HoliDes

Holistic Human Factors **Des**ign of Adaptive Cooperative Human-Machine Systems

HoliDes Platform Builder Validation Report

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1 Introduction

1.1 Purpose

The purpose of this document is to report the validation activities of the HoliDes Platform Builder application. Such validation task was defined based on the requirements included in the document "HoliDes Platform Builder requirements". This document is located in the Ajaxplorer and also is available from the menu bar in the PB app.

1.2 Scope

The scope of this document is to check all the validations in order to demonstrate that all the requirements are working fine and the PB application is running correctly.

1.3 Definitions, acronyms and abbreviations

Acronym	Meaning
HoliDes	Holistic Human Factors Design of Adaptive Cooperative Human-Machine Systems
Requirement	Requirements proposed in the document "HoliDes Platform Builder requirements.doc"
PB app	Platform Builder Application
HF Partners	Partners involved in the HoliDes Project with knowledge in Human Factor issues
HF User	User with access to the PB. Has received an identification including user and password
CSS	Stylesheet language that describes the presentation of an HTML (or XML) document.

2 Validations

A validation is done for each requirement proposed in the "HoliDes Platform Builder requirements" document; it should demonstrate and check a right execution. For each requirement a screenshot of the PB app, demonstrating the requirement, is included.

Each validation test contains the follow information:

Validation ID: number of validation, unique identify for each validation.
Type: functional or non-functional validation, it depends on the requirement (functional or not).
Name: a word describing the validation.
Description: explains the validation to check.

The validation tests are divided in 2 groups: functional and non-functional.

Functional validation: validations related to the functional requirements and should be specific for PB or HoliDes project.

Non-functional validation: generic validations related to non-functional requirements.

2.1 Functional validations

Validation ID	VAL-F1	**Type**	Functional
Name	Filtering.		
Description	Check the preconditions used to show the MTT's tools. Using: filters proposed by HF experts. HF issues, domains, regulations and related activities.		

Preconditions proposed by HF experts: domain, regulations, HF issues and related activities.

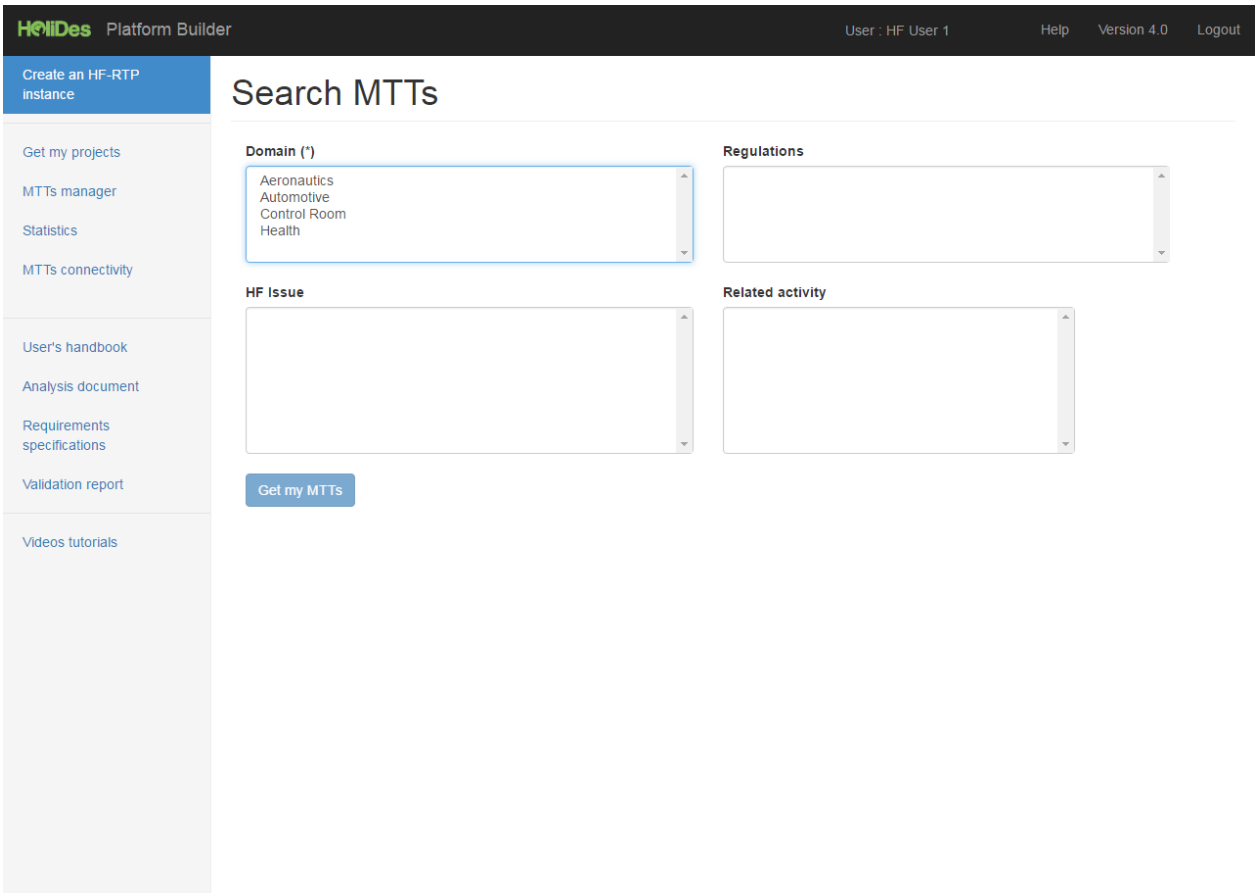

Figure 1 Input screen domains

Filtering by domain when a specific domain is selected:

- The content appearing in the regulations list:
  - "System for adoptive cruise control"
- The content appearing in the HF issue list:
  - "Attention".
  - "Behaviour".
  - "Distraction".
  - "Safety"
  - "Situational Awareness".
  - "Task Performance".
  - "Usability".
  - "Workload"

  The HF issues listed above are exclusively for "Automotive" domain as you can see in the screen shown below:

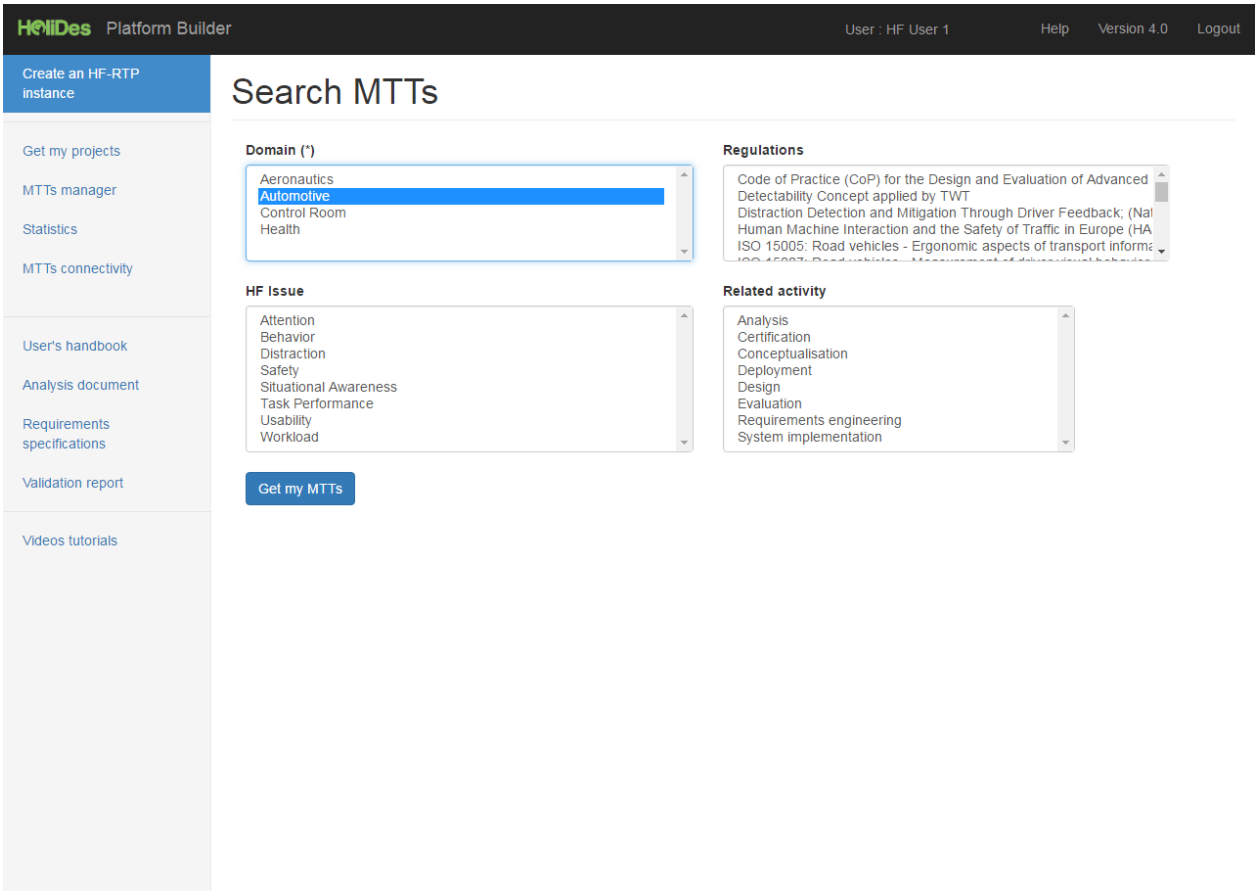

Figure 2 Input screen filters

Validation ID	VAL-F2	**Type**	Functional
Name	Rights.		
Description	Checking that the users can access to the PB app including the user/password. Different user rights are provided for each user.		

The access to the PB app is allowed by HF experts only with a user credentials provided, as the below image shows:

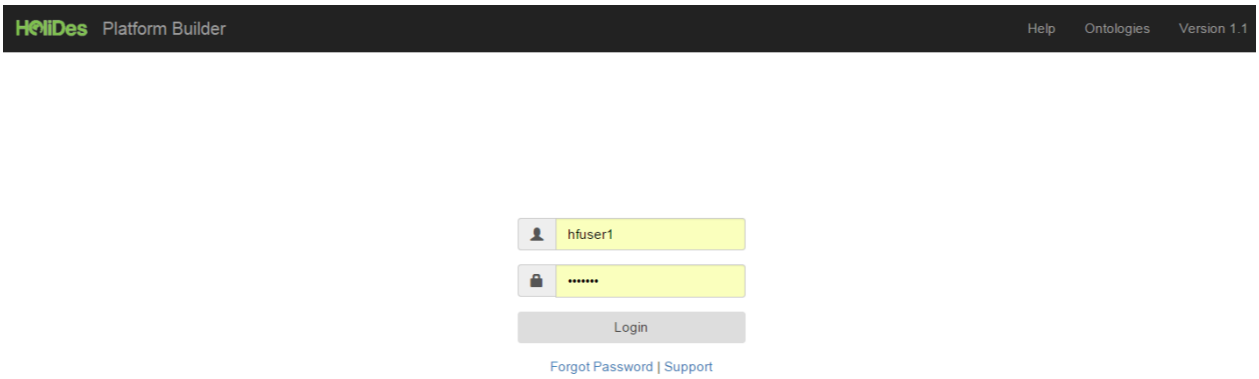

Figure 3 Login required

Once introduced the user/password the PB app shows the full name in the right and top part of the screen in the navigator bar, "HF User 1" in this case.

Figure 4 Navigator bar shows the "HF User 1" as a user logged

Validation ID	VAL-F3	**Type**	Functional
Name	Result.		
Description	Checking that PB app proposes a list of MTTs tools when the preconditions selected have some MTT to show, searching by filters selected.		

Selecting the "Aeronautics" domain, the HF issue: "Workload", giving in blank the regulations list and clicking on "Evaluation" in the related activity list:

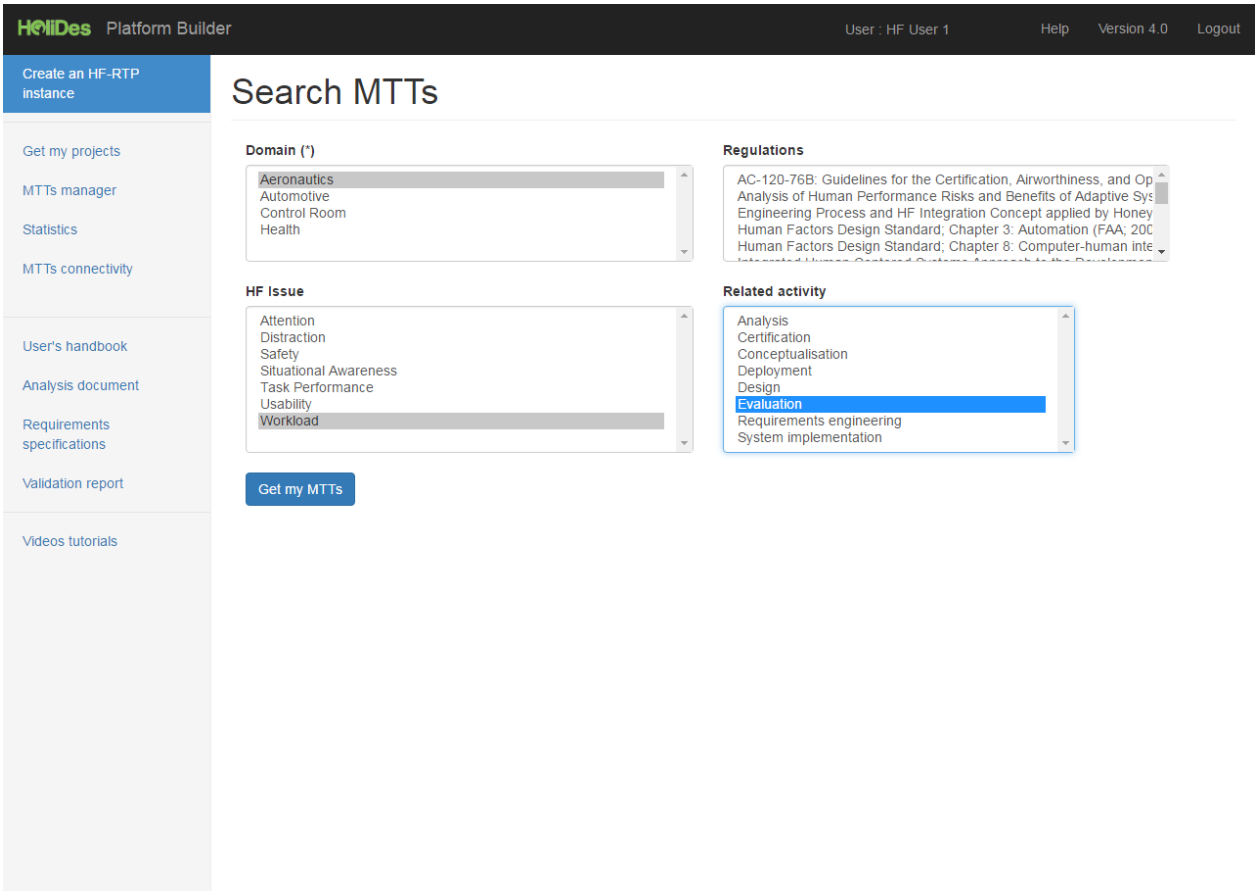

Figure 5 Selecting the criteria conditions

Clicking on "Get my HF-RTP" button, a list of MTTs appears in the Preliminary MTTs Screen:

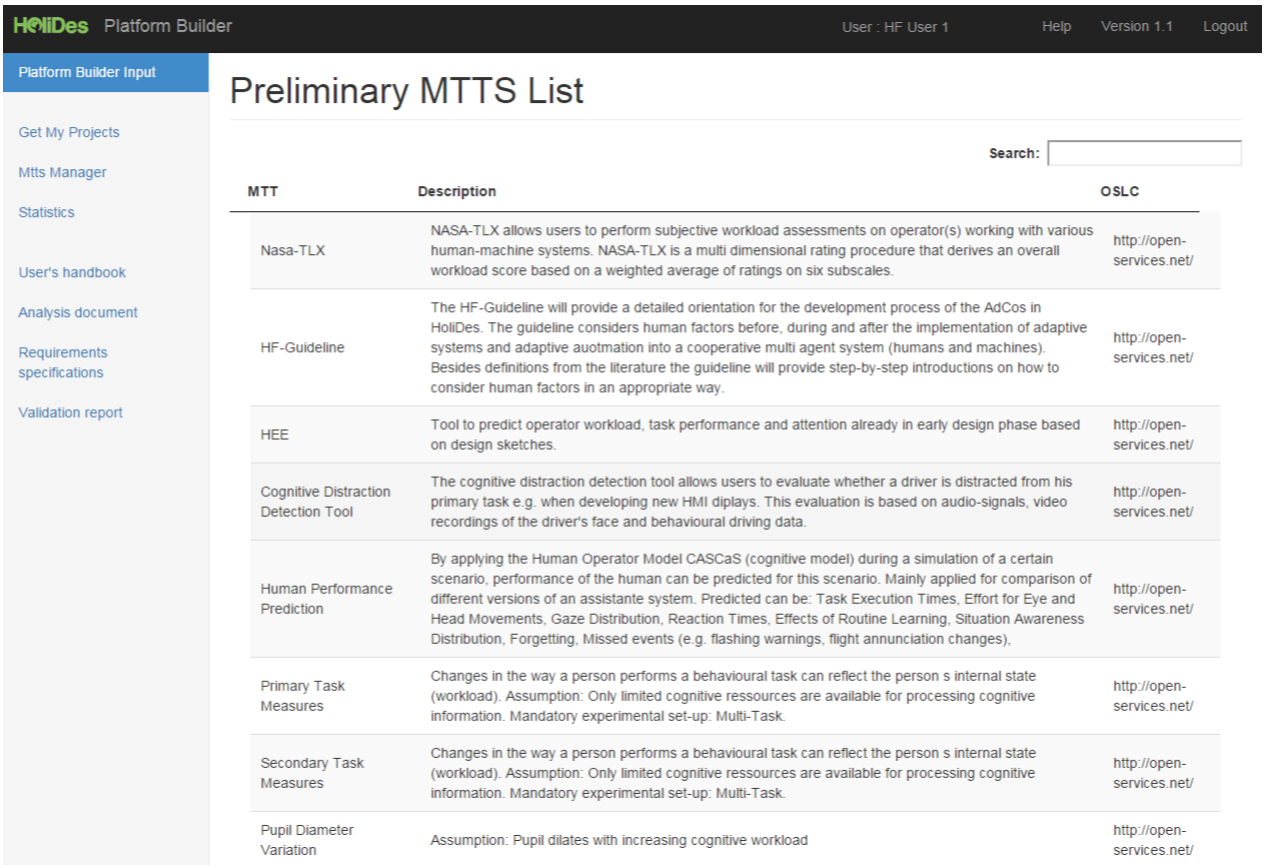

Figure 6 Preliminary MTTs list comply the criteria conditions

Validation ID	REQ-F4	**Type**	Functional
Name	Compare.		
Description	Checking the frame "Tools comparator". Is a frame appearing in the preliminary screen that allows the HF Users to compare the different features for each MTT. Helping the users to choose a MTT.		

In the frame "Tools Comparator" the user can see the capabilities for each MTT proposed, including the advantages and disadvantages for each MTT:

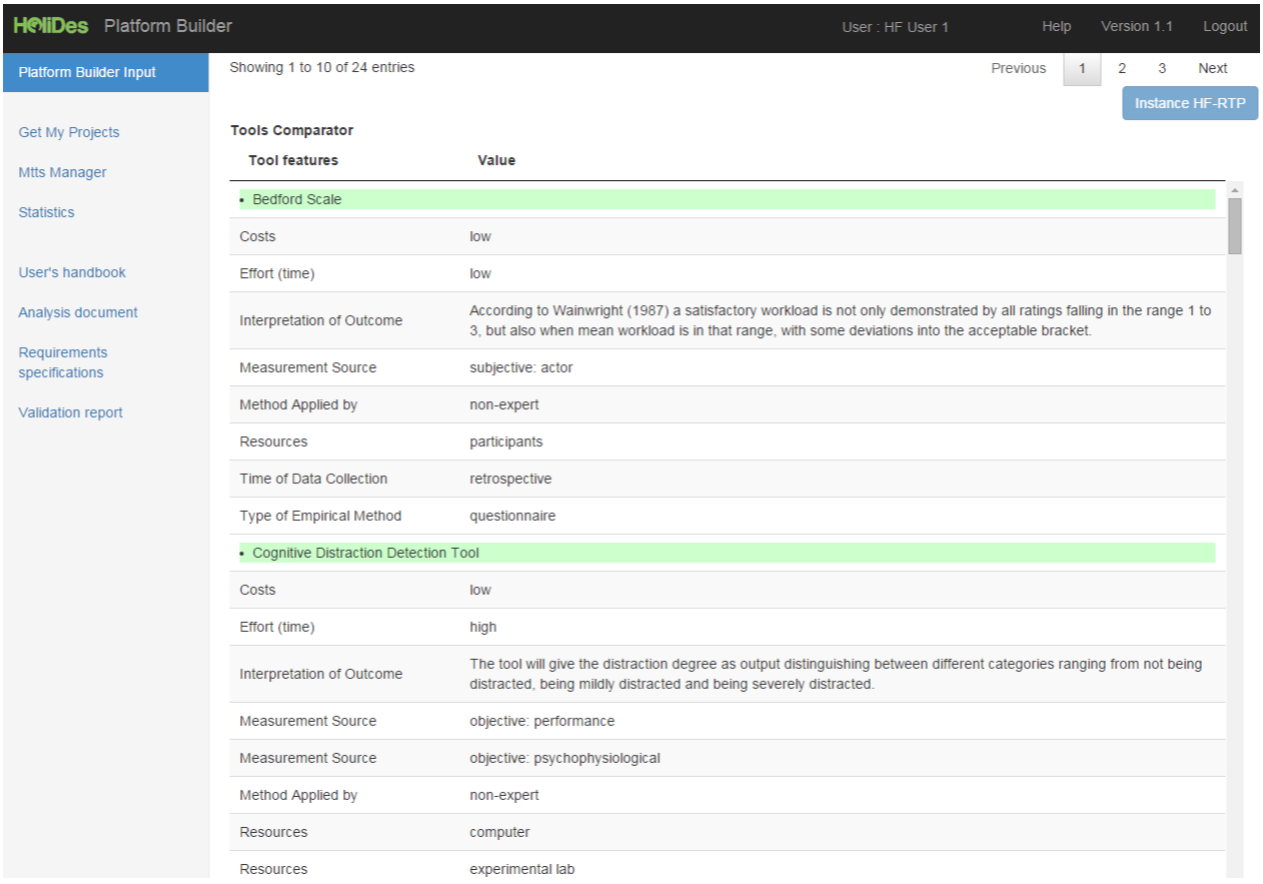

Figure 7 Tools comparator

Validation ID	VAL-F5	**Type**	Functional
Name	Select.		
Description	Checking the possibility to select different tools proposed by the PB, in order to make an HF-RTP instantiation.		

In this case is selected the MTT: "Human Performance Prediction".

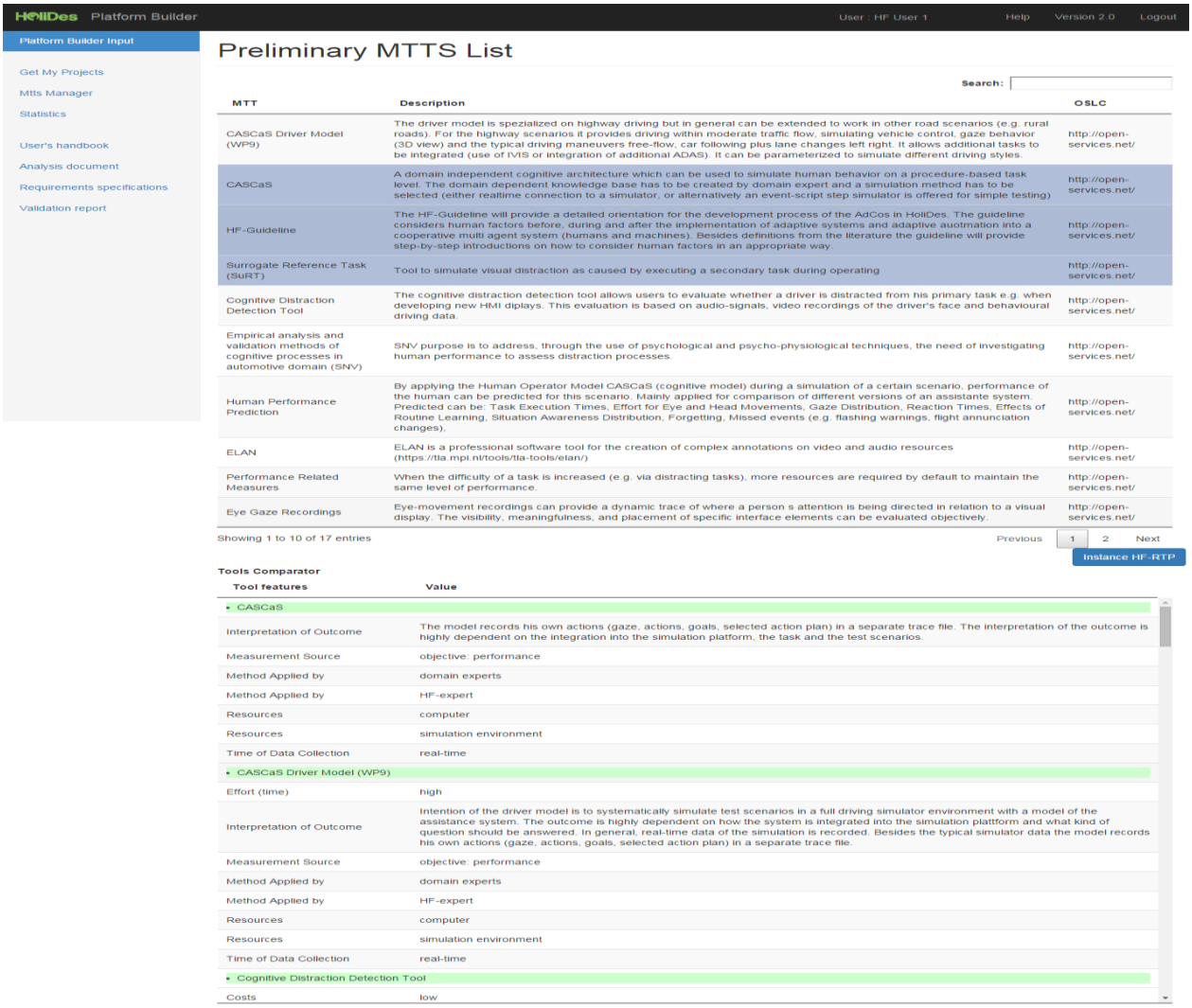

Figure 8 Selecting some MTTs

Validation ID	VAL-F6	**Type**	Functional
Name	Export.		
Description	Possibility to export all the results in some format files in order to export all the information to other platforms.		

Clicking on the buttons appearing in the top left side is possible to export to the follow formats: csv, Excel, pdf, also print the MTT and copy the MTT information to clipboard.

