

雷迅云系统 互联网无人机应用白皮书

前言

无人机在过去十年的全球市场中大幅增长,现在已经成为商业、政府和消费应用的重要工具。应用越来越多样化、细分化,对无人机监管和群集控制的需求也越来越明确,传统的点对点通讯的方式已经无法满足未来无人机应用的需求和管理,也存在一定的弊端。

集成弊端:传统的设备当中,图传、数传等模块,都是以单独的模块去安装,之间并没有什么关联性,甚至客户端都要采用不同的软件,才能控制飞机和观看视频。

通讯弊端:常规点对点设备,因为物理射频因素,很难穿透普通的一栋楼、一座小山,应用环境受限比较严重,必须以无遮挡的环境进行通讯。

监管弊端:目前传统无人机射频通讯,无法使用网络化、可视化的管理工具,进行多台飞机的监控和控制,只能以一个接收设备,管理和控制一台设备。

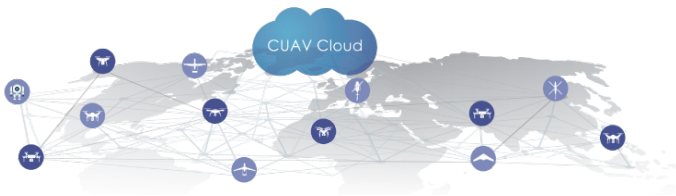
只有将无人机通讯数字化、互联网化,才能解决这些问题,这也是未来发展的趋势。

CUAV雷迅创新现已推出了基于公网/专网(LTE-4G / 5G)通讯的全套解决方案:雷迅云,将无人机的通讯进行互联网化,包括实时的视频数据(1080P)和实时的飞行数据,都可以通过配套的客户端软件进行观看、管理和控制,还可以利用雷迅云 WEB端进行无人机大数据的分析和回放、无人机的权限分配和管理,还可以搭建RTK-HUB硬件,使群组内的无人机获得厘米级的定位。并拥有先进的对称和非对称混合数据加密系统,保证了无人机的通讯安全。

部署雷迅云方案,将无人机通讯和管理进行云端化,它将使您的无人机业务得到质的提升并增加前所未有的竞争力。

雷迅云系统构成

CDLT服务器



无人机数据存储、转发的云端服务器,集成可靠的通讯加密系统,是雷迅云的核心服务器,用于支撑整个云端无人机的系统。

CUAV Cloud Web管理平台

CUAV Cloud Web是一款基于WEB可视化无人机数据管理平台,可在WEB界面显示无人机的实时视频、飞行数据和回放历史数据,并能对LTE-LINK RTK-4G设备绑定和配置、账号和权限管理和配置。

LTE-LINK硬件

LTE-LINK 是用于无人机机载的通讯硬件。集成处理器和通讯模块(4G/专网),将无人机的视频和数据实时交互传输到CDLT服务器,支持HDMI或SDI相机。



C-RTK BASE 4G硬件



C-RTK BASE 4G是一款基于无线LTE网络的高精度RTK基站,它通过接入CUAV云端,将RTK观测数据的融合到UAV-HUB云端进行处理。在基站范围(约50km)内群组内的无人机均能进行接收到RTK观测数据,如果无人机装有C-RTK模块即可解算RTK数据,即可达到厘米级别的定位,满足高精度定位应用需求。

客户端软件



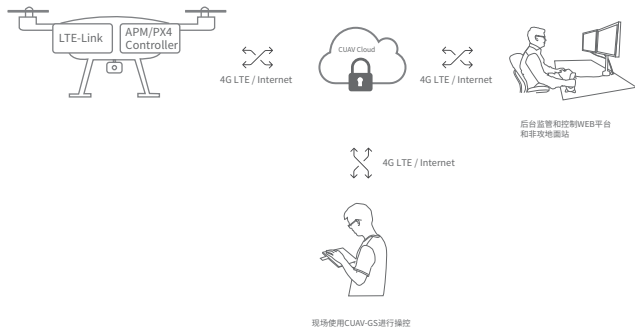
CUAV-GS: 基于安卓开发的客户端,通过登陆账号绑定LTE-LINK无人机,可进行无人机的实时视频观看、实时飞行数据的控制和规划。



