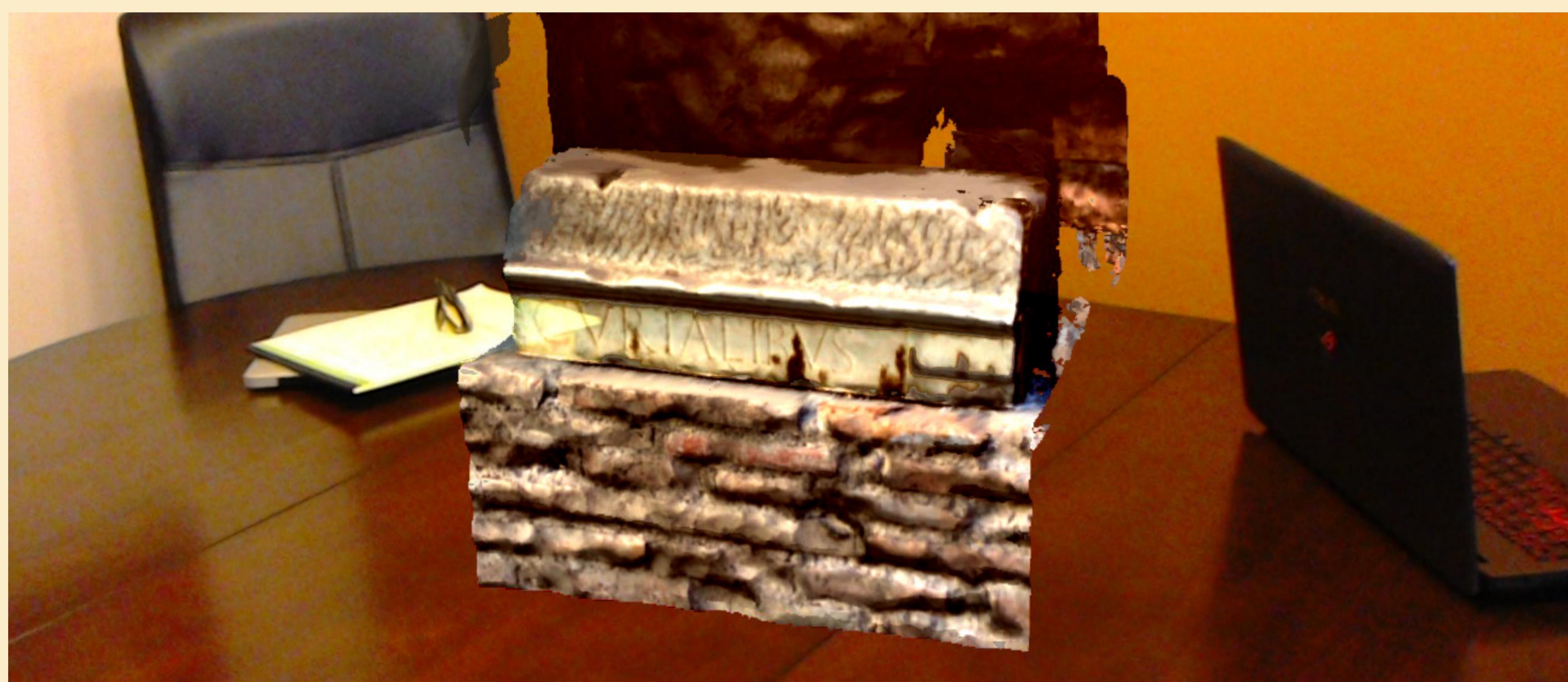
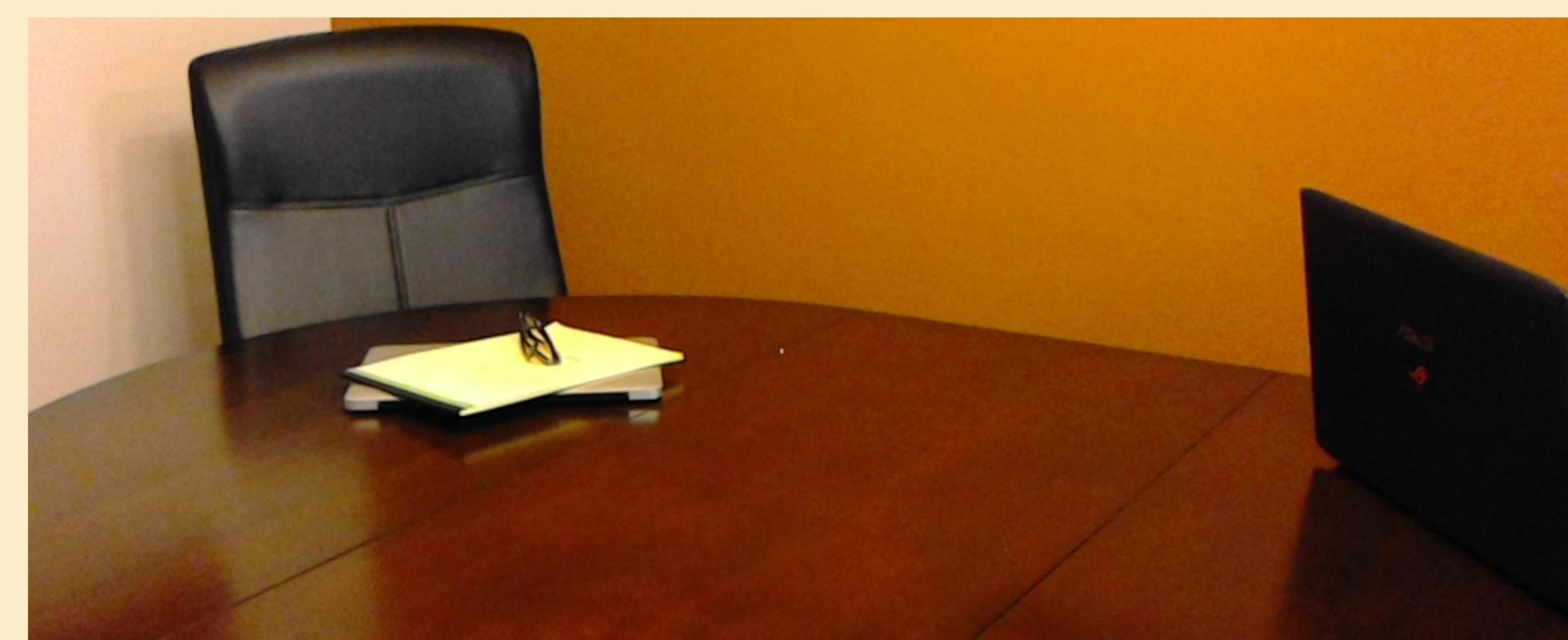


