downlink for operating the links on the Satellite for the locations mentioned in Section 3.1 dedicated to ISTRAC-ISRO services from the corresponding Regulatory body. The details and Terms and Conditions are provided in Section 7.0.
- 2.5 The Vendor should have necessary mutual coordination with the Satellite Service Providers, Teleport operators and OFC Service providers for the configuration of the Satellite Modems at Teleports, end to end link establishments, testing and verification of link performances, troubleshooting and resolution of any of the link issues due to Satellite, Interference, Teleport operations and failures, OFC segment issues and failures etc and as and when asked by ISTRAC related to any of the link issues and link unavailability under the Scope of Work of the Vendor. Vendor shall be responsible for the flawless links End to End.

3.0 Location of Services:

3.1 The locations of Ships are as follows:

S No	Description of the Location	Latitude and Longitude of the Location
3.1.1	Ship 1 Support location (The location of ships provided here are tentative and may have little changes based on the Mission requirements).	Pacific Ocean Lat: 8.2 deg N; Long: 114 deg W.
3.1.2	Ship 2 Support location (The location of ships provided here are tentative and may have little changes based on the Mission requirements).	North Atlantic Ocean Lat: 43 deg N; Long: 43 deg W.

S No	Description of the Location	Latitude and Longitude of the Location
3.1.3	Teleport-1 and Teleport-2 (for Ship 1)	The location details shall be provided by the Vendor in the offer.
3.1.4	Teleport-3 and Teleport-4 (for Ship 2)	The location details shall be provided by the Vendor in the offer.
3.1.5	Port of Integration for Ship 1 (Near Los Angeles)	The exact location details shall be provided to the Vendor during PO placement.
3.1.6	Port of Integration for Ship 2 (Near New York)	The exact location details shall be provided to the Vendor during PO placement.

3.2 The locations details of MOX-ISTRAC and SCC-ISTRAC are as follows:

3.2.1 The link Termination location by the Vendor at MOX-ISTRAC Bangalore is

**Gaganyaan Technical Facility (GTF),
MOX-ISTRAC Office,
3rd Main, 2nd Phase, Peenya Industrial Area,
Peenya, Bangalore-560058**

3.2.2 The link Termination location by the Vendor at SCC-ISTRAC Bangalore is

**IDRSS Feeder Station Facility,
SCC-ISTRAC Office,
3rd Main, 2nd Phase, Peenya Industrial Area,
Peenya, Bangalore-560058**

4.0 Configuration of Hybrid Communication circuits:

4.1 The Hybrid Full Duplex Circuits shall be the combination of one C-Band Satellite link (one hop only) from Ships to Teleports and extended from Teleports to MOX-ISTRAC and SCC-ISTRAC through Managed L3 MPLS as per the following configuration.

4.1.1 Circuit 1 (From Ship 1 to MOX-ISTRAC Bangalore):

SATCOM link: VSAT-1 at Ship 1 to Teleport-1 through C-Band Satellite-1

OFC link: Teleport-1 to MOX-ISTRAC through Managed L3 MPLS circuits

4.1.2 Circuit 2 (From Ship 1 to SCC-ISTRAC Bangalore):

SATCOM link: VSAT-2 at Ship 1 to Teleport-2 through C-Band Satellite-2

OFC link: Teleport-2 to SCC-ISTRAC through Managed L3 MPLS circuits

4.1.3 Circuit 3 (From Ship 2 to MOX-ISTRAC Bangalore):

SATCOM link: VSAT-3 at Ship 2 to Teleport-3 through C-Band Satellite-3

OFC link: Teleport-3 to MOX-ISTRAC through Managed L3 MPLS circuits

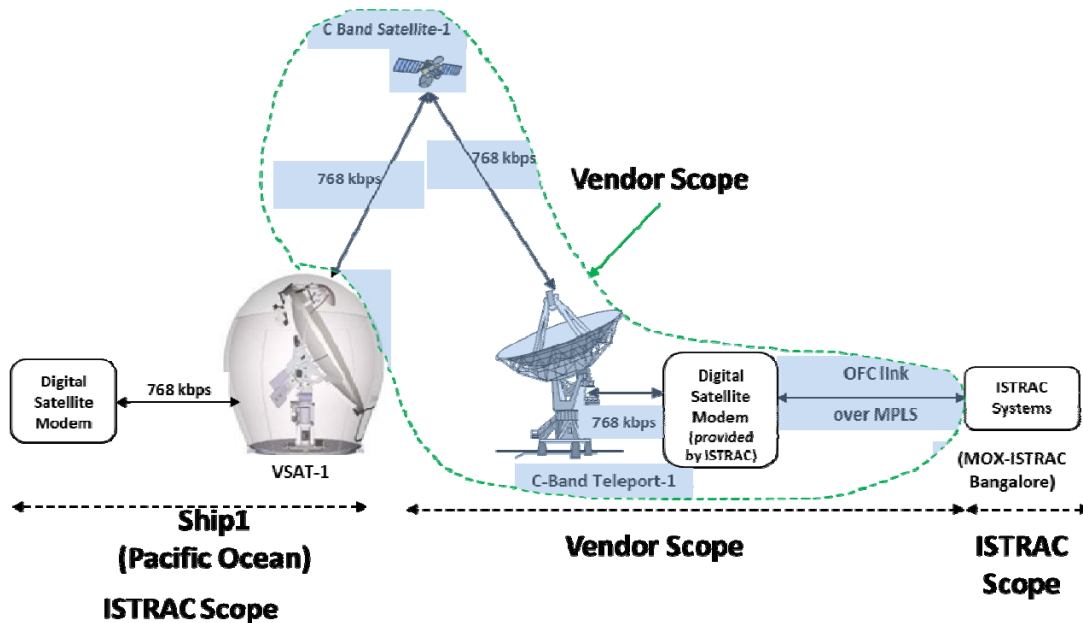
4.1.4 Circuit 4 (From Ship 2 to SCC-ISTRAC Bangalore):

