



VECTOR™ / SCORPION™

quantum
systems

QUANTUM-SYSTEMS

UAVS MADE IN GERMANY

Quantum-Systems GmbH was founded in 2015 in Munich and is specialized in the development and production of automatic, electric vertical take-off and landing (eVTOL) fixed-wing drones for a wide variety of use cases. The 50+ employees (growing) are working intensively on combining range and electric efficiency with the ability to vertically take-off and land without additional equipment.

CEO Florian Seibel: "Our passion is the continuous development of industry leading VTOL aircrafts. With our ready to operate systems we serve a wide range of customers. We help to increase yields in agriculture, fly 3-D reconstruction missions, do tactical mapping for security forces or provide mission critical video footage in real time to military and security users. Made in Germany, non ITAR and no back doors in soft- or hardware as all of our flight planning and autopilot software is designed in house".

Unique feature - eVTOL fixed-wing system

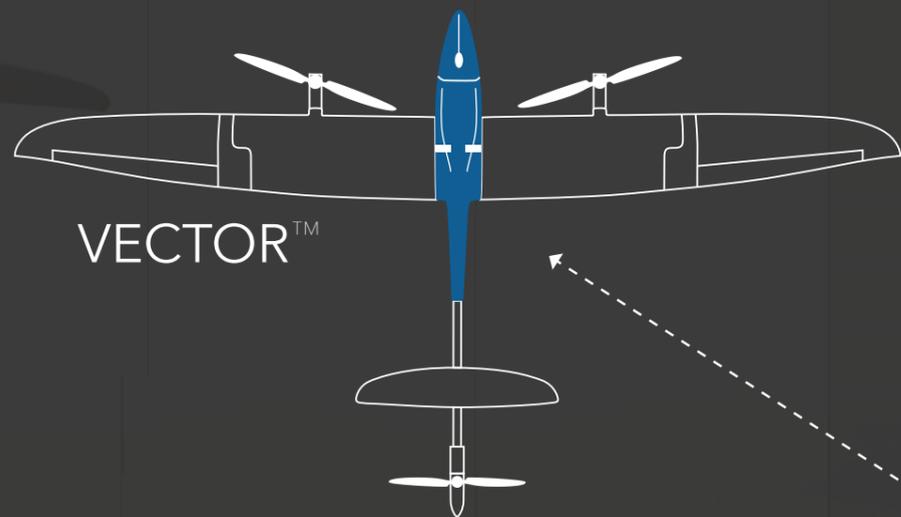
The eVTOL fixed-wing UAVs of Quantum-Systems unite the benefits of helicopters and airplanes in one new innovative aircraft. This makes it a game changer as it combines both, the convenient handling of a helicopter and the efficient aerodynamics of an airplane into one system. Therefore, such systems can cover up to 100 times more area than regular multi-rotor drones and it is equally easy to control and operate them. No catapults, runways or landing nets needed. Just fly.



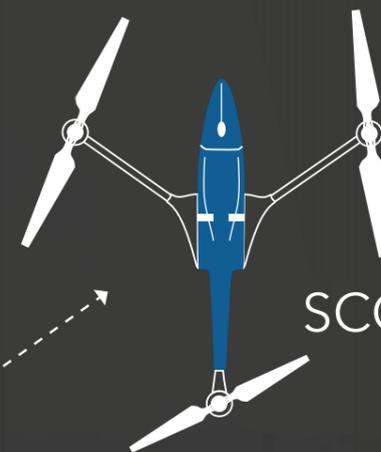
VECTOR™



2IN1 SYSTEM



VECTOR™



SCORPION™



The centerpiece includes:
EO/IR gimbal
Mesh IP encrypted data link
Quantum-Systems autopilot

- 15+ km data link range
- Harsh environmental conditions (rain & dust)
- Operation -20°C to +45°C (heated batteries)

SCORPION™



VECTOR™

eVTOL FIXED-WING

The mathematical definition of a vector fits very well for the latest UAV from Quantum-Systems. It can point into any direction: upward, forward or down. That's exactly what Vector from Quantum-Systems is capable to do. Vertical take-off. Energy efficient long range fixed wing flight and back to a vertical landing. All automatic, no pilot or operator input needed. Just fly.

