



## TECHNOLOGY SOLUTION

### Aerospace



# Modular In-Air Multi-UAV Docking

## UAV system for long-range networked tasking

This UAV design is a multi-vehicle concept with a large scale "parent" UAV that permits smaller "child" UAVs to dock wingtip-to-wingtip while in flight. The parent UAV is VTOL and conventionally capable, and operates as a wing-borne vehicle. The children UAVs resemble the parent but at smaller scale and can be deployed from the wing-borne parent unit, perform their task and re-dock before the full assembly returns to base.

Increasing the effective wingspan through wingtip docking results in significant increases in cruise efficiency and operational range over existing, singular UAV platforms. The sharing of onboard resources and automation of wingtip docking operations further increases the operational flexibility and mission utility of this modular UAV system.

### BENEFITS

- Increased operational range
- Increased payload capabilities
- Simultaneous multi-point operation increasing total energy efficiency
- Parent can readily utilize multiple power sources for sustained flight



## THE TECHNOLOGY

This modular vertical takeoff and landing (VTOL) Unmanned Aerial System (UAS) is made up of multiple Unmanned Aerial Vehicle (UAV) modules with uniform wingtips for tip-to-tip docking. Each UAV has twin booms with front and rear propellers and an empennage with a downward mounted vertical rudder. All the propellers are tilt-able for VTOL, and the front ones are stow-able for cruise efficiency.

One of the UAV's can be configured as a larger parent unit and carry additional fuel or battery resources to extend the range of the docked children UAVs. All of the UAVs in the formation are connected via onboard radio systems and programmed with a docking methodology.

Resources can be transferred between vehicles in the formation through probes and receptacles in the wingtips while they are securely docked together via magnetic retention. This enables the formation of UAVs to achieve longer range collectively, while enabling the child UAVs to detach for short run missions before returning for additional resources or to maximize cruise efficiency during the return flight to base.



Depiction of delivery while larger architecture remains aloft awaiting re-docking en route to multiple destinations. Image Credit: NASA

## APPLICATIONS

The technology has several potential applications:

- Long range delivery
- High payload deliveries
- Search and rescue
- Data collection

## PUBLICATIONS

Patent No: 10,189,565