

**BAI AEROSYSTEMS**

# **DRAGON DRONE UAV SYSTEM**



# Report Documentation Page

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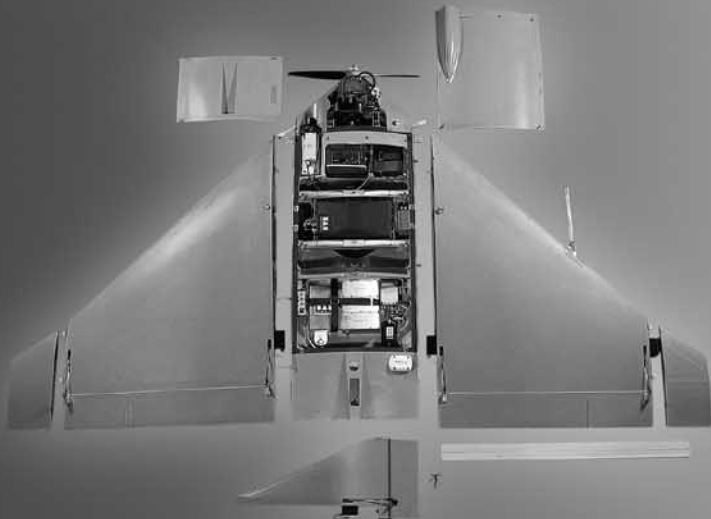
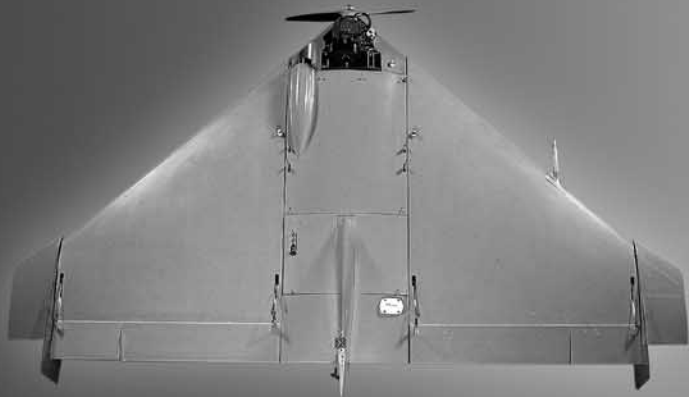
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**BAI's Dragon Drone UAV System.**

More than just a UAV...a carefully integrated system of advanced technology products designed to work together. It is the product of over fifteen years of continuous development by BAI and U.S. Government UAV users, with an unrivaled legacy of air vehicle production quantities counted in the hundreds. BAI's Dragon Drone system is the result of combining new ideas and emerging technologies with the in-depth knowledge gained from real military operational experience, by seasoned professionals. BAI Aerosystem's Dragon Drone UAV System. Ready to meet today's requirements, prepared to take on tomorrow's challenges.





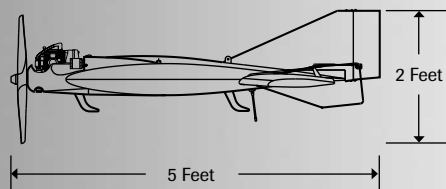
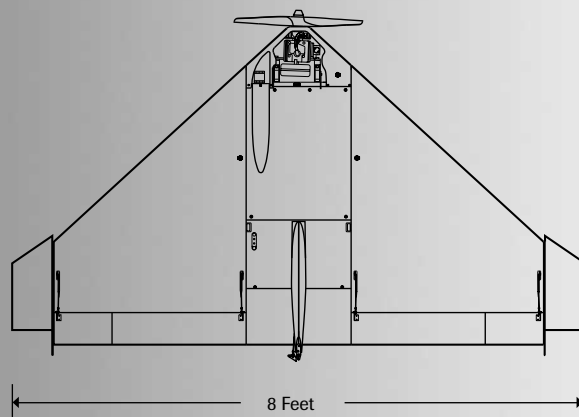
**The Dragon Drone UAV System** provides users with the ability to perform Reconnaissance, Surveillance, and Targeting of time-critical high value mobile targets, and Battle Damage Assessment. This compact system and crew of three may be easily deployed near the Forward Line of Own Troops for maximum tactical benefit.

