
# Cobham Antenna Systems

## Microwave Antennas

### Specialist Antenna Design and Manufacture

### Antennas for Ground Control Centres

The most important thing we build is trust

Designed to the highest specification

Critical and efficient communications

Antennas used worldwide on all types of unmanned airborne vehicles and target drones

Control links and robotics

## Ground Control Centre Antennas

Airborne Platforms, UAVs, Ground Vehicles, Robots

## Sector, Multi Sector and Omni Antennas

Unmanned helicopter

### Sector

- Azimuth coverage from 30° to 210°
- Gain up to 20dBi
- Null-fill, electrical tilt and sidelobe suppression available

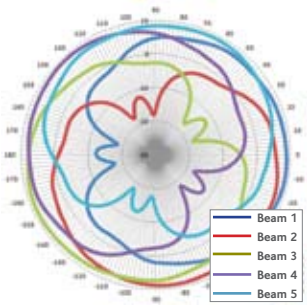
Sector antennas provide wide area coverage for military and security base station applications. They have clearly defined, wide, azimuth coverage, 30° to 210° in the horizontal plane with narrow elevation profiled vertical coverage.

**SA7-150-0.36V/1572 sector under test during development**

### Multi Sector

Multi Sector arrays - a multiple beam antenna in one housing - provide high gain wide area (up to 360°) and overhead coverage if required.

**MSA6-2.4V/1795: sector azimuth patterns show 9dBi peak gain, 120° beamwidth and high level of overlap**




### Omni-Directional

- Robust construction
- High gain, up to 10dBi
- Polarisation - circular or linear

An omni antenna radiates 360° in the horizontal plane with peak gain on or close to the horizon. All of our omnis are centre-fed making them ground-plane independent with stable radiation patterns across the band. High gain collinear omnis can be produced by stacking and feeding more elements. Sidelobes can be controlled and the elevation beam can be shaped to provide other features such as null-fill or electrical tilt. Collinear antennas are light weight with rigid glass fibre radomes and aluminium spigots for stable mounting.

## Sector Antennas

| Part Number | Frequency GHz | Gain dBi | Beamwidth Azimuth° | Beamwidth Elevation° | Polarisation | Dimensions mm | Connector | Photo + |
|---|---|---|---|---|---|---|---|---|
| SA7-150-0.36V/1572 | 0.34 - 0.37 | 6 | 173 | 35 | Vertical | 1090x386x3 | N(F) | above |
| SA13-60-0.9V/1462 | 0.90 - 0.93 | 13 | 73 | 16.5 | Vertical | 560x250x30 | N(F) | + |
| SA11-120-1.3V/1384 | 1.15 - 1.40 | 11 | 120 | 16 | Vertical | 870x95.6 Ø | N(F) | + |
| SA9-120-1.3V/1445 | 1.20 - 1.45 | 9 | 120 | 36 | Vertical | 490x95.6 Ø | N(M) | + |
| SA17-18V/417 | 1.71 - 1.88 | 17 | 70 | 9 | Vertical | 1204x140x21 | N(F) | |
| SA16-19V/230 | 1.85 - 1.99 | 16 | 75 | 10 | Vertical | 782x150x20 | N(F) | + |
| SA17-22V/555 | 2.00 - 2.30 | 17 | 65 | 8 | Vertical | 1140x150x14 | N(F) | + |
| SA12-110-2.4V/1480 | 2.00 - 2.70 | 12 | 112 | 17 | Vertical | 569x79 Ø | TNC(F) | + |

**SA13-60-0.9V/1462**

**SA11-120-1.3V/1384**

**SA9-120-1.3V/1445**

**SA16-19V/230**

**SA17-22V/555**



**SA12-110-2.4V/1480**

| Part Number | Frequency GHz | Gain dBi | Beamwidth Azimuth° | Beamwidth Elevation° | Polarisation | Dimensions mm | Connector | Photo + |
|---|---|---|---|---|---|---|---|---|
| SA16-60-25V/858 | 2.40 - 2.70 | 16 | 60 | 10 | Vertical | 725x130x11 | N(F) | + |
| SA16-60-35V/579 | 3.40 - 3.70 | 16 | 60 | 10 | Vertical | 474x88x9 | N(F) | + |
| SA17-60-4.7V/1419 | 4.40 - 5.00 | 17 | 55 | 8.5 | Vertical | 470x106x23 | N(F) | + |
| FPA10-4.7R/1564 | 4.40 - 5.00 | 9.5 | 54 | 58 | Right Circular | 10x84 Ø | TNC(F) | + |
| SA15-90-104V-D1/1124 | 10.10 - 10.65 | 15 | 84-87 | 7 | Vertical | 330x15x14 | N(F) | |
| SA17-13R/1077 | 13.40 - 14.00 | 17 | 75 | 6 | Right Circular | 220x50x11 | SMA(F) | + |

