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ABSTRACT

This document represents Deliverable D4.5 – Prototype of the UAS Recharging Station, developed within the OVERHEAT project.

The document illustrates the prototype's design with photographs and short descriptions.

Please note that this document does not include information pertaining to the drone's hardware and software, or its recharging station. These topics are comprehensively covered in Deliverable D4.1 – User Manual of the UAS Recharging Station and Deliverable D4.2 – User Manual of the UAS Recharging Station software.



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ACRONYMS

ECDIS – Electronic Chart Display and Information System

HMI – Human-Machine Interface

ICD – Interface Control Document

IOT – Internet of Things

IP – Ingress Protection

RTK – Real-Time Kinematics

RTSP – Real Time Streaming Protocol

UAS – Unmanned Aircraft System



INTRODUCTION

The OVERHEAT autonomous drone is an aerial system that integrates high-end industrial solutions with customized designs tailored specifically for maritime operations. The system is designed to ensure efficient and effective fire detection and firefighting support, both in port environments and on board the vessels.

The figure below shows the vessel segment architecture related to the connection between the operations on the vessel and ashore. In Figure 0-1, the OVERHEAT drone is highlighted in red.

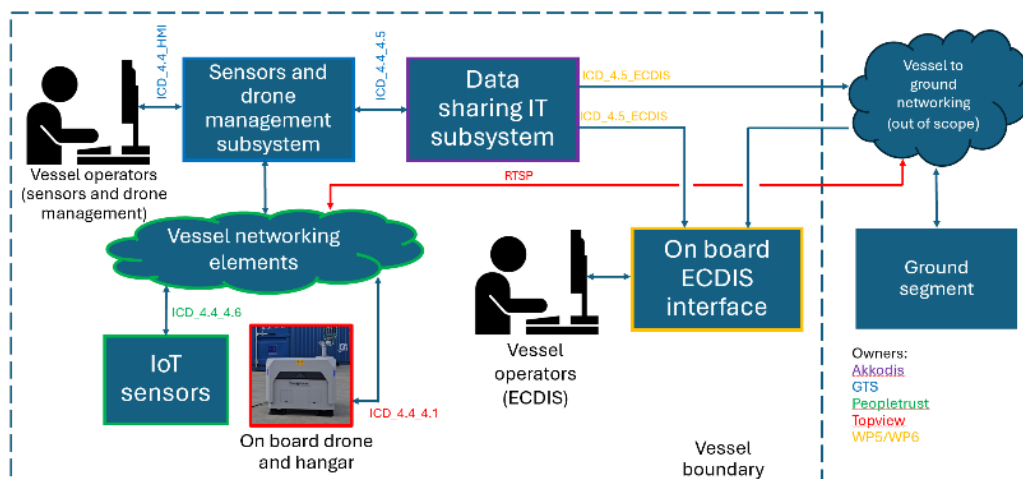


Figure 0-1 Vessel segment architecture

The Figure 0-2 shows the ground segment architecture. The OVERHEAT drone is highlighted in red.

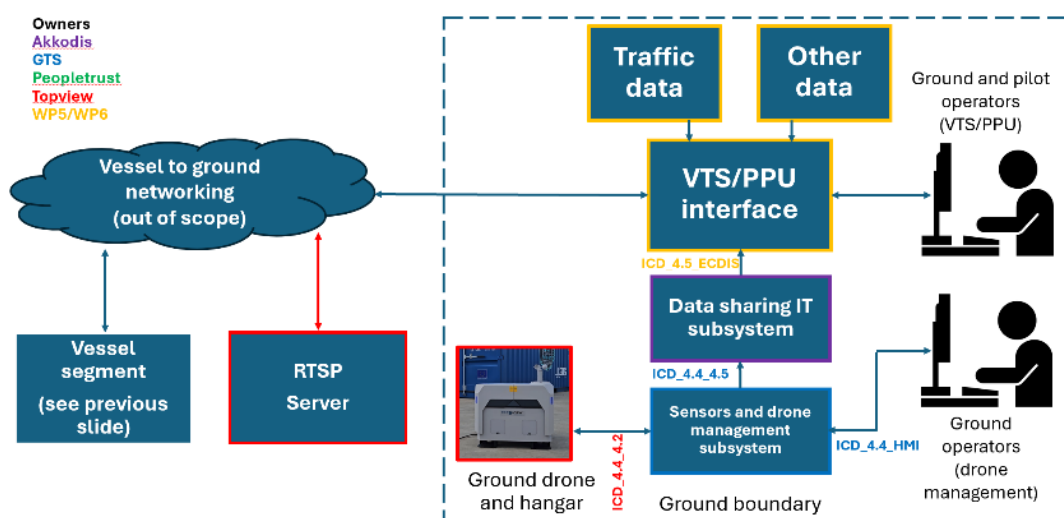


Figure 0-2 Ground segment architecture



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The core of the system is the DJI Hangar 2: a high-performance, automated hangar that features a lightweight and compact design. This advanced hangaring station is engineered for rapid deployment, allowing two operators to carry and install it with ease. Its integrated body structure simplifies setup, reducing installation time and ensuring a hassle-free experience.