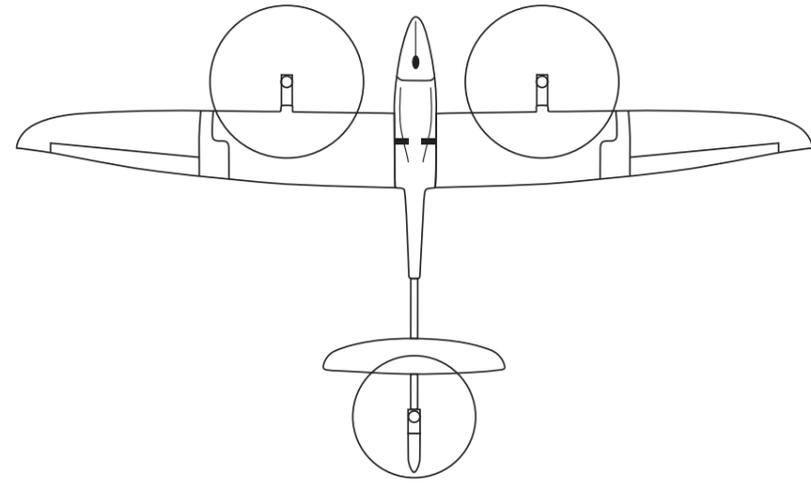
VECTOR™ - The 2in1 vertical take-off reconnaissance UAV

Flexible and enduring, the Vector provides flight and surveillance characteristics to military and security forces that are exceeding performance of current tactical UAV platforms in service all over the world. It is a military grade UAV System built to last and bring capabilities to the battlefield not available as of today.

The ability to operate in the most difficult terrain (VTOL) combined with extremely low noise emission (motor off silent mode) makes the Vector the perfect UAV for a wide range of military and security applications.

A military encrypted mesh IP link sends video streams up to a range of 15+ km. A flight time of up to 120 minutes speaks for itself. All combined in a compact and robust electric VTOL UAV.

The 2in1 System design opens up further applications with the "Scorpion" configuration - By removing the wings and attaching a separate set of copter arms a dedicated multi copter platform becomes available for an even wider variety of mission applications. Either use a VTOL fixed-wing or a conventional copter - in both cases you only need one system to train on and to deploy it on site.



| | | | | |
|---------------------------|-----------------------|----------------------------------|-----------------------|---------------------------|
| <6 kg WEIGHT | 120 MINUTES | 15-20 m/s CRUISE SPEED | 12 m/s WIND | 2.80 m WINGSPAN |
|---------------------------|-----------------------|----------------------------------|-----------------------|---------------------------|



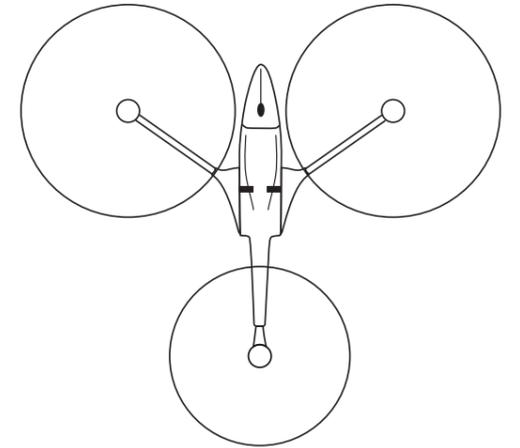
SCORPION™

TRI-COPTER

It is not only the optics that the Scorpion has in common with its animal fellow. Like the Vector it is also optimized for use in adverse conditions with extreme temperatures. The centerpiece is identical to the fixed-wing Vector UAV housing gimbal, autopilot and data link. The larger propellers and motors of Scorpion make it a state of the art tri-copter with live video data link for various mission scenarios.

The Scorpion impresses with the same HD data link with an operating range of up to 15+ km. As a tri-copter it is ideal for smaller-scale and stationary use, for example in densely built-up areas. With a flight time of 45 minutes, it can cover a wide range of applications.

