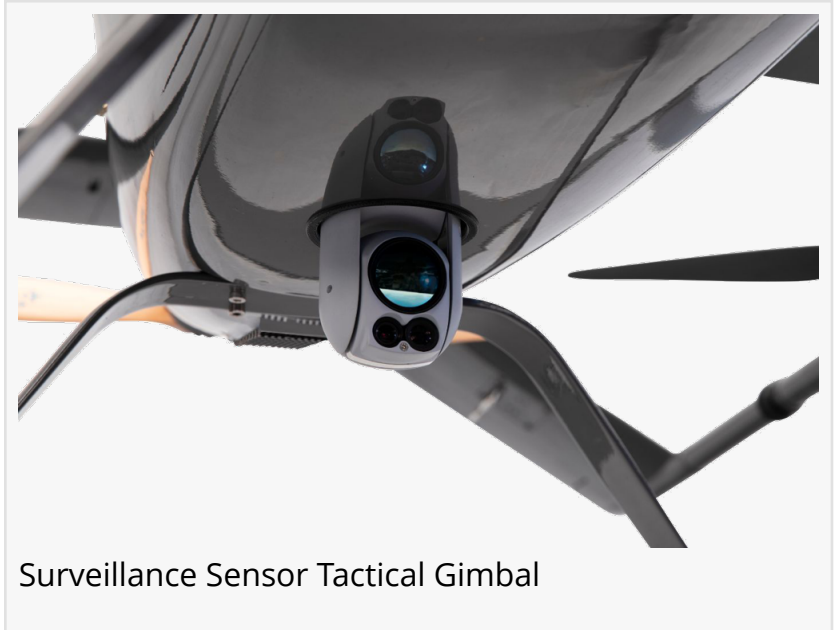


# Choosing the right sensors for Surveillance Drones

*COMPARISON of DIFFERENT SENSORS for SURVEILLANCE AND SECURITY DRONES: (OPTICAL VS THERMAL VS SAR)*

CAPE TOWN, SOUTH AFRICA, August 10, 2020 /EINPresswire.com/ -- Recent advances have made a variety of powerful technologies available on low altitude drones, which are perfect for [Surveillance](#) Security missions, whether they be Surveillance Drones for Police, Military or Government Applications.



Surveillance Sensor Tactical Gimbal

## THE IMPORTANCE OF SENSORS IN SURVEILLANCE OPERATIONS

Drone Surveillance operations are by nature fluid and can change at a moment's notice. The demands of the situation can demand change not only in flight-plan, but also in the deployment mode of onboard sensors. Sensors that proven themselves powerful and flexible enough for Surveillance Security operations include Infrared, Optical and [SAR](#) (Synthetic Aperture Radar) sensors.

DRI (Detection, Recognition, Identification) resolution criteria often used for Drone Surveillance operations. Resolution for thermal cameras and optical IP cameras are measured differently. Thermal cameras and optical cameras use totally different technology.

### Thermal Cameras

The performance of a thermal camera is defined by line pairs. The thermal cameras provide images based on the heat energy (Infra-Red) emitted by the object. To Detect an Object 1.0 Cycles on Target are required but to Identify a Member of Class 6.4 Cycles on Target is required for Optical Cameras.

### Optical IP Cameras

IP camera resolution performance is defined by the number of pixels in the sensor, with reference to the ability to identify a person. The optical camera provides an image from the light

reflecting off the object. Optical IP cameras provide color images, and this can help identify or recognize the object. They will switch to monochrome or black-white when it gets very dark. IP cameras use the pixel count to measure resolution. This provides a more defined way of determining what detail can be seen. To Detect a person 1.6pixels per feet are required and to Identify a person about 40 pixels are required across the face.

### Comparison of Thermal and Optical Technology

The optical IP cameras provide better detail than thermal cameras because they provide color video rather than the false color provided by monochrome thermal cameras. Color provides much more information and makes it easier to identify things. Since, the thermal cameras use heat energy from the target, they can operate in total darkness, while optical cameras require some light source.

