

## INNOVATION BY *INDIAN NAVY* TOWARDS COVID-19

1. Certain in-house initiative/ innovation pursued by the Indian Navy, with an aim to contribute to the ongoing efforts toward COVID-19, which could be useful for the IONS nations is being shared for information.

### Assisted Respiratory System (ARS)

2. **Item/Purpose.** Low-cost, portable, Continuous Positive Airway Pressure (CPAP) personal respiratory aid, to provide non-invasive oxygen enriched air with controllable flow rate.



3. **Impact.**

(a) Reduces requirement of invasive ventilation/ intensive care, through assisted respiration as per 1:2 breathing cycle, thereby reducing loading/ need for full-fledged ventilators.

(b) Allows better/ phased management of surge in hospitalisation.

(c) Portable device (self-contained DC supply with battery backup).

#### 4. Details.

(a) The number of patients affected with COVID-19 is increasing steadily during the ongoing pandemic. With this increase, requirement would arise to augment resources for providing assisted respiration support to a large number of affected people. A breathing aid following the concept of a Continuous Positive Airway Pressure (CPAP) that can provide non-invasive and oxygen enriched air through assisted respiration support has been designed by Indian Naval Dockyard. Such an Assisted Respiratory System (ARS) would benefit the COVID-19 patients by providing them a tool for assisted breathing. This is likely to reduce the requirement of invasive ventilation for COVID-19 patients and thus reduce the requirement of intensive care and loading of the hospitals.

(b) The ARS can be used as a personal Respiratory Aid Device. This portable device runs on DC supply with battery back-up. The device pumps in air at required pressure and at controllable flow rate, which is connected to a CPAP face mask through a respirator tube. This device has a microcontroller which is programmed to control the air flow as per the 1:2 breathing cycle of the patient. This aid ensures that the inspiration and expiration is assisted and the patient does not labour. Oxygen at the requisite pressure is introduced through a hydrator to ensure required Fraction of Inspired Oxygen (FiO<sub>2</sub>).



### Testing at the Indian Naval Dockyard Dispensary

5. Availability of assisted respiration is critical for patient's survival, if infected with COVID-19. Indian Naval Dockyard's low cost portable Assisted Respiratory System with patient specific breathing cycle may well be the answer to support a sudden surge of patients. The aid with its non-invasive, oxygen enriched assisted respiration support could be used to reduce the load on Intensive Care Units with ventilators, in case the situation worsens. This device has been tested at the Dispensary of Indian Naval Dockyard. In addition to maintaining assisted breathing, the vitals of the patient were also monitored by the Doctors and were observed to be satisfactory. This device may just prove to be the game changer in the fight against COVID19. Cost of equipment is INR 7500/-.

6. The Assisted Respiratory System, as described above, can be manufactured at any Ship Maintenance Facility or Repair Yard. If required by any IONS Nation, drawing could be provided by Indian Navy. Indian Navy could be contacted via email [acnsfci@navy.gov.in](mailto:acnsfci@navy.gov.in) or through promulgated IONS POC.