

# **SAR/MTI Radar Excels At Where EO/IR Camera Falls Short During UAV Operations**

Common Operating Picture or Recognized Picture is a mandatory asset that should be established and maintained on the ground, at the sea and in the air in order to observe current status of friendly and enemy units, to effectively make threat evaluation and to increase planning accuracy before the operations.

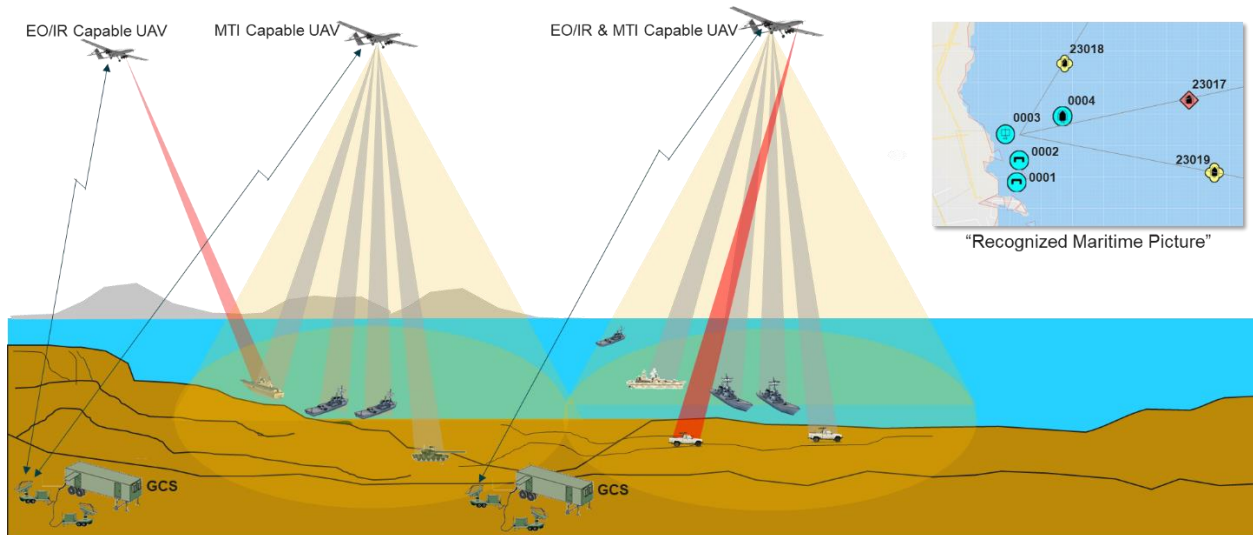
## **How does a SAR/MTI Radar contribute to Common Operating Picture?**

Operators try to identify military units in the battlefield through the usage of various types of sensors. Identification Friend or Foe (IFF), Automatic Identification System (AIS) sensors support the identification process for the cooperated targets. On the other hand, EO/IR cameras, Electronic Support Measures (ESM) systems, and radar systems are used in the process of identifying non-cooperated targets. In that sense, SAR/MTI radars could significantly increase the identification performance for the stationary and moving targets by means of evaluation of radar imagery (SAR and ISAR) and moving target indicators.

Although EO/IR sensors are the major identification tool for the surveillance platforms, the most of them including Unmanned Aerial Vehicles (UAVs) carry only EO/IR sensors which remarkably limit the platform's search capability due to their limited field of view. Radar systems' MTI feature provides round-the-clock situational awareness by shortening and enhancing the target detection process. If the detection and tracking process is implemented only with EO/IR sensors, it is obvious that the target detection and tracking is degraded due to the high-speed targets, being inside or over the cloud, and low visibility situations. These detection and tracking difficulties could be overcome by collectively using EO/IR sensor and SAR/MTI radar. Theoretically, this type of usage provides a robust solution to the detection and tracking cases for the moving and stationary targets. This theoretical approach comes with some practical limitations including UAV's payload capacity and budgetary problems. Low SWaP (Size, Weight, and Power), single LRU and low-cost SAR/MTI radars could turn an air vehicle such as a limited-capacity tactical UAV into a highly capable ISR (Intelligence, Surveillance, and Reconnaissance) platform.

