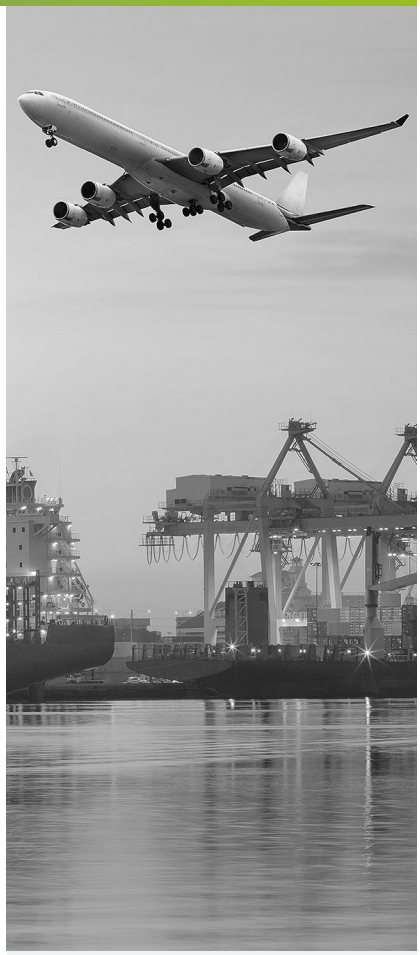
SAFEMODE



Newsletter 3
March 2021

SAFEMODE in progress

The SAFEMODE project has a duration of 36 months, from 1 June 2019 to 31 May 2022, and it is a Research and Innovation Action project funded under the Horizon 2020 programme. The main aim of the project is to develop a novel Human Risk Informed Design (HURID) framework in order to identify, collect and assess data for Human Factors in a systemic way. HURID will offer tools and data for designers and risk assessors, enabling them to take human factors risk-based considerations when designing transport systems and operations.

SAFEMODE has been running for 21 months, with all its Work Packages in progress:

Since our previous newsletter, several project deliverables have been submitted including:

- *Hurid Use Cases and HURID First Release (D5.1)*
- *Validation Plans: Conops, scenarios, technical equipment, experimental design (D6.2 & D7.2)*
- *Exploitation Plan (D9.1)*

This ambitious project will strengthen synergies between the aviation and maritime transport sectors in order to create shared methodologies for capturing Human Factors.

Hurid Use Cases and HURID First Release

The document D5.1 “HURID Use Cases and HURID First Release” presents the analysis of the current status of existing design approaches, major challenges associated to existing process and key opportunity areas to include Human Factors in the design of systems and operations for both the aviation and maritime sectors. This document also identifies the HURID Users and Use Case goals as a result of a comprehensive exploration based on constant interaction with the end-users, i.e., manufacturers, service providers, and operators and input from stakeholders.

HURID Use Cases describe how e-HURID platform can be used by system and operations designers, safety assessors, regulators, or other users to inform their decisions. We anticipate that different users will have different needs; as such, the ambition of HURID is to be scalable, proportionate to the risks involved, and customisable.