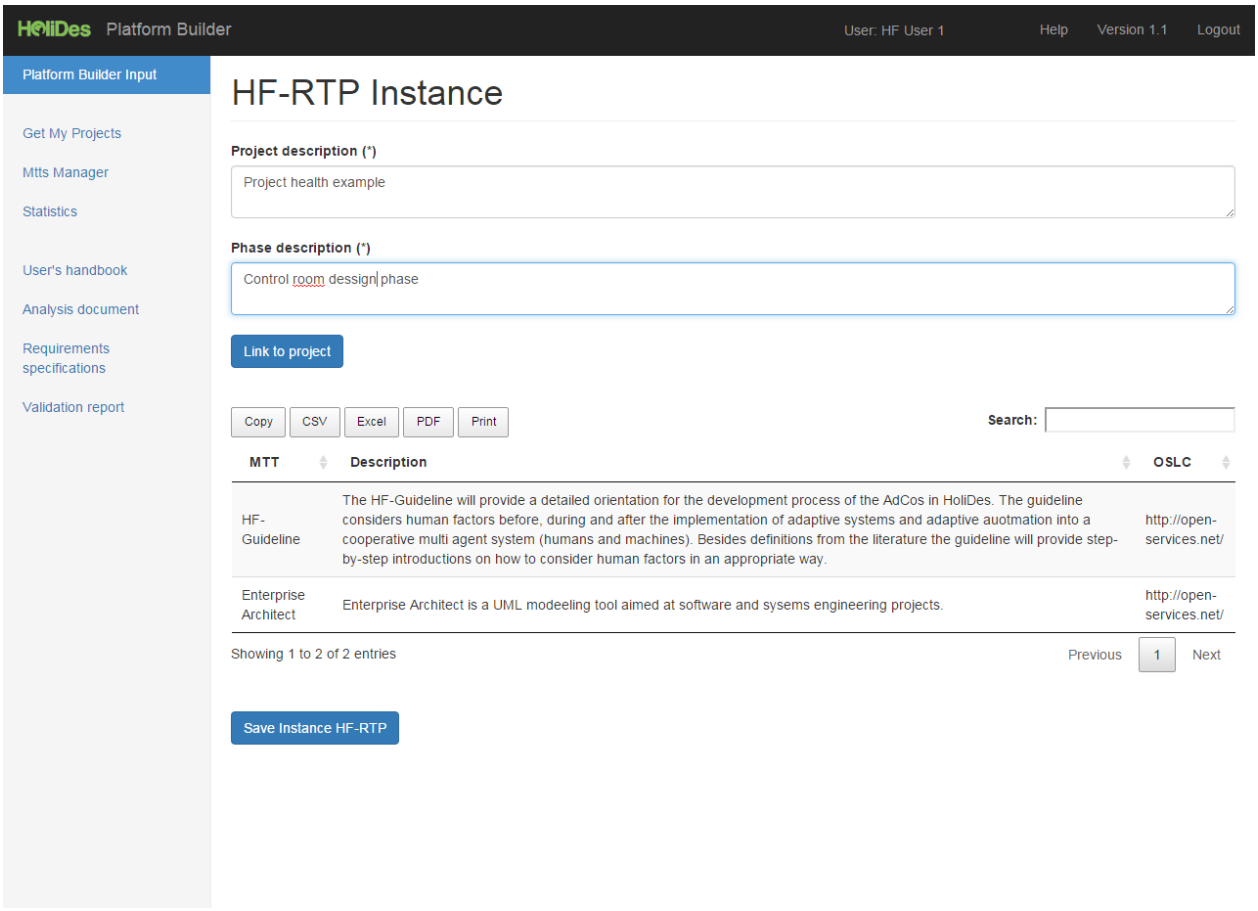

Figure 9 Exporting the MTTs information

Exporting in a pdf document appears:

Platform BuilderPlatform Builder

idRtp	idMtt	MTT	Description	OSLC
1	8	HF-Guideline	The HF-Guideline will provide a detailed orientation for the development process of the AdCos in HoliDes. The guideline considers human factors before, during and after the implementation of adaptive systems and adaptive auotmation into a cooperative multi agent system (humans and machines). Besides definitions from the literature the guideline will provide step-by-step introductions on how to consider human factors in an appropriate way.	http://open-services.net/
1	28	Enterprise Architect	Enterprise Architect is a UML modeeling tool aimed at software and sysems engineering projects.	http://open-services.net/

Figure 10 Export to PDF document

Validation ID	VAL-F7	**Type**	Functional
Name	Storing.		
Description	Checking and testing to store the user projects in the database and get these when you the user want to.		

A list of projects saved by users is shown in the projects screen in the PB. The user can manage his/her projects and selects one.

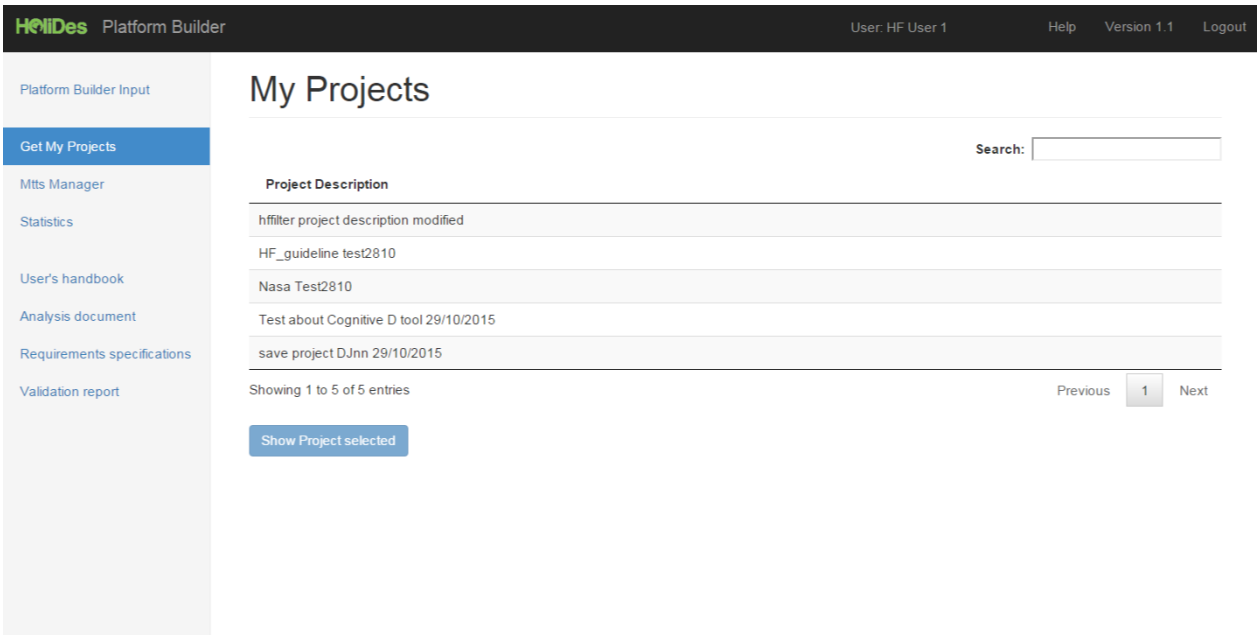

Figure 11 List of projects saved for the HF User 1

Validation ID	VAL-F8	**Type**	Functional
Name	Search Engine.		
Description	Help to users to find MTTs in the list of the MTTs proposed.		