SATCOM link: VSAT-4 at Ship 2 to Teleport-4 through C-Band Satellite-4

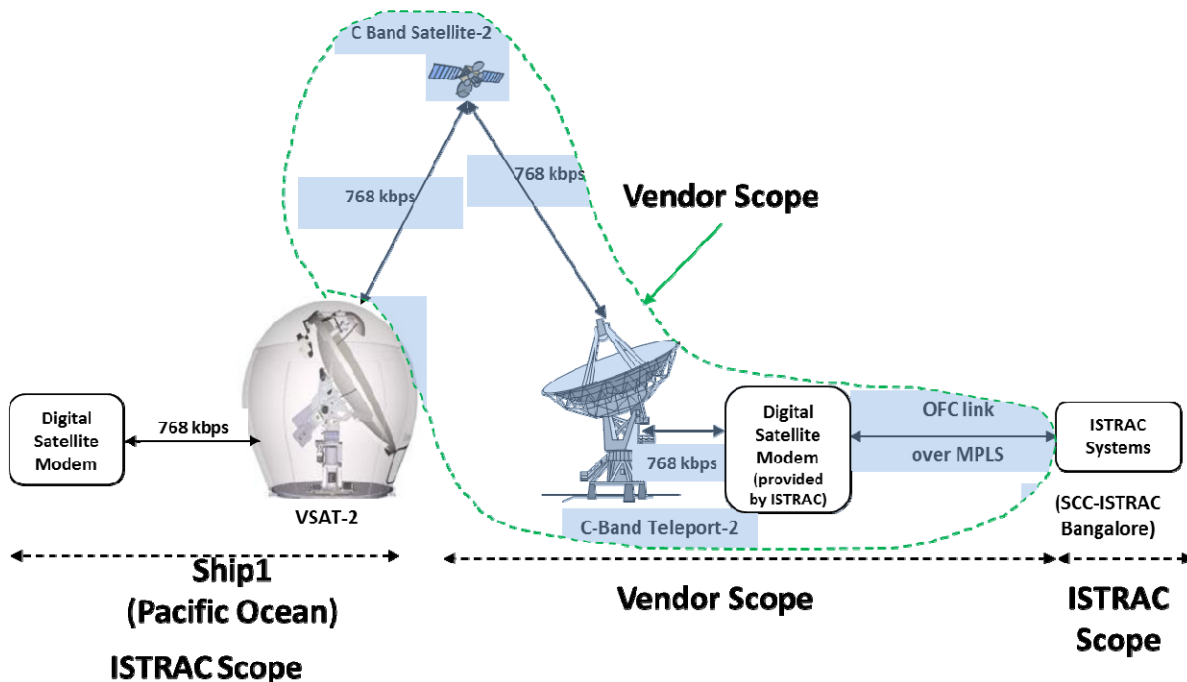
OFC link: Teleport-4 to SCC-ISTRAC through Managed L3 MPLS circuits

4.2 Schematic representation of the Hybrid Communication links

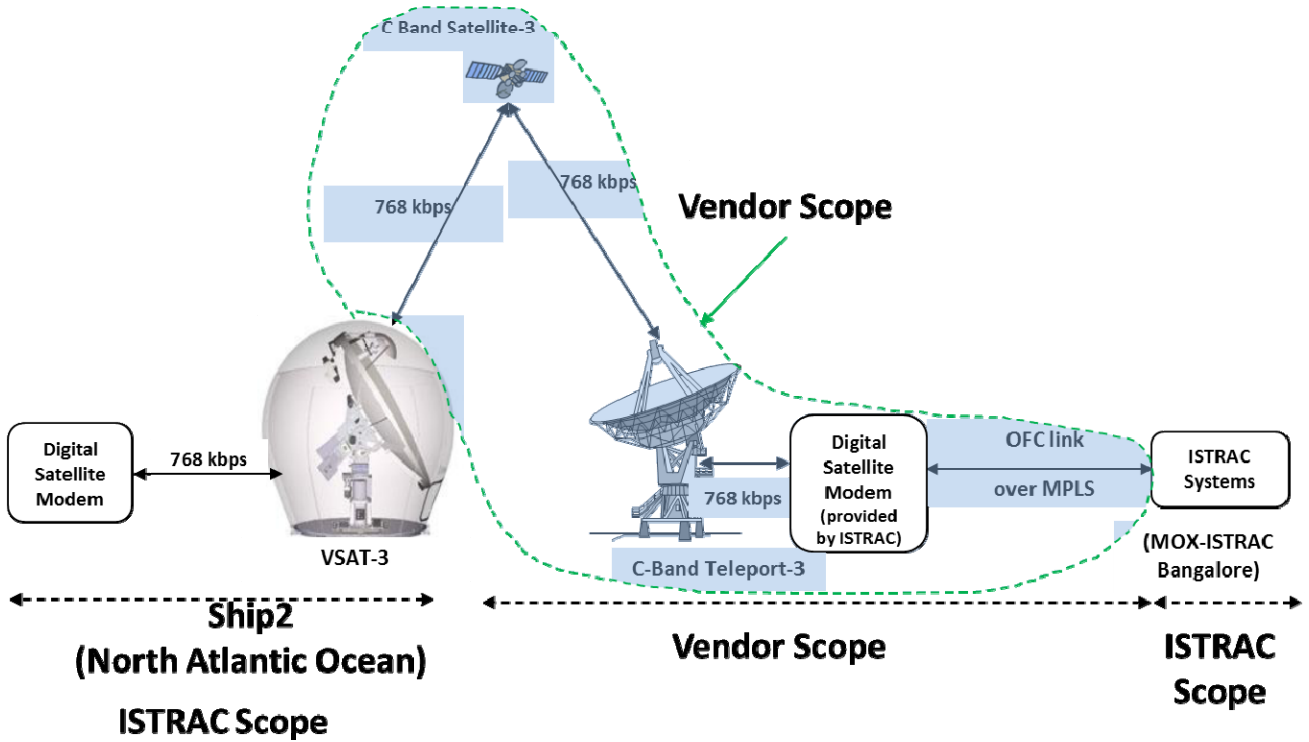
4.2.1 Circuit-1 (Hybrid Communication link from Ship-1 to MOX-ISTRAC)



