REPUBLIC OF THE PHILIPPINES
Department of Science and Technology
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL and ASTRONOMICAL SERVICES ADMINISTRATION (PAGASA)
Science Garden, BIR Road, Diliman, Quezon City 1101
www.pagasa.dost.com.ph / pagasa_bac@yahoo.com
Tel./Fax No. 4342661 / 4343817

TERMS OF REFERENCE FOR THE "SUPPLY, DELIVERY, INSTALLATION, TESTING, AND COMMISSIONING OF END TO END TELECOMMUNICATION NETWORK USING IP OVER VSAT"

A. BACKGROUND

A.1 Introduction:

In order for PAGASA to provide accurate, reliable, and real time weather and climate products, a reliable data transport system is needed to transfer data and products to and from its main center in Quezon City with back-up facility in Mactan, Cebu. PAGASA requires a broadband integrated telecommunications Wide Area Network (WAN), as part of its Information Technology and Telecommunications infrastructure to enhance communication among its HQ (Hub/NOC), Regional Stations, Remote Stations/Offices, Radar Stations, Synoptic Stations and other related Weather Monitoring Stations

This project is a satellite-based solution, an end-to-end Internet Protocol (IP) over VSAT network (IPoS) that will connect PAGASA's eight (8) Regional Stations (PRSDs), twelve (12) Flood Forecasting and Weather Centers (FFWC), fifty-one (51) Synoptic Stations, twenty-three (23) Agromet Stations, fifty-five (55) Camera Stations, and twenty-nine (29) High Frequency Radar (HFR), to two (2) Hub/NOC. This component must be a fully-managed platform through mostly standard C-Band but with other frequency band as well for non-time critical systems. All must have good look angle anywhere within the Philippines.

A.2 Project Purpose:

The purpose of the project is enumerated as follows:

1. The proposed solution shall cover a minimum PAGASA's 8 Regional Stations, 12 FFWC, 51 Synoptic Stations, 23 Agromet Stations, 55 Camera Stations, 29 HFR and 2 Hubs/NOCs with sites/stations details specified in the list attached as ANNEX A with a possibility for expansion for additional stations.

2. The proposed solution shall include secondary support equipment such as AVR, UPS, lightning, ground and surge protection system, equipment racks, mounting and other necessary support equipment and facilities.

3. The proposed solution shall be breakdown in accordance to the manner of transmission:
   For data transmission to Hubs
   - 51 Synoptic and 23 Agromet Stations to Hubs
   - 55 Camera Stations and 29 HFR to HUBs
   - PRSDs to HUBs
   - FFWCs to HUBs

For processed data distribution from HUB

- Hub to 51 Synoptic Stations
- Hub to 23 Agromet Stations
- Hub to PRSDs
- Hub to FFWCs

4. Any proposed solution should be able to function efficiently with bandwidth optimization and WAN Acceleration functions.

B. APPROVED BUDGET FOR THE CONTRACT (ABC)

The Approved Budget for the Contract is **Four Hundred Two Million Pesos** (**P402,000,000.00)** inclusive of VAT and all applicable government taxes.

C. QUALIFICATIONS OF THE BIDDER

(Please refer to Section II. Instructions to Bidders, the Bid Data Sheet and Checklist of Eligibility and Technical Requirements of the Bidding Documents)

Additional Bidder's Qualification:

- Must be in the systems integration and IT (Information Technology) business in the field of Satellite telecommunications and IT solution services for ten (10) years or more.

- Must be a well experienced Telecommunications Operator, Internet Service Provider or Network Solution Provider. The bidder is expected to possess a strong background and experiences in broadband satellite connectivity services provisioning with international/multinational institutions or major companies.

- Should have an excellent knowledge and understanding of satellite technology, Systems, Network and relevant experience in Enterprise IP hybrid (VSAT/Optic Fiber) integrated network design and implementation.

- Shall have successfully implemented as a principal contractor, at least two VSAT network projects implemented in a multiple locations environment within the last five years.

