FLYNEX

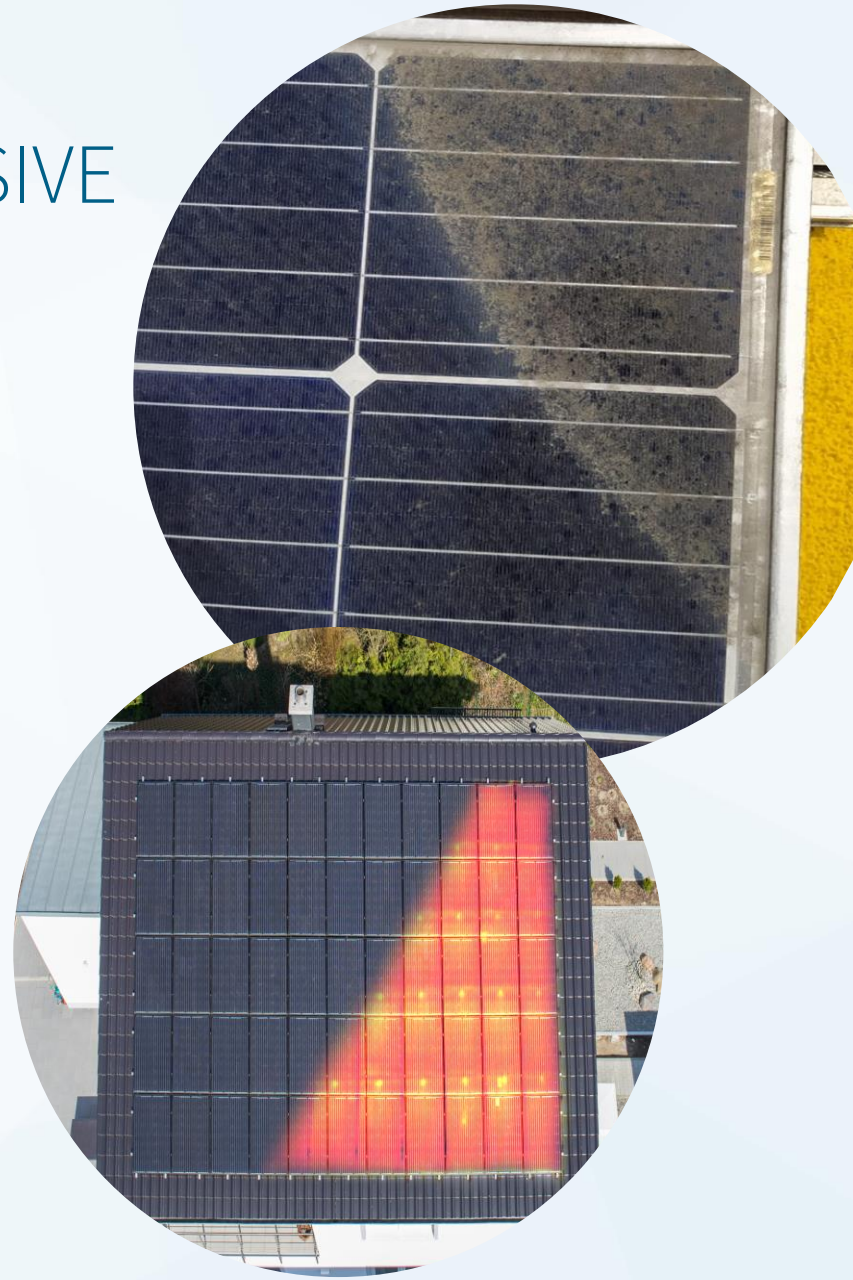
GREEN ENERGY

Scalable inspections of solar parks

TODAY INSPECTIONS

TIME CONSUMING & COMPARATIVELY EXPENSIVE

- Regular inspection tasks to maintain the return on investment.
- Visual inspections are often only possible with expensive (e.g., helicopters) or inflexible, time-consuming (e.g., employees with ground-based sensors) means
- Data generation, management, and processing are often not very digital
- The number of assets to be inspected increases
- Personnel costs increase
- Occupational health and safety are elementary



Drones are flexible and efficient tools for digital data generation. Different sensors guarantee high efficiency at comparatively low costs in an automated workflow.

FLYNEX ENTERPRISE –SOLAR PARK INSPECTION PROCESS

1

SOLAR PARK ASSETS

Assign your assets to a geolocation

Import of existing data

2 ## MISSION PLANNING

Preplan your mission in 2D & 3D, choose your dock and start the data capturing flight

3 ## GENERATE DATA OF SOLAR PARKS

Automated data generation and automated **upload** of the data with quality assurance

