1. LITERATURE REVIEW

Table I. Tangible interfaces for geospatial modeling: augmented architectural models

System	Interaction	GIS	User studies	Publications
Urp	Object detection		Case studies*	[Underkoffler and Ishii 1999]
				[Ishii et al. 2002]*
Collaborative Design Platform	Object detection			[Schubert et al. 2011]
	Touch			[Schubert et al. 2012]
	Sketching			[Schubert et al. 2014]
				[Schubert et al. 2015]

Table II. Tangible interfaces for geospatial modeling: actuated pin tables

System	Interaction	GIS	User studies	Publications
XenoVision Mark III Dynamic Sand Table	Sculpting			
Northrop Grumman Terrain Table	Sculpting			
Relief	Sculpting			[Leithinger and Ishii 2010]
				[Leithinger et al. 2009]
Recompose	Sculpting			[Leithinger et al. 2011]
	Gesture			[Blackshaw et al. 2011]
Tangible CityScape	Gesture			
Inform	Sculpting			[Follmer et al. 2013]
	Gesture			
	Object detection			

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Table III. Tangible interfaces for geospatial modeling: augmented clay

System	Interaction	GIS	User studies	Publications
Illuminating Clay	Sculpting		Protocol analysis[‡]	[Piper et al. 2002a]
				[Piper et al. 2002b]
				[Fielding-piper 2002]
				[Shamonsky 2003][‡]
				[Ishii et al. 2004]
				[Ratti et al. 2004]
Tangible Geospatial Modeling System	Sculpting	✓	Case studies[*]	[Mitasova et al. 2006]
				[Tateosian et al. 2010][*]

Table IV. Tangible interfaces for geospatial modeling: augmented sandboxes

System	Interaction	GIS	User studies	Publications
SandScape	Sculpting			[Ishii et al. 2004]
				[Ratti et al. 2004]
SandyStation	Sculpting			
Augmented Reality Sandbox	Sculpting			[Reed et al. 2014]
	Gesture			
Tangible Landscape	Sculpting	✓	Case studies[*]	[Petrasova et al. 2014]
	Object detection		User experiments[†]	[Petrasova et al. 2015][*]
	Sketching			[Harmon et al. 2016][†]
The Augmented REality Sandtable (ARES)	Sculpting			[Amburn et al. 2015]
	Gesture			

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