



HoliDes

Holistic Human Factors Design
of Adaptive Cooperative Human-
Machine Systems



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Annex I - Requirements Analysis Update

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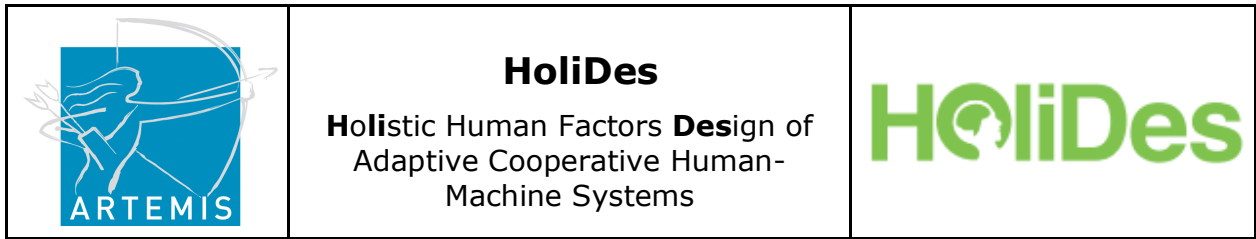


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Requirement Update

Version	Project Cycle	ID	Name	Definition	Rationale	Relevance	Requirement Type	Authors/Editors	Related HF-RTP requirements	Covered by [MTT, Property of RTP, ...]	Responsibility	Used in which WP needed?	Will be realized within Holidays	If fulfilled: Use Case: Example of best case. If rejected: Reason for NOT realizing the requirement	Further details can be found in
4	m24	WP1_HFRTP_REQ01_v4	Synchronized data processing	The HF-RTP shall provide MTTs that are able to process multimodal data sources in a synchronized manner.	Components that process data from different sources (e.g., audio, video, radar, ...) must be able to relate all data received from different inputs to a specific point in time. Preprocessing of the different data sources may cause different delays on each input, which is why some mean for synchronisation of data sources is necessary. This type of synchronisation is necessary during design-time for data collection (e.g., during evaluation by simulation or in order to build statistical models).	High	MTT	S. Borchers (TWT)	WP1_HFRTP_REQ02	RTMaps (INT)	INT	WP7, WP9	fulfilled	The RTMaps software has been provided to partners and successfully used in various AdCoS implementations (IFSTTAR, CRF, IBEQ, HONEYWELL, TWT...). Best example use case might be the IFSTTAR demonstrator where RTMaps is used for implementing the real-time processing of various data streams coming from the ProSIVIC simulator.	D3.3, D4.5, D7.2
5	m33	WP1_HFRTP_REQ02_v5	Data logging and tracing	If HF-RTP MTTs provide means for logging and tracing of data, this must be provided in a standardized way common to all HF-RTP MTTs. Logs of MTTs are then accessible to other MTTs and events can be sent from one MTT to another during development / design time.	Especially for the development phase of critical systems it is necessary being able to track the data flow and to understand the processing of data by each MTT.	Medium	Workflow	S. Borchers (TWT)	WP1_HFRTP_REQ01	RT-MAPS (INT) Experiment Data Archive (EDA) (TEC)	INT, TEC	WP6, WP7, WP9	fulfilled	The EDA tool stores the hierarchy of projects in a centralized way. This hierarchy is then exposed as an OSLC service catalog in RDF/XML format that can be consumed by other MTT in real time	D7.4, D7.6, D4.6, D7.8
5	m33	WP1_HFRTP_REQ03_v5	Consistent information exchange	HF-RTP MTTs shall work according to standard meta models and the IOS in order to provide consistent information exchange, so that all related MTTs work with the same information and are able to interact with each other.	Information needs to be provided for each MTT in a manner that it is processable by that MTT and that information is consistent in order to guarantee synchronized processing (possibly with real-time data). Data must be consistent, whenever two MTTs work on one data item.	High	Interface	S. Borchers (TWT)	WP1_HFRTP_REQ030, WP1_HFRTP_REQ31	IOS, HF ontology, meta-model definition	EAD-UK, TEC, OFF, ATO	WP6	fulfilled	In version 1.8 of HF-RTP a HF-RTP infrastructure and interoperability standard was defined. This IOS is focused in two types of interoperability: Lifecycle interoperability and non-Lifecycle interoperability	D1.7, D1.8
5	m33	WP1_HFRTP_REQ04_v5	Storage of experimental data	The HF-RTP shall provide MTTs for an efficient storage of experimental data. Those MTTs shall use common formats based on meta models if applicable.	Data that is computed during the development and testing needs to be stored in an efficient way not disturbing current processes while being available to be used for further processing steps.	High	MTT	S. Borchers (TWT)	WP1_HFRTP_REQ020, WP1_HFRTP_REQ34, WP1_HFRTP_REQ35, WP1_HFRTP_REQ21, WP1_HFRTP_REQ32, WP1_HFRTP_REQ33	Experiment Data Archive (EDA) (TEC)	TEC	WP6, WP7, WP8, WP9	fulfilled	The EDA tool complies with the OSLC specification in regards of the stored information publication	D7.4, D7.6, D4.6, D7.8
