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ABSTRACT

The OVERHEAT project, funded by the Horizon Europe programme aims at developing and demonstrating innovative integrated and interconnected digital solutions (DS) to prevent and manage fires on board container ships.

Among the Work Packages (WP) defined to cover the specification, development and test of the digital solutions, the WP5 concentrates the collection of users, system, functional and regulatory requirements:

- D5.1: Definition of the end user requirements
- D5.2: Definition of the Digital Solution requirements
- D5.3: Definition of the automated systems requirements
- D5.4: Ontology - a common definition of the Digital System, its component and the entities involved in Overheat

The WP5 produces the bases and guidelines for the following WP6 (Development of the DS) and WP7 (Validation and demonstration).

Purpose and scope of the document

The “OVERHEAT ontology” document defines the main concepts, entities, and relationships between these entities involved in the OVERHEAT project, supporting the development and the test of digital solutions for early fire detection, information exchange, and coordinated rescue operations at sea.

It provides a **common semantic framework** for project partners — technical developers, maritime operators, and safety authorities — to ensure consistency across system components and interoperability in data exchanges.

It is important to underline that this document is the so called “conceptual ontology document” depicting the concept of the processes / entities involved. It is not the “technical ontology document” that will be later produced by the developers of the technical modules for development and tests purposes.

Thus, the format is a **textual description** (including concepts, definitions, and relationships written in human-readable form.

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ACRONYMS

Acronym	Definition
ECDIS	Electronic Chart Display and Information System
ETA	Estimated Time of Arrival
EMSA	European Maritime Safety Agency
IHO	International Hydrographic Organisation
IMO	International Maritime Organization
IOT	Internet of Things
LAN	Local Area Network
RCT	Risk Contribution Tree
SoA	State-of-the-Art
VTS	Vessel Traffic System
WP	Work Package

In addition, the SECTION

SECTION 7 Glossary / Dictionary of Terms lists the specific terms related to OVERHEAT Ontology.

INTRODUCTION

Context

The **main** objective of the OVERHEAT project, funded by the Horizon Europe programme, is to prevent and manage fires on board container ships, by integrating innovative and interconnected solutions. Fires on this type of ship represent a major risk to vessels, the safety of crews, port infrastructure and the environment.

To meet this challenge, several Work Packages (WPs) have been implemented:

- **WP4** : Development of advanced surveillance and sensing technologies (IoT sensors, drones, autonomous systems).
- **WP5**: collection of user needs and definition of functional and regulatory requirements.
- **WP6**: integration of technological solutions into a **digital solution (DS)** allowing a global vision of the situation and the coordination of the actors.
- **WP7**: validation of the whole thing by simulations **and demonstrations** in different European operational contexts.

Objectives of WP5

Work **Package 5 (WP5)** aims to provide core specifications for the development of the DS (WP6) and the tests (WP7).

The specific objectives are:

- D5.1: Definition of the end user requirements
- D5.2: Definition of the Digital Solution requirements
- D5.3: Definition of the automated systems requirements
- D5.4: Ontology - a common definition of the Digital System, its component and the entities involved in OVERHEAT

Link with other Work Packages (WP4, WP5, WP6, WP7)

WP5 provides definitions and specifications on which the development of the different digital components can be based. It takes as inputs the studies and results of the WP 3 and 4.

It is an important guideline for the project development and tests phases.

Deliverable Target Audience

This deliverable is mainly intended for:

- The **consortium partners**, who will get a common understanding of the OVERHEAT DS operational scheme.

- End **users and operational stakeholders** (maritime authorities, ports, shipping companies, rescue services), as a high-level description of the OVERHEAT components, entities involved and relationships between them.

Purpose and scope of the document

The OVERHEAT ontology defines the main concepts, entities, and relationships between the entities involved in the OVERHEAT project, supporting the development and the test of digital solutions for early fire detection, information exchange, and coordinated rescue operations at sea.

It provides a **common semantic framework** for project partners — technical developers, maritime operators, and safety authorities — to ensure consistency across system components and interoperability in data exchanges.

It is important to underline that this document is the so called “conceptual ontology document” depicting the concept of the processes / entities involved. It is not the “technical ontology document” that will be later produced by the developers of the technical modules for development and tests purposes.

Thus, the format is a **textual description** (including concepts, definitions, and relationships written in human-readable form. The technical ontology document is close to a machine-readable language (e.g. OWL, RDF, JSON …).

SECTION 1 Ontology Structure

The OVERHEAT ontology is structured into **three interconnected layers**, each representing a level of action and information flow:

Table 1: Synthetic view of the three conceptual layers of the Ds

Layer	Description	Main Entities involved	Key Outputs
Layer 1 — Technical	On-board systems for detection and monitoring (sensors, drones, vessel bridge software)	Sensors, Drone, Vessel IT systems operator, and its computer	Detection events, video feed, technical data
Layer 2 — Functional	Communication and coordination between the vessel and maritime surveillance authorities once an alert is confirmed	Ship Captain and the ECDIS navigation system Maritime Surveillance Agency	Distress signal, situation reports, shared data
Layer 3 — Operational	Organisation and execution of rescue and port-of-refuge scenarios	Maritime Surveillance Agency, Rescue Vessel, Port Harbour master, Maritime Pilots	Rescue coordination plan, shared data, firefighting operation

SECTION 2 Core Conceptual Domains

SECTION 2.1 Detection and Monitoring (Layer 1)

Following the synthetic Table 1: Synthetic view of the three conceptual layers of the Ds

, the Layer 1 consists of the following technical components:

- **Sensor(s): Device(s) installed in containers and on the ship deck to detect overheating, smoke, or fire.**
    - *Attributes:* Type, ID, location on the vessel, fire detection thresholds, status, timestamp, data type and communication protocol
    - *Relations:* The *sensor detects an Anomaly*; the *Anomaly generates an Alert*.
- **Anomaly / Fire Event: Situation where a sensor measurement exceeds pre-defined safety threshold.**
    - *Attributes: none*
    - *Relations:* The *Fire Alert Event triggers a warning towards the IT manager, who may select a predefined drone flight plan and deploy the drone*.

- **Drone: Semi-autonomous device performing visual inspection and video streaming of the deck.**
    - *Attributes:* Type, ID, position over/on the vessel, temperature threshold, status, timestamp, data format and communication protocol
    - *Relations:* The d*rone surveys the deck*; the *Drone transmits Video Feed to the IT management computer and to the IT bridge computer*.
- **IT management computer**
    - *Attributes:* IP address on the ship LAN
    - *Relations: processes, stores and visualises alarms to the IT manager, and allows the IT manager to select a flight plan and deploy the drone.*
- **IT bridge computer: Central processing unit collecting all sensors and drone data.**
    - *Attributes: IP address on the ship LAN*
    - *Relations: The IT bridge computer processes, stores and visualises Data; The IT management computer supports the ship Captain's Decision.*

SECTION 2.2 Alert and Communication (Layer 2)
the Layer 2 consists of the following entities (technical components and persons):

- **IT manager: Ensure the monitoring of the vessel LAN, sensors, drone on the Traffic flow tracking and display system**
    - *Attributes: none*
    - *Relations:* The IT manager transfers the Fire Alert and related data to the *Captain; Captain confirms the Fire event*

SECTION 2.3 Operational Layer (Layer 3)
This layer includes the entities involved in the decision making process and in the coordination of rescue operations:

- **Captain: Vessel's decision-maker responsible for confirming incidents and communicating with maritime surveillance authorities.**
    - *Attributes: none*
    - *Relations: Captain sends a Distress Signal*.

- **Distress Signal: Standardised emergency message sent to coastal surveillance agency.**
    - *Attributes:* Vessel ID, GPS position, event description, time, severity.
    - *Relations: none*
- **Maritime surveillance agency: maritime authority responsible for traffic monitoring, sending and receiving alerts and distress messages, assessing situations.**
    - *Attributes: none*
    - *Relations:* The *Agency requests Additional Information to the Captain; the Agency evaluates the Risk Level*.
- **Information Exchange: Structured communication between the Captain (of the vessel in distress) and the maritime surveillance agency, including images, videos, and sensors data.**
    - *Attributes: none*
    - *Relations: Information / data exchange ship-shore to support Decision Making and the Rescue Operation*.
- ***The Maritime Surveillance Agency coordinates the rescue operation***
    - *Attributes: none*
    - *Relations: mobilises a rescue vessel and a port of refuge, transferring the overall picture of the situation*

SECTION 3 Detailed concepts

SECTION 3.1 Vessel & Equipment Status

- **Domain Description:** Focuses on the technical condition and operational status of the vessel and its equipment, ensuring early detection of anomalies.
- **Technical layer 1:** with relevance to Functional Layer (Layer 2) for decision-making.
- **Key Concepts / Entities:**
    - **Vessel:** ID, type, cargo, location, current status.
    - **Equipment / Systems:** Critical devices on board, including sensors, fire suppression systems, battery containers.
    - **Sensor:** Detects fire, overheating, or anomalies. Attributes: location, type of alert, alert threshold, alert status, timestamp.
    - **Drone:** Provides situational awareness by visually inspecting the deck and relaying video feed. Either the drone flies a survey in case of alert or periodically. However, from WP4's perspective, no requirements for drone flights unrelated to fire alarms have been specified.
    - **IT management Computer:** Collects and processes all sensor and drone data for the captain.
- **Relationships:**
    - *Sensor monitors Equipment*
    - *Drone inspects Vessel Deck*
    - *IT management computer aggregates Sensor and Drone data*

SECTION 3.2 Hazard Detection & Alerts

- **Domain Description:** Covers the identification, validation, and communication of hazards detected on board the vessel.
- **Layer: Functional Layer 2:** linking technical detection to operational response.
- **Key Concepts / Entities:**
    - **Anomaly / Fire Event:** Detected hazardous situation.
    - **Captain:** Confirms the Alert and initiates a Distress Signal.
    - **Distress Signal:** Communication to maritime surveillance authorities with vessel ID, location, alert type and severity, etc.

- **Maritime Surveillance Agency:** Receives the Distress Signal, requests additional information, evaluates risk.
- **Information Exchange:** Structured communication between the Captain and the Maritime Surveillance Agency supporting decision-making.

