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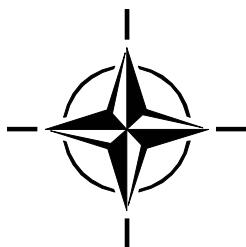
RTO TECHNICAL REPORT

TR-HFM-118

Spatial Disorientation Training – Demonstration and Avoidance

(Entraînement à la désorientation spatiale –
Démonstration et réponse)

Final Report of Task Group TG-039.



Published October 2008





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- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS System Analysis and Studies Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

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Table of Contents

	Page
List of Figures/Tables	ix
List of Acronyms	x
Programme Committee	xiii
 Executive Summary and Synthèse	 ES-1
 Chapter 1 – Introduction	 1-1
1.1 The Spatial Disorientation Problem	1-1
1.1.1 Recent Accident Statistics and Operational Implications	1-1
1.1.1.1 Present Trends in the US and Canada	1-1
1.1.1.2 Present Trends in Europe	1-2
1.1.1.3 Conclusion	1-4
1.2 SD Countermeasures	1-5
1.2.1 Technological Approach to Avoid SD	1-5
1.2.1.1 Instrument Displays / Novel Symbology	1-5
1.2.1.2 Acoustic HUD	1-7
1.2.1.3 Tactile Displays (TSAS and TTTD)	1-7
1.2.1.4 SORD	1-7
1.2.1.5 auto-GCAS and auto-ACAS	1-7
1.2.1.6 TCAS	1-8
1.2.2 Training SD Avoidance	1-8
1.3 The Objective of Task Group TG-039	1-8
1.3.1 Report Overview	1-9
1.3.1.1 Executive Summary	1-9
1.3.1.2 Chapter 1: Introduction	1-9
1.3.1.3 Chapter 2: Current Approach to SD Training as per 2006	1-9
1.3.1.4 Chapter 3: Ground-Based SD Demonstration and Training	1-10
1.3.1.5 Chapter 4: In-Flight SD Training	1-10
1.3.1.6 Chapter 5: SD Avoidance Training for Night Vision Devices	1-10
1.3.1.7 Chapter 6: Optimization of SD Avoidance Training	1-10
1.3.1.8 Chapter 7: Instructors	1-10
1.3.1.9 Chapter 8: Aircrew Handout	1-11
1.3.1.10 Chapter 9: References	1-11
 Chapter 2 – Approach to SD Training	 2-1
2.1 Standardization Agreement STANAG 3114	2-1
2.2 Training as in Several Countries as of 2006	2-2
2.2.1 United States	2-3
2.2.1.1 Organisation	2-3
2.2.1.2 Classroom	2-4

2.2.1.3	Ground-Based Demonstration	2-4
2.2.1.4	In-Flight	2-4
2.2.1.5	Refresher Training	2-5
2.2.1.6	Objectives and Evaluation	2-5
2.2.1.7	Credentials SD Trainers	2-6
2.2.2	United Kingdom	2-6
2.2.2.1	Organisation	2-6
2.2.2.2	Classroom	2-6
2.2.2.3	Ground-Based Demonstration	2-7
2.2.2.4	In-Flight	2-7
2.2.2.5	Refresher Training	2-8
2.2.2.6	Objectives and Evaluation	2-8
2.2.2.7	Credentials SD Trainers	2-8
2.2.3	Canada	2-9
2.2.3.1	Organisation	2-9
2.2.3.2	Classroom	2-9
2.2.3.3	Ground-Based Demonstration	2-9
2.2.3.4	In-Flight	2-9
2.2.3.5	Refresher Training	2-9
2.2.3.6	Objectives and Evaluation	2-9
2.2.3.7	Credentials SD Trainers	2-10
2.2.4	Australia	2-10
2.2.4.1	Organisation	2-10
2.2.4.2	Classroom	2-10
2.2.4.3	Ground-Based Demonstration	2-10
2.2.4.4	In-Flight	2-11
2.2.4.5	Refresher Training	2-11
2.2.4.6	Objectives and Evaluation	2-11
2.2.4.7	Credentials SD Trainers	2-11
2.2.5	New Zealand	2-11
2.2.5.1	Organisation	2-11
2.2.5.2	Classroom	2-11
2.2.5.3	Ground-Based Demonstration	2-12
2.2.5.4	In-Flight	2-12
2.2.5.5	Refresher Training	2-12
2.2.5.6	Objectives and Evaluation	2-12
2.2.5.7	Credentials SD Trainers	2-12
2.2.6	Czech Republic	2-13
2.2.6.1	Organisation	2-13
2.2.6.2	Classroom	2-13
2.2.6.3	Ground-Based Demonstration	2-13
2.2.6.4	In-Flight	2-13
2.2.6.5	Refresher Training	2-13
2.2.6.6	Objectives and Evaluation	2-13
2.2.6.7	Credentials SD Trainers	2-13
2.2.7	Italy	2-14
2.2.7.1	Organisation	2-14

