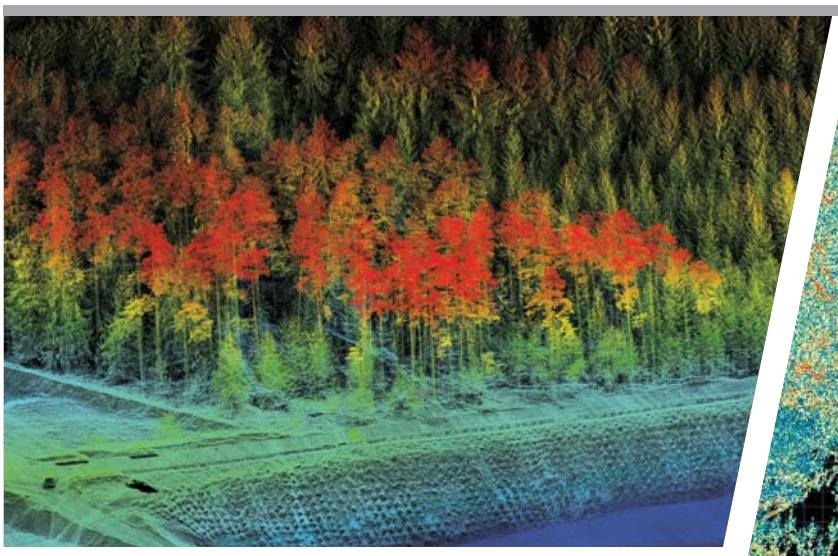
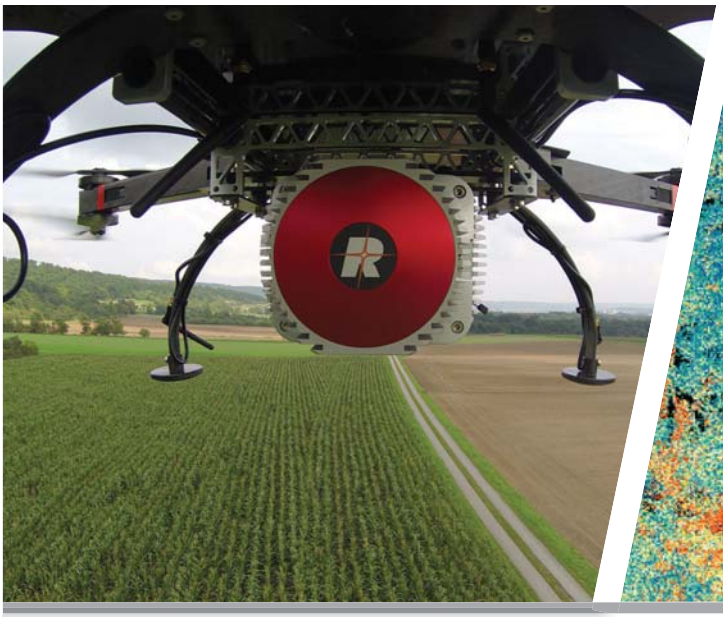