The Dragon Drone's composite delta-wing air vehicle features space-age composites with water-jet and laser-cut precision components, carefully hand-molded into a stable NACA 63A012 airfoil optimized following an exhaustive study by NASA researchers (Report #4200) performed in 1989.

Dragon Drone features a 2-stroke, 8 HP gasoline engine for reliable performance in most climates. A proven heavy fuel engine is available as a factory option.

Removable hatches provide easy access to avionics and payloads housed in Dragon Drone's fuselage. The forward bay is equipped with a vibration-isolating mount for payloads; the aft bay contains the vehicle's autopilot, uplink receiver, and a 10-watt microwave downlink for real-time transmission of video and air vehicle telemetry data.

Dragon Drone's factory-built components are fully interchangeable between different aircraft, and rapidly assembled using quick release fasteners. Add fuel and batteries and it's mission ready: "in the box" to "in the air" in less than 30 minutes.



**PERFORMANCE SPECIFICATIONS**

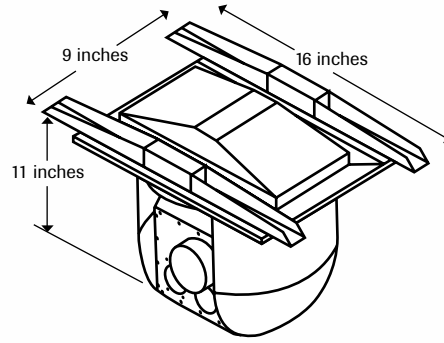
- Dash/Cruise Speed ... .80 mph
- Loiter Speed ... .60 mph
- Operating Altitude ... .1000-5000 Feet AGL
- Service Ceiling ... .10,000 Feet MSL
- Endurance ... .3 Hours
- Range ... .50 Miles (Typical)
- On-Board Power ... .12/24 Volts (3BA-5590/U Li Batteries)
- Launch ... .Pneumatic Rail or RATO
- Recovery ... .Skid or Net

**PHYSICAL CHARACTERISTICS**

- Wingspan ... .8 Feet
- Airfoil ... .NACA 63A012
- Length ... .5 Feet
- Height: ... .2 Feet
- Empty Weight ... .55 Pounds  
(w/o Payload, Fuel, Batteries)
- Max. Take-off Weight ... .95 Pounds
- Fuel Capacity ... .2.8 Gallons

# PAYLOADS, CONTROLLERS, AND AVIONICS

BAI's experience in the design and production of electronic components led to its creation of a family of lightweight gimballed sensors for the Dragon Drone system, and for many other applications as well. For drop-in compatibility with any Dragon Drone aircraft, all three payloads utilize the same mechanical and electronic interface, and feature a precision slip-ring to allow the operator unrestricted continuous 360° panning motion.



**Pan-Tilt-Zoom Daylight Color TV with Laser Rangefinder**  
Proven in use with the U.S. Marine Corps, the PTZ-LRF features an eye-safe laser rangefinder bore sighted with an electronically stabilized daylight color TV sensor for accurate targeting on the fly.



**Pan-Tilt-Zoom Daylight Color TV**  
BAI's electronically stabilized color TV sensor features an on-screen crosshair overlay. Encoders mounted on the gimbal's drive motors report sensor position via the payload's serial (RS-232) port.



**Pan-Tilt Infrared Camera**  
BAI has combined the technology of a hand-held un-cooled infrared camera with its light weight payload mechanism. At under 13 pounds, BAI's PT-IR is one of the lightest gimballed IR cameras available.

BAI's ergonomic Flight and Payload Controllers are designed for reliability. Serial data format and MIL-quality components are used. Connections for crew communications are built into each controller for added convenience.



One Payload Controller is compatible with all three of the Dragon Drone's payloads.



BAI's Flight Controller features all air vehicle command functions arranged for optimum ergonomics. A back-lit LCD displays mission programming data.



