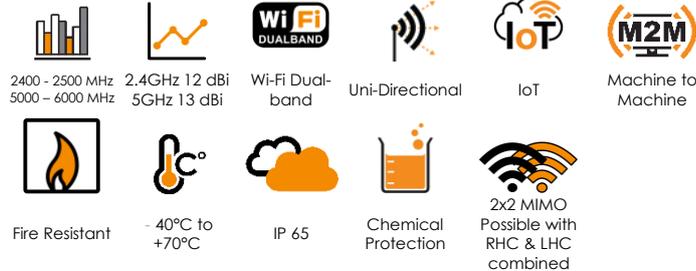


## ANTENNAS | HELI-13 SERIES

# CIRCULAR POLARISED, DIRECTIONAL MINE/TUNNEL ANTENNA

Dual-band Wi-Fi, 2400 - 2500 MHz, 12 dBi; 5000 - 6000 MHz, 13 dBi



- **Circular Polarised HELI antenna provides enhanced signal propagation and connection stability within a tunnel**
- **Left-hand Circular (LHC) & Right-hand Circular (RHC) Polarised options available**
- **Uni-directional – radiates in one direction in a tunnel**
- **Ruggedized & water ingress protected**
- **Ideal for Mining & Tunnel M2M and IoT deployments**



Mining and Surface



Mining



Tunnel

APPLICATION AREAS

## Product Overview

The HELI-13 forms part of a series of Mini-HELI antennas. These antennas are only mini in size relative to their bigger brothers, the HELI-3, HELI-4 & HELI-8, but offer medium to high gain, which makes these antennas ideal for mining tunnels where IoT/M2M connectivity is deployed and can also be used for coverage into the stopes.

The HELI-13 is a set of dual 2.4GHz and 5GHz antennas, radiating in one direction (i.e. Uni-directional), which make them ideal for the coverage of both 2.4GHz and 5GHz in mining and other type of tunnels. These antennas are typically used for the deployment of IoT within the tunnel to provide telemetry and mine automation. These antennas are available in both Left-hand Circular (LHC) & Right-hand Circular (RHC) polarised antenna elements to provide optimal decorrelation within a MIMO deployment when using the BRKT-45, resulting in the best of the two worlds; decorrelation due to the polarisation difference and spatial diversity to enhance MIMO performance and RF reliability to service the most severe connectivity within a demanding mining tunnel. The dual-band Wi-Fi connection propagates around tunnel bends in a non-Line of Sight scenario and provides immunity to many Wi-Fi signal disrupting objects such as trains and drilling machinery which appear to obscure the tunnel.

## Features

- Dual port 2.4GHz and 5GHz antenna
- This antenna is especially designed for mining and other types of tunnels where rapid extension of network is required
- Uni-directional – radiates in one direction in a tunnel
- Left & Right-hand Circular Polarised available (for MIMO)
- Intrinsically safe version available on request

## Application Areas

- Supplementing fibre/leaky feeder cable "Hotspots" to areas to enhance mobility or extend networks to inaccessible areas
- Underground telemetry and automation
- Creating of complete underground in tunnel wide data networks and internet/LTE connectivity
- Seamless connection to personnel using cellular phones and smart devices and tablets



