Ministry of Culture of the Republic of Moldova

Request to participate in the project

"Virtual tour services for the Reservation

"Orheiul Vechi" within the project

„MuHis - History and Music – values that bring us together”

“Starion Digital” SRL

IDNO 1021611001490

Director Stamat Iurii

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Summary

1. About Us.

Our team "ViAR technology" would like to present you an innovative proposal for the development of tourist infrastructure of the complex "Orheiul Vechi".

Our company has unique experience in the Republic of Moldova in creating high quality 3D models of real objects, as well as in developing augmented reality applications for mobile devices. We create 3D models of tourist and historical sights, monuments, buildings and natural landscapes. These models can then be used in restoration, 3D printing, and augmented reality on maps, brochures, booklets, postcards, signs, banners, and any other media. Our models will accurately convey the architectural and cultural features of your complex. With these new features, tourists will for the first time have access to perspectives that are not available on a conventional tour.

2. Our proposal.

We have prepared a comprehensive proposal covering the different areas of development of the Orheiul Vechi reservation. Our proposal consists of the following sections:

2.1 Development of "Orheiul Vechi 3D" application for interactive monitors.

2.2 Installation of 4 interactive monitors on the territory of the Orheiul Vechi reservation.

2.3 Development of an interactive page with a 3D map for the website orheiulvechi.com.

2.4 Development of a virtual tour "Orheiul Vechi VR".

2.5. Development of a mobile application "Orheiul Vechi AR".

2.6. Creation and installation of information lecterns (AR) at historical objects. 2.7.

2.7. Creation and installation of anamorphic glass panels with 2D reconstruction of objects.

2.8. 3D printing of Orheiul Vechi landmarks.

2.9. Creation and production of printed products with AR technology.

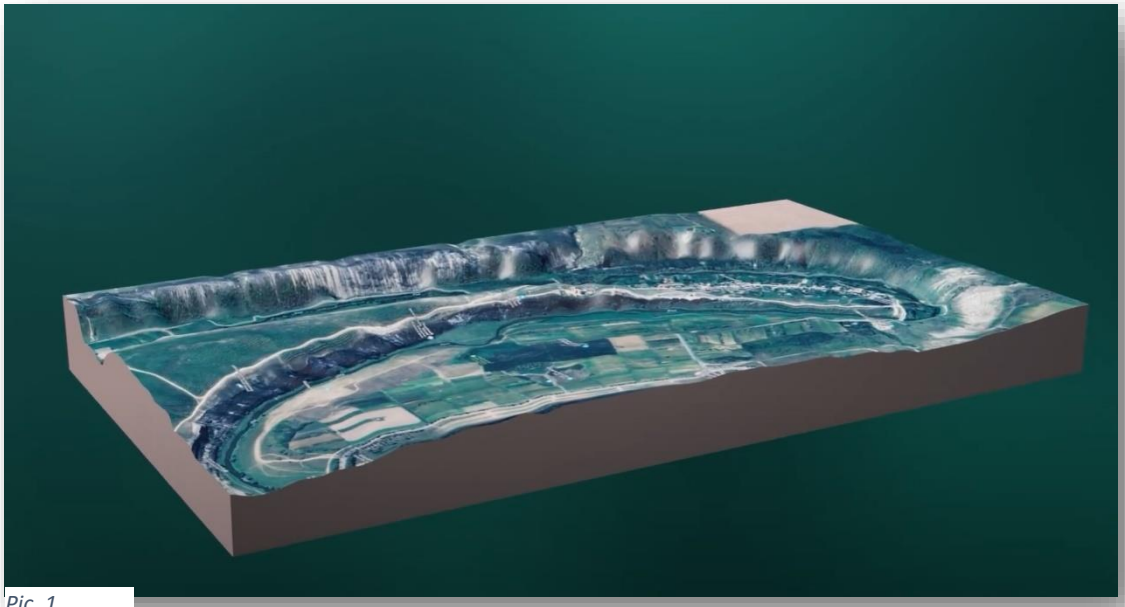
2.1 Development of "Orheiul Vechi 3D" application for interactive monitors.

An application specifically for interactive monitors - "Orheiul Vechi 3D" - will be created. Tourists will be able to explore the reservation from any angle in high detail. The map will also show all the tourist objects, which will appear in 3D when tapping on them. Also, it will be possible to launch a video overview or video tour with an audio guide for each site. The app will be able to be updated by replacing or adding information. The "Orheiul Vechi 3D" app will include 9 attractions of the Orheiul Vechi reservation (sketch of the platform - at https://youtu.be/N4FP_2YG5h0).

