MAKING THE INVISIBLE VISIBLE

Spectral intelligence for
Defense and Security

cubert

"**Hyperspectral UAV systems** capture the spectral signature of each pixel, **making the invisible visible** and **providing a complete picture** of the scene **in real time**. This provides **a decisive information advantage**."

EFFECTIVE RECONNAISSANCE STARTS WITH THE SPECTRUM

In dynamic operational environments, having an information advantage is crucial. Hyperspectral technology takes reconnaissance to a new level: revealing camouflage, identifying anomalies and providing details that remain hidden from conventional sensors. This creates a situational picture that provides reliable orientation and supports decision-making — precisely when every second counts.

In a world where threats are constantly emerging and the ability to adapt is critical for security, conventional sensor technologies are inadequate. Modern operations require the ability to deal with hidden dangers, camouflaged objects and substances that are difficult to identify.

Hyperspectral cameras offer a significant advantage in this regard, enabling material properties, camouflage structures and other anomalies to be identified. Hard-to-detect ground anomalies, optically concealed equipment depots and contaminated areas can even be differentiated by their characteristic spectral features.

Cubert's sensors uniquely capture the entire spectrum for from each pixel, in real time and extending well beyond the visible light spectrum.

REAL-TIME-SNAP-SHOT-TECHNOLOGY

tactical reconnaissance across the entire spectrum

Cubert's snapshot technology differs fundamentally from conventional hyperspectral camera systems. Unlike traditional push-broom sensors, which scan the object line by line and require constant movement of the sensor or scene, Cubert's snapshot technology captures the entire hyperspectral dataset in a single exposure.

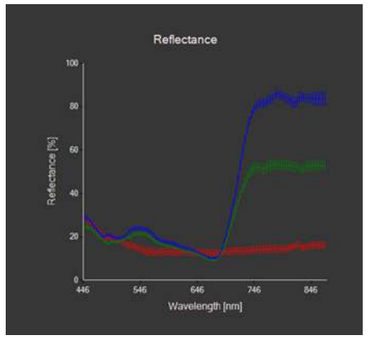
Each pixel receives not only a RGB-colour value, but also a complete spectrum comprising up to 164 wavelength bands, extending beyond the range of light visible to the human eye. The result is not an ordinary image, but a complete spectral data cube: high-resolution and synchronously captured, free of motion artefacts.

Simultaneously capturing all spectral information reliably prevents image distortions and artefacts, even from a moving platform or in dynamic scenes. This technology enables precise single images and high-resolution hyperspectral video analysis with frame rates of up to 45 fps. Image quality remains stable even during fast movements — a decisive advantage for video analysis using UAVs, vehicles or in dynamic deployment scenarios.

Cubert systems deliver complete spectral data in real time and enable direct analysis on site. Thanks to integrated software and AI-based classification, relevant information is immediately visible, eliminating the need for or post-processing. This reduces complexity and response time.

Providing a solid foundation for meaningful situation assessments, precise material classification and immediate insights, where quick and reliable decisions are crucial.

Precise data even during flight maneuvers, vibrations, and dynamic scenarios.



Spectral depth: up to 164 bands from 350–1000 nm.

KEY ADVANTAGES

of Cubert Snapshot technology for operational deployment

"**Snapshot instead of scans:** the entire spectrum in an instant, **without artifacts,** with immediately usable data for real-time analysis on site."

Robust imaging without any moving scanning mechanisms

Cubert captures the full spectrum of each image in a single moment, eliminating the need for mechanical scanning components such as rotating mirrors or moving sensors. This prevents wear and tear, minimizes maintenance requirements and increases operational reliability, particularly in harsh operating conditions.

Georeferencing, precise location for tactical applications

Captured image data can be precisely assigned and flexibly processed using GPS timestamps and metadata. This information is critical for situation reports. ISR evaluations, or command and control information systems. Thanks to its open software architecture, our data can be easily integrated into existing workflows and systems.