- **Relationships:**
  - *Sensor detects Anomaly*
  - *Anomaly generates Alert*
  - *Alert receives Captain*
  - *Captain sends Distress Signal*
  - Distress Signal reaches *Surveillance Agency*
  - *Surveillance Agency requests Additional Information*

SECTION 3.3 Coordinated rescue Operations

- **Domain Description:** Covers the coordination, execution, and monitoring of rescue efforts once a hazard is confirmed.
- **Layer: Operational Layer (Layer 3)**
- **Key Concepts / Entities:**
  - **Rescue Operation:** Coordinated action plan including vessel handling, crew safety, firefighting means decided after a confirmed distress event
    - ***Relations:*** **Maritime Rescue *Agency initiates Rescue Operation*, *Rescue Operation involves Rescue Vessel and Port of Refuge*.**
  - **Rescue Vessel:** Unit deployed to assist the distressed vessel.
    - ***Attributes:*** **ID, Type, capabilities, location, estimated arrival time.**
  - **Port of Refuge:** Safe location identified where the vessel can be safely docked
    - ***Relations: Port Harbour master evaluates the vessel reception conditions*** (tide, weather, berth availability, fire propagation risks, vessels on site).
  - **Harbour Master / Port Authority:** Prepares port resources for emergency docking and fire fighting
    - ***Relations: Harbour Master coordinates Fire-fighting Resources and Maritime Pilots*;** Coordinates port information exchange with the ship in distress, the pilots and the maritime surveillance agency coordinating the rescue

- **Fire-fighting Teams:** Intervention Units involved in extinguishing the fire
- **Maritime Pilots:** Assist the Captain to pilot the vessel from its entry in the port responsibility area to the berth or buoy of destination

- **Relationships:**
  - *Maritime Surveillance & Rescue Agency initiates and coordinates the Rescue Operation*
  - *Rescue Operation involves Vessel in distress, the Port of Refuge, the Maritime Pilots*
  - *The Harbour Master of the Port of refuge coordinates Firefighting Teams and Maritime Pilots*

SECTION 3.4 Summary – General concept

- **Vessel & Equipment Status → Hazard Detection & Alerts:** Sensor data and drone imagery feed hazard detection systems (software of the IT management computer)
- **Hazard Detection & Alerts → Rescue Operations:** Confirmed alerts trigger rescue planning and coordination with port authorities and rescue teams.

SECTION 4 Information Flow and Relationships

SECTION 4.1 Overview

Below is the overview of the information flows between the entities previously described.

Detection Chain: Sensor → Anomaly → IT management Computer → IT manager → Drone Survey → IT bridge Computer → Captain

Alert Chain: Captain → Distress Signal → Maritime Surveillance Agency → Data Request → Data Transmission

Rescue Chain: Maritime Surveillance Agency → Rescue Vessel + Port of Refuge → Harbour Master → Firefighting Teams + Maritime Pilots

Each chain forms a semantic sequence of "information generation – validation – action".

SECTION 4.2 Visual Concept Map

The Visual Concept Map represents graphically the relationships between Layers, Domains, and Key Entities.

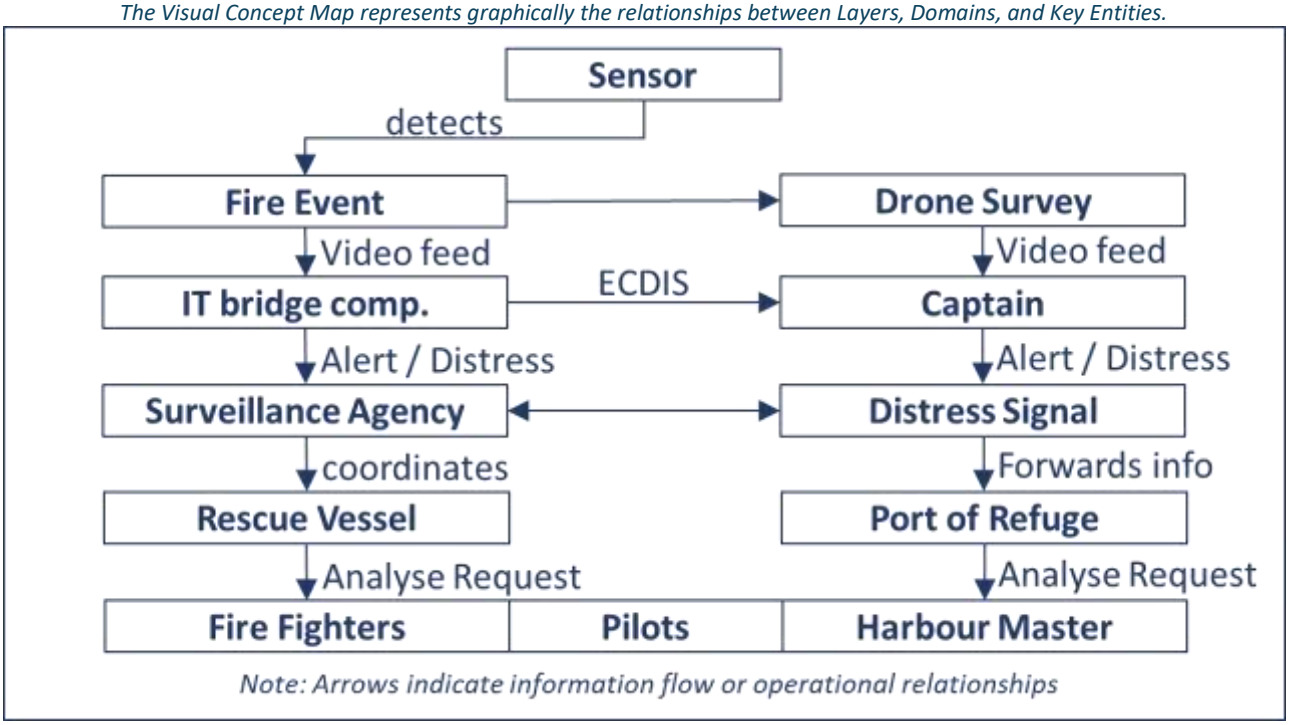

Figure 1: Graphical representation of the information flows

SECTION 5. Alignment with Standards

The ontology conceptually aligns with:

- **IMO e-Navigation Framework** (data exchange for safety of navigation and IMO S-100 data standards for digital navigation)
- **IALA S-200 Series** (maritime digital data models)
- **EMSA SafeSeaNet** (maritime safety communication)
- **SOLAS Convention** (safety procedures for distress and rescue)

SECTION 6 Future Developments

The conceptual ontology is the bases for further development. It will later be formalised into a **technical ontology** (e.g. OWL/RDF) to support system development, integration / unitary tests and final validation.

SECTION 7 Glossary / Dictionary of Terms

The dictionary of terms serves as a reference section in the conceptual ontology and ensures all partners understand the same definitions.

Table 2: Glossary (specific to OVERHEAT ontology)

Term	Definition	Layer / Domain	Example / Notes
Sensor	Device installed on vessel or containers to detect fire or overheating	Technical / Vessel & Equipment	Temperature threshold 60°C
Drone	Autonomous unit that surveys deck and transmits video feed	Technical / Vessel & Equipment	Deploys upon fire detection alert
Vessel networking elements	Provide communications between sensors, drones, IT management computer, Bridge computer	Technical/ Vessel & Equipment	Treats continuous data flows of various protocols
IT bridge computer	The computer that receives, processes and transmits data received from the IoT Gateway	Technical/ Vessel & Equipment	It can be used to detect effective alerts or relevant images
ECDIS	The standard regular navigation terminal on bord a vessel	Technical/ Vessel & Equipment	Can receive alerts + images from the IT bridge computer
VTS	The standard regulated terminal of the maritime surveillance agencies	Technical/ on shore equipment	Can receive standard distress info plus additional one (e.g. situational picture)
Navigation server	The interface on board between the ECDIS and the telecommunication link	Technical/ Vessel Equipment	Routes data to/from the telecom medium
Fire Event	Situation where sensor readings exceed thresholds	Functional / Hazard Detection & Alerts	Smoke or temperature anomaly
Captain	Vessel decision-maker	Functional / Hazard Detection & Alerts	Confirms fire and sends a distress signal
Distress Signal	Standardized alert sent to maritime surveillance agency	Functional / Hazard Detection & Alerts	Includes vessel ID, GPS, severity
Maritime Surveillance Agency	The coastal surveillance agency monitoring traffic over an area	Functional / Hazards Detection and Alerts	Receives the distress signal and evaluates the situation on board the vessel in distress
Rescue Operation	Coordinated set of actions to assist the vessel in distress	Operational / Rescue Operations	Mobilizes Rescue Vessel, Port of Refuge
Port of Refuge	Safe location to dock distressed vessel	Operational / Rescue Operations	Evaluated by Harbour Master
Harbour Master	Head of Port authority managing vessel acceptance and resources	Operational / Rescue Operations	Coordinates fire fighting and pilots according to responsibilities

CONCLUSIONS

The Deliverable 5.4 “Ontology - a common definition of the Digital System, its component and the entities involved in OVERHEAT” is one important deliverable of the Work Package 5 (WP5) which aims to provide core specifications for the development of the DS (WP6) and the tests (WP7).

In line with the Grant Agreement and the literature, the document corresponds to the so called “conceptual ontology document”. It defines the main concepts, entities, relationships and work flows between these entities involved in the OVERHEAT project. Moreover, it provides a common terminology framework for project partners — technical developers, maritime operators, and safety authorities — to ensure consistency across system components and interoperability in data exchanges.

The D5.4 is thus an important guideline for the project development and tests phases of the OVERHEAT digital solution designed for early fire detection, information exchange, and coordinated rescue operations at sea.
The format used along the document is a **textual description** of the concepts, definitions, and relationships written in human-readable form. The “technical ontology document” is produced by the developers of the technical modules for development and tests purposes.

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ANNEX 1 – IoT Architecture in OVERHAT

Annex 1.1 Scope of the paragraph

The Ontology Document is one basis for the development, test and validation of the different OVERHEAT digital systems components.

Therefore, this **annex** details **how data is transmitted, processed, and used within an Internet of Things (IoT) architecture, and how this model applies to the OVERHEAT project. It supports the conceptual ontology with a more detailed description of the data lifecycle from sensors to decision-makers.**

Note that this level of details is normally not part of the Ontology Document but will facilitate transition from a conceptual description of OVERHEAT processes to the following development (WP 6) and test/validation steps (WP7).

