NON-COMPREHENSIVE ANNUAL MAINTENANCE SERVICE CONTRACT (AMSC) FOR GASEOUS NITROGEN (GN_2) BLOWERS.		
Sl. No.	**Specification**	**Vendor Compliance (Complied/ Noted/ Value)**
1.0	**SPECIFICATIONS:** Gaseous Nitrogen (GN_2) blowers are used as the heart of the thermal systems of thermal vacuum chambers, for circulation of gaseous nitrogen (GN_2) through the thermal shrouds in closed-loop circuit for the simulation of temperature extremes on the test article i.e. spacecraft and its subsystems tested in different thermal vacuum chambers. These GN_2 blowers need to be continuously operational during the entire testing period. Therefore, preventive & breakdown maintenance activities for these blowers have to be carried out, to keep these blowers in healthy working condition for round the clock test requirements. There are 21 numbers of GN_2 blowers as part of thermal system of Thermal Vacuum Chambers at TVAC ETF-II division, U R Rao Satellite Centre (URSC), HAL Airport Road, Vimanapura Post, Bengaluru, and TVF- ETF-1 division ISITE, Marathalli, Bengaluru, for Non-Comprehensive Annual Maintenance Service Contract (AMSC). The list of these GN_2 blowers and technical details are provided in Annexure I & II respectively. Among the 21 numbers of GN_2 blowers, 15 numbers of GN_2 blowers are equipped with Thermal Vacuum Chambers located in Thermal Vacuum Lab (TVAC) of ETF- II Division,4 numbers GN_2 blowers are equipped with Large Space simulation chamber (LSSC) of ETF –II Division, URSC and 2 numbers GN_2 blowers are equipped with Thermal Vacuum Chambers located in TVF division ETF-1, ISITE.	

2.0	**<u>SCOPE OF WORK:</u>** 2.1 Preventive maintenance of all the 21 numbers of GN_2 blowers and accessories.	
	2.2 Checking of oil level of all the 21 numbers of GN_2 blowers and topping up if required.	
	2.3 Checking of couplings between blower and electrical motor.	
	2.3.1 Periodic calibration of pressure relief valves.	
	2.3.2 Attending trial test prior to spacecraft-level and major sub system level thermal vacuum tests and also during actual spacecraft-level and major sub system level testing to maintain satisfactory working conditions of the GN_2 blowers connected the thermal vacuum chamber where the testing is to be carried out.	
	2.3.3 Attending unlimited breakdown calls for all the listed GN_2 blowers and its accessories.	
	2.3.4 Repair and servicing of all the listed GN_2 blowers and its accessories.	
3.0	**Emergency Breakdown Calls:** Since these GN_2 blowers will be operational continuously during the testing period, for all the sub system level and spacecraft level testing, on round the clock basis, the vendor should attend the break down calls promptly and within a short notice of 3 hours at any time including holidays/weekends/after office hours. Hence, the vendors should be located in Bengaluru, and shall be available to attend the breakdown maintenance activities.	
4.0	**Unlimited Breakdown Calls:** The vendor should attend unlimited breakdown calls for all the	

	listed GN_2 blowers. The problem should be attended within next working day after intimation.	
5.0	**Prior intimation of necessary stocks:** The vendor should provide the list of spares required for the GN_2 blowers at least three months in advance.	
6.0	**Inclusions:** The accessories like silencer, after-cooler, pre-cooler, non-return valve, pressure relief valves, pressure gauges, hand valves, and couplings are in the scope of work.	
7.0	**Exclusions:** The following items & works are excluded from the scope of work and will be provided by URSC.	
	7.1 All the major accessories connected with the GN_2 blowers.	
	7.2 The maintenance of electric motor, which is coupled to the blower, will not be in the scope of work contract. However, the motor-to-blower couplings and its alignments are in the scope of work.	
	7.3 Pressure gauges, meters, spares, consumables and servicing tools.	
8.0	**SHEDULE OF VISIT AND PERIOD OF CONTRACT:**	
	8.1 The schedule of visit is **Ten continuous working days** in the first fifteen working days of every month for preventive maintenance.	
	8.2 **The period of the contract is for Two years. However, the contract may be extended by one more year on mutual consent with the same terms and conditions.**	