4.2.2 Circuit-2 (Hybrid Communication link from Ship-1 to SCC-ISTRAC)



4.2.3 Circuit-3 (Hybrid Communication link from Ship-2 to MOX-ISTRAC)



4.2.4 Circuit-4 (Hybrid Communication link from Ship-2 to SCC-ISTRAC)

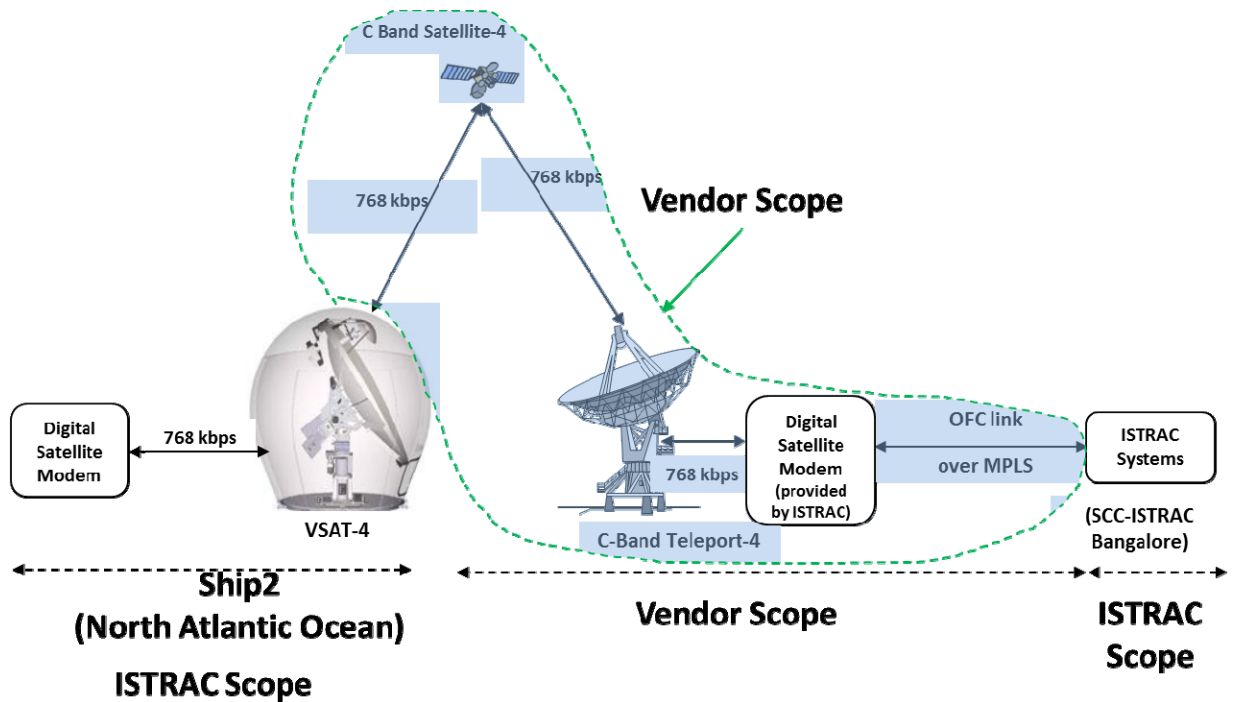


Table: 4.2 Nomenclature of each Circuit elements

S.No	Circuit Description	Circuit ID	Ship ID	VSAT ID	Satellite ID	Teleport ID	Destination location at ISTRAC
1	Ship1 to MOX-ISTRAC	Circuit-1	Ship1 (Pacific ocean)	VSAT-1	C-Band Satellite-1	Teleport-1	MOX-ISTRAC
2	Ship1 to SCC-ISTRAC	Circuit-2	Ship1 (Pacific ocean)	VSAT-2	C-Band Satellite-2	Teleport-2	SCC-ISTRAC
3	Ship2 to MOX-ISTRAC	Circuit-3	Ship2 (North Atlantic Ocean)	VSAT-3	C-Band Satellite-3	Teleport-3	MOX-ISTRAC
4	Ship2 to SCC-ISTRAC	Circuit-4	Ship2 (North Atlantic Ocean)	VSAT-4	C-Band Satellite-4	Teleport-4	SCC-ISTRAC

