www.GDEpri.com

Connects the World with Smart Terminals

PR 100 Multi-Illuminator Passive Radar-MiPAR

Electromagnetically silent for uncovering and tracking of low flying objects

Unexpected drones are having nowhere to hide

Highlights

- Dedicated MiPAR technology passively detects invading drones and other low flying objects.
- No radio emission, no electromagnetic interference to the environment, no need for radio frequency usage license, suitable for complex city and airport applications.
- Passive radar meaning detection by only receiving, keeping the detecting entity under covered and safe from radar searching.
- Suitable for indoor and outdoor, options for fixed permanent base station, mobile base station and on-vehicle base station.
- Extensible to multiple node-points architecture to support a distributed detection network for enhanced tracking resolution, coverage starting from 5 -10 square kM by a single node-point to hundreds of square kM by multiple node-points.
- Ready to establish a detecting, tracking and reacting 3-in-1 anti-drone system.

Applications

- Security of significant expos, conference, sports event etc.
- Airports and other restricted air space.
- Military and other sensitive sites.
- Critical government sites.
- Important power grid assets such as extra high voltage cable tower.
- Nuclear plant, hydro plant, oil and gas plant, off-shore wind park.
- Petroleum, LNG, natural gas and similar critical chemical plants.

Background

On 4 August 2018, at least two drones detonated explosives near Avenida Bolívar, Caracas, where Nicolás Maduro, the President of Venezuela, was addressing the Bolivarian National Guard in front of the Centro Simón Bolívar Towers and Palacio de Justicia de Caracas. The Venezuelan government claims the event was a targeted attempt to assassinate Maduro, though the cause and intention of the explosions is debated.

Between 19 and 21 December 2018, hundreds of flights were cancelled at Gatwick Airport near London, England, following reports of drone sightings close to the runway. The incident caused major travel disruption, affecting about 140,000 passengers and over 1,000 flights. It was the biggest disruption since ash from an Icelandic volcano shut the airport in 2010.

Drone technology on one hand brings new ways of working and enables joys from many innovative applications. But on the other hand it also introduces risks that can cause severe damages and even casualty no matter intentionally or unintentionally.

Therefore, the risks associated with drones and other low flying objects are now practically become a real national security challenge to the governments around the world. The PR100 passive radar is the product co-developed by GDEPRI and the Wuhan University targetting to provide a solution to this challenge.

The prototype of PR100 particiapated the Unmanned Drone Interception Competition 2018 and the Anti-Drone System Testing organized by the Central Millatary Commission and the Ministry of Public Security of the People Republic of China respectively. The production model had been installed in the China Guanghan Airport as a demonstration unit, served the Wuhan Marathon and China International Import Expo as their air space security system during the event.

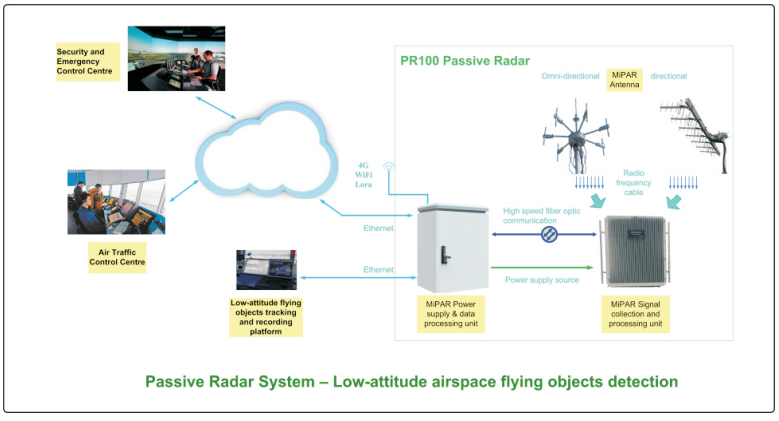
The Ministry of Public Security of the People Republic of China has formally mandated relevant low-altitude air space flying objects detection measures to protect critical facilities covering nuclear plant, petro-chemical factory, oil & gas storage plants, critical power grid assets and important government houses.