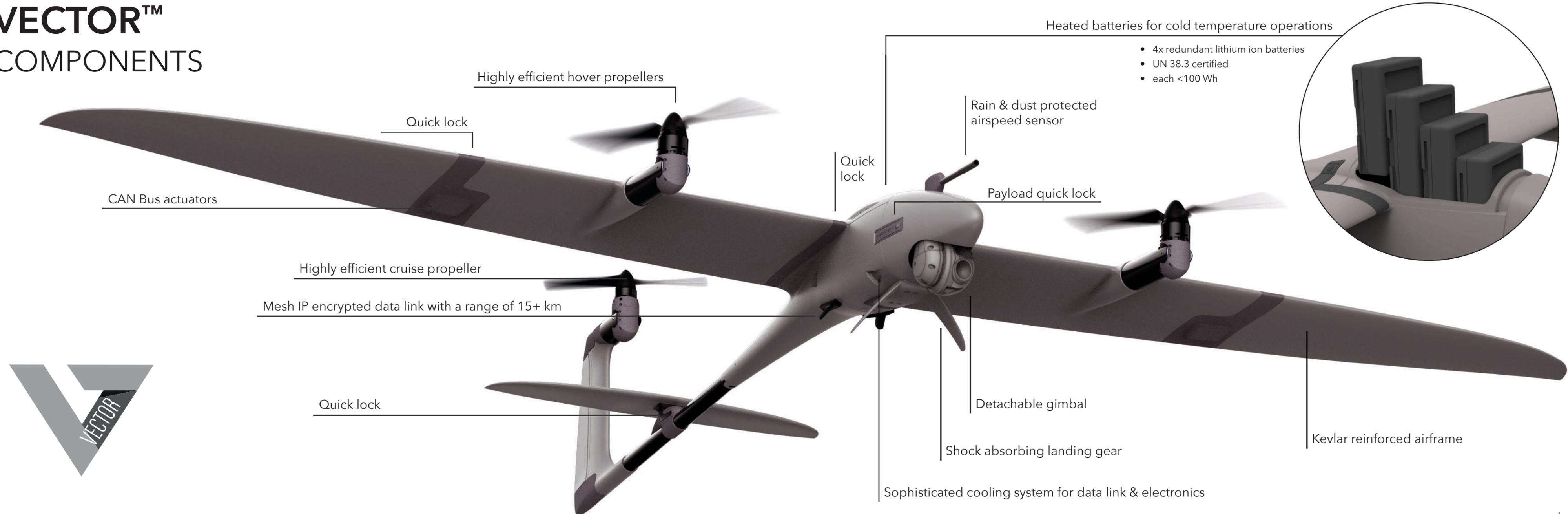
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|---------------------------|----------------------|---------------------------------|-----------------------|---------------------------|
| <5 kg WEIGHT | 45 MINUTES | 0-15 m/s CRUISE SPEED | 10 m/s WIND | 0.85 m WINGSPAN |
|---------------------------|----------------------|---------------------------------|-----------------------|---------------------------|



Both systems share these specifications:

- 15+ km command & control range
- Electric Vertical Take-off and Landing (eVTOL)
- EO/IR HD gimbal
- Made for harsh environmental conditions (-20°C up to +45°C)
- Heated batteries for cold temperature operations
- AES256bit encrypted data and mission link
- Small footprint (operation by one person)
- Glass fiber and kevlar honeycomb sandwich airframe