5	m33	WP1_HFRTP_REQ05_v5	Error and status reporting	HF-RTP MTTs shall be able to produce standardized alerts or reminders when ambiguities or errors are detected by them, or with respect to communication issues with another MTTs in order to ensure a reliable process.	For a reliable functioning of all MTTs and the communication between MTTs, it is important for the designer to understand errors in order to prevent them in future steps.	High	Workflow	S. Borchers	WP1_HFRTP_REQ08_v2	Needs to be implemented by each MTT.	-	WP7, WP8, WP9	rejected	This requirement would rely on each MTT's ability to report errors in a consistent way; this is not realizable within Holidays.	-
5	m33	WP1_HFRTP_REQ01_v5	Support of different user classes	The HF-RTP shall provide MTTs that allow a distinction of AdCoS user classes. These classes may, for instance, depend on the expertise level of the user for a given task. Depending on the user's class, the task may offer more or less information and/or control.	Users with different expertise levels in a certain task need different support and information. Expert users may be given more control over a certain task.	Medium	MTT	D. Martin (TWT)	WP1_HFRTP_REQ13a, WP1_HFRTP_REQ13b	CONFORM (DLR)	DLR	WP6, WP8, WP9	fulfilled	As a fact each driver has an individual driving style. Consequently different drivers also prefer different driving styles for an automated vehicle. The requirement takes this into account. The acceptance and the appealing of an automated vehicle is increased by supporting different user classes, i.e. different driving styles.	D3.6, D9.9
5	m33	WP1_HFRTP_REQ02_v5	Appropriate HMI/GUI designs	The HF-RTP shall provide MTTs for design of HMI / GUI that consider physical properties of the target display device.	HMI/GUI design is important for the resulting AdCoS to be optimally designed for supporting the operator in a specific task.	Medium	HMI	D. Martin (TWT)	WP1_HFRTP_REQ11_v2, WP1_HFRTP_REQ15_v2	-	-	WP7, WP8, WP9	rejected	No such MTT will be developed within Holidays. While such a requirement could be useful in general, the term "appropriate" would need to be further defined.	-
5	m33	WP1_HFRTP_REQ03a_v5	User's physiological data processing for the operator's state classification	The HF-RTP shall provide MTTs that allow determination of the state of the operator.	Depending on the user's physiological signals (EEG, gaze tracking) analysis, the state of the operator can be predicted.	High	MTT	D. Martin (TWT)	WP1_HFRTP_REQ11, WP1_HFRTP_REQ13b	Pattern classifier (TEC)	TEC	WP7, WP8, WP9	fulfilled	The Pilot Pattern Classifier objective is to extract information about the fatigue of the pilot from online recorded data.	D7.4, D7.6, D2.6, D7.8
5	m33	WP1_HFRTP_REQ01_3b_5	Assessment of user's psychological state	The HF-RTP shall provide MTTs that allow determination of the user's psychological state, e.g. MTTs for monitoring the cognitive load of the operator or operating team.	Users with different physiological states (e.g. stress, fatigue etc.) or psychological states (e.g. workload etc.) need different support and information. Depending on the user's state, the task may offer more or less information and/or control.	High	MTT	D. Martin (TWT)	WP1_HFRTP_REQ11, WP1_HFRTP_REQ13a, WP1_HFRTP_REQ18	- Detection of driver distraction based on data of vehicle dynamics (UTO) - Visual Distraction MTTs - Pattern classifier (TEC) - Cognitive Distraction MTT (TWT)	UTO, TEC, TWT	WP6, WP7, WP8, WP9	fulfilled	The Pilot Pattern Classifiers is developed based in the definition of a Human Model, and having as input data: electroencephalography (EEG), electrocardiogram (ECG) and gaze tracking. The model is based in the Random Forest technique.	D7.4, D7.6, D2.6, D7.8