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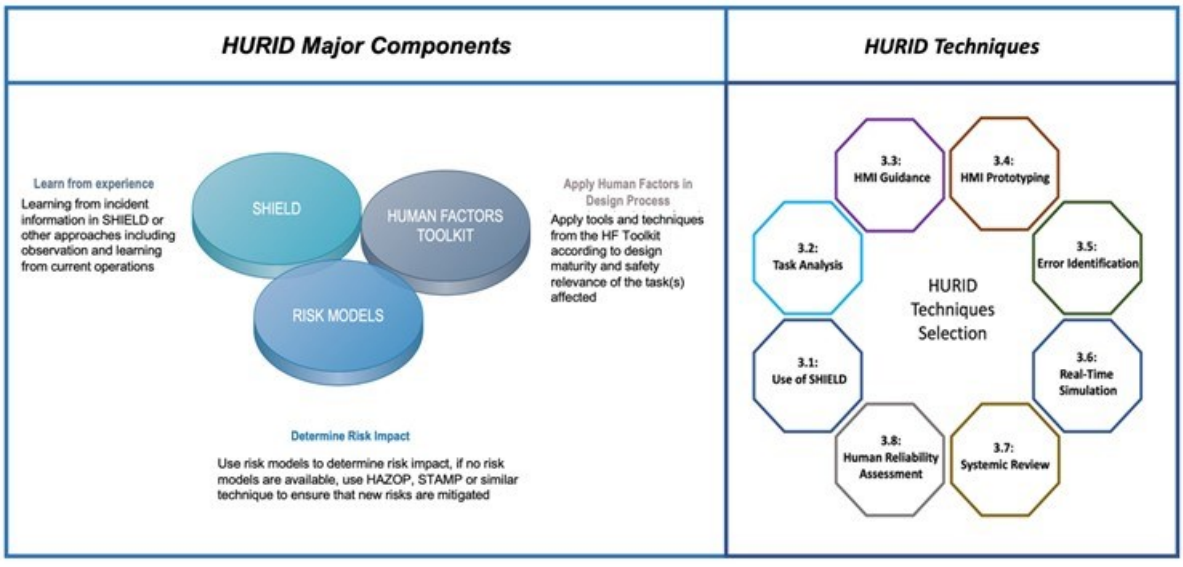
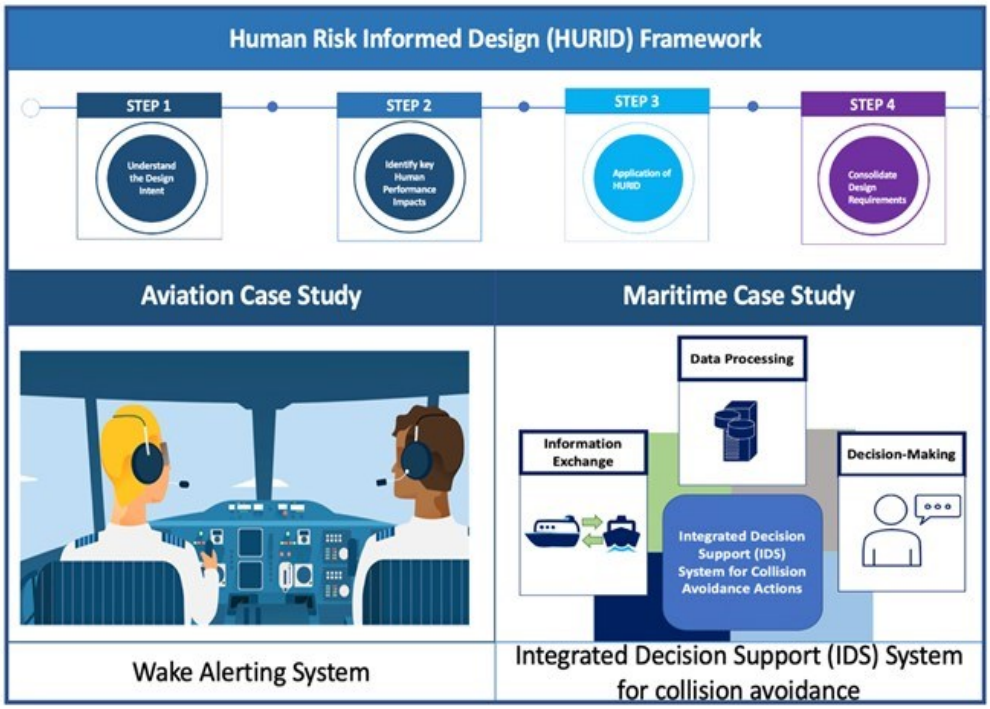
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814961.

All of that would make HURID sustainable, serving both to large organisations and small ones, to novice HF practitioners and to HF experts. Six main categories of HURID end-users were identified, which include: HF practitioners, designers/ developers, safety experts, inspectors/surveyors and auditors, investigators, and HF novices.