VECTOR™ COMPONENTS



Highly efficient hover propellers

Quick lock

CAN Bus actuators

Highly efficient cruise propeller

Mesh IP encrypted data link with a range of 15+ km

Quick lock

Heated batteries for cold temperature operations

- 4x redundant lithium ion batteries
- UN 38.3 certified
- each <100 Wh

Rain & dust protected
airspeed sensor

Quick
lock

Payload quick lock

Detachable gimbal

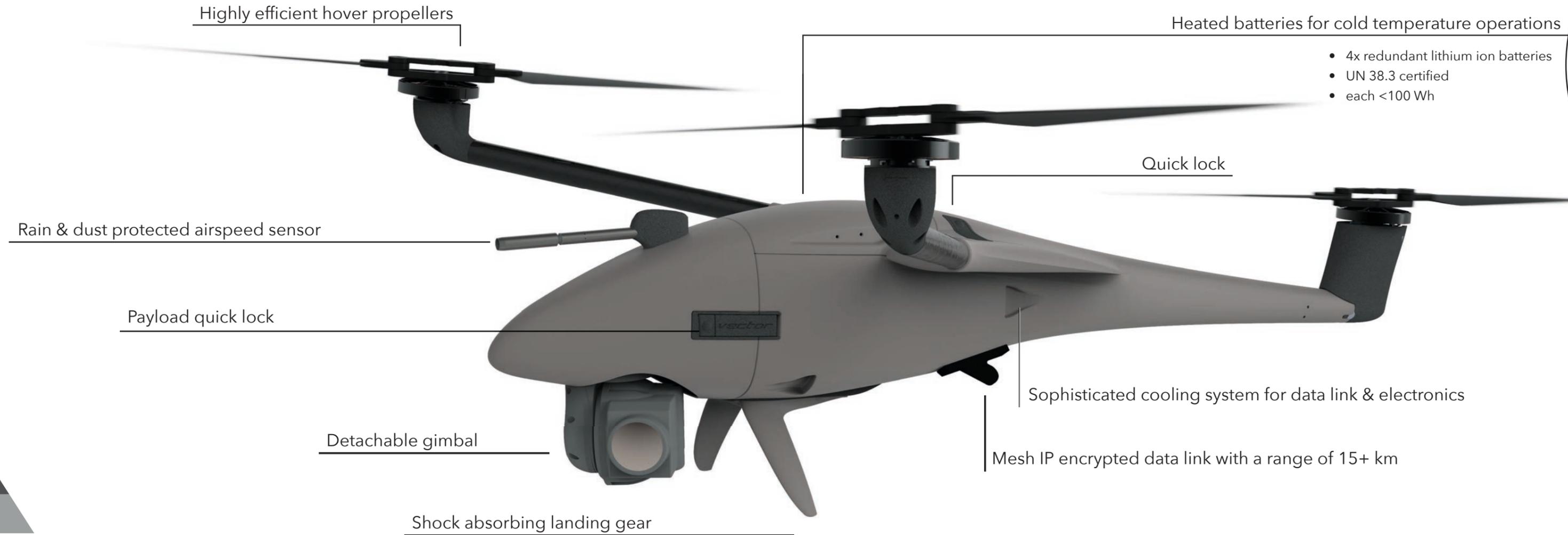
Shock absorbing landing gear

Kevlar reinforced airframe

Sophisticated cooling system for data link & electronics



SCORPION™ COMPONENTS



QBASE GCS

C2 MISSION SOFTWARE

Thanks to QBase 3D, all mission relevant steps from planning to execution can be carried out intuitively by a single person.

QBase 3D automatically generates efficient flight paths after the flight area and the mission parameters have been defined with a few clicks. It is also possible to launch Vector or Scorpion without having planned a mission beforehand in order to be operational quickly.

Our self-developed software allows you to dynamically adjust the mission in flight to mark targets on the map or in video before, during or after the mission, to show or detect critical points.

QBase 3D records the full mission on the GCS (including video and aircraft data) and replays it at any time, while recording is continued.

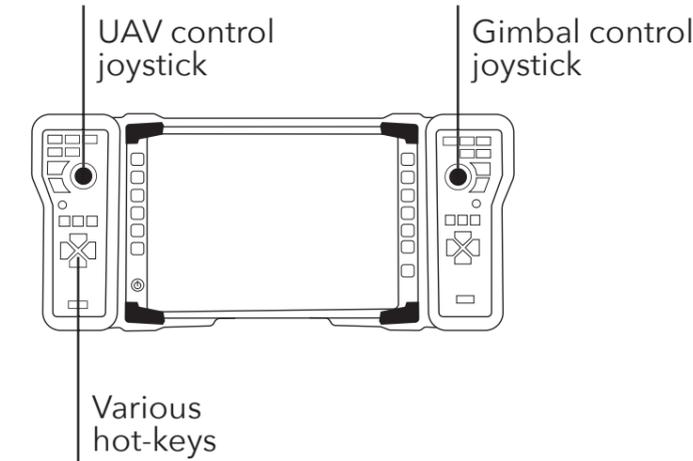
The software supports the operator with warnings when the aircraft is about to exceed its limits. Overwriting them is always possible if the mission requires it - Just fly.



