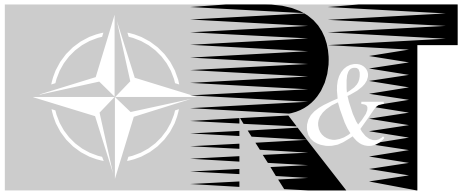
RTO-MP-062
AC/323(HFM-050)TP/34

RTO-MP-062

NORTH ATLANTIC TREATY ORGANIZATION



RESEARCH AND TECHNOLOGY ORGANIZATION

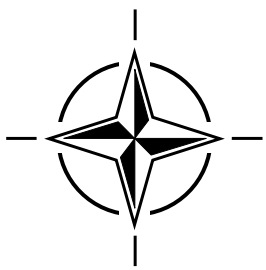
BP 25, 7 RUE ANCELLE, F-92201 NEUILLY-SUR-SEINE CEDEX, FRANCE

RTO MEETING PROCEEDINGS 62

Operational Medical Issues in Hypo- and Hyperbaric Conditions

(les Questions médicales à caractère opérationnel liées aux conditions hypobares ou hyperbares)

Papers presented at the RTO Human Factors and Medicine Panel (HFM) Symposium held in Toronto, Canada, 16-19 October 2000.



Published June 2001

Distribution and Availability on Back Cover

This page has been deliberately left blank

Page intentionnellement blanche

RTO-MP-062
AC/323(HFM-050)TP/34

NORTH ATLANTIC TREATY ORGANIZATION

RESEARCH AND TECHNOLOGY ORGANIZATION

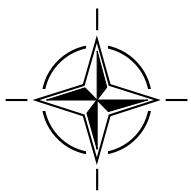
BP 25, 7 RUE ANCELLE, F-92201 NEUILLY-SUR-SEINE CEDEX, FRANCE

RTO MEETING PROCEEDINGS 62

Operational Medical Issues in Hypo- and Hyperbaric Conditions

(les Questions médicales à caractère opérationnel liées aux conditions hypobares ou hyperbares)

Papers presented at the RTO Human Factors and Medicine Panel (HFM) Symposium held in Toronto, Canada, 16-19 October 2000.



The Research and Technology Organization (RTO) of NATO

RTO is the single focus in NATO for Defence Research and Technology activities. Its mission is to conduct and promote cooperative research and information exchange. The objective is to support the development and effective use of national defence research and technology and to meet the military needs of the Alliance, to maintain a technological lead, and to provide advice to NATO and national decision makers. The RTO performs its mission with the support of an extensive network of national experts. It also ensures effective coordination with other NATO bodies involved in R&T activities.

RTO reports both to the Military Committee of NATO and to the Conference of National Armament Directors. It comprises a Research and Technology Board (RTB) as the highest level of national representation and the Research and Technology Agency (RTA), a dedicated staff with its headquarters in Neuilly, near Paris, France. In order to facilitate contacts with the military users and other NATO activities, a small part of the RTA staff is located in NATO Headquarters in Brussels. The Brussels staff also coordinates RTO's cooperation with nations in Middle and Eastern Europe, to which RTO attaches particular importance especially as working together in the field of research is one of the more promising areas of initial cooperation.

The total spectrum of R&T activities is covered by the following 7 bodies:

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

These bodies are made up of national representatives as well as generally recognised 'world class' scientists. They also provide a communication link to military users and other NATO bodies. RTO's scientific and technological work is carried out by Technical Teams, created for specific activities and with a specific duration. Such Technical Teams can organise workshops, symposia, field trials, lecture series and training courses. An important function of these Technical Teams is to ensure the continuity of the expert networks.

RTO builds upon earlier cooperation in defence research and technology as set-up under the Advisory Group for Aerospace Research and Development (AGARD) and the Defence Research Group (DRG). AGARD and the DRG share common roots in that they were both established at the initiative of Dr Theodore von Kármán, a leading aerospace scientist, who early on recognised the importance of scientific support for the Allied Armed Forces. RTO is capitalising on these common roots in order to provide the Alliance and the NATO nations with a strong scientific and technological basis that will guarantee a solid base for the future.