About the app. The platform is an innovative cross-platform application capable of functioning seamlessly on various operating systems including iOS, Android and Windows. At the core of this application is the React JS/React Native technology bundle, which provides a high degree of flexibility and efficiency in interface development.

Special emphasis is placed on advanced virtual and augmented reality (VR/AR) capabilities, which will allow users to interact with content at a new level of engagement and innovation.

The backend of the platform is based on Java Spring, providing reliability, security and scalability in processing business logic and data management. PostgreSQL is chosen as the data storage, providing reliability, integrity and high performance in processing and storing information.



Pic. 1

To ensure automation of development, integration and delivery processes, we plan to implement Jenkins Pipeline System into our platform. This will ensure high speed and stability of development, as well as minimize risks when making changes.

To manage containerization and autoscaling of the application, Kubernetes will be used. This will ensure optimal resource allocation, high availability and reliability of the platform, even under high load conditions.

Combining these technological components will create a modern and highly functional platform that can withstand high loads.

Technical description of an application for interactive monitors.

The Orheiul Vechi 3D application will be a full screen 3D map when launched. The 3D map will be presented as a horizontal platform with terrain relief and texture. The map will be able to rotate horizontally and vertically, change the viewing angle, and change the scale. There will be 15 points of local landmarks on the map. When you touch a point of interest - a slowly rotating realistic 3d-model of the point of interest will appear above it. This 3D model can also be rotated and viewed from any angle. At the same time it will be possible to listen to the audio guide information, and there will be explanatory text next to the object. A separate button in the object's dialog box will launch a video tour of the building's interior. Tapping on any part of the monitor outside the dialog box will close the window. The "Orheiul Vechi 3D" application will include 15 attractions of the Orheiul Vechi reservation.

List of interactive objects for the application "Orheiul Vechi AR":

1. Caravan-Sarai
2. Mosque
3. Medieval Church
4. Parcalabian Palace (Medieval Citadel)
5. The Tatar’s Bath
6. House Museum 1
7. House Museum 2
8. Two-storey museum house
9. Church of the Nativity of Our Lady (church on the rock)
10. Bosie Cave Monastery (under the church)
11. Cave Monastery Cave
12. Small bell tower and stone cross

13.Val de aparare
14.Museum of Anthropology and Archaeology. Reconstruction of a broken pitcher.
15.Sanctuary

2.2. Installation of 4 interactive monitors on the Orheiul Vechi reservation.

In the four locations of the reservation, chosen by the Orheiul Vechi administration to be the epicenters of tourist activity, 55" interactive monitors will be installed, configured and launched, allowing users to explore and learn about the reservation through the interactive program "Orheiul Vechi 3D".

Pic. 2

- The technical parameters of the monitors will allow them to work in 24/7 mode. At the request of the administration it will be possible to customize the schedule of work and "sleep mode" for the monitors.
- Online access to all four interactive monitors will be set up to ensure uninterrupted operation and prompt resolution of emerging technical issues.
- Free technical support of the software will be provided until December 31, 2024.

2.3. Develop an interactive page with a 3D map for orheiulvechi.com.

Similar to the application for interactive monitors, a page will be created for https://orheiulvechi.com with an interactive 3D map of the area and information about attractions and other tourist points of interest. The page will have functionality similar to the application for interactive monitors.

2.4. Creation of a virtual tour "Orheiul Vechi VR".

Using drones, 360° panoramic photos of the terrain will be created. The panoramic spherical photos will be taken at altitudes up to 50 meters above the ground and then combined into a single virtual tour "Orheiul Vechi VR". It will be launched and viewed on the "Orheiul Vechi 3D" app and on orheiulvechi.com on the "Orheiul Vechi 3D" page by launching through the interactive menu.

"Orheiul Vechi VR" will include 15 spherical panoramic photos distributed over the entire reservation.

Virtual tours of the interiors of the following buildings and 3D reconstructions of 10 units will also be created:

1) Caravan-Sarai
2) Mosques
3) Medieval Church
4) Father's Bath
5) House Museum 1
6) House Museum 2
7) A two-storey museum house
8) Church of the Nativity of the Mother of God (church on the rock)
9) Bosie Cave Monastery (under the church)
10) Rock Cave Monastery

2.5. Development of the mobile application "Orheiul Vechi AR".

Fact Sheet.