- Must be a registered legal company for ten (10) years or more.

- Must have five (5) IT service contracts or more that include satellite telecommunications and IT services contract deployment with reputable firms in the Philippines or abroad.

- In the case of joint ventures (JV), the qualifications and experience of all firms in the JV will be considered as if the JV was a single Bidder. Each firm in the JV must be a legally registered commercial enterprise established in the business of providing the required Services or a subsidiary of a legally registered company. PAGASA will require the identification of the JV partners and either a copy of the agreement entered into by the JV partners or the commitment to

enter into a JV agreement. The Contract with PAGASA must be signed so as to be legally binding on all partners, while only one of the firms in the JV arrangement shall be authorized by other partner(s) to receive payments and instructions for and on behalf of any and/or all partners of the JV.

D. DELIVERY PERIOD AND PLACE OF DELIVERY

The winning bidder shall supply, deliver, install, test, and commission end to end telecommunication network using IP over VSAT at sites mentioned for three hundred ten calendar days (310 c.d.) from receipt of the Notice to Proceed (NTP) at the PAGASA Central Office located at PAGASA Science Garden Complex, BIR Road, Diliman Quezon City.

E. BID PROPOSAL CONTENTS

The prospective bidder is expected to comply and respond in accordance with the specific instructions to bidders and submit all the documentary requirements under the Checklist of Eligibility, Technical and Financial Requirements. The submission of documentary requirements must be properly arranged in order and with label.

The prospective bidder shall respond paragraph by paragraph and shall clearly indicate compliance to all the required specifications (*Please see Section VII. Compliance Matrix*) and shall specify the number of days or schedules within which to complete the delivery of all the goods required (*Please see Section VI. Schedule of Requirements*).

The prospective bidder shall be required also to include in this proposal, original descriptive literatures and unamended brochures of all equipment/materials to be supplied. Plans, drawings, and diagrams/configurations must likewise be provided. These details will allow the **PAGASA-Bids and Awards Committee** to fully evaluate and determine compliance from the prospective bidders.

The following are additional requirements which will be part of the bid documents that will be submitted by interested bidders:

- Proposed network system diagrams including civil and electrical work.
- The required transponder bandwidth for the project including LINK BUDGET CALCULATION.
- Proposed transponder capacity calculation with consideration for possible future requirement.
- Methodologies of implementation of the services and performance assurance and the high level design illustrating how the topology should be implemented.
- In addition to cost of supply and installation of the remote and hub station, specify the monthly charges for transponder, operations, maintenance, relocation, supply of spare part costs for each site for the proposed solution.
- Bio-data of their network professionals and technical team that will be involved in the installation, operation and maintenance of the VSAT network offered accompanied by a proof of their network system competency such as but not limited to diplomas and certificates.

F. TECHNICAL SPECIFICATIONS

The winning bidder shall supply, deliver, install, test and commission end to end telecommunication network using IP over VSAT and should have the following minimum specifications:

1. SYSTEM SPECIFICATION

1.1. PAGASA requires the implementation of a fully-managed broadband IP over VSAT connectivity solution.

1.2. The VSAT connection solution shall be composed of three (3) parts:

1.2.1 Engineering design, supply, installation, testing and commissioning of satellite and network equipment including accessories, and integration with PAGASA weather monitoring system.
This shall include a command center for monitoring and control of satellite network and network equipment.

1.2.2 Engineering design, supply, installation, testing, and commissioning of new camera stations including accessories and integration with PAGASA weather monitoring system.
This part of the project shall be primarily used for the transmission of captured images (1 snapshot for every minute). The old existing camera equipment will be pulled-out and turned over and will be used as spares.