Published June 2001

ISBN 92-837-0019-8

Printed by St. Joseph Ottawa/Hull
(A St. Joseph Corporation Company)
45 Sacré-Cœur Blvd., Hull (Québec), Canada J8X 1C6

Operational Medical Issues in Hypo- and Hyperbaric Conditions

(RTO MP-062 / HFM-050)

Executive Summary

On 16-19 October 2000, NATO, Partnership for Peace, and Non-NATO nationals from 24 countries met in Toronto, Canada to discuss baromedical issues relevant to alliance operations. This was a symposium, not a consensus conference. Accordingly, the speeches and discussions presented the state-of-the-art, rather than arriving at definite conclusions or unanimous recommendations for all alliance nations.

Hypo- and hyperbaric exposures are encountered regularly in routine military operations, and require a high level of operational and medical expertise to avoid acute and long-term injury, or even mission failure.

In spite of more than 100 years of experience and research on decompression illness (DCI) in diving and aviation, this is still a major problem in alliance operations. Relevant research regarding improvement of operational and treatment procedures are in progress in several alliance nations. NATO/RTA/RTO/HFM should form a group of experts in baromedicine to follow closely research regarding DCI, breathing gas composition and possible long-term health damage from diving. The group should promote co-operation between relevant centres, and encourage exchange of research data. The group members should meet annually to discuss what should be recommended for implementation in technical and operational manuals, and which projects should be supported by the alliance.

Hyperbaric oxygen therapy (HBO) has proved valuable also on a number of indications other than dysbaric conditions, like typical battlefield injuries on sea and land. Accordingly, the alliance should see to that this treatment modality becomes available in or near theatres of operations, in order to save limbs and lives.

Alternobaric vertigo is encountered regularly, especially during diving. In aviation it may prove dangerous, especially in agile fighter aircraft. HFM should make sure that knowledge about how to tackle this type of dizziness becomes available in all alliance nations.

Selection, training and adaptation of personnel for special operations in hypo- and hyperbaric conditions are crucial for mission success. Several interesting and promising aspects on these issues were presented. HFM should follow up the ongoing research in this area, and recommend implication of relevant new knowledge into operational procedures. That could be done by arranging small consensus conferences on selected topics.

Eventually, in a few years another state-of-the-art symposium like the present one should be arranged.

les Questions médicales à caractère opérationnel liées aux conditions hypobares ou hyperbares

(RTO MP-062 / HFM-050)

Synthèse

Des représentants des pays membres de l'OTAN, des pays du Partenariat pour la Paix (PpP) et de 24 pays non-membres de l'OTAN se sont réunis du 16 au 19 octobre 2000 à Toronto au Canada pour aborder différentes questions baromédicales liées aux opérations de l'Alliance. Il s'agissait d'un symposium et non pas d'une conférence consensuelle. De ce fait, les présentations et les discussions n'ont présenté que l'état actuel des connaissances dans ce domaine et ne cherchaient donc pas à établir des conclusions ou des recommandations unanimes pour l'ensemble des pays de l'Alliance.

L'exposition aux conditions hypobares et hyperbares est fréquente lors des opérations militaires courantes et exige un haut niveau d'expertise médicale et opérationnelle pour empêcher toute lésion aigüe et de longue durée, voire même l'échec de la mission.

En dépit de plus de 100 ans d'expérience et de recherches sur les barotraumatismes (DCI) dans les domaines de la plongée et de l'aviation, ce type d'exposition pose toujours des problèmes considérables pour les opérations de l'Alliance. Des travaux de recherche sur l'amélioration des procédures de traitement et des procédures opérationnelles sont en cours dans plusieurs pays de l'Alliance. NATO/RTO/RTA/HFM devrait prochainement créer un groupe de spécialistes en baromédecine avec pour mandat de suivre de très près les travaux de recherche sur la DCI, la composition du mélange respiratoire et la dégradation possible de la santé à long terme liée à l'activité de plongée. Le groupe devra chercher à promouvoir la coopération entre les différents centres concernés et encourager l'échange de données résultant des recherches menées. Les membres du groupe devront se réunir une fois par an pour discuter d'éventuelles recommandations en ce qui concerne les manuels techniques et opérationnels et les projets qui devraient être soutenus par l'Alliance.

L'oxythérapie hyperbare (HBO) s'est avérée efficace dans un certain nombre de cas autres que dysbariques, comme les lésions de champ de bataille à terre ou en mer. Par conséquent, l'Alliance doit assurer la présence d'une telle capacité de traitement sur ou à proximité des théâtres d'opérations afin d'épargner des vies.

Le vertige alternobare est rencontré régulièrement, surtout lors des opérations de plongée sous-marine. En aviation il peut s'avérer dangereux, en particulier pour les pilotes d'avions de combat très manoeuvrants; HFM devra s'assurer que les informations concernant le traitement de ce type de vertige sont diffusées à l'ensemble des pays de l'Alliance.

