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1. INTRODUCTION

This document describes the results obtained during the Virgilius scenario 2 test execution, held in the Bucharest Philatelic National museum in the period 24 – 25 November 2014

1.1 *PURPOSE AND SCOPE*

Purpose of this document is to describe the environments and the process used to recruit the over 65 people that executed physically the test of the Virgilius system. The description of the different test scenarios executed will be reported. The process of collecting results is described (use of post-test questionnaire). Finally the analysis of the results is also presented and evaluated to address the future modifications of the system on the basis of the suggestions reported by the users.

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2. BUCHAREST PHILATELIC NATIONAL MUSEUM ENVIRONMENT DESCRIPTION

The test environment consists in the exhibition rooms of the Bucharest Philatelic National Museum.

The National Philatelic Museum is situated in Bucharest, Calea Victoriei 12, inside the National Museum of History.

The National Philatelic Museum presents part of Romania's treasury in the three exhibition halls listed below and owns goods listed in the National Cultural Heritage Treasure.

Exhibition halls:

- George I. Lahovari Hall (named in honor of the Romanian representative to the Congress for the constitution of the Universal Postal Union at Berna in 1874)
- The Cezar Librecht Hall (first director of the United Principalities Romanian Post)
- Dimitrie C. Butculescu Hall (The evolution of philately)