4.3 Terms and conditions of Hybrid Circuits:

- 4.3.1** It is preferred to have different C-Band Satellites for each SATCOM link in a Hybrid Circuit. If not feasible, Vendor shall provide the Bandwidth in two different Transponders in a same Satellite. Vendor to ensure that no single point failure makes both the links in a Ship to go down simultaneously.
- 4.3.2** Similarly, if Vendor provides Satellite link configuration as mentioned in 4.3.1, the Teleport-1 and Teleport-2 shall be geographically distinct, same applies to Teleport-3 and Teleport-4.
- 4.3.3** From Teleports, each Satellite links shall be extended through different Managed L3 MPLS circuits to MOX-ISTRAC and SCC-ISTRAC. The addresses of OFC link termination locations at MOX-ISTRAC and SCC-ISTRAC are provided in section 3.2.

5.0 Technical Specifications of the Satellites:

S.No	Parameters	Specifications
1.	Orbit	Geosynchronous Orbit
2.	Type of Satellite Service	Fixed satellite service
3.	Satellite Foot print coverage	Each Satellite Footprint shall have the common coverage over Ship Support locations, Teleport locations and locations of Ports of Integration as per the Satellite link Configurations mentioned in Section 4.0.
4.	Type of Transponder	Bent pipe
5.	Frequency Band of Operation (C-Band)	Uplink Band: 5.850 GHz to 6.425 GHz
		Downlink Band: 3.625 GHz to 4.200 GHz
6.	Polarization	Linear or Circular (Linear is preferred)
7.	Bandwidth	1.5 MHz in C-Band Satellite-1 1.5 MHz in C-Band Satellite-2 1.5 MHz in C-band Satellite-3 1.5 MHz in C-Band Satellite-4

8.	Downlink EIRP	Details have to be provided by the Vendor as per link design.
9.	G/T	(Vendor has to provide the Teleport Antenna RF parameters and link calculations taking care of Ship MVSAT parameters provided by ISTRAC).
10.	Saturation Flux density	Vendor to note that these details shall be in compliance with the required Link Margin as mentioned in Section 5.3.
11.	Cross-pol isolation	Minimum 30 dB (Ground verified)
		Minimum 26 dB (Ground to Space link verified)
12.	Intermodulation and Spurious	-18 dBc or better shall be in compliance with required link margin as mentioned in Section 5.3.

5.1 General Specifications

1.	The vendor shall provide the satellite name, parking slot, bandwidth availability, Polarization, EIRP, G/T. Foot print maps shall be provided showing both ships locations with longitude & latitude information of Ships, Teleport locations with longitude & latitude information and the Ports of Integration such as Los Angeles and Newyork. The offered satellite/s should be healthy and reliable in providing the communication support. Vendor shall ensure interference free environment in both satellite and ground segment.
2.	Vendor shall offer the C band transponder with suitable beams with stable footprint covering the given locations of Ships with sufficient link margin as mentioned in Section 5.3. Link Budget calculations for all the Space segment usages are to be submitted along with the offer. The Technical details of the VSATs at Ships are provided in Table 5.2.
3.	The Teleports shall have the capability with the sufficient Antenna size, EIRP and G/T etc to meet the Required Eb/No, Link Margin and throughput mentioned in Section 5.3.
4.	The provided Satellites shall have footprint in such a way that all Ship Support locations mentioned in Section 3.1 shall be atleast 300 km internally from the Edge of the Satellite Footprint.
5.	The Teleport and OFC operations, links provided by the Vendor shall comply with High Security standards.
6.	Vendor shall provide the Telemetry Beacon frequency details of each Satellite for the optimization of look angles (Az and El) of Maritime VSAT Antenna throughout the Contract period.
7.	Vendor shall provide a CW carrier in the allotted Satellites as in point No 6 of 5.0 (either from Teleport or from the Satellite) for each Satellite throughout the Mission period and as and when asked by ISTRAC for the optimization of Polarizer of Maritime VSATs at Ships.

5.2 Technical details of MVSATs at Ship (MVSATs are provided by ISTRAC-ISRO):

S.No	Parameters	Specifications
1.	Antenna size	2.2 m
2.	Maximum Power Sizing of the BUC	40 W (+46 dBm)
3.	Maximum EIRP of the VSATs at Ships	53.3 dBW at 6.150 GHz
4.	G/T of the VSATs at Ships	19.6 dB/K at 3.95 GHz at 20 deg El Clear Sky
5.	Frequency Band of Operation (C-Band)	Uplink Band: 5.850 GHz to 6.425 GHz
		Downlink Band: 3.625 GHz to 4.200 GHz
6.	Polarization	Linear or Circular

5.3 Baseband System specifications

S.No	Parameters	Specifications	Remarks
1.	Digital Interface	Ethernet on RJ-45 connector	Vendor shall configure the Digital Interface at Teleport based on ISTRAC requirements.
2.	Modcod parameters	Modulation: QPSK or 8-PSK FEC Rate: 3/4 or 7/8 FEC Algorithm: LDPC or TPC	
3.	Data Rate	768 kbps	
4.	Required Eb/No (dB) at both ends	9 dB +/- 2 dB	At both Ships and Teleports
5.	Required Link Margin at Clear Sky	Minimum 3 dB	
6.	Clear Throughput (End to End)	614.4 kbps minimum (768 kbps * 0.8)	Iperf test to be measured through UDP and TCP traffic
7.	Total Round Trip Latency of the link (End to End)	800 ms maximum	Vendor to note that this total latency of the link is End to End from Ships to MOX-ISTRAC and SCC-ISTRAC that includes Satellite link, Teleport and OFC link till termination locations at ISTRAC.
8.	Jitter (End to End)	70 ms Maximum	Vendor to build low latency circuit and keep the latency as minimum as possible.