This functionality can help the user to find some tools searching by word, the PB app provides a textbox in the top right side of the list of MTTs. For example in the figure below the search is done using the word "human", and appears all the MTTs comply it in their description or tool name:

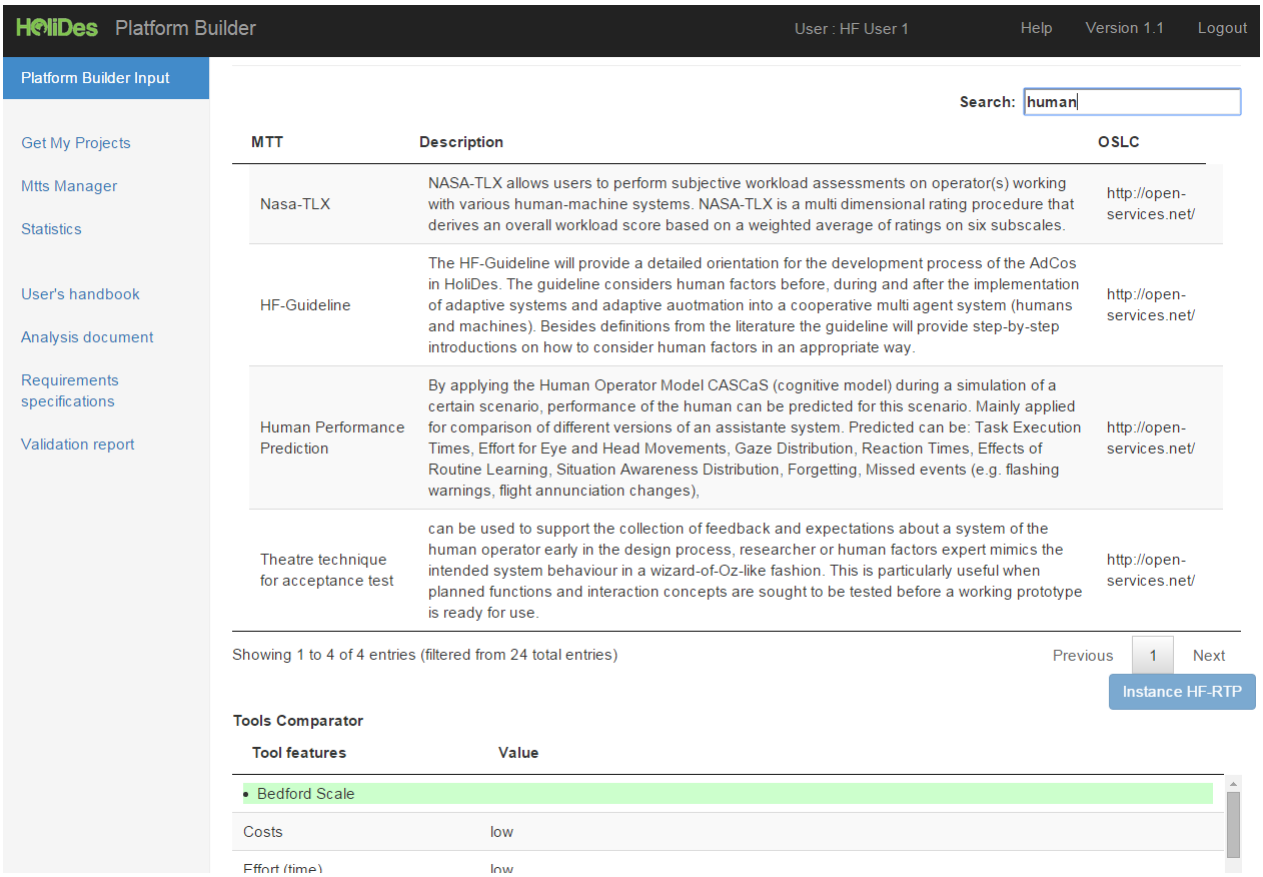

Figure 12 Search by word

Validation ID	VAL-F9	Type	Functional
Name	Statistics.		
Description	Statistics for PB shows how many tools are instantiate by each user, filtering by domains, and showing the information in a graphical environment.		

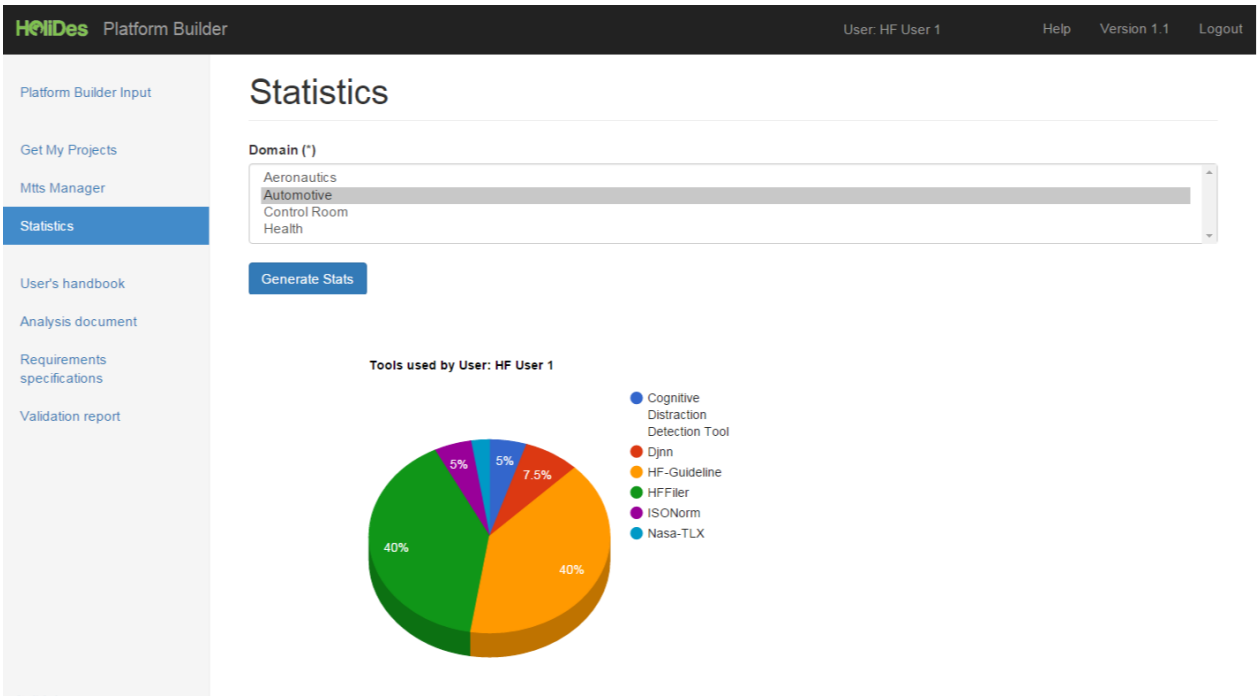

Figure 13 Statistics

Validation ID	VAL-F10	**Type**	functional
Name	Connectivity.		
Description	Provide a graphical environment to see the connection between tools.		

This functionality provides a graphical environment where MTTs can be selected by criteria: domain, related activities and HF issues, and these MTTs will be presented within a V-model picture, including each MTT in one or more related activities.

The MTTs can be located in some categories: analysis, conceptualization, certification, design, evaluation, deployment and system implementation.

Selecting for example the conceptualization and deployment items in the "related activity" combo list, a list of MTTs appears in the right size with the MTTs accomplishing the conditions.