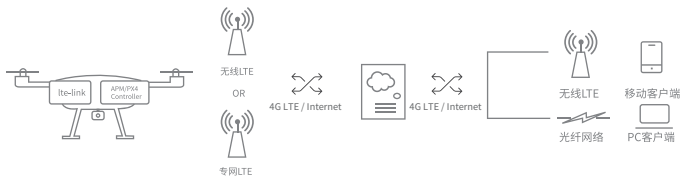
CUAV 非攻地面站:基于QT平台开发的客户端,可兼容Windows、MAC等平台,可进行多台或者单台无人机的实时视频观看、实时飞行数据的控制和规划。

雷迅云应用框架图

基于移动公网基站及CUAV公网云框架图



基于私有服务器及专网基站应用框架图





太阳能光伏发电系统主要分集中式和分布式，集中式电站一般占地面积广，自然环境较为恶劣，大量的运维工作，如常规设备检测、光伏板巡检等工作带来了巨大的维护压力。

传统巡检方式

采用点对点的无人机，人员必须去到现场起飞和控制，通讯距离有一定局限性，只能日晒雨淋的在室外巡检，自动化程度低，而且无法远程实时观看和分析处理。

云端无人机巡检方式

部署雷迅云系统后，无人机通过LTE网络或者专网通讯，客户根据应用场景挂载变焦或者热成像相机。只需要将无人机部署到室外，就可以远程通过手机或者电脑客户端操控起飞和规划任务，并获取实时的高清图像和飞行数据。满足大面积的巡检需求，并可以远程分析和处理，用户通过开放的API将实时图像做二次AI识别，实现智能化巡检。



当城市出现安全事件时,使用无人机可以极大的提高事件的处理和反应效率,一旦发生安全事件时,无人机可以捕捉直观清晰的实时画面,协助相关部门快速的展开和处理事件。

传统无人机

只能到达现场进行起飞和控制,如果遇上交通堵塞或者环境复杂的情况,点对点通讯的无人机基本派不上用场,受限比较明显。

雷迅云云端无人机

云端无人机依靠现有公网通讯网络,可以实现远程部署或者起飞的方式,快速的到达事发现场,无人机可以将实时的图像和数据直接与调度中心进行结合,实现远程快速指挥和调度。当公网网络中断时,可以部署专用网络实现通讯。



云端无人机应用场景之 -无人机机场-

越来越多的勘察、巡检应用由无人机代替，从而增加效率和降低人工成本和风险，而无人机可以实现空中立体视觉，这是传统人工巡检无法比拟的。

一些固定区域、私有领地，如矿场、石油天然气和海港等，需要大量反复的巡查，然而传统无人机反复飞行就需要反复更换电池和人员操作，而也无法达到时刻待命的需求。这时一个可以自动管理和起飞降落的无人机自动机场需求逐渐提升。

远程控制和通讯，群集管理是自动化机场关键技术的里程碑，部署雷迅云系统后，可以成熟稳定的解决远程通讯、多机管理、远程操控的关键技术问题，用户只需要设计一个具有更换电池的箱体和无人机，就能快速的实现自动化无人机机场。



无人机在内河或者港口应用中扮演了重要的角色，它不仅可以对环保、毒气检测、环境采样、污染检测，还可以进行各种巡查、巡视等工作。

无人机具有使用成本低、操作便捷，反应快速、高效，并能获取实时影像和数据，无人机的普及还大大降低了人工成本和风险。

河道或者港口环境非常复杂，各种障碍物导致信号阻挡而无法穿透，如果使用点对点的无人机操纵方式，就意味着操作者就必须在高处部署和控制无人机，这在实际环境中往往很难去实现，如果无法实时的去操控和获取实时的影像和数据，就失去了无人机实时巡视和实时处置的意义。

