

NASA: Brainwave Training Developments



Scientific and Technical Information (STI)

The same techniques used to optimize and measure brain activity in NASA pilots during flight simulation exercises are an integral part of iMusic. For years, scientists from NASA's Langley Research Center have researched and developed various physiological methods for assessing sustained attention, engagement, awareness and pilot stress in laboratory flight simulators. Such tests are crucial to maintaining the focus of pilots, taking into consideration that the task of flying a plane can sometimes be monotonous.

One of the most progressive physiological methods to spawn from Langley biofeedback research is iMusic, a real world application that will improve overall mental awareness for individuals of all ages.

These training methodologies have been also been transferred to a technology called Extended Attention Span Training (EAST). As a modification of biocybernetic technology used to increase the mental engagement of pilots, EAST transcends conventional neurofeedback systems by taking the form of a video game that responds to brain electrical activity and joystick input.

Extended attention span training system

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Attention Deficit Disorder (ADD) is a behavioral disorder characterized by the inability to sustain attention long enough to perform activities such as schoolwork or organized play. Treatments for this disorder include medication and brainwave biofeedback training. Brainwave biofeedback training systems feed back information to the trainee showing him how well he is producing the brainwave pattern that indicates attention. The Extended Attention Span Training (EAST) system takes the concept a step further by making a video game more difficult as the player's brainwaves indicate that attention is waning. The trainee can succeed at the game only by maintaining an adequate level of attention. The EAST system is a modification of a biocybernetic system that is currently being used to assess the extent to which automated flight management systems maintain pilot engagement. This biocybernetic system is a product of a program aimed at developing methods to evaluate automated flight deck designs for compatibility with human capabilities. The EAST technology can make a contribution in the fields of medical neuropsychology and neurology, where the emphasis is on cautious, conservative treatment of youngsters with attention disorders.

Letting Thoughts Take Wing

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Scientists are conducting research into electroencephalograms (EEGs) of brainwave activity, and electromyography (EMG) of muscle activity, in order to develop systems which can control an aircraft with only a pilot's thoughts.

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