This document introduces the Human Risk-Informed Design Framework (HURID). The HURID Framework brings together SAFEMODE's outcomes so that Human Factors can be integrated into design processes regardless of the maturity of the design project being considered, and then serves as a guide for applying Human Factors in the domain case studies. The HURID framework follows a multi-step process, which includes three major elements to assist the designer: the SHIELD database, the Human Factors Toolkit, and Risk Models. These elements can be used individually or combined to develop a risk-informed design that addresses the relevant Human Factors involvements and impacts of a new design.



The applications of the HURID Framework to the aviation and maritime domains will be demonstrated through specific domain case studies. Two examples, among those considered in SAFEMODE, are Wake Vortex and Collision Avoidance.

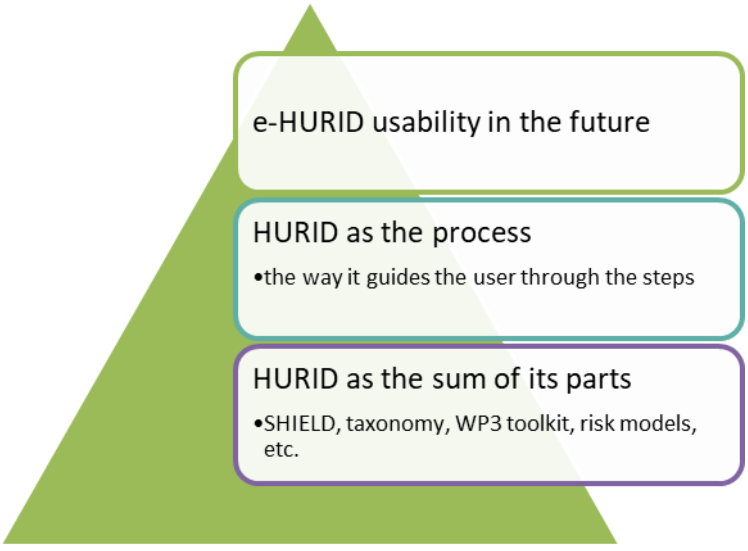


Validation Plans: CONOPS, scenarios, technical equipment, experimental design (D6.2)

Deliverable 6.2 describes the Validation Plan for the Aviation-Domain case studies performed in WP6. The plan differentiates between the common approach taken to validate the usability and fitness for purpose of HURID, and the approach taken to assess the individual case studies.

The validation of HURID is planned in three steps following a bottom-up approach, validating HURID as the sum of its parts, HURID as the process, and the usability of e-HURID. The objectives with their respective success criteria have been defined by the WP6 members jointly.

The case studies will provide the basis for testing the elements of HURID with the process itself and then evaluate them against the criteria. Thus, the evaluation will be based on feedback from the case studies via qualitative measures, such as questionnaires, interviews and observation.



It is anticipated that different users will have different needs. The ambition of HURID is to be scalable, proportionate to the risks involved, customizable for the different needs. This will make HURID sustainable, suitable for large organisations and for small ones too, for novice HF practitioners and for HF experts. The validation use cases will serve to differentiate the feedback received from the applied techniques, tools and methods according to the level and field of expertise of users.

The feedback will therefore be collected from different target end users of HURID: designers, developers, safety experts, as well as HF experts. Questions that are expected to be addressed include “Is the technique fit-for purpose?”, “Were the tools you used rather fragmented, or fitted well with each other?” and “Do you felt the need of extra training beyond the materials provided by HURID?”

The second part of the Validation Plan considers the case studies themselves. On the aviation side, three case studies have been defined, two of which are considered forward looking scenarios (CS2 and CS3):

CS1: En-route wake vortex alert and Upset indicators (with Training)
CS2: Drone-related forward-looking scenario
CS2 A: Prototype mobile app features
CS2 B: RPAS emergency landing with passenger on board
CS3: Intelligent Planning Tool for Multiple Remote Tower Concept

After their respective HF impacts have been identified, the case study teams put together the objectives and the HURID tools to be used to address them. The tools vary depending on the maturity of the topics; however, most of them incorporate prototyping sessions integrating several HMI design guidelines. Risk models and real-time simulations are also among the selected methods and tools, the latter being especially relevant in CS1.