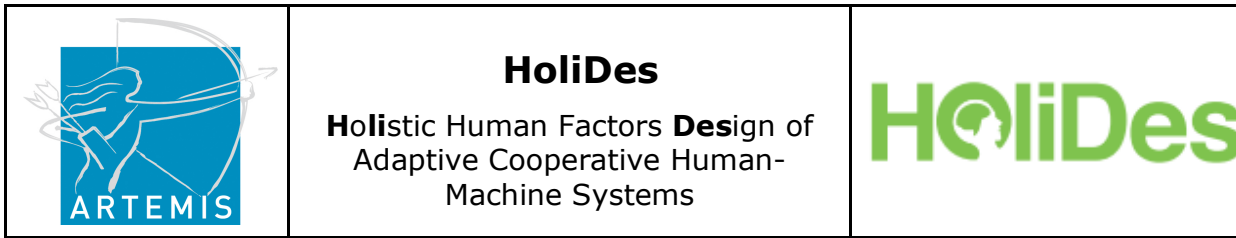


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5	m33	WP1_HFRTP_REQ3_1_v5	Conceptual HF issues	The RTP must provide an ontology regarding relations between Human Factors issues, MTTs, and according HF regulations and safety regulations.	The ontology should describe necessary human factors for modelling / describing human state / behavior in specific scenarios. HF concepts represented within the ontology help on the one hand integrating MTTs into the RTP. On the other hand, the ontology should enable the RTP to provide users with suitable MTTs to address HF issues within the system development process.	Very High	Concepts	S. Borcher (TWT)	WP1_HFRTP_REQ03, WP1_HFRTP_REQ11, WP1_HFRTP_REQ13a, WP1_HFRTP_REQ13b, WP1_HFRTP_REQ14, WP1_HFRTP_REQ18	HF ontology and meta model	HFC, TEC, AGI	WP6, WP7, WP9	fulfilled	An HF-Ontology is defined to show the relationships among HF issues, HF methods and regulations. This ontology also defines the interoperability standard to exchange information related with human factors that apply to each of the four domains covered in HoliDes project. This ontology formalizes in OWL language the HF related concepts identified in the HF-CMM	D1.5, D1.6, D1.7
5	m33	WP1_HFRTP_REQ3_2_v5	Project identifiers for AdCoS development	The HF-RTP shall provide means for transporting project identifiers to distinguish each AdCoS design and development project to be used by all tools in the same RTP instance.	If an RTP instance must support the development of several projects within the same organisation, a unique project identifier for each project will make the administration simpler and allow the construction of simple human-readable URL schemes to make the information handled in the RTP instance easily sharable.	Low	Workflow	Morten Larsen (AWI)	WP1_HFRTP_REQ04, WP1_HFRTP_REQ21, WP1_HFRTP_REQ33	Platform Builder	ATO	WP6, WP7, WP8, WP9	fulfilled	The Platform Builder provides a tool called "link project" in the "Create an HF-RTP instance" functionality, giving the possibility to create different AdCoS phases in the same RTP instance	D 1.7, annex HoliDes_Platform_Builder_user_handbook_v 5.0
5	m33	WP1_HFRTP_REQ3_3_v5	Provide a unique version identifier for a design version	The HF-RTP shall provide means for transporting unique version identifiers to distinguish each design and development cycle of the same project with the same RTP instance. The identifier must be available to all tools in the RTP instance that require it.	The individual RTP instances must support the design-development-evaluation cycle, which will lead to several design versions. A unique design version id will help make the references to design documents, source code and evaluation reports of various versions easier to manage. It will also allow the construction of simple human-readable URL schemes to make the information handled in the RTP instance easily sharable.	Low	Workflow	Morten Larsen (AWI)	WP1_HFRTP_REQ04, WP1_HFRTP_REQ21, WP1_HFRTP_REQ32	Platform Builder	ATO	WP6, WP7, WP8, WP9	fulfilled	The Platform Builder provides identifiers and description fields to distinguish each development cycle for the same project in the same instance. Phase and Project description can be inserted in the "create an HF-RTP instance" functionality, and modified in the "My Project" functionality.	D 1.7, annex HoliDes_Platform_Builder_user_handbook_v 5.0