Figure 1– National Museum of History

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Figure 2– Exhibition rooms

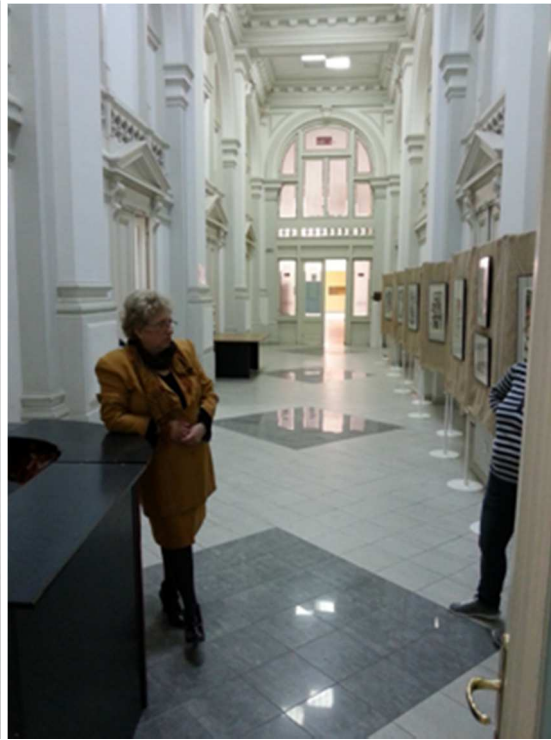


Figure 3– Hallway to the exhibition rooms

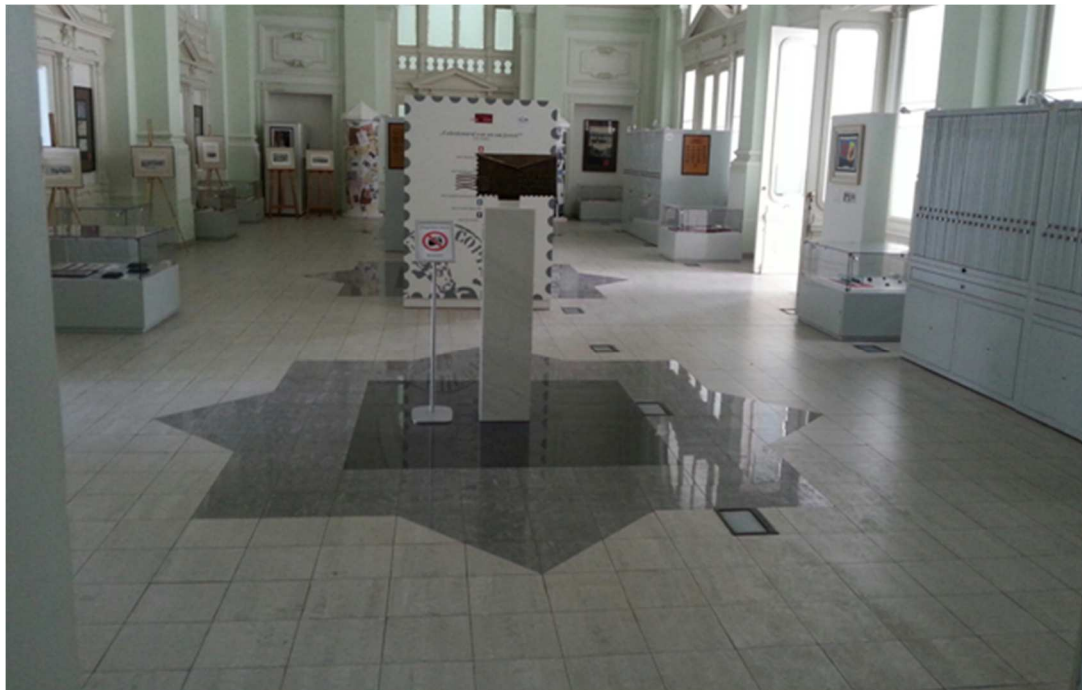


Figure 4- George I. Lahovari Hall

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Figure 5- Cezar Librecht Hall



Figure 6- Dimitrie C. Butculescu Hall

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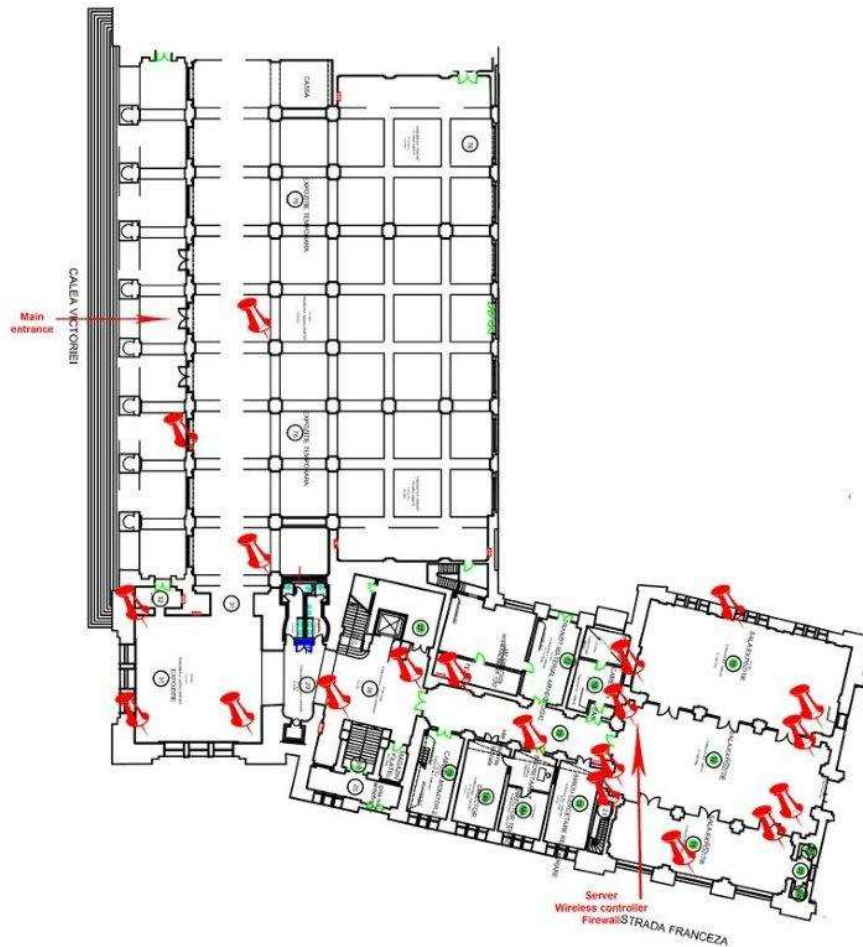


Figure 7– Internal maps of the MNF, including the positioning map of the Wi-Fi network

The red clips from the above map represent the positions of the installed Cisco Access Point.

The tests have been performed in all the exhibition rooms, starting from outdoor environment. In this way we demonstrated the functionality of the Virgilius system in both outdoor and indoor environment.

For internal positioning it has been used the Wi-Fi network (including the controller and the dedicated server (LA)) specially procured and installed by Rartel for the Virgilius project.

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3. TEST CASE DESCRIPTION

The selection of the test case to be submitted to the users has been made on the basis of the following criteria:

- Simulate a usage condition as similar as possible to a real case
- Include in the test case all the Virgilius functions that were developed
- Reduce as much as possible the test time taking into account the age of the volunteers

Following these guide lines a test case divided in three main steps has been defined:

Step 1 – Outdoor-indoor navigation

The user arrives by bus to the museum, stores the bus station position (personal POI creation) in the app and create a first trip from the bus station to an exhibition room chosen inside the internal cabled area.

Step 2 – Indoor-indoor navigation

The user arrives to the museum as final destination of the Step 1 and simulates the need to reach another exhibition room inside the cabled area. To do so, user creates a new trip with origin “current position” and final destination the chosen exhibition room.