9.0	**VENDOR ELIGIBILITY CRITERIA:** 9.1 Since these GN2 blowers have to be operational continuously on round-the-clock basis during testing period, preventive and breakdown maintenance works have to be attended promptly. Hence, the vendors should be located in Bengaluru and should attend the emergency breakdown calls within 3 hours. The vendor should furnish proof of their office location or regional service centre in Bengaluru with land-line phone, e-mail ID and postal address.	
	9.2 Vendor Experience: The vendors should have minimum of 3 years of experience in maintenance and servicing of GN2 blowers for at least three years in any reputed organization. Proof for the same to be supported by relevant documents along with contact details like address and telephone numbers.	
10.0	**SERVICE PERSONNEL & THEIR ROLE:**	
	10.1 The scope of work indicated above requires minimum of two qualified experienced service personnel.	
	10.2 The vendor should ensure prompt and uninterrupted service availability.	
	10.3 The vendor shall ensure that the service personnel deployed is fully knowledgeable and experienced in handling all the tasks required for maintenance and service. In the event that the service personnel damages or creates fault due to negligence or due to incompetence it should be the responsibility of the vendor to get the same repaired at vendors expenses.	
	10.4 After the completion of the maintenance activities the service report should be generated. The service report	

	should contain blower details with serial number, nature of the fault reported, details of work carried out, name and signature of the service personnel.	
	10.5 Vendor shall ensure that the deployed service personnel comply with the Rules and Regulations with regard to Security, Office Code and Conduct.	
11.0	**Vendors are at liberty to visit TVAC/LSSC Lab, URSC & TVF Lab, ISITE to inspect the** GN_2 blowers **for evaluating / assessing the quantum of work and for estimation before submitting their bids**.	
12.0	**Vendor Experience**: The vendors should have minimum of 3 years of experience for maintaining and servicing same & similar kind of equipments and should be supported by relevant documents along with contact details like address and telephone numbers.	
13.0	This is a complete non-comprehensive AMSC work package and hence part AMSC work package will not be accepted.	
14.0	Charges should be firm and fixed for the entire period of contract.	
15.0	Compliance statement for all our specification points from Sl. No. 2 to Sl. No. 14 should be given point-wise. The offer received without compliance statement or incomplete statement will not be considered and without any further correspondence.	

ANNEXURE-I

LIST OF GN_2 BLOWERS WITH THERMAL VACUUM CHAMBERS.

GN_2 BLOWERS IN TVAC & LSSC OF ETF – II DIVISION, URSC					
Sl. No.	**THERMOVAC CHAMBER**	**MODEL NO.**	**BLOWER SL. NO.**	**YEAR OF MFG.**	**MAKE**
1.	1.0 m	RP 40 S	18362	1988	SLM MANEKLAL
2.	1.2 m V	MP 40	605	1992	ASHU ENGG. PVT. LTD.
3.	1.2 m H	RP 40 S	9696	1976	SLM MANEKLAL
4.	1.2 m TWIN A	RP 40 S	18005	1987	SLM MANEKLAL
5.	1.2 m TWIN B	MP 40	606	1992	ASHU ENGG. PVT. LTD.
6.	1.6 m Blower 1	RP-40 S	18006	1999	SLM MANEKLAL
7.	1.6 m Blower 2	AEP 40	209170	2020	ACME AIR EQUIPMENT
8.	1.8 m Blower 1	URP 140 S	18191314	2019	USHA ENGG WORKS
9.	1.8 m Blower 2	RP 40 S	18631	1999	SLM MANEKLAL
10.	2.0 m Blower 1	RP-40S	18004	1987	SLM MANEKLAL
11.	2.0 m Blower 2	AEP 40	209055	2020	ACME AIR EQUIPMENT
12.	SPARE-1	RP 40 S	10456	1977	SLM MANEKLAL
13.	SPARE-2	RP 40 S	166263	2016	ACME AIR EQUIPMENT
14.	4.0 m Blower 1	RP 150 S	11643	1978	SLM MANEKLAL
15.	4.0 m Blower 2	URP 1150	1535	1996	USHA ENGG WORKS
16.	LSSC	25-3R	87302054-A1	1988	BUFFALO FORGE
17.	LSSC	25-3R	87302054-A2	1988	BUFFALO FORGE
18.	LSSC	35-5R	87302053-A1	1988	BUFFALO FORGE
19.	LSSC	35-5R	87302053-A2	1988	BUFFALO FORGE
GN_2 BLOWERS IN TVF OF ETF – I DIVISION, ISITE					
20.	1.2 m TVAC A	URP-140	23222	2002	USHA ENGG WORKS
21.	1.2 m TVAC B	URP-140	23223	2002	USHA ENGG WORKS