- LIVE VIDEO FEED
- 3D TERRAIN FOLLOW
- LIVE AIR TRAFFIC
- RESUME MISSION
- AFTER ACTION REPORT

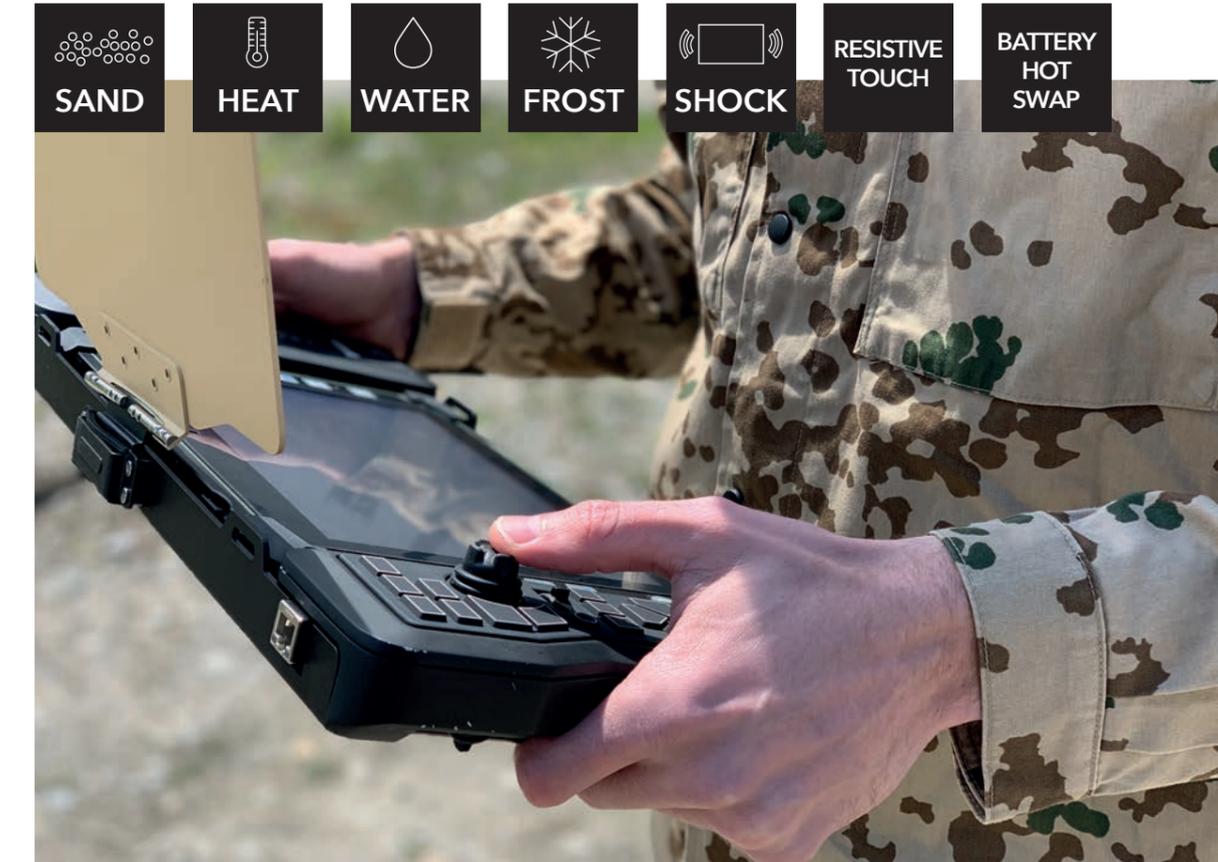
GCS

USER INTERFACE



The included ground control station (GCS) is a high-performance x86 based PC in a rugged case with haptic control elements and touch screen functionality.

