UAMS-R02 低空监视雷达

UAMS-R-02 Low Altitude Surveillance Radar

产品手册

Product Manual

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1 功能用途

1 Function and Purpose

UAMS-R02 型低空监视雷达采用主要应用于低空和地面监视，采用数字波束形成技术，等效全向辐射功率低，搜索数据率高。雷达采用自适应杂波抑制技术和密集目标检测前跟踪技术，杂波虚警率极低，可对超过 500 批目标进行自动跟踪建航，输出高精度位置信息。

UAMS-R02 low altitude surveillance radar is primarily used for low altitude and ground surveillance. The digital beam forming technology is employed. The effective omnidirectional radiated power is low, and the search data rate is high. The radar employs adaptive clutter suppression technology and dense target detection before tracking technology, which results in an extremely low clutter false alarm rate. It is capable of automatically tracking and mapping paths for over 500 targets, providing high-precision location information.

1.1 产品特点

1.1 Product Features

1) 检测概率高，虚警概率低

1) High Detection Probability, Low False Alarm Probability

通过运用自适应杂波抑制算法，自动匹配跟踪环境特征变化，可有效过滤树木、庄稼、云雨、海浪等环境杂波虚警，同时在复杂杂波条件下可以有效检测出弱小回波目标，为用户提供高检测灵敏度以及准确的传感应用。

By using the adaptive clutter suppression algorithm, it automatically matches and tracks the changes in environmental features. It effectively filters out environmental clutter false alarms such as trees, crops, clouds, rain, and sea waves. Meanwhile, under complex clutter conditions, it can effectively detect weak echo targets, providing users with high detection sensitivity and accurate sensing applications.

2) 跟踪效果好

2) Effectiveness of Tracking

雷达最大支持高达 1Hz 的空间扫描率，同时运用了先进的跟踪算法，实现了对各种强机动目标的实时跟踪，为用户提供准确且直观的目标信息。

Radar supports up to 1Hz spatial scan rate while utilizing advanced tracking algorithms, achieving real-time tracking of various highly maneuverable targets, providing users with accurate and intuitive target information.

3) 探测精度高

3) Precision of Detection

雷达方位、俯仰量测角精度高，远小于光电系统最小视场角，可在远距离处精确引导光电系统捕获目标，极大的提升了光电联动系统的应用价值。

Radar's azimuth and elevation angle measurement accuracy is significantly high, far less than the minimum field of view angle of optical systems. It can guide optical systems to capture targets precisely at long distances, greatly enhancing the application value of the electro-optical linkage system.

4) 便携，易操作

4) Portability and Ease of Operation

雷达重量轻，可单人应用架设，方便用户使用；同时人机界面直观简洁，配置简单，有效的降低了用户对雷达的学习使用成本。

Radar is lightweight, can be set up by a single person, making it convenient for users. Additionally, the human-machine interface is intuitive and straightforward, and the configuration is simple, effectively reducing the learning and usage cost of the radar for users.

1.2 产品指标

1.2 Product Specifications

1） 工作频段：X 波段；

1) Operating frequency band: X-band;

1） 俯仰覆盖范围（俯仰视场角）：-5～60°；

1) Elevation coverage range (elevation field of view angle): -5° to 60°;

2） 方位覆盖范围（水平视场角）：360°；

2) Azimuth coverage range (horizontal field of view angle): 360°;

3） 探测距离：

3) Detection range:

a) 小型旋翼无人机（RCS=0.01 ㎡）探测距离≥10km；

a) Small rotor UAV (RCS=0.01 ㎡) detection range ≥ 10km;

b) 中型固定翼无人机（RCS=2 ㎡）探测距离≥20Km；

b) Medium fixed-wing UAV (RCS=2 ㎡) detection range ≥ 20km;

c) 人员探测距离≥14Km；

c) Personnel detection range ≥ 14km;

d) 直升机、车辆探测距离≥20Km；

d) Helicopter and vehicle detection range ≥ 20km;

4） 最大探测高度：≥3000 米；

4) Maximum detection altitude: ≥ 3000m;

5） 盲区：≤50m；

5) Blind zone: ≤ 50m;

6） 测距精度：≤5m（RMS）；

6) Range accuracy: ≤ 5m (RMS);

7） 测角精度： 方位：≤0.4°（RMS），俯仰：≤0.4°（RMS）；

7) Angle measurement accuracy: Azimuth: ≤ 0.4° (RMS), elevation: ≤ 0.4° (RMS);

