Troll MIMO Radio and Dual-Polarized Directional Airborne and Ground Antennas

- Maximize Range and Data Throughput
- Transmit and Receive Capability in a Single Channel
- Rapidly Deploy Air-to-Ground Data Links in the Unlicensed ISM bands

Troll’s MIMO (Multiple Input, Multiple Output) IP packet-based data link is based on Time Division Multiple Access (TDMA), a popular channel sharing method used by cellular network providers. The radios can transmit and receive on a single frequency band 5MHz to 20MHz of bandwidth. This eliminates the cost and complexity associated with systems that require separate transmit and receive frequencies to support bidirectional links.

To improve performance in the aircraft, Troll manufactures dual-polarized versions of the SkyLink Mini II and has modified the popular SkyLink HD platform to support higher-gain, and up to four MIMO transceivers. Orthogonally polarized antennas are the only way to realize the high-bit-rates offered by MIMO (Multiple Input Multiple Output) communications systems.

On the ground, Troll manufactures a variety of high-gain and ultra-high-gain MIMO antennas that can accommodate as many as four MIMO signal streams simultaneously. Currently, Troll Systems provides fully integrated MIMO systems (transceivers, switching power amplifiers, tracking airborne and ground antennas). Troll’s MIMO solutions offer a fast and affordable way to deploy a high-speed, air-to-ground IP networks that feature:

- High data rates (up to 40 Mbps)
- Long-range options
- Resistance to interference
- Easy deployment in the unlicensed ISM bands
### Dual-Polarized MIMO Antennas

**Bidirectional Ethernet in a Single Frequency Band**

**A60 SkyLink Bidirectional Antenna Physical Characteristics**
- **Control:** Ethernet or RS-485/422/432
- **Input Voltage:** 18-32 VDC (supplied by Network LinkBox)
- **Input Current:** 0.5 nominal, 2.0A max with external radios
- **Communication Output:** ASI or Ethernet
- **Control Device:** Troll Network LinkBox with Cyclops application
- **Control Interface:** Third party interfaces via open source protocol
- **Antenna Type:** Horn
- **Polarization:** Dual-polarized horizontal, vertical, RHC and LHC

### Airborne Mini II Antenna

<table>
<thead>
<tr>
<th>Type</th>
<th>L Band</th>
<th>S Band</th>
<th>Lower C</th>
<th>Upper C</th>
<th>Ku Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Band:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beamwidth Az/El (-3dB):</td>
<td>1.8 GHz</td>
<td>2.3 GHz</td>
<td>4.4 GHz</td>
<td>6.5 GHz</td>
<td>14 GHz</td>
</tr>
<tr>
<td>Antenna Gain:</td>
<td>10 dBi</td>
<td>10 dBi</td>
<td>13 dBi</td>
<td>15 dBi</td>
<td>18 dBi</td>
</tr>
<tr>
<td>Polarization:</td>
<td>Linear</td>
<td>Linear</td>
<td>Circ/Linear</td>
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</tbody>
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- **Azimuth Steering:** Continuous rotation, 100 ° per second
- **Elevation Steering:** +/- 22 ° per second
- **Airborne Characteristics:** VNE > 200 Knots - drag @ 120 knots = 107 lbs

### Environmental
- **Operating Temperature:** -40 to + 55 ° C
- **Certification:** Pending

### Mechanical
- **Dimensions:** 23” W x 23” L x 10.5 H
- **Weight:** 35 lbs (excluding mounting bracket)

### Ground Antenna Gain

<table>
<thead>
<tr>
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<tr>
<td>12 dB</td>
<td>13 dBi</td>
<td>16 dBi</td>
<td>17 dB</td>
<td>18 dB</td>
<td>20 dB</td>
<td></td>
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**Specialized MMO Antennas for:**
- High-gain Airborne Applications in L and S Band
- Fixed-wing Aircraft
- Rotor-wing Aircraft
- Unmanned vehicles
- Maritime vehicles
- Fixed ground sites
- Mobile ground vehicles