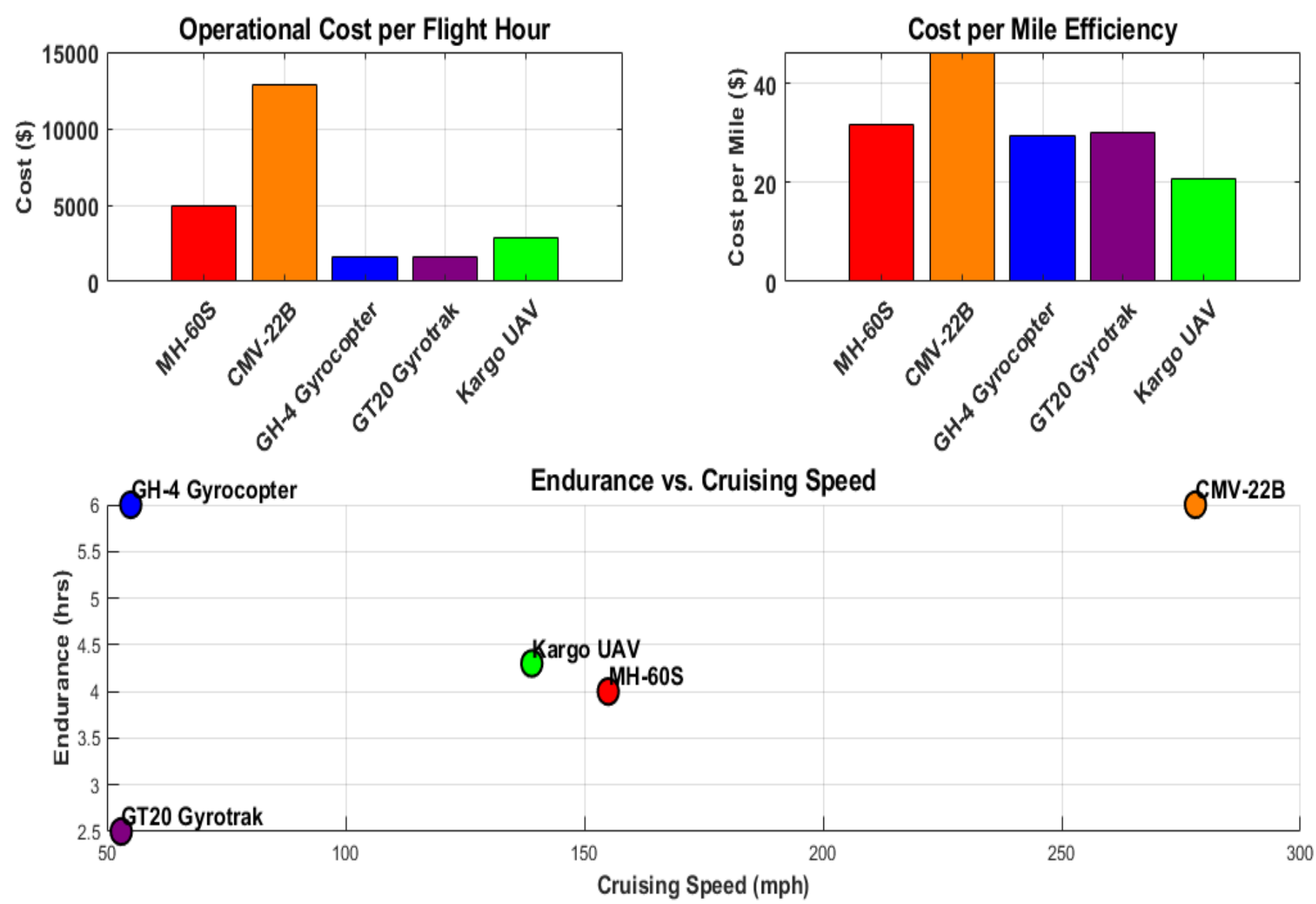


## Background

This study examines the cost-effectiveness of traditional aerial delivery systems, such as the MH-60S Seahawk and CMV-22B Osprey, against emerging fuel-efficient hybrid vertical takeoff and landing (HVTOL) UAVs, like as Unmanned Aerospace’s GH-4 Gyrocopter.

Spare parts are essential for maintaining operational readiness of Department of Defense (DOD) ships. When parts are needed, they are flown in from shore or another vessel, typically via rotary-wing or tiltrotor aircraft like the MH-60S and CMV-22B, which limit aircraft availability for other missions.

Are fuel-efficient UAVs a cost-effective alternative to delivering spare parts to ships at sea?



## Research Questions and Approach

In this study, we aimed to address the following research questions:

- How do next-generation Group 3 UAVs compare to traditional aircraft in cost and sustainability?
- Are HVTOL UAVs viable for naval spare parts delivery?

### Cost Effectiveness Approach

We use a cost-effectiveness analysis framework to address the research questions, following the OMB Circular A-94 guidance. This approach incorporates:

- Operational context, expert insights, operational and regulatory considerations, and infrastructure implications through the following methods:
  - Measurable data through cost, emissions, and performance metrics
  - Impact Assessment and a sensitivity/ risk analysis.

## Results & Recommendations

Group 3 HVTOL UAVs provide a cost-efficient and lower-emission alternative to manned aircraft for delivering spare parts to ships.

UAVs have lower acquisition, operating, and maintenance costs and produced fewer GHG emissions, support logistics by enabling frequent small-payload deliveries without using mission aircraft.

These results support integrating UAVs into naval logistics, aligning with DOD sustainability goals, reducing fuel use and maintenance costs, and improving fleet readiness.

Replacing manned aircraft for small-payload deliveries frees high-value aircraft for mission-critical roles.

The findings align with Navy efforts to adopt autonomous systems and distributed maritime operations. UAV use improves logistics speed, resource use, and fleet readiness.



Sikorsky MH-60S Seahawk



Unmanned Aerospace GH-4 Gyrocopter



Arial Robotics GT20 Gyrotrak



Kaman Kargo UAV



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