4 ## OBJECT BASED DATA STORAGE

All pictures are saved at their digital twin within FlyNex cloud

5 ## DATA ANALYSIS

Manual and AI based analysis incl. data privacy compliance

6 ## RESULTS

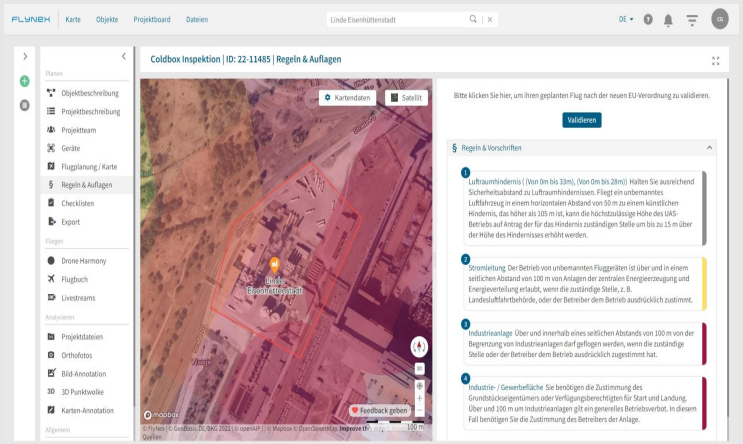
Delivering results into desired systems by API e.g., SAP, MS Share Point

MOST ADVANCED INDUSTRY COMPLIANT CONNECTED SOLUTION

The corporate platform **to inspect and find damages at scale** for thousands of infrastructure assets.

1 PLATFORM

- digital asset map based project planning
- holds all assets for data management and control
- Multi-tenant for data management and collaboration
- **fully compliant operation planning***



2 DATA COLLECTION

- permanently onsite based drone for continuouss data capturing
- utilization of an industry leading plattform
- **automated data capturing and transfer**

3 AI SUPPORTED ANALYTICS

- Delivery of remote information and results
- mapping , 3D visuals, digital twins
- Domain structure and unlimited workflows
- **AI assisted damage detection**

Enterprise compliance and norm requirements* ISO 9001 / ISO14001 / ISO/IEC25000 / ISO 21384-3:2019 / DIN 5452-6:2020-08 /DIN 5452-2:2019-10 / DIN SPEC 5452-5:2021-11

Data Management & System Integration

Object-Based Data Storage – Raw data is securely stored within the FlyNex Cloud.

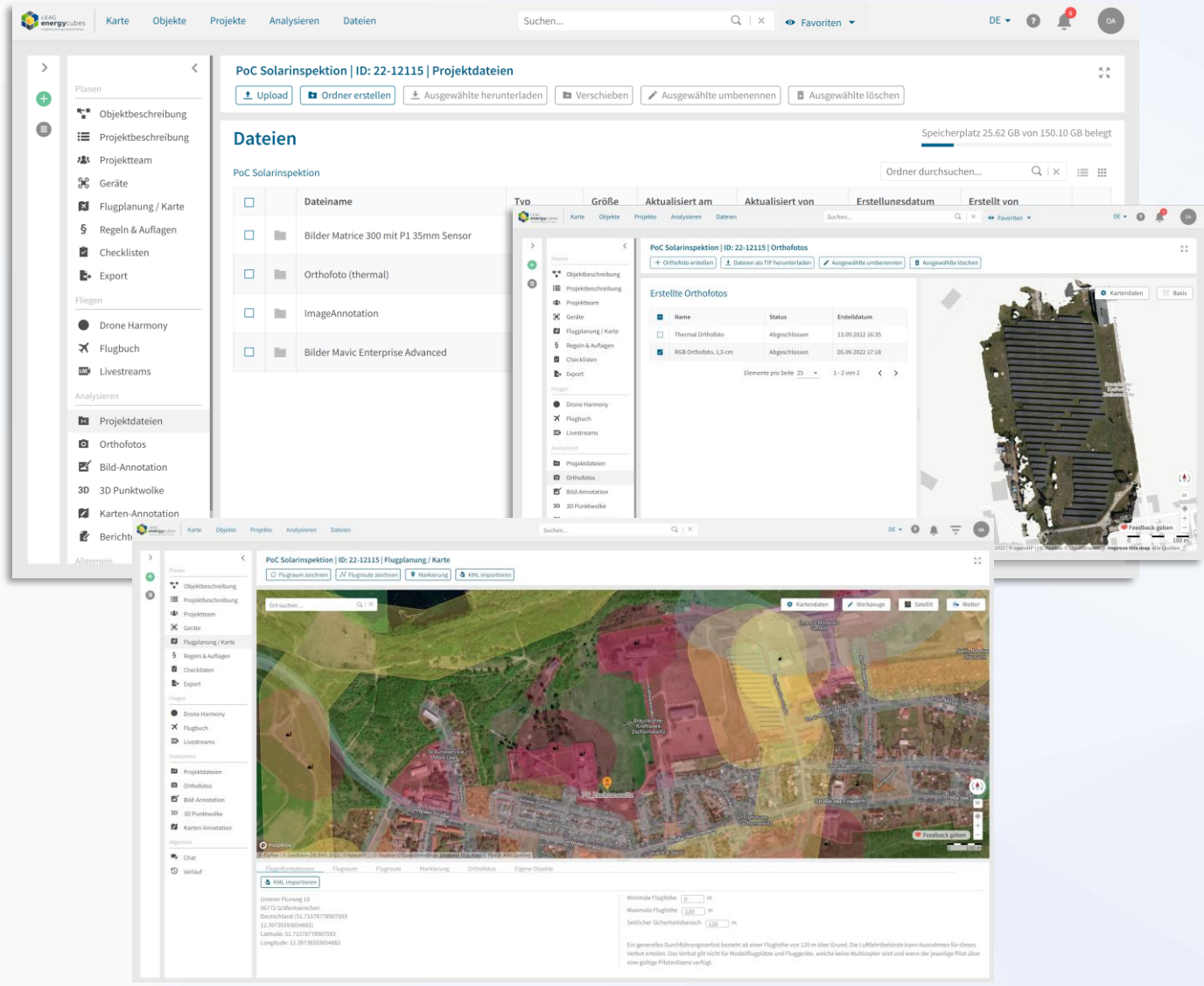
Role & Access Control – Internal rights management ensures regulated data access.