Validation Plans: CONOPS, scenarios, technical equipment, experimental design (D7.2)

Deliverable D7.2 presents the validation plans for the selected SAFEMODE maritime case studies, and documents the process followed to gather a level of information functional to the design of the experiments.

Validation plans start with the definition of common validation requirements and assumptions, chosen considering the needs of a selection of possible HURID users. On this basis, general validation objectives have been defined to allow the evaluation of all HURID components, also in agreement with the aviation domain in order to maintain a cross-domain approach.

The HURID framework approach

HURID will assist designers, operators and assessors to answer the following questions

- *What went wrong before with this type of system or operation or interface?*
- *What are the key human performance drivers with this type of situation?*
- *Where do I really need to focus and what is considered best practice in those areas?*
- *What are the tools or models I need to apply?*

Further information can be found at:

www.safemodeproject.eu/hurid

The case studies for which this activity has been carried out are the following:

CS1 - Operator Assessment of Remote-control Ships

In this CS we address the Maritime Autonomous Surface Ship (MASS) concept by validating and improving an existing HMI through HURID application.

CS2 - Implementation of a Human Factors and Risk-based Investigation suite for Maritime End Users (Organizational Level)

This CS is focused on enhancing commonly adopted processes for maritime casualties investigation thanks to SAFEMODE tools.

CS3 - Simulator-based evaluation of human response in emergencies – the case of ship collision

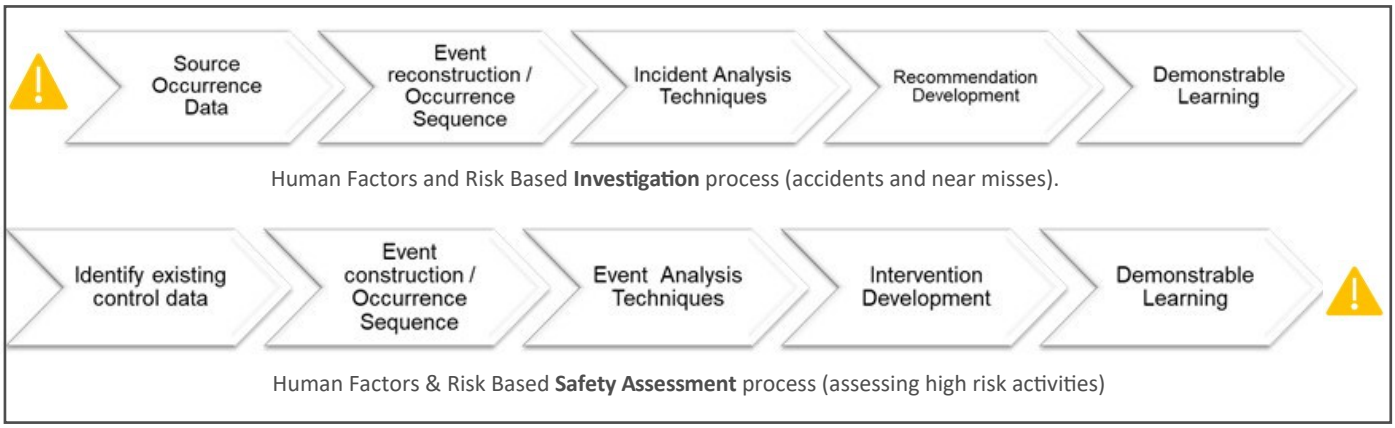
The last CS deals with the design of improved procedures and existing Integrated Decision System customization for supporting bridge operations.

For case studies 1 and 3, whose scenarios are generally based on actual incidents, simulation-based experiments have been chosen in order to place the test subjects in a real-like environment and gather the relevant measurements. Case study 2 will follow a different validation strategy due to its intrinsically 'offline' nature; the chosen validation activities will assess HURID validity for constructing an investigation process able to identify incident causes at multiple levels.