S.No	Parameters	Specifications	Remarks
9.	Availability of the link (End to End)	99.5 % or better.	

6.0 Bandwidth Requirements of the Satellite:

- 6.1 The Data rate for each Carrier of Full Duplex Circuits is 768 kbps. The Bandwidth required for each carrier is 0.75 MHz. So, the Bandwidth required for each Full Duplex circuit is $0.75 \text{ MHz} \times 2 = 1.5 \text{ MHz}$.
- 6.2 Accordingly, Vendor shall provide C-Band Satellite Bandwidth of 1.5 MHz in Circuit-1, 1.5 MHz in Circuit-2, 1.5 MHz in Circuit-3 and 1.5 MHz in Circuit-4.
- 6.3 Satellite Bandwidth of 1.5 MHz in all Circuits shall be dedicated to ISTRAC-ISRO services and sharing of this bandwidth with any other service is strictly not allowed till the completion/ termination of Contract Period.

7.0 Regulatory Licensing for Uplink and Downlink:

- 7.1 The Regulatory licenses for uplink and downlink shall be obtained for operating the Satellite links at the locations as mentioned in 3.1.1, 3.1.2, 3.1.3, 3.1.4 and along the voyage from Ports of Integration to the Ship Support locations throughout the Contract period. In case of any delay in Mission, ISTRAC would renew the Contract period based on the Mission requirements that includes the Regulatory Licenses for Uplink and Downlink too.
- 7.2 The Regulatory licenses for uplink and downlink from Ports of Integration (Los Angeles Port and New York Port) shall be obtained for 15 days during Integration of VSATs into the Ship and testing of VSATs. The dates required for this licensing shall be informed to the Vendor through call and email 20 days prior to the start date. In case of any delay in Mission, ISTRAC may ask for the extension of Regulatory Licenses for Uplink and Downlink at the above mentioned locations.

8.0 Link Establishment, testing, Commissioning and Operations & Maintenance Support of Hybrid links:

Very important: This project is highly time critical and vendor should strictly adhere to the time schedule.

- 8.1 "The Vendor to provide the Ship support either at 'Atlantic Ocean', OR at 'Pacific Ocean' OR both at 'Atlantic Ocean and Pacific Ocean'. Vendor shall establish the circuits viz either Circuit 1&2, OR circuit 3&4, OR circuit 1,2,3&4 as per the Table 4.2, within 12 weeks from the date of intimation by ISTRAC through an official email to the Vendor, in accordance". Vendor to note that the tentative start date of Mission shall be in the Mid of Feb-2025.
- 8.2 The Teleports shall be in RF Satellite loop towards MOX-ISTRAC & SCC-ISTRAC for testing and verification of the link performances by ISTRAC, till ships are ready for establishing the link.
- 8.3 The readiness of Ships will be intimated to the Vendor by ISTRAC.
- 8.4 During Integration of VSATs in Ships, ISTRAC provides the configuration of the Satellite Modems at Teleports. Vendor has to mutually co-ordinate with the Satellite Service Providers, Teleport Operators and OFC Service Providers for the configuration of the Satellite modems as provided by ISTRAC and as and when asked by ISTRAC, establishment of links End to End from Ships to MOX-ISTRAC and SCC-ISTRAC as per the Configuration mentioned in Section 4.0.
- 8.5 After Establishment of End to End links, ISTRAC will test and verify the performance of all Hybrid circuits in compliance with the performance measures as mentioned in Section 5.3.

- 8.6 After Commissioning of Hybrid links from Ships, the links shall be under continuous monitoring by the Vendors, Satellite Service Providers, Teleport operators and OFC Service Providers. In case of any link failures in any link segment reported by ISTRAC, Vendor shall acknowledge the ticket raised within an hour and necessary support shall be immediately provided by the Vendor for the restoration of the link to its full capacity and performances within the time as specified in 10.22.7 from the time of ticket raised. After this specified time, penalty will be applicable as per Section 10.22.7.
- 8.7 Vendor shall maintain logs of the Monitoring of each link segments and in case of any link issues during critical launch support period, i.e. from T-30 days to T+10 days, Vendor may be asked to provide the detailed critical logs of the performance of the links.
- 9.0 OFC segment requirements:**
- 9.1 The OFC links shall be configured with a bandwidth of minimum 1 Mbps for each full duplex circuit.
- 9.2 Vendor to note that the Last mile OFC circuits shall be on Ring Architecture for each Circuit to avoid any single point failures.
- 10.0 General Terms and conditions:**
- 10.1 The Vendor shall ensure no common point in the circuits from the Teleports, OFC to MOX-ISTRAC & SCC-ISTRAC that can lead to the failure of all circuits from a Ship or circuits from both the Ships simultaneously.
- 10.2 Transportation of Satellite Modems from ISTRAC to Teleports and back to ISTRAC after Contract termination:**
- 10.2.1 ISTRAC provides CDM-625A Satellite Modems and configurations to be used at each Teleports.
- 10.2.2 For every Teleport, required Satellite Modems will be provided as per the Configuration with a Spare.
- 10.2.3 It is the responsibility of the Vendor
- 10.2.3.1 To collect the Modems from ISTRAC and deliver it to the respective Teleport locations.
- 10.2.3.2 To deliver back all Modems from Teleports to ISTRAC within 30 days from the date of Completion/ Termination of Contract.
- 10.2.3.3 The Satellite modems provided by ISTRAC shall be used only for ISTRAC-ISRO services. The usage of modems other than ISTRAC-ISRO Services is strictly not allowed.
- 10.2.3.4 The charges for the Transportation of Satellite Modems to Teleports and returning back to ISTRAC Bangalore are to be incurred by the Vendor and shall be included in the Pricing.
- 10.3 Vendor shall ensure that the offered solution is complete to meet the link requirements and meets all the specifications and terms & conditions mentioned in this tender.
- 10.4 Vendor to provide all IP details of the circuits after award of Contract to the Vendor.
- 10.5 Vendor to note that the Managed OFC Network shall have low latency and low jitter with adequate multi-paths. If any submarine cable is cut, Vendor to provide the link through alternate path with low latency and low jitter considering ISTRAC Services at highest priority.
- 10.6 Vendor to note that the OFC circuits should not cross any region over China and Honkong.

