

Experimental System for Remote Airport Traffic Control Center Research

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Abstract: In this paper research is described with the long term goal of airport traffic control without the need of a real tower building, the Virtual Tower. Specifically we address the intermediate step of a Remote Airport Tower Center (RTC) for remote surveillance and control of small airports. An experimental high resolution video panorama system was developed as main HMI to replace the real far view out of the tower windows. Field tests of the reconstructed far view yield the effective visual resolution of a 180°-video panorama in agreement with the theoretical predictions. The digital video panorama provides the framework for video-see-through augmented vision by integration of additional information like weather and transponder data, and it allows for panorama replay. An integrated zoom function provides a "foveal" component by means of a remotely controlled pan-tilt zoom camera, including object tracking options. Besides the experimental system for field testing a simulation environment is described, based on a two-airport tower-simulator. It supports the design of the new work environment including safety aspects based on statistically confirmed data from reproducible simulator experiments with professional tower controllers.

Keywords: Human Machine Interface, remote airport traffic control, display, perception, simulation.