Step 3 – Indoor-outdoor navigation

The user arrives to the final destination of Step 2 and creates a new trip to come back to the bus station.

During the execution of these three steps the user is invited to use the emergency functions of the Virgilius mobile app to verify:

- The activation of emergency page
- The automatic transmission of an SMS to the relative user associated
- The possibility to call emergency number
- The visualization on the home page of the mobile app of the personal medical data useful for the rescuers

After the completion of these three steps, each user is invited to re-enter in the museum for the final phase of the test that consists in the usage of the Virgilius web application and then the filling of the post test questionnaire.

The evaluation of the Virgilius web application includes the following test:

- Verification of the final user tracking function for the relative user associated and authorized
- Usage of the main functions dedicated to the final users:
 - Trip creation from the PC and verification of the automatic transmission of the trip to the mobile
 - Personal data modification and automatic transmission to the mobile
 - Relative authorization management

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For simplicity all the final users associated to the terminals available for the Bucharest test, had the same relative user associated.

In the next figures some testers during the tests execution are shown.

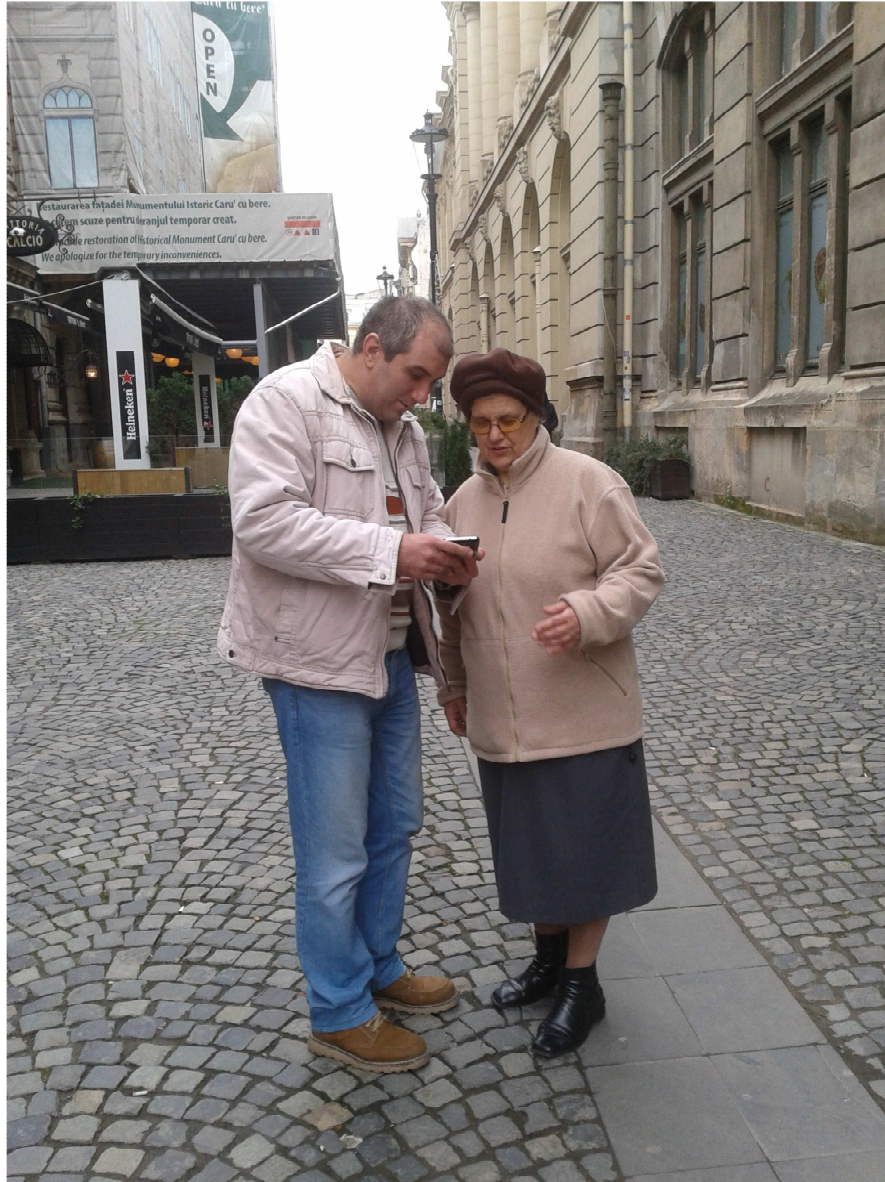


Figure 8- Step 1 – User starts trip

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Figure 9– Step 1 – User during outdoor navigation



