

Messenger Antenna Array (MAA)

COBHAM

12 dB, 1.7-2.5 GHz, Six-Panel Array

The most important thing we build is trust.

Applications

- Long Distance A/V Mobile Links
- Airborne Surveillance Links
- Electronic News Gathering (ENG)
- Repeaters
- UAV/UGV Applications

Key System Features

(when used with GMS' MSR Receiver)

- Low-Cost Tracking Antenna
- Provides 1.7-2.5 GHz Omni Coverage
(w/BDC 1.7-1.85 GHz or 1.99-2.5 GHz)
- Fully Electronic Tracker
 - No moving parts!
 - High Reliability!
- Fully Automatic & Self-Contained
 - No GPS required!
 - No special equipment needed on the remote Tx!
- Track multiple objects with one MAA!
- Integral Block Down Converters or LNAs
- Rugged Weather Proof Enclosure



GMS' Messenger Antenna Arrays (MAA) provides a reliable, cost effective alternative to conventional electro-mechanical Dual-Axis or Single-Axis Auto-Tracking Antenna Systems. When used with GMS' C-OFDM Messenger Smart Receiver (MSR) [Sold Separately], this linear-polarized, wide-bandwidth (1.7-2.5 GHz) antenna array provides auto-tracking over an OMNI-pattern for one or multiple DVB-T C-OFDM Audio/Video compliant transmissions with 12 dB gain. It is a fully electronic system, designed for harsh outdoor environments!

The MAA, when used in conjunction with the high-performance MSR, provides Maximal-Ratio Pre-Detection Diversity Combining that effectively sums the RF energy presented to any of the antennas. This capability, in conjunction with the equally spaced high-gain panel antennas, automatically provides reliable tracking of airborne transmission. At the crossover points between any two panel antennas, the MSR's Pre-Detect Combining helps to overcome the dip in the receive pattern by adding an additional 2.5 dB gain through this region.

Another key attribute of the Messenger Antenna Array/MSR combination is that, unlike other systems that use GPS for positioning, there is no special equipment required at the transmitter. This capability greatly simplifies the implementation in the airborne vehicle.

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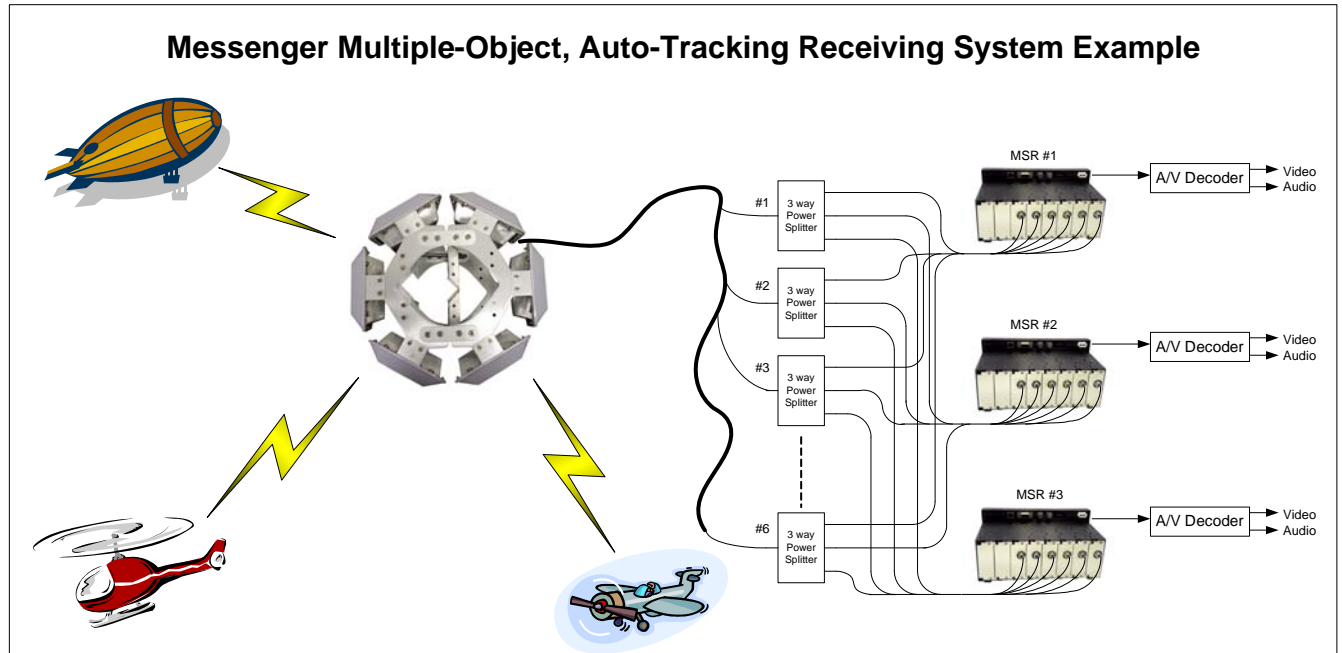