2x HELI-13 antennas mounted on the BRKT-45 for MIMO application

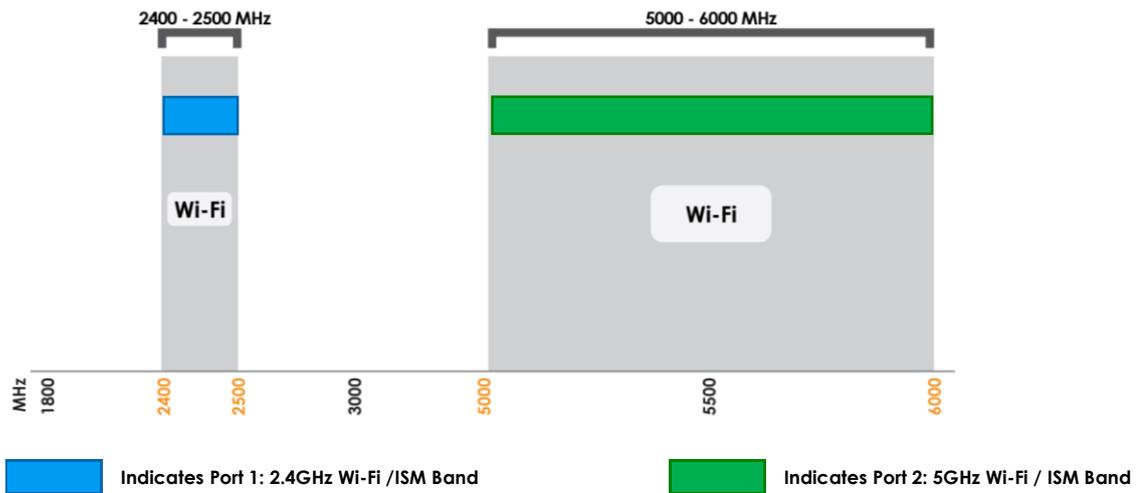
## HELI-13

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Product Specifications may change without prior notice  
Revised: May 2020



### Frequency Bands

The Heli-13 is a Wi-Fi / ISM antenna that works from 2400 – 2500 MHz & 5000 - 6000 MHz



### Antenna Overview

Port	1	2
Frequency Bands	2400 - 2500 MHz	5000 - 6000 MHz
Peak Gain	12 dBi	13 dBi
Coax Cable Type	RG-58	RG-58
Coax Cable Length	350mm	350mm
Connector Type	N-Type Male	N-Type Male

## Electrical Specifications

<b>Frequency bands:</b>	2400 MHz - 2500 MHz 5000 MHz - 6000 MHz
<b>Gain (max):</b>	12.0 dBi for 2400 MHz – 2500 MHz 13.0 dBi for 5000 MHz - 6000 MHz
<b>VSWR:</b>	<1.5:1 over 90%of the band
<b>Feed power handling:</b>	30 W
<b>Input impedance:</b>	50 Ohm (nominal)
<b>Polarisation:</b>	Circular Polarised (LHC or RHC)
<b>Coax cable loss:</b>	0.97 dB /m @ 2.4 GHz 2.0 dB/m @ 5.8 GHz
<b>DC short:</b>	N/A

## Coax Cable & Connector Type

<b>Cable length:</b>	350 mm
<b>Coax cable type:</b>	RG 58
<b>Connector type:</b>	N-Type (Male)

*\*The coax cable & connector is factory mounted to the antenna*

## Product Box Contents

<b>Antenna:</b>	A-HELI-0013-V1-01
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## Ordering Information

<b>Commercial name:</b>	HELI-13
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### a) Right-hand Circular Version

<b>Order product code:</b>	A-HELI-0013-V1-01-RH
<b>EAN number:</b>	6009710920015

### b) Left-hand Circular Version

<b>Order product code:</b>	A-HELI-0013-V1-01-LH
<b>EAN number:</b>	6009710920008

**Note: For MIMO application, order both Right-hand Circular and Left-hand Circular antennas.**

## Mechanical Specifications

<b>Product dimensions</b>	321 mm x 142 mm x 114 mm
<b>Packaged dimensions:</b>	360mm x 165mm x 140mm
<b>Weight:</b>	0.85 kg
<b>Packaged weight:</b>	1.35 kg
<b>Radome material:</b>	ABS & PVC
<b>Radome colour:</b>	Grey
<b>Mounting Type:</b>	Ceiling mounted

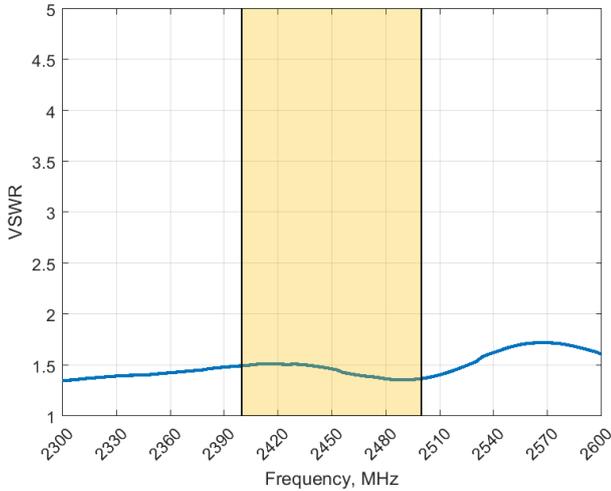
## Environmental Specifications, Certification & Approvals