Augmented reality (AR) is a technological approach that allows virtual objects to integrate with the real environment by utilizing the displays of mobile devices such as smartphones. This technology is achieved by combining video images from the device's camera with virtual elements created by software.

The procedure for the operation of the technology, is as follows:

1) The user downloads and launches the augmented reality app on their mobile device using a QR code.

2) The app projects virtual objects onto the video image from the camera. These objects can be 3D models, animations, texts or other visual elements. They are integrated with the real environment, which creates the effect of being in a virtual world.

3) The user can observe virtual objects on the screen of a mobile device, viewing them from different angles. Interaction with these objects can include tapping, swipes or other gestures to control and change their state.

4) To create a continuous and realistic augmented reality experience, the application continuously tracks the position and orientation of the mobile device, updating the virtual objects to reflect the changing perspective.

Thus, using a cell phone to view augmented reality objects involves calculations to align virtual and real scene elements, and provides an excellent user experience, interaction with virtual objects and perception of the surrounding world with improved information content.

Our company is planning to create a cross-platform (Android/iOS) application "Orheiul Vechi AR". It will contain 3D copies of existing landmarks and 3D reconstructions of destroyed historical buildings of the reservation. The app will allow users to explore the exterior and interior of the buildings in detail from different angles and in great detail. And an audio guide will enrich the visual presentation with additional information. The Orheiul Vechi AR app will include 15 attractions of the Orheiul Vechi Reservation and will be launched by scanning a QR code on various media:

- On the territory of the reservation, the application will be launched by scanning a QR code on the AR lecterns (p. 2.6) and will display on the screens of mobile devices the studied object in augmented reality, interacting with the information table of the lectern.
- The "Orheiul Vechi AR" application will run on paper tourist maps of the reservation.
- In the future, other printed products using augmented reality (AR) may also be produced at the suggestion of the reservation administration.

List of facilities to be included in the Orheiul Vechi AR application:

№	Name of object	Types of AR work
1	Caravan-Sarai	3D reconstruction + audio guide
2	Mosques	
3	Medieval Church	
4	Parcalabian Palace (Medieval Citadel)	
5	Sanctuary	
6	The Tatar's Bath	
7	Museum of Anthropology and Archaeology. Reconstruction of a broken pitcher	
8	Wave defence	
9	House Museum 1	3D model + audio guide
10	House Museum 2	
11	A two-storey museum house	
12	Church of the Nativity of the Virgin Mary (church on the rock)	
13	Small bell tower and stone cross	
14	Bosie Cave Monastery (under the church)	AR video tour + audio guide
15	Cave Monastery Cave	

Other features of AR technology.

- The AR technology used by our company allows us to make changes and additions to the already existing program at the Customer's request without changing the physical media (information lecterns, printed products, etc.).
- Our augmented reality application will use the new technology of "direct launch", i.e. after scanning a QR code the application will be launched directly, without the need to install it on the phone.
- One QR code can launch dozens of videos or 3D objects with audio.
- To the augmented reality it is possible to add an interactive menu with buttons for contacts, address, social networks, the organization's website, temporary promotions and offers. The interactive menu can be updated/changed at the customer's request.

Our company will provide free support with proposed changes and additions to the application "Orheiul Vechi AR" until 31.12.2024.

2.6. Create and install information boards (AR) at historic sites.

Augmented Reality (AR) information lecterns will be installed at the base of some landmarks. This structure is a composition of a metal support that supports a flat horizontal surface for placing information - an information table. On the information table there will be a text in Romanian and English languages, as well as a QR code. All information will be laser engraved for maximum durability.

By pointing the phone camera at the QR code, the application "Orheiul Vechi AR" will be launched (p. 2.5.).

Pic. 3

5 informational AR-type lecterns will be constructed and installed. The list of objects in front of which AR-pillars will be installed:Caravan-Sarai

1) Mosques
2) Medieval Church
3) Parcalabian Palace (Medieval Citadel)
4) Tatar Bath

The design of the informational lecterns will be coordinated with the reservation administration prior to production.

