

# Triton On-Board Weight and Balance System (OBWBS)



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**SYSCOM:** Naval Air Systems Command  
(NAVAIR) | [www.navair.navy.mil](http://www.navair.navy.mil)

**Program Sponsor:** Persistent Maritime  
Unmanned Aircraft Systems Program Office  
(PMA) 262

## Other Potential Programs:

CH-53K King Stallion, P-8A Poseidon, F/A-18  
E/F Super Hornet, E/A-18G Growler

**Current TRL:** 4

**Projected TRL:** 7 / Q4 2025

**Keywords:** Aircraft Onboard Weight &  
Balance, Condition Based Maintenance,  
Structural Health Monitoring

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## THE CHALLENGE

The MQ-4C currently requires a time intensive fueling and weighing procedure in order to safely operate the aircraft. The goal of the OBWBS is to eliminate the need to tow the MQ-4C back and forth to a hanger or shelter. To satisfy this goal, the OBWBS must accurately determine the weight and CG of the MQ-4C outdoors immediately before and after fueling under normal fueling conditions including environmental effects such as wind. The elimination of towing steps will reduce fueling turnaround time and wear and fatigue cycles from towing, reducing unplanned maintenance of the landing gear systems and structure and risk of overloading the nose landing gear while towing. OBWBS will also perform a health monitoring function by measuring shock strut charging gas (nitrogen) pressure and temperature.

## THE INNOVATION

The MQ-4C OBWBS utilizes ES3-developed landing gear sensors, interfacing data collection components, and control units developed specifically for use in extremely harsh environments. The technology allows for flexibility and expansion of data collection requirements to fit a variety of operational needs. Sensor capabilities include landing gear strut pressure/temperature on each Main Landing Gear (MLG) and Nose Landing Gear (NLG) struts.

## THE NAVY BENEFIT

OBWBS provides real-time information on aircraft gross weight and center of gravity, eliminating the use of aircraft scales in day-to-day operations and providing large cost savings due to elimination of maintenance activities associated with towing aircraft into the hangar after fueling to verify aircraft weight and balance prior to operations. The system also implements CBM+ in accordance with DoDI 4151.22P for detection of loss of nitrogen and hydraulic fluid in landing gear shock struts caused by extended operations at high altitude and low temperature. Having real-time information allows operators to understand the aircraft state before landing, which promises to reduce occurrences of off-nominal landings and inform the need for additional inspection.

## THE FUTURE

ES3 intends to be the Original Equipment Manufacturer (OEM) of the MQ-4C Triton OBWBS. Manufacturing combines organic and key supplier sources controlled via ES3 design, documentation, and quality control. ES3 is also currently developing a CH-53K OBWBS for the heavy lift helicopter program.