

# Augmented Reality Authoring for Non-Programmers

Rodney Berry

National University of Singapore  
IDMI Mixed Reality Lab and  
Communications and New Media  
Programme

Arnaud Palin Sainte Agathe  
Pôle Universitaire Léonard de Vinci  
Institut Internationale du  
Multimédia, Paris

Janaka Prasad

National University of Singapore  
IDMI Mixed Reality Lab

Liu Wei

National University of Singapore  
Mixed Reality Lab

Jörg Unterberg

Filmakademie Baden  
Württemberg

Adrian David Cheok

National University of Singapore  
IDMI Mixed Reality Lab, Keio  
University KMD, Tokyo

## 1 Background

Artists are typically among the first to embrace new technologies but, even after more than a decade of development, Augmented Reality (AR) is yet to become a true artistic medium. The main obstacle to AR art-making is still the complex and cumbersome nature of existing AR authoring tools. For an artist to make an interactive AR environment or art work, she must first either be, or have access to, a competent computer programmer. This limits the number of people who can even begin the process, let alone start to build a shared body of theory and practice.

Among the recent AR authoring tools, the DART project from Georgia Tech (MacIntyre, Gandy et al. 2004) is the one most successfully aimed at artists and designers. Although the time-line-based interaction is ideal for narrative projects and many designers are already proficient in director, Director's 3D capabilities are still quite limited. This has led us to search out a host application that is dedicated more to real-time interactive 3D modeling and animations. The work presented here picks up where the first author's 2004 SIGGRAPH concept poster left off by actually realizing a functional prototype and demo applications.

## 2 Touch Designer-based AR authoring tool

Touch Designer (Hereafter referred to as *Touch*) by Derivative, uses a procedural flow type interface where the user connects various 'operators' together to manipulate geometry, textures and control data in real time. By exploiting Touch's ability to read data placed in shared memory, we are able to use an ARToolkit-based application to track fiducial markers then pass both the original camera video and tracking data into Touch for further processing. Touch then puts the camera image in the background and uses the tracking data to correctly place 3D geometry into the scene. Touch also provides for various interface tools with which we made utilities that make marker assignment and training a drag and drop process.

This set of AR tools allows the user to take advantage of the various features of Touch. Touch allows for a variety of inputs and outputs, for example: MIDI and Open Sound Control (OSC) messages; TCP network socket data; Video frames by TCP sockets; Live camera input; Text and images loaded from URLs

etc. Examples of the kind of AR explorations made possible might include: messing up the 'real' world video image so it's perhaps less real than the CG images; using distances and orientations of markers in relation to the camera and each other to dynamically modify textures geometries or character behaviors (Touch supports skeleton-based mesh deforming and facial morphing); modifying models and textures from realtime data from web-based XML sources; scenes that respond to or generate audio; non-photorealistic imagery using GLSL shaders.

The system has an easy learning curve for a beginner but offers deeper challenges the longer one engages with it. We have barely scratched the surface.

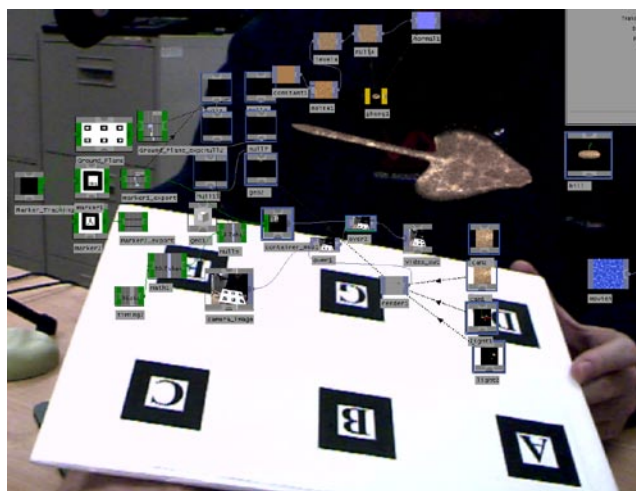


Figure 1. A procedural AR stingray modelled and animated in Touch Designer with skin texture and water caustics.

## 3 References

MACINTYRE, B., M. GANDY, et al. 2004. DART: a toolkit for rapid design exploration of augmented reality experiences. Proceedings of the 17th annual ACM symposium on User interface software and technology. Santa Fe, NM, USA, ACM Press: 197-206.