Seamless System Integration – Interfaces for automated data exchange with existing platforms like SAP or Microsoft.

High-Level Data Security – Compliance with strict German and European data protection standards.

Flexible Deployment Options – Full system operation possible on proprietary infrastructure.

Comprehensive Object Documentation – Detailed metadata storage, including location, structural attributes, and maintenance history.



FLIGHT PLANNING & RESTRICTIONS MANAGEMENT

Smart Dispatching – Efficient deployment planning of pilots and drones.

Special Permit Handling – Seamless entry and management of required authorizations.

Digital Grid Representation – A comprehensive digital twin of the power network.

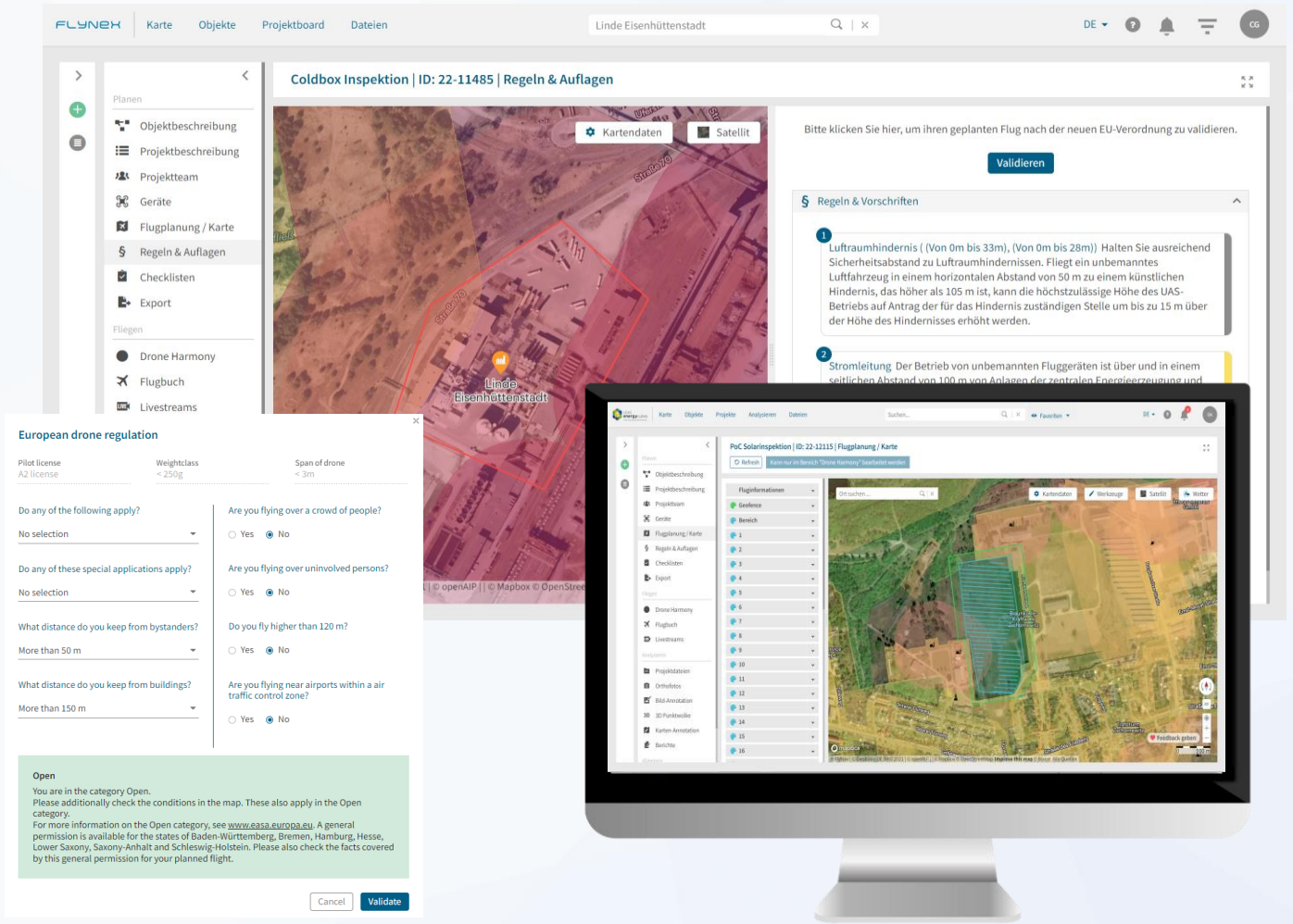
Permit & Compliance Management – Oversight of route-specific authorizations and regulatory requirements.

