AtomicOrchid: a Mixed-Reality Game to Investigate Coordination in Disaster Response

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AtomicOrchid

AtomicOrchid is a **location-based mixed-reality game** based on the fictitious scenario of expanding radioactive clouds that threaten field responders on the ground. In their mission to rescue all the targets from the radioactive zone, the field responders are supported by players in centrally located 'headquarters'.

The **research aim** is to **explore coordination** and **agile teaming** under temporal and spatial constraints. We study various **interactional arrangements** in which **human responders** can be **supported by agents** in disaster response scenarios in the future.

The **objective** is to to explore **design for disaster response** scenarios while also having greater confidence in the **efficacy of behavioural observations**.

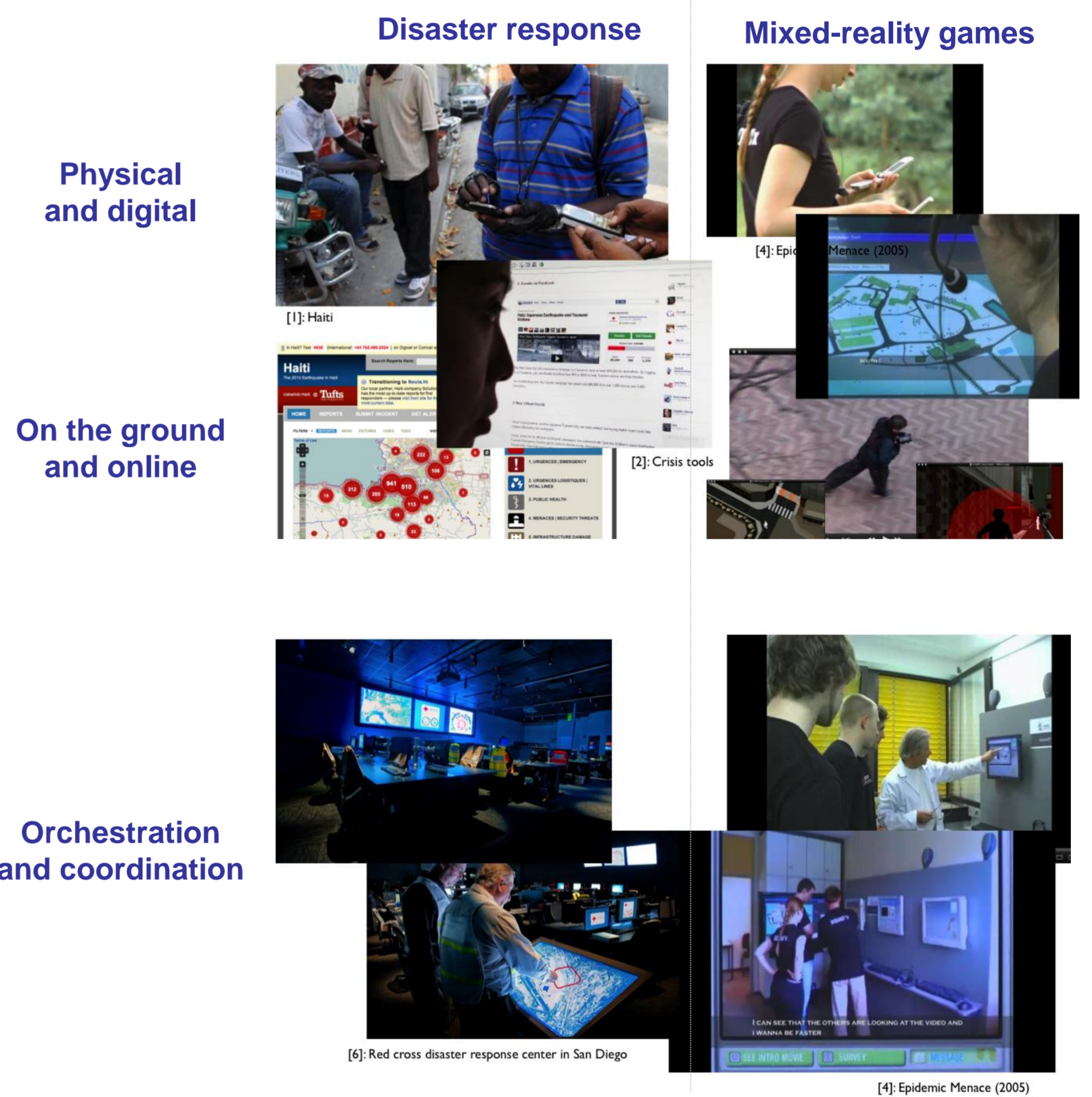We call our approach **serious mixed-reality games**.

Messaging
Sensing and awareness
Drop-off zone
Player
Targets
Player overview info 'radioactive' cloud
HQ Dashboard
Mobile responder tool

Serious Mixed Reality Games

At-a-glance

- Our approach to study research questions on human-agent interaction, coordination and collaboration
- Human emotional and visceral realism integral to approach
- Research focuses on requirements for situational awareness
- Opportunity for public engagement

Mixed reality games **share key characteristics** with disaster response scenarios.

Disaster response
Mixed-reality games
Physical and digital
On the ground and online
Orchestration and coordination
[1]: Haiti
[2]: Crisis tools
[4]: Epidemic Menace (2005)
[6]: Red cross disaster response center in San Diego

Researching Human-Agent-Collectives (HACs) with AtomicOrchid

To explore HACs in AtomicOrchid, we integrate a **computational coordinator** agent that instructs field responders on when to form coalitions and which targets to rescue based **on real-time analysis** of salient **real-world characteristics**.

Through a series of **deployments**, we will explore the **human response** to different interactional arrangements (see table on the right).

With this research design, we can tackle **research questions of human-agent interaction**, such as:

- How (and when) does the agent need to present the information or instructions most effectively to support the responders' tasks?
- Where do agents fit into existing human disaster response practices?
- What are the benefits and shortcomings of using a software agent to instruct and assist disaster response compared to a human coordinator?
- How can people best respond to agent instructions, and how can the agent improve/learn from the human response?

Interactional Arrangements of HACs

Instruction arrangement

Agent-HQ-Responder / Agent-Responder

Delivery mode

One-off (instruct once, before start)

Just-in-time (instruct after every completed task)