La sélection, l'entraînement et l'adaptation des personnels devant exécuter des missions dans des conditions hypobares et hyperbares sont décisifs pour la réussite des missions. Différents aspects intéressants et prometteurs de ces questions ont été présentés. HFM devra suivre les travaux de recherche actuellement en cours dans ce domaine et faire des recommandations concernant l'intégration de ces nouvelles connaissances dans les procédures opérationnelles. Pour cela, il suffirait d'organiser des conférences consensuelles à petite échelle sur des sujets particuliers.

Ensuite, dans quelques années, un autre symposium résumant l'état des connaissances dans ce domaine pourrait être envisagé.

Click inside the blue boxes or on the titles to view the corresponding section

Contents

SESSION V: HYPOBARIC MEDICINE RESEARCH

Human Factors and Medicine Panel

Chairman:

Dr M.C. WALKER
Director, Centre for Human Sciences
DERA
F138 Building - Room 204
Farnborough, Hants GU14 OLX
United Kingdom

Vice-Chairman:

Col. W. C. M. TIELEMANS, MD
RNLAF/SGO
P.O. Box 20703
Binckhorstlaan, 135
2500 ES The Hague
The Netherlands

PROGRAMME COMMITTEE

Chairmen

LtCol. Dr. FRANCISCO RIOS TEJADA
SPAF Aeromedical Center (CIMA)
Arturo Soria 82, 28027 Madrid - SPAIN
Tel: 34 91408 4028 Fax: 34 91408 4027
Email: francisco.rios@aero.cima.es

Dr. A. J. F. MACMILLAN
Royal Air Force Centre of Aviation Medicine
Farnborough, Hants GU14 6SZ - UK
Tel: 44- 1252 392 635 Fax: 44 1252 393 469
Email: farnborough@rafcam.org.uk

Members

Col. Med E. ROEDIG
Generalartz der Luftwaffe. Fachdienstliche Abteilung II
PO Box 902500, BW 356
Koeln-Wahn 552 - GERMANY
Tel: 49 2241 95 80 236
Fax: 49 2241 388 036
Email: recce52@aol.com

Med. Chef J. P. MENU
HIA Saint Anne/IMNSSA/D
Boulevard Saint Anne
83800 Toulon Naval - FRANCE
Tel: 33 4 9409 9168 Fax: 33 4 9409 9251
Email: jp.menu@wanadoo.fr

Col. Dr G. WOLF
Chief Division Hyperbaric Medicine
USAFSAM/FEH, 2602 West Gate Road
Brooks AFB, San Antonio, TX 78235 - USA
Tel: 1 210 536 3281 Fax: 1 210 536 2944
Email: george.wolf@brooks.af.mil

Surgeon Capt. Dr W. GRONFELDT
Danish Armed Forces Health Services
Jaegersborg Alle 150, PO BOX 96
DK-2820 Gentoffe - DENMARK
Tel: 45 3977 1241 Fax: 45 3977 1220
Email: fsusls@hotmail.com

Col. Dr D. IVAN
Chief Clinical Services
USAFSAM/AFC
2507 Kennedy Circle
Brooks AFB, TX 78235-5117 - USA
Tel: 1 210 536 3241
Email: douglas.ivan@samafc.brooks.af

PANEL EXECUTIVE

Dr C. WIENTJES
BP 25 - 7, Rue Ancelle
92201 Neuilly-sur-Seine, France
Tel: +33 1 55 61 22 60
Fax: +33 1 55 61 22 98
E-mail: wientjesc@rta.nato.int or pelatd@rta.nato.int

REPORT DOCUMENTATION PAGE

1. Recipient's Reference	2. Originator's References	3. Further Reference	4. Security Classification of Document
	RTO-MP-062 AC/323(HFM-050)TP/34	ISBN 92-837-0019-8	UNCLASSIFIED/ UNLIMITED

5. Originator

Research and Technology Organization
North Atlantic Treaty Organization
BP 25, 7 rue Ancelle, F-92201 Neuilly-sur-Seine Cedex, France

6. Title

Operational Medical Issues in Hypo- and Hyperbaric Conditions

7. Presented at/sponsored by

the RTO Human Factors and Medicine Panel (HFM) Symposium held in Toronto, Canada, 16-19 October 2000.