The display is anti-reflective and guarantees optimum sharpness of detail even under the most adverse lighting conditions. Thanks to a resistive screen, interaction in rain or with gloves is possible.



GIMBAL PAYLOAD

INTELLIGENCE IN THE SKY

In order to provide relevant intelligence for better decision making we integrate high value sensors with powerful optics while keeping size and weight at a minimum. The result is state of the art stability combined with unmatched robustness.

Thanks to its modular concept, the front section of Vector & Scorpion can be equipped with different payloads. There are currently three payload variants available:

- Vector/Scorpion gimbal EO/IR: 10x optical zoom, 720p EO video, 480p IR video, laser illuminator, IR laser ranger
- Scorpion gimbal EO: 30x optical zoom, 720p EO video
- Vector/Scorpion: tactical mapping with a 21 MP Sony UMC10

All sensor changes are done by simply exchanging the complete payload bay in a matter of seconds. No tools required. Observing targets at day and night with IR capability (EO/IR option) gives you all the flexibility needed. Reading license plates at up to 700m distance with EO 30x zoom option or marking targets at night with IR illuminator (laser option) increase your operational success.

Quantum-Systems is continually working to increase the number of compatible sensors. As the Vector and Scorpion user family grows, there will be an ever increasing array of innovative and custom sensors available. Chemical detection, ground penetrating low energy radar, LiDAR or LTE-cell are some we are working on in the future. The message is: the versatility of your platform will grow over time.



Embedded video processing
Electronic stabilization and scene tracking



Environmentally sealed
Machined magnesium housing sealed to IP66



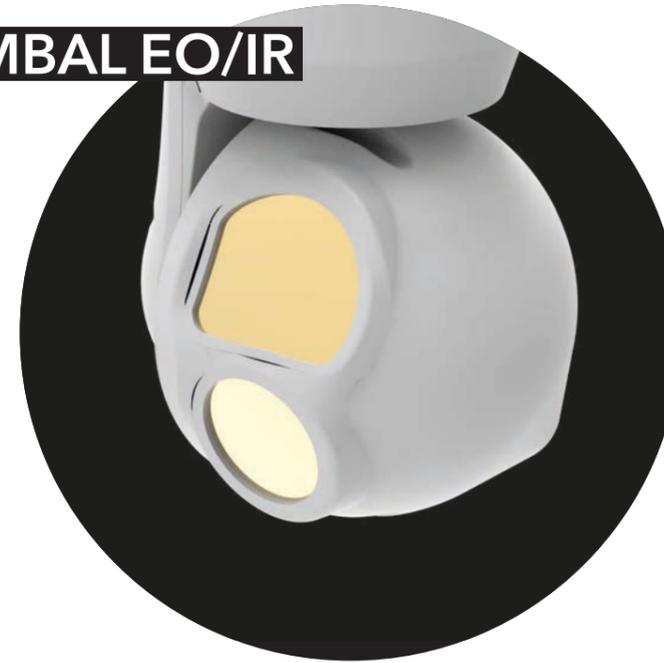
ITAR-free
Non-controlled configurations available



Ethernet interface
Video and gimbal control over ethernet or RS-232



GIMBAL EO/IR



Vector/Scorpion Gimbal EO/IR

- Resolution EO: 1280x720
- Resolution IR: 640x480
- Zoom:
 - EO optical: 42° - 4.4° FOV
 - EO digital: 4.4° - 2.2° FOV
 - IR digital: 18.2° - 4.6° FOV
- Weight: 550g
- IP 66
- ITAR free

Scorpion Gimbal EO

- Resolution EO: 1280x720
- Zoom:
 - EO optical: 63° - 2.2° FOV
 - EO digital: 2.2° - 1.1° FOV
- Weight: 800g
- IP 66
- ITAR free



QBase 3D - Zoom 1x - 490m - EO



QBase 3D - Zoom 1x - 730m - IR

MESH IP ENCRYPTED DATA LINK

Radio communication, which meets the requirements of modern applications, especially in the military sector, today requires more range, data throughput and reliability than ever before. Self-healing, digital link management and automatic rerouting are no longer just options. They are a must.