Figure 10– Step 1 – User during outdoor navigation

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Figure 11– Step 1 – User during outdoor navigation

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Figure 12– Step 1 - Users enters in the Museum and are navigating to the exhibition room chosen at the beginning of the trip



Figure 13– Step 2 - Users navigating inside the museum, from one exhibition room to another

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Figure 14– Users preparing for the post test questionnaire



Figure 15– End of the test, day 1

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4. FINAL USER RECRUITMENT

The over 65 volunteers that participated to the final test have been recruited by the staff of the Museum and Rartel supporting the Virgilius test activities. These people have been contacted by means of the “Armata Salvarii” operating in Romania and by means of personal relatives of the staff of the Museum and of Rartel.

As reported in details in [1], the number of people that filled the pre test questionnaire needed to evaluate the needs of the over 65 people, were 51.

From these 51 people, only 11 accepted to participate to the final test phase of the Virgilius system.

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5. TEST RESULTS DESCRIPTION

As already described, at the end of the test, each user has been requested to fill a questionnaire for the evaluation of the system and to report suggestions and comments. Here below the English version of the questionnaire is reported:

1. Age
 - a. 65 – 70
 - b. 71 – 75
 - c. Over 75
2. Did you find easy the Virgilius usage?
 - a. Yes
 - b. No
 - c. partially
3. Do you think that Virgilius can be useful?
 - a. Yes
 - b. No
 - c. Only partly
4. Personally Do you use Virgilius system?
 - a. Yes
 - b. No
5. Do you change something in the following Virgilius characteristics?

	SI	NO
Graphical design		
Buttons shape, dimension or position		
Colours choice		
Data insertion logic		

6. Please, give an evaluation about the usefulness of the following Virgilius functions

	USEFUL	UNUSEFUL	INDIFFERENT
Indoor navigation			
Emergency management			

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<i>Remote tracking for the parents/caregivers</i>			
<i>Medical data management</i>			

7. Please, give an evaluation about the “user friendly” degree of the following Virgilius functions

	SIMPLE	NORMAL	DIFFICULT
<i>Trip Creation and management</i>			
<i>Navigation</i>			
<i>Arrive to final destination</i>			
<i>Emergency signal activation</i>			
<i>Parents/caregivers authorizations management</i>			

8. In your opinion, what functions, currently not implemented, could be useful to include in the Virgilius system?

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9. Suggestions/comments

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In the following the collected results from the questionnaire will be described for each question.

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Question 1: Age

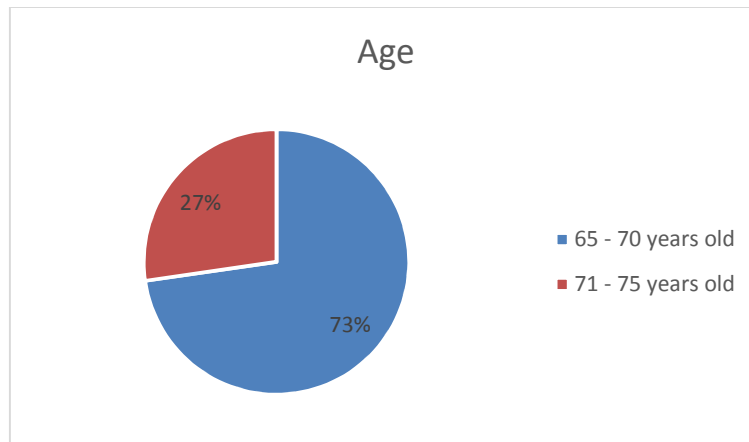


Figure 16– Testers age distribution

Most of the participants to the test were in the range 65 – 70 years old. Because of the cold weather and of the difficulty to move independently far from their familiar places, the people over 70 couldn't participate to these tests even if they previously accepted to participate.

Question 2: Did you find easy the Virgilius usage?

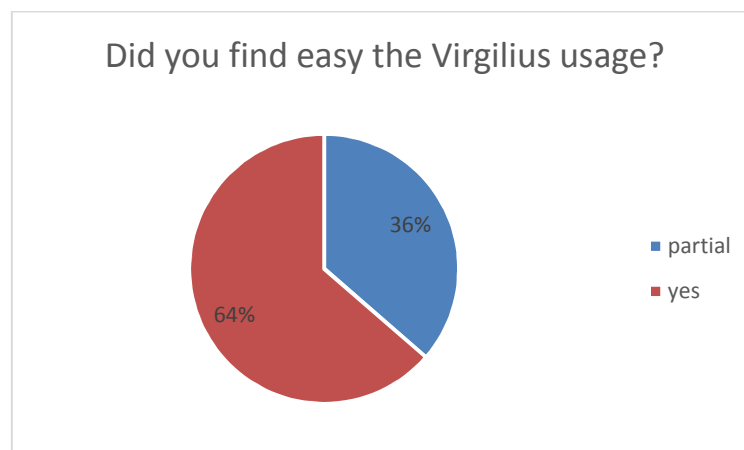


Figure 17– Virgilius usability evaluation

For the most of the elderly people which participated to the test, the Virgilius system was easy to use (64%). This shows that the system is user friendly even for the over 65 people and we consider that this is a success in the design of the application.