The drone itself, the DJI MATRICE™ 3TD, is a state of the art in autonomous aerial technology. This sophisticated aircraft boasts a six-directional vision system, providing comprehensive obstacle detection for enhanced flight safety. Additionally, its infrared sensing capabilities enable precise environmental awareness, making it well-suited for complex missions. The RTK (Real-Time Kinematics) system ensures highly accurate positioning, crucial for precision-based operations. With an IP54 protection level, the drone is resilient against dust and water, enabling reliable performance in various conditions.

Adding to its versatility, the vessel version of the system includes satellite-based internet connectivity via Starlink for Maritime. This ensures uninterrupted communication and seamless data transmission, allowing users to operate the drone remotely from virtually anywhere. With Starlink's reliable, high-speed internet, operators can conduct real-time flight task planning, remote aircraft controls, live site monitoring, and debugging, enabling efficient mission execution even in remote oceanic regions.

1. Prototype of the UAS Recharging Station



Figure 1-1 UAS recharging station deployed near a container

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Figure 1-2 The tilting mechanism of the vessel version

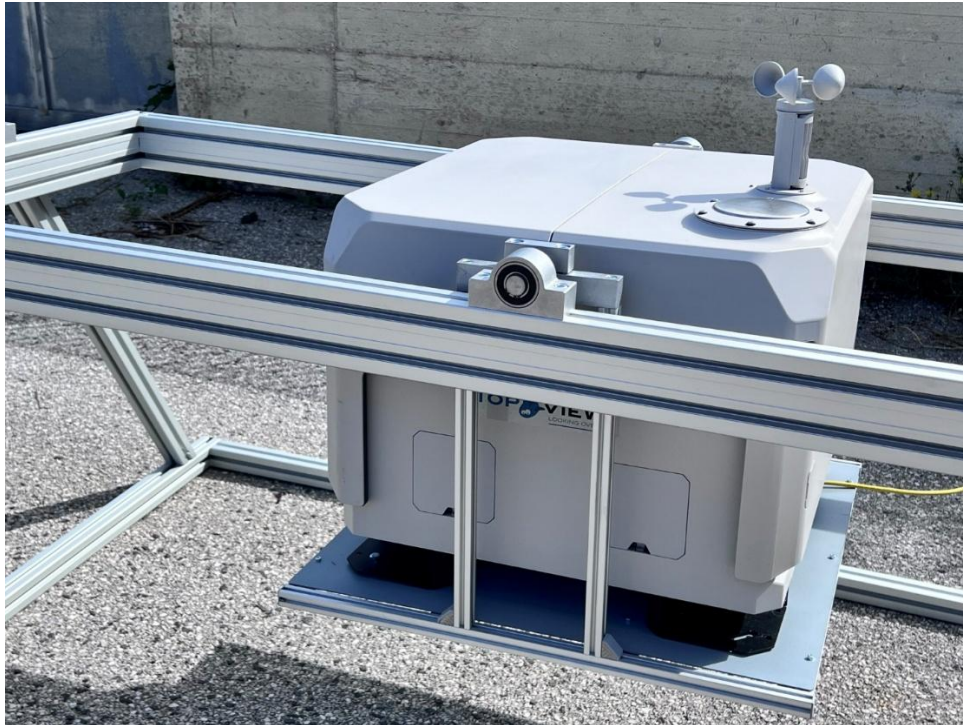


Figure 1-3 UAS recharging station installed in the tilting mechanism – front view