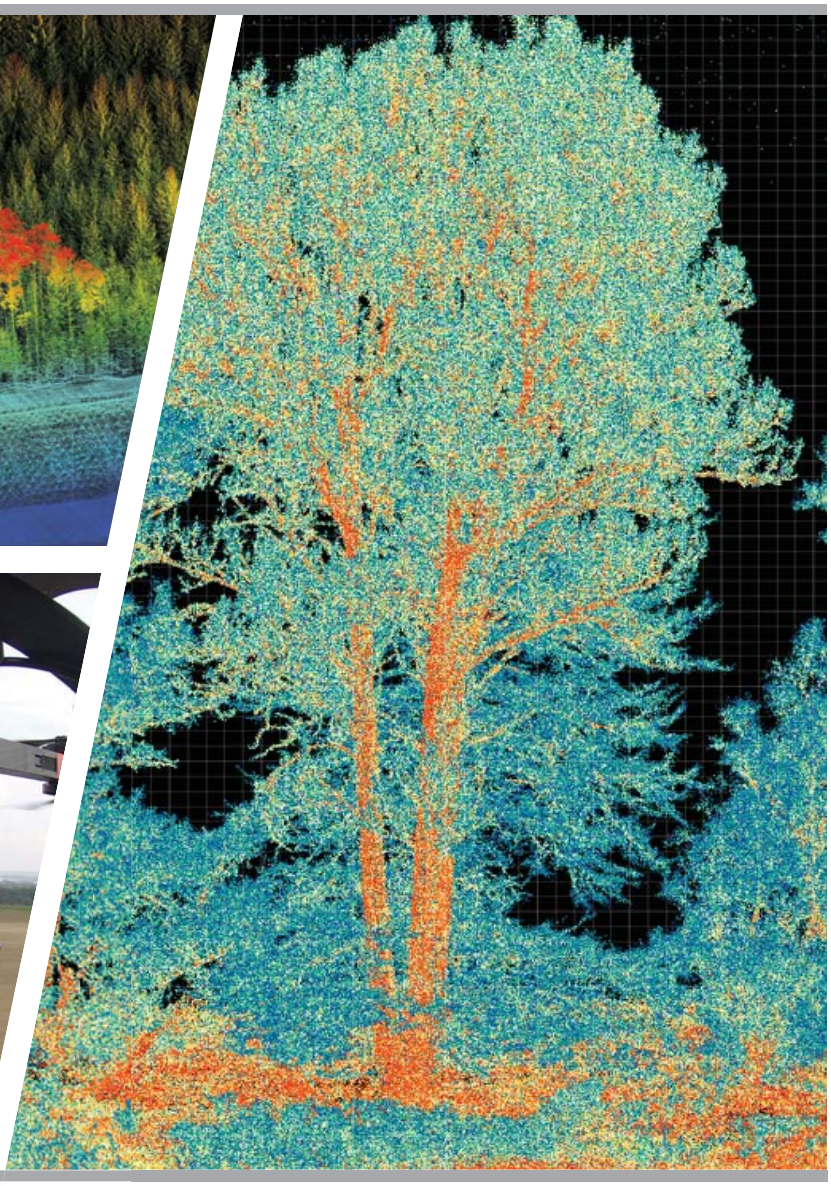
Forestry & Precision Agriculture Applications

