Plextek
Exceptional Engineering Solutions

Delivering novel concepts to deployable capability

PLX-U16

UBIQUITOUS RADAR

Reliably detect, track and identify drones in complex environments

Drones and other uncrewed aerial vehicles are now widely available in commercial, industrial and consumer markets. Reliably detecting, tracking and identifying drones can be problematic particularly in urban areas where line of site is diminished.

Plextek's PLX-U16 Ubiquitous Radar has been designed and developed to address these issues. In contrast to traditional scanning radars which scan a narrow beam around the scene the PLX-U16 Radar is able to detect returns from many directions simultaneously. It can also differentiate between drones and birds even determining the size and type of drone (e.g. fixed wing vs rotary wing).

The PLX-U16 has a wide range of applications and is very versatile, for example it can be deployed in congested environments (e.g. on ground, side of buildings) as part of a distributed sensing system. Alternatively, it can be mounted on a drone/helicopter as a forward-facing radar to provide medium range detection. (500 m to around 1 km, depending on target size).

The Problem - Detecting Drones

- Countering drones is a difficult and challenging problem
- Detecting Class 1 drones at range is difficult (even with a high power radar)
- Class 1 drones can have a low RCS (-20 dBsm), and fly low and slow
- Ranges > 500 m difficult in many environments due to line of sight issues

PLX-U16 Ubiquitous Radar - Distributed Sensing

- Using several radars to provide a distributed sensing capability
- Provides coverage in shadow regions
- Can deploy as unattended sensors to extend the range and area of coverage

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Key Benefits

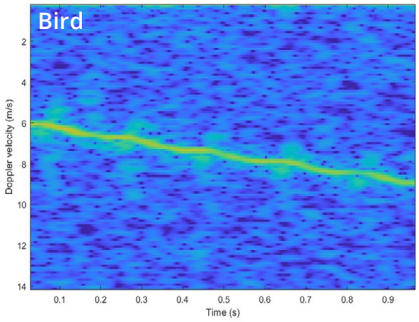
- Wide beam on transmit, digitally beamform on receive
- Radar able to detect returns from many directions simultaneously
- Contrast with traditional scanning radars which scan a narrow beam around the scene
- Enables tracking of multiple dynamic targets simultaneously
- Enables extended dwell times on a target which aids target classification, without compromising simultaneous wide area coverage

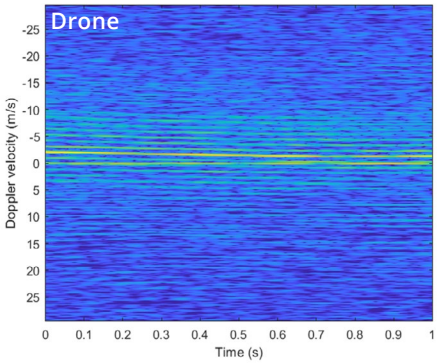
Key Features

- Low size, weight and power
- Deployable on the ground, buildings or drones
- Operates standalone, or as apart of a distributed radar network to provide coverage in complex cluttered environments
- Can detect, localise and track a wide range of targets including drones, people, cars, helicopters and more
- Can reliably distinguish between birds and drones
- Technology can be used as a seeker for hunter-killer drones, or collision avoidance for uncrewed systems
- Operates in Ku band (15.7-17.2 GHz)

Target Classification

- Reliably detect, track and classify small Uncrewed Air Systems (UAS)
- Differentiate between drones and birds / other confusers
- Determine type of drone (e.g. fixed wing vs rotary wing)
- Estimate size of drone





Example Applications

The PLX-U16 platform can be used for a wide and diverse range of applications, including but not limited to:

Mounted on drone/helicopter as a forward facing radar to provide medium range (500 m – 1km, depending on target size) detection capability against other airborne targets

Downward facing to enable measurement of ground-Doppler to assist in GNSS-denied navigation.

Deployable radar in congested environments (e.g. on ground, side of buildings) – as part of a distributed sensing system

Infill/Overwatch radar (to plug gaps in the coverage of other wide area surveillance systems)

Specification

SIZE (INC. TX MOUNTING BRACKET)	337 mm x 100 mm x 60 mm
WEIGHT	Radar Module 1.4 kg
SUPPLY VOLTAGE INPUT	12 – 15 VDC (regulated supply required)
POWER CONSUMPTION	< 45 W
TRANSMIT FREQUENCY	Within 15.7 - 17.2 GHz (Ku-band)
TRANSMIT POWER	1 W typical (2 W max)
TRANSMISSION MODE	FMCW
BEAMFORMING	Beamform-on-receive using parallel receive channels
TRANSMITTED BANDWIDTH	20 MHz
ANGULAR ACCURACY OF DETECTIONS (AZIMUTH AND ELEVATION)	±3° or better (Typically ±1°azimuth)
DETECTION RANGE	Target size dependent (Typically many hundreds of metres against a small target)
FIELD OF VIEW (FOV)	120° (azimuth) x 20° (elevation). Option of electronically-scanned on transmit concept to achieve 90° elevation field of regard (FoR)
MAXIMUM INSTRUMENTED RANGE	Approximately 1 km
DEVELOPMENT STANDARD	SAPIENT Compliant

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