



# Technology Transfer of AMBU Bag based Critical Care Ventilator- 'PRANA'

## Interest Exploration Note

VSSC/ISRO has developed a low-cost and portable critical care ventilator named 'PRANA' (प्राणा)- "Programmable Respiratory Assistance for the Needy Aid". The ventilator is based on the automated compression of an AMBU bag. The system has a sophisticated control system that includes airway pressure sensor, flow sensor, oxygen sensor, servo actuator as well as expiration and PEEP control valves.

The clinicians can select the ventilation mode and set the required parameters through a touch screen panel and monitor various parameters like pressure, flow, tidal volume, oxygen concentration, etc. on the same screen. The ventilator can deliver the required flow of oxygen-air mixture to the patient's lung at a desired rate set by the clinicians. It has a provision to attach external battery for backup during power failure.

PRANA supports both invasive and non-invasive ventilation modes and is capable of giving mandatory breaths (controlled by ventilator) as well as spontaneous breaths (controlled by the patient). A robust algorithm for controlled and safe ventilation of the patient is implemented which raises alarm and opens safety valves to prevent barotrauma, asphyxia and apnea during the ventilation. Alarm is also raised in case of wrong or improper connection of the ventilation circuit or inadvertent disconnection of the hose or sensors. There are also provisions to attach bacterial viral filters at each interface to prevent cross-infection and the contamination of air.



## SPECIFICATIONS

S.N	Parameter	Values
1.	Ventilator Category	Adult Critical Care Ventilator
2.	Rated Power	170W
3.	Operating Voltage	230V AC / 24V DC Battery
4.	Ventilation Modes	Invasive: PCV, VCV, PRVC, PSV, SIMV (with ET tube) Non-Invasive: PAP (with sealed orinasal mask)
5.	FiO2	21% to 80% by controlling O2 flowrate using external valve

6.	Tidal Volume	200 - 1000 cc (depending on lung compliance)
7.	I/E Ratio	1:1 - 1:3
8.	Respiratory Rate	0 - 33BPM
9.	Expiratory Pressure & PEEP	0 - 25 hPa
10.	Flow Rate	0 - 60 lpm
11.	Inspiratory Pressure	10 - 35 hPa
12.	Pressure Trigger	-1 to -3 hPa below PEEP
13.	Bounding Dimensions	592 x 316 x 400 mm

The proto type developed at VSSC/ISRO has undergone in-house test & evaluation and meets the specifications given above. The responsibility of obtaining mandatory certification from approving agencies of government of India before clinical usage vests with the industry.

**ISRO intends to transfer the technology of VaU Ventilator to PSUs/Industries/Start-ups having good track record in manufacture of critical medical/electronic equipment manufacturing.**

Interested industries / entrepreneurs are requested to submit their **expression of interest along with details as per attached annexure** in the email address provided below for the purpose of evaluation. Shortlisted industries will be contacted over the email address provided, along with details.

Last date for application: **5 pm on June 15, 2021.**

The Eol applications and all communications are to be send to [pranaventilator@gmail.com](mailto:pranaventilator@gmail.com)

## Response form for ToT of "PRANA" Ventilator

1. Name of the Firm
2. Nationality of the firm
3. Address of the Registered Office
4. Start-up or established firm (Include registration number)
5. Nature of present business
6. Details of medical equipment manufactured earlier
7. Financial Background
8. Manpower available for realisation of product (Electronics, Mechanical)
9. Plan for realisation of the product
10. Infrastructure available for realisation of the equipment (Electronics & Mechanical Fabrication)
11. Test and evaluation plan
12. Marketing plan
13. Email Address
14. Contact Person Name
15. Contact Person Phone Number

I declare that the information submitted above is true to the best of my knowledge and the information will be used by ISRO for shortlisting the industry for the purpose of technology transfer. I understand that if any information furnished here is found to be wrong/fabricated, it will lead to forfeiture of the technology transfer and any future association of my industry with ISRO.

PREPARED AND SUBMITTED BY

(AUTHORISED SIGNATORY WITH SEAL)

To

The Head  
Technology Transfer & Industry Coordination Division  
Vikram Sarabhai Space Centre  
Indian Space Research Organisation  
Thiruvananthapuram