

Tama Building Analyst #404

-Highly automated extraction of building damages from UAV data-

The Tama Building Analyst #404 is a software solution for building owners, operators and inspectors, categorized as a 'decision support system'. The Solution provides users with the capability to quantify defects on building elements such as roofs and facades based on various kinds of imagery, especially as captured by UAV/drones. The goal is to maximize automation of image data analytics and by that to reduce manual extraction effort to a minimum. The user interface is characterized by a clear structure and can be adapted with regard to design and layout.

In her current version 1.0, the Tama Building Analyst includes quantification and localization of various defect classes such as cracks, dirt classes like stains, generic defects and several building measurement tools such as tile labeling. In addition, it is possible to categorize thermal hot spots and interactively create individual objects and classes. Further tools comprise the calculation of spatial resolution based on a reference object and area measurement functionalities. The list of supported features will constantly be increased and can be modified on demand.

The basic process is structured in 1) import of (standardized) data, 2) automated data processing concerning desired features, 3) interactive editing of objects, and 4) report generation. The following figure illustrates the user interface in the current version.



Fig. 1: User interface with implemented modules in version 1.0

The tabs in the left part lead the user through the individual steps and are expandable by a modular approach. Below this block, users can directly access all necessary tools when working in interactive mode or when adjusting settings. The main part of the screen's 'real estate' is reserved to imagery and the thematic layers to the imagery. By this, users can quickly see how far the automated analytics already went and where to start and end manual intervention. Fig. 2 illustrates the calculation of the spatial resolution of an image section, based on the known size of an object. This offers the possibility to quantify building parts especially in non-georeferenced data and enables the export of tables with area measurements for every object.

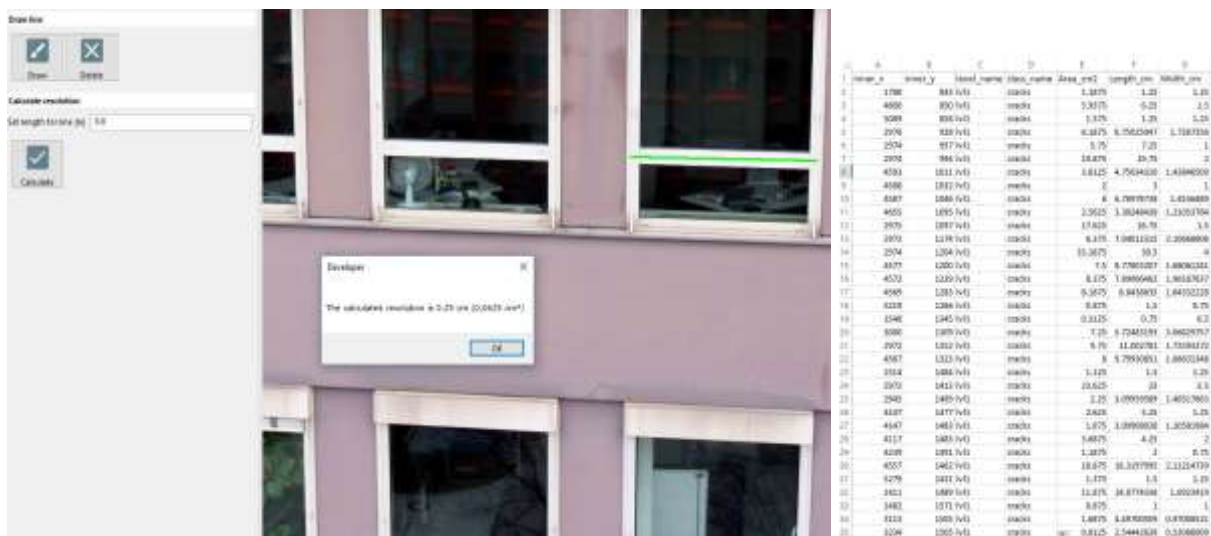


Fig. 2: Module for calculation of spatial resolution and exported table

With the Tama Building Analyst V 1.0 especially building surfaces like façades and roofs are addressed. Extensions with regard to green areas and further impervious surfaces inside the building's terrain are planned. Up to now, the application has been tested for certain materials (e.g. bricks, concrete, roughcast, stone), additional surface materials can be added by available sample data. The following figures illustrate extracted façade characteristics and functions.



Fig. 3: Detected cracks (left) and hot-spots in thermal images with object characteristics (right)

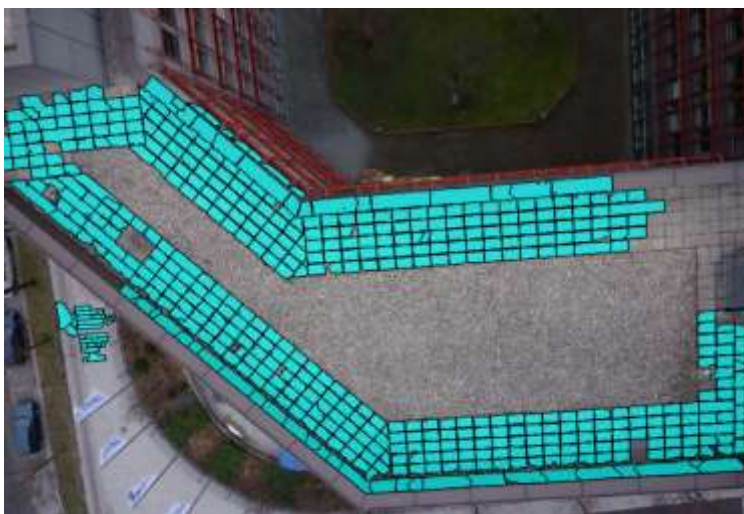
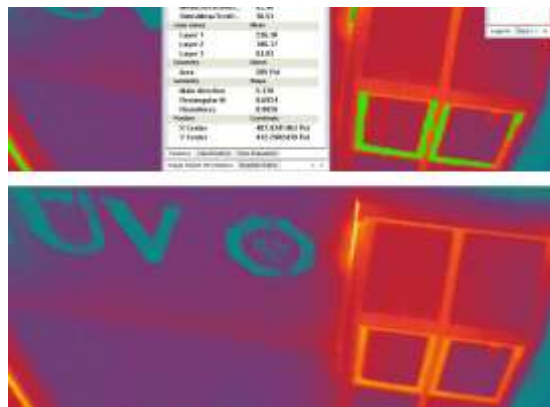


Fig. 4: Extracted tiles of a roof (left) and possibilities of interactive object editing (right)

Overview of the Tama Building Analyst #404

Input data	RGB images Thermal images Video frames
Preprocessing	If required: mosaicking if single images by external software
Software	eCognition Architect eCognition Server (recommended for large datasets)
Ruleware	Tama Group multi-stage approach: <ul style="list-style-type: none">• Recognition of candidates• Interactive editing• Export of results in various formats
Results	Output format: <ul style="list-style-type: none">• Image data (JPEG/TIF/PNG)• Vector data of objects (SHP)• Statistics



Tama Group specializes in automated information extraction, especially in object-based image analysis with eCognition.

We analyze images from various sensors and continue to refine our methods of automating information extraction. In doing so we combine machine learning, deep learning and expert knowledge.

With our **forest portal**, we are able to offer an image-based digital twin of his forest to practically every forestry company. This allows us to provide important information about the managed forest area in a clear manner.

Our **information factories** offer solutions for specific questions in various industrial areas such as agriculture, construction, energy, transport, environmental protection and materials science.

Distribution of Trimble eCognition: We offer an extensive sales, support and training portfolio, including our 4D maintenance package.