2.2.7.2	Classroom	2-14
2.2.7.3	Ground-Based Demonstration	2-14
2.2.7.4	In-Flight	2-14
2.2.7.5	Refresher Training	2-14
2.2.7.6	Objectives and Evaluation	2-15
2.2.8	The Netherlands	2-15
2.2.8.1	Organisation	2-15
2.2.8.2	Classroom	2-15
2.2.8.3	Ground-Based Demonstration	2-15
2.2.8.4	In-Flight	2-15
2.2.8.5	Refresher Training	2-16
2.2.8.6	Objectives and Evaluation	2-16
2.2.9	France	2-16
2.2.9.1	Organisation	2-16
2.2.9.2	Classroom	2-16
2.2.9.3	Ground-Based Demonstration	2-16
2.2.9.4	In-Flight	2-16
2.2.9.5	Refresher Training	2-16
2.2.9.6	Objectives and Evaluation	2-16
2.2.10	Germany	2-17
2.2.10.1	Organisation	2-17
2.2.10.2	Classroom	2-17
2.2.10.3	Ground-Based Demonstration	2-17
2.2.10.4	In-Flight	2-17
2.2.10.5	Refresher Training	2-18
2.2.10.6	Objectives and Evaluation	2-18
2.2.11	Sweden	2-18
2.2.11.1	Organisation	2-18
2.2.11.2	Classroom	2-18
2.2.11.3	Ground-Based Demonstration	2-18
2.2.11.4	In-Flight	2-18
2.2.11.5	Refresher Training	2-19
2.2.11.6	Objectives and Evaluation	2-19
2.2.12	Greece	2-19
2.2.12.1	Organisation	2-19
2.2.12.2	Classroom	2-19
2.2.12.3	Ground-Based Demonstration	2-19
2.2.12.4	In-Flight	2-20
2.2.12.5	Refresher Training	2-20
2.2.12.6	Objectives and Evaluation	2-20
2.3	Conclusions	2-21

Chapter 3 – Ground-Based SD Training	3-1
3.1 Introduction	3-1
3.2 Academic Instruction	3-2
3.2.1 Basics of SD Mechanism	3-2