Question 3: Do you think that Virgilius can be useful?

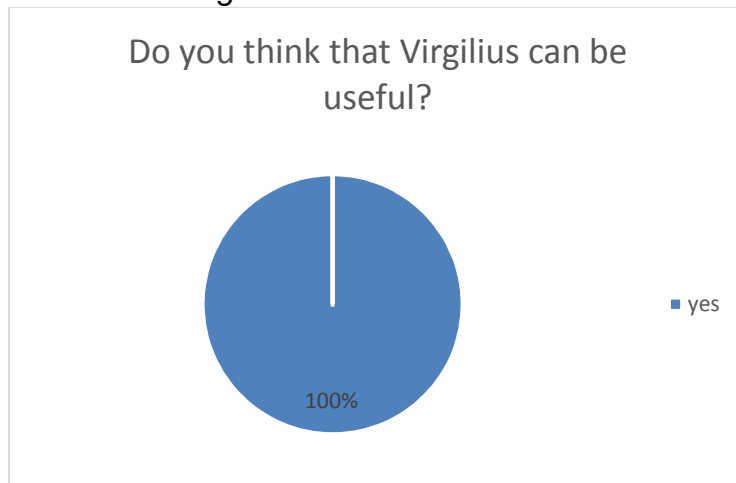


Figure 18– Usefulness of Virgilius system

Question 4: Personally would you use Virgilius system?

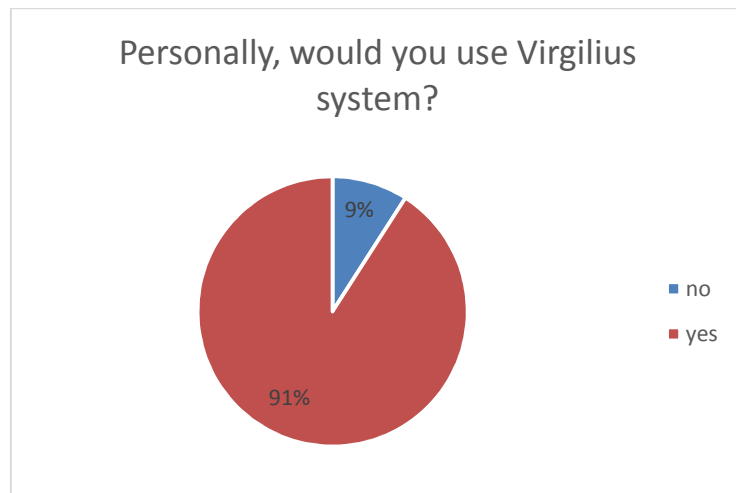


Figure 19– Personal feeling with the Virgilius system

Question 5: Would you change something in the following Virgilius characteristics?