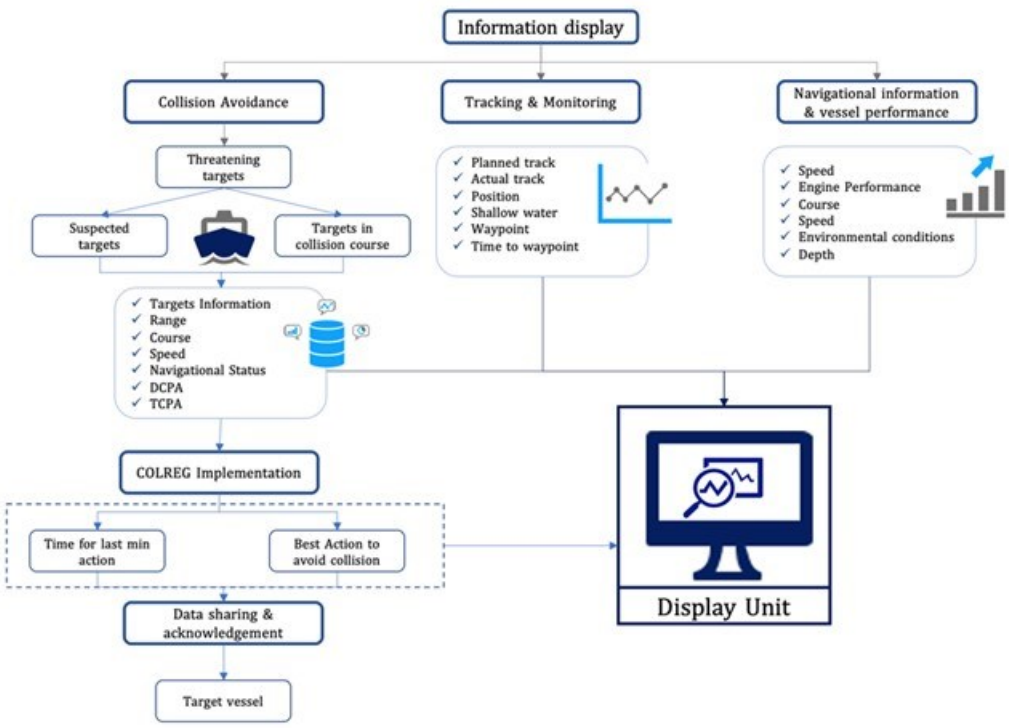
The SAFEMODE consortium

brings together experience from the whole safety value chain. Manufacturers, service providers, regulators, academia and small-medium enterprises will collaborate to integrate Human Factors into safety and deliver safer transport systems.

Case Study 1: remote ship control platform



Case Study 2: reactive and proactive investigation processes



Case Study 3: Integrated Decision System framework

The validation plans present a general description of the activities to be tested, and start from the already proposed concepts and scenarios definition, refining their scope and focusing on the practical activities to carry out. More in detail:

- where appropriate, Concepts of Operations (CONOPS) were built using task analysis methods in order to formalize details and build specific knowledge on the modelled operations themselves;
- scenarios were defined based on actual incidents (CS1 and 3) and on conventional investigation phases (CS2) in order to make results comparable with real-world situations;
- technical equipment was selected accordingly in order to measure the parameters relevant to the validation;
- experiments were designed considering the simulation facilities available within SAFEMODE Partners and exploring possible synergies.

For Each Case Study, specific validation objectives have been defined, to be merged with the general ones already mentioned. Where available (Case Studies 1 and 3), a preliminary application of HF Methods is also documented. The activity was carried out with the purpose to kick off design activities while at the same time generating knowledge onto which building meaningful CONOPS and effective experiments scheduling.

Exploitation Plan

The purpose of the deliverable (D9.1) is to present the SAFEMODE's exploitation objectives and methodology, and the project's initial plan for business and exploitation of its results. In addition, the deliverable explores the potential for the development and exploitation of SAFEMODE outcomes beyond the life of the project. More specifically, this deliverable aims to:

- Present a preliminary exploitation strategy of the project and an overview of the exploitation landscape surrounding it.
- Introduce the actors, markets and sectors that are relevant in the context of exploitation, and to emphasise the importance of iteratively analysing their role, needs and potential.
- Serve as a step towards setting out clear and measurable exploitation targets, the results of which will be monitored and regularly reviewed.
- Serve as a guidance document for SAFEMODE project partners and to stimulate their engagement in the exploitation of the project results.
- Ensure that exploitable outcomes of the project will be optimally used and that the desired impact is achieved.

