INTRODUCING OUTLAW ER

- Affordable
- Easily Deployable
- Manual Or Auto Piloted
- Numerous Payload Options
- Expandable Capabilities

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Systems Engineer
Outlaw ER First Flight

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Outlaw ER Test Flights
Why Outlaw ER?

✓ Griffon’s customers need:
  • Much longer endurance….. (Extended Range – “ER”)
  • More payload weight/volume
  • Easier payload access/integration
  • Power generation
  • Expand the proven and qualified MQM-170A Outlaw systems and certifications

✓ Offer range and endurance to fully utilize the Outlaw’s satellite Command and Control (C2) link

✓ Offer more capability without disrupting Environmental, Safety, Frequency, and Reliability documentation in place at test and training ranges.

✓ Continue to offer the industry’s most cost effective unmanned aircraft systems and Flight Services.
Boomer… Step to ER

Outlaw ER

Outlaw Boomer
What is Outlaw ER?

✓ A flight-proven unmanned aircraft / surrogate UAV target based on proven systems that have flown thousands of air defense training and payload test missions.

✓ Low-cost, tactical size, payload flexibility, 6-9 hour endurance, and multi-mission flexibility make it an extremely versatile tool for Test and Evaluation.

✓ Multi-mission solution for gun/missile tracking and live fire, payload test /development, ISR training, sensor and weapon development, and UAV system research and development.

✓ Griffon Aerospace is the U.S. Army’s Target Management Office and the U.S. Navy’s Prime Contractor for Outlaw design, production, and flight operations.
Missions Commonly Supported

- Systems/Subsystem Research and Development
- Systems Test and Evaluation
- Surrogate UAS Training
- Tracking and Engagement
- Range Surveillance / Debris Observation
- UAV Payload Development Flight Ops
- Long Endurance Shipboard Defense Engagements
**AIRCRAFT CONFIGURATION:** High wing, boomed V-tail monoplane, pusher engine configuration

**FUSELAGE LENGTH:** 9.18 ft / 2.8 m

**WING SPAN:** 15.1 ft / 4.84 m

**PAYLOAD BAY VOLUME:** 1.9 ft³ / .054 m³

**MAX HEIGHT IN PAYLOAD BAY:** 1 ft / .3 m

**GROSS WEIGHT:** 175 lbs / 79 kg

**EMPTY WEIGHT:** 98 lbs / 34.5 kg

**STRUCTURAL LIMIT LOADS:** +/- 8 g’s

**STRUCTURAL LIMIT VELOCITY:** 150 mph

**POWERPLANT:** 16 HP, 2 cylinder 2-stroke, air-cooled engine
## Performance

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard Outlaw</th>
<th>ER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross T.O. Weight (lb/kg)</td>
<td>120/54.4</td>
<td>175/79</td>
</tr>
<tr>
<td>Empty Weight (lb/kg)</td>
<td>76/34.5</td>
<td>98/34.5</td>
</tr>
<tr>
<td>Max Fuel Weight (lb/kg)</td>
<td>19/8.6 (3 gal)</td>
<td>56/25.4 (9 gal)</td>
</tr>
<tr>
<td>Payload at Max Fuel (lb/kg)</td>
<td>25/11.3</td>
<td>21/9.5</td>
</tr>
<tr>
<td>Cruise Speed 75% power (knts)</td>
<td>80</td>
<td>75</td>
</tr>
<tr>
<td>Max Speed 100% power (knts)</td>
<td>108</td>
<td>98</td>
</tr>
<tr>
<td>Controllable Slow Flight (1.15 Stall) (knts)</td>
<td>52</td>
<td>60</td>
</tr>
<tr>
<td>Stall Speed (knts)</td>
<td>45</td>
<td>48</td>
</tr>
<tr>
<td>Speed for Max Endurance (knts)</td>
<td>64</td>
<td>68</td>
</tr>
<tr>
<td>Maximum Endurance (hrs)</td>
<td>2.5</td>
<td>6-9</td>
</tr>
<tr>
<td>Maximum Range (nautical miles)</td>
<td>160</td>
<td>594</td>
</tr>
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Control System

BEYOND VISUAL RANGE (BVR) AUTOPilot SYSTEM

• Autonomous execution of pre-planned missions through waypoints and altitudes.
• State-of-the-art solid state acceleration and GPS position sensors and works with a laptop based ground station to provide mission execution and aircraft health and status data.
• Real-time waypoint and mission redirects are performed via the RF data link
• A 225 to 400 Mhz UHF transceiver C2 link with a transmit power adequate for 25-30 kilometer missions.
• Low cost satellite C2 link for very long range missions.