2.7. Create and install anamorphic glass panels with 2D reconstruction of objects.

In conjunction with the AR lecterns, anamorphic panels will be installed. Their construction will consist of a vertically arranged 8 mm Plexiglas panel in a metal frame fixed on a vertical post to a foundation in the ground. A reconstructed 2D image of the landmark will be applied to the plexiglass. On top of the image will be applied protective lamination - a special coating, to protect against physical impact and ultraviolet solar radiation. The anamorphic glass panel will be installed opposite the landmark at a specially calculated distance. Thus, the observer viewing the archaeological remains of the landmark through the glass panel sees it in its restored form.

Pic. 4

5 anamorphic glass panels will be designed and installed. List of objects in front of which the glass panels will be installed:

1) Caravan-Sarai

2) Mosques

3) Medieval Church

4) Palace of the Parcalabes (Medieval Citadel)

5) The Tatar's Bath

The design of the informational lecterns will be coordinated with the reservation administration prior to production.

2.8. 3D printing of Orheiul Vechi landmarks.

There are also plans to 3D print some of the reservation's landmarks for placement in the following locations:

1) Museums and fairs. Many museums, fairs, and art galleries may include 3D printed physical models of landmarks in their exhibitions.

2) Educational institutions. Schools, universities, and other educational institutions can use 3D models as part of their curricula, showcasing historical and architectural sites.

3) Historical and cultural centers. Places related to history and culture can use printed 3D models for educational events, presentations.

4) Tourist Information Centers. Tourist information centers can display physical 3D models to help tourists better visualize local attractions.

5) Cultural and community events. Displaying printed 3D models can be an interesting aspect of events such as festivals, conferences or cultural celebrations.

6) Exploring layouts by people with visual limitations. Physical models of landmarks will allow people with visual disabilities to fully explore them.

The models of landmarks will be printed to a scale of up to 30 cm in height. The models of demolished buildings will be chosen for this purpose. The models will also be artistically painted to imitate real materials and their colors. This proposal will help to increase interest in the reservation at various events and its recognition as a distinct tourist brand.

Proposed objects and number of mock-ups for 3D printing.

№	Name	Number to print, units.
1	Caravan-Sarai	5
2	Mosques	5
3	Medieval Church	5
4	Parcalabian Palace (Medieval Citadel)	5
5	The Tatar's Bath	5
	TOTAL, units.	**25**

2.9. Development and production of printed products with AR technology.

Separately, for the convenience of tourists, we offer the development of a map of the Orheiul Vechi reservation in A3 format with AR technology, on which you can use a mobile application to study in detail all the tourist objects of "Orheiul Vechi" in augmented reality, with audio guide and interactive menu. The AR technology on the map will work anywhere in the world where there is internet, allowing users not only to explore the reservation, but also to share it with people in their social circle, thus advertising and attracting new tourists to the region.

It is planned to develop and print AR-maps in circulation of 10 thousand pcs.

The following areas may also be developed in the future:

- Tourist brochures and postcards with attractions with AR augmented reality technology, audio guide and interactive menu, attracting new tourists from all over the world to the "Orheiul Vechi" reservation.
- Paper eco bags with symbols or images of the Orheiul Vechi complex with AR technology, on which promotional videos about the Orheiul Vechi complex will be launched.
- Tourist magnetic souvenirs with the attractions of the reservation, including magnetic souvenirs using AR technology.
- Many other things.

3.0. Project Cost.

The total cost of the project is estimated at 1 398 800,00 (One Million Three Hundred Ninety Eight Thousand Eight Hundred) lei. The cost includes the following works and expenses:

- Writing application code «Orheiul Vechi 3D», «Orheiul Vechi AR».
- Creation of the "Orheiul Vechi 3D" page on the orheiulvechi.com website.
- Procurement, transportation and installation of 4 interactive monitors on the reservation.
- Scanning, photogrammetry of 16 historical sites.
- 3D modeling, sculpting, retopology, texturing of 16 sites.
- Creation of at least 15 360° panoramic photos.

- Design, development, transportation and installation of AR information lecterns (5 units) and anamorphic glass panels (5 units).
- 3D printing of Orheiul Vechi sights in the amount of 25 units.
- Design and production of tourist AR maps of the reservation in the amount of 10,000 pcs.
- Transportation costs.
- Accommodation expenses.
- Expenses for warranty service of the installed equipment and software until 31.12.2024.

We hope that our proposal will interest you and we can start working on this project soon.