Micro Unmanned Aerial Vehicle

With Autonomous Flight and Navigation Capabilities

and Modular Payloads

RECONNAISSANCE  SURVEILLANCE  SEARCH AND RESCUE  INTELLIGENCE  INSPECTION
AIRROBOT

is a new Micro Unmanned Aerial Vehicle (micro UAV) with autonomous flight and navigation capabilities and modular payloads for use in:

■ Reconnaissance
■ Surveillance
■ Search and Rescue
■ Intelligence
■ Documentation
■ Inspection

The AIRROBOT can go where no other unit can go, providing vital real time information from the air or the ground, keeping personnel out of harms way at the same time.

With the AIRROBOT a new dimension in operational effectiveness and situational awareness is now available to:

■ Search and Rescue Teams
■ Firefighters
■ Law Enforcement
■ Military
■ Special Operation Forces
The AIRROBOT offers tremendous reconnaissance, surveillance, and intelligence capabilities. It provides constant airborne imaging or data transmission while hovering and flying or from the ground while perching. At the same time it keeps personnel out of harms way.

With the AIRROBOT’s unique autonomous self-positioning and self-stabilizing flight management processor, non-pilot operators can safely operate the AIRROBOT. It is lightweight and ready to deploy within minutes by one operator. With vertical take off and landing capabilities there are no limitations as where to use the unit, even in confined or complex terrain. Almost silent operation avoids escalation of critical situations as well as enabling the unit to be used for stealth surveillance.

Affordable, responsive, easy to operate, simple to learn and use, providing forward observer presence without placing the operator at risk. Due to its interchangeable payload it can be used for a wide variety of applications:

- Day/night surveillance/reconnaissance/documentation
- Hover and stare, perch and stare operations
- Security/early warning
- Inspection of critical assets like bridges
- Remote detection of hazardous/radio active materials
- Transport of small items like walky talkies for search and rescue
FLYING PLATFORM AR 100

The flying platform AR 100 is a vertical take-off and landing autonomous micro UAV. Its unique technology allows for fully autonomous stable “hands-off”, “hover and stare” operation using GPS or optical position lock. The optical positioning system memorizes the underlying area and keeps the unit in position even in conditions where a GPS signal is not accessible.

The AR 100 can be controlled by the operator using the life video feed. The unit does not have to be in sight, this way the unit is flown like the operator is sitting in it. This also opens the possibility for remote landing and launch. Used as a ground sensor the AR 100 still retains the ability to take-off and fly to another location, or to follow something of interest that is moving.

The unit is further stabilized with a unique combination of gyroscopic, barometric and magnetic sensors. The AR 100 will maintain its position, direction and flight altitude without operator interference. It is safe to operate at all times. When the unit does not receive any commands it will simply stay in position - even under windy conditions. A non-pilot operator can achieve safe operation without the skills associated with a pilot.

The AR 100 has the ability to move in all directions including sideways and backwards. The electrical propulsion makes the AR100 almost silent to operate. Batteries can be exchanged in a snap to extend the operation time. All moving parts are protected by a ring, which avoids damage to the rotors in case of an unintended collision with an obstacle.
A non-pilot operator can achieve safe operation without the skills associated with a pilot.

### KEY FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Auto Position</strong></td>
<td>GPS and optical lock</td>
</tr>
<tr>
<td><strong>Auto Stabilization</strong></td>
<td>altitude and direction with barometric-, magnetic-, gyroscopic sensors</td>
</tr>
<tr>
<td><strong>Electrical Propulsion</strong></td>
<td>4 maintenance-free, brushless and gearless motors running at 2000-rpm maximum for almost silent operation</td>
</tr>
<tr>
<td><strong>Max Ceiling</strong></td>
<td>3000 ft</td>
</tr>
<tr>
<td><strong>Service Ceiling</strong></td>
<td>450 ft</td>
</tr>
<tr>
<td><strong>Endurance</strong></td>
<td>&lt; 20 min</td>
</tr>
<tr>
<td><strong>Max Payload</strong></td>
<td>0.5 lbs</td>
</tr>
<tr>
<td><strong>Payloads</strong></td>
<td>User interchangeable without tools, stepless tilt mechanism allows for 100 degree remote controlled tilt</td>
</tr>
<tr>
<td><strong>Deployable Radius</strong></td>
<td>1800 ft (limited by video signal)</td>
</tr>
<tr>
<td><strong>Environmental Conditions</strong></td>
<td>Sealed electronics and motors capable of operation in rain, salt, fog, sand, dust</td>
</tr>
<tr>
<td><strong>Max Wind Load</strong></td>
<td>4 m/s</td>
</tr>
<tr>
<td><strong>Max Airspeed</strong></td>
<td>25 mph</td>
</tr>
<tr>
<td><strong>Launch/Recovery</strong></td>
<td>Vertical take off, landing and recovery</td>
</tr>
<tr>
<td><strong>Autonomous Landing</strong></td>
<td>When battery limit is reached or radio communication is lost</td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td>Lithium Polymer 14.2 V 2.05 A, Recharging time 1 h 15 min</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td>30°F → 115°F, 100% humidity</td>
</tr>
<tr>
<td><strong>Gross Weight</strong></td>
<td>2 lbs</td>
</tr>
<tr>
<td><strong>Diameter</strong></td>
<td>40 inches</td>
</tr>
<tr>
<td><strong>Receiver</strong></td>
<td>HF radio transmission</td>
</tr>
</tbody>
</table>
PAYLOADS

The modular payload concept greatly extends the range of applications for the AIRROBOT. From constant airborne video imaging over IR sensors up to measurement and detection of hazardous and radio active materials, the AIRROBOT will accommodate the appropriate sensors. All payloads can be tilted remote controlled up to 100 degrees. Cameras can look in all directions including straight down. The operator can change all payloads without tools within minutes.