1.2.3 Operations, maintenance, and support services.
This part of the project also includes the following:

- Transponder bandwidth / space segment lease.
- Provisioning of spares and service units including RMA support.
- Services of qualified local manpower who shall support PAGASA's NOC operation and conduct preventive maintenance services and provide onsite support when necessary.
- 24/7 Call center manned by technically-capable personnel who shall handle requests, inquiries, reports and other technical concerns from PAGASA.
- Basic operations training.
- Periodic Preventive Maintenance Services.

1.3. The VSAT network is expected to provide end to end connectivity of PAGASA's eight (8) Regional Stations (PRSDs), twelve (12) Flood Forecasting and Warning Center (FFWC), fifty-one (51) Synoptic Stations, twenty-three (23) Agromet Stations, fifty-five (55) Camera Stations, twenty-nine (29) High Frequency Radar (HFR), to two (2) Hub/NOC. STAR, MESH, or HYBRID TOPOLOGY can be used with the consideration of most efficient transponder utilization. The Network Operation Centre (NOC)/VSAT Hub and 2nd NOC must be located in PAGASA's headquarter in Quezon City and in Mactan, Cebu respectively. Both the hub stations and remote sites will be fully managed by the PAGASA main NOC and the 2nd NOC will have access to monitor the network and manage resources such as the bandwidth.

1.4. The proposed VSAT solution shall operate most in C-band except for the Camera and HFR Stations. The bidder shall provide technical justification which may include calculations, white paper or any binding document that will ensure high link performances minimizing attenuation on the system used for HFR and Camera stations.

1.5. The proposal for providing the services mentioned shall cover a minimum period of twelve (12) months with a possibility for extension for an additional period of one year twice. The preferred access technology/protocol should be multicast outbound while the inbound traffic can be TDMA or dynamic SCPC whichever one justified being the best user experience within the delay environment of satellite communications. The TDM/MCPC solutions should allow for larger multicasts utilizing DVB-S2/ACM for outbound and TDMA or dynamic SCPC for inbound traffic.

1.6. The proposed VSAT solution should include the major and most recent IP over satellite solution/technology such as Adaptive Coding and Modulation (ACM), TCP IP Acceleration, DNS caching, effective QoS and effective compression for multimedia traffic (voice, video and data), turbo codes, etc.

1.7. New equipment will be installed to all stations. The existing equipment will be configured to the new system and will served as back-up system. Transfer/Pull-out of existing equipment from a station will be discussed in details during the kick-off meeting or as the project progresses.

1.8. The bidder must ensure the full compliance, integration, and interconnection of its technical proposal with the PAGASA's weather monitoring system, network and infrastructure.

1.9. The bidder must provide a proposed Bandwidth Allocation Plan that would permit progressive expansion of bandwidth in each site, and in which the starting bandwidth and the maximal bandwidth will be clearly specified in conjunction with existing and planned traffic per site.

1.10. Provide a comprehensive cost for the space segment, and the cost of shared bandwidth for all sites.

1.11. The preliminary bandwidth allocation per site is specified in **Annex A attached.**

1.12. PAGASA requires that the selected bidder meets the criteria for the VSAT network as summarized in table below:

SUMMARY OF SLA FOR VSAT Network

SLA indicator	Required SLA Value
VSAT Network and remote link availability	99.9%
VSAT round trip on a single satellite hop circuit	Less than 650 ms
Packet Loss	Less than 0.4 %
Pack Jitter	Less than 2 ms
Mean time to repair	Max of 1 hour

2. EQUIPMENT SPECIFICATION

2.1. SATELLITE/TRANSPONDER

The Bidder must provide the required transponder bandwidth for the project including LINK BUDGET CALCULATION.	
The Bidder must provide a contiguous transponder bandwidth.	
The bidder must be able to provide an additional transponder capacity on the same transponder and satellite for possible future requirement.	
The bidder should agree to reduce the subscribed bandwidth from the upon request at any time in the future due to the revision of the link budget , new technology and network resizing.	
Satellite Orbital Location : +/-30deg of 120Deg East	
The bidder must consider 1.8m antenna or smaller to some PAGASA remote station due to space limitation.	
Provide technical details including satellite information (satellite name, proposed transponders, launched year, satellite orbit, coverage, EIRP & G/T contours, footprint, status) for link budget validation	
Life Span	15 Years or less
Age	Not more than 5 years
Coverage/Footprint	Nationwide including Kalayaan Group of Islands
EIRP	Min of 40dBW
Frequency	C-band (5850-6425MHz/3625-4200MHz)
Polarization	Horizontal/Vertical