3.2.2	The Didactic Syllabus of the SD Mechanisms	3-3
3.2.3	Organization of Academic Instruction	3-6
3.3	Demonstration of Basic Visual and Vestibular Illusions	3-6
3.3.1	Demonstration Goal: Showing the Basic SD Mechanisms	3-6
3.3.2	Organization	3-6
3.3.3	Equipment for Basic SD-Provocative Visual and Vestibular Illusions	3-8
3.3.4	Examples of Basic SD-Provocative Visual/Vestibular Illusions	3-8
3.3.4.1	Somatogyral and Oculogyral Illusion, Autokinetic Effect Device: Rotating Chair, Yaw Mode	3-8
3.3.4.2	Somatogravic Illusion, Somatogyral Illusion, Roll Vection Device: Rotating Chair, Eccentric Yaw Mode	3-9
3.3.4.3	Somatogravic Illusion, Somatogyral Illusion Device: Rotating Chair, Roll Mode	3-9
3.3.4.4	Visual-Vestibular Interaction in Coriolis Effects Device: Rotating Chair, Yaw Mode	3-10
3.3.4.5	Visual Frame (Rod-and-Frame Effect), Somatogravic Illusion, Oculogravic Illusion Device: Tilting Room	3-10
3.3.4.6	Circular Vection, Pseudo-Coriolis Effects Device: Optokinetic Drum	3-10
3.4	Ground-Based Training of In-Flight SD Illusions	3-10
3.4.1	Goal of Ground-Based Training of In-Flight Illusions	3-10
3.4.2	Organization	3-10
3.4.3	Equipment for Demonstrating In-Flight Illusions on the Ground	3-11
3.4.3.1	Fundamental Makeup of a Ground-Based SD Trainer	3-12
3.4.3.2	Cockpit or Cab	3-12
3.4.3.3	Visual Out-The-Window Scene (OTW Visuals)	3-12
3.4.3.4	Instruments	3-14
3.4.3.5	Motion Platform	3-14
3.4.3.6	Motion Cueing Requirements	3-14
3.4.3.7	Work Station	3-16
3.4.3.8	Future Ground-Based Simulators for SD Training	3-17
3.4.4	Examples of Ground-Based Demonstrations of In-Flight Illusions (AIR STD 61/117/14)	3-18
3.4.4.1	The Leans	3-19
3.4.5	Conclusion	3-23
3.5	Ground-Based SD Training Scenarios for Full Flight Simulators	3-23
3.5.1	Introduction	3-23
3.5.2	USAARL Simulator Training	3-23
3.5.2.1	General Procedure and Typical Example	3-23
3.5.3	The RAF CAM SD Simulator Training Study	3-25
3.5.3.1	Background	3-25
3.5.3.2	Trial Overview	3-25
3.5.3.3	Scenarios	3-26
3.5.3.4	Results	3-29
3.5.3.5	Conclusions	3-31
3.5.4	Usefulness of Full Flight Simulators for SD Training	3-31

Chapter 4 – In-Flight SD Training	4-1
4.1 Rotary Wing In-Flight Demonstration of SD Illusions	4-1
4.1.1 Introduction	4-1
4.1.2 Examples of Rotary-Wing SD Demonstration Maneuvers	4-1
4.1.2.1 Level Turn	4-1
4.1.2.2 Straight and Level	4-1
4.1.2.3 Straight and Level Deceleration	4-2
4.1.2.4 Inadvertent Descent	4-2
4.1.2.5 Hover	4-2
4.1.3 Organization	4-2
4.2 Fixed Wing In-Flight Demonstration of SD Illusions	4-2
4.2.1 Fixed Wing SD Demonstrations	4-2
4.2.2 Examples of Fixed-Wing SD Demonstration Maneuvers According to AIR STD 61/117/13	4-3
4.2.2.1 Pitch Misperception during Acceleration	4-3
4.2.2.2 Elevator Illusion	4-3
4.2.2.3 False Climb in a Turn	4-4
4.2.2.4 Diving During Turn Recovery	4-4
4.2.2.5 The Somatogyral Illusion	4-4
4.2.2.6 Post Roll Effect	4-4
4.2.2.7 Tilt with Skid	4-5
4.2.2.8 Coriolis Cross-Coupling Effect	4-5
4.2.3 Organization	4-5
4.3 In-Flight SD Training Scenarios	4-5
4.3.1 Management of SD in Flight	4-6
4.3.2 In-Flight Training	4-6
4.3.3 Inadvertent Entry into IMC	4-6
4.3.4 Recovery from Unusual Attitudes	4-6
4.3.5 Training the Trainers	4-7
Chapter 5 – SD Avoidance Training for Night Vision Devices	5-1
5.1 Ground-Based Demonstration of SD Aspects of Night Vision Devices	5-1
5.1.1 Introduction	5-1
5.1.2 Image Degradation	5-1
5.1.3 Terrain Board	5-3
5.1.4 Meteorological Demonstrations	5-3
5.1.4.1 Spectral Density	5-3
5.1.4.2 Halos	5-4
5.1.4.3 False Perspective	5-4
5.1.4.4 Shadows	5-4
5.1.4.5 Reflections	5-4
5.1.5 Conclusion	5-4
5.2 SD Training Scenarios for Night Vision Devices	5-5
5.2.1 Helmet Mounted Systems Training, Ground-Based	5-5
5.2.2 Night Vision Device Effects on Pilot Vision	5-5
5.2.2.1 Visual Acuity	5-5