8） 天线转速：20rpm（120°/s）,30rpm（180°/s）,60rpm（360°/s）；

8) Antenna rotation speed: 20rpm (120°/s), 30rpm (180°/s), 60rpm (360°/s);

9） 同时跟踪目标批数：≥500 批；

9) Number of targets that can be tracked simultaneously: ≥ 500 targets;

10） 跟踪速度范围：1～150m/s；

10) Tracking speed range: 1 to 150 m/s;

11） 优异的抗杂波能力，常见杂波不引起虚警；

11) Excellent anti-clutter capability, common clutter does not trigger false alarms;

12） 环境适应性：-40～+55℃；

12) Environmental adaptability: -40 to +55°C;

13） 工作湿度：≯60%；

13) Operating humidity: ≤ 60%;

14） 防护等级：IP66；

14) Protection level: IP66;

15） 重量：≤50Kg；

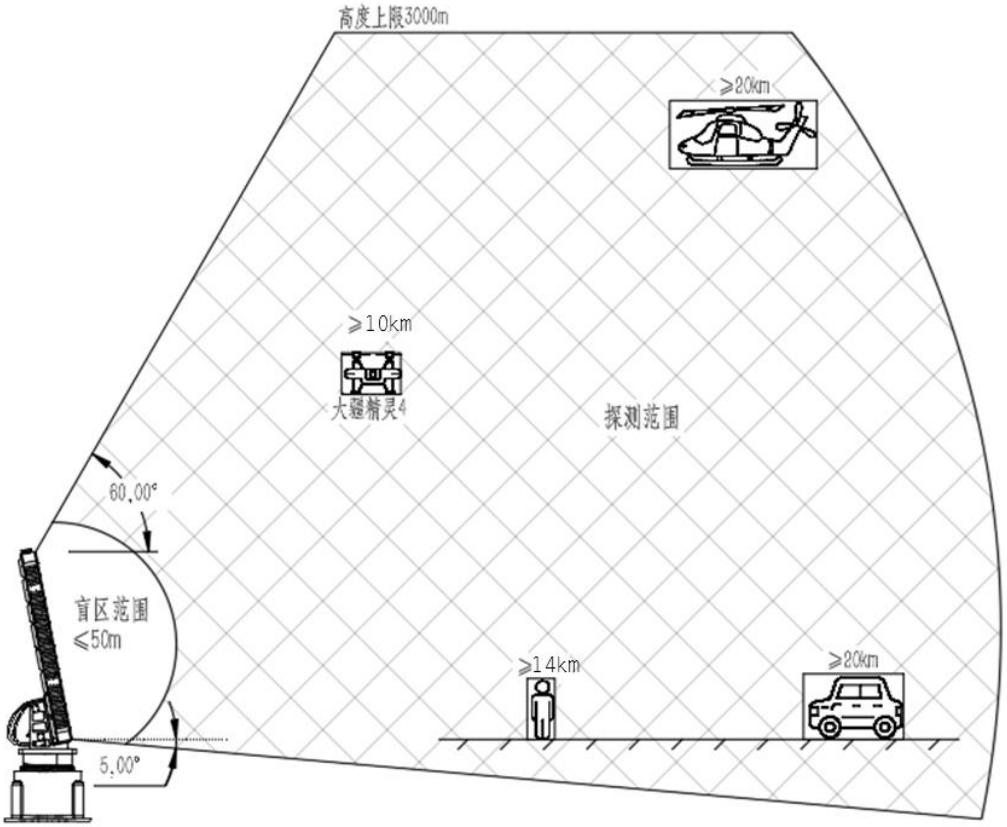
15) Weight: ≤ 50kg;

16） 功耗：≤400W；

16) Power consumption: ≤ 400W;