8. Author(s)/Editor(s)	9. Date
Multiple	June 2001
10. Author's/Editor's Address	**11. Pages**
Multiple	382

12. Distribution Statement

There are no restrictions on the distribution of this document. Information about the availability of this and other RTO unclassified publications is given on the back cover.

13. Keywords/Descriptors

Hyperbaric medicine	Hypoxia	Aerospace medicine
Human factors engineering	Personnel selection	Pressure suits
Breathing gases	Eustachian tube	Nitrogen
Decompression sickness	Barotrauma	Oxygen
Military medicine	Vertigo	Hypobaric chambers
Decompression chambers	Pressure breathing	Anti-g suits
Respiration	Diving	
Breathing apparatus	High altitude	

14. Abstract

On 16-19 October 2000, NATO, Partnership for Peace (PfP) and Non-NATO nationals from 24 countries met in Toronto, Canada to attend a symposium on Operational Medical Issues in Hypo- and Hyperbaric Conditions relevant to the alliance, arranged by NATO/RTO/HFM. Exposures to the said conditions are experienced regularly in military operations, but this was the first time operational medical issues affecting air, sea and land forces were addressed in a NATO forum. Canada was chosen as venue site due to Canadian research establishments' expertise in special environmental issues. Themes addressed were decompression illness, breathing gas composition, hypoxia, hyperbaric oxygen treatment of combat injuries, selection, training and adaptation of personnel for special operations, Eustachian tube function, barotrauma, alternobaric vertigo, positive pressure breathing and long term health damage in divers. Relevant technical issues were also discussed.

This page has been deliberately left blank

Page intentionnellement blanche

NORTH ATLANTIC TREATY ORGANIZATION

RESEARCH AND TECHNOLOGY ORGANIZATION
BP 25 • 7 RUE ANCELLE
F-92201 NEUILLY-SUR-SEINE CEDEX • FRANCE
Télécopie 0(1)55.61.22.99 • E-mail mailbox@rta.nato.int

DIFFUSION DES PUBLICATIONS
RTO NON CLASSIFIEES

L'Organisation pour la recherche et la technologie de l'OTAN (RTO), détient un stock limité de certaines de ses publications récentes, ainsi que de celles de l'ancien AGARD (Groupe consultatif pour la recherche et les réalisations aérospatiales de l'OTAN). Celles-ci pourront éventuellement être obtenues sous forme de copie papier. Pour de plus amples renseignements concernant l'achat de ces ouvrages, adressez-vous par lettre ou par télécopie à l'adresse indiquée ci-dessus. Veuillez ne pas téléphoner.

Des exemplaires supplémentaires peuvent parfois être obtenus auprès des centres nationaux de distribution indiqués ci-dessous. Si vous souhaitez recevoir toutes les publications de la RTO, ou simplement celles qui concernent certains Panels, vous pouvez demander d'être inclus sur la liste d'envoi de l'un de ces centres.

Les publications de la RTO et de l'AGARD sont en vente auprès des agences de vente indiquées ci-dessous, sous forme de photocopie ou de microfiche. Certains originaux peuvent également être obtenus auprès de CASI.

CENTRES DE DIFFUSION NATIONAUX

ALLEMAGNE
Streitkräfteamt / Abteilung III
Fachinformationszentrum der Bundeswehr, (FIZBw)
Friedrich-Ebert-Allee 34
D-53113 Bonn

BELGIQUE
Coordinateur RTO - VSL/RTO
Etat-Major de la Force Aérienne
Quartier Reine Elisabeth
Rue d'Evère, B-1140 Bruxelles

CANADA
Services d'information scientifique pour la défense (SISD)
R et D pour la défense Canada
Ministère de la Défense nationale
Ottawa, Ontario K1A 0K2

DANEMARK
Danish Defence Research Establishment
Ryvangs Allé 1, P.O. Box 2715
DK-2100 Copenhagen Ø

ESPAGNE
INTA (RTO/AGARD Publications)
Carretera de Torrejón a Ajalvir, Pk.4
28850 Torrejón de Ardoz - Madrid

ETATS-UNIS
NASA Center for AeroSpace Information (CASI)
Parkway Center
7121 Standard Drive
Hanover, MD 21076-1320

FRANCE
O.N.E.R.A. (ISP)
29, Avenue de la Division Leclerc
BP 72, 92322 Châtillon Cedex

GRECE (Correspondant)
Hellenic Ministry of National Defence
Defence Industry Research & Technology General Directorate
Technological R&D Directorate
D.Soutsou 40, GR-11521, Athens