5.2.2.2	Limited Field of View (FOV)	5-5
5.2.2.3	Color Discrimination	5-6
5.2.2.4	Illumination	5-6
5.2.2.5	Weather Considerations	5-6
5.2.2.6	Depth Perception and Distance Estimation	5-6
5.2.2.7	Obstruction Detection	5-7
5.2.2.8	Types of Surfaces	5-7
5.2.3	Considerations and Strategies for Flying with NVGs	5-7
5.2.3.1	Considerations for Fixed-Wing Flight with NVGs	5-7
5.2.3.2	Considerations for Helicopter Terrain Flight with NVGs	5-8
5.2.3.3	Strategies for Safe Aided Night Flight	5-8
5.2.4	Conclusions	5-9

Chapter 6 – Optimisation of SD Training **6-1**

6.1	Introduction	6-1
6.2	Organisation of Training	6-1
6.2.1	Timing of Training	6-1
6.2.2	Instructional Techniques	6-1
6.2.3	Training Assessment	6-4
6.3	Types of Training	6-4
6.3.1	Ground-Based SD Demonstration and Training	6-4
6.3.1.1	What Illusions Should be Demonstrated	6-5
6.3.1.2	Eye Tracking / Visual Scan Training for Refresher Courses	6-7
6.3.2	SD In-Flight Demonstration and Training	6-7
6.4	Some Practical Recommendations for Aircrew to Improve SD Awareness	6-8

Chapter 7 – Instructors **7-1**

7.1	Introduction	7-1
7.2	Personnel	7-1
7.2.1	Flight Surgeons, Physicians (In General, Instructors with a Life Science Background)	7-2
7.2.2	Pilots/Navigators	7-2
7.2.3	Neurophysiologists/Neuropsychologists	7-3
7.2.4	Technical Personnel	7-3
7.3	Certification	7-3

Chapter 8 – Aircrew Handout (Example) **8-1**

8.1	Introduction	8-1
8.2	Text for SD Handout	8-1
8.2.1	Definitions	8-1
8.2.2	Sensory Organs	8-1
8.2.3	Brain Function	8-2
8.2.4	Most Common SDs	8-2
8.2.5	Factors Linked to SD	8-3
8.3	Example of Single Sheet SD Handout	8-4