**SA16-60-25V/858**

**SA16-60-35V/579**

**SA17-60-4.7V/1419**

**FPA10-4.7R/1564**

**SA17-13R/1077**

# Sector, Multi Sector and Omni Antennas

Cranfield Aerospace prototype Boeing X-48B Blended Wing Body UAV, feature blade antennas

## Multi Sector Antennas

| Part Number | Frequency GHz | Gain dBi | Beamwidth Azimuth° | Elevation° | Polarisation | Dimensions mm | Connector | Photo + |
|---|---|---|---|---|---|---|---|---|
| MSA5-1400/1131 | 1.31 - 1.43 | 12 sector | 88 | 19 | Vertical | | | |
| | | 6.5 o/head | 57 | 56 | Right Circular | 743x197 Ø | N(F) | |
| MSA6-2.4V/1795 | 2.00 - 2.70 | 8 sector | 110 | 36 | Vertical | | | |
| | | 7 o/head | | | Right Circular | 300x155 Ø | SMA(F) x6 | + |
| MSA7-16-2350R/829 | 2.30 - 2.40 | 14 sector | 70 | 10 | | | | |
| | | 6.5 o/head | 60 | 53 | Right Circular | 812x231 Ø | N(F) | + |
| MSA5-10-24R/389 | 2.30 - 2.50 | 10 sector | 90 | 40 | | | | |
| | | 6 o/head | 90 | 90 | Right Circular | 210x140 Ø | SMA(F) x5 | |
| MSA4-24R/199 | 2.30 - 2.50 | 13 | 90 | 20 | Right Circular | 606x156 Ø | N(F) | + |
| MSA5-24L-ECS/1293 | 2.30 - 2.50 | 13 sector | 90 | 20 | | | | |
| | | 7 o/head | 80 | 80 | Left Circular | 582x156 Ø | N/a | |
| MSA5-24R/223 | 2.30 - 2.50 | 13 sector | 80 | 20 | | | | |
| | | 7 o/head | 80 | 80 | Right Circular | 706x156 Ø | N(F) | |
| MSA5-26L/117 | 2.48 - 2.68 | 13 sector | 90 | 20 | | | | |
| | | 7 o/head | 80 | 80 | Left Circular | 706x156 Ø | N(F) | |
| MSA5-3.3L/1407 | 3.20 - 3.40 | 12.5 sector | 68 | 16.7 | | | | |
| | | 8 o/head | 64 | 62 | Left Circular | 582x156 Ø | N/a | |

**MSA6-2.4V/1795**

**MSA7-16R-2350R/829 with 6 sectors and one overhead**

**MSA4-24R/199**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MSA5-3.4V/1435 | 3.35 - 3.55 | 13 | 80 | 16.5 | Vertical | 482x162 Ø | SMA(F) x5 | |
| MSA7-16-35R/497 | 3.40 - 3.50 | 15 sector | 70 | 10 | | | | |
| | | 7 o/head | 70 | 60 | Right Circular | 681x158 Ø | N(F) | + |
| MSA5-34L/963 | 3.40 - 3.60 | 13 sector | 80 | 20 | | | | |
| | | 7 o/head | 80 | 80 | Left Circular | 606x156 Ø | N(F) | |
| MSA5-34R-ECS/374 | 3.40 - 3.60 | 13 sector | 80 | 20 | | | | |
| | | 7 o/head | 80 | 80 | Right Circular | 706x156 Ø | N(F) | + |
| MSA6-15-46L/879 | 4.40 - 4.80 | 15 sector | 70 | 8.4 | | | | |
| | | 8.5 o/head | 60 | 55 | Left Circular | 527x158 Ø | N(F) | + |
| MSA6-4.7V/1484 | 4.40 - 5.00 | 15 sector | 70 | 8 | Vertical | | | |
| | | 8 o/head | 70 | 65 | Right Circular | 627x162 Ø | N(F) | |
| MSA6-90-4.7V/1554 | 4.40 - 5.00 | 13.8 sector | 90 | 8 | Vertical | | | |
| | | 8 o/head | 70 | 65 | Right Circular | 627x162 Ø | N(F) | |
| MSA10-HEX-105V/250 | 10.30 - 10.80 | 10 | 80 | 40 | Vertical | 50x60 Ø | SMA(M) x6 | + |