A 1.2 IoT Architecture Layers

The whole data management process is as follows:

Sensors-> produce data -> IoT Gateway -> IT management computer and Bridge computer (not the ECDIS terminal)

A 1.2.1 Sensing Layer (Sensors and Drone Systems)
Sensors installed in containers and on the vessel deck collect continuous measurements (temperature, gas, smoke). Drone-based video and imagery complement these measurements. These raw data streams are typically noisy and unstructured.

A 1.2.2 Vessel networking elements
Various pieces of equipment (routers, switches LAN cables, LoRa and Bluetooth Gateways, etc.) provide communications between sensors, drones, IT management computer, Bridge computer.

A 1.2.3 Platform Layer (IT Management Computer, Bridge Computer, ECDIS terminal and shore systems)
The data exchange principle is as follows:

IT management computer -> filtered/processed data -> Bridge Computer -> ECDIS terminal -> Navigation server -> wireless link -> VTS

Data is transmitted to the vessel's bridge computer. Here the data is processed, stored, enriched, and analysed using rules, models, or AI to:

- verify fire events
- assess risk levels
- correlate with AIS, weather and cargo manifest data
- generate alerts or recommendations

A1.2.4 Application Layer (Operational Decision Support)

In case of confirmed event (fire on board), the IT manager transmits the alert to the Captain on the ECDIS terminal, with additional information (e.g. drone imagery, situation reports). Here starts the rescue scenario depicted previously:

- The captain sends the distress signal to the maritime surveillance agencies.
- The surveillance Agency requests more information; the Captain transfers the situation reports and drone images/ video.
- The Surveillance Agency routes the Distress message to rescue vessel with additional information (vessel IMO ID, GPS position, cargo details, vessel status, weather, access constraints)
- The Surveillance Agency contacts port authorities with the same information; the Port Authority checks the capability to accept the vessel, and analyses the conditions, calculates the ETA.

A1.3. Summary

The IoT architecture enables OVERHEAT to transition from raw sensor signals to actionable information for coordinated rescue and emergency response. It supports reliability, rapid decision-making, and cross-agency situational awareness in line with the conceptual ontology.

ANNEX 2 Data transmission protocols and equipment

This section precises how rough data is transmitted and managed between the sensors and the IT management computer and how data is transmitted to the Bridge computer, ECDIS and the VTS on shore.

A2.1 Sensors → IT management computer (WP4)

Communication occurs through the vessel networking elements using IP protocols over various physical layers (LAN cables, LoRa and Bluetooth radio communication, WiFi).

A2.2 IT management computer → Bridge Computer (WP4)

The Bridge Computer is connected to the vessel LAN. The detailed specifications will be specified in the WP6.1.

A2.3 — Interface between the ECDIS (on board) and the VTS station (on shore)

The ECDIS is an internationally regulated standardized equipment. It never communicates directly with coastal equipment. The correct chain is as follows:

A2.4 ECDIS → Navigation Data Server → Ship Shore Link → VTS

a) ECDIS → Navigation data server (NMEA 0183 / NMEA 2000)

The ECDIS produces and visualises: the ship position, its route, route plans, alerts, navigation chart layers (bathymetry, dangers, coast lines…) using S-57/S-100 standards.

It does not send any data directly to coastal equipment. It is connected to a Navigation Server able to transmit data outside the vessel.

b) Ship-Shore Communication System

Several telecommunication solutions can be used:

- Inmarsat Fleet Broadband
- VSAT Ku/Ka
- Iridium Certus
- Or future VHF Data Exchange System (VDES) (2025+)

Also several protocols can be selected:

- HTTPS/TLS (secured)
- REST/JSON via a navigation middleware box
- Message Queue (MQTT over TLS) more and more used in modern VTS projects

c) VTS station (surveillance agency)

The VTS station can receive data via:

- AIS (AtoN messages)
- S-100 frameworks
- interoperable VTS data models (IALA G1000 series)

Summary:

The ECDIS is not connected directly to a VTS station.

Data is transferred through a navigation server using a ship-shore link (VSAT/Inmarsat) and a secured protocol (HTTPS or MQTT-TLS).

The VTS receives a normalised version of the data, not the rough data sent by the ECDIS.

ANNEX 3 About Ontology

28.07.2005 – by Wolfgang Hesse

https://gi.de/informatiklexikon/ontologien#:~:text=Ontologie%20ist%20ein%20%C3%BCberliefert er%20Begriff,Wahrnehmens%20und%20Erkennens%20auseinander%20setzt.

Ontology is a traditional term from philosophy, where it refers to the study of being – more precisely, of the possibilities and conditions of being – and is therefore closely related to epistemology, which deals with the possibilities and limits of human perception and cognition.

In computer science, many areas are faced with the task of representing what has been recognised or conceived and communicating knowledge, e.g. about facts, circumstances or rules in a technical application area, in a business process or in a legal procedure, or about the content of documents or websites.

Humans can make use of stored knowledge by drawing on their basic and contextual knowledge of the respective field of knowledge, using textbooks, rulebooks, encyclopaedias and keyword indexes, and linking them to the stored content. If, on the other hand, machines are to take on search, communication and decision-making tasks relating to stored knowledge or exchange data that itself contains information on how it is to be structured and interpreted (so-called metadata), they need a representation of the underlying concepts and their interrelationships. In recent years, the term *ontology* has become established in some branches of computer science.

Probably the best-known attempt at a definition comes from T. Gruber. He describes ontology as ‘explicit formal specification of a shared conceptualisation’.

In this sense, an ontology describes a knowledge domain with the help of standardised terminology as well as relationships and, if necessary, derivation rules between the terms defined there. The shared vocabulary is usually given in the form of a taxonomy that contains classes, relations, functions and axioms as starting elements (modelling primitives). Since there are many areas of knowledge – each with its own or even several competing terminologies – the use of the plural (‘ontologies’) makes sense here (in contrast to philosophy).

In addition to their assignment to areas of application, ontologies can also be classified according to their scope. Ron Weber (following Guarini) distinguishes between three levels of ontologies: (1) general, cross-domain ‘top level ontologies’, (2) ‘domain ontologies’ related to specific areas of application, (3) well-known conceptual data and class models that are merely being upgraded with the fashionable name ‘ontology’. In the following, only levels (1) and (2) will be considered.

What are ontologies used for in computer science? Gruninger and Lee distinguish between three areas of application: *communication*, *automatic inference*, and *representation and reuse of knowledge*. If two programmes (e.g. web search engines or software agents) are to communicate with each other, they must either contain the interpretation rules for the data themselves (i.e. they are data-dependent) or provide these in the form of metadata from an ontology accessible to both sides. In automatic inference, programmes can draw logical conclusions based on the

derivation rules known from ontology – these do not always have to be transmitted anew. The situation is similar with knowledge representation and reuse (see Staab's detailed description).

Ontologies are therefore important in all areas of computer science dealing with knowledge, such as artificial intelligence, databases and information systems (in the broadest sense, including the global information system WWW). In addition, there are related areas such as software engineering and multimedia communication, as well as fields of application such as medicine, law and business informatics.

The term ontology is linked to compounds such as *ontology design* and *ontological engineering*. Of course, both terms only make sense in the context of computer science – in a philosophical interpretation, they could at most be assumed to refer to the actions of a demiurge, i.e. a metaphysical higher being. Ontological engineering encompasses – analogous to software engineering – everything that can serve to support the ontology life cycle. Ontology design can basically be done using an *inductive* approach (forming larger ontologies from several small 'lightweight' ones by merging them) or a *deductive* approach (defining general concepts and rules by a committee or consortium, reviewing, standardising and then specialising for sub-areas).

The value of an ontology stands or falls with the extent of recognition and acceptance ('ontological commitment') it receives in the relevant professional community. In general, the more decision-makers and stakeholders are involved in the design process, the easier it is to achieve this acceptance. On the other hand, the effort involved usually increases with the number of people involved in the design.

Ontologies have recently attracted particular worldwide interest due to the Semantic Web initiative launched by WWW creator Tim Berners-Lee and his colleagues. It is based on the fundamental idea of providing web documents (of any size) with 'semantics' in the form of *metadata* ('tags') that describe their content in more detail and linking them together using inference rules. The aim is to support search engines and other electronic mechanisms such as agents in finding and linking the required information in a targeted and efficient manner. Ontologies serve to provide the necessary metadata and linking rules. This means, for example, that two agents can communicate about their tasks and results with the help of an ontology available to both.

In recent years, a number of languages, methods and tools have been developed and made available for the development and testing of ontologies. In connection with the Semantic Web approach, XML (Extensible Markup Language) and RDF (Resource Description Framework) are particularly noteworthy here: XML for the annotation and structural description of data and documents, RDF for the possibility of describing resources by properties and assigning values to them, including references to other resources. This approach is based on the well-known basic idea of viewing semantic networks as graphs.

The power of these language tools and the readability of documents can be significantly increased through the use of *schema definitions* (*XML Schema Definition XSD* and *RDF Schema RDFS*).

In addition, the US agency DARPA has defined DAML (DARPA Agent Markup Language) as an agent communication language – '*an Esperanto for machines*'. This has been combined with OIL

(originally: Ontology Inference Layer, now: Ontology Interchange Language) to form *DAML+OIL* and is proposed by the WWW Consortium as the standard for the representation of metadata and ontologies.

This approach is based on the *frames* familiar from AI and on *description logics* for describing semantics and logical links. (For more information on this and on tools such as ontology editors and development environments.) Ontologies have already been developed for various fields of knowledge, e.g. for decision support systems (DSS) or for knowledge management. They already play an important role in the commercial sector, e.g. as the basis for e-business systems. For the field of information systems, the IFIP working group FRISCO (Framework of Information System Concepts) has proposed a comprehensive conceptual framework that could also serve as a general basis for further specialised ontologies. Y. Wand and R. Weber have developed a related approach.

In software engineering, ontologies are currently gaining importance in two respects:

1. Ontologies as tools and knowledge bases in software development. If the idea of web services, i.e. reusable application systems or components distributed across the web, is to be realised, they must be based on a common understanding of the structure and terminology of the relevant application area shared by all potential users.
2. Ontologies can help to significantly increase the proportion of reusable results (e.g. concepts or models) in the early phases.