5	m33	WP1_HFRTP_REQ3_4_v5	Creation and storage of evaluation plans	The HF-RTP shall include MTTs to set up and store itemised evaluation plans for AdCoS. The evaluation plans must refer to a unique AdCoS project within the same RTP instance. The plans must be incrementally modifiable as new versions of the AdCoS design are defined.	In a design-development-evaluation cycle, it provides for a more structured approach if the evaluation plans can be stored and managed in the RTP instance for the project. Some application domains have requirements to make the test plans (of which the evaluation plan is a part) traceable, and a versioned and traceable workflow within the RTP instance will provide support for this.	High	MTT	Morten Larsen (AWI)	WP1_HFRTP_REQ04, WP1_HFRTP_REQ21, WP1_HFRTP_REQ35	HF Filer tool	AWI	WP6, WP8	fulfilled	Guided patient positioning/Robust VCG triggering	D6.8
5	m33	WP1_HFRTP_REQ3_5_v5	Storage of textual evaluation reports	The HF-RTP shall provide MTTs for a storage of textual evaluation reports based on itemised evaluation plans. The evaluation reports must be traceable to design versions.	In a design-development-evaluation cycle, it provides for a more structured approach if the evaluation plans can be stored and managed in the RTP instance for the project. Some application domains have requirements to make the test results (of which the evaluation report is a part) traceable, and a versioned and traceable workflow within the RTP instance will provide support for this.	High	MTT	Morten Larsen (AWI)	WP1_HFRTP_REQ04, WP1_HFRTP_REQ21, WP1_HFRTP_REQ34	HF Filer tool	AWI	WP6, WP8	fulfilled	Guided patient positioning/Robust VCG triggering	D6.8
5	m33	WP1_HFRTP_REQ3_6_v5	Creation of new projects	If a single RTP instance should support the development of multiple AdCoS, there must be one MTT which can create a new project for the development of the new AdCoS.	WP1_HFRTP_REQ34_v2 refers to "unique AdCoS projects". Currently there would be no way to create such projects.	Low	MTT	David Käthner (DLR)	WP1_HFRTP_REQ04, WP1_HFRTP_REQ32, WP1_HFRTP_REQ33	Platform Builder	ATO	WP6, WP7, WP8, WP9	fulfilled	Using the functionality "Create an HF-RTP instance" is possible to add MTTs about different AdCoS.	D 1.7, annex HoliDes_Platform_Builder_user_handbook_v 5.0
5	m33	WP1_HFRTP_REQ3_7_v5	Creation and management of users	For traceability, HF-RTP MTTs shall provide the functionality to create and manage multiple users who use the RTP instance for the design and evaluation of AdCoS. Alternatively, MTTs may use existing user authentication mechanisms depending on the company's needs.	This improves traceability.	Medium	MTT	David Käthner (DLR)	WP1_HFRTP_REQ36, WP1_HFRTP_REQ04, WP1_HFRTP_REQ34, WP1_HFRTP_REQ35	Platform Builder	ATO	WP6, WP7, WP8, WP9	fulfilled	"New registration" functionality has been included to give different rights to the Platform Builder users to use the app. Different authentication mechanisms separated by user roles has been contemplated.	D 1.7, annex HoliDes_Platform_Builder_user_handbook_v 5.0
5	m33	WP1_HFRTP_REQ3_8_v5	Requirements Management	The HF-RTP shall provide at least one MTT for the management of textual requirements.	Requirements are the basis of any systems engineering project.	High	MTT	Ian Giblett (EAD-UK)	WP1_HFRTP_REQ36, WP1_HFRTP_REQ03	IOS compliant adaptor for DOORs (EAD-UK)	EAD-UK	WP8	fulfilled	Control Room Use cases 1 to 6	D8.6, D8.7
5	m33	WP1_HFRTP_REQ3_9_v5	Modelling of Human Views	The HF-RTP shall provide at least one MTT for the modelling of human views in an architectural framework.	So that human factors can be used more effectively in the context of model based systems engineering. Human views add the ability to model human information such as their lines of communication, their experiences, rank and more.	Medium	MTT	Ian Giblett (EAD-UK)	WP1_HFRTP_REQ13a, WP1_HFRTP_REQ13b, WP1_HFRTP_REQ18, WP1_HFRTP_REQ20, WP1_HFRTP_REQ31	Extensions to DoDAF/NAF by WP8 (EAD-UK)	EAD-UK	WP8	fulfilled	Control Room Use cases 1 to 6	D8.6, D8.7