<b>Wind Survival:</b>	<120 km/h
<b>Temperature Range (Operating):</b>	-40°C to +70°C
<b>Environmental Conditions:</b>	Outdoor/Indoor
<b>Water ingress protection ratio/standard:</b>	IP 65
<b>Salt Spray:</b>	MIL-STD 810F/ASTM B117
<b>Operating Relative Humidity:</b>	Up to 98%
<b>Storage Humidity:</b>	5% to 95% - non-condensing
<b>Storage Temperature:</b>	-40°C to +70°C
<b>Enclosure Flammability Rating:</b>	UL 94-HB
<b>Impact resistance:</b>	IK 08
<b>Product Safety &amp; Environmental:</b>	Complies with CE and RoHS standards



**Antenna Performance Plots**

**VSWR 2400-2500 MHz**

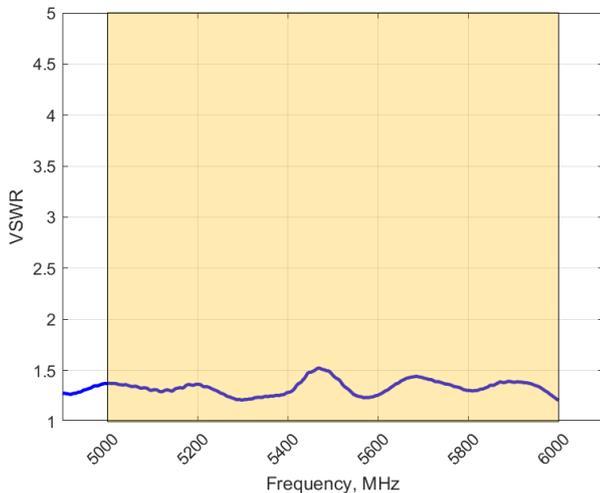


**Voltage Standing Wave Ratio (VSWR)**

VSWR is a measure of how efficiently radio-frequency power is transmitted from a power source, through a transmission line, into a load. In an ideal system, 100% of the energy is transmitted which corresponds to a VSWR of 1:1.

The HELI-13 delivers superior performance across all bands with a VSWR to 1.5:1 or better across 90% of the band.

**VSWR 5000-6000 MHz**

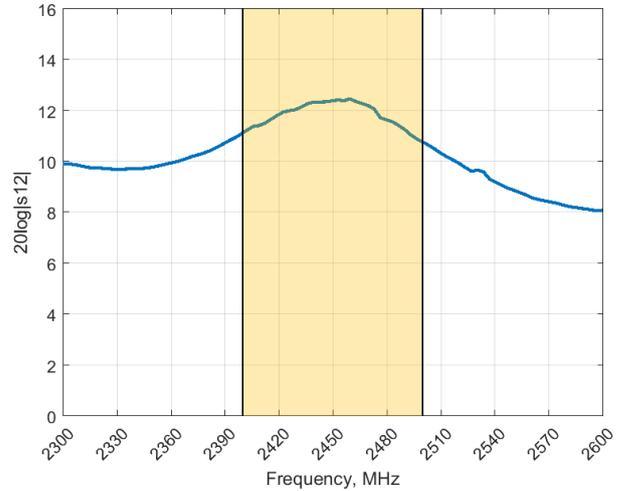


**Voltage Standing Wave Ratio (VSWR)**

VSWR is a measure of how efficiently radio-frequency power is transmitted from a power source, through a transmission line, into a load. In an ideal system, 100% of the energy is transmitted which corresponds to a VSWR of 1:1.

The HELI-13 delivers superior performance across all bands with a VSWR of 1.5:1 or better across 90% of the band.

