



ई.सी.एल.एस.एस. परियोजना / ECLSS Project

गगनयान / Gaganyaan

समानव अंतरिक्ष उड़ान केंद्र / Human Space Flight Centre

भारतीय अंतरिक्ष अनुसंधान संगठन / Indian Space Research Organization

बेंगलूरु / Bangalore

Ref: HSFC/GY/ECLSS. Proj/RFP/MOM/24

16/07/2024

Minutes of meeting

Pre-Bid committee - ECLSS RFP

Date	: 15-07-2024
Time	: 10.30AM – 12.30 PM
Venue	: WebEx & Gaganyaan conference hall

List of Participants - Annexure I

Internal Discussion:

Background:

A tender for Feasibility Study for Design, Development, Qualification of Human Rated Environmental control and Life Support System (ECLSS) for Gaganyaan, HSFC/Group-C/HS202400014701, is floated on PT two-part basis. The RFP document and terms and condition are reviewed and cleared by SWC task team.

Pre bid meeting is planned as mandatory condition for bidding and to clarify any technical or commercial doubt by the vendors. To conduct the pre bid meeting a committee is constituted by chairman SWC as follows:

Shri/Smt/Dr/Mr/Mrs

- | | |
|---------------------------------|--------------------|
| 1. Mathew George, PD, GTM | : Chairman |
| 2. Bollineni Nagaraju, GD, MSG | : Member |
| 3. Krishna kumar R, APD ECLSS | : Member |
| 4. S Sreejith, Dy. Pr. Director | : Member |
| 5. Sr. Purchase officer, HSFC | : Member |
| 6. Sr. Accounts officer, HSFC | : Member |
| 7. Indentor | : Member-Secretary |

Total of eight vendors are participating for pre bid meeting in offline as well as online mode.

Discussion with Vendors:

Shri Mathew George, Chairman/Pre-bid committee, welcomed all the industry participants and committee members. He informed that ECLSS is a very important and critical system for Gaganyaan mission. ECLSS is a system of systems required for providing earthlike

breathable environment for crew. In this tender, HSFC is looking for end to end solution for ECLSS system which includes Thermal and Humidity control system, Cabin pressure control system, Air revitalization system and ECLSS controller including space grade sensors for operation of the ECLSS in closed loop control.

Committee members and vendor's representative introduced themselves one by one. v vendor's representative also briefed about their company.

Shri Gaurav Kumar, Engr./ECLSS highlighted the technical requirements, schedule and mandatory compliance requirement as per RFP. The outcomes are as follows:

Technical condition:

1. Scope of work:

1. Party shall carry out the feasibility study to design, develop and qualify the ECLSS system using hardware qualified to human rating requirement along with certificate, ground servicing equipment as per the requirements given in RFP.
2. Feasibility of delivering 5 sets of ECLSS hardware including electrical, mechanical, sensors etc. (there is no physical delivery of hardware) shall be assessed, cost and schedule for the qualification and delivery shall be provided.
3. The design shall be presented to ISRO for review and approval and suggestions shall be implemented based on mutual understanding **without any extra cost**.
4. Expected outcome is a detailed feasibility study document containing
 - P&I diagram and pneumatic/hydraulic/electrical circuit of ECLSS
 - Component specification (quantity, heritage and design feasibility of new component)
 - Operation sequence and control methodology
 - Philosophy (Algorithm) for Failure detection and isolation (FDI)
 - Integration at ISRO facility
 - Accommodation and systems engineering in crew module and service module for ECLSS
 - Detailed P&I diagram and pneumatic /hydraulic /electrical circuit of ground servicing equipment (GSE),
 - Mass, power, volume, electrical and mechanical interfaces,
 - Test requirement and scheme
 - Sensors, DAQ and electronics requirement
 - The party shall give the cost of developing/qualifying and delivering 5 sets ECLSS system for which party has done the feasibility study.

Based on successful completion of this feasibility study, order for supply of 5 sets of ECLSS hardware either in full or sub system wise may be considered by HSFC for Indian human space missions.

2. Schedule

- | | | |
|---|---|---------------|
| a. NDA | : | T0 |
| b. Feasibility study | : | T0 + 2 months |
| c. ECLSS and Ground servicing equipment PDR | : | T0 + 4 months |

- d. PDR : T0 + 4 months
e. Final feasibility study report after implementing PDR suggestion : T0 + 4.5 months
T0: Date of NDA signing

3. Technical compliance matrix as per section 10 of RFP is discussed and followings are highlighted:

- Only parties with prior experience or collaboration with party having prior experience in manned mission hardware design and delivery will be considered
- If the party is planning to sub contract the activities; MoU/Contract between prime and sub-contractor shall be provided to department for reference and verification.
- Offered product shall have flight heritage or minimum TRL level of 7 as per RFP.
- List of Applicable standards followed for human rating and the processes shall be provided
- A detailed plan and route to certification to be submitted.
- Willingness to deliver 5 sets of ECLSS hardware after successful completion of feasibility study shall be indicated
- At least 1 set of ECLS Subsystem (THCS, CPCS, ARS, ECLSS controller) integration and ECLS System Integration to Orbital Module in India shall be agreed to be done by the party

Shri Saravanan V, Sr. PSO highlighted the commercial requirements as per RFP.