Chapter 9 – References **9-1**

List of Figures/Tables

Figure		Page
Figure 3.1	Motion System Complexity Enables More Complex SD Manoeuvres to be Simulated	3-15
Figure 3.2	Scheme for the Analysis of Perceived Motion in Real and Simulated Flight	3-16
Figure 3.3	Gyro IPT II (ETC, Southampton, PA)	3-19
Figure 3.4	Airfox Diso (AMST, Ranshofen, Austria)	3-21
Figure 3.5	Diagrammatic Representation of the Trial Design	3-26
Figure 3.6	Mean Instructor Ratings for the SD Trained and Control Groups in the Test Scenario (** p < 0.01, *** p < 0.001)	3-30
Figure 3.7	The Percentage of Students in the SD Trained (n = 9) and Control Groups (n = 9) in the Test Scenario who were Rated by the Instructor as Well-Prepared for the Unexpected	3-30
Figure 5.1	Visualization of the Degradation of Image Quality of a Modern NVG Relative to Normal Daylight Vision, without the Characteristic Photon Noise	5-2
Figure 5.2	Effect of Lights with Different Colors	5-3
Figure 5.3	Line of Sight	5-4
Figure 8.1	SD Handout Side A	8-4
Figure 8.2	SD Handout Side B	8-5
 Table		
Table 1.1	Percentage of Accidents Featuring SD for the Two Analysis Periods	1-4
Table 1.2	International Comparison of SD Related Class A Mishaps	1-5
Table 2.1	SD Training by Country	2-2
Table 2.2	SD Training Sorties (Standard Profiles for SD Training)	2-20
Table 3.1	Categorisation of SD Devices According to AIR STD 61/117/14	3-11
Table 3.2	The Illusions for Fixed- and Rotary-wing SD Demonstration as Presented in AIR STD 61/117/14	3-18
Table 6.1	Examples of Situations that have Caused SD Incidents or Accidents	6-3
Table 6.2	Barany Chair (Category 1) Ground-Based SD Demonstration	6-4
Table 6.3	Rotary-Wing Aircraft Ground-Based SD Demonstration	6-5
Table 6.4	Fixed-Wing Aircraft Ground-Based SD Demonstration	6-6
Table 7.1	Personnel Suggested for Basic and Advanced SD Courses	7-2

List of Acronyms

3-D	Three dimensional
AB	After Burner
ACAS	Aircraft Collision Avoidance System
ACM	Air Combat Manoeuvres
ADI	Attitude Display Indicator
AF	Air Force
AFB	Air Force Base
AFCS	Automatic Flight Control System
AFRL	Air Force Research Laboratory
AGARD	Advisory Group for Aerospace Research and Development
AGL	Above Ground Level
AI	Aircrew Instructor
AI	Attitude Indicator
AIAA	American Institute of Aeronautics and Astronautics
AMTI	AeroMedical Training Institute
AOB	Angle of Bank
AP	Aerospace Physiology
API	Aviation Pre-flight Indoctrination
APTO	Aviation Physiology Training Officer
ASAR	Arc Segment Attitude Reference symbology (similar to NDFR)
ASCC	Air Standardization Coordinating Committee
ATC	Air Traffic Control
AVMED	Aviation MEDicine
Avn	Aviation
CA	Consultant Advisor
CAVOK	Cloud and Visibility OK
CF	Canadian Forces
CFIT	Controlled Flight into Terrain
CML	<i>Centrum voor Mens en Luchtvaart</i> , Centre for Man and Aviation, RNLAf
CRM	Cockpit Resource Management / Crew Resource Management
CRT	Cathode Ray Tube
CTP	Course Training Plan
CTS	Course Training Standard
DDI	Digital Display Indicator
DESDEMONA	DESoriëntatie DEMONstrator Amst (advanced SD trainer by AMST)
DFS	Dynamic Flight Simulator
DISO	DISOrientation trainer (SD trainer DISO Airfox by AMST)
DoF	Degrees of Freedom
DOT	DesOrientierungs Trainer
EC	Enabling Check
EO	Enabling Objective
Fatt	Fighter Attack
FFS	Full Flight Simulator
FLIR	Forward-Looking InfraRed