2.2. RF / ANTENNA

Antenna Gain	
Satellite Operator Certified	All antenna should be certified by the partner satellite operator
Mounting	NPN/Penetrating
Polarization	Linear
Survival (wind) Operational(wind)	200Km/Hr or better 80Km/Hr or better
Baseband frequency	L-Band/IF
RF Hub/B-Hub Remote	Full Redundant Single
RF NMS Hub/B-Hub	IP/RS232-485

2.3. BASEBAND

Interface	
RF-Base band	L-Band/IF
Network	Ethernet 100/1000 Full Duplex
Network Protocol	IP
Network Management	Centralized w/ Back-up Remote Access capable

2.4. CAMERA

Software	Standard, non-proprietary
Power/Back-up Power	Solar, UPS, AVR
Space	Pole Mounting or similar
Configured TRANSMISSION	1 snapshot every minute
Latency	
Viewing Angle	90 degrees
IR Filter	Automatic Day/Night IR Filter
Resolution	Selectable image resolutions (pre-sets)
Image Tagging	Timestamps and GPS location
Environmental	Can withstand harsh rugged weather conditions

3. ADDITIONAL REQUIREMENTS

The requirements for the solution shall include the following:

3.1. Bidder must ensure the full compliance, integration and interconnection of its technical proposal with the PAGASA's existing Local Area network infrastructure.

3.2. The bidder will also provide performance assurance tool which will enable the PAGASA to monitor, control, configure, manage, and evaluate the performance of the solution.

3.3. The tool should enable measure and provide results for WAN services such as the following:

- Link status
- Availability of links for up to one-year log
- One-way delay
- Round trip delay
- Jitter
- Packet loss
- Link throughput
- Bandwidth utilization

3.4. The tool should also have the capability of automated bandwidth and capacity management and generating summarized and detailed reports.

G. SCOPE OF WORK

The scope of work covers the supply, deliver, install, test, and commission end to end telecommunication network using IP over VSAT. The works and services to be performed under this contract shall essentially consist of but not limited to the following:

1. Kickoff meeting, upon issuance of the notice-to-proceed (NTP), among PAGASA, satellite operator and winning bidder.

2. Site survey, including technical inspection in preparation to integration to various PAGASA data gathering systems.

3. Final design review.

4. Importation and delivery of equipment to Manila.

5. Pre-installation preparation including plans approval, civil and electrical works.

6. Delivery, installation, and testing of equipment at various stations

7. Integration with various PAGASA data gathering systems.

8. Grounding system shall be provided and should be bonded to the existing PAGASA grounding system. Grounding resistance should be ≤ 3Ω.

9. Technical assessment, for final adjustment purposes, upon installation and integration to 5% of the total number of stations.

10. Operations training, upon installation and integration to 20% of the total number of stations.

11. Commissioning and acceptance on per station level; system-wide commissioning and acceptance upon installation and deployment to all stations.

12. Submission of documentations.

H. WARRANTIES

1. The bidder warrants that it shall strictly conform to all the Terms and Conditions of this Terms of Reference.

2. The Bidder must provide a 24/7 technical support with:

Communication support facility.
- E-mail /Telephone /mobile /sms
- Online Support / Chat Support

Escalation
- PAGASA NOC
- 24/7/SUPPORT
- Technical group

Scheduled Maintenance
- Quarterly
- Semi-Annually
- Annually

3. The winning bidder shall neither assign, transfer, pledge, nor subcontract any part or interest therein.