Task Coordination – Role-based access and rights management for streamlined workflows.

Automated Flight Logbook – Legally compliant documentation of all drone operations.

Regulatory Proof for Authorities – Ensuring adherence to national and regional aviation laws.

Geospatial Compliance Checks – Verification of flights against geographical restrictions.



Deployment Planning - FlyNex Platform

DATA CAPTURE PLANNING

Flexible On-Site Adjustments – Adapt flight plans directly via mobile devices for maximum efficiency.

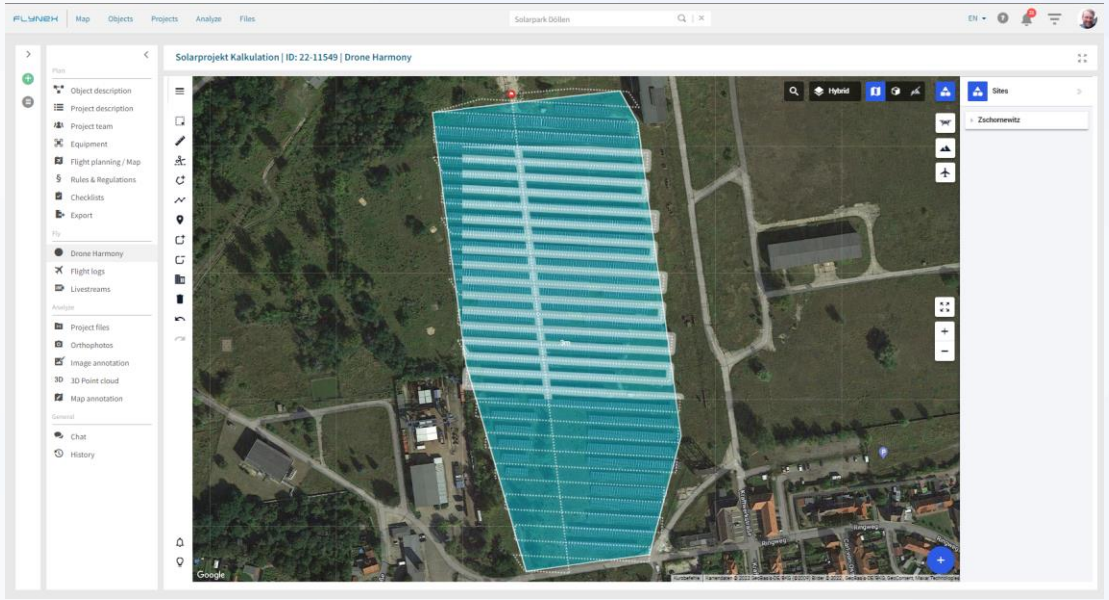
3D flight planning - use of individualizable flight patterns – Mobile retrieval and adjustment of flight planning

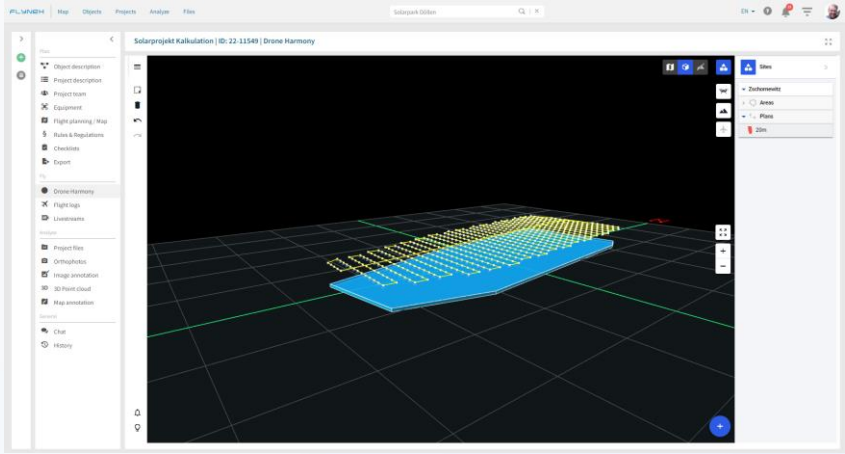
Consistent Data Quality – Standardized flight patterns and image capture ensure reliable and comparable results.

Live Streaming Capability – Enable real-time monitoring from the field to a central office (1:n connection).

Full Integration the Dock Hardware – Command and controll the data gathering from the desk (nat. Regulations apply)

Seamless Cloud Integration – Automatically upload inspection data to the FlyNex cloud for secure storage and analysis.





Flight Planning – FlyNex

AUTOMATED DATA CAPTURING FLIGHTS

Thermal & RGB Data Capture – Simultaneous acquisition of visual and infrared data for precise condition assessment of assets.