Software engineering as the subject of an ontology, i.e. as a standardised field of knowledge to be described. The SWEBoK initiative (Software Engineering Body of Knowledge) has done valuable groundwork for such a software engineering ontology.

3. In this context, German-language work on a ‘concept network’ for software engineering should also be mentioned.

From today's perspective, the most important unresolved problems with ontologies concern the following points:

- How can easily usable metadata be generated and consistently developed for very large resource collections? Can the annotation of documents be automated in a meaningful way?
- Can resources be classified clearly and unambiguously, e.g. into documents, data, metadata, physical and virtual actors, physical entities?
- How can metadata be classified in (possibly overlapping and inconsistent) ontologies? How are synonyms, homonyms and circular definitions handled?
- Does it make sense to search for a common top-level, universal or meta-ontology underlying all ontologies – or does this lead to similar difficulties as the search for an objective world view in physics?

Last, but not least, there is the question of the philosophical foundation of an (informatic) concept of ontology. For philosophers, the answer to the fundamental ontological question ‘What is?’ is by no means as trivial as it might seem at first glance, since

- our perception of reality is filtered through our sensory organs, so we can never be sure that the world is as we perceive it;
- the answer must inevitably be given in linguistic terms, so that when we describe what we perceive, we may once again distance ourselves from what actually 'is' through our choice of concepts, words and images.

Traditional ontology has been assigned to the field of metaphysics since ancient times. While physics deals with the existence of (material) things, their movements and the natural necessity of matter (*res concretae*), metaphysics deals with the fundamentals of things and the ideas behind them (*res abstractae*).

Kant already judged traditional ontology to be 'presumptuous' and replaced the (doctrinal) assumption of "given" objects with a transcendental philosophy that 'contains the conditions and first elements of all our knowledge a priori' and thus uses knowledge as a filter for 'being'.

In the 20th century, attempts were made to develop a logically precise version, e.g. by E. Husserl as *formal ontology* using the means of 'pure logic'. Husserl explicitly distinguishes between the thing itself (material, anchored in nature) and its meaning, to which no 'real properties' can be assigned. The analysis of perceptions and experiences with regard to their meaning leads to the recognition of different 'regions of being' and thus to - now occurring in the plural (!) - *material* or *regional ontologies*.

More modern approaches aim to remove the metaphysical character of ontology. In analytical philosophy, for example, the linguistic point of view takes centre stage: An ontology is speaker-related and provides the listener or reader with the preconditions for existence to which they commit themselves by accepting a language or theory. W. van O. Quine formulates a radically formalistic version of this approach: 'To be is to be the value of a bound variable.'

Here, philosophy and computer science finally converge: Ontology is no longer understood as a metaphysical interpretation of the essence of all things, but as a practice-oriented linguistic categorisation of areas of life and knowledge. In this sense, despite the associated risks of misunderstanding, rightly pointed out by P. Janich, computer scientists should also be allowed and may even find it useful to engage with ontology(ies).

ANNEX 4 OVERHEAT Glossary

Rational:

To start with this subtask 5.4 Ontology led to a lot discussion:

- What is really meant by this subtask?
- How can we seize this task?
- What would be useful? Where is the benefit for the OVERHEAT project?
- Why this task has been scheduled so early?
- This task is a bit holistic. How can it accomplish a comprehensive work when many pieces of OVERHEAT are not yet ready or even available?
- How much effort can be spent, seeing that the Grant Agreement allocates only little resources?

So, many fundamental questions

Ontology can be understood in very different ways, in a broad or narrow sense, sensu largo or sensu stricto. Subtask 5.4 was only added to the agenda shortly before the proposal was submitted, and no one wanted to take responsibility for it. Its holistic rational is closely related to WP6. It was declared being just a little subtask, which has not even been assigned manpower. This makes it clear that ontology is to be understood in sensu stricto.

Nevertheless, in order to provide a framework and lay a foundation, Fabienne has prepared a broader and more open skeleton. She deserves considerable thanks for this. However, revising the entire OVERHEAT architecture is not part of this task. Details like data exchange between sensors are not the objective neither is the architecture as its whole. However, some pieces can be achieved.

What are the building block making sense:

OVERHEAT is a challenging, innovative technology project. Specifically, it screws together various things from quite different areas. This concerns:

- Technology fields
- Skills and expertise
- Experience
- Work culture, mindsets and characters from different EU countries and different social backgrounds (companies, schools, authorities, etc.). This aspect will not be considered further.

The first three bullet points from the above-mentioned domains are important. They relate to the following different technology fields, among others:

- Sensors
- Drones and device carriers

- Containers and ports (logistics)
- Telecommunications
  - on a ‘small’ scale (networking of sensors and computers)
  - on a ‘large’ scale (exchange of information between land and sea)
- Fire fighting in ports and at deep sea
- Positioning and navigation
- Environmental aspects
- General (shared) situational picture
- And anything else I may have forgotten

Against the backdrop of these different areas, there is a desire to find a common understanding and, above all, a common terminology or, to put it more simply, a common language. And this may-be the rationale behind this subtask 5.4 ‘Ontology’. In this respect, in order to remain within the scope of this task, it must be limited to the lowest common denominator and essentially compile a glossary of all technical terms.

Therefore all project partners contribute knowledge, building blocks and technologies to OVERHEAT. So, all deliverables as far as they were already available were screened in order to integrate them linguistically within the scope of this task.

This means that subtask 5.4 Ontology does **not** affect the responsibility of the individual work packages and their work results. It does not duplicate any development or design of a procedure or a piece of technology. This document rather compiles and condenses what has been achieved and delivered throughout the entire project so far.

On the other hand, it is not the objective of this subtask to describe or even specify the architecture of the overall system (ontology in sensu largo), let aloof technical details of the data flow topology, transmission protocols or measurement ranges of the sensor technology. Details do not belong here, but remain with the individual work packages.

The following glossary is based on these deliverables:

Deliverable 01	task 1.1
Deliverable 02	task 1.2_1st, 2nd version
Deliverable 04	task 1.4
Deliverable 05	task 1.5
Deliverable 07	task 2.1
Deliverable 11	task 4.1
Deliverable 12	task 4.2
Deliverable 14	task 4.4
Deliverable 15	task 4.5
Deliverable 17	task 4.7
Deliverable 18	task 5.1
Deliverable 19	task 5.2
Deliverable 27	task 7.3

Deliverable 31 task 9.1
Deliverable 33 task 9.3

No.	Term	Explanation	Occurrence
1	Above the weather deck (location on containerships)	Area on containerships located above the main deck, often at risk for fire incidents.	Deli 27 task 7.3
2	Advanced RTH	A sophisticated Return to Home function that optimizes the drone's return path based on conditions.	Deli 12 task 4.2
3	Aerial-related risks (AR1-AR6)	Risks associated with aerial operations, including interference from other air traffic and environmental factors.	Deli 27 task 7.3
4	Airspace restriction verification	Process of checking for any limitations on airspace use before drone operations.	Deli 27 task 7.3
5	AIS (Automatic Identification System) services	Services that provide real-time vessel tracking and identification to enhance maritime safety.	Deli 33 task 9.3
6	ALARP principle (As Low As Reasonably Practicable)	Risk management principle ensuring risks are minimized to the lowest level that is reasonably achievable.	Deli 27 task 7.3
7	Alternate landing site	A designated location for the drone to land if the primary landing site is unsuitable.	Deli 12 task 4.2
8	Altitude Mode (ASL, ALT, AGL)	Modes that define the altitude reference for drone operations: Above Sea Level, Absolute, or Above Ground Level.	Deli 12 task 4.2
9	API (Application Programming Interface)	A set of protocols for building and interacting with software applications, facilitating integration.	Deli 12 task 4.2
10	API (Application Programming Interface) for interoperability	A set of protocols that allows different software systems to communicate and share data.	Deli 33 task 9.3
11	Artificial intelligence algorithms for container detection and thermal anomaly identification	AI systems that identify containers and detect thermal anomalies, enhancing safety and response.	Deli 12 task 4.2
12	Battery charge level monitoring	Tracking the power level of the sensor's battery to ensure it is adequately charged for operation.	Deli 14 task 4.4
13	Bluetooth Low Energy (BLE) communication	A wireless technology used for short-range communication between the sensor and other devices.	Deli 14 task 4.4
14	Bluetooth Low Energy gateway	A device that receives BLE signals from multiple sensors and forwards them to a central system.	Deli 14 task 4.4
15	Bosch AI-Studio platform	Software platform for data management and algorithm training for Bosch sensors.	Deli 27 task 7.3
16	Bosch BME688 sensor system	Environmental sensor for monitoring gas concentrations, temperature, humidity, and pressure.	Deli 27 task 7.3
17	Bosch Software Environmental Cluster (BSEC)	Software managing data acquisition and processing for Bosch sensors.	Deli 27 task 7.3
18	Cargo holds (cargo spaces)	Enclosed areas within a ship where cargo is stored during transit.	Deli 07 task 2.1