AVAILABLE PAYLOADS

Daylight color video camera
Resolution 480 x 640 px
Frame Rate: 25 fps PAL, 30 fps NTSC
Angle of view 70 degrees
The daylight video camera provides real time video feed to the ground station or video glasses. Video can be recorded for documentation with the optional documentation software or external device. The optional software package also allows for capture of still images out of the video feed.

Dawn/ low light black and white camera
Black and white imaging
Resolution 570 lines
Frame Rate 25 fps
Sensitivity 0.0003 lux
Angle of view 90 degrees
For surveillance, reconnaissance in low light conditions with live video feed and optional recording for documentation purpose using documentation software. The optional software package also allows for capture of still images out of the video feed.

8 MP Still Camera
Color still images 2448 x 3264 px
Sensitivity up to 400 ASA
Remote controlled 3x Zoom
Provides high-resolution still images. Images are stored on memory card in the payload. Camera trigger through documentation software based on video feed used as preview.

Infrared camera
IR thermal image camera
320 x 240 pixel array
Response 7-14 µm (filter bandwith)
Thermal sensitivity < 50 mK
Refresh rate real-time 30 Hz
Start-up time ~ 4 sec.
Contrast/brightness advanced image processing
Saturation temperature 1100° F (600° C) +/- 10 % w,
Automatic electronic iris
Optic focal lenght 11,6 mm, field of view ~ 50° x 37°
Focus method manual, temperature stabilized
For detection of human activity up to 330 feet

Affordable, responsive, easy to operate, simple to learn and use, providing forward observer presence without placing the operator at risk.
GROUND STATIONS

The ground stations contain everything to control the AIRROBOT and to communicate with cameras and sensors installed on the AIRROBOT. Two versions of the ground station are available:

1. Ground Station Standard
   With the ground station all functions of the AIRROBOT can be controlled and overseen from a safe location. Battery status and GPS positions are constantly available. The payloads can be tilted remote controlled.
   Contains:
   - Radio remote control for flight operation
   - Video receiver security link with 4-fold diversity receiver
   - Video goggles
   - Charger and battery for video receiver
   - Antenna stand
   - Transportation case for AR100 and components

2. Ground Station with Documentation
   The station with documentation capacities in addition allows for recording of video footage including documentation of time and GPS position. Further it enables the operator to capture still images out of the video feed. It also features an orientation by point of the compass and a “home” guidance system, which makes it easy for the operator to steer the unit back to the original location when out of sight.
   Contains:
   - Radio remote control for flight operation
   - Video receiver security link with 4-fold diversity receiver
   - Video antenna
   - Charger and battery for video receiver
   - Laptop computer
   - AIRROBOT documentation software
   - Antenna stand
   - Transportation case for AR100 and components
The windows based documentation software displays all relevant data and records all transmitted video footage. All data is filed within a database and linked to projects which contain time, date and GPS location of the recording.

The software also monitors battery status, flight data, distance and GPS position. For better orientation during flight under "out of sight" conditions it has a display of flight direction by point of compass. A backtrack system makes it easy for the operator to steer the unit back to the original location.

The user interface is straight forward, all information and controls are available from within one window.

**Software Features**

- Live video display (including full screen)
- Project-image preview tab
- Battery status AIRROBOT
- Battery status laptop computer
- GPS-signal strength including readiness
- GPS data
- Date and time stamp
- Compass
- Backtrack

The software can be used in conjunction with the laptop computer as part of the base station with documentation or it can be installed on a windows computer system which is already mounted in a command center or vehicle.
Flight platform only. Without payloads and tilt mechanism. Does not include remote controller, batteries, charger and payloads.

Required for operation. Please order separate - not part of AR100, Ground stations or complete sets AR191 and AR192.

AR005 Payload tilt mechanism

Required for attachment of payloads

AR003 Dawn/ Low light Camera
Constant airborne b/w video feed under low light conditions

AR002 Daylight video camera
Constant airborne color video feed under daylight conditions

AR006 8.0 MP still camera
Hi res still images stored on card in payload and constant video feed

AR004 IR camera
Thermal imaging - detection of human activity in up to 330 ft distance from unit

AR016 Flight battery LIPO 2A 14.8V

AR014 Charing station for LIPO batteries

AR103 Ground station standard
Flight control with video goggles

AR104 Ground station documentation
Flight control with laptop computer and documentation

AR100 Flying platform

AR192 Set 1
AR191 Set 2

AR101 Flight control with video goggles

AR102 Flight control and documentation based on existing computer equipment

AR103 Custom solutions for integration into command centers and vehicles
Flight control and documentation based on existing computer equipment
AIRROBOT

Headquarters Germany
Airrobot GmbH & Co KG
Werler Strasse 4-8
59755 Arnsberg
Tel. +49.2932.547740
Fax. +49.2932.547745
www.airrobot.de
service@airrobot.de

Managing Director
Burkhard Wiggerich

U.S. Subsidiary
Airrobot US, Inc.
169 8th Avenue 5F
New York, NY 10011
Tel. 347.332.6974
Fax. 347.521.1502
www.airrobot-us.com

President
Thomas Meyer

All technical data is subject to change without notice. Copyright © 2007 Airrobot US, Inc. All rights reserved. No reproduction or reprint in part or full without prior written consent.