Figure 1-4 UAS recharging station installed in the tilting mechanism – side view

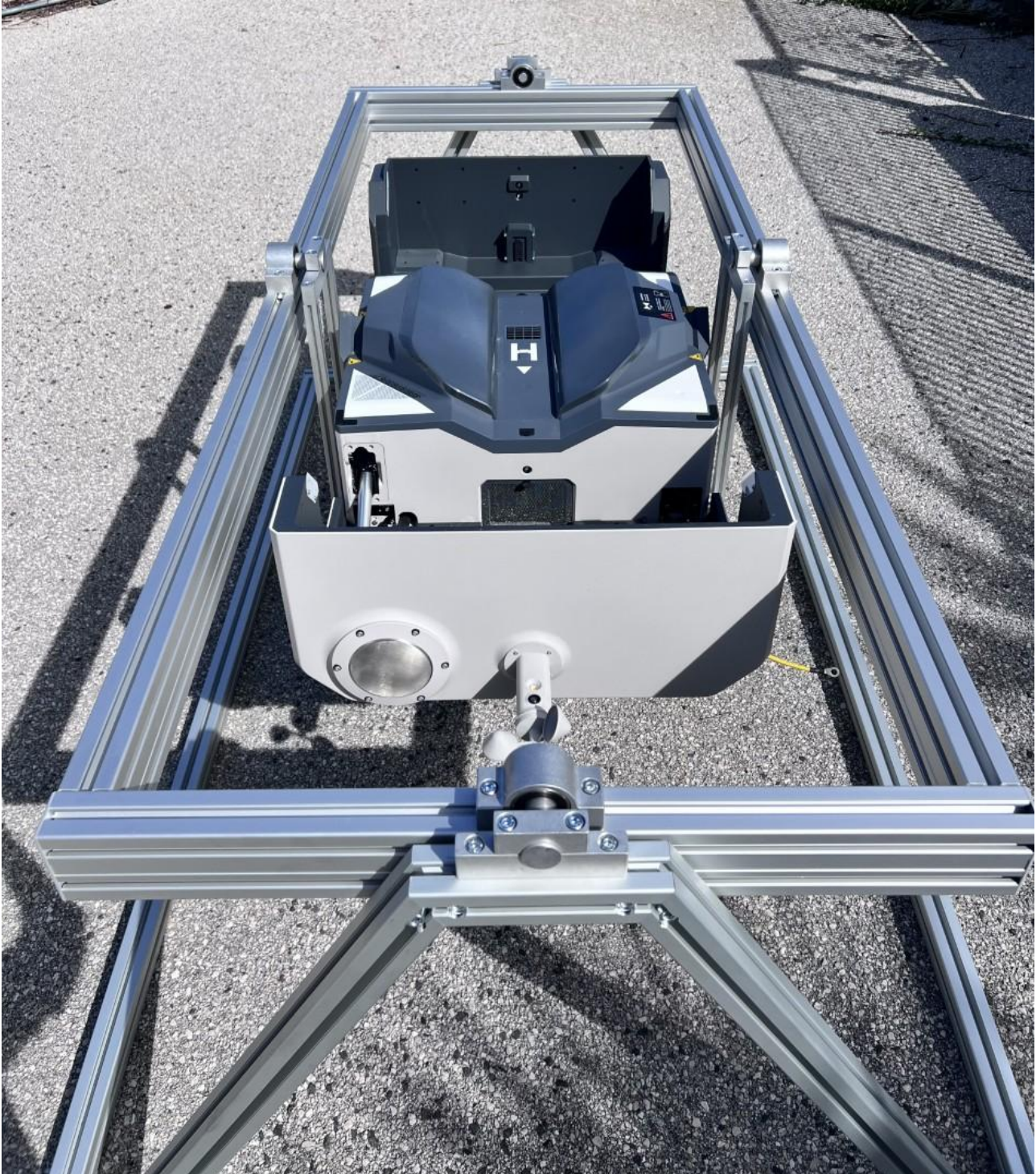


Figure 1-5 UAS recharging station opened in the tilting mechanism – view from the top