- 10.7 Vendor to note that the End to End Communication link Establishment shall be the responsibility of the Vendor in total and shall include all the necessary coordination in delivering the End to End circuitry flawlessly.
- 10.8 Downtime for a link is defined as outage which shall start at the trouble ticket is being opened by ISTRAC and end when ISTRAC closes the trouble ticket.
- 10.9 Services unavailability doesn't include outages due to the following reasons:
 - 10.9.1 Any outage due to ISTRAC provided Power or equipment
 - 10.9.2 Any outage attributable to Force Majeure Events
 - 10.9.3 Any planned outage maintenance activities such as switch over, software upgrade etc after the approval by ISTRAC.
 - 10.9.4 Satellite links down due to Sun interference phenomenon.
- 10.10 Critical period of launch support is from 30 days before launch to launch + 10 days. During this period, vendor should ensure that the communication links are free from any planned outage for maintenance activities. Also any unplanned outage should be resolved fully within 30 minutes. Mission dates will be intimated to the vendor, one month prior to the launch by ISRO and further updates if any.
- 10.11 On launch day, vendor should ensure adequate resource allocations and appropriate configurations for achieving 100% availability. Vendor shall ensure positioning of technical manpower at critical locations (teleports, OFC landing points and network control centers) for monitoring of the links and fast resolution of any issue.
- 10.12 End to End escalation matrix has to be provided by the vendor with contact details after PO release. The Point of Contacts (POCs) details of ISTRAC will be shared.
- 10.13 Whenever there is a breakdown of the link, the vendor need to submit Root Cause Analysis (RCA) and Reason for Outage report against the ticket raised.
- 10.14 Vendor shall provide the detailed Bill of services with breakup costs for all Bandwidth charges, Regulatory licensing charges for Uplink and Downlink, Teleport services cost, OFC services cost, Installation charges, applicable taxes, operational cost etc (refer Annexure).
- 10.15 Vendor to note that the Service period starts from the date of acceptance of circuits by ISTRAC.
- 10.16 If Ships are not positioned at the defined locations, the Acceptance may be based on the RF Satellite loop from Teleports towards MOX-ISTRAC and SCC-ISTRAC.
- 10.17 Vendor to note that the initial Contract period is for 1 Year from the date of Acceptance of the Contract by ISTRAC and ISTRAC shall have the right to renew the contract every 1 Year based on the Mission requirements. The validity of the terms and conditions of the Contract shall be upto 3 Years on the same terms and conditions. Vendor to note that the extension of contract shall be intimated to the Vendor 2 months in advance.
- 10.18 Vendor to note that ISTRAC shall have the right to terminate the contract by giving notice to the Vendor by email one month prior to the termination.
- 10.19 Vendor to note that ISTRAC shall have the right to terminate the contract for a particular circuit, if the performance of the circuit falls below 99% of availability during a month and payment will be made till the termination date only on pro-rata basis.
- 10.20 Vendor to note that an equivalent of one month charges shall be paid to the Vendor, if PO is terminated due to any Mission abort.

10.21 Vendor to note that Counter terms for any of the RFP clause in this tender is not acceptable.

10.22 Payment terms:

10.22.1 Vendor to note that all recurring charges payments for the Services availed under the Scope of Vendor shall be done on quarterly billing cycle in arrears.

10.22.2 Vendor to note that the One-time charges shall be made along with the first quarterly recurring charges payment in arrears after the acceptance of links by ISTRAC.

10.22.3 The recurring charges payments shall be made on quarterly basis after satisfactory completion of service for the respective billing cycle duly certified by the Engineer-in-Charge and approved by Division Head of ISTRAC.

10.22.4 All invoices shall be addressed to Accounts Officer, ISTRAC by the Vendor on or after the billing cycle period. The contact details shall be provided along with the Purchase Order.

10.22.5 **Commencement of payment:** One-time charges payments and the Recurring charges payments shall be accounted from the date of acceptance of the links by ISTRAC.

10.22.6 The Service Unavailability time shall be calculated on monthly basis accumulated for quarter of an year. The Service unavailability credit shall be adjusted against the Invoice and settled accordingly. The Service Unavailability formula is as follows:

$$\text{Percentage of Service Unavailability} = (\text{Sum of all downtime in a month/ Total time per month}) * 100$$

10.22.7 The target value of the availability of the Circuit should be 99.5% or better. If the availability falls below 99.5%, rebate should be provided on slab basis as given below or better.

