

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188		
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE	2. REPORT TYPE Viewgraphs	3. DATES COVERED			
4. TITLE AND SUBTITLE Reducing NVG-Related Spatial Disorientation Mishaps		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S) Joseph Antonio		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Air Warfare Center Aircraft Division 22347 Cedar Point Road, Unit #6 Patuxent River, Maryland 20670-1161		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Joseph Antonio
Unclassified	Unclassified	Unclassified	SAR	5	19b. TELEPHONE NUMBER (include area code) (301) 342-9283

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39-18

DTIC QUALITY INSPECTED 3

20010109 027



Recent Trends in Spatial Disorientation Research

November 15 – 17, 2000 San Antonio, Texas

Reducing NVG-Related Spatial Disorientation Mishaps

Joseph C. Antonio, MD
Crew Systems Department
Naval Air Warfare Center – Aircraft Division
Patuxent River, Maryland

Introduction

- **Purpose**
 - Provide recipe for success in helping decrease NVG-related CFIT mishaps
- **Disclaimer**
 - Opinions are those of the briefer and do not represent official Navy position

Making Rabbit Stew

What is the first thing to do when making rabbit stew?

Making Rabbit Stew

Find and catch the rabbit.

***Reducing NVG-Related CFIT
Mishaps***

What is the first thing to do when attempting to reduce the occurrence of NVG-related CFIT mishaps?

***Reducing NVG-Related CFIT
Mishaps***

Find the primary cause and provide solutions.

Primary Cause

- **Factors leading to NVG-related CFIT mishaps**
 - Task saturation
 - Breakdown of crew coordination
 - Fatigue
 - Poor judgment
 - Complacency
 - Overconfidence
- **What is culminating event?**
 - Breakdown in instrument crosscheck

Potential Solutions

- **Assumption is made that breakdown in instrument crosscheck is the primary cause for NVG-related CFIT mishaps**
- **Discussion about solutions divided into three topics**
 - Design efforts
 - Training
 - Operational tools
- **May require new thinking in order to provide help before the mishap**
 - Another way of saying that some of the recommendations may be controversial

Design Efforts 1

- **Software changes and upgrades (requires early prioritization)**
 - Cursor control
 - Decision making algorithms
- **Commonality in crewstation design within platform types**
 - Habit pattern same for each aircraft
- **Layout of instrument panel**
 - Keep same for left and right seats
 - Group primary flight instruments to allow for quick scan
- **HMD design considerations**
 - Poor requirements may lead to added workload
 - Keep it simple

Design Efforts 2

- **NVIS interior lighting**
 - Good lighting design more critical when using NVGs
 - Instruments scanned quickly
 - Habit pattern established with previous lighting
 - Primary flight instrument readability more important than compatibility with NVGs
- **NVIS exterior lighting**
 - Can help with sorting
 - Improved section/division integrity
- **Improved NVG performance and FOV**
 - Color
 - Fusion with other sensors
 - Improved low light capability

Training

- **Introduce NVGs and scan requirements during all phases of flight training (e.g., primary, basic, etc.)**
 - Easier to establish a pattern than to change one
 - Determine how "normal" instrument scan differs from scan when using NVGs and train to those differences
- **Begin NVG flight training during low illumination**
 - Creates the right impression upfront
- **Add SD-inducing profiles to simulator training**
 - Re-create events leading to previous mishaps
 - Integrate with regular simulator training sorties
- **Insure ground, simulation, and flight training correlate to reinforce instrument crosscheck**
 - Training for each typically created in a box. Need to insure they interact effectively.

Operational Tools

- **Realistic guidance for low illumination**
 - Current value of .0022 lux is not accurate for current NVG technology
 - Should be based on data agreed to by all parties
- **Improved tools for preflight planning**
 - Risk management
 - Current and accurate light level planning calendars
- **Track experience via event-based data and use a matrix tied to critical experience criteria**
 - NVG flight time is not an accurate indicator of experience
- **Insure distribution of NVGs is based on mission requirements**
 - Aircrew flying missions requiring enhanced detail (e.g., low illumination masking, low altitude over low contrast terrain, etc.) should have the NVG with the best performance

Summary

NVGs have been in use for a number of years but there are still lessons to be learned. There is no need to wait for the next mishap to take action. Being proactive may result in saved lives and will help win the war of attrition. This may require a new way of looking at the way business is being conducted.