No.	Term	Explanation	Occurrence
19	CE marking (illustrative on prototype sensors)	A label indicating that a product meets European safety and environmental protection standards.	Deli 14 task 4.4
20	Classification societies (e.g., DNV GL, Lloyd's Register, Bureau Veritas)	Organizations that establish and maintain standards for the design, construction, and maintenance of ships.	Deli 07 task 2.1
21	Collaborative platform for real-time data sharing between vessels and shore-based teams	A system that enables seamless communication and data exchange among maritime stakeholders.	Deli 33 task 9.3
22	Combination Stick Command (CSC)	A specific control maneuver used to start the drone's motors.	Deli 12 task 4.2
23	Common Operational Picture (COP)	A shared view of the operational environment for enhanced situational awareness among stakeholders.	Deli 19 task 5.2
24	Consortium Agreement (CA)	A contractual document defining the rights, responsibilities, and management rules among project partners.	Deli 05 task 1.5
25	Container Safety Convention (CSC)	An international agreement aimed at ensuring the safety of containers used in international transport.	Deli 07 task 2.1
26	Containers' Thermal Anomalies Detection	The process of identifying abnormal heat signatures in shipping containers using drone technology.	Deli 12 task 4.2
27	Cybersecurity protocols aligned with IMO MSC-FAL.1/Circ.3 and many others	Security measures to protect maritime digital systems from cyber threats, ensuring data integrity.	Deli 19 task 5.2
28	Dangerous Goods (DG) categorization and handling alerts	Notifications regarding the classification and safe management of hazardous materials on vessels.	Deli 19 task 5.2
29	Data access control (username/password, personalized accounts)	Restricting data access to authorized users through individual login credentials to ensure secure and controlled data sharing.	Deli 02 task 1.2_1
30	Data aggregation and transmission system	A framework for collecting and transmitting data from various sources for analysis and decision-making.	Deli 33 task 9.3
31	Data clouds interconnection for unified operational view	Integration of multiple data sources to provide a comprehensive perspective on maritime operations.	Deli 33 task 9.3
32	Data consent form (for participant data collection)	A document to obtain participants' permission for collecting, recording, and using their personal data during the project.	Deli 02 task 1.2_1
33	Data formats	The specific file types used for storing and exchanging documents, spreadsheets, videos, and audio data.	Deli 02 task 1.2_1
34	Data interoperability mappings	Standardized vocabularies and ontologies enabling data exchange and integration across different systems and datasets.	Deli 02 task 1.2_1
35	Data Management Plan (DMP)	A document outlining principles and procedures for handling, storing, and sharing research data throughout a project's lifecycle, ensuring data are Findable, Accessible, Interoperable, and Reusable (FAIR).	Deli 02 task 1.2_1
36	Data management responsibilities (Project Coordinator, Project Management Board)	Oversight and strategic decision-making for data handling, ensuring compliance with FAIR principles and project policies.	Deli 02 task 1.2_1

No.	Term	Explanation	Occurrence
37	Data metadata standards	Agreed formats and vocabularies used to describe data for findability, accessibility, interoperability, and reusability.	Deli 02 task 1.2_1
38	Data repository (certified repositories, EU Funding & Tenders Portal, CORDIS)	Trusted platforms for storing, accessing, and sharing research data and project outputs in compliance with EU Horizon program requirements.	Deli 02 task 1.2_1
39	Data security protocols (authentication, authorization)	Procedures and measures ensuring secure storage, transfer, and recovery of sensitive data.	Deli 02 task 1.2_1
40	Data sharing platforms (OVERHEAT website, SharePoint, CORDIS)	Digital systems or repositories that enable storage, access, and exchange of research data among authorized users.	Deli 02 task 1.2_1
41	Data sources (IoT sensors, validation exercises, technological instruments)	Origins or origins of data used or collected in a project, including qualitative and quantitative inputs from various tools, sensors, surveys, or existing datasets.	Deli 02 task 1.2_1
42	Data utility stakeholders (regulatory bodies like IMO, EMSA, firefighting system industries)	Individuals or groups who benefit from or utilize the data generated by the project for research, regulatory, or industrial purposes.	Deli 02 task 1.2_1
43	Decision support tools for port authorities	Tools designed to assist port authorities in making informed decisions based on real-time data.	Deli 33 task 9.3
44	Deliverable	A specific output or document produced as a result of project activities, subject to review and approval.	Deli 05 task 1.5
45	Deliverable leader	The partner responsible for ensuring a deliverable is prepared, reviewed, and finalized on time, coordinating the writing and quality assurance process.	Deli 05 task 1.5
46	Digital coordination interface accessible via ECDIS or VTS terminals	A digital platform for real-time communication and coordination among maritime stakeholders.	Deli 19 task 5.2
47	Digital fire management system requirements (functional and non-functional)	Specifications for the capabilities and performance of a digital system designed to manage maritime fire incidents.	Deli 18 task 5.1
48	Digital Solution (DS)	An integrated system combining data from various sensors to provide real-time situational awareness for fire prevention and management on containerships.	Deli 01 task 1.1
49	Directive 2011/65/EU (RoHS - restriction of hazardous substances)	Regulation limiting the use of specific hazardous materials in electrical and electronic equipment.	Deli 14 task 4.4
50	Directive 2014/30/EU (Electromagnetic Compatibility Directive)	Regulation ensuring that electrical equipment does not generate electromagnetic interference.	Deli 14 task 4.4
51	Directive 2014/35/EU (Low Voltage Directive)	Regulation governing the safety of electrical equipment operating within specified voltage limits.	Deli 14 task 4.4
52	Directive 2014/53/EU (Radio Equipment Directive)	Regulation covering the requirements for radio equipment and telecommunications devices.	Deli 14 task 4.4
53	DJI Dock 2 (automated hangar/docking station)	An automated hangar designed for rapid deployment and efficient drone charging.	Deli 11 task 4.1

No.	Term	Explanation	Occurrence
54	DJI Dock 2 (drone docking station)	Automated docking station for the DJI MATRICE™ 3TD drone, facilitating charging and deployment.	Deli 27 task 7.3
55	DJI FlightHub 2 (mission planning software)	Mission planning and management software for drone operations.	Deli 27 task 7.3
56	DJI Hangar 2	An automated hangar designed for rapid deployment and easy installation of drones.	Deli 15 task 4.5
57	DJI MATRICE™ 3TD	A sophisticated autonomous drone equipped with advanced sensing and positioning technology.	Deli 15 task 4.5
58	DJI MATRICE™ 3TD (drone model)	A sophisticated drone model equipped with advanced sensing and obstacle detection capabilities.	Deli 11 task 4.1
59	DJI MATRICE™ 3TD drone	Advanced drone equipped for autonomous aerial surveillance and monitoring.	Deli 27 task 7.3
60	DJI RC Pro Enterprise remote controller	A specialized remote control device for operating the DJI MATRICE™ 3TD drone.	Deli 12 task 4.2
61	Drones (for fire monitoring)	Unmanned aerial vehicles used to monitor cargo holds for potential fire hazards.	Deli 07 task 2.1
62	Drones (Unmanned Aerial Systems - UAS)	Aerial vehicles operated without a pilot onboard, used for surveillance and data collection.	Deli 33 task 9.3
63	Duty cycle (sensor operation)	The operational pattern of a sensor, balancing measurement and rest periods to optimize performance.	Deli 27 task 7.3
64	ECDIS (Electronic Chart Display and Information System) - as used specifically in OVERHEAT for fire management integration	A digital navigation system that integrates real-time data for effective fire management on vessels.	Deli 18 task 5.1
65	Electromagnetic interference detection	Process of identifying disruptions in sensor operation caused by electromagnetic fields.	Deli 27 task 7.3
66	Electronic Chart Display and Information Systems (ECDIS)	A navigation system that integrates digital charts and real-time data for safe maritime navigation.	Deli 19 task 5.2
67	Electrostatic discharge (ESD) protection	Measures taken to prevent damage to electronic components from static electricity.	Deli 27 task 7.3
68	Emergency Commands (emergency landing, forced stop, drone emergency stop)	Commands that allow for immediate intervention during critical situations to ensure safety.	Deli 12 task 4.2
69	Emergency landing procedures	Protocols to safely land a drone in case of malfunction or adverse conditions.	Deli 27 task 7.3
70	Emerging risks identification and management	Process of recognizing and addressing new hazards that arise during operations.	Deli 27 task 7.3
71	ENSM platform	An experimental simulation platform used for fire prevention and management demonstrations in port environments.	Deli 01 task 1.1
72	Environment sensors (wind speed, rainfall, temperature, humidity)	Devices measuring wind speed, rainfall, temperature, and humidity for safe drone operation.	Deli 11 task 4.1
73	Environmental resilience (sensor and drone)	Ability of sensors and drones to operate effectively in varying environmental conditions.	Deli 27 task 7.3
74	Error codes (sensor diagnostics)	Codes generated by sensors to indicate faults or operational issues.	Deli 27 task 7.3

No.	Term	Explanation	Occurrence
75	Event Tree Analysis (ETA)	Method for analyzing potential outcomes of events to assess risks.	Deli 27 task 7.3
76	Executive Board (EB)	The executive body responsible for monitoring project progress and making decisions.	Deli 05 task 1.5
77	Executive Board Meeting (EBM)	A formal gathering of the Executive Board to monitor project progress, discuss critical issues, and make decisions.	Deli 05 task 1.5
78	Exploitation roadmap and Key Exploitable Results (KERs)	A strategic plan outlining how project outcomes will be utilized and commercialized post-project.	Deli 33 task 9.3
79	Failure Mode and Effects Analysis (FMEA)	Systematic approach to identifying potential failure modes and their impacts.	Deli 27 task 7.3
80	FAIR principles (Findable, Accessible, Interoperable, Reusable)	Guidelines ensuring research data are Findable, Accessible, Interoperable, and Reusable.	Deli 02 task 1.2_1
81	Fault Tree Analysis (FTA)	Method for analyzing the causes of system failures through a graphical representation.	Deli 27 task 7.3
82	Fire containment zones (zoning within cargo holds)	Designated areas within cargo holds to limit the spread of fire.	Deli 07 task 2.1
83	Fire detection (maritime context)	The process of identifying fires on vessels or in port environments using aerial systems.	Deli 15 task 4.5
84	Fire detection automation (AI-based smoke detection, CCTV)	Advanced systems using artificial intelligence and cameras to detect smoke and fire automatically.	Deli 07 task 2.1
85	Fire detection performance	Effectiveness of detecting fires early with minimal false alarms.	Deli 01 task 1.1
86	Fire extinguishing operations	Actions and procedures to detect, control, and put out fires on board containerships.	Deli 01 task 1.1
87	Fire incident fire safety best practice guidelines (ICS, BIMCO, World Shipping Council)	Recommended practices for preventing and managing fire incidents on ships.	Deli 07 task 2.1
88	Fire incident fire safety container packing codes (CTU Code)	Guidelines for the safe packing and securing of cargo in containers to prevent accidents.	Deli 07 task 2.1
89	Fire incident fire safety insurance loss prevention guidelines (TT Club, Allianz)	Recommendations from insurers to minimize losses from fire incidents on ships.	Deli 07 task 2.1
90	Fire incident fire safety national and international regulations and directives (e.g., EMSA guidelines, EU directives, national maritime authority guidelines)	Legal frameworks governing fire safety standards for ships at national and international levels.	Deli 07 task 2.1
91	Fire incident fire safety port security laws (e.g., Bremen Port Security Act)	Regulations ensuring safety and security in port operations to prevent fire incidents.	Deli 07 task 2.1
92	Fire incident fire safety quantitative safety targets (incident reduction, cargo loss reduction, response time improvement, environmental impact reduction, zero fatalities)	Measurable goals aimed at improving fire safety and reducing incidents and losses.	Deli 07 task 2.1