17） 阵面尺寸：650*815*85mm。

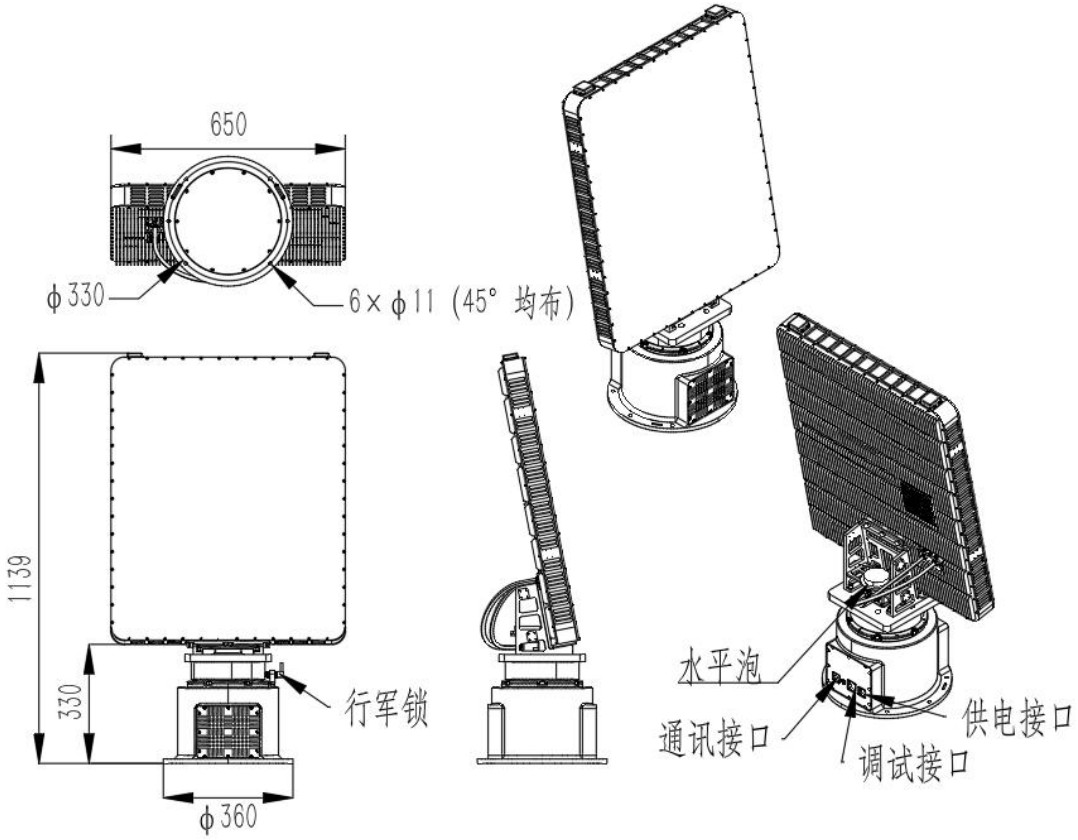
17) Antenna dimensions: 650*815*85mm.



高度上限 Maximum altitude	
大疆精灵 4 Phantom 4	
探测范围 Detection range	
盲区范围 Blind zone range	

1.3 产品尺寸

1.3 Dimensions of YRL-02



行军锁 Transport lock	
水平泡 Level bubble	
通讯接口 Communication interface	
调试接口 Debugging interface	
通电接口 Power interface	

1.4 包装尺寸

1.4 Packaging Dimensions

产品发货包装分为三个部分

Product shipping packaging consists of three parts

1、雷达面板：采用铝合金包装箱包装

1. Radar panel: Packed in an aluminum alloy case

包装箱尺寸：1140 *980 * 450mm

Packaging case dimensions: 1140 * 980 * 450mm

包装加产品总重量：45kg

Total packaging and product weight: 45kg

2、雷达转台、连接网线、电源适配器：采用铝合金包装箱包装

2. Radar turntable, connecting network cable, power adapter: Packed in an aluminum alloy case

包装箱尺寸：700 *600 * 650mm

Packaging case dimensions: 700 * 600 * 650mm

包装加产品总重量：45kg

Total packaging and product weight: 45kg

3、三脚架、转接盘：采用编织袋包装

3. Tripod, adapter plate: Packed in a woven bag

包装箱尺寸：290*290*1140mm

Packaging case dimensions: 290 * 290 * 1140mm

包装加产品总重量：15kg

Total packaging and product weight: 15kg

2 应用场景

2. Application Scenarios

边境监视

Border surveillance

海面监视

Sea surface surveillance

要地防护

Ground protection

战场侦察

Battlefield reconnaissance

机场探鸟

Airport bird detection

3 产品组成

3 Product components

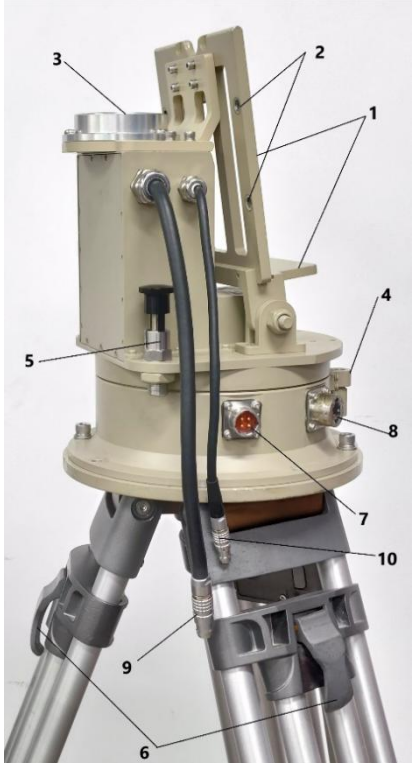
雷达系统由雷达主机、雷达转台、电源适配器、数据网线、安装工具及倾角仪组成，产品组成实物图如图 1 所示。

