ES93B-1

9.3 Meter ESA

The Andrew 9.3 M earth station antenna system incorporates features and versatility unmatched in its class. The 9.3 M is capable of operation on all major satellite systems. Operation in C-band linear and circular, cross and co-polarization are possible with the proper selection of feed and combiner systems.

As the first 9.3 M antenna ever commissioned as a ‘B’ station, fully compliant and meeting and exceeding Intelsat® and U.S. FCC requirements, Andrew 9.3 meter antenna is a proven performer. The system’s four-port circularly polarized combining network is state of the art. The elevation-over-azimuth mount enables horizon-to-horizon coverage from any worldwide location.

A computer optimized Gregorian dual-reflector system, together with precision stretch-formed reflector panel segments using close-tolerance manufacturing techniques, results in exceptional high gain, superior efficiency, and closely controlled pattern characteristics.

Features:
- High gain. Excellent pattern characteristics
- Rugged aluminum and steel construction
- Large equipment enclosure with doors for hub mounting electronic systems.
Electrical Performance Meets or Exceeds:

- U.S. FCC Regulation 25.209 for mandatory pattern requirements for 2 degree satellite spacing.
- Russian Homologation Certificate # OC/1-AO-136
- Meets or exceeds Intelsat requirements for standard B, F-3

Design Standards

**Material/Finish Reflector:** Aluminum, conversion coated, painted with highly diffusive white paint

**Ground Mount:** Hot-dipped galvanized steel, per ASTM-A123 for structural steel

**Hardware:**

Sizes < 3/8 in (9.5 mm), stainless steel, passivated per MIL-F-14072-E300
Sizes > 3/8 in (9.5 mm), hot-dipped galvanized steel per ASTM-A123

Mechanical Specifications

**Optics Type:** Dual-reflector, Gregorian

**Reflector Material:** Precision formed aluminum

**Reflector Segments:** 20

**Hub/Enclosure Dimensions:**
- Diameter 84.00" (2.31)
- Depth 46.00" (1.17)

**Mount Type:** Tripod mount

**Antenna Pointing Range,**

<table>
<thead>
<tr>
<th>Course/(Continuous)</th>
<th>Elevation 0 (85)</th>
<th>Azimuth 180 (120)</th>
<th>Polarization 360 (180)</th>
</tr>
</thead>
</table>

Environmental Conditions

**Operating Temperature:** -40°F to 125°F (-40° to 50°C)

**Wind Loading, Survival:** Antenna, with or without motor drives will survive 125 mph (200 km/h) winds while in a stationary position

**Wind Loading, Operational:** Antenna with motor drives or fixed antennas can be repositioned in winds of 45 mph (72 km/h), with gusts up to 65 mph (105 km/h)

**Seismic (Earthquakes):** 1 G vertical and horizontal acceleration; equivalent to a Richter magnitude 8.3 and grade 11 on the modified Mercalli scale

**Rain:** 4 in (102 mm) per hour

**Solar Radiation:** 360 BTU/hr/ft² (1135 W/m²)

**Relative Humidity:** 100

**Shock and Vibration:** As encountered by commercial air, rail and truck shipment

**Atmospheric Conditions:** As encountered in a moderately corrosive coastal and industrial area

Dimensional Drawings

**Tripod mount, Top View:**
Tripod mount, Side View:
Energy Density Calculation
Andrew Earth Station Antennas - ES93B-1 9.3 Meter ESA

| A: | Vertex to aperture plane of main reflector | 5.14 ft (1.57 m) |
| B: | Aperture plane of main reflector to aperture plane of subreflector | 4.79 ft (1.46 m) |
| C: | Diameter of main reflector | 31.1 ft (9.48 m) |
| D: | Diameter of subreflector | 4 ft (1.22 m) |
| E: | Diameter of feed horn | 1.25 ft (0.381 m) |
| F: | Distance from feed aperture to aperture plane of subreflector | 2.36 ft (0.72 m) |
| G: | Distance from aperture plane of main reflector to feed horn aperture | 2.43 ft (0.74 m) |
| H: | Angle from bore sight to subreflector edge | 29.5° |

Earth Station Antenna and Feed System Specifications

ES93B-1 9.3 M Intelsat(R_) Standard B Compliant transmit/receive Earth Station Antenna.

