

# Morel: Remotely Launchable Outdoor Playthings

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## ABSTRACT

This paper proposes Morel, a physical plaything device that facilitates the emergence of new forms of outdoor physical play. It encourages the improvising of new games and behavior by not defining game rules on its own, but by providing players the ability to know the existence of other Morels in the vicinity, and to remotely make other Morels launch up in the air. One game that can be played with Morels is Police & Bomber, a variation of Kick-the-can with wireless ranges as vital gameplay elements.

## Categories and Subject Descriptors

K.8.0 [Personal Computing]: General – Games.

## General Terms

Design, Experimentation

## Keywords

Pervasive games, Mobile games, Physical play, Ad-hoc rule improvisation

## 1. INTRODUCTION

Morel is a physical plaything that aims to facilitate new forms of physical outdoor play. It accomplishes this by having Morels 'aware' of each other via wireless communications, and allowing the holder of a Morel to remotely launch other nearby Morels into the air.

Research in digitally augmented reality-based gaming has been on the rise for the past few years, such as New York University's *Pac-Manhattan* and The University of Glasgow's *Seamful Game*. However, most such games have mainly been developed from the perspective of video games, extending and reaching out to reality. Morel is a project that takes a reverse approach, specializing on casual, physical games often played by kids. Such games differ from more 'formal' games and sports most significantly in that the game rules can be highly ad-hoc, and prone to change on the players' whims.

Morel attempts to accommodate this dynamic nature of casual

physical games and allow players new gameplay actions at the same time, by introducing new behaviors into outdoor playthings, but avoiding defining specific game rules within the device itself.

## 2. DESIGN

### 2.1 User Experience

#### 2.1.1 The Device

Morels are soft cylindrical objects, approximately the size of basketballs or soccer balls. Their outer shells are made of soft urethane, which allows them to be kicked and thrown like balls.



Figure 1. A single Morel.

When a Morel senses the existence of another Morel nearby, it will emit a sound to notify the player. It will also make a sound when another Morel has left the vicinity as well.

While other Morels are nearby, a player can 'charge them up' by holding and squeezing his Morel. This will cause a tone, rising in pitch, to be emitted from other Morels to show they are being charged up. When the 'charge' reaches its maximum, the sound will change to a wailing tone; Once the charging player lets go and squeezes once again on his Morel at this point, charged Morels will launch themselves up.

#### 2.1.2 Games using Morels: "Police & Bomber"

The behavior of Morels does not contain rules for specific games, and players are encouraged to either play known games with it or improvise their own. One example game using Morels we have devised is "Police & Bomber", an inverted variation of Kick The Can.

In Police & Bomber, players first split into the police players, who are the majority, and a single bomber player. Each team holds their own Morel, with the bomber carrying it with him and the police keeping it in a fixed location. The game's objective for the bomber is to get within the vicinity of the police Morel and launch it, while the objective for the police team is to prevent that from happening.

The game is given a twist by an additional rule. When the bomber is within the vicinity of the police Morel, police players can tag and capture him. Conversely, when the bomber is outside of the vicinity of the police Morel, he can tag and capture other police players. Because of this rule, the bomber will have to fulfill two conflicting goals: to get inside the police Morel's range, but avoid getting captured.

The game often involve large amounts of running, as many outdoor casual games do. One aspect that differs from such games, however, is that players tend to keep themselves focused on the aural signals that Morels give out, as the wireless ranges are tied to the game as a vital piece of information. This essentially gives players a virtual 'sixth sense' – a sense of radio, used in addition to the five senses that players already have.



**Figure 2. Police & Bomber Gameplay.**

Police & Bomber is only one possibility of games that can be played. Games such as radar-enabled hide-and-seek, or other new games, can be improvised and played using Morels.

## 2.2 Technical Design

Currently, two variations of Morels exist: the receiver, which has the capability to launch itself, and the sender, which can detect squeezing actions by the player.

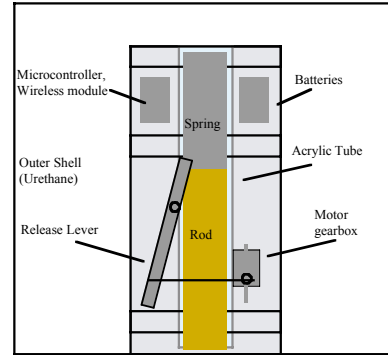
The architecture of the receiver Morel consists of an inner core that contains a PIC16F88 microcontroller, and a soft sponge outer shell surrounding it. The microcontroller is connected to an AM wireless module and an FA-130 motor via a TA7291P motor driver IC. In the center of the core, a short spring-loaded rod is held inside a cylinder by a metal lever, facing down.

Communication between Morels is done using the AM module. When a Morel is "popped," the motor pulls the lever, releasing the spring-loaded rod against the ground and thereby making the Morel jump.

The transmitter Morel does not contain the cylinder and the rod. Instead it houses a pushbutton that will register as being pressed when the player squeezes the Morel.

## 3. FUTURE WORK

The current working version has the sender and receiver Morel as separate different designs. In our next iteration of the device, we



**Figure 3. Inside the Receiver Morel.**

aim to remove this distinction and allow all Morels to both send and receive. Also, testing the implications of having multiple wireless game entities capable of communicating with each other, by playing games with more than two Morels, has yet to be done.

As Morel is designed to facilitate the emergence of new behavior and games by its players, we would like to observe large numbers of test players, especially kids, document their behavior and emerging gameplay, and eventually create a compilation of new games designed to be played using Morels.

## 4. CONCLUSION

Morel proposes a new kind of physical, casual gameplay, where digital devices are fused with old-style outdoor play in an intuitive way. With no screens to read off of and no buttons to push, it allows for players to focus on their physical reality, yet in extended ways that was impossible with playthings of the past.

## 5. ACKNOWLEDGEMENTS

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