



**Rhoman Aerospace** builds drone control systems that let any VTOL UAV fly better, farther, and perform their mission more effectively through our control-enhancement software download.

### Current Contracts:

- FAA, stability and control with shifting payloads
- US Air Force, projectile-kickback and payload raise/lower deployment
- Stealth UAV Firm, custom controls for variable-pitch, 5-prop, tri-copter

### Key Technology:

- Caltech & Rhoman, longer flight time, stability with hanging payloads
- 2 issued patents, 5 pending non-provisional patents

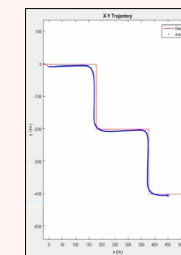
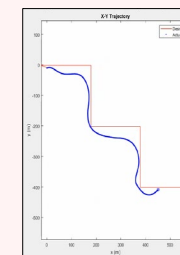
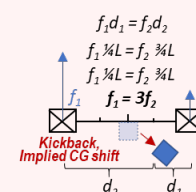
## Technology & Deployment



### Capability Enhancements via Software:

- Rhoman control algorithms require less torque- $\Delta$  & power
- Systems predict and account for shifting CG from payload deployment: launch, projectile kick-back, lower-PL-to-ground

### Smooth Technology Deployment:



## Capabilities & Use Cases

Added capabilities for current & future small and large UAV

Increased Range

Robust to All Weather

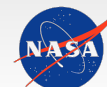
Handles & Deploys Any Payload



- Fly farther, see more
- Auster condition capable
- Swap any sensors, bad-CG cargo payload
- Launch or lower any payload w/out landing

## Rhoman Team

The right team, stakeholders, and experience, executing in aerospace and bringing software products to market, ensures success



Caltech



Rhoman team and partners have the right experience



Customers and funding sources benefit from Rhoman technology

# Capabilities & Use Cases

## PROVIDES CAPABILITIES TO ACCOMPLISH CURRENT & FUTURE MISSIONS

### Small & Large UAV Enhanced

#### Increased Range

Less torque- $\Delta$  means less power is used

#### Robust to All Weather

Adaptive controls are more stable despite surprise environmental factors

#### Handles Any Payload

Incorporation of live-PL CG lets vehicle fly with bad-CG sensors and ad hoc payload

#### Deploys Any Payload

System handles projectile-kickback and allows a hanging payload with precision



#### Better Awareness

*Fly farther, see more, gather more data*

#### Persistent

*Never stop a mission due to weather*

#### Multi-functionality

*UAV can fly perfectly with any swapped out or ad hoc payload*

#### Deliver Your Payload

- Launch a payload w/ perfect aim & stability
- Precisely deliver a payload without landing

ENHANCES CURRENTLY DEPLOYED SMALL RECON UAV | ESSENTIAL FOR FULL CAPABILITIES OF FUTURE, LARGE UAV

## Less Torque- $\Delta$ & Less Power ► More Flight Time

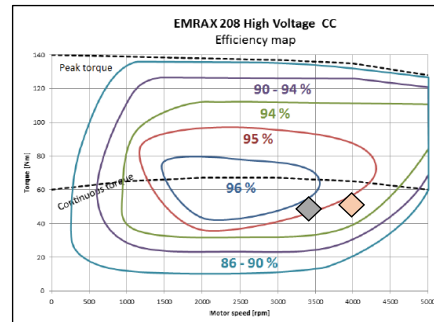
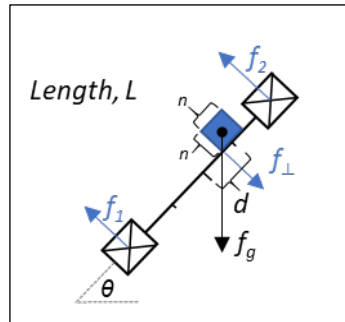


Diagram illustrating the effect of a kickback on the center of gravity (CG) shift.

Left side (Balanced system):

- Equations:  $f_1 d_1 = f_2 d_2$ ,  $f_1 L = f_2 L$ ,  $f_1 = f_2$
- Distances:  $d_1$  and  $d_2$

Right side (System after kickback):

- Equations:  $f_1 d_1 = f_2 d_2$ ,  $f_1 \frac{1}{4} L = f_2 \frac{3}{4} L$ ,  $f_1 = 3f_2$
- Distances:  $d_2$  and  $d_1$
- Annotation: **Kickback, Implied CG shift** (indicated by a red arrow pointing to the new position of the mass  $f_2$ )

## Deployment is Smooth

## Software Download

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