# Augmented Reality for Epigraphy: How to bring holograms of inscriptions to your classrooms.

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A photograph captured by our holographic application, showing the hologram of an inscription rendered on top of a real table.



A photograph of the physical space is shown for comparison without any holograms.

## Introduction

The year 2017 is a turning point for many disciplines as within the past year new technologies, such as virtual and augmented reality, have been established as low-cost and easy-to-use consumer devices. The potential advantages were eloquently predicted by Bodel et al. in the paper titled "Epigraphy in 2017": What we hope will change and improve by 2017 are the tools available for gathering information and analyzing it..."

In this work we present a method for a novel interface for studying inscriptions, using augmented reality head-mounted displays, such as Microsoft's Hololens glasses. This interface allows the users to browse through 3D databases of inscriptions and visualize the inscription within their actual physical space, such as office or classroom. Once the user positions the hologram of the inscription in a particular location, as the top of the desk, it remains there, allowing him/her to move around the inscription and study the artifact as a whole, up close, and from different perspectives. Similarly multiple inscriptions can be positioned next to one another, providing the opportunity for comparative readings, profound study of lettering techniques, and potential identification and pairing of fragments.

To the best of our knowledge this is the first project that utilizes this kind of holographic technology, opening for the first time the possibilities to epigraphists to conveniently study the inscriptions in a more natural way as physical objects instead of viewing the artifacts simply as 3D files on a desktop computer.

## Natural User Interface

In this project 3D models from the Digital Epigraphy and Archaeology database were imported to the Hololens Augmented Reality headset. The user can browse the 3D database of inscriptions by performing natural hand gestures, such as pointing, picking, moving, and dragging. Once the user selects an inscription, he or she can place its hologram within the physical space, for example on the top of a desk. The user can study the inscription by naturally

walking around the hologram. Fine details of the inscription can be studied by scaling up the hologram using natural hand gestures. In addition, the user can rotate, scale, and move the hologram in the real space, as well as open multiple holograms at the same time. This feature is useful especially for comparative study of inscriptions. For example, multiple inscribed fragments can be brought together as holograms on the top of a table and studied one on the side of the other.

Furthermore, the benefits of this project are numerous, as it allows the inscriptions to be studied along with their bearer, thus contextualizing the inscription and providing a holistic record of the artifact to the scholar.

Finally, classrooms, libraries, and museums are few examples of environments that can be augmented using the models from our database, and offer a unique learning experience to students, scholars, and visitors in general.

## 3D Holographic Database

The holograms for this project were generated from the 3D models of the Digital Epigraphy and Archaeology project (DEA). DEA is an interdisciplinary project initiated by scholars from the Digital Worlds Institute and the Department of Classics at the University of Florida. The goal of the project is to develop new open-access scientific tools for the Humanities and apply concepts from digital and interactive media and computer science to Archaeology and Classics.