No.	Term	Explanation	Occurrence
93	Fire incident fire safety risk assessments (e.g., ISPS Code)	Evaluations of potential fire risks on ships to enhance safety measures.	Deli 07 task 2.1
94	Fire incident fire safety stakeholder roles (shipowners, port authorities, insurers, classification societies)	Defined responsibilities of various parties involved in fire safety management on ships.	Deli 07 task 2.1
95	Fire incident fire safety technological innovations (drones, thermal imaging, AI)	New technologies developed to enhance fire detection and response capabilities on ships.	Deli 07 task 2.1
96	Fire incident live trials	Real-time practical tests simulating fire emergencies on containerships to validate prevention and response strategies.	Deli 01 task 1.1
97	Fire incident recovery	The process of managing and restoring operations after a fire accident on board containerships.	Deli 01 task 1.1
98	Fire incident response	Actions and procedures to detect, manage, and extinguish fires on board containerships to ensure safety and minimize damage.	Deli 01 task 1.1
99	Fire incident risk analysis	Evaluating the likelihood and impact of fire hazards to prevent and manage fire accidents.	Deli 01 task 1.1
100	Fire incident risk control options (ROCs)	Strategies and measures implemented to mitigate fire risks on ships.	Deli 07 task 2.1
101	Fire incident scenario testing	Simulated exercises to evaluate fire prevention, detection, and response strategies on containerships.	Deli 01 task 1.1
102	Fire incident simulation	A virtual or controlled exercise replicating shipboard fire scenarios to test prevention, detection, and response strategies.	Deli 01 task 1.1
103	Fire incidents on board of containerships	Accidental fires occurring on container ships, posing risks to crew safety, cargo integrity, and the environment.	Deli 01 task 1.1
104	Fire risk mitigation	Actions and strategies to reduce the likelihood and impact of fires.	Deli 01 task 1.1
105	Fire safety management	Coordinated strategies and procedures to prevent, detect, and respond to fires, ensuring safety of people and protection of the environment.	Deli 01 task 1.1
106	Fire severity classification and fire type assessment (solid, gas, liquid, metal, lithium-ion battery fires, dangerous goods)	A systematic approach to categorize fires based on their characteristics and the materials involved.	Deli 18 task 5.1
107	Firefighting and assistance vessels UAV integration	The incorporation of Unmanned Aerial Vehicles into firefighting operations to enhance situational awareness and response.	Deli 18 task 5.1
108	Firefighting camps	Specialized training facilities where firefighting personnel practice and validate fire prevention and management techniques in simulated environments.	Deli 01 task 1.1
109	Firefighting support (maritime context)	Assistance provided by aerial systems to combat fires on ships or in maritime settings.	Deli 15 task 4.5

No.	Term	Explanation	Occurrence
110	Firefighting technique recommendations per fire type (solid, gas, liquid, metal)	Guidelines for appropriate firefighting methods based on the type of fire encountered.	Deli 19 task 5.2
111	Fixed fire detection and alarm systems (specific to maritime regulations)	Systems required by maritime regulations for detecting fires in specific areas of a vessel.	Deli 27 task 7.3
112	Flight Route Library	A repository for storing and managing predefined flight paths for drone operations.	Deli 12 task 4.2
113	Flight routes	Specific paths that the drone follows during its missions, defined by waypoints and parameters.	Deli 12 task 4.2
114	Flight telemetry data	Data collected during drone flights, including position, speed, and battery status.	Deli 27 task 7.3
115	Formal Safety Assessment (FSA) Guidelines	Guidelines for conducting safety assessments in maritime contexts.	Deli 27 task 7.3
116	FPV (First Person View) view	A live video feed from the drone's perspective, allowing operators to see what the drone sees.	Deli 12 task 4.2
117	GDPR and maritime data privacy compliance	Adherence to data protection regulations to ensure the privacy of personal and operational data.	Deli 19 task 5.2
118	General Assembly (GA) meetings	Gatherings of all project consortium members to discuss overall project progress, coordination, and decision-making.	Deli 05 task 1.5
119	GEO Zones (Geofencing zones)	Restricted areas where drone operations are limited or prohibited for safety and regulatory reasons.	Deli 12 task 4.2
120	Geofencing	Technology that creates virtual boundaries for drone operations to ensure safety.	Deli 27 task 7.3
121	Global Maritime Distress and Safety System (GMDSS)	A communication system for distress signaling and safety information in maritime operations.	Deli 19 task 5.2
122	GNSS/RTK Antenna	A navigation antenna providing precise positioning for the drone using satellite signals.	Deli 11 task 4.1
123	Grant Agreement (GA)	A formal contract between the European Union and project partners defining funding, objectives, and obligations.	Deli 05 task 1.5
124	Ground segment architecture	The infrastructure supporting drone operations on land, including control and communication systems.	Deli 11 task 4.1; Deli 12 task 4.2; Deli 15 task 4.5
127	Ground-related risks (GR1-GR9)	Risks associated with ground operations, including obstacles and environmental factors.	Deli 27 task 7.3
128	GSD (Ground Sample Distance)	A measure of the spatial resolution of images captured by the drone, affecting detail and clarity.	Deli 12 task 4.2
129	Hazard identification and risk analysis methods	Techniques used to identify and evaluate potential hazards in operations.	Deli 27 task 7.3
130	Hazard log	Document recording identified hazards and their management status.	Deli 27 task 7.3
131	Hazard risk	The probability and severity of potential dangerous events and their impacts.	Deli 01 task 1.1
132	Hazard taxonomy (technical malfunctions, dangerous goods	Classification system for categorizing different types of hazards.	Deli 27 task 7.3

No.	Term	Explanation	Occurrence
	behaviour, human error, mechanical failures, external factors)		
133	HAZOP (Hazard and Operability Study)	Structured technique for identifying hazards and operational issues in systems.	Deli 27 task 7.3
134	Heater profiles (sensor operation)	Defined temperature settings for the operation of sensors to ensure accurate readings.	Deli 27 task 7.3
135	Human-centered design principles for interface	Design approach focused on user needs and usability to enhance operational efficiency.	Deli 19 task 5.2
136	Hydrographic data monitoring (tides, water levels)	The process of tracking and analyzing water conditions to ensure safe navigation and operations.	Deli 33 task 9.3
137	IALA S-2XX standards (e.g., S-201 Aids to Navigation Information, S-210 Inter-VTS Exchange Format)	International standards for navigation aids and vessel traffic services to ensure safety and interoperability.	Deli 19 task 5.2
138	IEC 60945, IEC 61162 series, IEC 62288, IEC 62923 standards	International standards governing maritime electronic equipment and communication protocols.	Deli 19 task 5.2
139	IEC 61174:2015 standard for ECDIS	A standard outlining performance and operational requirements for Electronic Chart Display Systems.	Deli 19 task 5.2
140	IHO S-100 framework	A universal data model for hydrographic and maritime information to support various applications.	Deli 19 task 5.2
141	IHO S-57, S-52, S-64, S-58, S-61, S-62, S-63, S-65, S-11 Part A standards	Standards for digital hydrographic data and electronic navigational charts to ensure data quality and interoperability.	Deli 19 task 5.2
142	IMAT	The Consortium Coordinator and partner responsible for the deliverable in the OVERHEAT project.	Deli 02 task 1.2_1
143	IMAT platform	A simulation and firefighting experimental platform used for testing and validating fire prevention and management solutions on containerships.	Deli 01 task 1.1
144	IMO Resolutions (e.g., MSC_36(63), MSC.97(73), MSC.191(79))	Official decisions by the IMO to update maritime regulations and standards for safety and efficiency.	Deli 19 task 5.2
145	Infrared sensing capabilities (drone)	Ability of a drone to detect heat signatures for environmental monitoring.	Deli 27 task 7.3
146	Installation app (smartphone/tablet app for sensor installation and configuration)	An application used to install and configure the IoT sensors via a mobile device.	Deli 14 task 4.4
147	Intellectual Property Rights (IPR)	Legal rights protecting creations and inventions of the mind.	Deli 05 task 1.5
148	Internal quality assurance	Processes to ensure deliverables and work meet quality standards within the project.	Deli 05 task 1.5
149	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)	A convention setting global standards for the training and certification of maritime personnel.	Deli 19 task 5.2
150	International Maritime Dangerous Goods (IMDG) Code	A set of regulations for the safe transport of hazardous materials by sea.	Deli 07 task 2.1

No.	Term	Explanation	Occurrence
151	International Maritime Organization (IMO) fire safety regulations	Global standards established by the IMO to ensure fire safety on ships.	Deli 07 task 2.1
152	Interoperability with port fire control systems and emergency services dashboards	The ability to integrate and communicate effectively with port-based emergency response systems.	Deli 19 task 5.2
153	IoT gateway prototypes	Initial models of devices that connect IoT sensors to networks for data transmission.	Deli 17 task 4.7
154	IoT sensor alert triggering mechanism	A system that activates alerts based on data from Internet of Things sensors monitoring conditions.	Deli 12 task 4.2
155	IoT sensor types: smoke detectors, heat sensors, environmental monitoring devices	Devices that collect data on environmental conditions to enhance safety and operational efficiency.	Deli 33 task 9.3
156	IoT sensors	Devices that collect data from the environment for monitoring and analysis in IoT systems.	Deli 17 task 4.7; Deli 31 task 9.1; Deli 33 task 9.3
157	IoT-based fire detection systems	Internet of Things technology used for real-time monitoring and detection of fire hazards.	Deli 19 task 5.2
158	IoT-based fire monitoring (Internet of Things sensors for fire detection)	Utilization of interconnected sensors to detect and monitor fire conditions in real-time.	Deli 18 task 5.1
159	IP grade 40 (Ingress Protection rating of the sensor)	A rating indicating the sensor's protection against dust and water ingress.	Deli 14 task 4.4
160	IP54 protection level	A rating indicating the drone's resistance to dust and water, ensuring reliable performance.	Deli 15 task 4.5; Deli 27 task 7.3
161	ISO 31000:2018 (Risk Management standard applied in project)	International standard for risk management guidelines.	Deli 27 task 7.3
162	ISO 6346 container ID (owner prefix, serial number, check digit)	A standardized identification system for shipping containers, including ownership and serial details.	Deli 14 task 4.4
163	ISO/OSI model compliance	Adherence to standardized communication protocols to ensure interoperability between systems.	Deli 33 task 9.3
164	IT system for data sharing among maritime stakeholders	A technological framework that facilitates the exchange of information among maritime entities.	Deli 33 task 9.3
165	Key Performance Indicators (KPIs)	Measurable values used to assess the effectiveness and success of a project or activity.	Deli 01 task 1.1
166	Local area network for sensor communication onboard vessels	A network that connects sensors on a vessel for efficient data transmission and monitoring.	Deli 33 task 9.3
167	LoRa communication	A long-range wireless communication technology used for transmitting data over large distances.	Deli 14 task 4.4
168	LoRa gateway	A device that receives LoRa signals from sensors and connects them to a network for data processing.	Deli 14 task 4.4
169	Manual override commands	Commands allowing operators to take control of a drone manually during operations.	Deli 27 task 7.3
170	Maritime cargo and container tracking for fire response	Systems to monitor and track the location and status of cargo and containers during fire incidents.	Deli 18 task 5.1
171	Maritime data privacy and GDPR compliance in fire management systems	Ensuring that fire management systems adhere to data protection regulations and respect user privacy.	Deli 18 task 5.1