YRL-02 consists of the radar host, radar turntable, power adapter, data network cable, installation tools, and inclinometer. A physical diagram of the product components is shown in Figure 1.

雷达主机-背面　雷达转台+三脚架　电源适配器　数据网线　安装工具

雷达主机-背面 **Radar host - back view**	雷达转台+三脚架 **Radar turntable + tripod**	电源适配器 **Power adapter**	数据网线 **Data network cable**	安装工具 **Installation tools**

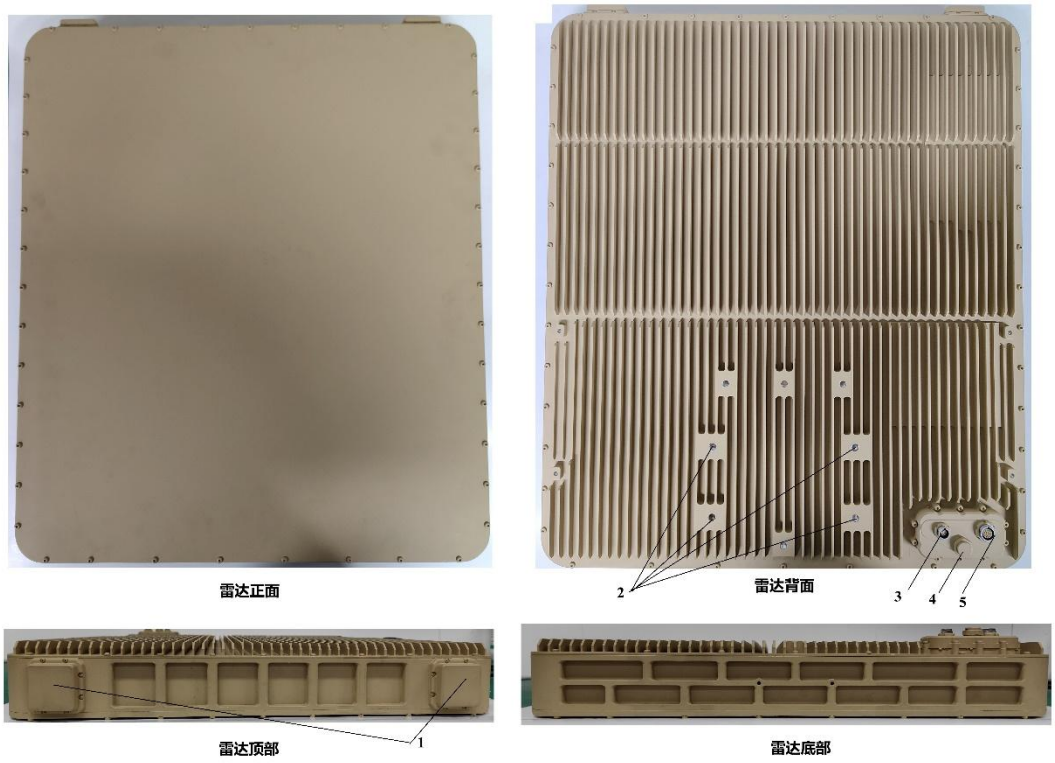
- 部件介绍-雷达转台
- Component Introduction - Radar Turntable



序号 Serial Number	名称 Name	用途 Purpose
1	雷达主机安装支架 Radar Host Mounting Bracket	转台与雷达主机之间的安装过渡机构 Installation transition mechanism between the turntable and the radar host
2	雷达主机安装孔 Radar Host Mounting Hole	用于将雷达主机到固定于安装支架上 Used to fix the radar host onto the mounting bracket
3	水平仪 Bubble Level	用于三脚架调平 Used for leveling the tripod
4	转台锁死机构 Turntable Locking Mechanism	与转台锁死栓配合，实现运输过程中转台锁死 Works with the turntable locking pin to lock the turntable during transportation.
5	转台锁死栓	与转台锁死机构配合，实现运输过程中转台锁死