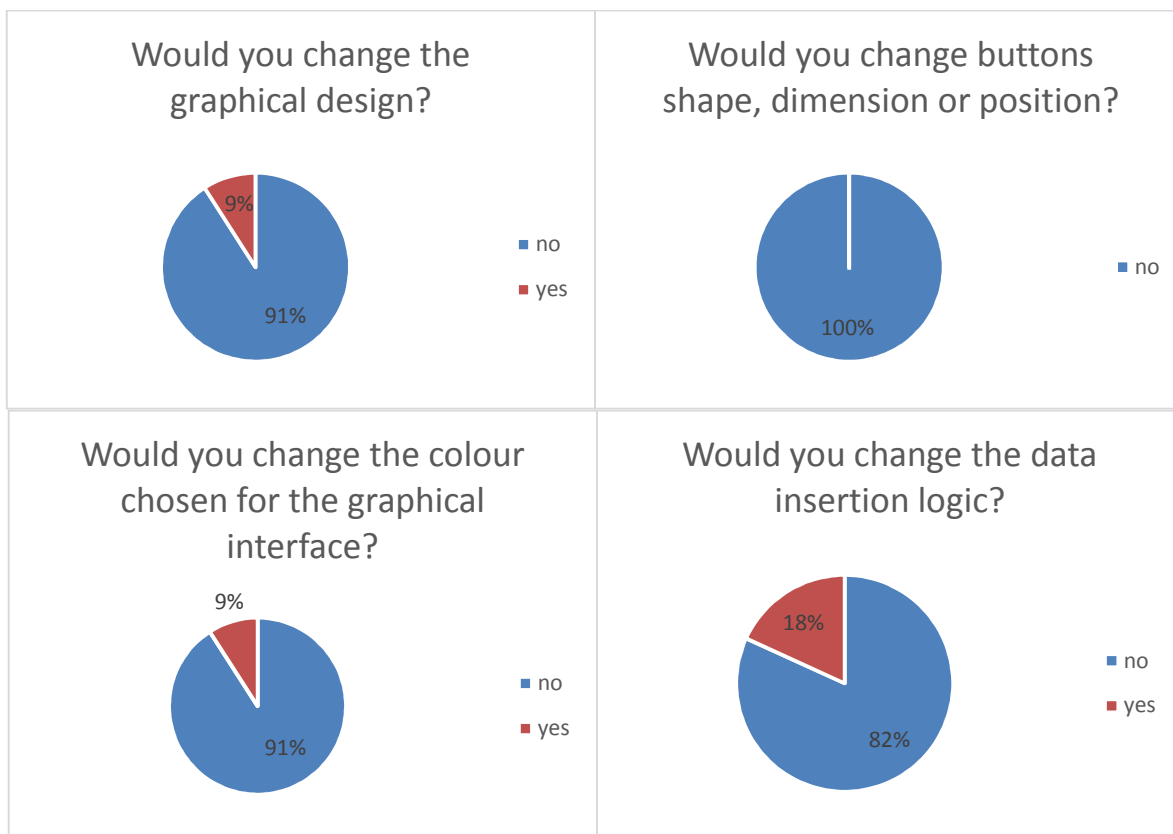


Figure 20– Changing needs in main Virgilius functions

From the above graphs, we can see that most of the testers declared that they are happy with the Virgilius functions (91% wouldn't change the graphical design, none of the testers would change the buttons shape, dimension or position, 91% wouldn't change the colour for the graphical interface and 82% wouldn't change the data insertion logic).

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Question 6: Please, give an evaluation about the usefulness of the following Virgilius functions