RIEGL VUX®-1UAV | *RIEGL* VUX-SYS

RIEGL **has developed a new class of LiDAR sensor to meet the challenges of emerging surveying applications by Remotely Piloted - or "Unmanned" - Aircraft Systems (RPAS resp. UAS), gyrocopters, and ultra-light aircraft, both in measurement performance and in system integration.**







Scan this QR code with your smartphone to get further information about the *RIEGL* VUX®-1UAV.

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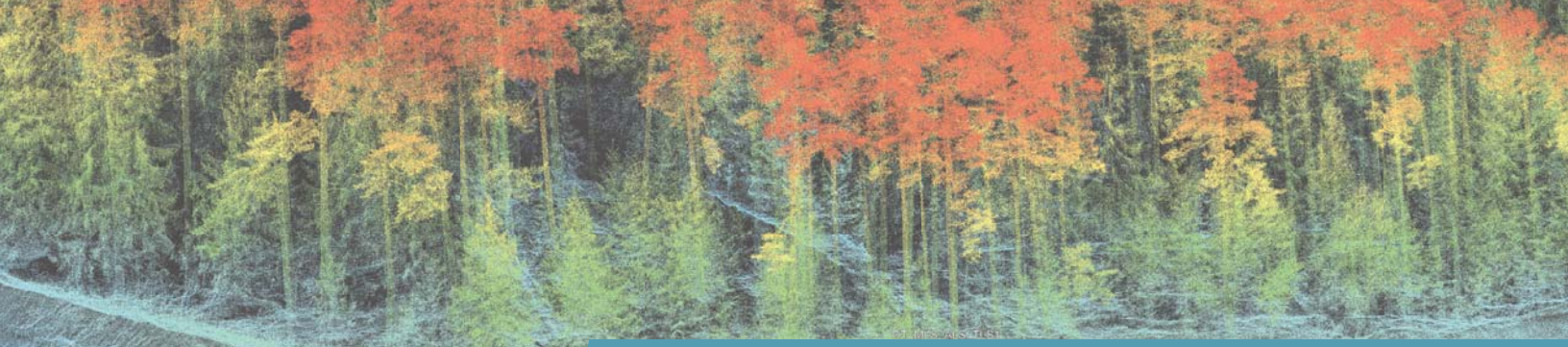
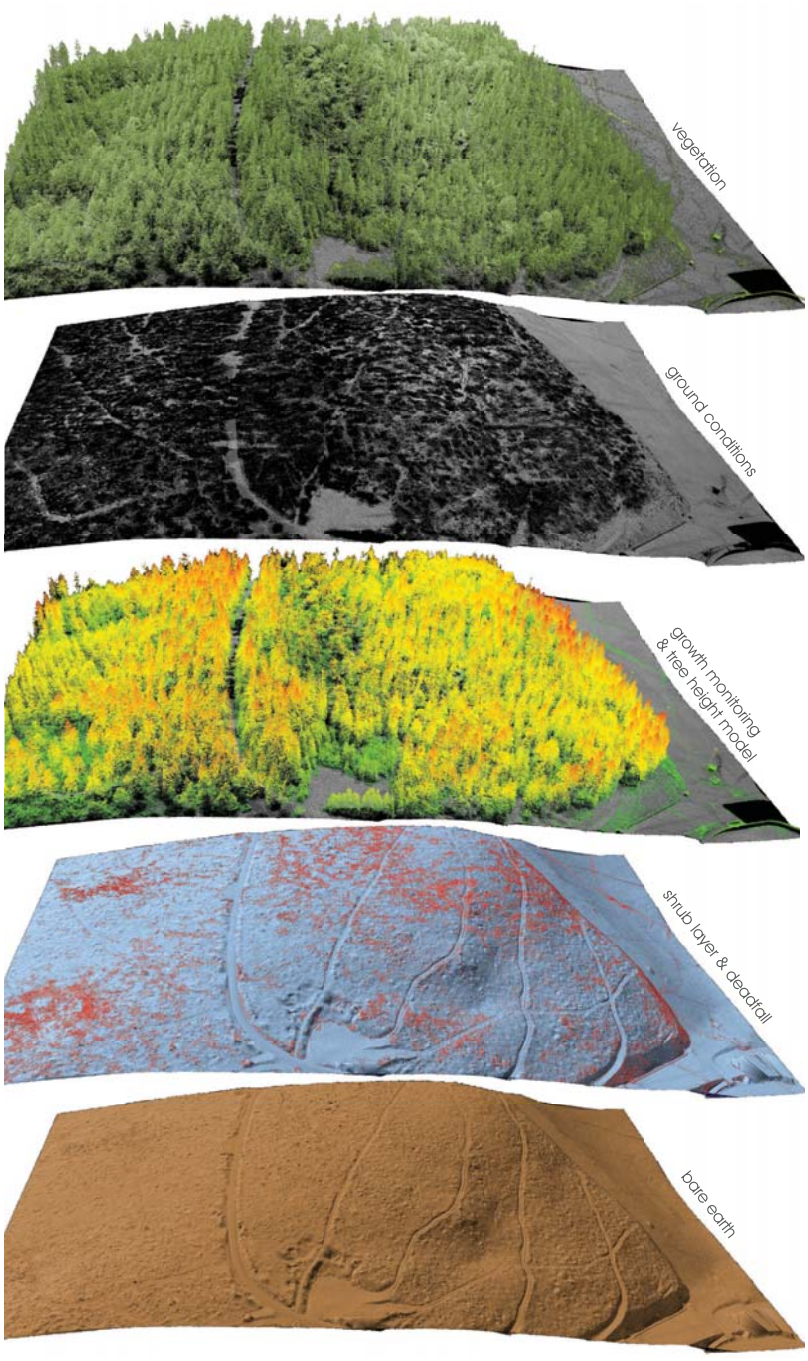


Forestry Applications



VEGETATION

Due to the extremely high scanning rates the **VUX®-1UAV** provides an outstanding high-density pointcloud, which makes it ideal for forestry applications.

