

# Micro-Aerial Vehicles for the Dismounted Soldier

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# Airborne Sensor for the Dismounted Soldier

## Situation

Platoon on morning patrol approaches a village and suddenly takes sniper fire.

## Mission

Platoon to locate and eliminate the sniper(s) while minimizing civilian casualties.

## Key Questions

*Would an airborne sensor contribute to successful execution of the mission?*



## Current Options – Fixed Wing



- Size & Weight
  - 72 cm, 430 g
- Endurance
  - 45 min.
- Sensor
  - EO or IR camera
  - forward & side looking
- GCS
  - IP-based, analog
  - tablet interface
  - waypoint navigation

# Current/Future Options - Rotorcraft



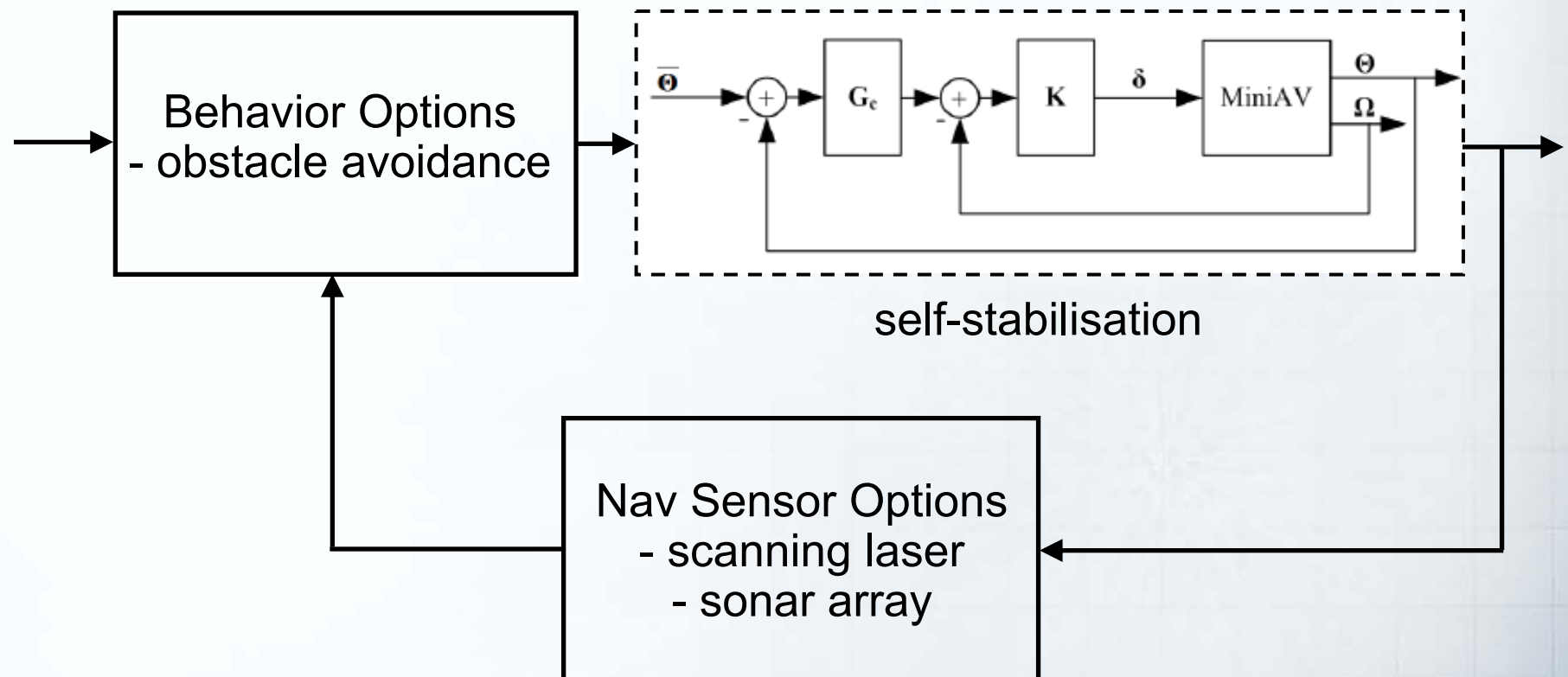
Aeryon Scout

- Size & Weight
  - 80 cm, 1.7 kg
- Endurance
  - 20 min
- Sensor
  - EO still or video
  - gimballed
- GCS
  - analog
  - tablet interface
  - waypoint navigation