System Architecture

Single Node Configuration

Standard PR100 consists of three parts:

- MiPAR directional or omni-directional receiving antenna
- MiPAR signal processing unit
- MiPAR power supply and data processing unit



Passive Radar System – Low-attitude airspace flying objects detection

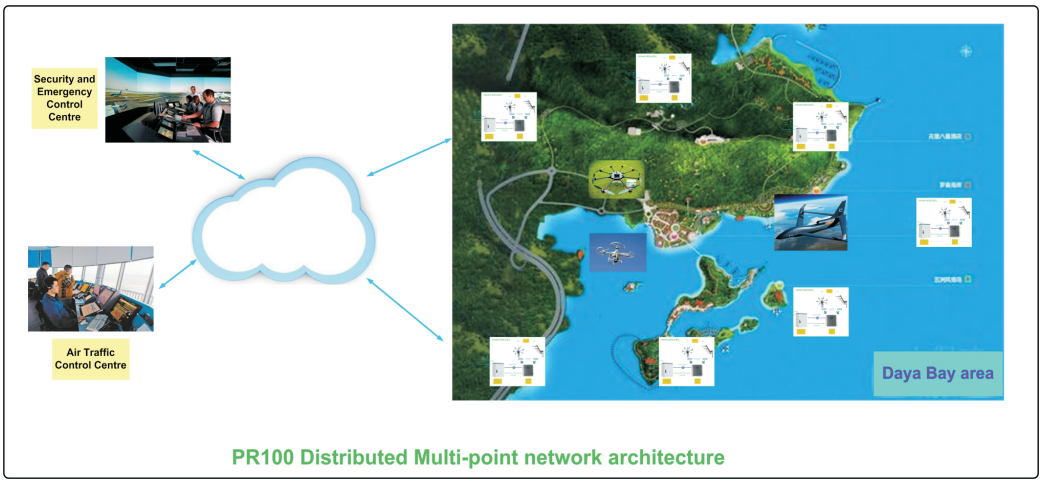
PR100 provides standard data communication interface to connect with the air-space control center or any emergency operation unit for flying objects discovering and tracking. It can connect with relevant system to initiate suitable reaction to the tracked objects, forming a 3-in-1 low-altitude anti-drone system.

The optional locus tracking and recording module together with the geo-map software enable facility owners to keep detail records of the invading drones for any nencessary next step follow-up actions.

System Architecture

Multiple Node-Points Networking System

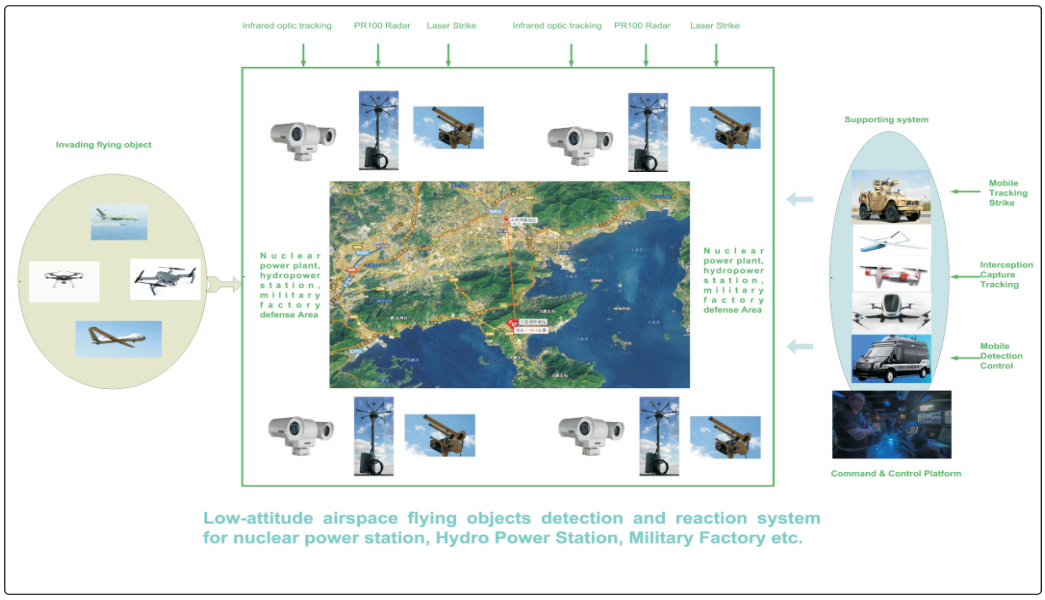
PR 100 can be extended to a multiple node-points networking architecture, capable to manage multiple node-points in a defined area. These allows enhanced tracking resolution and multiple flying objects tracing capability. In such configuration, the covered air space can be extended from 5-10 square kM to hundreds of square kM.