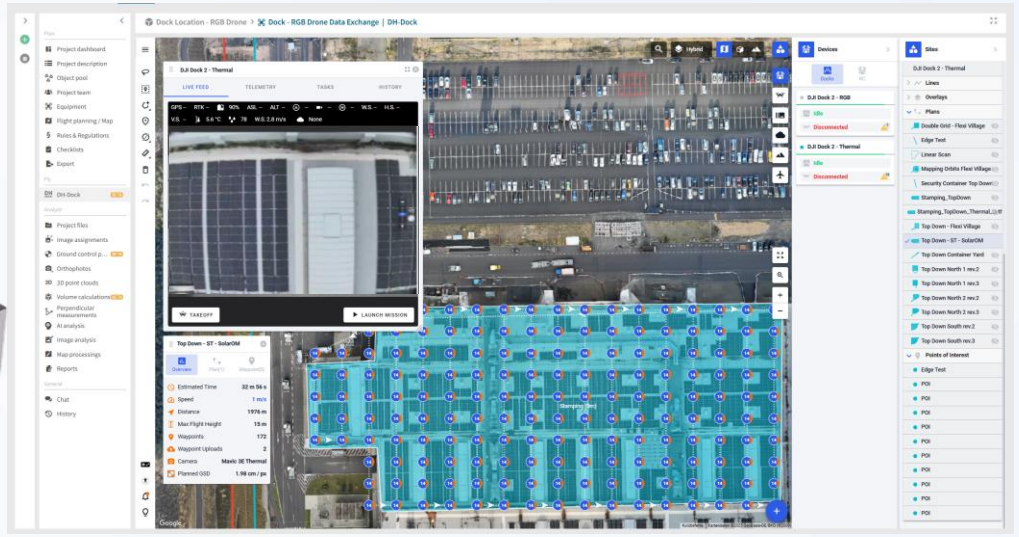
Predefined Flight Missions – Systematic drone operations with structured waypoints for comprehensive area coverage.

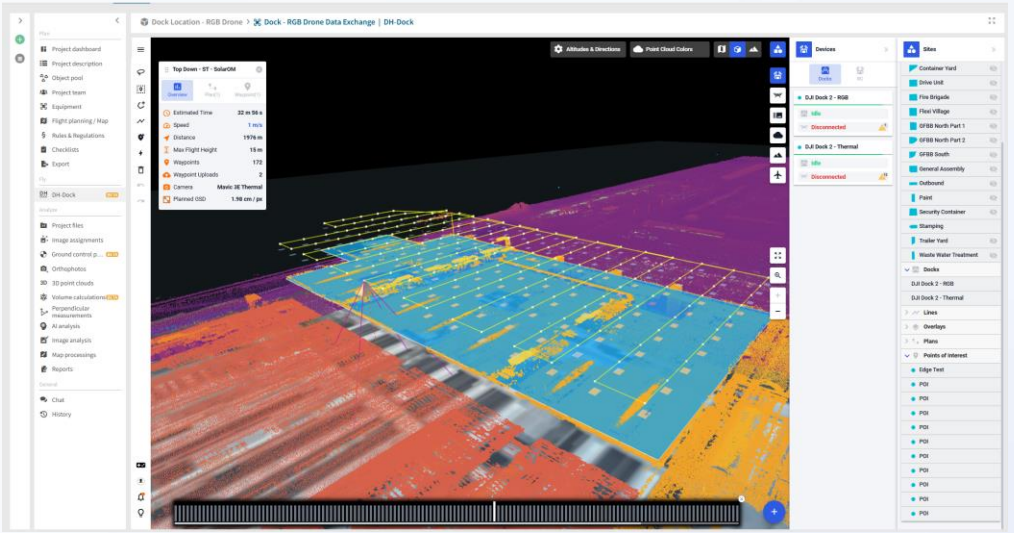
Advanced 3D Flight Management – Comprehensive 3D flight planning and management solution for the DJI Dock, enhancing situational awareness, planning, and visualization capabilities.

Live Data Visualization – Real-time mapping and classification of structures, temperature anomalies, and defects.

Seamless Workflow Integration – Direct transfer of captured data into structured reports for rapid decision-making.

Fleet & Site Management – Centralized control of multiple drone operations across different locations.





Flight Execution – FlyNex

DATA ANALYSIS

High-Resolution 3D Modelling – Generation of detailed point clouds for precise visualization, structural & thermal assessment solar parks directly in the FlyNex cloud.