Selecting some MTTs, these ones will appear in the V-model picture as the picture below shows:

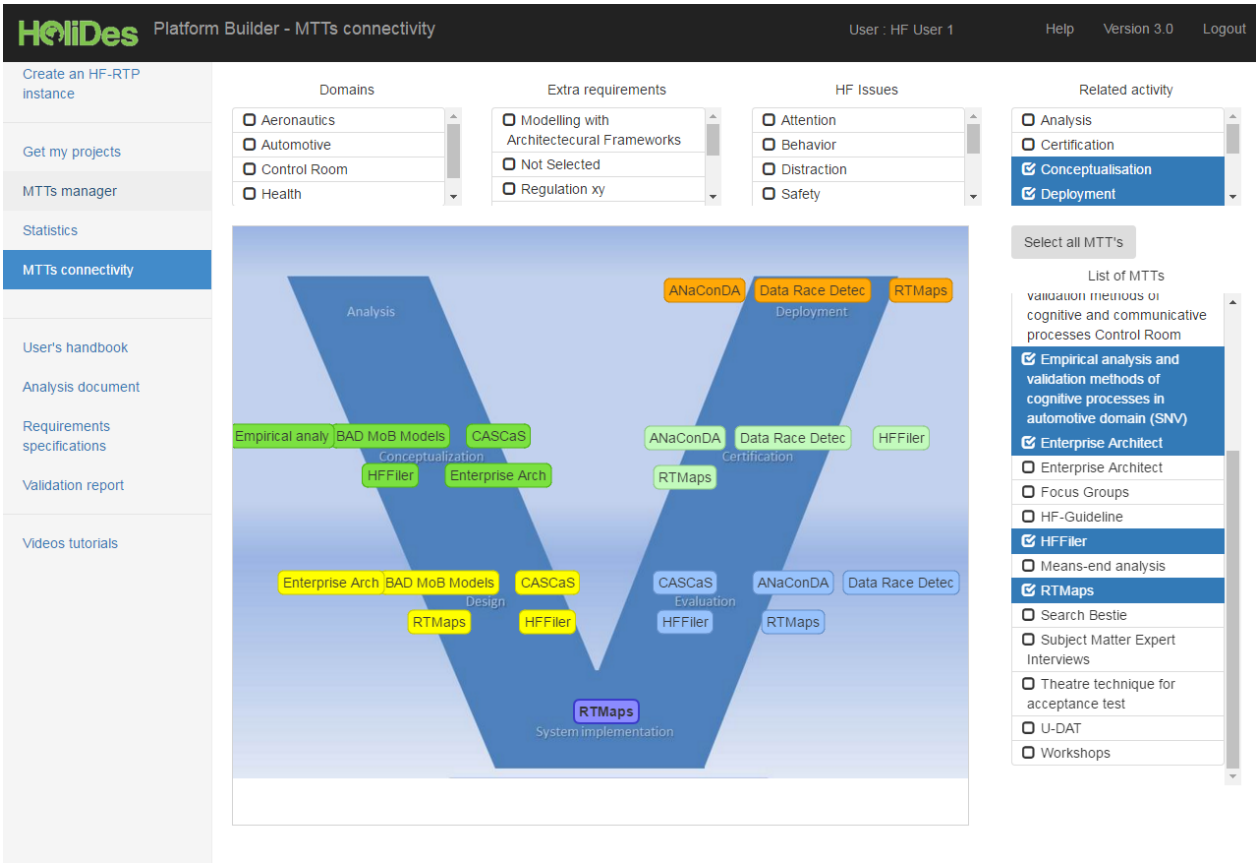

Figure 14 MTTs Connectivity GUI

Requirement ID	REQ-F11	**Type**	functional
Name	AdCoS Integration		
Description	Possibility to connect the Platform Builder with some AdCoS.		

The integration between the PB and the HoliDes AdCoS has been done in the "Adaptation framework" tool, inside PB app.

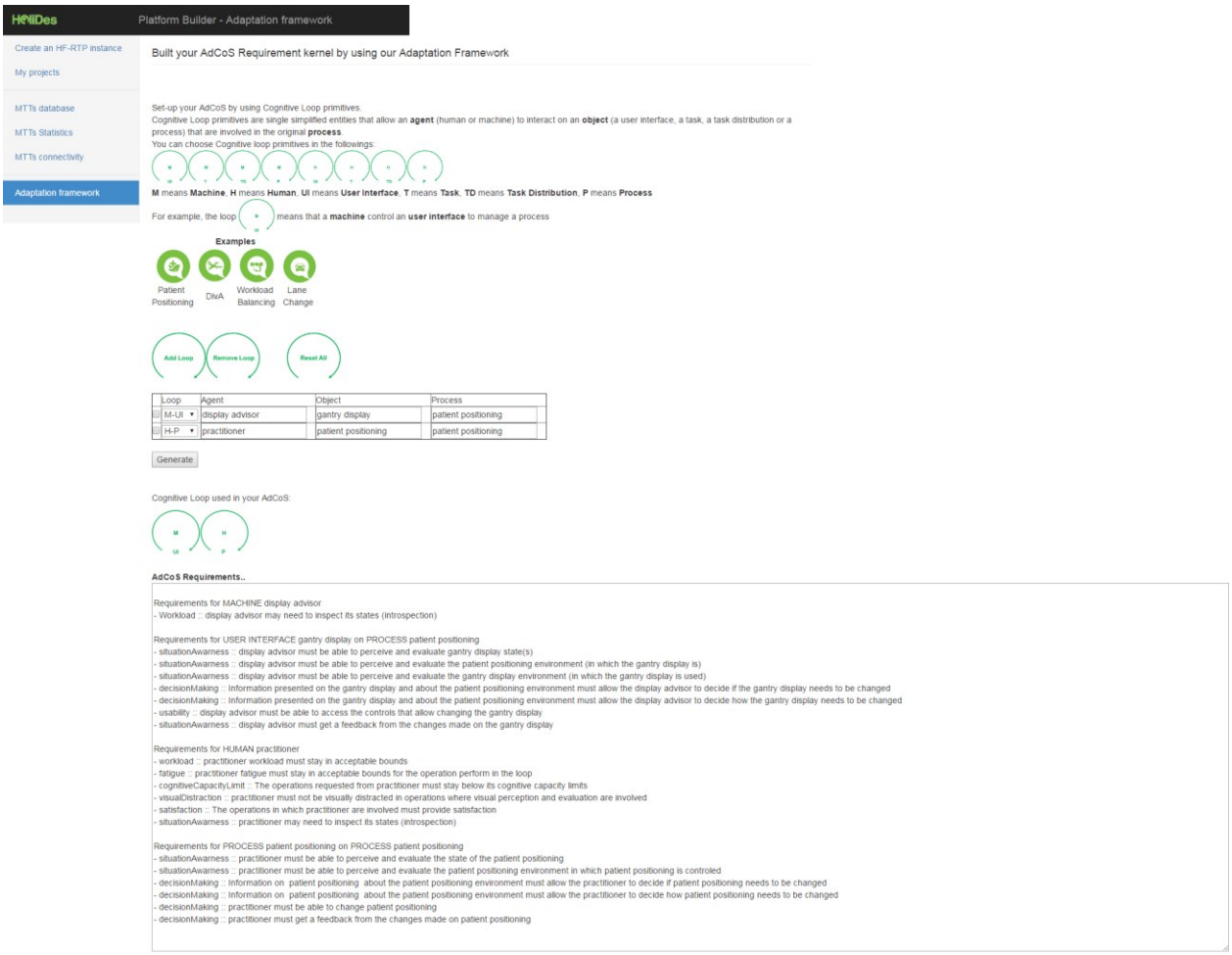

Figure 15 PB Adaptation framework

It provides an interface that allows an agent (human or machine) to interact on an object (a user interface, a task, a user distribution or a process) that are involved in the original process.

