

## Modular platform for augmented reality displaying

### Development status

#### Phase 2

**Feasibility study.** There is a realistic design of the technology and the initial tests in the laboratory are leading to the specification of the technology requirements and its capabilities.

### IP protection status

### Partnering strategy

*Collaboration, licensing*

### Institution



**Tomas Bata University in Zlín**

### Challenge

Current augmented reality products are often single-purpose and thus offer relatively little variability in user experience. With a few exceptions, it is also worth noting that augmented reality often serves only as an attraction without any deeper interactivity or philosophical justification for the usage of it. Augmented and virtual reality is still a technology in its infancy, but with the democratization of the industry and more and more manufacturers producing appropriate headsets, it can be expected to see more and more momentum in the near future. It is the lack of market saturation that has been the main motivation to develop new, more interactive and more versatile solutions.

### Description

The technology consists of a physical prototype. It is a game board composed of 4 parts, the number of which can be changed if necessary. This board is monitored by a camera connected to a Raspberry Pi microcomputer. Game pieces can be placed on the board, which have a so-called ARUco marker on their top side, which the camera can recognize. In the case study, 6 types of pieces were produced for a total of 48. Each figure in this case represents a certain biome and the number of them is further scalable. The microcomputer can then transmit the position of each figure on the board to a mobile phone, tablet or other device. In the prototype, the tablet generates a map based on the position of the pieces consisting of the appropriate biomes that the pieces represent. This map can then be further interacted with by the user. For example, he can use a simple user interface to plant trees or plants on the map and observe how they grow in a given biome. The actual detection of the figures is handled in a microcomputer due to the higher accuracy and high computational complexity, which could limit the mobile phone in the actual map generation and subsequent augmented reality rendering. The tablet app is built in the Unity game engine, offering the possibility of easy expansion in the future and a relatively easy transition to different types of platforms (Android, iOS, Meta Quest).

## Commercial opportunity

This modular solution offers many possibilities for use in the commercial sector. The education segment is the first to be offered, where the proposed case study can help with teaching geography and science in primary schools. Moreover, the case study foresees possible future extensions with additional teaching functions. However, there are also other possible applications such as urban planning and simulation, where more complex systems can be planned in the case of a larger grid. Even the net principle can be used both in an educational environment and, for example, for better communication of the subject to the public. It can also be used in the simulation of electronic and logic circuits, again in educational issues. The possibilities that this system allows are many and can be achieved either with the same game pieces or by easily exchanging them. There is currently no similar solution on the market that offers such a high degree of possible variability.