FOV	Field of View
FS	Flight Surgeon
FTD	Flight Training Device
FW	Fixed Wing
GAF	German Air Force
GAFIAM	German Air Force Institute of Aviation Medicine
GCAS	Ground Collision Avoidance System
GPWS	Ground Proximity Warning System
Gyro IPT	Gyro Integrated Physiological Trainer (by ETC)
HCAM	Hellenic Centre for Aviation Medicine
HDG	Heading
HEA	Human Effectiveness Aircrew Training Division
HITS	Highway-in-the-Sky
HMD	Helmet Mounted Display
HMS	Helmet Mounted System
HP	Handling Pilot
HUD	Head Up Display
IFC	Instrument Flying Conditions
IFR	Instrument Flight Rules
IHADSS	Integrated Helmet And Display Sighting System
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IP	Instructor Pilot
IR	InfraRed
ITAF	ITalian Air Force
JHC	Joint Helicopter Command
LED	Light Emitting Diode
LS	Landing Site
LSA	Loss of Situational Awareness
MD	Medical Doctor
MFD	Multi Function Display
MMR	Multi-Mode Radar
MSDD	Multi-Station Disorientation Demonstrator
NAMRL	Naval Aerospace Medical Research Laboratory
NASTP	Naval Aviation Survival Training Program
NATO	North Atlantic Treaty Organisation
NDFR	Non-Distributed Flight Reference symbology (similar to ASAR)
NHP	Non-Handling Pilot
NM	Nautical Miles
NOE	Nap of the Earth
NOMI	Naval Operational Medical Institute
NVD	Night Vision Device
NVG	Night Vision Goggle
OTW	Out-the-Window (visuals)
OVC	Overcast

PAR	Precision Approach Radar
PO	Performance Objective
PWR	Power
QFI	Qualified Flight Instructor
RAAF	Royal Australian Air Force
RADALT	Radar Altimeter
RAeS	Royal Aeronautical Society
RAF	United Kingdom Royal Air Force
RAF CAM	RAF Centre of Aviation Medicine
RFA	Remote Field Area
RNLAF	Royal Netherlands Air Force
RT	Radio Transmission
RTB	Return to Base
RTO	Research & Technology Organisation
RW	Rotary Wing
SA	Situational Awareness
SAM	Specialist in Aviation Medicine
SD	Spatial Disorientation
SID	Standard Instrument Departure
SORD	Spatial Orientation Retention Device
SP	Student Pilot
STANAG	Standardization Agreement
STD	Standard
SUPT	Specialized Undergraduate Pilot Training
TADS	Target Acquisition and Designation System
TCAS	Traffic-alert and Collision-Avoidance System
TG	Task Group
TNO	<i>Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek</i> , Netherlands Organisation for Applied Scientific Research
TOR	Terms of Reference
TSAS	Tactile Situation Awareness System
TTTD	TNO Tactile Torso Display
UA	Unusual Attitude
UAV	Unmanned Air Vehicle
UK	United Kingdom
UNT	Undergraduate Navigation Training
US	United States
USAARL	US Army Aeromedical Research Laboratory
USAF	United States Air Force
VMC	Visual Meteorological Conditions
WP	Working Party

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¹ The authors dedicate this report to Curtis Spenny, who enjoyed working on this report. He was unable to complete his contribution because of his untimely death.

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14. Abstract	<p>Recent accident statistics reveal that Spatial Disorientation (SD) is still a major threat to flight safety in many NATO countries. A review of SD training programmes as applied in most NATO countries, in agreement with STANAG 3114, shows that SD training is not fully developed. The goal of the report is to provide the necessary information to improve these SD training programmes. To this purpose, the report provides many detailed examples of ground-based and in-flight SD training scenarios. Ground-based training devices range from Barany chairs to Full Flight Simulators; in-flight SD training scenarios are described for rotary wing as well as for fixed wing aircraft. A separate chapter is devoted to SD avoidance training for Night Vision Devices.</p> <p>The report also pays attention to the optimization of the SD training programme by selecting the appropriate SD scenarios, by choosing and training the right personnel and by the suitable integration of basic and continuation SD courses into the pilot training programme. An adequate training programme will enhance SD awareness, and consequently, flight safety.</p>																							





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