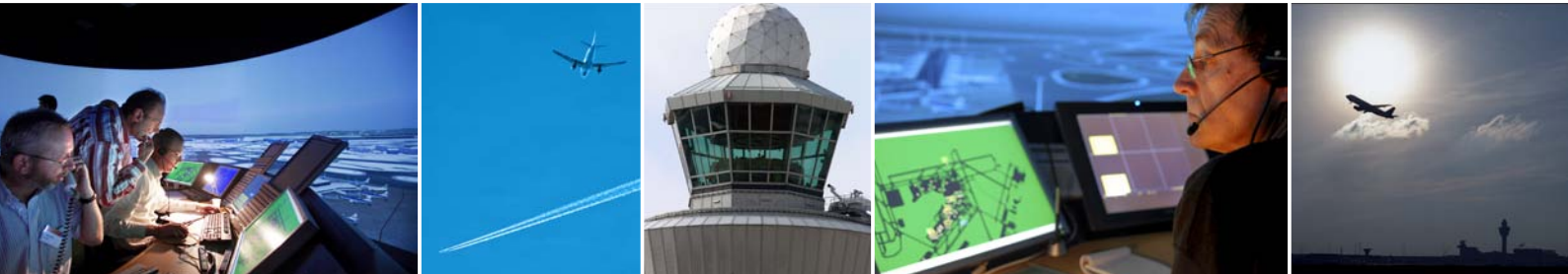






Augmented Reality for Tower Control



 Air Transport Division
Air Traffic Management & Airports

 atm@nlr.nl

 +31 88 511 31 01

Augmented Reality (AR) is a field of computer research which deals with the combination of real-world and computer-generated data (virtual reality), where computer graphics objects are blended into real footage in real time. To investigate the feasibility of using Augmented Reality in ATC tower environments, NLR has developed a concept demonstrator.



"STATE-OF-THE-ART HMD, ADVANCED VIRTUAL REALITY APPLICATIONS"

Real world problem

Currently, airport operations under low visibility conditions are still based on procedures and working methods without automation support. One of the reasons is the fact that, by definition, the controller is unable to visually identify the traffic. With Augmented Reality, the visual information is enhanced to make identification and tracking possible. A second application area of AR in the ATC Tower is the reduction of so-called "Head-Down Time". This refers to the potential inability of an operator (e.g. a tower air traffic controller) to optimally divide attention between the primary visual field (out the tower window, for instance), and an auxiliary tool (e.g. paper or electronic flight strips or surface movement radar).

Concept Demonstrator

The concept demonstrator consists of a simulated ATC Tower environment to act as the real out-the-window view and an nVisor ST head-mounted-display from NVIS with a Flock-of-birds tracker device from Ascension to augment the visual perception. The HMD is tracked for its position and attitude with high precision to be able to superimpose a bright virtual image across 60° field-of-view. The superimposed image can be static data (e.g. arbitrary flight strip information, to reduce head-down time) or information which depends on the direction of view (e.g. direction finder information, flight strip information filtered based on the direction of view or label information attached to the actual seen aircraft).



Head-mounted-display for research into augmented reality in ATC Tower environment



Virtual binoculars for use in NARSIM Tower

Concluding remarks

Early feedback from controllers indicate that apart from ergonomic discomforts (heavy device, unpleasant to wear, cables, etc.) and concerns about the accuracy and availability of (sensor) data, the concept of enhancing visual information using a HMD looks promising. NLR concluded to further study the application of augmented reality in ATC tower environments. Contact us for more information or a demonstration at NLR, Amsterdam, the Netherlands.



NARSIM ATC Tower simulator