

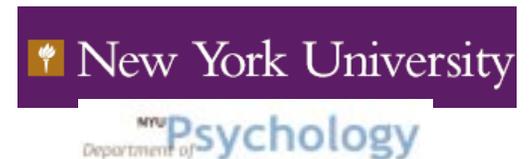


Human Error Modeling Augmentations: Increasing Air MIDAS' Visual System For SvS

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Human
Automation
Integration
Laboratory





SvS Environment



- Visual CRT display in the cockpit that incorporates several elements.
- Computer graphics to generate a texture-mapped display of the earth's surface.
- Text and other symbology will be overlaid onto the display
 - Ownship velocity, “follow-me” aircraft and its velocity, a “tunnel-in-the-sky”, other nearby aircraft.
 - Flight controls
 - air speed, attitude, elevation.



Air MIDAS Augmentation



- Desire to have the ability to accurately
 - perceive objects in near and far plane.
- Current Air MIDAS Visual Model:
 - Look at = Perception.
 - Limited to one plane.
 - Not able to discriminate text.
- New York University - Mike Landy
 - Wealth of research examining visual perception, 3-Dimensional perception, discrimination, classification.



NYU Visual Perception



- Spatial Channels.
 - Early visual coding represents the retinal image using a variety of channels.
- Retinal Inhomogeneity and Sampling.
- Masking.
 - Detection.
 - Discrimination.
 - Classification.



NYU/Landy - Discrim. Program



- NYU (Mike Landy)'s Discrim. Program permits viewing parameters and model parameters change (for the single model that has been implemented so far).
 - viewing distance, image size and image sampling.
 - model parameters are specific to the particular model, and specify the model's contrast sensitivity function and parameters of image masking.



Visual Augmentation Process



- Task analysis of SvS displays and flight scen.
 - Bottlenecks from limitations of vis. processing.
 - Simplified models of visual processing will be developed based on extant psychophysical data.
 - Visibility of the symbology representing approaching planes on the synthetic vision display,
 - Distraction from a given task by unnecessary, redundant or intrusive information on the display,
 - Accuracy of observer estimates of velocity of aircraft/neighboring aircraft from multiple sources of such information available on the display,
 - Ability of the observer to program a scan path using information available on the display.



NYU - HAIL Association



- Anticipating the completion of a more detailed visual model for Air MIDAS.
 - Mike Landy brings expertise not only in the visual domain with human visual performance, but also in computer programming.
 - Knowledge of computational limitations will guide algorithm implementation in Air MIDAS.