For instance in the picture above Figure 15, selecting the "Patient Positioning" example, gives as a result a list of AdCoS requirements, shown in the inferior part of the Figure 15.

2.2 Non-functional validations

Non-functional validations are related to non-functional requirements described in the "HoliDes Platform Builder requirements" document.

Validation ID	VAL-NF01	**Type**	Non-functional
Name	Accessibility.		
Description	Checking that the PB can be used by people with disabilities. More specifically, people with disabilities can perceive, understand, navigate and interact with the PB.		

The design used in the version 1.1 of the PB app covers this condition.
It's been designed using Bootstrap CSS, this framework provides a compatibility with the most relevant navigators.

For example using Chrome Navigator:

Chrome OS includes built-in accessibility features like ChromeVox, high contrast, and magnifier.

The Chrome browser supports screen readers and magnifiers, and offers people with low vision full-page zoom, high-contrast colour and extensions.

Requirement ID	VAL-NF02	Type	Non-functional
Name	Capacity, current and forecast.		
Description	Checking the capacity of the solution should be planned for an unexpected increase of resources needed.		

The application is uploaded to a server as a .war file. The database is created in a server with an automatically expandable size in case of a big amount data.

Requirement ID	VAL-NF03	Type	Non-functional
Name	Compliance		
Description	The PB may be developed in compliance with specifications created by reference industry bodies, such as the IETF.		

PB app is developed using standards languages: java, using CSS and HTML5 in order to give a unique design easily updatable.

Requirement ID	VAL-NF04	Type	Non-functional
Name	Documentation		
Description	All the software engineering process of the PB should be documented.		

There are 4 documents explaining the architecture of PB and how it's possible to access it, these documents are: analysis, a handbook for users, requirements and the validation Report. It's been uploaded in the Ajaxplorer repository.

Requirement ID	VAL-NF05	Type	Non-functional
Name	Disaster recovery		
Description	Security measures aimed to prevent the lack of access due to different kinds of disaster or unexpected contingencies.		

The application includes a user/password security for HF users only.
Database is only accessible for user administrator, and all the selects and modifications are available only for the users logged in the PB app.

Requirement ID	VAL-NF06	Type	Non-functional
Name	Efficiency		
Description	The PB should accomplish is mission in an efficient and optimal way.		

The solution proposed is working on server and is easy to access it via navigator, in order to simplify some extra work for the users.

Requirement ID	VAL-NF07	Type	Non-functional
Name	Effectiveness.		
Description	The PB should be able to achieve its objectives and the extent to which targeted problems are solved.		

The PB app has developed for the HoliDes project in order to achieve the objectives proposed in WP1. It's a technical solution done specifically for this project.

Requirement ID	VAL -NF08	Type	Non-functional
Name	Extensibility.		
Description	If is needed the application developed can be extended and is possible to include in the app more features in the future.		

There is a control of the versions in the PB app.
The PB app has been created to accept the inclusion of new functionalities. The architecture, software engineering and the database are created to simplify future modifications.

Requirement ID	VAL-NF09	Type	Non-functional
Name	Fault tolerance.		
Description	Errors should be considered and managed in an optimal way.		

A control of errors has been included in the software application in order to manage and keep a stable control of the application.

Requirement ID	VAL-NF10	Type	Non-functional
Name	Interoperability.		
Description	Components developed in different technologies should be able to communicate their selves.		

The PB app is developed in a standard HTML format, it's accessibly from different devices (laptops, mobile devices, smartphones and others devices using navigator). At the same time the architecture used is divided in 3 parts MVC: Model, View and Control detailed in the analysis document.

Requirement ID	VAL-NF11	Type	Non-functional
Name	Maintainability.		
Description	The maintenance of the PB should be a continuous process and easy to achieve.		

There is a control of versions in the documents related to the PB app. This control provides to the developers team to know in real time the state of the functionalities included in the version.

Requirement ID	VAL-NF12	Type	Non-functional
Name	Privacy		
Description	The personal data of the users should be protected with privacy mechanisms.		

Each user only can access their own data, and the application does not have the ability to view the saved projects or private data used for other users.

Requirement ID	VAL-NF13	Type	Non-functional
Name	Portability		
Description	The functionalities of the PB should works in the same way for different computing platforms.		

The PB has developed using languages, technics and software to give the maximum possibilities to access it by the users.
For example: responsive design to adapt automatically for different devices, using Bootstrap CSS and HTML5.

Requirement ID	VAL-NF14	Type	Non-functional
Name	Quality.		
Description	The PB app should comply to a given design based in the functional requirements described in the requirements document.		

The design of the PB has been proposed to help and simplify the work for HF experts. It's been included help panels and handbook documents to help the users.

Requirement ID	VAL-NF15	Type	Non-functional
Name	Reliability.		
Description	The PB app should be able to be tested as failure-free for a specified period of time in a specified environment.		

There are two different environments: one for the execution (production environment) and another one to test the PB app (localhost environment), in order to know and check all the possible errors found.

Requirement ID	VAL-NF16	Type	Non-functional
Name	Resilience.		
Description	The PB should be a resilient system. This means that it can be hot in a critical component and recover and come back for more in a known, bounded, and generally acceptable period of time.		

The composition of the PB is based in components and the links between them: database, view (javascript, jquery, html), control (servlets, bean java), this architecture provide an independence between all these components allowing a simple and non-critical situation if one component needs to be replace by a new version.

Requirement ID	VAL-NF17	Type	Non-functional
Name	Response time.		
Description	The PB should use an acceptable time for responding the request of a final user.		

The business and the preconditions involved for each tool and the connectivity between them are located in the database, and the PB app proposes an effectively solution as soon as possible.

Requirement ID	VAL-NF18	Type	Non-functional
Name	Robustness.		
Description	The PB should be able to cope with errors during execution time.		

A control error exists for each function or procedure in the software, controlling the different kind of errors: warning, critical or information.

Requirement ID	VAL-NF19	Type	Non-functional
Name	Scalability.		
Description	The PB should be able to handle a growing amount of work in a capable manner or to be enlarged to accommodate that growth.		

It's hosted in expandable servers, the database server and web server are located in different places and there is a system team working and managing these servers.

Requirement ID	VAL-NF20	Type	Non-functional
Name	Security.		
Description	Security constraints should be covered in all the software engineering process of the PB.		

Constraints have defined in the database tables, applied too in the PB app for the users, accessing only their own information, without the possibility to see other information of other users.

Requirement ID	VAL-NF21	Type	Non-functional
Name	Testability.		
Description	The developed PB should be able to be tested in a set of different environments and technical constraints.		

The tests have done in different navigators and using different devices in order to cover the maximum test possibilities.

To test different devices is used the google Chrome extension: Responsive web design tester.