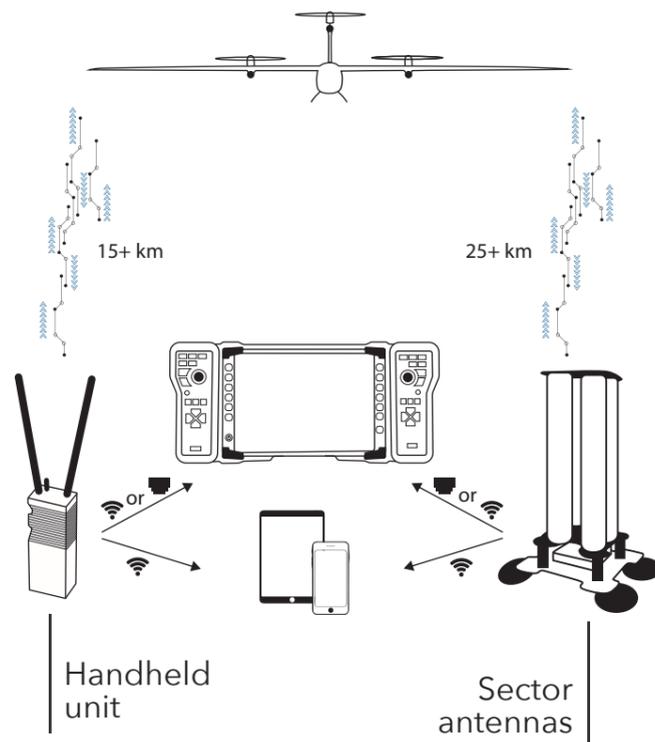
They are a must.

That is why Quantum-Systems uses a state of the art encrypted mesh IP link which delivers unprecedented performance never seen before in challenging environments.

The data link hardware consists of a robust handheld unit on the ground and an OEM module onboard the UAV. Sector antennas can boost the range to 25+ km. No tracking antenna or moving parts are necessary.

This setup enables an 128/256 bit AES encrypted 10+ Mbit data stream and up to 25+ km (sector antennas) video and command & control range.

The hardware is optimized for tactical applications and comes in ruggedized, IP 67 rated casings. It uses sophisticated MIMO mesh network technology. Data link control is fully integrated into QBase 3D including link and power management.



Technical specifications:

- Selectable channel bandwidth: 5, 10, 20 MHz
- Different frequencies from 400 MHz - 6 GHz available
- Encryption: DES56, AES/GCM 128/256
- Data rate: up to 100 Mbps (adaptive)
- Output power: 1mW - 4W (up to 8W with sector antennas)
- Latency: 7ms average (20MHz BW)
- Sensitivity: -99 dBm @ 5MHz BW
- Battery life: Up to 12h (for handheld)
- IP 67 housing

TRANSPORT CASE & BACKPACK

When disassembled, Scorpion and Vector can be transported comfortably and safely by one person. Only a few steps are required to get the systems ready for use.

As standard, the transport case has external dimensions of 850x470x280 mm. It is IP67 (submersible and floating) certified and therefore suitable for the most adverse conditions. As an option, it is also possible to use the all-terrain backpack.



| | | | | |
|----------------------------|---------------------------|-----------------------------|-------|-------|
| <2 min ASSEMBLY TIME | <17 kg TOTAL WEIGHT | 850x470 x 280 mm SIZE | IP 67 | SHOCK |
|----------------------------|---------------------------|-----------------------------|-------|-------|

ISR AND SECURITY APPLICATIONS

Vector and Scorpion deliver relevant and timely information from the sky and support decision making in intelligence, surveillance, reconnaissance (ISR) and other security applications such as

- Search and Rescue
- Criminal pursuit
- Convoy protection
- Battlefield monitoring
- Border patrol
- Traffic investigation
- Harbour, facility and asset protection

All of our systems are available in an ITAR free version.

Just fly.





quantum
systems

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