Penalty for the Duration of Service unavailability for OFC segment:

Service level Credit 1-216 minutes: No Credit

217-480 minutes: 2% of MRC (Monthly Recurring charge)

481-1080 minutes: 5% of MRC

1081-1440 minutes: 10% of MRC

For each subsequent 24-hour period thereafter: 3% of MRC.

Penalty for the Duration of Service unavailability for Satellite segment and Teleport operations and services:

Service level Credit 1-30 minutes: No Credit

31-60 minutes: 2% of MRC (Monthly Recurring charge)

61-120 minutes: 5% of MRC

121-240 minutes: 10% of MRC

Greater than 241 minutes: 10% of MRC (for 240 minutes) + 0.125% of MRC per hour.

10.22.8 Vendor to note that unavailability of Throughput of minimum 614.4 kbps under the Scope of Vendor will be considered as downtime or Service Unavailability and penalty is applicable as per Section 10.22.7.

- 10.23 Vendor has to submit a Bank Guarantee of equivalent amount of approximately Rs. 10 Lakhs/ modem provided before collecting the modems from ISTRAC Premises. The Bank Guarantee will be returned back to the Vendor after the receipt of Modems in working condition at ISTRAC.
- 10.24 Class of Services for MPLS OFC segment shall be considered highest class and 100% highest priority.
- 10.25 If required, during Technical Evaluation of the offers, Vendor shall provide for Technical presentation either physically or through online mode when asked by ISTRAC.
- 10.26 Vendor shall note that the Gaganyaan mission support focuses on high standards and certification for Human Rated services. Hence, the offered solution should focus on priority, High security, adherence to mission-critical concerns, specifically ensuring highest availability and reliability in delivering the proposed communication services throughout the Contract period.
- 10.27 Vendor should not breach the security and Integrity of ISRO Missions.
- 10.28 Vendor shall have extensive experience in establishing VSAT communication links, Teleport operations and mutual coordination with all Service Providers. Vendor shall provide evidences of such links or such services realized.
- 10.29 Vendor shall confirm the availability of the required capacity in all the segments including international segment and its ability to establish the communication link within the time period specified. If the vendor is hiring Satellite bandwidth from third party, then consent letter from such parties involved shall be enclosed. Offers without the above mentioned documentary details are liable to be rejected.
- 10.30 The deliverables have been shown for the requirement of establishing four communication links from ships to MOX-ISTRAC and SCC-ISTRAC. However at the time of ordering, ISTRAC may choose to order for a lesser number of links and the required Bandwidth. Vendor shall clearly indicate the associated breakup costs for establishing individual link as per the Annexure.
- 10.31 Vendor shall note that their technical personnel are not allowed on the ship. Issue resolutions will have to be done through ISRO personnel on-board the ship in coordination.
- 10.32 The offer should be complete in all respects so as to avoid need for further clarifications as the project is time critical and all technical aspects should be complied and substantiated with adequate documents. The vendor shall submit their offer as per the due date.
- 10.33 The offer shall be valid for 120 days. However, ISTRAC reserves the right to seek an extension in the validity period if necessary, based on any changes in the Mission timelines.
- 10.34 The tentative timeline for the Mission would be Feb-Mar 2025 as of now. The exact Timeline will be intimated during PO placement.
- 10.35 Vendor shall furnish the following details along with the offer:-
- 10.35.1 Compliance Matrix indicating the party's compliance to all the technical specifications, terms and conditions indicated in the RFP to be submitted along with this offer.
 - 10.35.2 The vendor shall submit a technical solution offered with detailed write-ups towards establishing the Hybrid links End to End in the technical bid, enclosing the Satellite Parameters, Link Budgeting, Teleport, OFC services etc.

11.0 Vendor Selection criteria (Criteria for L1):

- 11.1 Vendor to note that the Contract will be awarded only to the technically suitable lowest offer (L1) that complies with all technical specifications, Terms and conditions in this RFP.
- 11.2 The Criteria for L1 is as follows:

- 11.2.1 Vendor to note that L1 on each Circuit will be considered independently.
- 11.2.2 **The lowest quote on Circuit/s shall consists of following in arriving at total cost of any circuit:**
 - 11.2.2.1 One-time cost for the End to End link Establishment, Testing, Commissioning and Acceptance of links.
 - 11.2.2.2 One-time cost for the Transportation of Satellite modems from ISTRAC to Teleports.
 - 11.2.2.3 One-time cost for the Delivery of Satellite Modems back to ISTRAC from Teleports after the Completion/ Termination of Contract.
 - 11.2.2.4 Recurring charges for 12 months for obtaining the Satellite Bandwidth.
 - 11.2.2.5 Recurring charges for 12 months for obtaining the Regulatory Licensing for Uplink and Downlink.
 - 11.2.2.6 Recurring charges for 12 months for availing Teleport Services.
 - 11.2.2.7 Recurring charges for 12 months for availing OFC Services.
 - 11.2.2.8 Recurring charges for 12 months for availing Operational Services.
- 11.3 ISTRAC reserves the right to Order the number of circuits as per Mission requirements.

12.0 PRE-BID MEETING

- 12.1 Pre-bid meeting for technical discussion/clarifications on RFP is scheduled at ISTRAC, Bangalore (dates are indicated in the tender). Vendors shall attend the meeting at ISTRAC (preferred) or online mode.
- 12.2 Purchase will intimate the Date and Time for the schedule of Pre-Bid meeting.