**GAIN 2400-2500 MHz (EXCLUDING CABLE LOSS)**



**Gain\* in dBi**

12 dBi is the peak gain from 2400 – 2500 MHz

*\*Antenna gain measured with polarisation aligned standard antenna*

**GAIN 5000-6000 MHz (EXCLUDING CABLE LOSS)**

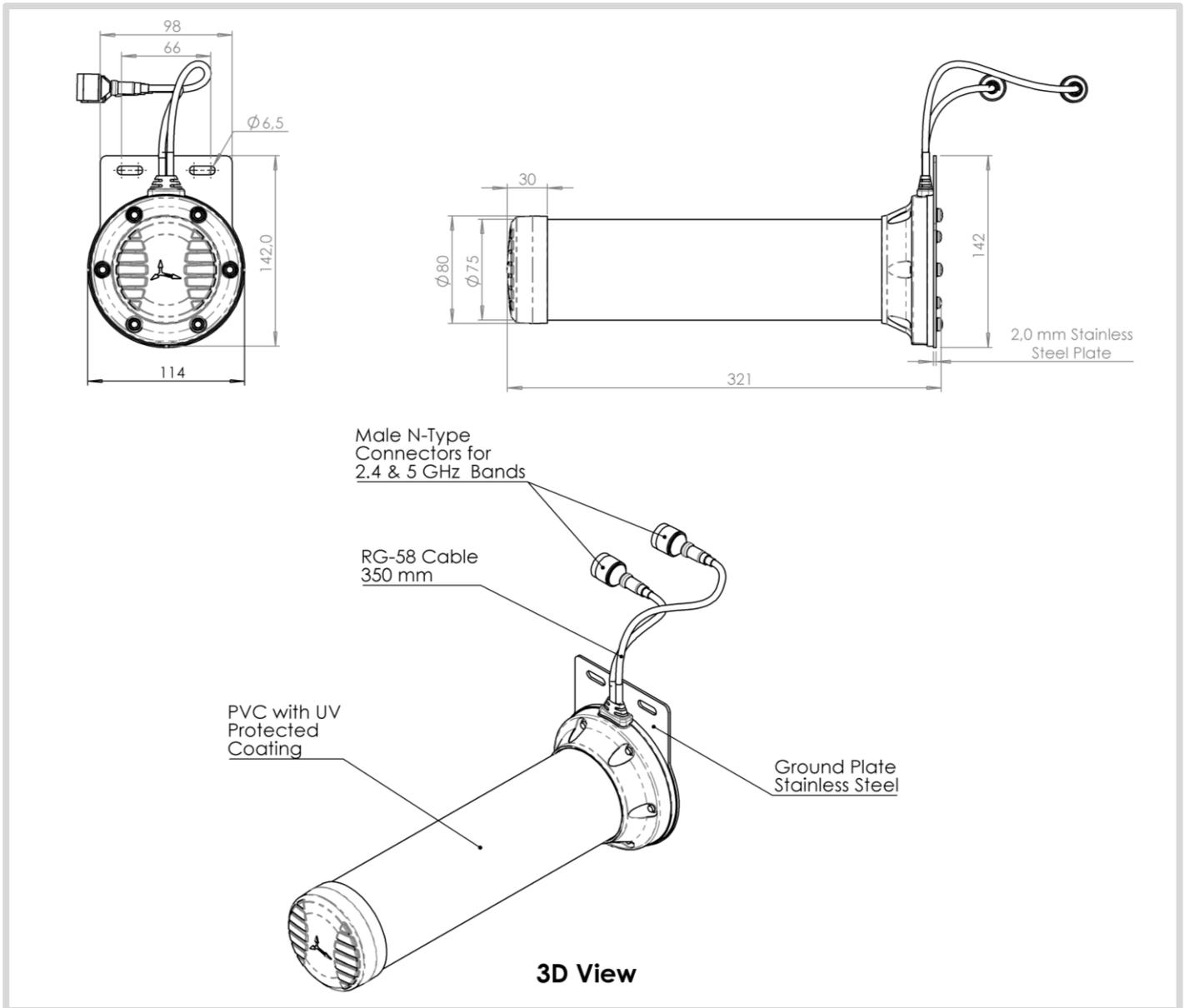