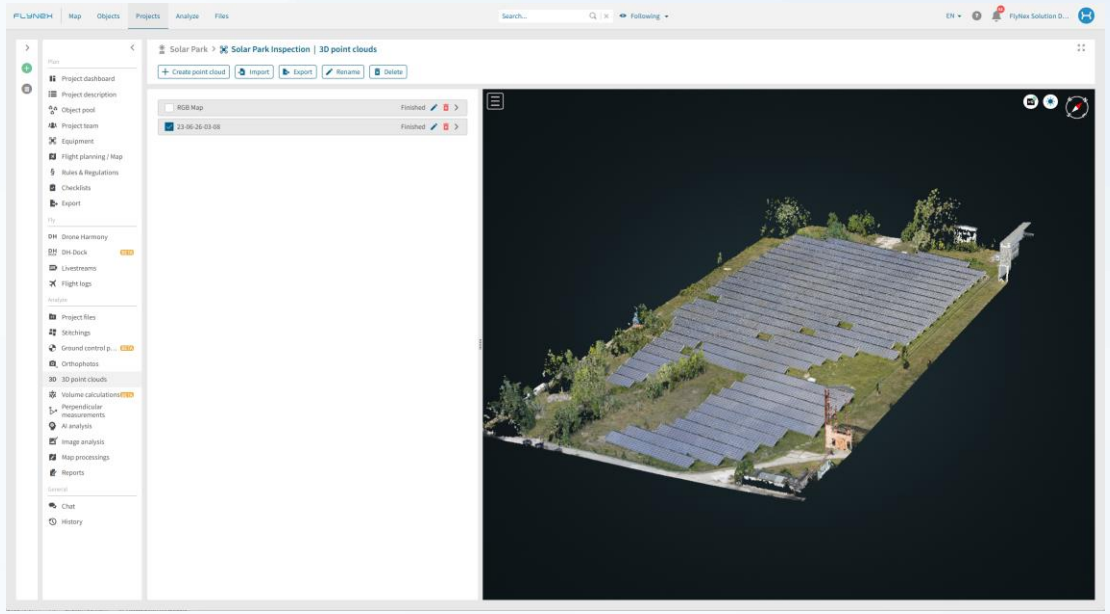
Image Annotation – Detection and marking of critical components, such as insulators, fasteners, and cable connections, to streamline inspections.

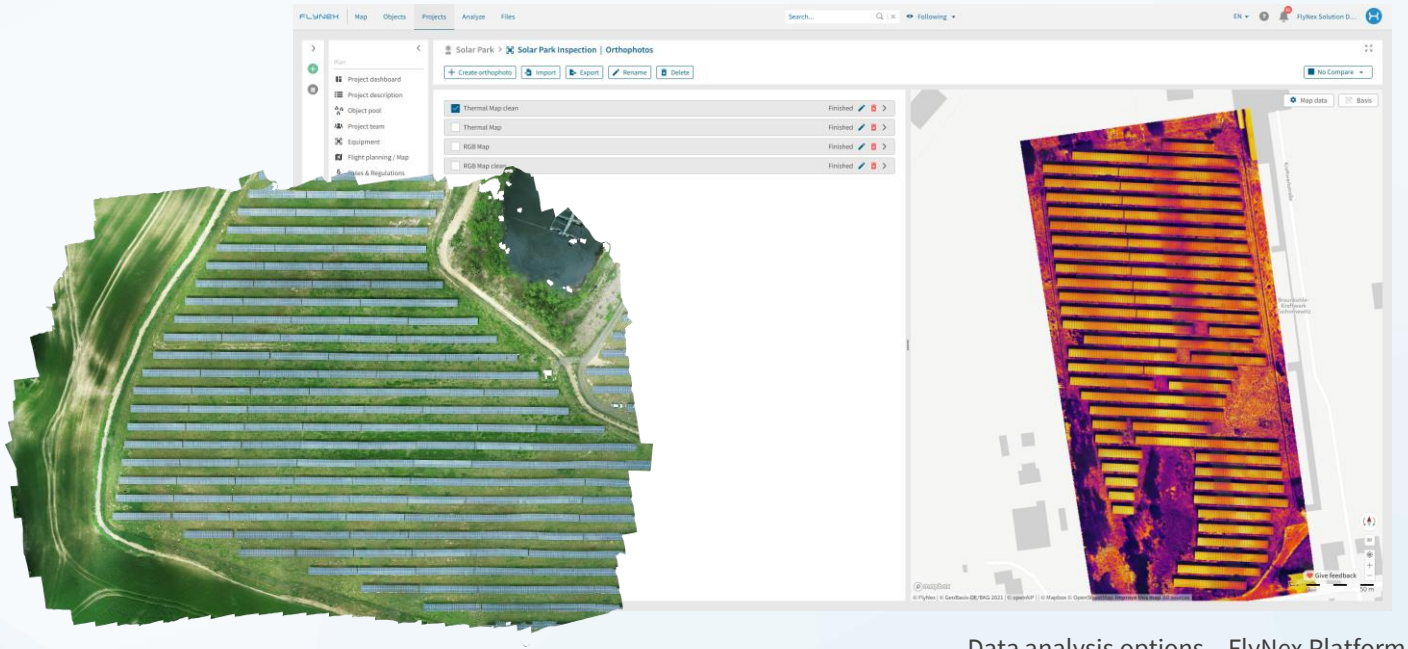
Seamless Image Navigation – Intuitive interface to zoom into specific details, compare multiple images, and review historical data for trend analysis.

Efficient Data Structuring – Categorization of images and 3D models into project folders for easy access and collaboration.

Integrated Workflow Management – Direct linkage of analysis results to maintenance tasks, ensuring that insights lead to actionable decisions.

Cloud-Based Data Storage – Secure and structured storage of raw data, annotations, and reports for fast retrieval and compliance tracking.





