TEACHING-LEARNING-RESEARCH: DESIGN AND ENVIRONMENTS

• Paper / Proposal Title:
Mixed Reality Design-Production Research Through Cooperative Lab and Studio

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• Abstract (300 words):
The purpose of this paper is to comprehensively present interwoven research and teaching initiatives that leverage mixed reality (MR) and low-tech fabrication into experimental modes of cooperative design and immersive production. This ongoing work has been enabled by intermingling several key channels and courses within Georgia Tech (GT) School of Architecture (SOA), most notably the Spatial Futures Lab and its associated Spatial Futures Studio.

Spatial Futures Lab is an interdisciplinary cyber-physical research endeavor which sets out to develop projective forms of practice that interweave rapidly proliferating design technologies into intuitively operable design-production environments and fluidly collaborative workflows. With research assistants from both GT School of Architecture and School of Electrical and Computer Engineering, a customized constellation of established and developed protocols orchestrate the live use of technologies such as MR, aerial robotics, spatial tracking and dynamic modeling into interactive design environments laden with potentials to frame future modes of live, immersive and expansively cooperative work in remote deployments.

Experimental in both its pedagogical setup and design-production workflows, Spatial Futures Studio was the first SOA Design + Research Studio with access to Spatial Futures Lab resources. Through extensive collaborative agility, participants collectively designed, fabricated and assembled a voluminous spatial construct which configures a
cantilevered drone landing pad, elevated billboard and operations deck. Building onto a 3m tall prefabricated deer-hunting platform with 1200m of 6mm diameter steel rods, MR goggles and smartphones were utilized in conjunction with a small hand-operated rod bender and welding machines. All spatial components were designed and fabricated exclusively with MR workflows that facilitated direct digital-to-physical translations and vice-versa. Notably, no studio member had previously worked through such an advanced production or MR-intensive process. Protocol refinements and key lessons learned are set to critically inform near-term SFL research in its pursuit to steer cooperative design-production approaches further towards positive demonstrations and impactful applications.

• Author(s) Biography (200 words each):
Keith Kaseman is an Assistant Professor at Georgia Institute of Technology School of Architecture and coordinator of its M.S. Architecture | Advanced Production. Kaseman founded and directs the Spatial Futures Lab, an interdisciplinary cyber-physical facility embedded within Georgia Tech’s Digital Fabrication Lab which is configured to perform research on multisystem design-production platforms that incorporate unmanned aerial systems (UAS), robotics, augmented reality (AR), mixed reality (MR), motion capture and other digital fabrication protocols into customized workflows and modes of collaborative operation. Kaseman is also a partner at KBAS, a digitally agile spatial design practice founded in 2003 with Julie Beckman upon having their design competition entry selected for the National 9/11 Pentagon Memorial. Prior to KBAS, Kaseman was a designer and project Manager at SHoP Architects (New York). Kaseman has held previous teaching posts at University of Pennsylvania PennDesign (2004-2013), Columbia University GSAPP (2005-2014) and University of Tennessee Knoxville (2014-2016).