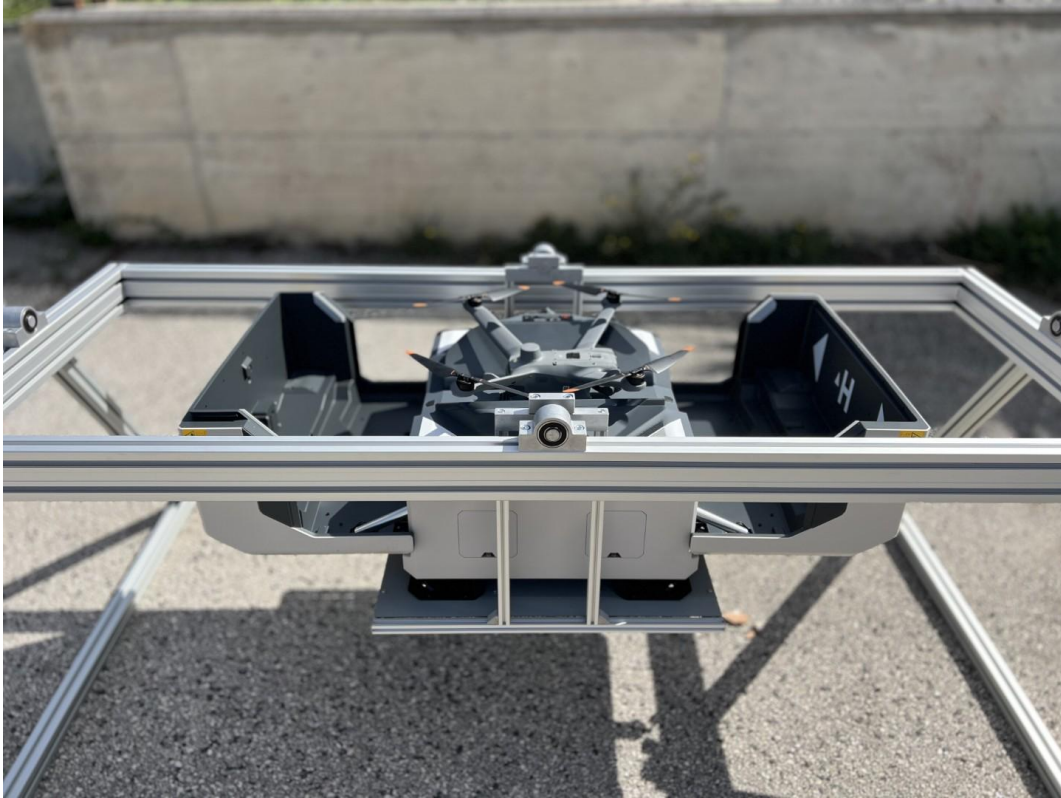


Figure 1-6 UAS recharging station opened in the tilting mechanism – front view



Figure 1-7 UAS recharging station opened in the tilting mechanism – view from the top

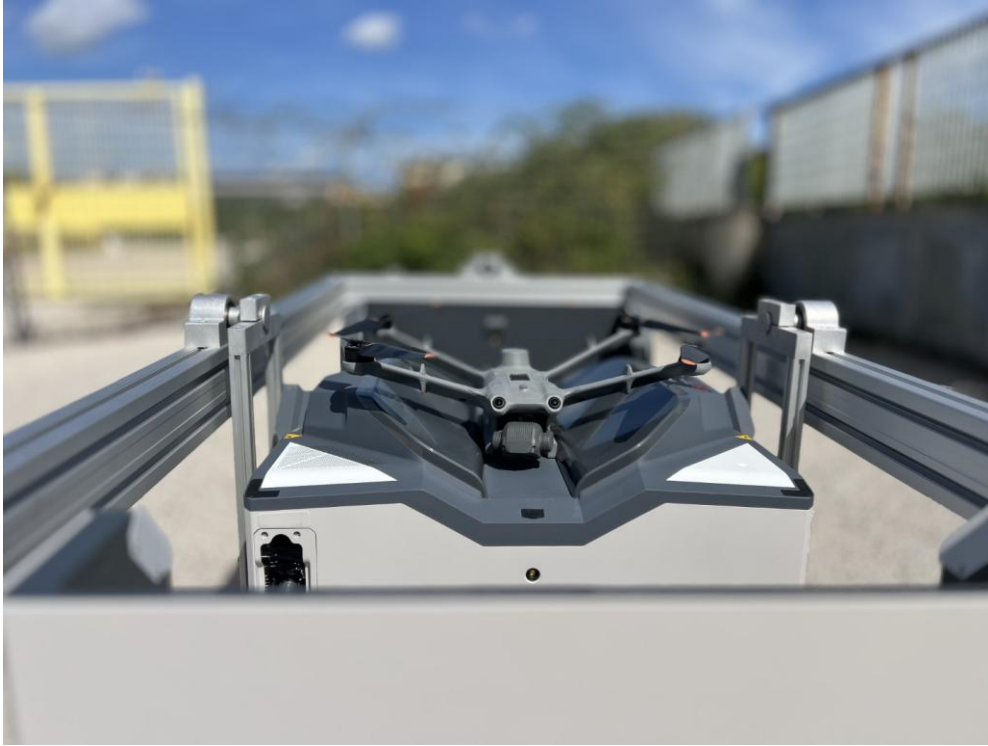


Figure 1-8 Detail of the UAS placed in the tilting mechanism



Figure 1-9 Detail of the UAS placed in the tilting mechanism



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