**Gain\* in dBi**

13 dBi is the peak gain from 5000 – 6000 MHz

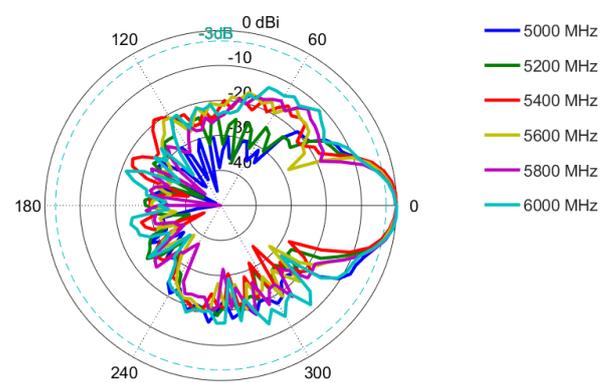
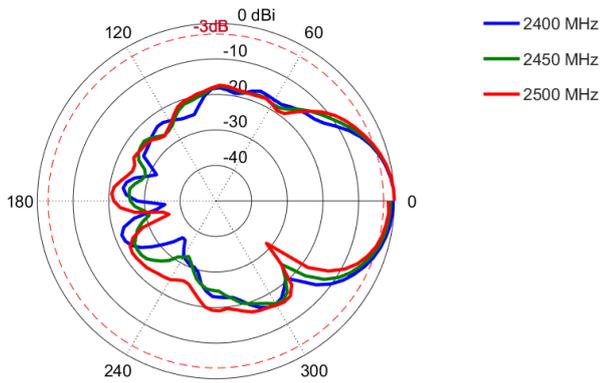
*\*Antenna gain measured with circular polarised standard antenna*

Technical Drawings

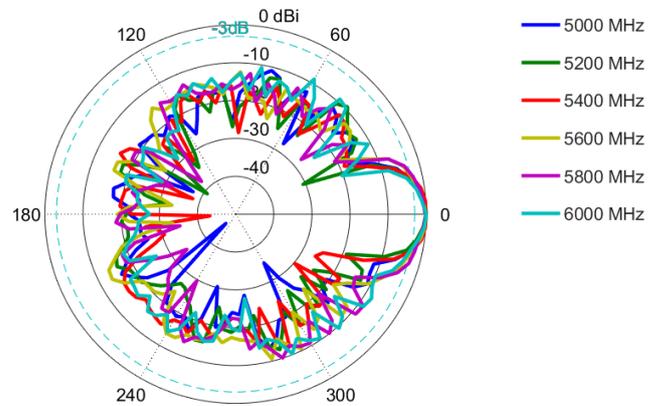
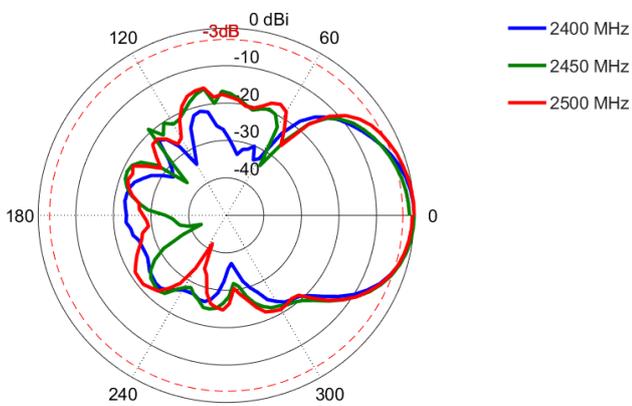


