types with the associated infrastructure objects is provided. For each infrastructure object and infrastructure type there is a fact sheet with illustrations and text descriptions. Infrastructure types and objects are linked to each other, so for each infrastructure type a navigable listing of infrastructure objects occurring in it is provided. In the infrastructure object profiles, a list of infrastructure types is displayed on which the selected object can occur.

For the analysis of infrastructures as well as for object recognition and identification, different domains, such as land vehicles or industrial plants, can be created in order to keep an overview of the entire database.

Product RecceMan®

RecceMan® was realized as a software product on behalf of the BAAINBw and has been used as an operational system in the Bundeswehr since 2010. The software consists of the following components:

- Recognition component for image-based object recognition and object identification as well as for image-based analysis of infrastructures.
- Recognition training for training evaluation and recognition skills
- Editing tools for adding and maintaining reference objects
- Administration tool for managing, archiving and distributing the database
- All components are Java desktop applications for common Windows and Linux operating systems
- The recognition component and the recognition training are additionally offered as a network solution
- RecceMan® is delivered with a sample dataset

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Interactive recognition assistance for image-based object recognition and infrastructure analysis

RecceMan®

RecceMan®

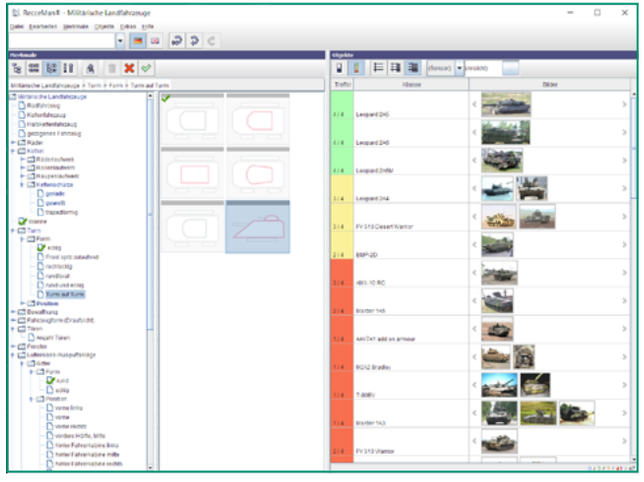
Interactive recognition assistance for image-based object recognition and infrastructure analysis

In many military domains, information about objects and infrastructures must be derived from image-based data. One area is imaging reconnaissance. Here, military-relevant information about an area of interest must be obtained by capturing and analyzing aerial and satellite imagery and, in particular, UAV video. Key tasks are the detection and identification of objects, e.g. land vehicles or ships, and the analysis of infrastructures, e.g. ports or industrial facilities. These tasks are performed by specially trained image analysts and require extensive knowledge of the objects to be analyzed and their characteristics, as well as the structure and function of infrastructures.

Due to increased foreign deployments and the rapid development of more and more new systems, the armed forces are confronted with a growing variety of objects and infrastructures. Under these circumstances, it is almost impossible to ensure that each individual image analyst is appropriately qualified for all mission-relevant conditions.

Solution

In order to guarantee a high detection and analysis quality even without extensive training, the recognition assistance RecceMan® was developed at Fraunhofer IOSB. This interactive software supports the image analyst in the image-based recognition and identification of objects as well as in the analysis of infrastructures.



Object recognition and identification

The object recognition and identification assistance enables the image analyst to describe the object to be evaluated on the basis of its recognition features (characteristic optical features). For this purpose, both the relevant objects and the corresponding recognition features are stored and linked in the RecceMan® database. The task of the image analyst is to transfer the features recognized in the material to be analyzed to the RecceMan®. After each transfer of a feature, the object list and feature tree are updated. The objects that are still relevant are sorted upwards in the object list and marked in green. Features that are no longer relevant for further evaluation lose their blue color. This allows the image analyst to keep track of which objects and features are still relevant for further evaluation. In addition, a fact sheet with detailed image information and textual descriptions is available for each object. If, at a certain point in the evaluation process, the number of objects in question is manageably small, these object descriptions can be very helpful for final identification. The features are additionally provided with pictograms, which should help to better understand the meaning of the respective feature.

Analysis of infrastructures

When analyzing infrastructures, the focus is usually on the question of what purpose an infrastructure as a whole or its individual components serve, or how they can be used. In the case of industrial facilities, for example, it is of central interest which products can be produced there, e.g. an aluminum-producing or biochemical industrial facility. RecceMan® provides a reference tool in which, for each infrastructure, an overview of the corresponding infrastructure