The main SAFEMODE Exploitable results have been identified as follows in D9.1.

SAFEMODE Results	Description
SHIELD: Human Factors Risk Event Database in aviation and maritime	Comprehensive and high quality data source on human performance in safety-relevant situations to support HF analysis. Data is based on aviation and maritime safety reports and structured according to the SAFEMODE taxonomy.
Human Factors-based risk models	Newly-developed risk models with a specific focus on HF contribution to safety. The quantification of the overall risk level enables to support aviation and maritime Case Studies on current and future risks and the design of safety improvements.
Human Assurance Toolkit	This toolkit includes a comprehensive catalogue of checklists, procedures, best practises, HF techniques and methods to account for human-related aspects when a new procedure or system is designed or assessed. It is fully integrated with the HURID framework and with existing state-of-the-art HF techniques and it consist of (i) guidelines, taxonomy, and recommendations, (ii) design methods and tools for human-centred higher levels of automation, and (iii) supporting educational material.
HURID framework to support design, operations, and continuous monitoring	Integrated framework, including all SAFEMODE techniques, methods and tools that allow the assessment and management of human risk factors, facilitating the involvement of HF disciplines and techniques in both the design and the operations stages.

For each of these Exploitable Results, a specific Exploitation strategy is delineated. and describes the SAFEMODE's exploitation environment through a SWOT Analysis conducted and a description of other ongoing projects SAFEMODE will collaborate with to strengthen its exploitation activities. Additionally, the main exploitation performance indicators (PIs) and key performance indicators (KPIs) are delineated.

These include for example the number of organisations and institutions adopting SHIELD as data source for human factors in aviation and maritime safety assessments, the number of agencies and institutions that adopt the HF-based risk models for assessing new technologies and procedures, the number of organizations that adopt the risk models for assessments, training material or further research, or that express interest in adopting the HURID framework to design, operate and monitor the operations. Finally, D9.1 includes a timeline for the implementation of the exploitation activities and next steps.

Upcoming deliverables

Human Assurance toolkit and guidance on Human Assurance Levels(D3.1): A guideline will be devised for HF considerations when making design and operational decisions. With minimal additional effort required from target users to integrate them into current processes, the toolkit will provide guidance on how to generate, assess, and select new alternatives.

Predictive models of human performance and Human Assurance Levels (D3.2): In support of risk modelling and safety assessments, this task will develop predictive models of human performance. These models will incorporate Human Reliability Assessment (HRA) approaches from barrier-based risk models, predicting what can go wrong and how likely it will be to go wrong, based on human performance influencing factors. Further, models will be developed to provide a broader understanding of human performance variability under safety-relevant conditions, in areas such as timing characteristics for recognizing and responding in critical situations, information transfer in sociotechnical systems, and human workload.

HF methods and techniques for case studies (D3.3): HF method and techniques are being considered for the SAFEMODE case studies that fall under WP6 and WP7. Methods and techniques will include qualitative measures, subjective assessments, and neurophysiological indicators.

Risk models of major accident types in both domains (D4.2):There are many types of incidents identified in WP2 that require data that describes the major issues that affect different transport domains.

SAFEMODE virtual conferences participations:

SENTA 2020 (8th December 2020)

International Conference on Maritime Technology

2021 World of Shipping Portugal Conference (28th-29th January 2021)

An International Research Conference on Maritime Affairs

World of Shipping Portugal Conference

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*Please **visit** our website **www.safemodeproject.eu** and **subscribe to our newsletter** (at the bottom of the home page) to stay informed about future project results, events and news.*

Future events

Due to the COVID-19 outbreak all upcoming SAFEMODE project scheduled events will be carried out online until further notice.

News regarding events will be announced on social media and website.

SAFEMODE

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