A VENTILATION DEVICE TO COMBAT THE COVID-19 GLOBAL CRISIS

Briefing to the UN Office of Outer Space Affairs (UNOOSA)

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A new high-pressure ventilator was developed by JPL engineers targeted to treat coronavirus (COVID-19) patients.

This ventilator, which can be quickly built using fewer parts, most of which are currently available in supply chains, should allow emergency rooms to save ICU ventilators for the most critical patients.
DEVELOPMENT STORY:

JPL is a Federally Funded Research and Development Center for NASA; managed by the California Institute of Technology, whose work includes robotic exploration of the solar system, astrophysics and Earth science missions.

In mid-March, a chance meeting in the cafeteria led two engineers to ask: “How can we help the current COVID crisis?” That conversation resulted in a plan to design a ventilator that could be readily made from easily accessible parts.

JPL engaged local doctors to better understand the specific needs of COVID patients and healthcare workers.

In 37 days, about 40 engineers, 90% of whom tele-worked, designed and developed a new ventilator, ready for testing.

On Day 38, JPL sent this ventilator to Mt. Sinai Hospital in New York City to test the design.

We are currently awaiting FDA Emergency Approval for the device.
DEVELOPMENT STRATEGY:

Rapid design / rapid prototyping of ventilating device based on inputs from healthcare advisers

Partner with industry, government and medical doctors and institutions during the design process

Work with the FDA from initiation to validate requirements and establish qualification strategy

Design for manufacturing by industry partners

Don’t interfere with supply chains for existing ventilators

Design to scale up production rapidly

Intuitive use to minimize training of end users
KEY CHARACTERISTICS OF THE VITAL DESIGN:

**Two designs** produced to accommodate different operating environments and maximize component availability

Simple design, low parts count (**1/7th the number of parts** as commercial ventilator)

**Utilizes easy to obtain parts** from outside the medical industry

Low cost enables **disposability instead of service and repair**

Internally controlled by simple micro-controller vs. high end computers to **reduce hardware and software complexity**

**Supplies the high pressures** required by COVID-19 patients with severe ARDS

Targeted functionality to satisfy the needs of most COVID-19 patients; **freeing up high end units for the sickest of patients**

**FDA reviewed** for Emergency Use Ventilation
MILESTONES AND NEXT STEPS

As seen during testing of the device at Icahn School of Medicine at Mount Sinai on a high fidelity human patient simulator (monitor in foreground shows data from the test venue).

April 21, 2020: Prototype unit demonstrated at Mount Sinai Hospital in New York City

April 22, 2020: FDA Emergency Use Authorization (EUA) Application Submitted

April 24, 2020: Caltech announces they will award royalty free licenses

April 27, 2020: 100+ US and foreign companies have expressed interest in producing the design

April 30, 2020: FDA approves VITAL for Emergency Use Authorization (EUA)

May 21, 2020: (est.): Award licenses in the USA and internationally
Applications for VITAL License

NOTES:
- * Manual edits
- Registration Dashboard consists of data collected. Not all entries have been reviewed
- ** Click the metric to see it
- Data will fluctuate depending on duplicate submissions

288 Registered**
90 Proposals: Submitted**
45 Proposals: Viable**
0 Proposals: Not Reviewed**
9 From Caltech Call List*
204 With Government Contract Experience

Ventilator Registration Metrics

Day Registered

Reporting Day: 05/13/20
Applications for VITAL License

By Region:
- Asia: 49%
- Australia and Oceania: 18%
- Central America and the Caribbean: 10%
- Europe: 5%
- Middle East, North Africa, and Greater Arabia: 2%
- North America: 3%
- South America: 13%
- Sub-Saharan Africa: 10%
Applications for VITAL License

Nature of Business

- Medical Device Manufacturer: 33%
- Aerospace: 20%
- Automotive: 14%
- Electronics: 7%
- Investor: 3%
- Philanthropy: 2%
- Product Manufacturing: 2%
- Other (Please fill in below): 2%

Number of Employees

- 10 - 100: 233
- 100 - 1,000: 52
- 1,000 - 5,000: 26
- 5,000 - 10,000: 8
- 10,000+: 12
THANK YOU

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