

# MINOAS

## Marine Inspection Robot Assistant System



Scaffolding needed for the inspection of large cargo holds



DFKI prototype for an ultra-light magnetic crawler for the inspection of cargo holds and ship hulls



An optical laser tracker is used for the localization of the individual robots of the Minoas fleet

### Development of a Robot-Based Inspection System to Facilitate and Accelerate the Inspection of Marine Vessels

Within the EU-funded project MINOAS, a new concept for the inspection of marine vessels will be developed. This concept combines state-of-the-art technologies with a standardization of the overall inspection process. In a holistic approach, MINOAS develops a new infrastructure that supports human personnel through high-locomotion enabled robots equipped with high-resolution sensors. MINOAS uses crawling, climbing, and flying robots to access different sections of a ship. Information gathered by the robots is integrated and presented to the human inspection staff in a central command center.

The heterogeneous, multi-modal MINOAS robot fleet will be able to cover most sections of a standard vessel, including both on-board and overboard regions. In particular in regions that are difficult to access (e.g. in tall cargo holds or on the ship hull), the robots provide the inspectors with advanced remote perception and handling capabilities. Among others, this will reduce the need for costly supporting measures (e.g. scaffolding to access large cargo holds) and increase workplace safety for the inspectors.

By introducing robots for the inspection, multiple inspection processes can be executed in parallel. This speeds up the overall inspection process, which today often is performed on a section-by-section basis

through a single inspector.

In summary, the main objectives of MINOAS are

- to use robots in order to provide better access to those sections of marine vessels that are difficult to reach for human inspectors (both above and under-water),
- to collect, integrate and analyze the data gathered by a multi-disciplinary robot fleet in a central command center,
- to record the overall inspection process for future reference and the identification of potential deficiencies.

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