然而河道、内海或者港口面积非常大，一台无人机去应用和工作效率非常低，而使用多台无人机进行工作时，就需要配备多个飞手，大大增加了使用成本和不可控的因素，使用传统的无人机也无法对接到监管中心，出现案情时也只能通过人工通报的方式。

现存痛点：通讯无法穿透障碍物、无法多机控制和管理、无法与监管中心对接、无法实时调度。

部署CUAV Cloud 后，无人机可以通过现有的基站网络进行无限距离的通讯，监控中心可以使用CUAV Cloud WEB平台进行实时查看群内的全部无人机数据和影像进行任务调度，并可以直接在室内即可使用 CUAV非攻地面进行操控一台或者多台无人机。



演示的无人机装配了LTE-LINK 通讯链路、CUAV V5飞控、C-RTK精准定位模块。控制端手机采用安卓系统，并安装了CUAV GS客户端。监控中心电脑采用win10系统，并安装了CUAV 非攻地面站，火狐最新WEB浏览器。



现场人员将无人机接通电,并放置到在合适的安全起飞位置。



现场人员通过CUAV GS客户端登陆账号连接上对应无人机,检查相关参数和状态是否正常通知无人机监管中心,准备就绪。



监管中心使用通过CUAV非攻客户端 登陆具有无人机控制权限的账号,并进行规划巡视航线任务。通过客户端即可进行远程自动起飞和执行飞行任务。在监管中心平台上可以显示实时的飞行视频和状态信息,还可以实时的对无人机进行操作,包括:云台调节、暂停任务、指点飞行、任务重置、指点飞行、自动返航、自动降落等。

CUAV Cloud System

Internet Drone Application White Paper

Foreword

UAVs have grown substantially in the global market over the past decade and have become commercial, government and consumer applications, important tool. Applications are becoming more and more diverse and segmented, and the need for drone monitoring and cluster control is increasing. Clearly, the traditional point-to-point communication method is no longer meet the needs and management of future UAV applications, And there are also certain drawbacks.

Integration malpractice: In traditional equipment, modules such as image transmission and data transmission are installed in separate modules. There is no correlation, and even the client has to use different software to control the aircraft and watch the video.

Communication Disadvantages: Conventional point-to-point devices, because of physical RF factors, it is difficult to penetrate an ordinary building, a small in the mountains, the application environment is limited, and communication must be carried out in an unobstructed environment.

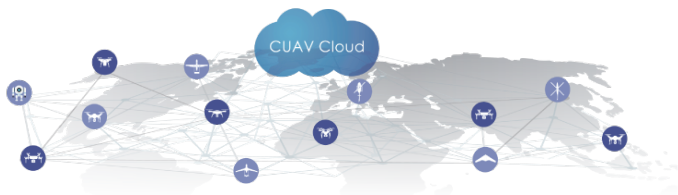
Regulatory malpractice: At present, traditional UAV radio communication cannot be carried out using networked and visual management tools. The monitoring and control of multiple aircraft can only manage and control one device with one receiving device.

Only by digitizing and Internetizing drone communications can these problems be solved, which is also the trend of future development.

CUAV Lei Xun Innovation has launched a complete solution based on public network / private network (LTE-4G / 5G) communication: CUAV Cloud, the communication of the drone's communication, including real-time video data (1080P) and real time flight data can be viewed, managed and controlled through the supporting client software, and can also be utilized CUAV Cloud Web-side analysis and playback of drone big data, authority allocation and management of drones, The RTK-HUB hardware can be built to enable the drones in the group to achieve centimeter-level positioning. And has advanced symmetry And asymmetric hybrid data encryption system to ensure the communication security of the drone. Deploy the CUAV Cloud solution to cloud the drone communication and management, and get your drone business improve quality and increase competitiveness.

