

# AIR INDUCTION AND GAS EXHAUST SOLUTIONS FOR SUBMARINES

## Complete, Reliable And Tailorable

L3Harris' induction and exhaust systems for submarine snorkels represent an all-in-one solution for safely handling air induction and gas exhaust disposal, with its proven history of validity at sea.

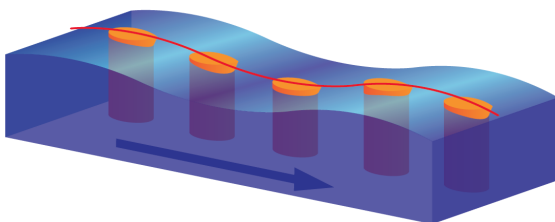
### AIR INDUCTION SYSTEM

L3Harris provides qualified air induction valves integrated with the design of the boat and of the snorkel mast. The design solution for the snorkel allows the air induction through the mast with an optimized airflow. This guarantees minimum pressure drop, enhancing diesel engine efficiency. The entire system is designed to withstand underwater pressure up to the concealed preparation depth (wet version) or up to the submarine's maximum diving depth (dry version).

The snorkel head can be equipped as follows:

- > Butterfly-type valve: lets the air entering without any deviation normally caused by standard type heads. The flat shape of the snorkel head results in a minimum radar cross-section and a reduced visual detectability of the mast when deployed.
- > Mushroom-type valve: it features a cap protecting the valve, in case of extreme environmental conditions. It allows integration with the optronic and the communication masts.

An alternative to the fixed-head type is the wave-following snorkel version. This offers increased stealth features, as the upper part of the snorkel head follows the sea level in real-time while the water-sensors activate a control system aimed at keeping the part of the head protruding above the water level steady. As a result, the submarine can take advantage of minimum detectability during the air inlet operations.



WAVE FOLLOWING SNORKEL  
FOR MINIMUM DETECTABILITY

MAIN FEATURES & BENEFITS	
Actuation	Hydraulic or electric actuation
Operating speed	Deployment/operating speed up to 12/16 knots
Qualifications	Shock qualified according to customer specifications
Maintenance	Mean time between overhauls of more than 8 years
Design	Cartridge design
Noise reduction	System design is able to guarantee signature reduction
Additional functions	Deplumer to reduce wake & plume and water ingestion
Additional features	Radar Absorbing Material (RAM) version available

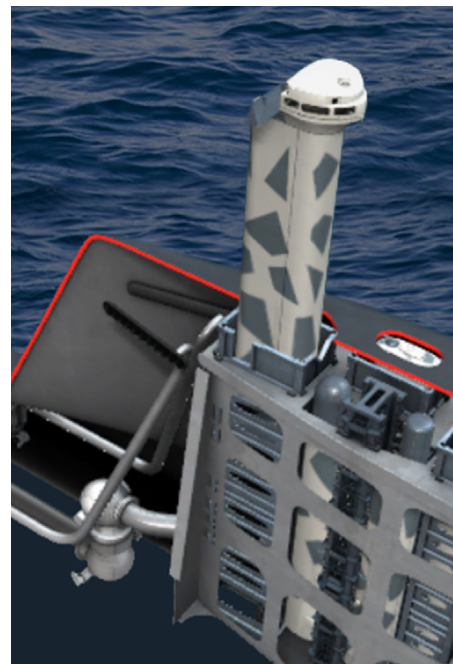


L3HARRIS' SUBMARINE AIR INDUCTION AND GAS EXHAUST CUSTOMIZED SOLUTIONS ARE CURRENTLY EQUIPPED ON NAVY FLEETS AROUND THE WORLD.



## GAS EXHAUST SYSTEM

Wet and dry systems are also available for the gas exhaust pipeline, with different valve layouts tailored to the design of the submarine. All the designs of the gas exhaust systems are aimed to increase overall safety. The valve design features a unique deformable sealing system, combined with a water sprayer system. This configuration guarantees perfect tightness sealing, eliminating the need for noisy grinding operations and avoiding dangerous sea-water leaks. The gas exhaust system also features an exhaust thermal control solution, created to reduce the submarine's thermal signature, further reducing the detectability of the submarine. Each valve of the system is made of high-grade stainless steel, designed to last for the submarine's entire operational life, requiring just standard overhaul.



### MAIN FEATURES AND BENEFITS:

- > Exhaust thermal control (exhaust gas temperature reduced up to approximately 70 °C)
- > Self-closing valve design
- > High-grade stainless steel
- > Perfect water-tightness
- > IR signature reduction
- > Noiseless operations



## Air Induction And Gas Exhaust Solutions For Submarines

**A SAFE, RELIABLE AND CUSTOMIZABLE SOLUTION**

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