**Radiation Patterns**

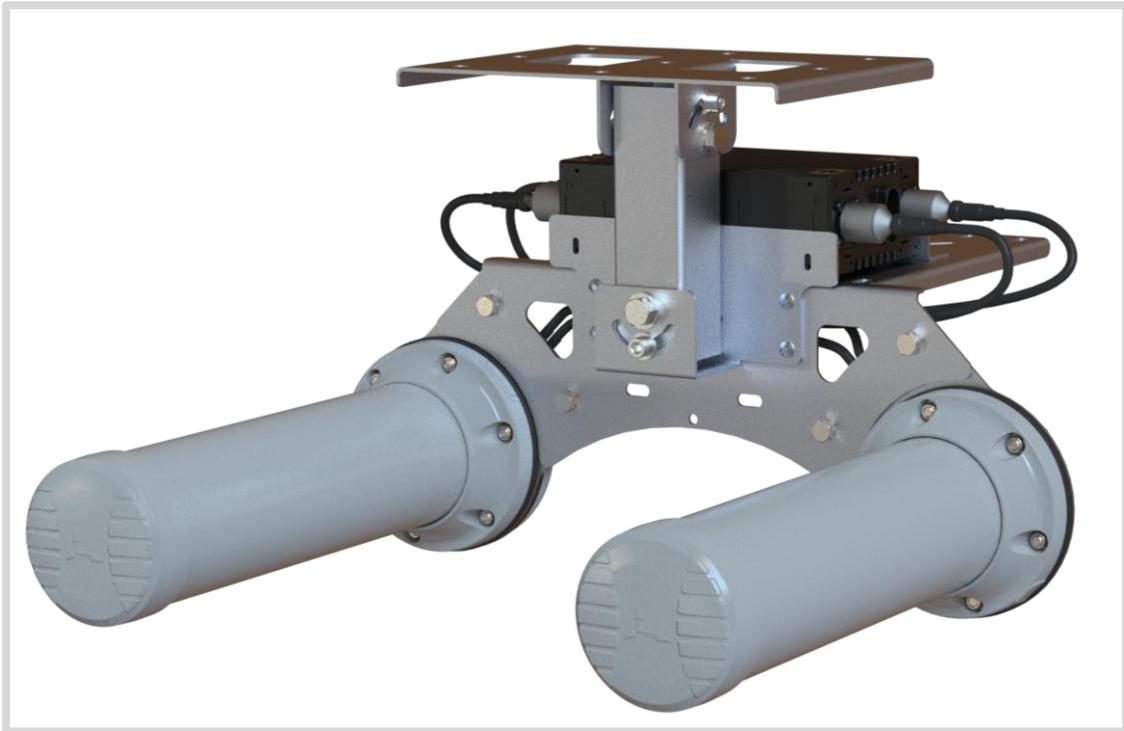
Elevation Port 1: 2400 – 2500 MHz      Elevation Port 2: 5000 – 6000 MHz



Azimuth Port 1: 2400 – 2500 MHz      Azimuth Port 2: 5000 – 6000 MHz



## Additional Accessories



### Complete assemblies available with antennas and brackets:

#### A-HELI-0021-V2-01 consists of:

- A-HELI-0013-V2-01-L \_ Left-hand, Circular polarised uni-directional antenna
- A-HELI-0013-V2-01-R \_ Right-hand, Circular polarised uni-directional antenna
- A-BRKT-045-V2-01 \_ Ceiling Mount, swivel bracket

#### A-HELI-0021-V2-02 consists of:

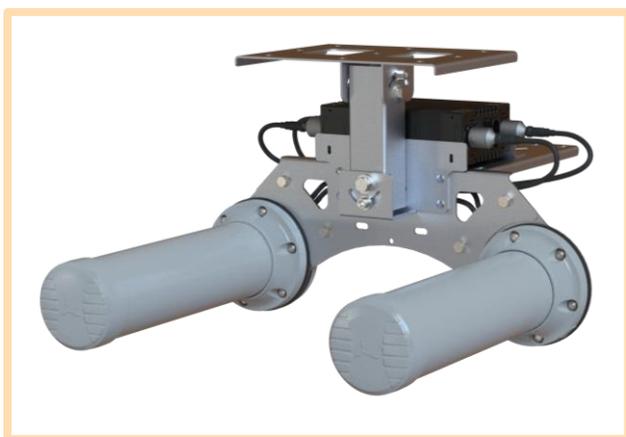
- A-HELI-0013-V2-01-L \_ Left-hand, Circular polarised uni-directional antenna
- A-HELI-0013-V2-01-R \_ Right-hand, Circular polarised uni-directional antenna
- A-BRKT-045-V2-01 \_ Ceiling Mount, swivel bracket
- A-BRKT-047-V1-01 \_ Mine roof bolt attachment accessory

## Mounting Options



### Base Mount

The antenna can be fastened directly using the two slots on its base, via an L-bracket to a pipe or directly to another surface.



### Ceiling Mount (MIMO) - Optional

An optional Multi directional swivel bracket is available for mounting 2 x miniHELI antennas (right-hand circular and left-hand circular polarised antennas) to a ceiling for MIMO application

This option uses A-BRKT-045-V2-01.



### Roof Bolt Mounting - Optional

This optional 20mm roof bolt mounting bracket attachment is used in conjunction with BRKT-45 for mounting to standard mine roof bolts..

This option uses A-BRKT-047-V1-01.

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**Additional Accessories****A – BRKT – 045 - V2 - 01**

Ceiling mounting bracket for holding miniHELI right-hand and left-hand circular polarized antennas.

**A – BRKT – 047 - V1 - 01**

Ceiling 20mm Rod mounting bracket attachment to use with BRKT-45.

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