# Vigilante
# VTOL UAV

## *Attachment 1, 2008 Vigilante FAA COA Application*

(b) (6)
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**Aviation Applied Technology Directorate**

# Vigilante VTOL UAV Testbed

Vigilante serves as a testbed vehicle at AATD for testing and demonstrating manned-unmanned teaming and UAV technologies, including weapons and sensors.

## *Aircraft Information*

| | | | |
|---|---|---|---|
| ▪**Powerplant** | Rotax 914, 100hp | ▪**Fuel Capacity** | 36 gal |
| ▪**Length** | 26 ft | ▪**Payload** | 275 lbs |
| ▪**Rotor Diameter** | 23 ft | ▪**Interior Volume** | 5 cubic Ft. |
| ▪**Height** | 8 ft | ▪**Endurance** | 5 hours (Payload dependant) |
| ▪**Width** | 4ft | ▪**Range** | 20 NM (Data link & Test Range Restriction Dependant) |

# Vigilante's COTS Heritage

| 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|
|  | |  | |  | |  | | |
| UltraSport 254 | UltraSport 331 | UltraSport 496 | BMDO Vigilante | 331 OPV | Vigilante 496 | Vigilante 500 | Vigilante 502 | Vigilante Tagalong |
|  | |  | |  | |  | | |

Manned | Optionally Piloted | Unmanned

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# Ultrasport 496 Helicopter

- $50K Kit
- 2 Passenger / 500lb Useful Load
- 2.5 hrs Endurance / 65 kts Cruise
- Composite Airframe / Blades
- 95HP 2-stroke Engine
- 100+ sold, 2000+ hours on fleet

www.ultrasport.rotor.com

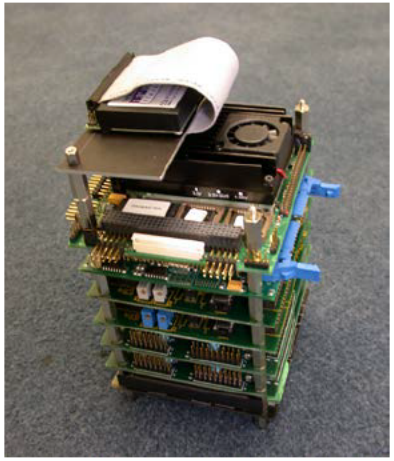
# 496-OPV

- ATI / Aerobotics IRAD
- Built in Spring 1998 to develop UAV flight controls
- US496 Platform
- Optionally Piloted Vehicle
- Fuzzy Logic Adaptive Controller (FLAC) based flight controls.


# 496-OPV w/ SAIC AFCS

- SAIC replaced Aerobotics as control system developer after USN VTOL UAV demo
- 1st ½ of 1999 IRAD
- Global Hawk DDE-based ground control station
- Successfully demo'd waypoint navigation, auto takeoff / land, lost link recovery

# Flight Control System Avionics

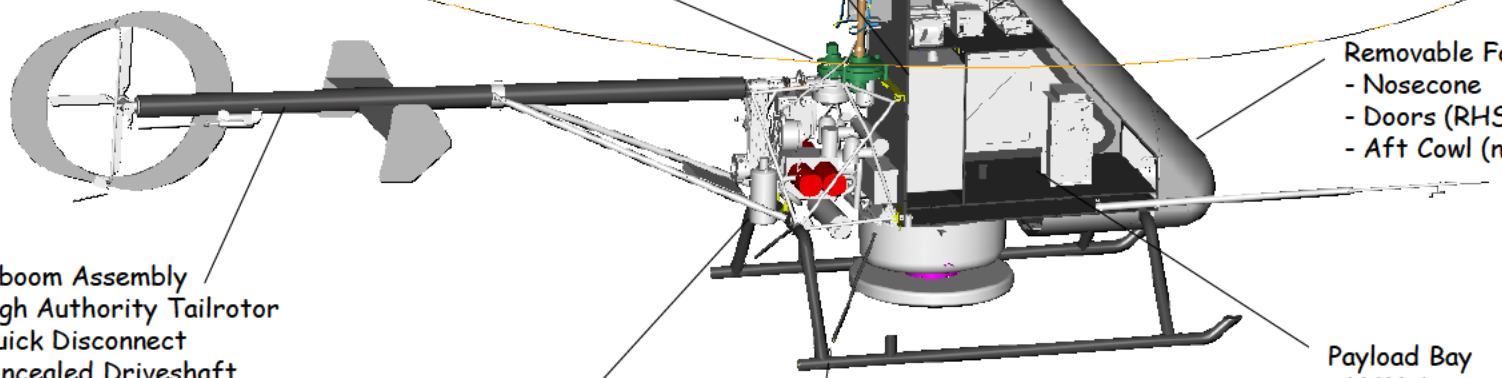


- PC/104 processing suite
  - 166-266 MHz Pentium
  - Ethernet
  - Analog conversion
  - Anti-alias filtering
  - Discrete signal conditioning
  - Spare serial ports
  - PWM Conversion
  - Power supply
  - Rugged “CanTainer”

- Navigation Sensor Unit
  - Turnkey IMU/GPS
  - ~216 in3
  - Man-rated
  - Embedded air data
  - $60k


- Freewave RF Modems
  - 200-400 & (b) (3), 10 U.S.C. § 130 MHz
  - <= 115 kbps
  - 20 nmi range (with amp)
  - FHSS
  - Unique addressing for security

# Configuration



Main Gearbox
- Multi-V Belt Drive
- Tailrotor Driveshaft Takeoff
- Prov'ns for Rotor Brake

Fuel System
- Dual Electric Pumps
- Flexible Bladder
- Foam Baffling

Main Rotor
- Teetering Hub
- Composite Blades

Avionics Deck
- Nav Sensor
- Flight Computer
- Flight Control Servos

Removable Fairings
- Nosecone
- Doors (RHS not shown)
- Aft Cowl (not shown)

Tailboom Assembly
- High Authority Tailrotor
- Quick Disconnect
- Concealed Driveshaft
- Tailrotor Servo

Rotax 914 Engine
- Turbocharged
- 100HP to 16K'
- Liquid Cooled

Undercarriage
- 7" Clearance to Notional Payload
- 3G Vert, 2G Run-on Landing
- Ground Handling Wheels

Payload Bay
- UAV Avionics Rack
- Payload Processors (not shown)
- Belly Mount Payload

# Ground Control Station

- Hardware implementation based on field-proven DDE design
- Complete ground control software suite
  - » flight systems controls and displays
  - » data acquisition recording and file management
  - » mission management tools
- User-friendly interface permits safe employment by low-time operators
- Modular design permits rapid incorporation of specialized interfaces.
- Telemetry capture tools integrated with complete postflight data analysis environment.
- Flight simulator for training & mission plan checkout