Nominal C Band G/T Antenna Performance

<table>
<thead>
<tr>
<th>LNA/LNB Noise Temperature:</th>
<th>65 K</th>
<th>45 K</th>
<th>30 K</th>
</tr>
</thead>
<tbody>
<tr>
<td>G/T @ 10 Degrees Elevation:</td>
<td>30 dB/K</td>
<td>30.9 dB/K</td>
<td>31.8 dB/K</td>
</tr>
</tbody>
</table>

Beamwidth, midband, degrees

<table>
<thead>
<tr>
<th>C-Band Rx</th>
<th>C-Band Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.51°</td>
<td>0.34°</td>
</tr>
</tbody>
</table>

4 Port C Band Transmit / Receive Feed Systems

Feed Part Numbers: 4CPNC-9B-206

<table>
<thead>
<tr>
<th>Operation</th>
<th>Transmit / Receive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polarization</td>
<td>Circular</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency, GHz</th>
<th>Rx 3.625-4.200</th>
<th>Tx 5.850-6.425</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion Loss dB Rx (Tx)</td>
<td>0.22 (0.22)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port-to-Port Isolation, dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rx to Rx</td>
</tr>
<tr>
<td>Tx to Rx</td>
</tr>
</tbody>
</table>

Interface Flange

Tx Port: Plated Brass, CPR137G
Rx Port: Brass, CPR229G

Gain @ feed output flange (dBi ± 0.2 dB)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6250 GHz</td>
<td>50.0</td>
</tr>
<tr>
<td>4.0000 GHz</td>
<td>50.9</td>
</tr>
<tr>
<td>4.2000 GHz</td>
<td>51.3</td>
</tr>
<tr>
<td>5.8500 GHz</td>
<td>53.1</td>
</tr>
<tr>
<td>6.1750 GHz</td>
<td>53.7</td>
</tr>
<tr>
<td>6.4250 GHz</td>
<td>54.1</td>
</tr>
</tbody>
</table>

Antenna Noise Temperature - clear sky conditions, at 68°F (20°C)

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°</td>
<td>37</td>
</tr>
<tr>
<td>30°</td>
<td>27</td>
</tr>
</tbody>
</table>
Andrew Earth Station Antennas - ES93B-1 9.3 Meter ESA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>50° elevation</td>
<td>25</td>
</tr>
<tr>
<td>Tx Power Capacity</td>
<td>2500 W</td>
</tr>
<tr>
<td>Maximum Pressurization</td>
<td>0.50 psi</td>
</tr>
</tbody>
</table>

**Typical Antenna Patterns - C Band**

4 GHz Azimuth Rx @ 3 degrees
4 GHz Elevation Rx @ 3 degrees

6.3 GHz Azimuth Tx @ 3 degrees
6.3 GHz Elevation Tx @ 3 degrees
**Motorization and Antenna Controllers**

The variable speed motor kits include 3 HP Az and El motors, line filters and mounting kits. The local motor controller provides electrical power distribution and local control of the motors at the antenna pedestal. The local motor controller is housed in an environmental protected enclosure that mounts to the side of the antenna pedestal. The hand held controller allows the operator or maintenance personnel to control the position the antenna and the feed polarization from the local motor controller.

The ACS100 automatically moves the antenna to the requested satellite position.

A jog switch is provided on the front panel to allow manual movement of the antenna. 40 satellite positions can be entered and stored in the ACS100 memory.

The ACS3000S-xx-93-xxx is an all-inclusive motorization and antenna controller package. Includes Outdoor Unit (ODU), Data Transmission Unit (DTU) and jack mounted gear motors. Can be run by customer-provided PC running a Web browser on a private local area network, an existing station monitor and control computer via serial interface, or the included Andrew handheld unit. Data transmission unit accepts external tracking signals supplied by either the customer or an optional tracking receiver. In addition to manual control, the ACS300S-() provides Andrew proprietary SmarTrack® and ephemeris data automated tracking with NORAD two Line or Intelsat® element sets.

Requires customer-provided PC. Beacon receiver (if required), ordered separately.