ANNEXURE-II

SPECIFICATIONS OF GN_2 BLOWERS

I. **For Sl. No. 1,3,6,7,8,9,11,13, 20 & 21 in Annexure – I**

(1)	Type	: Twin lobe roots blower
(2)	Working medium	: Air/Gaseous Nitrogen
(3)	Capacity	: 350 CMH @ 2850 rpm, ΔP = 1 bar (g)
(4)	Operating temperature	: Ambient to $+50^0C$
(5)	Max. Working Pressure	: 3 bar g
(6)	Cooling type	: Water cooled
(7)	Suction & Delivery flow direction	: Horizontal
(8)	Accessories	: Silencer, After-cooler, Non-return valve, Pressure relief valve & pressure gauges.

II. **For Sl. No. 2,4,5,10 & 12 in Annexure – I**

(1)	Type	: Twin lobe roots blower
(2)	Working medium	: Air/Gaseous Nitrogen
(3)	Capacity	: 180 CMH @ 1825 rpm, ΔP = 1 bar (g)
(4)	Operating temperature	: Ambient to $+50^0C$
(5)	Max. Working Pressure	: 3 bar g
(6)	Cooling type	: Water cooled
(7)	Suction & Delivery flow direction	: Horizontal
(8)	Accessories	: Silencer, After-cooler, Non-return valve, Pressure relief valve & pressure gauges.

III. **For Sl. No. 2,4 & 5 in Annexure – I**

(1)	Type	: Twin lobe roots blower
(2)	Working medium	: Air/Gaseous Nitrogen
(3)	Capacity	: 180 CMH @ 1460 rpm, ΔP = 1 bar (g)
(4)	Operating temperature	: Ambient to $+50^0C$
(5)	Max. Working Pressure	: 3 bar g
(6)	Cooling type	: Water cooled
(7)	Suction & Delivery flow direction	: Horizontal
(8)	Accessories	: Silencer, After-cooler, Non-return valve, Pressure relief valve & pressure gauges.

IV. **For Sl. No. 9 & 11 in Annexure – I**

(1) Type	: Twin lobe roots blower
(2) Working medium	: Air/Gaseous Nitrogen
(3) Capacity	: 180 CMH @ 3000 rpm, ΔP = 1 bar (g)
(4) Operating temperature	: Ambient to $+50^0$C
(5) Max. Working Pressure	: 3 bar g
(6) Cooling type	: Water cooled
(7) Suction & Delivery flow direction	: Horizontal
(8) Accessories	: Silencer, After-cooler, Non-return valve, Pressure relief valve & pressure gauges.

V. **For Sl. No. 14 & 15 in Annexure – I**

(1) Type	: Twin lobe roots blower
(2) Working medium	: Air/Gaseous Nitrogen
(3) Capacity	: 1920 CMH @ 1450 rpm, ΔP = 1 bar (g) 1210 CMH @ 980 rpm, ΔP = 1 bar (g)
(4) Operating temperature	: Ambient to $+50^0$C
(5) Max. Working Pressure	: 3 bar g
(6) Cooling type	: Water cooled
(7) Suction & Delivery flow direction	: Horizontal
(8) Accessories	: Silencer, After-cooler, Non-return valve, Pressure relief valve & pressure gauges.

VI. **For Sl. No. 16 & 17 in Annexure – I**

(1) Type	: Centrifugal type blower with oil conditioning Unit.
(2) Make	: Buffalo Forge, Howden blowers, USA
(3) Capacity	: 3000 SCFM @ 2850 rpm, P = 2.0 bar (g)
(4) Pressure Head	: 80`` water column (static)
(5) Operating Temperature	: -196^0C to $+125^0$C
(6) Cooling type	: Forced oil cooling to bearings with External oil conditioning unit make Barewell Inc. USA.
(7) Accessories	: Couplings, pressure gauges & oil conditioning unit.

VII. **For Sl. No. 18 & 19 in Annexure – I**

(1) Type	: Centrifugal type blower with oil conditioning Unit.
(2) Make	: Buffalo Forge, Howden blowers, USA
(3) Capacity	: 5000 SCFM @ 2850 rpm, P = 2.0 bar (g)
(4) Pressure Head	: 80`` water column (static)
(5) Operating Temperature	: -196^0C to $+125^0$C
(6) Cooling type	: Forced oil cooling to bearings with External oil conditioning unit make Barewell Inc. USA.
(7) Accessories	: Couplings, pressure gauges & oil conditioning unit.