Title: NASA-NAVY Telemedicine: Autogenic Feedback Training Exercises for Motion Sickness

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Abstract Body:

Introduction: Airsickness is the most significant medical condition affecting naval aviation training. A 2001 study showed that airsickness was reported in 81% of naval aviation students and was associated with 82% of below average flight scores. The cost to a single training air-wing was over $150,000 annually for fuel and maintenance costs alone. Resistant cases are sent to the Naval Aerospace Medical Institute (NAMI) for evaluation and desensitization in the self-paced airsickness desensitization (SPAD) program. This approach is 75% successful, but can take up to 8 weeks at a significant travel cost. NASA Ames Research Center's Autogenic Feedback Training Exercises (AFTE) uses physiological and biofeedback training for motion sickness prevention. It has a remote capability that has been used from Moffett Field, CA to Atlanta, GA. AFTE is administered in twelve (30-minute) training sessions. The success rate for the NASA AFTE program has been over 85%.

Methods: Implementation Phases: Phase I: Transfer NASA AFTE to NAMI; NASA will remotely train aviation students at NAMI. Phase II: NAMI-centered AFTE application with NASA oversight. Phase III: NAMI-centered AFTE to remotely train at various Navy sites. Phase IV: NAMI to offer Tri-service application and examine research opportunities.

Results: 1. Use available telemedicine connectivity between NAMI and NASA. 2. Save over $2,000 per student trained. 3. Reduce aviation training attrition. 4. Provide standardization of multi-location motion sickness training. 5. Future tri-service initiatives. 6. Data to NASA and Navy for QA and research opportunities.

Discussion: The NAMI SPAD program successfully treats 75% of motion sickness cases over six to eight weeks. The AFTE program shortens treatment to less than two weeks with a remote capability for wider application at reduced cost. AFTE has shown benefits for NASA Astronauts and Russian Cosmonauts with applicability to Naval Aviators. AFTE provides a telemedicine solution for the training delays and costs associated with motion sickness. The remote training increases availability, decreases cost and maintains central standardization of motion sickness treatment. The NASA-Navy collaboration will result in operational benefits for both agencies with cost-savings through resource sharing and remote delivery.

Learning Objective 1: Telemedicine offers the opportunity for advanced technology transfer of AFTE for mutual benefit and enhanced performance with cost sharing opportunities.

Learning Objective 2: Telemedicine offers opportunities for remote AFTE application for rapid and wider availability with cost saving benefits.

Learning Objective 3: Telemedicine application of AFTE allows for central standardization and quality assurance of the application with opportunities for multi-agency application and collaborative research.
NASA-Navy Telemedicine Project:

‘AUTOGENIC FEEDBACK TRAINING TO IMPROVE MOTION SICKNESS’

Presented By:

CDR Michael Acromite
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• **Problem Definition**

  – Motion sickness adversely affects Naval Aviation especially aviation training.

  – A 2001 study showed that 81% of naval aviation students reported airsickness on one or more flights. In addition, 82% of below average flight scores were associated with motion sickness.

  – Standard anti-motion sickness medications can cause unacceptable side-effects and are contraindicated in the operational setting.

  – ~ 20-30 severe, resistant cases annually require a more thorough evaluation, and more aggressive physiological desensitization in the Self-Paced Airsickness Desensitization (SPAD) program.

  – SPAD is successful in 75% of cases, but can take up to 8 weeks to complete.

  – Unsuccessful SPAD results in mid-training attrition.

  – Travel costs required for training at NAMI is prohibitive.
• Opportunities

  – NASA AFTE expands and supplants the established and similar SPAD Program systems

  – NASA hardware is currently available at NAMI for implementation.

  – NASA and NAMI personnel are currently poised for trial and implementation.

  – NAMI audio-visual connectivity with NASA for real-time interface established

  – Initial training of NAMI personnel in AFTE applications is currently established while additional integrated training will be ongoing.
• NASA-Navy Collaborative Support

  – Utilize currently available NAMI audio-video teleconferencing (AVT) equipment and Internet connectivity to interface with NASA technologies.

  – System Administrative Support Requirements: Utilize established local support from the current SPAD program

  – Modification of NAMI SPAD Hardware for AFTE

  – NASA AFTE Specific Hardware

  – NAS AFTE technical specialists for the initial set up and ongoing support

  – NASA will provide ongoing remote support from program designers.
**Implementation**

- Phase I: Technology & Training transfer for NASA to remotely train aviation students at NAMI using the AFTE program.

- Phase II: NAMI will use AFTE technology to train all aviation students with motion sickness at NAMI using AFTE.

- Phase III: NAMI will remotely train motion sickness prone students at multiple other Navy aviation sites.

- Phase IV: NAMI will offer to train Tri-Service aviation students remotely using AFTE and examine research opportunities.
• Outcome Measures
  – the percent of students who successfully complete aviation training following AFTE.
  – The time-to-complete AFTE

• Return on Investment
  – Financial benefits:
    • AFTE is estimated to save over $2,000 per student trained, compared to the SPAD, based on per diem costs alone.
  – Non-financial benefits:
    • reduce training attrition
    • provide standardization of motion sickness training
    • Provide effectiveness and QA data to NASA and the Navy for advancement and subsequent research opportunities.
    • Future Tri-Service initiative
Funding: Navy Medicine Support Command

2 year money plus sustainment dollars to support phases I and II:

- **Phase I:** Technology & Training transfer for NASA to remotely train aviation students at NAMI using the AFTE program.

- **Phase II:** NAMI will use AFTE technology locally to train all aviation students with motion sickness at NAMI using AFTE with NASA oversight.

- **Sustainment:** Maintain technology and hardware to continue the successful application and investigate new and wider applications.
• Conclusion

– NASA Proven AFTE technology offers a more effective alternative to keep motion sickness susceptible aviators in the pipeline.

– Collaboration results in operational benefits for both agencies while realizing cost-savings through resource sharing and remote delivery of training.

– Remote application maintains central standardization and cost savings

– Remote application offers opportunities for wider and expanded applications

– The collaboration provides opportunities for additional AFTE research and training between NASA, Navy and other agencies.