Data analysis options – FlyNex Platform

AI-BASED SOLAR PARK ANALYSIS

Thermal Anomaly Detection – Identification of hot cells, hot spots, and overheating junction boxes.

String & Circuit Failures – Detection of inactive strings, advanced stage PID (Potential Induced Degradation) and wiring errors.

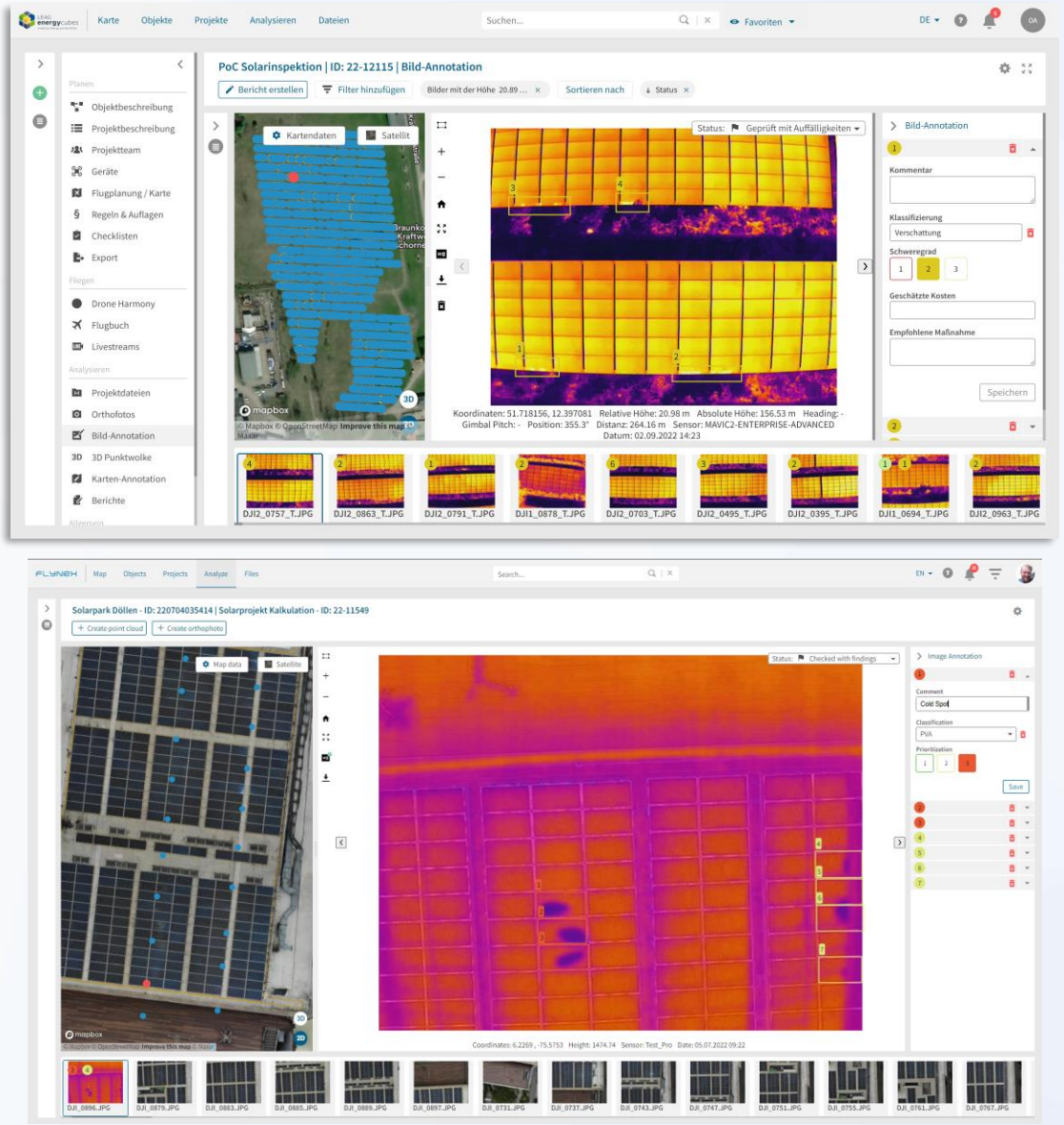
Component Integrity Assessment – Analysis of bypass diode defects, cell connector failures, and inverter malfunctions.

Structural Damage Recognition – Identification of glass breakage, shading effects, and dirt accumulation.

Automated Workflows – Seamless integration through tailored system interfaces.

Defect Classification Review – Verification of predefined damage categories.

Structured Data Output – Delivery of analysis results in a predefined format for target systems.