Mechanical Data
Dimensions: 4.8 inches (") x 2.4” x 1.5”
Weight: 7.5 ounces
Power: 8 to 20 VDC; 3.6 watts at 12 VDC nominal

Capabilities
• Multiple Waypoints (100) Capable
• Integrated 6-axis IMU
• 6DOF Simulation Support
• Integrated GPS Receiver
• PWM-Based Servo Command Outputs
• Real-Time Waypoint Route Editing
BVR GCS

- BVR ground control station consists of a laptop, a communications control module, and a UHF transceiver.
- Provides pre-mission planning, mission monitoring, and real-time mission redirects.
- Mission waypoints are displayed and edited. The real-time mission data is stored and available for post-mission display and processing.
- BVR flights out to a range of 25 KM assuming minimal ground obstructions.
- Outlaw ground station is easy to use, compact, and extensively used by other UAVs.
EO/IR GIMBALED SENSORS

- Piccolo autopilots offer standard interfaces to a variety of gimbaled camera systems.
- Griffon owns and operates TASE retract gimbals.
- Outlaw supported Marine VideoScout training by serving as a surrogate Shadow UAV.
- Stabilized and target tracking.
- JF-12 video downlinks available.
Standard ISR Payloads

Onboard Video Processing
• Provides onboard gimbal processing and pointing.
• Superimposes metadata on video feed.
• Image stabilization.
• Provides feed to video downlink transmitter.

Video Downlink
• Analog video transmitters (L, S, and C).
• Different transmit power levels.
• Digital video downlinks available.
Transponders
- Standard Mode C IFF.
- 150 Watt pulse.
- Squawk code changeable in flight.

Satellite C2 Datalink Modem
- Offers unlimited range for control link.
- Low speed command link.
Standard RPVT Payloads

INFRARED (IR) ENHANCER
- Generates IR signature per STINGER/U.S. Army requirements.
- Engagements from directly aft to nearly nose on (~300 degree).

RADAR AND ACCOUSTIC SCORING
- Realtime round or missile scoring. Radar Scalar or Acoustic Vector

MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM (MILES)
- Eight (8) state of the art laser sensors
- Optimally located for reliable detection from laser training weapons.
- Functions with on-board smoke system to provide visual hit or miss.

SMOKE GENERATOR
- Interfaces with the transmitter to provide smoke when commanded.
- Interfaces with the MILES laser training system.
- Provides a minimum of 10 minutes of smoke visible to 3000 meters.

RADAR REFLECTOR CORNER CUBES
- Metal corner cubes added to enhance RF signature.
- Cubes of different sizes to provide desired radar signature.
Ground Support Equipment

PNEUMATIC LAUNCHER

- Zero Length Pneumatic Launcher
- High pressure air storage bottles provide launch energy
- Reliably supports high density altitude operations
- Can be towed behind commercial or military vehicles
- Designed to provide easy access to the engine and vital aircraft system
- Designed to accommodate optional landing gear equipped RPVTs

SHIPBOARD LAUNCH AND RECOVERY IN DEVELOPMENT
MISSION OPS TEAMS

• Mission Lead works directly with the field commander to achieve training objectives.
• Pilots present the aircraft to assure maximum probability of engagement success.
• 3 people – for 1 target in the air at a time.
• 4 people – for 2 targets flying simultaneously.
• 5-6 people – for 24 hour operations.
• All pilots experienced flying RPVTs, UAVs, and RC aircraft with a minimum of 2-5 years experience.
Ready to Serve

Serving You... Anywhere, Anytime

- The equipment and pilots are prepared for the conditions.
- Outlaw pilots are certified in night flight and high altitude operations to offer realistic threat engagements - anywhere, anytime.
Surrogate UAV Services

Now....

- UAV Threat Simulation
- Low Cost Sensor Development
- ISR Training Surrogate
- Range Debris Inspection
- UAV Fire Support Training
- What’s your problem?