

Topic: N171-007

Sera Star LLC.

Oxygen Mask Development to Improve and Facilitate Mask Discipline

The Sera Star Systems / AVOX team has developed a High-Performance Oxygen Mask (HPM) Retrofit Kit for the current US Navy MBU-23/P series masks used on today's high-performance, On-Board Oxygen Generation System (OBOGS)-equipped fighter aircraft and trainers. Our retrofit kit incorporates an innovative face piece and other mask fit technologies designed to accommodate a larger anthropometric group, thereby increasing mask discipline, endurance, and performance while decreasing the likelihood of physiological events (e.g., Hypoxia). Our strategy leverages the Engineering Change Proposal (ECP) process as an attractive alternative to developing a new oxygen mask, which would be a much lengthier and costlier approach.

Technology Category Alignment:

Human Systems

Protection, Sustainment, and Warfighter Performance

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SYSCOM: NAVAIR

Contract: N68335-19-C-0008



Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-19-C-0008



Tech Talk: <https://atsi.adobeconnect.com/pd98q58my96b/>

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2019-1079

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WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA 265

Transition Target: US Navy, US Air Force, FMS

TPOC:
(301)342-6638

Other transition opportunities:

Notes: This High-Performance Oxygen Mask (HPM) Retrofit Kit is for the current US Navy MBU-23/P series masks used on today's high-performance, On-Board Oxygen Generation System (OBOGS)-equipped fighter aircraft and trainers.



Photo Courtesy of Sera Star

WHAT

Operational Need and Improvement:

US Navy seeks to improve mask discipline and oxygen flow over the current MBU-23/P mask.

Specifications Required:

Investigate root causes of MBU-23/P mask discomfort and develop a solution that seamlessly integrates into existing oxygen systems. Reduce mask removal by:

- Improving airflow passing through seals around the nose;
- Reducing pressure around the face due to inconsistent fit;
- Improving pilot's ability to attach and detach mask especially when eating or drinking;
- Improving mask comfort especially during long flights;
- Eliminating the mask from sliding around pilots face during high-G maneuvering

Technology Developed: Our team has developed a retrofit kit that improves the face piece geometry of the MBU-23/P and integrates completely with the following systems:

- On-Board Oxygen Generation System (OBOGS)
- Emergency Oxygen System (EOS)
- Regulated Integrated Terminal Block (RITB)
- Pre-coolers
- Pneumatic valves and temperature/pressure sensors
- Water separators and inlet filters
- Rear-pilot interface connectors

Warfighter Value: FASTER | BETTER | CHEAPER

Our HPM solution can get into the fleet faster than any other solution available. Our mask incorporates the full range of facial anthropometric parameters for pilot comfort, is compatible with current helmet design and communications systems, and is interoperable with all air platforms that utilize the current OBOGS. Our strategy leverages the Engineering Change Proposal (ECP) process as an attractive alternative to developing a new oxygen mask, which would be a much lengthier and costlier approach.

WHEN

Contract Number: N68335-19-C-0008

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Complete SBIR Phase I Feasibility Study	Low	Study completed, submit Phase II proposal	4	September 2018
Develop Retrofit Kit to replace MBU-23P	Low	Product improves face piece geometry of MBU-23P	4	February 2019
Test Retrofit Kit to verify seamless integration w/ existing oxygen systems	Low	Retrofit Kit integrates w/ OBOGS, EOS, RITB	5	May 2019
Conduct Limited User Tests (LUT)	Low	Successful LUT	5	September 2019
Validate Design	Low	Design validated	5	December 2019
Conduct Safety of Flight Testing	Low	Successful Safety of Flight Tests in an operational environment	6	September 2020

HOW

Projected Business Model:

Use the Engineering Change Proposal (ECP) process to enhance the MBU-23/P series mask. Sell the improved mask and retrofit kit through the Defense Logistics Agency (DLA) system.

Company Objectives:

Our objective is to improve and facilitate greater mask discipline among pilots, by providing a retrofit kit that integrates into the current MBU-23/P oxygen masks. Our long history with Aircrew Life Support programs ultimately drives us to provide a solution that mirrors the feedback the end-users provided to us and provide a reasonable solution that solves the wide range of facial anthropometric parameters and is compatible with current helmet and communication systems.

Potential Commercial Applications:

Once this mask improvement is fielded, it is expected to be in service with the US DoD and Foreign Military Services (FMS) for the next 20 years as its predecessors. New US DoD life support programs are few and challenging to complete due to the nature of the federal acquisition regulations (FAR) and US fiscal funding uncertainties. The incorporation of new enabling technologies / capabilities and the inclusion into the DLA sustainment / logistics data base system, with a National Stock Number (NSN) will ensure the stability and commercial success of this High Performance Mask (HPM) for many years.

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