CUAV Cloud System

CDLTserver



The cloud server for data storage and forwarding of drones, integrated and reliable communication encryption system, is the core of Cloud Server, a system used to support the entire cloud drone.

CUAV Cloud Web Management Platform

CUAV Cloud Web is a web-based visual drone data management platform that displays drones on the WEB interface. Real-time video, flight data and playback history data, and can be bound and configured for LTE-LINK RTK-4G devices. Number and rights management and configuration.

LTE-LINK Hardware

LTE-LINK is a communication hardware for unmanned aerial vehicles, integrated processing and communication modules (4G/special network), will drone video and data Real-time interactive transfer to CDLT server, support for HDMI or SDI cameras.



C-RTK BASE 4G hardware



C-RTK BASE 4G is based on wireless LTE network. High-precision RTK base station, which is connected to CUAV Cloud. In the cloud, the integration of RTK observation data into the CUAV cloud the end is processed. Within the baseline range (about 50km) the drones in the group can receive RTK observation data. If the drone is equipped with a C-RTK module, the RTK data can be solved. Can achieve centimeter-level positioning for high-precision positioning application requirements.

Client software



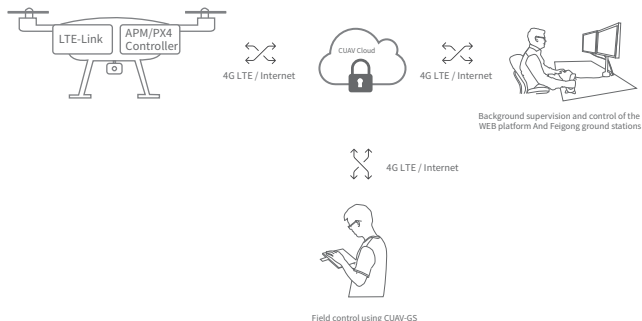
CUAV-GS: Client based on Android development, through the account Binding LTE-LINK drone for real-time viewing of drones frequency viewing, control and planning of real-time flight data.



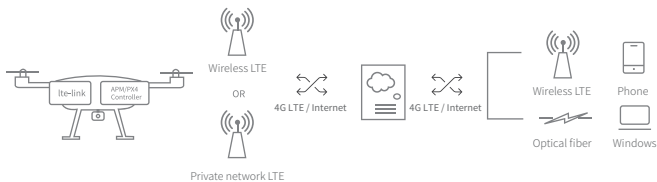
CUAV Feigong ground station: client based on QT platform development, Compatible with Windows, MAC and other platforms, can be used for multiple or Real-time video viewing of single drones, real-time flight data control and planning.

CUAV Cloud Application framework

CUAV public network cloud framework base on mobile public network base station



Application framework based on private server and private network base station





The solar photovoltaic power generation system is mainly divided into centralized and distributed. The centralized power station generally covers a large area, and the natural environment is relatively harsh. A large number of operation and maintenance work, such as routine equipment inspection and photovoltaic panel inspection, bring great maintenance pressure.

Traditional inspection methods

With point-to-point drones, personnel must go to the site for take-off and control, and the communication distance has certain limitations. It can only be used for outdoor inspections in the sun and rain, with low automation and remote real-time viewing and analysis.

Cloud drone inspection method

After deploying the CUAV Cloud system, the drone passes the LTE network or the private network communication, and the customer hangs according to the application scenario. Load zoom or thermal imaging camera. You only need to deploy the drone to the outside, you can remotely use your mobile phone or electricity. The brain client controls take off and planning tasks and captures real-time HD images and flight data. Satisfy a large area inspection requirements, and can be analyzed and managed remotely. Users can make real-time images for secondary AI recognition through an open API implement intelligent inspections.