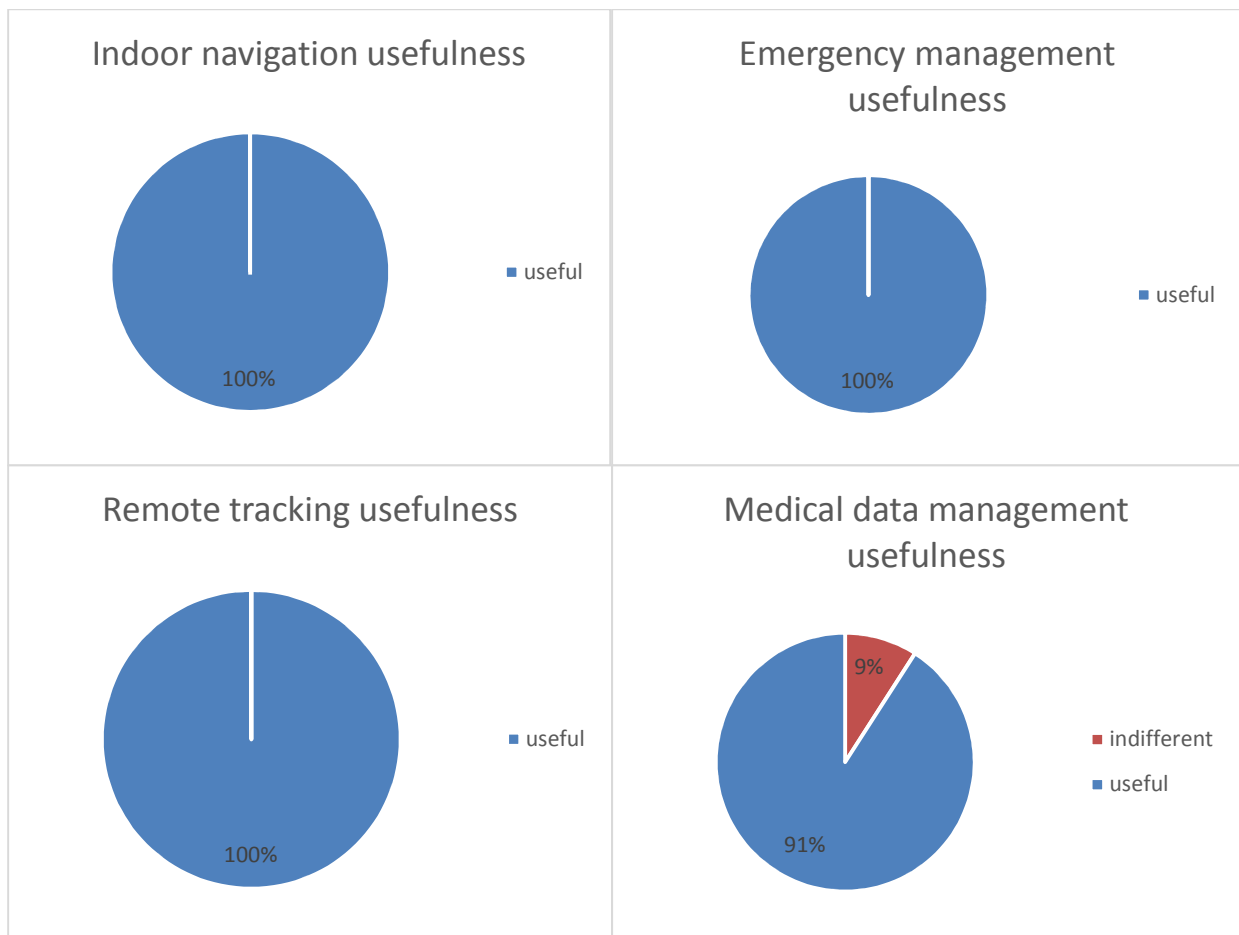


Figure 21– Main Virgilius functions usefulness evaluation

From the results presented above, it can be seen that almost all the testers evaluated as usefulness the indoor navigation, emergency management, remote tracking and medical data management. In particular, during the tests, they declared that it is very important for them to be able to navigate securely also in indoor and outdoor environment and to be remotely tracked by their relatives / caregivers for safety reasons.

Question 7: Please, give an evaluation about the “user friendly” degree of the following Virgilius functions