No.	Term	Explanation	Occurrence
172	Maritime environmental data layers integration (weather overlays, bathymetry, surface currents)	The incorporation of various environmental data into maritime systems to enhance decision-making during emergencies.	Deli 18 task 5.1
173	Maritime fire safety clustering activities (with sibling projects like SafeNav and OCEAN)	Collaborative efforts to enhance maritime fire safety by sharing knowledge and resources among related projects.	Deli 31 task 9.1
174	Maritime fire safety dissemination, communication and exploitation (D&C&E) sheet	A document used to track and manage the dissemination and communication activities of the project.	Deli 31 task 9.1
175	Maritime fire safety intellectual property rights (IPR) management	The process of overseeing and protecting the intellectual property generated by the project to ensure its commercial viability.	Deli 31 task 9.1
176	Maritime fire safety open-access publications	Research outputs made freely available to the public to promote knowledge sharing and accessibility in the maritime safety community.	Deli 31 task 9.1
177	Maritime operations (specific context)	Activities related to the use of drones for tasks in marine environments.	Deli 15 task 4.5
178	Maritime Rescue Coordination Centres (MRCC) integration	The connection of fire management systems with MRCCs to facilitate coordinated emergency responses.	Deli 18 task 5.1
179	Maritime safety regulations compliance (IMO, SOLAS, IEC)	Adherence to international maritime safety standards to ensure safe operations at sea.	Deli 19 task 5.2
180	Maritime safety sector stakeholders (port authorities, ship owners, public authorities)	Key players involved in ensuring safety and compliance in maritime operations.	Deli 33 task 9.3
181	Maritime standards: S-100, ECDIS (Electronic Chart Display and Information System)	Regulatory frameworks that guide the use of electronic navigation and data presentation systems.	Deli 33 task 9.3
182	Maritime traffic management data integration (S-127)	The integration of traffic management data into fire response systems to improve navigation and safety.	Deli 18 task 5.1
183	Media Management (photos, videos, RTCM data)	The process of organizing and handling multimedia files generated during drone operations.	Deli 12 task 4.2
184	Metadata	Structured information describing data attributes to make data findable, accessible, interoperable, and reusable.	Deli 02 task 1.2_1
185	Met-ocean conditions monitoring (wind, waves, currents)	The observation and analysis of meteorological and oceanographic conditions affecting maritime activities.	Deli 33 task 9.3
186	Milestone report	Report documenting key project achievements at specific points.	Deli 05 task 1.5
187	Mission plans	Detailed outlines of tasks and objectives for drone missions, including flight paths and actions.	Deli 12 task 4.2
188	Modular architecture for scalability and future upgrades	A design approach allowing for easy expansion and integration of new technologies in the system.	Deli 19 task 5.2
189	MQTT, HTTPS, WebSocket protocols	Communication protocols used for data exchange between devices and applications in the system.	Deli 12 task 4.2
190	Multi-factor authentication (MFA)	Security measure requiring multiple forms of verification for access.	Deli 27 task 7.3

No.	Term	Explanation	Occurrence
191	Multi-sensor inputs (smoke detectors, gas sensors, temperature sensors, Infrared (IR) cameras)	Integration of various sensors to provide comprehensive monitoring of fire conditions.	Deli 19 task 5.2
192	Multi-stakeholder communication and Situational Awareness (SA)	Collaborative information sharing among various parties to enhance operational awareness and response.	Deli 19 task 5.2
193	Networking elements for vessels	Components that enable communication and data exchange between various systems on a vessel.	Deli 33 task 9.3
194	NMEA standards (NMEA 0183, NMEA 2000®, NMEA OneNet®)	Standards for marine electronics communication to ensure compatibility and data exchange.	Deli 19 task 5.2
195	NOTAM (Notice to Airmen) checks	Verification of notices that affect airspace operations before flights.	Deli 27 task 7.3
196	Obstacle detection (aerial system context)	The capability of drones to identify and avoid obstacles during flight.	Deli 15 task 4.5
197	Onboard sensors	Devices installed on vessels to monitor conditions and enhance safety measures.	Deli 33 task 9.3
198	Operational risk assessment	Evaluating the likelihood and impact of hazards to identify and mitigate risks.	Deli 01 task 1.1
199	Operational risks (environmental influences, human factors, procedural deviations)	Risks arising from environmental factors, human errors, and procedural deviations.	Deli 27 task 7.3
200	Operational safety procedures (pre-flight, in-flight, post-flight)	Guidelines for ensuring safety during all phases of drone operations.	Deli 27 task 7.3
201	Original Route RTH procedure	The standard procedure for returning the drone to its home point when control is lost.	Deli 12 task 4.2
202	OVERHEAT autonomous drone	A drone developed for maritime operations, focusing on fire detection and firefighting.	Deli 15 task 4.5
203	OVERHEAT DS (Digital System)	The digital solution developed under the OVERHEAT project to enhance maritime fire safety and response.	Deli 18 task 5.1
204	OVERHEAT ontology	Standardized vocabulary defining technical terms and concepts to harmonize data and deliverables within the OVERHEAT project.	Deli 02 task 1.2_1
205	OVERHEAT SharePoint	Central platform for storing, tracking, and sharing project documents.	Deli 05 task 1.5
206	Pause/RTH (Return to Home)	A function that allows the operator to pause the current mission and return the drone to its home point.	Deli 12 task 4.2
207	Persistent identifiers	Unique, stable references assigned to digital resources ensuring permanent accessibility and identification. (e.g., Digital Object Identifiers - DOI)	Deli 02 task 1.2_1
208	Port DS or Ground DS (Port Digital Solution)	A digital platform for managing and coordinating port operations and emergency responses.	Deli 19 task 5.2
209	Port State Control (PSC) inspections	Inspections conducted by port authorities to ensure compliance with safety regulations for visiting ships.	Deli 07 task 2.1
210	Portable Pilot Unit (PPU) - as a subsystem in OVERHEAT DS	A mobile system that assists pilots in navigating vessels safely, integrating fire management data.	Deli 18 task 5.1

No.	Term	Explanation	Occurrence
211	Post-operational evaluation	Review process after operations to assess performance and identify improvements.	Deli 27 task 7.3
212	Power interface specification	Guidelines for the electrical connections and power requirements of maritime systems.	Deli 33 task 9.3
213	Predefined communication workflows using GMDSS or S-124 protocols	Established procedures for emergency communication among maritime stakeholders.	Deli 19 task 5.2
214	Predictive approach	Assessing risks by forecasting probability and severity of hazards for mitigation.	Deli 01 task 1.1
215	Pre-operational risk review	Assessment conducted before operations to identify potential hazards.	Deli 27 task 7.3
216	Preventive checklists	Lists of actions to be taken to prevent risks during operations.	Deli 27 task 7.3
217	Private Mode (data storage option)	Data storage option that keeps all flight data locally without external communication.	Deli 27 task 7.3
218	Project Coordination Committee (PCC)	Group managing project quality, progress, risks, and documentation.	Deli 05 task 1.5
219	QR + OCR-based container ID mapping	Technology for identifying and tracking containers using QR codes and optical character recognition.	Deli 19 task 5.2
220	Quality assurance Plan (D1.5)	Document describing procedures to maintain project deliverables' quality.	Deli 05 task 1.5
221	Quality assurance process	Set of actions to monitor and maintain high-quality outputs.	Deli 05 task 1.5
222	Rainfall Gauge (pressure sensing module, self-heating)	A pressure sensing module that measures rainfall, featuring self-heating for low temperatures.	Deli 11 task 4.1
223	Real-time data acquisition from onboard and aerial sensors	Continuous collection of data from various sensors for immediate analysis and response.	Deli 19 task 5.2
224	Real-time flight task planning	The ability to plan and adjust flight missions dynamically as conditions change.	Deli 15 task 4.5
225	Real-time risk monitoring	Continuous assessment of risks during operations to enable immediate response.	Deli 27 task 7.3
226	Real-time sensor fusion (combining data from multiple sensors and UAV feeds)	The process of integrating data from various sensors and UAVs to provide a comprehensive view of fire incidents.	Deli 18 task 5.1
227	Real-Time Streaming Protocol (RTSP)	A protocol for streaming live video and audio data over the internet, used in maritime operations.	Deli 19 task 5.2
228	Reefer containers (refrigerated containers)	Containers equipped with temperature control systems for transporting perishable goods.	Deli 07 task 2.1
229	Requirements specification	A detailed description of the criteria and functionalities a project or system must fulfill.	Deli 01 task 1.1
230	Return to Home (RTH) procedures	Safety protocols for drones to return to a designated location in case of emergencies.	Deli 33 task 9.3; Deli 27 task 7.3
231	Review lifecycle	Timeline and steps for checking, reviewing, approving, and verifying deliverables.	Deli 05 task 1.5
232	Review Process (Check, Review, Approve and Verify process)	Stepwise procedure to ensure deliverables are properly reviewed and approved.	Deli 05 task 1.5

