



**HAIP**

# HAIP Solutions

## APPLICATION NOTE

### BlackBird V2

## Restoring Natural Habitats

### 1. Problem: Climate Change and Biodiversity

Facing nowadays challenges of climate change, the need to secure a greener future is constantly increasing. Many impacts of climate change like global warming, drought, bushfires, sea level rise and storms are affecting biodiversity. More than 80 percent of European habitats are in a bad condition with a continuously decreasing biological diversity. To counteract this biodiversity loss, the affected nature must be restored. The new EU Nature Restoration Law mandates that by 2030, restoration measures should cover at least 20% of the EU's land and sea areas, expanding to all necessary ecosystems by 2050. Those restoration measures include the removal of invasive plants from meadows, wetlands and forests and the rewetting of drained moorland areas and much more.

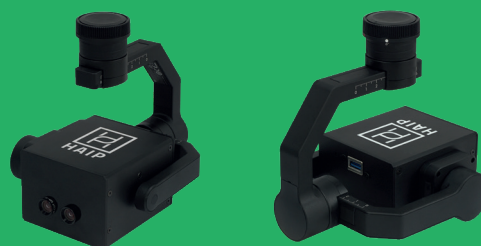


### 2. Solution: Hyperspectral Imaging

Traditional methods of plant species and diversity mapping are labor-intensive and time-consuming, leading to severe data gaps and biases. The solution for this is hyperspectral imaging (HSI). Hyperspectral data can differentiate and analyze vegetation species and soil types as well as soil water content by analyzing the spectral features of reflected and absorbed light in a target scene. HSI cameras, especially when integrated into unmanned aerial vehicles (UAVs), can significantly enhance the monitoring and reporting processes of changing environments. Hyperspectral imaging cameras on UAVs make it possible to capture detailed spectral information across large and inaccessible areas. This capability is crucial for creating accurate maps of habitats and monitoring changes over time. It also aids in the early detection of relevant environmental changes. Hyperspectral cameras on UAVs can establish comprehensive baseline data on current habitat conditions, providing a benchmark for monitoring restoration progress.

#### HAIP BlackBird V2

- Spectral range: 500 – 1000 nm
- Spectral resolution: 5 nm
- Spatial resolution: 540 px
- Two sensors: HSI & RGB



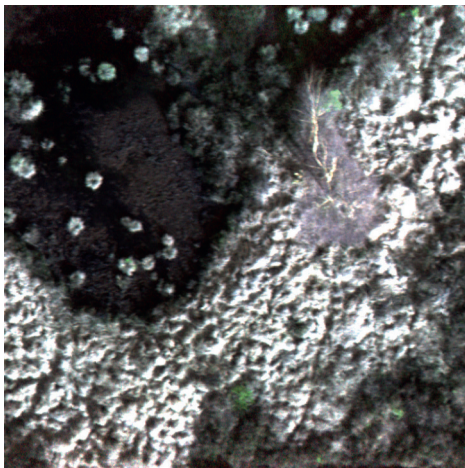
# APPLICATION NOTE

## BlackBird V2 - Restoring Natural Habitats

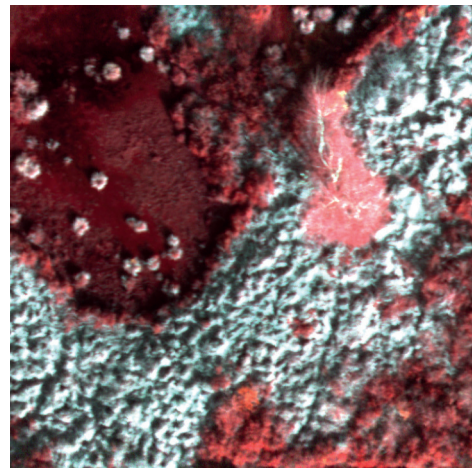


HAIP Solutions BlackBird V2 is a hyperspectral imaging camera specifically designed for the use with DJI drones from the Matrice 300 & 350 RTK series. The camera enables the simultaneous acquisition of HSI and RGB images. It provides a spatial resolution of 540 pixels with 100 spectral bands in the VNIR wavelength range from 500 nm to 1000 nm.

### 4. Case Study: Vitality of Vegetation



*HSI Image in RGB  
(R: 512 nm | G: 562 nm | B: 642 nm)*



*HSI Image in false color  
(R: 892 nm | G: 577 nm | B: 622 nm)*

False color display of hyperspectral images enables the identification of certain spectral characteristics by setting the color channels (red, green, blue) to the corresponding wavelength ranges. This is particularly useful for the quick identification and monitoring of vegetation, as no additional calculations are required. This case study examines a degraded bog site that is gradually being restored. By visualizing the NIR spectral range by the red color channel, the vitality of the vegetation is highlighted. The healthy vegetation in red differs significantly from the dry grass in white, which reflects poorly in the NIR spectral range.