Real-time capability in use with very short exposure times

Depending on the illumination of the scene, our camera systems only require a few milliseconds per image. Enabling precise measurements to be taken while in motion, from the air, in a vehicle or even when handheld..

It is designed for operational systems

Cubert sensors can be easily integrated into existing platforms, including UAVs, ground vehicles and permanent installations. Their real-time data is immediately available for live analysis and mapping or automated decision support.

ULTRIS X20P – Spectral precision for UAV applications

The ultra-compact UAV camera delivers complete spectral information in real time, robust, artifact-free, and ready for use in the field.

Snapshot instead of scans: Complete data cube per image, no moving parts

- Artifact-free in motion: Precise data even during flight maneuvers and vibrations
- Wide spectrum: Up to 164 bands from 350–1000 nm
- Compact payload: approx. 630 g, ideal for UAV integration
- Georeferencing: precise positioning for tactical applications
- ITAR-free: Robust operability without export restrictions

Artificial intelligence transforms hyperspectral data into clear recommendations for action, automatically, precisely and in real time.

- Automatic analysis of every spectrum in real time
- Immediate detection of spectral anomalies
- Clear material and object classification
- Clear highlighting of camouflaged structures
- Integration into digital situation maps & C4ISR systems
- Fact-based decision-making at the speed of the operation

AI-SUPPORTED EVALUATION –

Fast response with system

The hyperspectral platform reaches its full potential when used in combination with artificial intelligence. Algorithms can detect spectral deviations, identify material classes, highlight anomalies and convert large amounts of data into a structured basis for decision-making. The result is precise indications of dangerous situations, such as camouflaged vehicles or disturbed ground structures. Chemical residues are also detected early and clearly.

The evaluation can be carried out directly on site and is supported by AI, allowing integration into digital situation reports or command information systems. Relevant information is available in a structured, real-time format, providing a reliable basis for decision-making even under time pressure.

Integration, process security and technological reliability

Cubert provides comprehensive system solutions, including sensor technology, stabilized gimbals, and modular analysis software. ULTRIS cameras offer up to 164 spectral bands with high spatial resolution in the visible, near-infrared and short-wave infrared ranges.
In combination with our CUVIS software, data is provided in real time and immediately ready for use. The open architecture and software development kit (SDK) enable seamless integration into existing systems and facilitate extensions, such as fusion with LiDAR, thermal and RGB sensors.

This technology has also proven itself in industrial production environments. Hyperspectral sensors from Cubert can detect microscopic material deviations in real-time directly on production lines and enable continuous, spectrally based process control. Increasing reliability, reducing quality fluctuations and enhancing operational resilience in sensitive production processes.

Future-proof and ready for use with low maintenance requirements.

Designed for the most demanding conditions, Cubert systems are durable, low maintenance and reliable, whether they are used in the military, for border surveillance or for securing critical infrastructure. All components are designed for high deployment density and operational resilience. Data can be processed, exported, and geo-referenced immediately without any lead time.

The systems are built to be durable and low maintenance for use in demanding environments, including military operations, infrastructure monitoring and automated quality control.

Cubert stands for both innovative spectral camera technology and comprehensive reconnaissance solutions. As a technology architect for spectral intelligence, Cubert supports customer-specific integration, system development, and technical advancement reliably and cooperatively with a view to the future.

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WHY CUBERT?

Spectral intelligence for Defense & Security

Since 2012, Cubert in Ulm has been developing hyperspectral systems that make the invisible visible, in real time, robust and ready for use. Our snapshot technology provides information where seconds decide safety.

What makes Cubert unique:

- Made in Germany – precise, reliable, exportable
- Snapshot technology – complete spectral data in real time, without motion artifacts
- Robust & low maintenance – developed for demanding operating environments
- System solutions – UAV-ready, modularly integrable, immediately usable
- AI-supported – automatic classification & amp; anomaly detection for fact-based decisions

Experience the operational advantage. Request a live demo now.

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