## **MTI Feature**

As depicted in Figure 1, EO/IR capable UAV has a limited search capability. In contrast, MTI capable UAV has a 360-degree search capability including Ground Moving Target Indication (GMTI) and Maritime Moving Target Indication (MMTI). If these two types of UAVs are jointly operated, detection-tracking-identification process could be implemented even with low-cost tactical UAVs. MTI capable UAV detects the moving targets on the surface and then Ground Control Station (GCS) may automatically direct the EO/IR capable UAV to the detection location for identification. In the second alternative, it is possible to have onboard EO/IR sensor and MTI radar which should be selected in accordance with the tactical UAV's payload capacity. MTI to EO/IR cueing mechanism is triggered by the sensor operator on GCS.

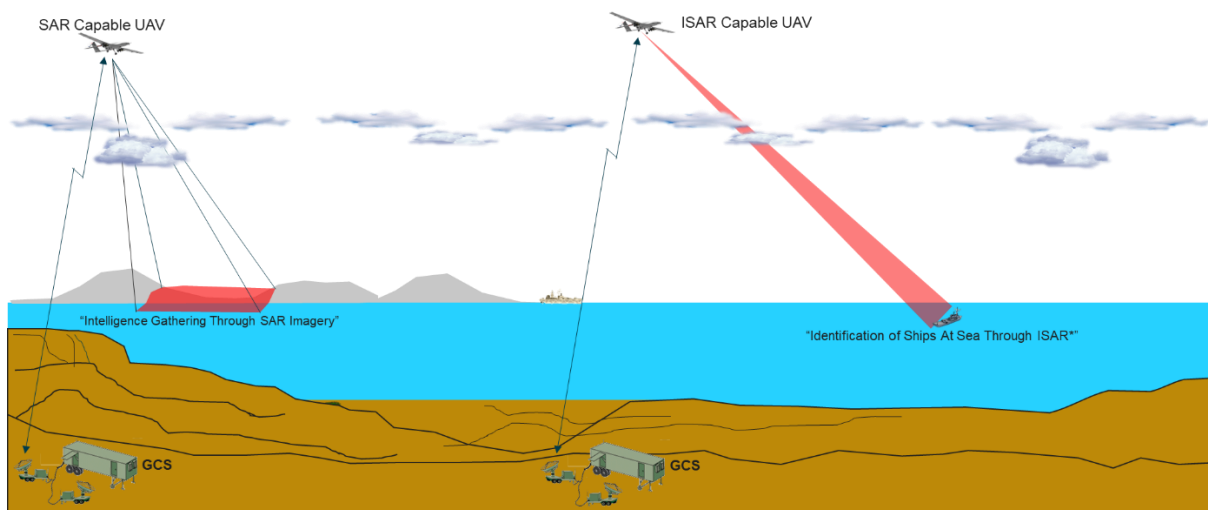


**Figure 1** Extending UAV's Sensor Capabilities with MTI Feature

### SAR/ISAR Features

Unlike MTI, SAR feature provides status of the stationary targets especially for the intelligence personnel regardless of what weather conditions are there. Image resolution of the EO/IR sensor decreases while the range increases. However, SAR radar imagery has a constant resolution which is independent of the range. Submetric resolution for an area of interest tens of kilometers away from the surveillance platform give a great opportunity to the intelligence personnel to gather imagery intelligence in a stand-off range in all weather conditions as seen in Figure 2.

The countries with maritime borders have to establish and maintain Recognized Maritime Picture for maritime security. ISAR feature helps the operators identify the ships offshore even in the low visibility conditions where EO/IR sensors fall short.



**Figure 2** Extending UAV's Sensor Capabilities with SAR/ISAR Features

METEKSAN's SAR/MTI Radar MILSAR is capable of operating on unmanned air vehicles (UAVs), helicopters and fixed wing aircraft along with its easy installation feature. This high resolution radar system has the same form-fit mechanical interfaces as standard 15" EO/IR

sensor turret to be readily replaced with an EO/IR sensor. Operating MILSAR together with an EO/IR sensor in a “slew-to-cue” fashion improves the effectiveness of the UAV-UCAV joint operations through maximizing wide area surveillance of UAV and increasing UCAV’s attack capability.



*Figure 3 MILSAR SAR/MTI Radar*

For detailed information, visit <https://www.meteksan.com/en/products/radar-systems/milsar-uav-sar-gmti-radar> or send your questions to [sales@meteksan.com](mailto:sales@meteksan.com)