Cloud UAV Application Scenario - City Security -

When a security incident occurs in a city, the use of drones can greatly improve the handling and response efficiency of events. In the event of a security incident, the drone can capture an intuitive and clear real-time picture to assist the relevant departments speed up and process events.

Traditional Drone

Can only reach the site for take-off and control, if there is traffic jam or complicated environment, point-to-point the drones of communication are basically not used, and the restrictions are obvious.

CUAV Cloud UAV

Cloud UAVs rely on the existing public network communication network to enable remote deployment or take-off, fast upon arrival at the scene, the drone can combine real-time images and data directly with the dispatch center to achieve remote fast command and dispatch. When the public network is interrupted, a dedicated network can be deployed to implement communication.



More and more survey and inspection applications are replaced by drones, increasing efficiency and reducing labor costs and risks. The drone can realize aerial stereo vision, which is unmatched by traditional manual inspection.

Some fixed areas, private territories, such as mines, oil and gas, and seaports, require extensive and extensive inspections. However, the repeated flight of traditional drones requires repeated battery and personnel operations, and it is impossible to always on stand by requirements. Demand for life. At this time, an automatic airport demand for a drone that can be automatically managed and taken off and landed is gradually increased.

Remote control and communication, cluster management is a milestone in automating key airport technologies, deploying CUAV Cloud After the system, it can mature and solve the key technical problems of remote communication, multi-machine management and remote control. Users only need to design a cabinet with a replacement battery and a drone, which can be quickly automated. man-machine airport.



UAVs play an important role in river or port applications, not only for environmental protection, gas detection, Environmental sampling, pollution detection, and various inspections, patrol, etc.

The drone has low cost of use, convenient operation, fast response, high efficiency, and access to real-time images and data. The popularity of drones has also greatly reduced labor costs and risks.

The river or port environment is very complicated, and various obstacles cause signal blocking and cannot penetrate, if point pairs are used. The way the drone is operated means that the operator must deploy and control the drone at a high place. This is actually It is often difficult to implement in the environment. If you can't control and get real-time images and data in real time, you will lose it. The significance of real-time inspection and real-time disposal of drones.

However, the river, the inland sea or the port is very large, and a drone is very application-efficient and works very efficiently. When working with multiple drones, it is necessary to equip multiple flying hands, which greatly increases the cost of use and is uncontrollable, factors, the use of traditional drones can not be connected to the regulatory center, when the case arises, only through manual notification The way. Existing pain points: communication can't penetrate obstacles, can't be controlled and managed by multiple machines, can't connect with supervision center, unable to schedule in real time.

After deploying the CUAV Cloud, the drone can communicate over unlimited distances through the existing base station network. The monitoring center can use the CUAV

Cloud WEB platform to view all the drone data and images in the group in real time.Task scheduling, and you can use the CUAV non-attack ground to control one or more directly indoors.



The demo drone is equipped with LTE-LINK communication link, CUAV V5 flight control, and C-RTK precision positioning module. control The mobilephone is Android and has the CUAV GS client installed. The monitoring center computer uses the win10 system.And installed CUAV non-attack ground station, Firefox's latest WEB browser.



The field personnel turned the drone on and placed it in A suitable safe takeoff location.



Field personnel access the account through the CUAV GS client. Connect the corresponding drone, check the relevant parameters and status. Whether the drone supervision center is normally notified and ready.




The supervisory center uses the CUAV non-attack client to log in to the account with drone control authority and regulates Plan the tour route mission. Remote automatic takeoff and mission execution are available through the client. In supervision Real-time flight video and status information can be displayed on the heart platform, and the drone can be operated in real time. Including: PTZ adjustment, pause mission, pointing flight, mission reset, pointing flight, automatic return, automatic Landing, etc.



180-2719-9112
180-1176-0310
180-1188-1413

 www.cuav.net

 广州市南沙区环市大道南2号 资讯科技园 软件楼
Technology Park software building, Nansha
District, Guangzhou City, China.