5	m33	WP1_HFRTP_REQ40_v5	(Cognitive) Task Analysis	The HF-RTP shall provide MTTs to elicit information regarding objective task characteristics, cognitive task demands associated with a task, and human factors issues addressed by a task, which is performed by a user in interaction with a technical system.	These analyses are the basis for designing better HMIs or training programs. They enable an investigator to understand the rationale of a person performing a task, the strategies and skills that are used / needed. The results of task analyses can be used at all stages of system development, from early requirements specification through to final system evaluation.	High	MTT	Linda Onnasch (HFC)	WP1_HFRTP_REQ13a, WP1_HFRTP_REQ13b, WP1_HFRTP_REQ18, WP1_HFRTP_REQ20, WP1_HFRTP_REQ22, WP1_HFRTP_REQ23, WP1_HFRTP_REQ29, WP1_HFRTP_REQ31	Human Factors - Task Analysis Tool (HF-TA) (HFC) GOMS (DLR)	HFC, DLR	WP6 WP9	fulfilled	use case 9.2, Overtaking Manoeuvre; use case 6.4, Robust ECG Triggering System	D 5.5, D6.9
5	m33	WP1_HFRTP_REQ41_v5	Human Factors Common Meta Model (CMM)	The HF-RTP must provide a Human Factors Common Meta-Model where common elements of all MTTs are gathered and synchronized in such way that an exchange of input and output data between different MTTs in an RTP instance is possible.	In an RTP instance the data exchange between different MTTs needs to be possible. To enable the data exchange a common element for each data that needs to be exchanged must be defined as part of a common meta model. This ensures that information can be exchanged between MTTs and that MTTs can interact with each other.	High	Concepts	Marie-Christine Ostendorp (OFF)	WP1_HFRTP_REQ03, WP1_HFRTP_REQ31	HF ontology and meta model	OFF	WP6, WP7, WP9	fulfilled	EATT - WP7	D1.7, D2.7, D7.X