<http://www.digitalepigraphy.org>

The DEA project has digitized in 3D numerous inscriptions and other historical artifacts in collaboration with the UF Department of Classics, Tampa Museum of Art, Cornell University, University of Berkeley, Library of Congress, National Archives, U.K., University of Lyon 2, France, Berlin-Brandenburg Academy of Sciences and Humanities, Germany, University of Venice, Italy, and other collaborators.

A live demo of the holographic interface is available to watch at:

<http://www.digitalepigraphy.org/videos/>



An example of a hologram of an inscription with the inscription bearer.

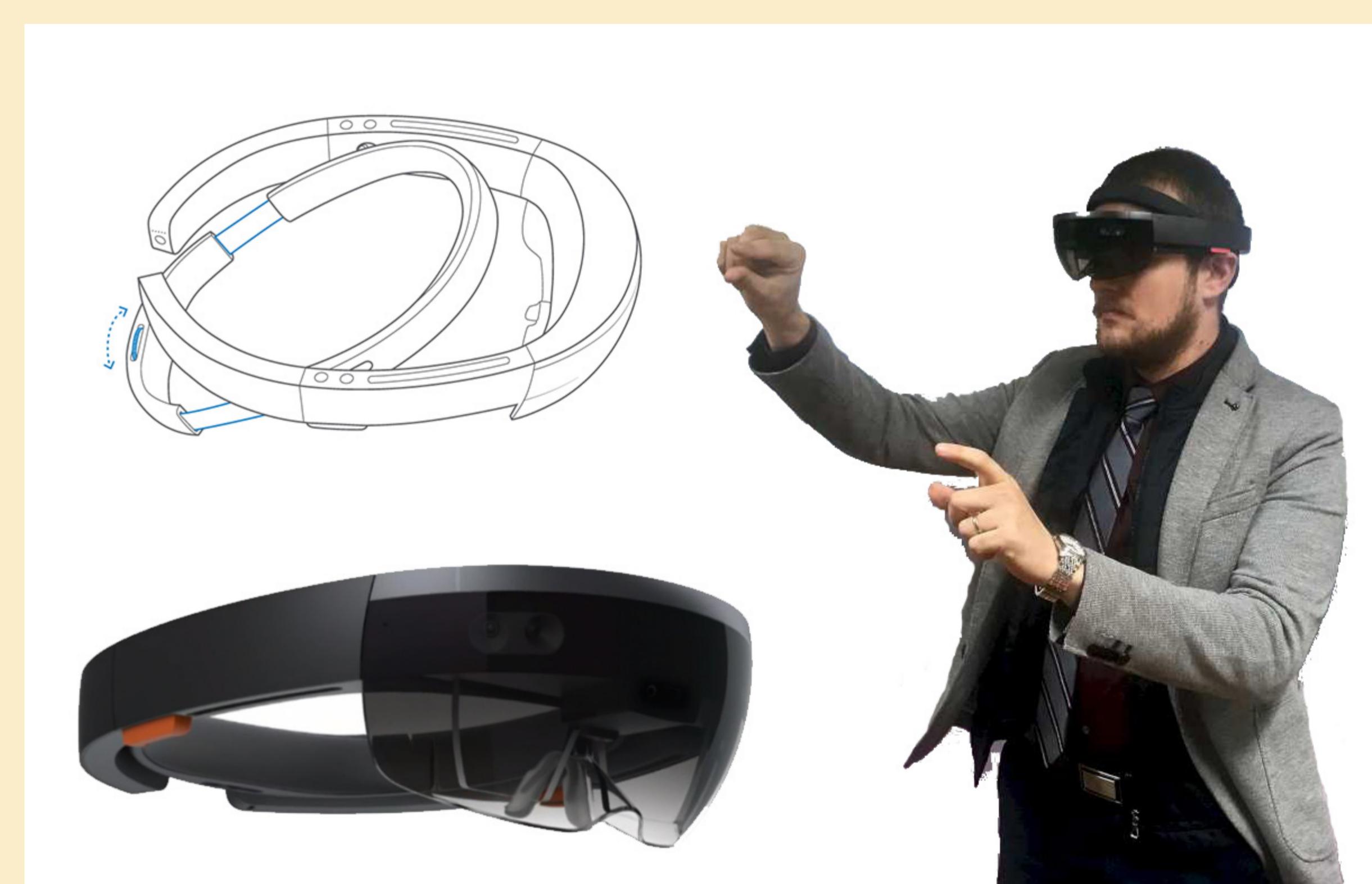


Illustration of the augmented reality headset, Microsoft Hololens, used in this project.

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