GROUND CONDITIONS

The excellent vegetation penetration rate results in a high number of ground returns that can be used to generate very detailed terrain models. The sample to the left depicts points classified as ground coloured by reflectance.

GROWTH MONITORING & TREE HEIGHT MODEL

All points classified as vegetation can be coloured by relative height above ground. This yields for a relative estimation model of the trees revealing regions of low and high vegetation stands. Growth rates can be documented by comparison of height models collected over a period of time.

SHRUB LAYER & DEADFALL

The undergrowth of a forest consists of shrubby vegetation and seedling trees. It plays an important role in the forest eco system and is a habitat for wildlife and birds. The image to the left shows points classified as low vegetation (red) and clearly shows areas of dense natural cover. Furthermore deadwood can be detected in this data layer.

BARE EARTH

With all vegetation data removed, the remaining points define a very detailed terrain model. This model clearly reveals roads and trenches as well as results of slope instability and erosion.

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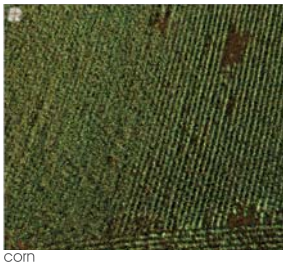
Precision Agriculture Applications

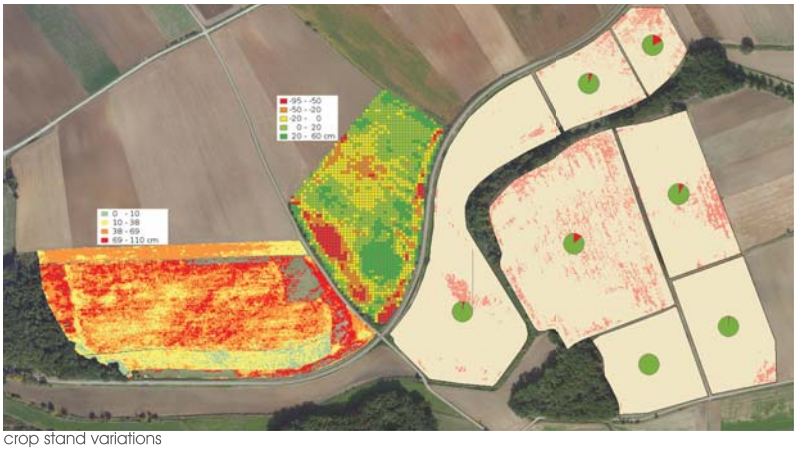
- Continuous crop monitoring during growth period
- Observation of irregularities in plant growth
- Detection of hail damage
- Analysis of terrain changes
- Yield estimation
- Observation of nutrient over- or undersupply
- Longterm regular observation of growth characteristics for geological evalution and classification



corn
colored pointcloud

sunflowers
colored pointcloud

Illustration of
penetration capacity



crop stand variations

Advantages of Laser Scanning in Vegetation Monitoring

By contrast to photogrammetry, which is limited to determining Digital Surface Models (DSM), the technique of laser scanning enables the user to capture data suitable for the generation of DSM and Digital Terrain Models (DTM).
Advanced processing algorithms account for a full exploitation of the information included in scan data. A typical target situation is measuring areas covered by vegetation. Several target echoes resulting from a single laser pulse emission are obtained by echo digitization and subsequently resolved by online waveform processing, resulting in measurement ranges, echo amplitudes, calibrated target reflectance and pulse shape information.

Crop Growth

Crop growth and health is closely monitored in Precision Farming in order to minimize the use of fertilizers or irrigation. Airborne laser scanning data enable to observe plant growth – while at the same time displaying changes in ground surface – or to detect areas of irregularities.

Field Characteristics

While plant height cannot per se be interpreted as a direct factor for yield calculation, irregularities due to, e.g., different soil composure, variety of seed type or damage (e.g., weather-related, caused by storm, hail, or rainfall) can easily be discerned and taken as an indicator for further developments and estimation of yield at harvest.

Monitoring

Constant monitoring of agricultural areas enables early yield estimation based upon differences in plant growth development.

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