No.	Term	Explanation	Occurrence
233	Risk Management Plan (RMP) (D1.4)	Document outlining risks and mitigation measures for the project.	Deli 05 task 1.5
234	Risk mitigation measures	Strategies implemented to reduce identified risks to acceptable levels.	Deli 27 task 7.3
235	Risk register	Document listing identified risks, their assessments, and mitigation actions.	Deli 27 task 7.3
236	Role-based access control	Security measure that restricts system access based on user roles.	Deli 27 task 7.3
237	RTH	Return to Home; a safety feature that directs the drone back to its launch point automatically.	Deli 12 task 4.2
238	RTK (Real-Time Kinematics) system	A Real-Time Kinematics system that enhances positioning accuracy for drone operations.	Deli 11 task 4.1; Deli 15 task 4.5; Deli 27 task 7.3
239	S-100 Universal Hydrographic Data Model	A framework for managing and sharing hydrographic data across various maritime applications.	Deli 19 task 5.2
240	S-100 Universal Hydrographic Data Model and S-100 product layers	A framework for managing and sharing hydrographic data to support maritime navigation and safety.	Deli 18 task 5.1
241	S-1XX product specifications (e.g., S-101 ENC, S-102 Bathymetric Surface, S-104 Water Level Information, S-111 Surface Currents, S-121 Maritime Limits and Boundaries, S-122 Marine Protected Areas, S-123 Marine Radio Services, S-124 Navigational Warnings, S-125 Marine Aids to Navigation, S-126 Marine Physical Environment, S-127 Marine Traffic Management, S-128 Catalogue of Nautical Products, S-129 Under Keel Clearance Management, S-130 Polygonal Demarcations of Global Sea Areas, S-131 Marine Harbour Infrastructure, S-164 IHO Test Data Sets)	Specifications for various hydrographic and navigational products to standardize maritime data.	Deli 19 task 5.2
242	Safety of Life at Sea (SOLAS) Convention - Fire protection chapter	An international treaty setting safety standards for ships, including fire safety measures.	Deli 07 task 2.1
243	Safety perimeter and exclusion zones	Designated areas to ensure safety during drone operations.	Deli 27 task 7.3
244	Satellite-based internet connectivity	Internet access via satellites, enabling remote control and data transmission for drones.	Deli 15 task 4.5
245	Sensor calibration and drift compensation	Processes to ensure sensors provide accurate readings over time.	Deli 27 task 7.3
246	Sensors	Devices integrated on containerships and drones to detect fires early and provide data for the digital fire management system.	Deli 01 task 1.1

No.	Term	Explanation	Occurrence
247	Service-Oriented Architecture (SOA) based frameworks	A design approach that allows different services to communicate and work together in a flexible manner.	Deli 19 task 5.2
248	Simulation platform	A controlled virtual environment used to validate and test fire prevention and management solutions for containerships before real-world demonstrations.	Deli 01 task 1.1
249	Simulation tools and models for maritime operations	Software used to create virtual scenarios for testing and optimizing maritime operations.	Deli 33 task 9.3
250	Situation awareness	Real-time understanding of fire-related conditions on and around the vessel to support prevention and response.	Deli 01 task 1.1
251	Six official IMO languages interface support (Arabic, Chinese, English, French, Russian, Spanish)	Multilingual support for maritime communication to accommodate international crews.	Deli 19 task 5.2
252	Six-directional vision system	A technology that allows drones to detect obstacles in all directions for enhanced safety.	Deli 15 task 4.5
253	Six-directional vision system (drone obstacle detection)	Technology in drones for detecting obstacles in all directions.	Deli 27 task 7.3
254	Smart ship	A containership integrated with a digital fire management system that fuses data from various sensors into the vessel's IT infrastructure to enable prevention, early detection, and rapid response to fires.	Deli 01 task 1.1
255	SOA (Service-Oriented Architecture) for interoperability	A design approach that enables different systems to communicate and work together effectively.	Deli 18 task 5.1
256	SSA (Shared Situational Awareness) / COP (Common Operational Picture)	A collaborative understanding of the operational environment among various stakeholders during emergencies.	Deli 18 task 5.1
257	Stakeholder Support Board	A group of project participants who provide consent and support for activities such as data collection, including permission for recording and photographing during research events.	Deli 02 task 1.2_1; Deli 05 task 1.5; Deli 31 task 9.1; Deli 33 task 9.3
258	Standard Marine Communication Phrases (SMCP)	A set of standardized phrases for clear communication in maritime operations.	Deli 19 task 5.2
259	Starlink for Maritime (satellite internet connectivity)	Satellite internet service providing reliable connectivity for remote drone operations at sea.	Deli 11 task 4.1; Deli 15 task 4.5; Deli 27 task 7.3
260	State-of-the-Art (SoA) analysis	Current knowledge and research overview on fire causes and prevention in cargo spaces.	Deli 01 task 1.1
261	Surge Protective Device (SPD)	A device that protects the system from electrical surges and voltage fluctuations.	Deli 11 task 4.1
262	Surge Protector Circuit Breaker (SCB)	A circuit breaker that safeguards electrical systems from surges and interruptions.	Deli 11 task 4.1
263	Surveillance & rescue data infrastructure	Integrated system combining data from sensors, drones, vessels, ports, and rescue teams to monitor, detect, and respond to fires on containerships in real time.	Deli 01 task 1.1

No.	Term	Explanation	Occurrence
264	System-of-systems approach	Methodology treating multiple systems as interconnected for risk management.	Deli 27 task 7.3
265	Task leader	Person responsible for managing a specific task within a WP.	Deli 05 task 1.5
266	Technical Requirements (TRs)	Specific criteria that the Digital Solution must meet to ensure functionality and compliance.	Deli 19 task 5.2
267	Technical risks (hardware, software, communication, data acquisition)	Risks related to hardware, software, and communication failures.	Deli 27 task 7.3
268	Temperature and humidity sensors (external and internal hangar)	Sensors that monitor internal and external temperature and humidity levels in the hangar.	Deli 11 task 4.1
269	Test alarm (function to verify sensor alarm functionality)	A feature that allows users to check if the sensor's alarm system is functioning correctly.	Deli 14 task 4.4
270	Thermal imaging cameras (for fire detection)	Devices that detect heat signatures to identify potential fire hazards in cargo holds.	Deli 07 task 2.1
271	Thionyl chloride primary battery (planned for operational phase)	A type of battery with high capacity and low self-discharge, intended for use in operational sensors.	Deli 14 task 4.4
272	Tilting mechanism (vessel version)	A system that allows the drone recharging station to adjust its angle for optimal operation.	Deli 15 task 4.5
273	Traffic Flow Tracking and Display System	A system that monitors and visualizes vessel traffic to improve navigation and safety.	Deli 33 task 9.3
274	Training and familiarization for operators	Education programs for operators to ensure safe and effective use of systems.	Deli 27 task 7.3
275	Training modules for S-100 adoption and DS usage	Educational resources designed to facilitate the transition to S-100 standards and the use of the digital system.	Deli 18 task 5.1
276	UAS (Unmanned Aerial System) placement in tilting mechanism	The positioning of drones within a tilting structure for efficient recharging and deployment.	Deli 15 task 4.5; Deli 31 task 9.1; Deli 02 task 1.2_1
277	UAS Recharging Station	A facility designed to recharge unmanned aerial systems, enhancing their operational readiness.	Deli 15 task 4.5
278	UAS Recharging Station (ground and onboard installations)	Facilities designed to recharge drones, both on land and aboard vessels, for continuous operation.	Deli 33 task 9.3
279	UAV (Unmanned Aerial Vehicle) surveillance and UAV-assisted IR (Infrared) imaging	The use of drones for aerial monitoring and infrared imaging to enhance fire detection and response efforts.	Deli 18 task 5.1
280	UAV-assisted monitoring with dual vision (thermal + optical)	Use of drones equipped with thermal and optical cameras for enhanced monitoring of fire incidents.	Deli 19 task 5.2
281	Uninterruptible Power Supply (UPS)	Backup power system ensuring continuous operation during power failures.	Deli 27 task 7.3
282	Use cases (UCs)	Specific scenarios or situations identified and detailed during the project to demonstrate and validate the feasibility and benefits of the proposed solutions.	Deli 01 task 1.1
283	User personas and scenario-based design for maritime fire management	The creation of representative user profiles and scenarios to guide the design of effective fire management systems.	Deli 18 task 5.1

No.	Term	Explanation	Occurrence
284	Validation platforms	Systems or environments used to test, verify, and demonstrate the accuracy and effectiveness of data, models, or technologies.	Deli 02 task 1.2_1
285	Vessel and port environment interoperability	The ability for vessels and port systems to work together seamlessly for improved safety and efficiency.	Deli 19 task 5.2
286	Vessel DS (Vessel Digital Solution)	A digital system for managing fire safety and response on board vessels.	Deli 19 task 5.2
287	Vessel segment architecture	The design framework for drone operations on vessels, accommodating maritime conditions.	Deli 11 task 4.1; Deli 12 task 4.2; Deli 15 task 4.5
288	Virtual Private Network (VPN)	Secure network connection for remote access to systems.	Deli 27 task 7.3
289	VTS Interface (Vessel Traffic Service Interface) on ground	A communication interface that connects vessel traffic services with fire management systems for improved coordination.	Deli 18 task 5.1
290	WEEE (Waste from Electrical and Electronic Equipment) disposal regulations	Regulations governing the disposal and recycling of electronic waste to minimize environmental impact.	Deli 14 task 4.4
291	What-If Analysis	Technique for exploring potential scenarios and their impacts on operations.	Deli 27 task 7.3
292	Wheelmark (EU conformity mark for marine equipment)	A certification mark indicating compliance with EU safety standards for marine equipment.	Deli 19 task 5.2
293	Wind Speed Gauge (self-heating, Beaufort scale limit for flight safety)	A self-heating device measuring wind speed to ensure safe drone takeoff and landing conditions.	Deli 11 task 4.1
294	WMO SERCOM S-4XX standards (e.g., S-411 Dynamic Ice Information, S-412 Marine Weather Warnings)	Standards for weather-related data and services to enhance maritime safety and navigation.	Deli 19 task 5.2
295	Work Package (WP)	A major project component with defined objectives and tasks.	Deli 05 task 1.5
296	WP leader	Partner responsible for coordinating activities and deliverables of a WP.	Deli 05 task 1.5

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