**MSA7-16-35R/497**

**MSA5-34R-ECS/374**

**MSA6-15-46L/879**

**MSA10-HEX-105V/250**

OA2-2.4V/1392
omni antenna

## Omni Antennas

| Part Number | Frequency GHz | Gain dBi | Beamwidth Azimuth° | Elevation° | Polarisation | Dimensions mm | Connector | Photo + |
|---|---|---|---|---|---|---|---|---|
| OA4-0.9V/1520 | 0.87 - 0.96 | 4.5 | 360 | 45 | Vertical | 605x57 Ø | N(F) | |
| OA8-1.4V/1251 | 1.35 - 1.525 | 9 | 360 | 12.6 | Vertical | 1208x57 Ø | N(F) | |
| OA6-1.44V/1508 | 1.43 - 1.45 | 7 | 360 | 19.5 | Vertical | 858x57 Ø | N(F) | + |
| VOA10-1615/897 | 1.59 - 1.64 | 9 | 360 | 10 | Vertical | 1225x57 Ø | N(F) | + |
| VOA10-1800/111 | 1.70 - 1.88 | 10 | 360 | 10 | Vertical | 1255x57 Ø | N(F) | + |
| OA4-1.8V/1641 | 1.71 - 1.88 | 4.4 | 360 | 38 | Vertical | 391x51 Ø | QN(M) | + |
| VOA10-1900/232 | 1.85 - 1.95 | 10 | 360 | 10 | Vertical | 1250x57 Ø | N(F) | + |
| XVO9-2150-D2/870 | 2.00 - 2.30 | 9 | 360 | 8 | Vertical | 1006x106 Ø | N(F) | |

**OA6-1.44V/1508**

**VOA10-1615/897**

**VOA10-1800/111**

**OA4-1.8V/1641**

**VOA10-1900/232**

**VOA10UT4-VOA4UT25-LPA5-2265/827**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| VOA10UT4- | 2.20 - 2.335 | 9.5 | 360 | 7.5 | Vertical | | | |
| VOA4UT25- | 2.20 - 2.335 | 4 | 360 | 30 | Vertical | | | |
| LPA5-2265/827 | 2.20 - 2.335 | 6 | 360 | 70 | Right Circular | 1505x150 Ø | N(F) x3 | + |
| SVD2-2300/427 | 2.20 - 2.34 | 2 | 360 | 80 | Vertical | 103x11 Ø | SMA(M) | |
| OA2-2.4V/1392 | 2.25 - 4.00 | 2 | 360 | 65 | Vertical | 185x32 Ø | TNC(F) | above |
| LCO10-2350/720 | 2.27 - 2.43 | 10 | 360 | 10 | Left Circular | 800x104 Ø | N(F) | |
| VOA10-2340/459 | 2.28 - 2.38 | 10 | 360 | 10 | Vertical | 1008x57 Ø | N(F) | |
| OA4-2.5V/1542 | 2.28 - 2.70 | 4 | 360 | 40 | Vertical | 222x25 Ø | TNC(M) | + |
| OA10-2.4V/1655 | 2.30 - 2.55 | 9 | 360 | 13 | Vertical | 908x57 Ø | N(F) | + |
| VOA10-2450/177 | 2.40 - 2.50 | 10 | 360 | 80 | Vertical | 905x57 Ø | N(F) | + |
| RCO10-2460/255 | 2.40 - 2.55 | 10 | 360 | 10 | Right Circular | 891x104 Ø | N(F) | |
| VOA11-26/1095 | 2.50 - 2.70 | 10 | 360 | 10 | Vertical | 1133x31 Ø | 716(F) | |
| XV010-3450/065 | 3.30 - 3.55 | 10 | 360 | 10 | Vertical | 600x95 Ø | N(F) | |
| RCO10-3500/931 | 3.40 - 3.60 | 9 | 360 | 12 | Right Circular | 647x85 Ø | N(F) | + |
| RCO10-3500-D1/1185 | 3.40 - 3.60 | 9 | 360 | 12 | Right Circular | 579x79 Ø | N(F) | |
| VOA7-36/1146 | 3.40 - 3.80 | 6 | 360 | 20 | Vertical | 356x31 Ø | N(F) | + |
| XVO9-3880/944 | 3.70 - 4.06 | 9 | 360 | 7 | Vertical | 782x98 Ø | N(F) | |
| VOA9-45/1161 | 4.30 - 4.70 | 9 | 360 | 11 | Vertical | 550 x 31 Ø | N(F) | + |
| OA9-4.6V/1701 | 4.49 - 4.80 | 9 | 360 | 12 | Vertical | 600x36 Ø | N(F) | |

**OA4-2.5V/1542**

**OA10-2.4V/1655**

**VOA10-2450/177**

**RCO10-3500/931**

**VOA7-36/1146**

**VOA9-45/1161**

Control and data links for robotics applications

## Ground Control Centre Antennas

**Cobham Antenna Systems, Microwave Antennas provides antennas for both control centre and remote platform.**

**The control centre antenna usually provides the higher gain part of the link and may be a medium to high gain omni antenna, medium gain sector or high gain directional antenna.**

A directional antenna is likely to require a two-axis steering system. A less complex but compact multi-sector antenna array provides intermediate range coverage for communicating with a remote platform. This type of arrangement can be used for quick deployment, tactical applications.