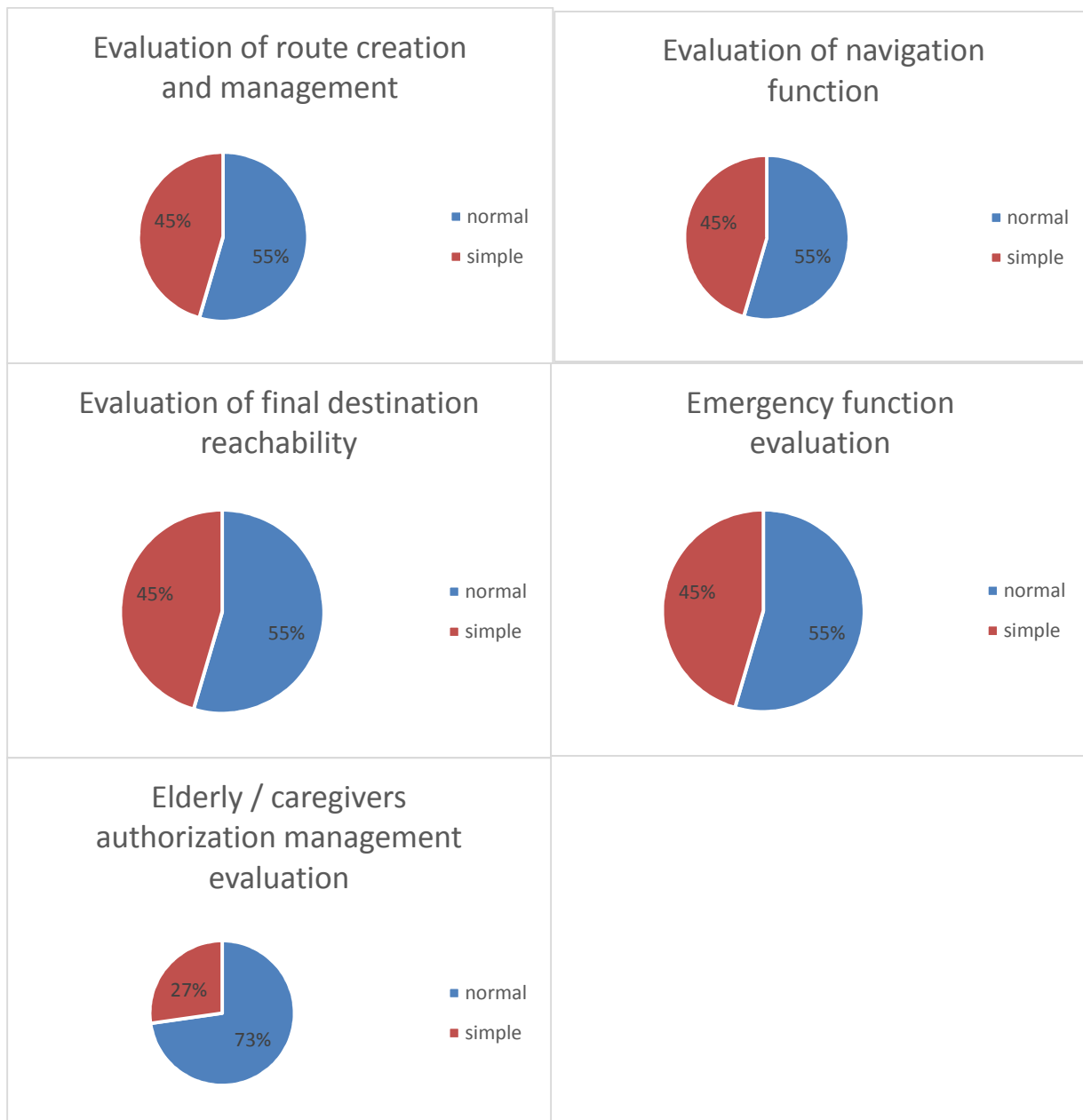


Figure 22– Main Virgilius functions friendly degree evaluation

The evaluation results of route creation and management, navigation function, final destination reachability and emergency function shows that 55% of the testers found it user friendly and 45% evaluated these functions having a normal degree for easy to use.

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With respect to the authorization management, the results show that 73% of the testers find it simple to be managed.

Question 8: In your opinion, what functions, currently not implemented, could be useful to include in the Virgilius system?

The suggestions of the testers with respect to functions of Virgilius, currently not implemented, are for cultural – touristic travels. They would like to use the system (for both indoor and outdoor navigation) during their national and abroad travels which include cultural and touristic objectives. Also, another suggestion was to include in the map the cardinal points, for a better orientation.

Question 9: Suggestions/comments

- During the navigation the interface does not notice if the user is going in the opposite direction with respect to the right one
- The pointing arrow is indicating another orientation of the person than the real orientation
- The internal position is always in late with respect to the real position and this is disorienting (turn left or right).
- The personal data, including the medical data is considered a very useful function but the privacy must be assured.
- Also, it could be very useful, that the Virgilius application to be implemented in museums greater than the National Philatelic Museum, to have a functionality that allows users to choose the possibility to have a sort of "quick general visit" as a final destination. In this way users can have a general path within the museum without choosing only a particular exhibition room.

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6. CONCLUSIONS

The test campaign of Virgilius system, conducted in the Bucharest Philatelic National museum in the days 24-25 November had, as main goal, not the performance verification of the system (already internally tested in previous test sessions within the museum), but an affordable evaluation of the final users feeling with the new technology proposed.

Unfortunately, the number of over 65 people that accepted to participate to the campaign has been very poor, notwithstanding the number of people previously involved in the meetings presentation and in the pre-test questionnaires submission. Only 11 people over 51, participated to the final test phase.

The general impression that emerged from the two days of test is that people are very interested to the product presented. They participated to the test showing a high level of attention and asking a lot of questions about the Virgilius functionalities and performances.

The questionnaire results shown that, most of the testers would personally use Virgilius. From the Virgilius characteristics point of view it resulted that most of the testers were happy with the Virgilius functions and the majority of them wouldn't change the data insertion logic.

Regarding the functions of the system, almost all the testers evaluated as usefulness the indoor navigation, emergency management, remote tracking and medical data management. In particular, during the tests, they declared that it is very important for them to be able to navigate securely in both indoor and outdoor environment and to be remotely tracked by their relatives / caregivers for safety reasons.

At the end of the test, the users had some suggestions / comments like: there is no notification alert in case the user is going in the opposite direction with respect to the right one; sometimes the pointing arrow is indicating another orientation of the person than the real orientation; the internal position is always in late with the respect to the real position. Regarding the personal data and the medical data, the testers considered it a very useful function but conditioned by the privacy which must be ensured.

Also, it could be very useful, that the Virgilius application to be implemented in museums greater than the National Philatelic Museum, includes a more useful functionality for a more interactive visit to the museum (possibility to select a general visit, integration of a sort of graphical and audio guide).

Finally, it worth the trouble to highlight that the most comments are related to the poor performances of the navigation/positioning, instead to the addition of new functionalities. This is strictly related to the kind of technology (WI-FI) experimented in the museum scenario for the indoor positioning. This technology shown to be not mature for the usage in a real environment and in a real product to be launched on the market.

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