13.0 Information to all Vendors (Information only):

Currently OFC Service Providers available at MOX-ISTRAC:

1. TATA
2. VODAFONE
3. AIRTEL
4. SIFY
5. BSNL
6. RAILTEL

Currently OFC Service Providers available at SCC-ISTRAC:

1. TATA
2. VODAFONE
3. AIRTEL
4. BSNL
5. POWERGRID

Annexure

SI No	Description	Quantity (In Nos)	Unit cost	Total cost
<u>Circuit-1 (One-time charges)</u>				
1.	Establishment, testing, commissioning and Acceptance	1 Lot		
2.	Transportation of Satellite Modems from ISTRAC to Teleports.	1 Lot		
3.	Delivery of Satellite Modems back to ISTRAC from Teleports after completion/ Termination of Contract.	1 Lot		
4.	Regulatory licensing charges/ Extension for operating C-Band Satellite-1 Bandwidth at Ports of Integration for 15 days	1 Lot		
5.	Service Taxes & duties as applicable. (Vendor shall indicate clearly taxes applicable to different type of services)	1 Lot		
6.	Any other Charges applicable			
<u>Circuit-1 (Recurring charges)</u>				
7.	C-Band Satellite-1 Bandwidth of 1.5 MHz for the Contract period of 12 months	1.5 MHz		
8.	Regulatory licensing charges for operating C-Band Satellite-1 Bandwidth for the Contract period of 12 months	1 Lot		
9.	Teleport-1 Service charges for the Contract period of 12 months	1 Lot		
10.	OFC link service charges for the Contract period of 12 months	1 Lot		
11.	Operational cost for the Contract period of 12 months	1 Lot		
<u>Circuit-2 (One-time charges)</u>				
1.	Establishment, testing, commissioning and Acceptance	1 Lot		
2.	Transportation of Satellite Modems from ISTRAC to Teleports.	1 Lot		
3.	Delivery of Satellite Modems back to ISTRAC from Teleports after completion/ Termination of Contract.	1 Lot		

SI No	Description	Quantity (In Nos)	Unit cost	Total cost
4.	Regulatory licensing charges/ Extension for operating C-Band Satellite-2 Bandwidth at Ports of Integration for 15 days	1 Lot		
5.	Service Taxes & duties as applicable. (Vendor shall indicate clearly taxes applicable to different type of services)	1 Lot		
6.	Any other charges applicable			
<u>Circuit-2 (Recurring charges)</u>				
7.	C-Band Satellite-2 Bandwidth of 1.5 MHz for the Contract period of 12 months	1.5 MHz		
8.	Regulatory licensing charges for operating C-Band Satellite-2 Bandwidth for the Contract period of 12 months	1 Lot		
9.	Teleport-2 Service charges for the Contract period of 12 months	1 Lot		
10.	OFC link service charges for the Contract period of 12 months	1 Lot		
11.	Operational cost for the Contract period of 12 months	1 Lot		
<u>Circuit-3 (One-time charges)</u>				
1.	Establishment, testing, commissioning and Acceptance	1 Lot		
2.	Transportation of Satellite Modems from ISTRAC to Teleports.	1 Lot		
3.	Delivery of Satellite Modems back to ISTRAC from Teleports after completion/ Termination of Contract.	1 Lot		
4.	Regulatory licensing charges/ Extension for operating C-Band Satellite-3 Bandwidth at Ports of Integration for 15 days	1 Lot		
5.	Service Taxes & duties as applicable. (Vendor shall indicate clearly taxes applicable to different type of services)	1 Lot		
6.	Any other charges applicable			
<u>Circuit-3 (Recurring charges)</u>				
7.	C-Band Satellite-3 Bandwidth of 1.5 MHz for the Contract period of 12 months	1.5 MHz		

SI No	Description	Quantity (In Nos)	Unit cost	Total cost
8.	Regulatory licensing charges for operating C-Band Satellite-3 Bandwidth for the Contract period of 12 months	1 Lot		
9.	Teleport-3 Service charges for the Contract period of 12 months	1 Lot		
10.	OFC link service charges for the Contract period of 12 months	1 Lot		
11.	Operational cost for the Contract period of 12 months	1 Lot		
<u>Circuit-4 (One-time charges)</u>				
1.	Establishment, testing, commissioning and Acceptance	1 Lot		
2.	Transportation of Satellite Modems from ISTRAC to Teleports.	1 Lot		
3.	Delivery of Satellite Modems back to ISTRAC from Teleports after completion/ Termination of Contract.	1 Lot		
4.	Regulatory licensing charges/ Extension for operating C-Band Satellite-4 Bandwidth at Ports of Integration for 15 days	1 Lot		
5.	Service Taxes & duties as applicable. (Vendor shall indicate clearly taxes applicable to different type of services)	1 Lot		
6.	Any other charges applicable			
<u>Circuit-4 (Recurring charges)</u>				
7.	C-Band Satellite-4 Bandwidth of 1.5 MHz for the Contract period of 12 months	1.5 MHz		
8.	Regulatory licensing charges for operating C-Band Satellite-4 Bandwidth for the Contract period of 12 months	1 Lot		
9.	Teleport-4 Service charges for the Contract period of 12 months	1 Lot		
10.	OFC link service charges for the Contract period of 12 months	1 Lot		
11.	Operational cost for the Contract period of 12 months	1 Lot		