### Autopilot

At the heart of Dragon Drone's avionics is its programmable flight controller, built around the sophisticated Motorola™ 68332 microprocessor. Dragon Drone's flight controller is designed to minimize operator workload by offering the following capabilities:

- Manual Operation
- Wing Leveling
- Cruise and Loiter Modes
- GPS Waypoint Navigation
- RS-232 Payload Interface

BAI's programmable flight controller is supported with several included onboard sensors, including a vertical reference and multiple rate gyroscopes, a barometric altimeter, tachometer, airspeed probe, and a 12 channel (C/A code) GPS receiver.

## GROUND CONTROL SYSTEM

The Dragon Drone's compact Ground Control Station consists of two consoles featuring readily-accessible rack-mounted components housed in durable shipping cases, tripod-mounted for convenient deployment. The Ground Station's Transmit and Receive antennas are also tripod-mounted, and are supplied in their own shipping cases. An auto-tracking receive antenna is optional.

The Flight Control Console provides all command and control functions required to operate the Dragon Drone air vehicle and payloads. Included are a 5 channel synthesized UHF uplink transmitter, central data processor, power supply, and a rugged laptop computer used for autopilot programming and to display the Dragon Drone's instrumented flight data. BAI's Windows™-based mission operating software allows uploading of GPS navigation waypoints either before launch or while in-flight.

- Uplink Band . . . . .UHF (Standard)
- Uplink Range . . . . .50 Miles (Typical)
- Downlink Band . . . . ."L" or "S" (Standard)
- Downlink Range . . . . 50 Miles (Typical)

The Payload Control Console offers a stand-alone facility for the payload operator, and incorporates a frequency-selectable downlink receiver, video display and 8 mm recorder as standard equipment. Connections are provided to allow the use of additional user-supplied monitors, recorders, or image processing equipment. Hooded displays are standard.





## LAUNCHER AND ACCESSORIES

The next generation of small UAV launch systems is now available!

Dragon Drone's pneumatic launcher is state of the art, and offers safe, reliable launching of aircraft weighing up to 100 pounds.

Precision rodless cylinders, designed for heavy-duty, day-in, day-out use in industrial applications, are the most recent development in pneumatic launcher technology. Rodless cylinder technology makes the Dragon Drone launcher totally self-contained: only the aircraft leaves the launcher! Dangerous and expensive launch pistons and interface hardware are not required on the Dragon Drone launcher, and consequently, the Dragon Drone launch mechanism is particularly well suited for shipboard applications.

An added feature of the rodless cylinder is its ability to operate using high volume, low pressure gas. Bottled nitrogen or compressed air is typically used to charge the launcher to approximately 100 psi., but if desired, the launcher may also be charged with a small, light duty compressor. Maximum launch velocity of a 95 pound Dragon Drone is approximately 60 miles per hour.

Built onto a rigid welded steel trailer, the launcher provides a sturdy platform for carrying other needed equipment; the on-board storage boxes hold all launcher support equipment, as well as the aircraft's starter and fuel transfer pump. A built-in aircraft C.G. suspension apparatus makes weight and balance checks quick and easy.

### LAUNCHER DIMENSIONS/SPECIFICATONS

Length	.23 Feet
Width	.6 Feet
Height	Deployed: 6 Feet Stowed: 4 Feet
Weight	.1,500 Lbs.
Accessories Furnished	.Launcher Maintenance Tools Hoses Wheel Chocks Air Vehicle Fuel Pump Starter C.G. Apparatus

## FLIGHT OPERATIONS AND TRAINING



BAI Aerosystems maintains a qualified staff of UAV Flight Operations Personnel and expert Training Instructors. Training programs may be tailored for all levels of operator candidates, and may be performed at BAI, or onsite at a customer's facility.

BAI's flight operations personnel and equipment are also available to perform flight operations at customer-specified locations, to provide turn-key UAV flight services for participation in exercises, experiments, or demonstrations.

BAI's knowledgeable UAV systems integration specialists can provide customers with payload adaptation, documentation, software customization, and complete end-to-end product support, from development to full production. BAI's total systems approach, operationally-proven hardware and experienced organization makes it a leader in UAV technology.

### RAGGED ISLAND

Limited flight testing and operator training is performed at BAI's private Ragged Island facility, located near Cambridge, Maryland. Equipped with a 2000 foot paved, lighted runway and maintenance shop, Ragged Island is a convenient location to perform system familiarization and basic flight operations training.