### Synthetic Aperture Radar (SAR)

Lowering cost electronics are just beginning to make SAR technology economical for smaller scale uses at altitudes much closer to points of interest.

SAR provides broad-area imaging at high resolutions whether at night or during inclement weather. SAR systems take advantage of the long-range propagation characteristics of radar signals and the complex information processing capability of modern digital electronics to provide high resolution imagery. SAR complements photographic and other optical imaging capabilities because it is not limited by the time of day or atmospheric conditions and because of the unique responses of terrain and cultural targets to radar frequencies.

SAR is a mode run by a conventional radar system that is moving to artificially create a representation of an extremely large antenna with the help of clever signal processing. SAR techniques are used to achieve much greater angular antenna resolution, which can be used to generate highly detailed maps in situations and conditions when optical and infrared cameras or sensors are not adequate. Creating 2-D and 3-D images from radar reflections off the ground makes SAR ideal for identifying targets the size of a human body.

SAR relies on radio or microwaves rather than visible light and can see through haze, clouds, and even thick forest canopies.

### 'Noisy' cluttered environments and weather conditions

Long-range ground targets are difficult to detect in a noisy cluttered environment. To overcome these synthetic aperture radar (SAR) images or infrared (IR) images are frequently used.

SAR can measure the electromagnetic scattering property of targets under any weather and light conditions. This method is used frequently to detect distant targets because it provides strong radar cross section (RCS) values and shape information of targets referred to as RCS signatures as opposed to the thermal signatures in the IR case. While both sensors have day and night capabilities the SAR sensor has weather-independency compared to the IR sensors that are strongly affected by weather conditions.

## Foliage, Ground and Flame Penetration

Synthetic aperture radars further also offer the capability for penetrating materials, which are optically opaque and thus not visible by optical or IR techniques. Low-frequency SARs may be used under certain conditions to penetrate foliage and even soil. This provides the capability for imaging targets, normally hidden by trees, brush, and other ground cover.

## Detecting the human body

The human body emits a narrow range of Infra-Red radiation and IR has been the go-to sensor for detecting humans. However the size of the human body is more in the range wave lengths of Radio or Microwaves making them ideal for detection by radar energy.

Using the strong Radar Cross Section (RCS) values of the human body and with complex SAR signal processing, it is possible to identify targets with a 100% accuracy.

## IMAGE SIGNATURES AT REMOTE SENSING ALTITUDES

### IR/Thermal

At remote sensing altitudes, the visual thermal signatures of people, animals, hot rocks or terrain would look exactly the same, with no way of distinguishing between them.

### SAR

Whereas with SAR, from the same perspective, the preset RCS signatures along with the radio waves used, and signal processing software, enabled by the right learning software (AI), you will not only be able to automatically recognize a human, but with incremental values of SAR, also differentiate amongst various individuals.

### Operating Modes for SAR

Using ground/dismount moving target indicator, and maritime wide area search modes to locate moving vehicles, to very slow-moving vehicles and people on foot, and detects ship and boat traffic in various sea states; to provide the wide-area coverage, and then allow for cross-cue to a narrow field-of-view (FOV) electro-optical/infrared (EO/IR) sensor.

[Airborne Drones](#) is a specialist manufacturer of long range Surveillance Drones for Military, Police Surveillance Drones, or Government Surveillance Drones.

MR GP Gerber

Airborne Drones

+27 87 550 4319

[email us here](#)

---

This press release can be viewed online at: <https://www.einpresswire.com/article/523685634>

EIN Presswire's priority is source transparency. We do not allow opaque clients, and our editors try to be careful about weeding out false and misleading content. As a user, if you see something we have missed, please do bring it to our attention. Your help is welcome. EIN Presswire,

Everyone's Internet News Presswire™, tries to define some of the boundaries that are reasonable in today's world. Please see our Editorial Guidelines for more information.

© 1995-2020 IPD Group, Inc. All Right Reserved.