

# Educational Multiplayer Game for the Planetarium

## Exploring the World of the Ants in an Interactive Game

### Students



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**Introduction:** Planetariums are traditionally used for the presentation of non-interactive fulldome films, positioning visitors as passive spectators. This project investigates how a planetarium dome can be used as a shared interactive medium by implementing a real-time multiplayer game tailored for large audiences.

The project was developed in collaboration with the Swiss Museum of Transport (Verkehrshaus Luzern).

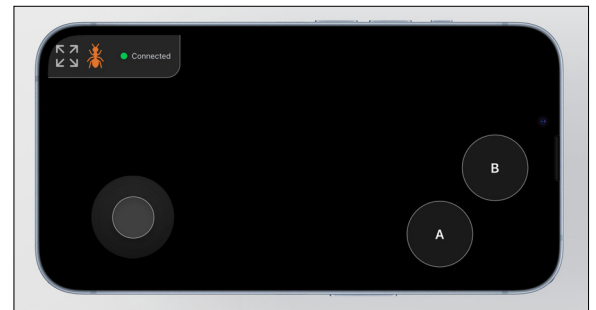
**Approach / Technology:** The work presents a distributed system that enables visitors to participate using their personal smartphones as web-based controllers. The game is implemented in Unreal Engine and rendered onto a 360° dome projection. A custom backend coordinates real-time communication between the game, multiple concurrent controller clients, and an administrative interface used by the show host, which allows game control and monitoring during live events.

To demonstrate the approach, an educational multiplayer game centered around ant colony behavior was created. Gamification principles are applied to convey knowledge implicitly through game mechanics, making the experience accessible to a broad audience. Although designed for a planetarium context, the underlying interaction model and system architecture are intended to be transferable to other large-audience venues such as cinemas or event spaces.

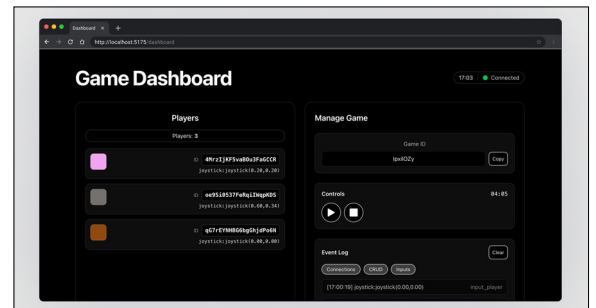
**Result:** The result of this work is a functional prototype consisting of the multiplayer game, a backend infrastructure, and platform-independent web-based controller and administration interfaces. The prototype demonstrates the technical feasibility of large-audience interaction in a fulldome environment

and provides a solid foundation for a subsequent bachelor thesis, in which the framework will be generalized and the educational gameplay further expanded.

### Frontend Webcontroller Own presentation



### Frontend Dashboard Own presentation



### Gameplay Screenshot Own presentation



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