Typical weights and dimensions for ACS3000S products is: 48 in L x 43 in W x 56 in H, 275 lbs.
<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK93VS-208</td>
<td>Variable speed motorization kit. 0.5 deg/sec fast, Az/Ei. 0.05 deg/sec slow, Az/Ei</td>
<td>Power: 200-230 VAC, 3 phase 50/60 Hz. 4 conductor (3 ph Delta safety ground) or 5 conductor (3 ph WYE+safety ground.) Use with ACS100-100 controller</td>
</tr>
<tr>
<td>MK93VS-380</td>
<td>Variable speed motorization kit. 0.5 deg/sec fast, Az/Ei. 0.05 deg/sec slow, Az/Ei</td>
<td>Power: 380-460 VAC, 3 phase 50/60 Hz. 4 conductor (3 ph Delta safety ground) or 5 conductor (3 ph WYE+safety ground.) Use with ACS100-100 controller</td>
</tr>
<tr>
<td>ACS100-100</td>
<td>Antenna programmable control system. Incl: positioner, local motor controller, 100 ft control cable</td>
<td>265 VAC 50/60 Hz, 1 Ph. Use with MK(<em>)VS-(</em>) variable speed motorization packages.</td>
</tr>
<tr>
<td>ACS100-100</td>
<td>Antenna programmable control system. Incl: positioner, local motor controller, 100 ft control cable</td>
<td>265 VAC 50/60 Hz, 1 Ph. Use with MK(<em>)VS-(</em>) variable speed motorization packages.</td>
</tr>
<tr>
<td>ACS3000S-05-93-208</td>
<td>Antenna control system, StepTrack. Incl: ODU,DTU, jackmount gearmotors, handheld unit. 50m cable</td>
<td>Run by customer-provided PC running a Web browser installed on a private LAN, an existing station M&amp;C computer or the handheld unit. Beacon receiver ordered separately. 0.5 Fast/0.05 Slow Az/Ei. 200-230VAC/3Ph/50-60 Hz. 4 cond (3 ph Delta+ safety gnd) or 5 cond (3 ph WYE+ safety gnd)</td>
</tr>
<tr>
<td>ACS3000S-05-93-380</td>
<td>Antenna control system, StepTrack. Incl: ODU,DTU, jackmount gearmotors, handheld unit. 50m cable</td>
<td>Run by customer-provided PC running Web browser installed on a private LAN, an existing station M&amp;C computer or the handheld unit. Beacon receiver ordered separately. 0.5 Fast/0.05 Slow Az/Ei. 380-460 VAC/3Ph/50-60 Hz. 4 cond (3 ph Delta+ safety gnd) or 5 cond (3 ph WYE+ safety gnd)</td>
</tr>
<tr>
<td>ACS3000S-10-93-208</td>
<td>Antenna control system, StepTrack. Incl: ODU,DTU, jackmount gearmotors, handheld unit. 100m cable</td>
<td>Run by customer-provided PC running a Web browser installed on a private LAN, an existing station M&amp;C computer or the handheld unit. Beacon receiver ordered separately. 0.5 Fast/0.05 Slow Az/Ei. 200-230VAC/3Ph/50-60 Hz. 4 cond (3 ph Delta+ safety gnd) or 5 cond (3 ph WYE+ safety gnd)</td>
</tr>
<tr>
<td>ACS3000S-10-93-380</td>
<td>Antenna control system, StepTrack. Incl: ODU,DTU, jackmount gearmotors, handheld unit. 100m cable</td>
<td>Run by customer-provided PC running Web browser installed on a private LAN, an existing station M&amp;C computer or the handheld unit. Beacon receiver ordered separately. 0.5 Fast/0.05 Slow Az/Ei. 380-460 VAC/3Ph/50-60 Hz. 4 cond (3 ph Delta+ safety gnd) or 5 cond (3 ph WYE+ safety gnd)</td>
</tr>
<tr>
<td>ACS3000S-F2-93-208</td>
<td>Antenna control system, StepTrack. Incl: ODU,DTU, jackmount gearmotors, handheld unit. 200m fiber</td>
<td>Run by customer-provided PC running a Web browser installed on a private LAN, an existing station M&amp;C computer or the handheld unit. Beacon receiver ordered separately. 0.5 Fast/0.05 Slow Az/Ei. 200-230VAC/3Ph/50-60 Hz. 4 cond (3 ph Delta+ safety gnd) or 5 cond (3 ph WYE+ safety gnd)</td>
</tr>
<tr>
<td>ACS3000S-F2-93-380</td>
<td>Antenna control system, StepTrack. Incl: ODU,DTU, jackmount gearmotors, handheld unit. 200m fiber</td>
<td>Run by customer-provided PC running Web browser installed on a private LAN, an existing station M&amp;C computer or the handheld unit. Beacon receiver ordered separately. 0.5 Fast/0.05 Slow Az/Ei. 380-460 VAC/3Ph/50-60 Hz. 4 cond (3 ph Delta+ safety gnd) or 5 cond (3 ph WYE+ safety gnd)</td>
</tr>
</tbody>
</table>

**Cross and Polarization Axis Waveguide Kits**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2XAC-9</td>
<td>4-Port C-band polarization axis w/g kit. Enclosure to mount, Tx, 2 runs. 0.34 dB total insertion loss</td>
<td></td>
</tr>
<tr>
<td>2XPC-9B</td>
<td>4-Port C-band polarization axis w/g kit. Feed to enclosure, Tx. 2 runs. 0.42 dB total insertion loss</td>
<td></td>
</tr>
</tbody>
</table>
**Heating Options**

Antenna De-Icing is forced heated air. A sensor and controller unit automatically senses moisture and activates the system whenever the need for heating is determined.

