# 3D interactie in virtuele omgevingen: Jet Fighter

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## ABSTRACT
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## 1. INTRODUCTION
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## 2. APPLICATION DOMAIN
A jet fighter game in which the player controls a jet fighter. First the player has to take off (from an aircraft carrier). Next the player has to complete some objectives (destroying enemy planes, bombing targets on the ground). And finally the player has to land safely.

There is also a two player option, in which one player controls the plane and the other player controls the weapons.

## 3. CHALLENGES
The main challenge is mapping all the different actions (navigating the jet, shooting weapons, switching weapons, ...). Ideally the player could navigate the plane and simultaneously shoot and select enemy plane. But this requires a lot of gestures and it might be difficult for the user to do multiple actions simultaneously.

Another challenge is selecting target enemy planes. There can be multiple planes and they can be rather small. We have to find a way to easily select enemies and confirm the selection (so the player doesn't accidentally select a wrong plane while trying to select another plane or doing another action).

**Table 1: Mappings of actions**

| Action |
|---|
| Navigate left/right |
| Navigate up/down |
| Select target |
| Shoot missile |
| Shoot machine gun |
| Change speed |
| Switch to bomb mode |
| Take off / landing |

## 4. INTERACTION TECHNIQUES
The game needs to support a lot of actions (see table 1).

### 4.1 Navigation
We've tried four different approaches for navigation. All of them are active techniques (some are both active and passive).

The first approach is a torso-directed steering technique. The user leans forwards/backwards to go down/up, and leans left/right to go left/right. This approach leaves the user's hands free for manipulation, but leaning backwards might be hard for the user.

In the second approach the user sticks out one arm. He still uses his torso to go left/right, but to go up/down he raises/lowers his arm. This approach leaves one hand free for manipulation, but it's hard to navigate with one arm and manipulate with the other.

The third approach is both active and passive. The user sticks both arms out. He uses his torso to go left/right and raises/lowers his arms to go up/down. When the user wants to manipulate he stops holding his arms sideways and starts manipulating with his hands. This will enable the auto-pilot and it follows the auto-locked target.
This way the user doesn't have to do two different actions with both arms, but he can't manipulate and navigate at the same time.

The last approach is also both active and passive. It works

the same as the third approach, except when the user is manipulating he can still lean left/right to navigate left/right. This way the user can more or less navigate and manipulate at the same time, but he is unable to navigate up or down. Also leaning and manipulating at same time sometimes requires clunky movement.

### 4.2 Selection

### 4.3 Manipulation

## 5. CONCLUSIONS

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## 6. ACKNOWLEDGMENTS

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## 7. REFERENCES