# OASSAS Autonomous Navigation R&D

Desired location

Actual location



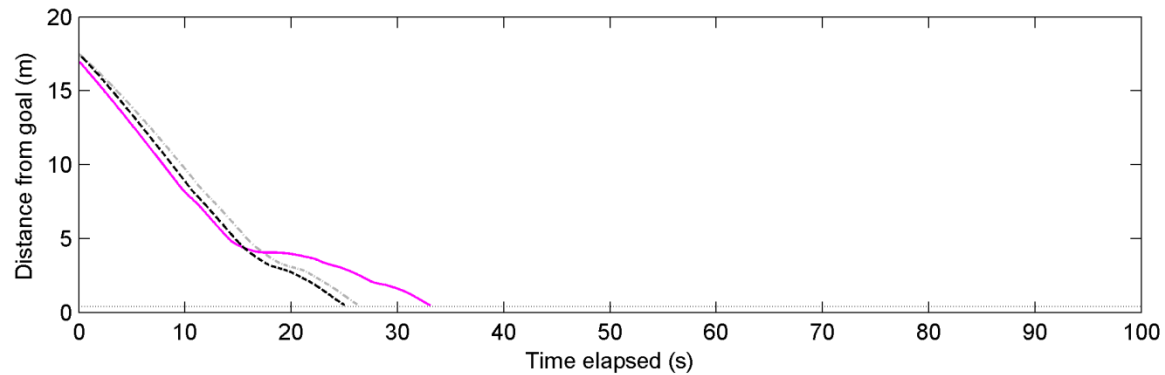
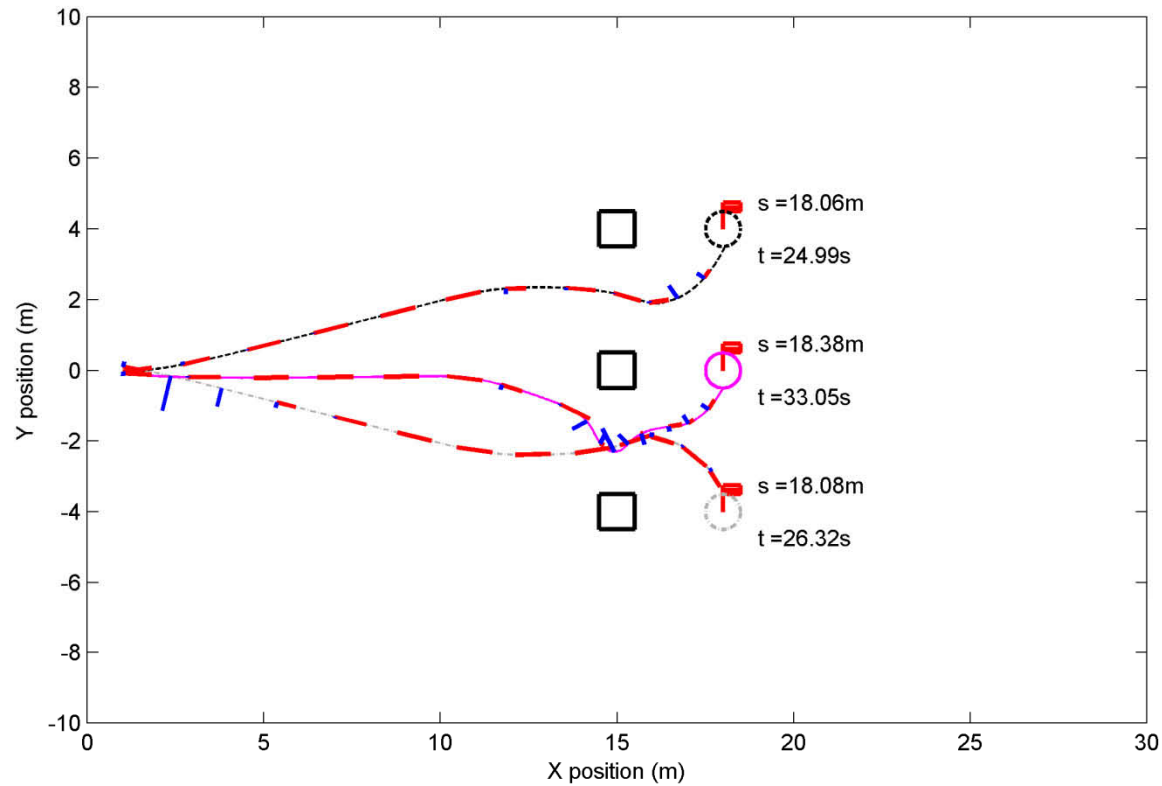
*Airborne sensor must take care of itself so soldier can concentrate on the mission.*