Commercial condition:

1. Tender is public tender on Two-part basis. There shall not be any price element in the technical bid otherwise bid will not be considered for further evaluation.
2. Pre bid meeting is mandatory. Parties not attending the pre-bid will not be considered for bid evaluation.
3. Make in India clause is applicable as per government norms.

Queries from vendor:

Chairman requested the vendors to ask any doubts they are having in RFP terms and condition one by one. The queries from vendors were clarified. The outcomes are as follows:

1. Tentative environmental test levels are provided in Annexure III of RFP. Final level will be provided after NDA.
2. Intellectual Property Right generated in the course of or resulting from work undertaken for the purpose of this Contract shall vest with the Department.
3. Vendor not having human mission experience may collaborate with party having prior experience in manned mission. MoU/Contract between prime and sub-contractor shall be provided to department.
4. Separation system for CM and SM is under the scope of ISRO. However, Hydraulic, pneumatic and electrical lines between SM & CM for ECLSS shall be separable. The configuration shall be as per the CM-SM connect –disconnect system.

5. COTS components are acceptable subjected to qualification of components as per human rating requirements given in RFP as per the Gaganyaan schedules.
6. Gas bottle envelope will be provided after NDA.
7. Power and mass budget shall be as per RFP. Provided values are maximum permissible as per project requirement.
8. Avionics/Instrumentation may be proposed as per vendor expertise subjected to the telemetry and tele-command interface with Mission computer for all subsystems over 1553B bus or raw bus commands.
9. Tender is for feasibility study of end-to-end development of ECLSS for Gaganyaan mission. Hence, no splitting of scope is feasible. Vendor may kindly ignore the splitting of order clause in the tender commercial terms.
10. Vendor verification will be done based on document scrutiny and prior ISRO vendor management directory. If required, vendor site visit also may be planned based on technical evaluation committee recommendation.

Chairman thanked all the pre bid committee members and vendor for participation and active discussion.

Prepared By

Approved By



Gaurav Kumar
ECLSS



Mathew George
Chairman, Pre-bid committee

To

Chairman and members of the committee

Cc:

Sr. Head, HPSO/Accounts-IFA
PD, ECLSS Project
Chairman, SWC

- for kind information

List of participating vendors:

1. M/s Rangsons Aerospace Pvt Ltd
2. M/s Inspecity space laboratories Pvt. Ltd.
3. M/s Airbus India Pvt. Ltd.
4. M/s Newtech Aerospace Pvt Ltd.
5. M/s Micronel Global engineers Pvt. Ltd.
6. M/s VEM Technologies Pvt. Ltd.
7. M/s Tamopahaa Technologies Pvt. Ltd.
8. M/s Crafronics India

Pre Bid Meeting- Feasibility Study for Design, Development, Qualification of Human Rated Environmental Control and Life Support System (ECLSS) for Gaganyaan

Date: 15-07-24

SI No	Name	Designation/Centre	Signature
1.	Mathew George	PD, GTM/ HSFC Chairman, Pre bid committee	
2.	Bollineni Nagaraju	GD, MSG, HSFC	—
3.	Krishna kumar R	APD ECLSS, HSFC	
4.	S Sreejith	Dy. Pr. Director, HSFC	 15/07/24.
5.	Sr. Purchase officer	HSFC	 15.07.24
6.	Sr. Accounts officer	HSFC	
7.	Indentor	HSFC	for 
8.	Mr Govindaraj K	Manager Business Development, Rangsons	online
9.	Mr. Shivasankar H	Executive Business Development, Rangsons	 15.07.24
10.	Arindrajit Chowdhury	CEO, Inspecity Space Laboratories Pvt. Ltd.	—
11.	Sagar Sarvad G M	Project Manager, Inspecity Space Laboratories Pvt. Ltd.	 15/07/2024

@VSSC
NP

Prof.
IITB

12.	Debanjana Shrivastava	R & D Engineer, Inspecity Space Laboratories Pvt. Ltd.	Debanjana 15/04/2024	✓
13.	Murali	New tech	online	not connected
14.	Harish	Airbus Defence + space	online	✓ ✓
15.	S Anuradha	Micronel	online	✓ ←
16.	G K Rao	VEM	online	✓ LEO Sat
17.	Bharathi S	Tamopahad tech	online	✓ avionics system
18.	Raghu S Rao	New tech	online	✓ URSE → subassembly for Gaganyaan
19.	Sayed Akbar	craftronics	online	✓ Aerospace system
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