UVC-track

ELECTRO-OPTICAL DETECTION SYSTEMS

UVC-TRACK is an innovative ultra-fast and ultra-sensitive modular system for the detection of ultraviolet light sources (200nm - 300nm).

Any detector operating in this band is **solar-blind**, that is, it can operate day and night without the background noise introduced by solar radiation as happens in the case of detectors operating in the visible or infrared. Furthermore, the sensors operating in this particular spectrum band generate a very low number of false alarms compared to sensors operating in the infrared or thermal.

Ultraviolet light in this frequency range is emitted from the combustion of rocket propellant or from gunpowder. For this reason, this type of detectors are used both to detect and track fast-moving objects such as missiles up to distances of a few kilometers, or to detect short-range firearms.

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The detection systems already widespread in the industrial and military fields mainly use solid state devices such as CCD (Charge-Coupled Device) or CMOS (Charge-Coupled Device). **UVC-TRACK** uses devices that operate in photon-counting mode. The idea of using these types of devices comes from the more than ten-year experience of the OMICA team in the field of ultraviolet light detection generated by the passage of cosmic rays through the atmosphere.

These devices are implemented to optimize the ultra-fast detection of very low intensity signals. Compared to solid state devices (CCD and CMOS) it is possible to sample the signal generated by a moving source with a higher frequency than a CCD over 10^5 times.
Furthermore, they have a higher sensitivity due to the very low level of background noise which makes them suitable for the detection of very small intensity signals; it is therefore possible to detect threats at even greater distances and create a more performing Warning System.

Tracking devices using **PMTs** are able to identify and reconstruct the dynamics of moving objects that generate ultraviolet light even at distances greater than 20 km.

Below is a table that summarizes, with respect to some fundamental parameters, the advantages and disadvantages of using solid state devices (CCD and CMOS) rather than photon-counting devices.

PARAMET.	CCD / CMS	Photon Counting	COMP.
Spectral sensitivity	Good	Great	+
Acquisition times	<10 3 frames / sec	Signal sampling up to 109 / sec	++
Intrinsic spatial resolution	Grat	Poor due to the physical size	--
Spatial resolution	Great	Excellent with real-time signal reconstruction algorithms	=
Dimensions	Great	Good Low level of miniaturization	-
Robustness	Good	Great	+
Costs	Low	Low	=
Dynamic range	Good	Grat	+
Cooling	Advisable	Unnecessary	+

UVC-TRACK is a support system for launching and tracking threats potentially integrable with any type of gun control system, silent acquisition and surveillance system direct infrared countermeasures, multi-mission air-to-air missile system