Cobham Antenna Systems, Microwave Antennas has a range of multi-sector arrays.

A selection of suitable antennas is listed in this leaflet, with more available in our main catalogue. Contact us for assistance.

### Unmanned Vehicle Antennas

Unmanned Systems (UMS) are providing an increasing number of operational functions including airborne and remote ground surveillance, video transmission, border patrol and tactical systems.

As the demand for Unmanned Systems increases, so does the need for antennas for payloads, data communications systems, command and control.

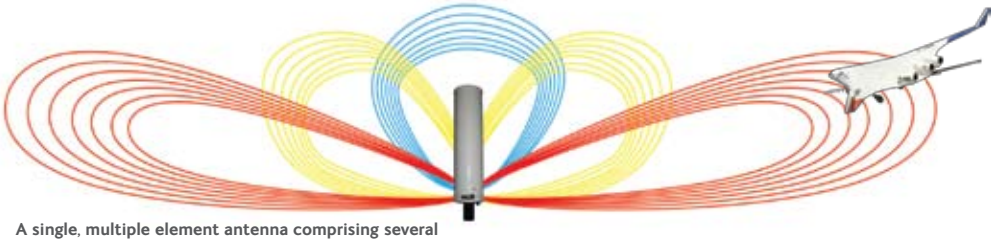
Cobham Antenna Systems, Microwave Antennas has a range of standard cost-effective, high performance antenna designs that are already used on Unmanned Systems.

## Link Margin (Fly-By) Analysis

Link margin (fly-by) analyses can be performed for many airborne systems. The method is applicable to helicopter, unmanned airborne systems (UAS) and missile applications. These calculations are based upon real measured 3D antenna patterns, and can be used to assist in system planning. The region over which coverage is required is considered, and the path losses to points within the region are calculated. The gain of the antenna at the angle of each location is added to the path loss which provides data for plotting graphs of Relative Signal Strength vs. Range at different altitudes.

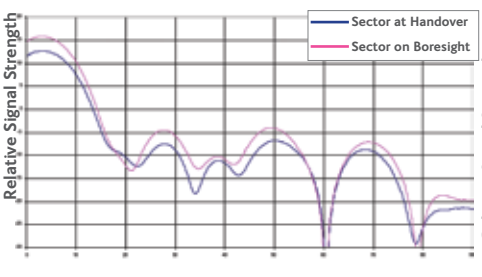
As the Cobham Antenna Systems library of measured antenna performance is so extensive, the optimum antenna combination can be considered for a given requirement. Such planning can assist in deciding when to use switched sector instead of omni-directional antennas, how many separate antennas to have provide elevation coverage, and whether or not to use an additional overhead antenna to ensure links are maintained for communication at high elevation angles.

The ideal antenna combination will vary according to the specifics of the requirement. Generally, a number of altitudes within the desired operational ceiling are considered, and link margins at all ranges within the required envelope are calculated at these altitudes. The worst case handover angle between sector antennas will be used, and any effects of polarisation mismatch loss through antenna misalignment can be factored in.



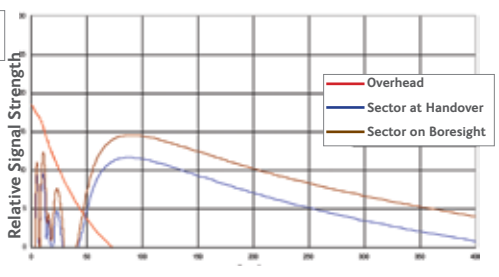
**A single, multiple element antenna comprising several omni or omni and sectors can be designed to provide optimum coverage for a given operational requirement.**

**Typical Elevation Pattern of Sector Antenna used to Calculate Signal Strength**




**Elevation Angle/Degree**

**Calculated Output showing 40,000ft Altitude Signal Strength vs. Range**




**Range/km**

OTHER BROCHURES

Antenna Catalogue

Total Capability

Ground Control

Antenna Testing

Link16

IED Countermeasures

Unmanned Systems

WiMAX and LTE

C-Band

Radar Systems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