PR100 Distributed Multi-point network architecture

Low Attitude Airspace Anti-Drone System

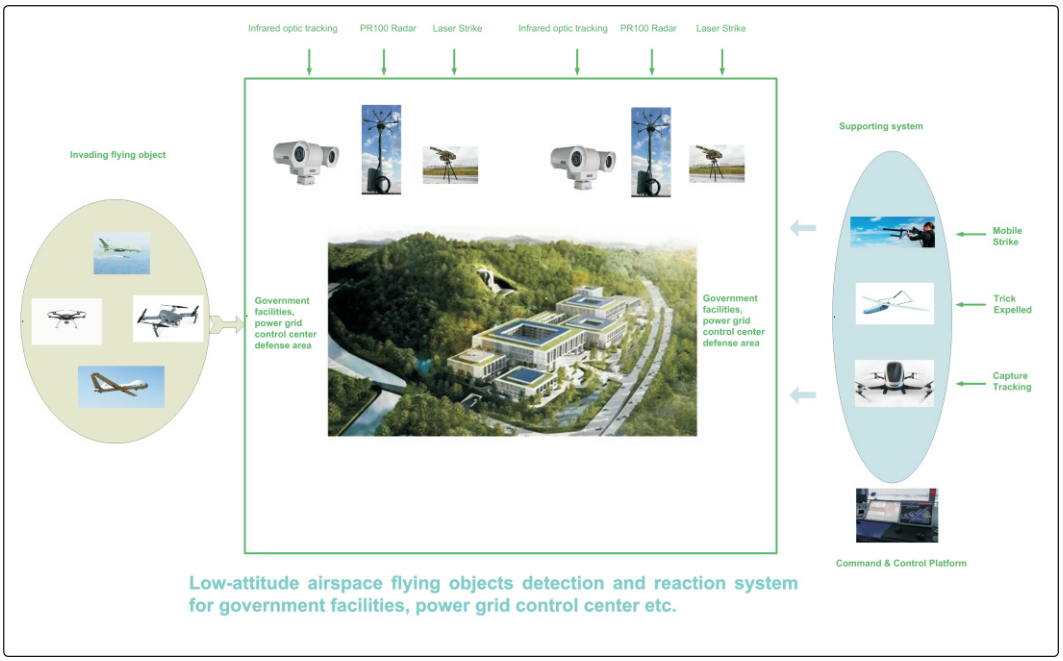
PR100 is the core of an anti-drone platform.



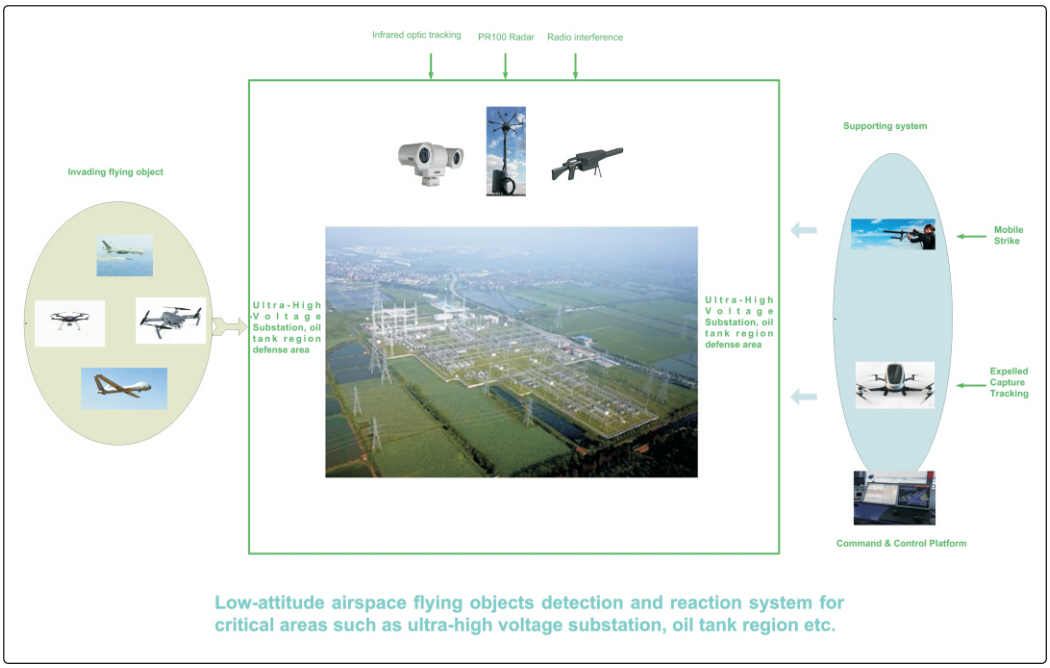
Low-attitude airspace flying objects detection and reaction system for nuclear power station, Hydro Power Station, Military Factory etc.