# Obstacle Avoidance Navigation Options

Category	Type	Characteristic
Sensors	scanning LRF	5.6 m range (160g, \$1.5K)
		30 m range (370g, \$6K)
	sonar	number – 2, 3, 4 over 180 deg (15g, \$30 each)
		beam angle – 30, 45 deg
Behaviors	smooth nearness diagram	
	vector field histogram +	
Obstacles	boxes only	box – 1m x 1m x 1m
	boxes and wall	wall – 5m x 1m x 1m

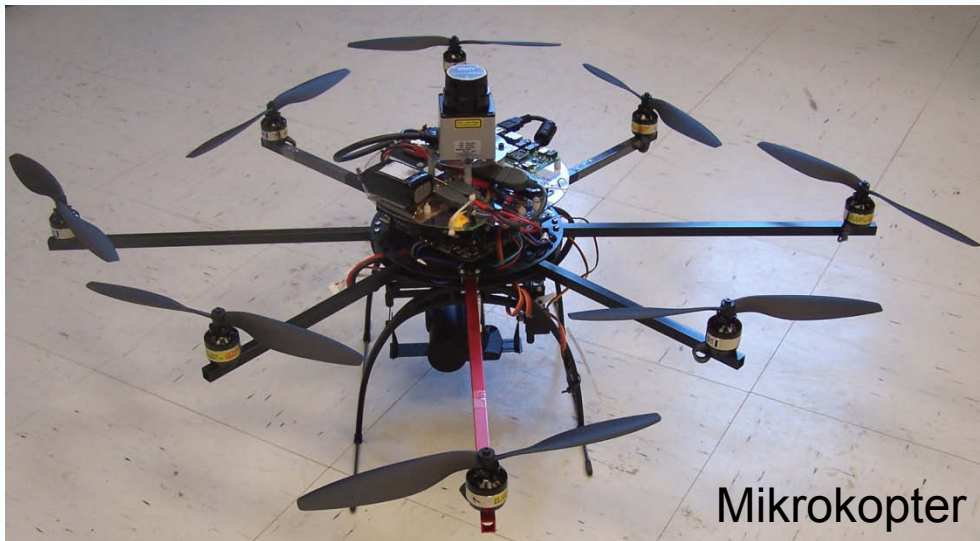


# SND algorithm with 5.6m scanning LRF



 simulation video

## Way Ahead - Rotorcraft Testbed



- Frame Size & Weight
  - 100 cm, 1.5 kg
- Endurance
  - 25 min
- Payload Capacity
  - 1.5 kg
- Onboard Sensors
  - Scanning LRF
  - Sonar
  - EO camera
- Main Avionics Board
  - Stabilization algorithm
- Daughter Board
  - OA algorithm
- Ground Controller
  - analog datalink