BLADESHIPS -An Interactive Attraction in Mixed Reality-

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1 Introduction

A new type of interactive attraction in mixed reality environment, BLADESHIPS, has been designed and developed. The BLADE-SHIPS is a game in which players compete with each other by controlling virtually expressed belt-shaped flying objects, "ships", with their hands in a real environment (Figure 1).

The scenario of BLADESHIPS has won a prize in "MREC2002" [MREC 2002], a contest for entertainment scenarios using mixed-reality technology. It is designed and developed in order to put before the public as a demonstration in "MR-EXPO" [MR-EXPO 2003], an Expo of Mixed Reality Entertainment.
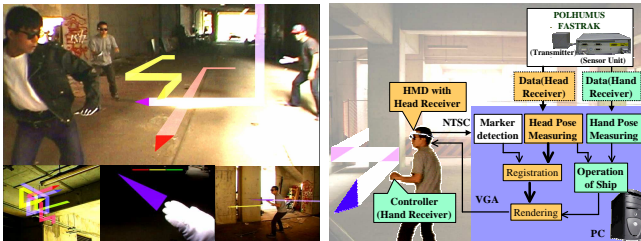

Figure 1: Conc

2 Concept

The player's hand-ori........ control the .... of the flying ship. We aim to realize a control interface intuitive and easily-learnable for every player. The series of simple operations for the ships can infinitely grow the complexity of the game. The skill and tactics necessary to drive the enemy ship into clash charm the players.
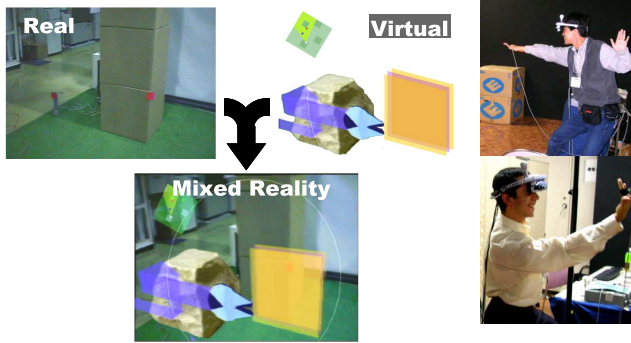

Figure 3: Mixed reality.

Figure 4: Players operating ships.

3 System

Figure 2 illustrates the structure of the developed system. The player wares a video-see-through HMD. The pose of HMD is necessary to merge the virtual objects and the real world as shown in figure 3. An electromagnetic tracker attached to the HMD roughly measures its pose and the landmark tracking technique on images improves the accuracy. The landmarks have no unique identifier but they can be identified by their location estimated by the rough pose obtained by the electromagnetic tracker.

Figure 4 shows snapshots of the players controlling their own ships by their hand. The orientation of hand is directly mapped to the orientation of the ship. The distance between hand and head is mapped to the speed of the ship. The position and orientation of hand are measured by an electromagnetic tracker.

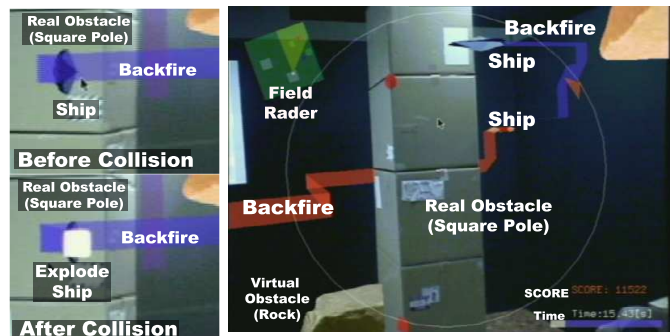## 4 Interaction of real and virtual objects

Figure 5: Collision of ship to real obstacles.

Figure 6: Occlusion of virtual objects by real obstacles.

Figure 5 shows snapshots of collision of a ship with a real object. Figure 6 shows a view of occlusion between real boxes and virtual ships and their backfires. The collisions of a ship to real objects, such as boxes and walls, and to virtual objects, such as other ships and backfires, are an important factor to make the BLADESHIPS as a battling game with multiple players. Furthermore, interactions between the real and virtual objects are effective to improve the reality of the mixed-reality world. In order to detect the collisions and to represent the occlusions in high accuracy, the landmarks for image tracking are arranged around the real objects.

The BLADESHIPS system for two players was demonstrated at the MR-EXPO for 5 days and hundreds of visitors enjoyed the new mixed-reality game.

References

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