Figure 1: Multiple-Object Auto-Tracking Configuration

As shown in Figure 1, a single MAA can be used to simultaneously track multiple transmitters. This is accomplished by adding a commercial UHF/VHF splitter/amplifier to the IF output of each Antenna Array Element and then distributing the split IF signals to multiple MSRs, one MSR for each tracked vehicle. This capability is not possible with conventional electro-mechanical tracking systems!

The MAA consists of up to six vertically polarized panel antennas each with 12 dB gain arranged in a uniform periphery (6 elements) for omni-directional coverage. Each antenna housing contains either an internally mounted Block Down-Converter Card (BDCC) or an LNA. Note that the BDCC limits the systems frequency range to either 1.7-1.85 GHz or 1.99-2.5 GHz. If LNAs are installed, the system antenna elements will output RF through a 50-Ohm, N-FM connector. If the internal BDCCs are chosen, the system antenna elements will output an IF through a 75-Ohm, F-FM connector. The 3dB Beamwidth of the panel antennas is ~70 degrees in azimuth and ~30 degrees in elevation. Each of these antennas is tilted upward by 10 degrees to optimize antenna maximum gain to just above the horizontal plane.

Figure 2 is representative of the elevation pattern of the panel antennas. Gain is expected to be about 12 dBi at 10 degrees elevation. It will be observed that gain on the horizon is about 11 dBi.

Likewise, Figure 3 is representative of the azimuth pattern at 10 degrees elevation. The gain on the horizon is expected to be 11 dBi and the pattern is identical.

The net effect of these six antennas and the diversity properties of the COFDM receivers are to provide unbroken aircraft coverage to the horizon without resort to moving parts (mechanical auto trackers). Note that from a

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system standpoint the dip at the cross-over point between any of the two 12 dB panels will be reduced by up to 2.5 dB due to the Pre-Detect Diversity Combining gain of the MSR receiver. This provides excellent coverage over an OMNI pattern.

The six panel antennas are identical in construction and are assembled in an x6 array using brackets. The internal pipe mount bracket can accommodate pipe sizes from 3" to 6".

