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PROYECTO FIN DE CARRERA

DESARROLLO DE UNA APLICACIÓN SOFTWARE MULTIMODAL PARA TELEOPERAR UAVS BASADA EN SENSORES COLOCADOS SOBRE EL USUARIO

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Abstract

*T*he paramount goal of this project is a teleoperation station design for UAVs (Unmanned Aerial Vehicle); it is known that is necessary a station to control this types of vehicles with the ability to fly without a pilot on board in remote way. The fact that the pilot is not onboard of the vehicle creates an effect called "Sensory Isolation"; our goal is so to make a station design to minimize this sensory lack. For that, the design will be based on multimodal display and involved human factors in these system types to improve the Human-Machine interface. Later, experiments will be made to improve our system benefits and reach in this way to a more intuitive, flexible and comfortable system for the future operator of our station.

Our multimodal display shall consist of the following elements: three touch screens, a Firewire cam, headphones and vibrators devices. Besides this hardware items, we have some software tools and programs in which the project has been based and developed. Also some interesting software tools, that have been studied but for some or other reasons will be finally discarded for our system, will be seen along the memory of the project and will be explained why they were discarded. Main software tools with which we have been working in our station are: Head-Tracking, this software tool, helped by the Firmware cam and an IMU placed in the Headphones, let us to know where operator is looking at all the time. For example, this tool is very helpful when we consider that our station has three screens, thus we can know which screen the operator is looking at all the time (very important to the alert management). 3D Sound, this technology let us with a Headphones to emulate the 3D properties of the actual sound, and thanks to it to locate sounds in the space.

Finally, the latter one part of the project consists of programming a 3D simulation tool to test the benefits of the multimodal station and possible algorithms on UAVs, such as collision detection or joint work of several UAVs.

This project presents a first approach to the design of such stations, it goes without saying that in the coming years even months will emerge new technologies and tools that allow better control and monitoring of this of any type of autonomous vehicles, so never will be considered a closed project, but open to more than probable future improvements.