	Turntable Locking Pin	Works with the turntable locking mechanism to lock the turntable during transportation.
6	三脚架伸缩调节阀 Tripod Telescoping Adjustment Valve	用于锁死/解锁三脚架支撑腿伸缩，解锁后可分别调整三脚架支撑腿伸缩长度，实现高度调整及调平，调整完成及运输过程中须锁死。 Used to lock/unlock the telescoping legs of the tripod. After unlocking, the length of each tripod leg can be adjusted to achieve height adjustment and leveling. It must be locked after adjustments are completed and during transportation.
7	转台电源插口 Turntable Power Socket	用于接入电源适配器 Used to connect the power adapter.
8	转台网络数据插口 Turntable Network Data Socket	用于接入网络数据线缆 Used to connect the network data cable.
9	转台-雷达电源插口 Turntable - Radar Power Socket	接入雷达主机电源接口 Connect to the power interface of the radar host.
10	转台-雷达网络数据接口 Turntable - Radar Network Data Interface	接入雷达主机网络数据接口 Connect to the network data interface of the radar host.

- **部件介绍-雷达主机**
- Component Introduction - Radar Host



雷达正面 Radar Front View	雷达背面 Radar Rear View	雷达顶部 Radar Top View	雷达底部 Radar Bottom View

序号 Serial Number	名称 Name	用途 Purpose
1	RTK 天线 RTK Antenna	用于雷达定位定向 Used for radar positioning and orientation
2	雷达主机安装孔 Radar Host Mounting Hole	用于固定雷达主机与转台安装支架 Used to secure the radar host and the turntable mounting bracket
3	雷达主机网络数据接口 Radar host network data	连接到转台的雷达网络数据接口，雷达主机输出数据

	interface	Connects to the radar network data interface on the turntable, with the radar host outputting data
4	雷达主机电源接口 Radar host power interface	连接到转台的雷达电源插口，给雷达主机提供电源输入 Connects to the radar power socket on the turntable, providing power input to the radar host
5	泄压阀 Pressure relief valve	平衡雷达内外压力 Balances internal and external pressure of YRL-02

4 注意事项

4 Precautions

★ *严禁雷达架设于室内或者强反射体旁边，比如高楼、大金属块/墙，否则会导致雷达性能下降甚至烧毁；*

★ *It is strictly prohibited to set up YRL-02 indoors or near strong reflectors, such as tall buildings or large metal blocks/walls, as this may degrade radar performance or even cause damage.*

★ *雷达架设场地应无其他强电磁干扰，如其他同波段雷达、电磁干扰设备，否则会导致雷达性能下降甚至毁坏；如确实无法避免，应尽量远离强电磁干扰源安装；*

★ *The radar installation site should be free of strong electromagnetic interference, such as other radars operating in the same frequency band or electromagnetic interference equipment, as this may degrade the performance of YRL-02 or even cause damage. If it is unavoidable, install it as far away from strong electromagnetic interference sources as possible.*

★ *雷达架设宜选择周边空旷的地区，探测要求的覆盖范围内不宜有影响探测效果的障碍物；*

★ *It is recommended to choose an open area for radar installation, avoiding obstacles within the desired detection coverage that could affect the detection performance.*

★ *雷达属精密仪器，运输及安装应轻拿轻放，注意有效防护；*

★ *The radar is a precision instrument; handle it with care during transportation and installation, ensuring effective protection.*

★ *运输过程中请保持转台锁死机构处于锁死状态，防止在运输过程中转台自由转动造成不必要的损伤*;

★ *During transportation, ensure that the turntable locking mechanism is in the locked state to prevent unnecessary damage caused by the turntable rotating freely in transit.*

转台锁死

Turntable locking

★ *雷达运行前请务必解除锁死机构的锁死状态（，防止上电后转台无法运行电气烧毁；*

★ *Before operating YRL-02, ensure that the locking state of the locking mechanism is released to prevent electrical damage due to the turntable being unable to operate after power-on.*

转台解除锁死

Turntable unlocking

★ *安装/拆除雷达主机时一定要托住雷达底部，螺丝紧固后才可松开，防止不稳定导致雷达主机跌落造成不必要的损伤，*

★ *When installing/removing the radar host, always support the bottom of YRL-02. Only loosen your grip after the screws are securely fastened to prevent instability that may cause the radar host to fall and sustain unnecessary damage.*

安装/拆除雷达主机时托住底部，防止跌落

Support the bottom during radar host installation/removal to prevent falling