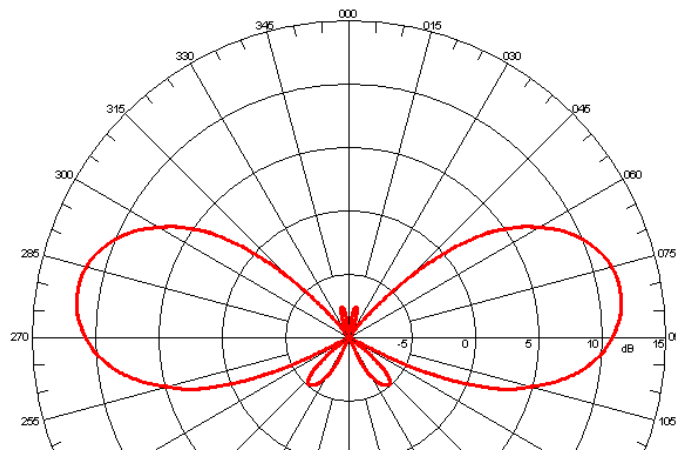


Figure 2: Messenger Antenna Array Elevation Pattern

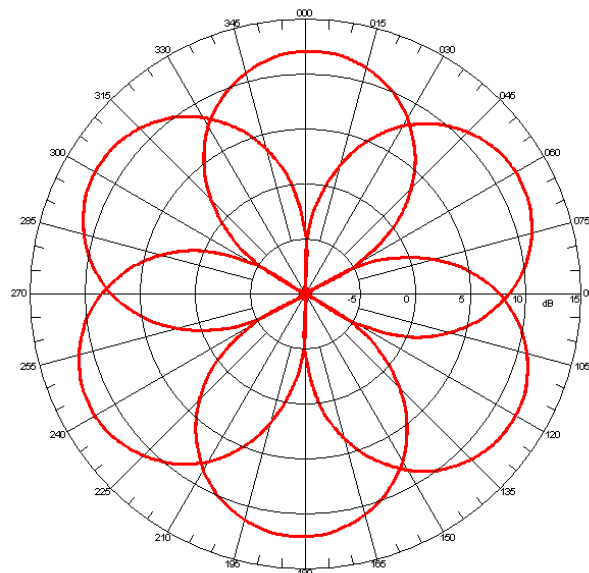


Figure 3: Projected Panel Antenna Azimuth Pattern

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The tracking ability of the MAA and MSR combination is enabled by the MSR's Multiple-Input Maximal-Ratio Diversity Combining ability that sums the signals of up to six independent receive paths. Maximal-Ratio Diversity Combining can increase the Signal to Noise Ratio (SNR) by 2.5 dB or 78% for two inputs if the antennas are getting the same signal from a transmitter. Unlike conventional DVB-T systems, the MSR is designed for mobile environments. With 2K carriers and 16-QAM, a dual-input or greater MSR can handle >570 Hz of Doppler frequency shift, which equates to 174 mph (280 km/h) @ 2200 MHz carrier frequency. This feature is an enabling technology for C-OFDM based Helicopter and UAV links!

Specifications:

Model Number*: MAALSV12360XX46

Frequency Range: 1.7 to 2.5 GHz

12 dB Patch Antennas

GMS PN: MAPLSV12070XX4

Performance: Refer to Data Sheet: 100-DS0204X

Physical

Weight: 15.4 lbs (6.99 kg)

Model Number*: MAALSV123603E36

Frequency Range: 1.7 to 2.5 GHz

12 dB Patch Antennas

GMS PN: MAPLSV120703E3

Performance: Refer to Data Sheet: 100-DS0204X

LNAs

GMS PN: PLW4K8S11

Performance: Refer to Data Sheet: 100-DS0077X

Physical

Weight: 16 lbs (7.26 kg)

Model Number*: MAAL2V123608Q26

Frequency Range: 1.7 to 1.85 GHz

12 dB Patch Antennas

GMS PN: MAPL2V120758Q2

Performance: Refer to Data Sheet: 100-DS0204X

BDCCs

GMS PN: BDCCL2U4P7Y3

Performance: Refer to Data Sheet: 100-DS0221X

Physical

Weight: 19.2 lbs (8.7 kg) with BDCCs

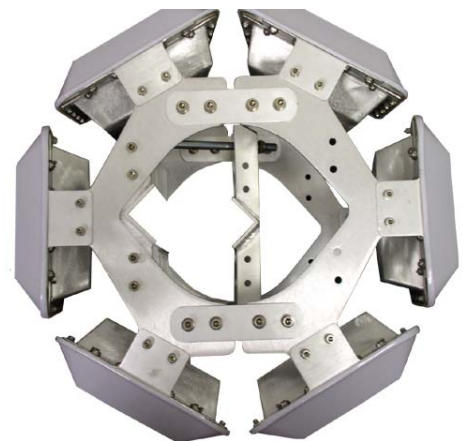
Model Number*: MAAS2V123607Q26

Frequency Range: 1.99 to 2.5 GHz

12 dB Patch Antennas

GMS PN: MAPS2V120687Q2

Performance: Refer to Data Sheet: 100-DS0204X



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BDCCs

GMS PN: BDCCS2U2P5Y3

Performance: Refer to Data Sheet: 100-DS0207X

Physical

Weight: 19.2 lbs (8.7 kg) with BDCCs

General Physical Characteristics

Dimensions: 19" (Diameter) x 9.5" (High)

66.69 cm (Diameter) x 24.13 cm (High)

Pole Clamping Range: 3" to 6" (7.62 cm to 15 cm)

Environmental:

Operational Temperature: -20 to 70 deg C

Humidity: Up to 100%

* The last digit in the MAA Model Number represents the number of Panel Antennas used on the Array. With 6 Antennas you get 360 ° coverage. Numbers from 2 to 6 are standard providing ~120 ° to 360 ° in 60 ° steps.