Feed heating is available.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full reflector electric de-icing. Incl remote panel, controller and 100 ft</td>
<td><strong>WEC93R-208-100</strong></td>
</tr>
<tr>
<td>cabling</td>
<td></td>
</tr>
<tr>
<td>Full reflector and feed electric de-icing. Incl remote panel, controller</td>
<td><strong>WEC93RF-208-100</strong></td>
</tr>
<tr>
<td>and 100 ft cabling</td>
<td></td>
</tr>
<tr>
<td>Full reflector electric de-icing. Incl remote panel, controller and 100 ft</td>
<td><strong>WEC93R-380-100</strong></td>
</tr>
<tr>
<td>cabling</td>
<td></td>
</tr>
<tr>
<td>Full reflector and feed electric de-icing. Incl remote panel, controller</td>
<td><strong>WEC93RF-380-100</strong></td>
</tr>
<tr>
<td>and 100 ft cabling</td>
<td></td>
</tr>
<tr>
<td>Feed heater kit, C-band</td>
<td><strong>FH9A</strong></td>
</tr>
</tbody>
</table>

**Options**

Contact Sales for part number and pricing for your specific requirement.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubrication and Maintenance Kit</td>
<td>209906-2</td>
</tr>
<tr>
<td>Hub Heater Kit</td>
<td>HUBHTR-230</td>
</tr>
<tr>
<td>Emergency Hub Light Kit</td>
<td>EMRGYLT-115</td>
</tr>
<tr>
<td>Emergency Hub Light Kit</td>
<td>EMRGYLT-230</td>
</tr>
<tr>
<td>Hub Light Kit</td>
<td>HUBLT-115</td>
</tr>
<tr>
<td>Foundation Grounding Kit</td>
<td>ANTGND-9</td>
</tr>
<tr>
<td>Hub Light Kit</td>
<td>HUBLT-230</td>
</tr>
<tr>
<td>Lightning Rod Kit</td>
<td>LRK9</td>
</tr>
<tr>
<td>Obstacle Warning Light Kit</td>
<td>OBWRNLT-115</td>
</tr>
<tr>
<td>Obstacle Warning Light Kit</td>
<td>OBWRNLT-230</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>TK-MAN-LG</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>TK-MOT-LG</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>223711</td>
</tr>
<tr>
<td>Maintenance Ladder and Platform Kit</td>
<td>MANPL9</td>
</tr>
</tbody>
</table>

**Typical Slab and Pier Foundation Specifications**

<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Bearing Capacity</td>
<td>2000 lb/ft² (9764 kg/m²)</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>2940 lb (1339 kg)</td>
</tr>
<tr>
<td>Concrete Compressive Strength</td>
<td>3000 lb/in² (211 kg/cm²)</td>
</tr>
<tr>
<td>Foundation Length</td>
<td>19.5 ft (5.94 m)</td>
</tr>
<tr>
<td>Foundation Width</td>
<td>19.5 ft (5.94 m)</td>
</tr>
<tr>
<td>Foundation Depth</td>
<td>2.5 ft (0.76 m)</td>
</tr>
<tr>
<td>Foundation Concrete Volume</td>
<td>35.2 yd³ (27 m³)</td>
</tr>
<tr>
<td>Foundation Specification Drawing</td>
<td>37737</td>
</tr>
<tr>
<td>Typical Pier Foundation Drawing</td>
<td>240000</td>
</tr>
<tr>
<td>Typical Slab Foundation Drawing</td>
<td>240007</td>
</tr>
</tbody>
</table>

Note: Foundation specifications provided are for a typical design only. Certification of suitability for a particular installation by a professional engineer is required prior to its use for actual fabrication.
Shipping Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Net Weight</td>
<td>8000 lb (3629 kg)</td>
</tr>
<tr>
<td>Typical Shipping Weight</td>
<td>11154 lb (5059 kg)</td>
</tr>
<tr>
<td>Typical Shipping Volume</td>
<td>1280 ft³ (36.3 m³)</td>
</tr>
<tr>
<td>Shipping Container</td>
<td>Qty 1 per standard 40 ft land/sea container.</td>
</tr>
</tbody>
</table>

Note: Weights and dimensions may vary based upon actual equipment ordered and consolidation of parts. This information should be considered typical for antenna only.

Part numbers, designs and specifications provided are subject to change without notice.

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