Ball Aerospace’s industry-leading line of electronically steerable antennas (ESAs) provide reliable, secure and high-speed communications across networks, frequencies and platforms. Our antenna solutions deliver unmatched flexibility to meet any use case, enabling fully customizable and affordable ESAs in Ku frequency bands for government, military and commercial markets.

ESA technology will transform how we connect and share information across the world. With our scale, experience and resources along with our global manufacturing partners, we are bringing the promise of ESA technology to the market today.
Architecture Overview

Ball's electronically steered Ku-Band phased array antennas feature our innovative subarray antenna architecture. The subarray is an environmentally-sealed ESA building block, assembled in volume to minimize cost and optimize flexibility for larger terminals. A terminal's transmit and receive antenna sizes are independently optimized by tiling multiple subarrays to meet the use case requirements. The subarrays support both military and commercial use cases, including in-flight connectivity (IFC), communications on the move (COTM) and enterprise.

Durable & Dependable
- Subarrays are an environmentally-sealed assembly, protecting all electronics

Affordable
- Designed for existing high-volume manufacturing processes
- Use highly-integrated commercial semiconductor devices and circuit boards
- Designed with integrated radome to reduce system cost and improve performance

Interoperable / Future-Proof
- Antenna terminals are network and modem agnostic to support access to multiple networks
- ESA fast beam update rates easily support LEO satellite tracking
- Software-defined antenna enables our architecture to meet the network needs of today and tomorrow

ESA: Proven & Ready

Ball has assembled and tested multiple ESA terminals, demonstrating the performance and scalability of the subarray design. Terminals have been demonstrated on geostationary orbit (GEO) and low-Earth orbit (LEO) networks, showcasing the flexibility and robust communication capabilities of our terminals to maintain links under highly dynamic maneuvers.

Ball ESA terminals are ready today to meet your SATCOM needs. The company is actively ramping up our production of subarrays. We offer a flexible partnership model that capitalizes on each organizations' expertise, whether delivering full terminal solutions or just the antenna.

- **ESCAPABILITIES**
  - Frequency
    - Transmit: 13.75* – 14.50 GHz
    - Receive: 10.70 – 12.75 GHz
  - Polarization
    - V/H/RHCP/LHCP (software switchable)
  - Axial Ratio
    - < 2.0 dB (software controlled)
  - Coverage
    - Azimuth: 360°
    - Elevation: 10° to 90°
  - Beam Update Rate
    - < 1ms (any position, any polarization)
  - Interfaces
    - Open AMIP / Custom
  - Dual Beam
    - Receive capable

  *Extendable down to 12.75

<table>
<thead>
<tr>
<th>ANTENNA CONFIGURATION (SUBARRAYS)</th>
<th>ESTIMATE ANTENNA PERFORMANCE</th>
<th>APERTURE SIZE</th>
<th>WEIGHT (SUBARRAYS ONLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tx Rx</td>
<td>EIRP (dBW)</td>
<td>G/T (dB/K)</td>
<td>Tx (in)</td>
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