System Architecture

Low Attitude Airspace Anti-Drone System



Low-attitude airspace flying objects detection and reaction system for government facilities, power grid control center etc.

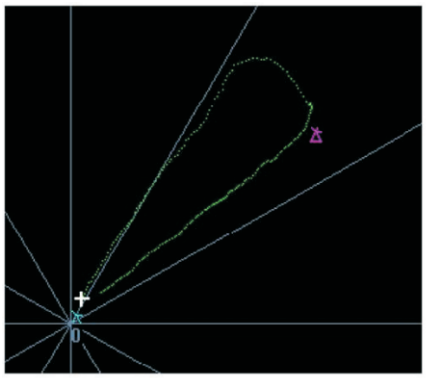


Low-attitude airspace flying objects detection and reaction system for critical areas such as ultra-high voltage substation, oil tank region etc.

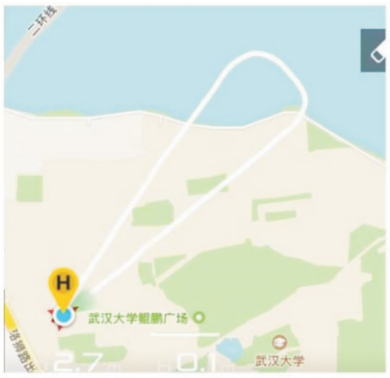
Project References

Installed system in the China International Import Expo 2018

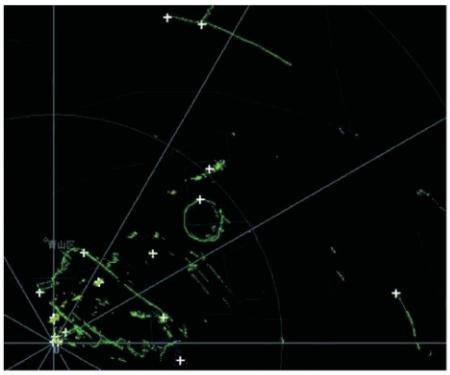
Contrast Map of Radar Detection Trajectory of Unmanned Aerial Vehicle in Luojiashan Campus of Wuhan University



(a) PR 100 tracked drone flying locus



(b) The drone's own GPS record



(a) PR 100 tracked flying-object locus

(b) The object's own GPS record

Performed at the Guanghan Airport and supported by the Civil Aviation Flight Academy of China

Configuration

The PR100 can be configured as a permanent base station, a lugguageble mobile base station an in-vehicle base station for both indoor or outdoor application. The GDEPRI engineering team will tailor-made the most suitable configuration according to the actual situation. Our expert can also provide site survey and application consultation service to the end-users or the system integrator.

Item no.	Parts	Model	Quantity	Remarks
1	MiPar Antenna	PR100-AFD directional antenna		
		PR100-AD omni-directional antenna with gimbal	1	
2	MiPar signal receiver and processing unit	PR100-SRP 8-channel processing unit	1	
3	MiPar Data processing unit	PR100-DP Data Processing Unit	1	
		PR100-CP Indoor power supply unit		
		PR100-CPA Outdoor power supply, air-condition unit	1	
4	Military grade fiber optic	10GBase-LR dual-core cable	1	Length according to actual condition
5	MiPar Control Center	PowerCloud low attitude drone detecting and tracing package	1	
		HD LCD Panel	3	User specifiable

Technical Specifications

- Model: PR100 Exogenous passive radar
- Detection range: 5-10 square km (with the reference drone DJI Phantom 3)
- Emission Power: 0 (No emission)
- Detection resolution in distance: 20m
- Detection resolution in velocity: 1m/s
- Angular resolution: 1°
- Positioning accuracy: 20m (Multiple Node-points configuration)
- Scanning speed: >60r/min (electronically scanned array)
- Scanning attitude: ⩽1000m
- Rate of false alarm: $<10^{-5}$
- Node-point extendibility: no limit
- Installation: on the ground or in-vehicle
- Power requirement: AC220V / 800W

GDEPRI Power Control Systems & Equipment (HK) LTD.

NO.39 NanYun San Road,GuangZhou,China
Tel:86-20-87071649 Fax:86-20-37020105
QQ: 109487311 Post Code:510520

Uint A,11th Floor,Chung Pont Commercial Building,
300 Hennessy Road, Wanchai ,Hong Kong
Tel:852-27881288 Fax:852-28062486
www.gdepri.com Email:sales@gdepri.com

Note: the information and data in this document may be updated from time to time without prior notice.