AI-based detection of thermal anamolies

AUTOMATED REPORTING & DEFECT ANALYSIS

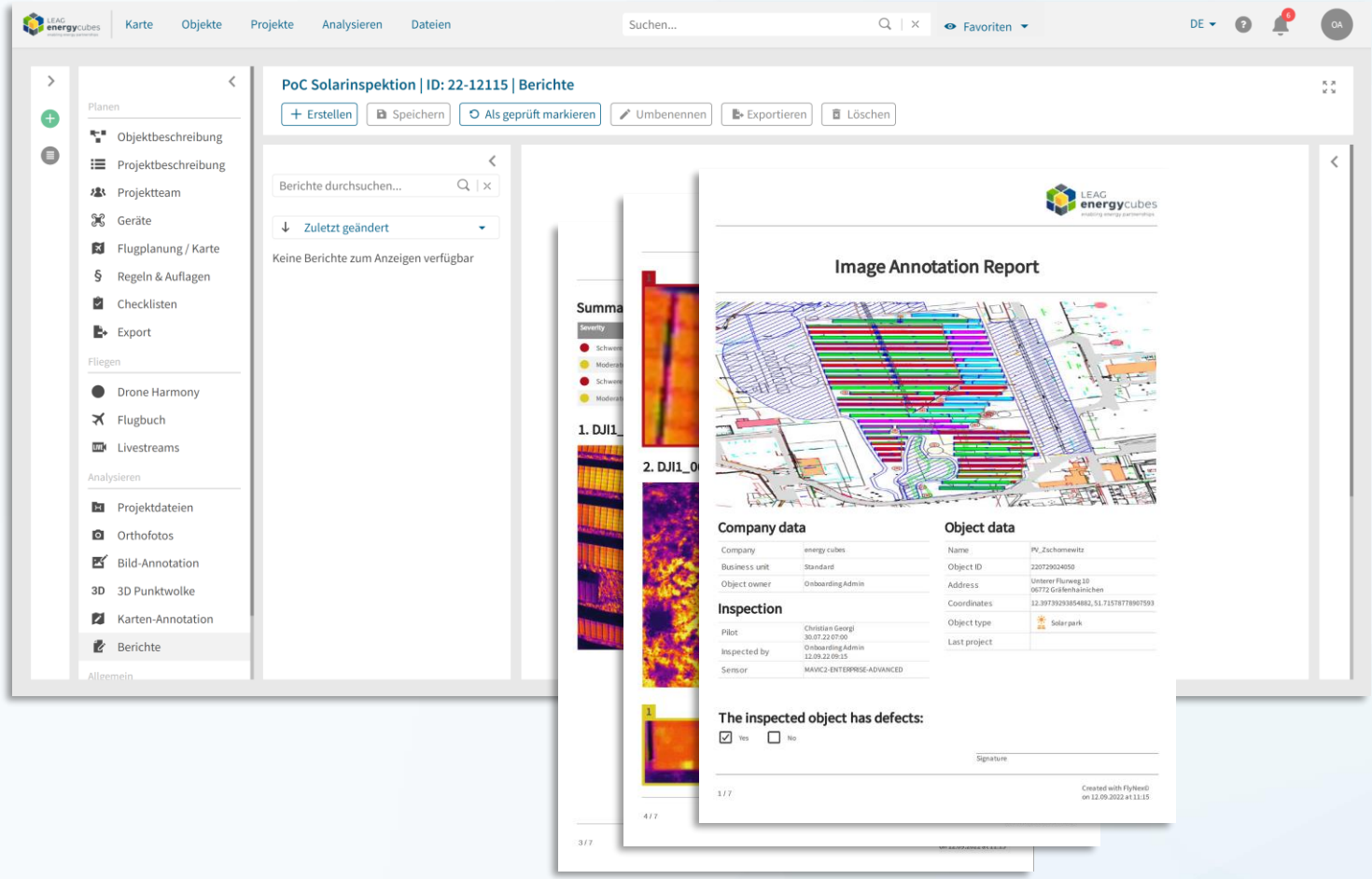
Comprehensive Inspection Reports – Structured summaries of detected anomalies, including severity classification and thermal imaging analysis.

Image Annotation & Defect Mapping – Visual representation of inspection findings, enabling precise identification of affected areas.

Seamless Data Documentation – Automated generation of standardized reports with company, object, and inspection details.

Defect Classification & Assessment – Systematic verification of damages with integrated approval and validation workflows.

Export & Integration – Reports can be exported and integrated into existing maintenance systems for immediate action.



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ADDED VALUE FOR SOLAR INSPECTIONS

ADDED VALUE THROUGH :

- Networking of systems
- Build-up of process knowledge, step-by-step process automation
- Structured, digital data
- Reduction of workload
- Reduction of on-site operation time
- Integration of further application possibilities

Cost savings primarily through process automation

Prerequisite: Know-how setup + required systems

First measured values from practice:

Inspection time per MW is reduced by around 60%.

Operating efficiency can be increased by approx. 15%.

IMPLEMENTATION

POC

- Start with one DJI Dock at a test site
- Collect learnings through out the project
- Get legal approvals
- Scale to more docks and operations

(type of dock is interchangeable later on)

Start approval process	Site setup	Implementation	Operations
Define location and flight area Explore site and rules and regulations Prepare documents and file for operational approval	Prepare site and location Laserscan of site Check power and connectivity Manual installation of dock	Cloud server setup and connection to the dock Platform integration and automatic data upload Site flight planning on captured 3D pointcloud	Test flight paths and time patterns Explore collected data and connect analytics Explore connection to own IT infrastructure

FLYNEX

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