HONGRIE
Department for Scientific Analysis
Institute of Military Technology
Ministry of Defence
H-1525 Budapest P O Box 26

ISLANDE
Director of Aviation
c/o Flugrad
Reykjavik

ITALIE
Centro di Documentazione Tecnico-Scientifica della Difesa
Via XX Settembre 123a
00187 Roma

LUXEMBOURG
Voir Belgique

NORVEGE
Norwegian Defence Research Establishment
Attn: Biblioteket
P.O. Box 25, NO-2007 Kjeller

PAYS-BAS
NDRCC
DGM/DWOO
P.O. Box 20701
2500 ES Den Haag

POLOGNE
Chief of International Cooperation Division
Research & Development Department
218 Niepodleglosci Av.
00-911 Warsaw

PORTUGAL
Estado Maior da Força Aérea
SDFA - Centro de Documentação
Alfragide
P-2720 Amadora

REPUBLIQUE TCHEQUE
Distribuční a informační středisko R&T
VTÚL a PVO Praha
Mladoboleslavská ul.
197 06 Praha 9-Kbely AFB

ROYAUME-UNI
Defence Research Information Centre
Kentigern House
65 Brown Street
Glasgow G2 8EX

TURQUIE
Millî Savunma Başkanliği (MSB)
ARGE Dairesi Başkanliği (MSB)
06650 Bakanliklar - Ankara

AGENCES DE VENTE

NASA Center for AeroSpace Information (CASI)
Parkway Center
7121 Standard Drive
Hanover, MD 21076-1320
Etats-Unis

The British Library Document Supply Centre
Boston Spa, Wetherby
West Yorkshire LS23 7BQ
Royaume-Uni

Canada Institute for Scientific and Technical Information (CISTI)
National Research Council
Document Delivery
Montreal Road, Building M-55
Ottawa K1A 0S2, Canada

Les demandes de documents RTO ou AGARD doivent comporter la dénomination "RTO" ou "AGARD" selon le cas, suivie du numéro de série (par exemple AGARD-AG-315). Des informations analogues, telles que le titre et la date de publication sont souhaitables. Des références bibliographiques complètes ainsi que des résumés des publications RTO et AGARD figurent dans les journaux suivants:

Scientific and Technical Aerospace Reports (STAR)
STAR peut être consulté en ligne au localisateur de ressources uniformes (URL) suivant:
http://www.sti.nasa.gov/Pubs/star/Star.html
STAR est édité par CASI dans le cadre du programme NASA d'information scientifique et technique (STI)
STI Program Office, MS 157A
NASA Langley Research Center
Hampton, Virginia 23681-0001
Etats-Unis

Government Reports Announcements & Index (GRA&I)
publié par le National Technical Information Service
Springfield
Virginia 2216
Etats-Unis
(accessible également en mode interactif dans la base de données bibliographiques en ligne du NTIS, et sur CD-ROM)

Imprimé par St-Joseph Ottawa/Hull
(Membre de la Corporation St-Joseph)
45, boul. Sacré-Cœur, Hull (Québec), Canada J8X 1C6

NORTH ATLANTIC TREATY ORGANIZATION

RESEARCH AND TECHNOLOGY ORGANIZATION
BP 25 • 7 RUE ANCELLE
F-92201 NEUILLY-SUR-SEINE CEDEX • FRANCE
Telefax 0(1)55.61.22.99 • E-mail mailbox@rta.nato.int

DISTRIBUTION OF UNCLASSIFIED RTO PUBLICATIONS

NATO's Research and Technology Organization (RTO) holds limited quantities of some of its recent publications and those of the former AGARD (Advisory Group for Aerospace Research & Development of NATO), and these may be available for purchase in hard copy form. For more information, write or send a telefax to the address given above. **Please do not telephone**.

Further copies are sometimes available from the National Distribution Centres listed below. If you wish to receive all RTO publications, or just those relating to one or more specific RTO Panels, they may be willing to include you (or your organisation) in their distribution.

RTO and AGARD publications may be purchased from the Sales Agencies listed below, in photocopy or microfiche form. Original copies of some publications may be available from CASI.

NATIONAL DISTRIBUTION CENTRES

BELGIUM
Coordinateur RTO - VSL/RTO
Etat-Major de la Force Aérienne
Quartier Reine Elisabeth
Rue d'Evère, B-1140 Bruxelles

CANADA
Defence Scientific Information Services (DSIS)
Defence R&D Canada
Department of National Defence
Ottawa, Ontario K1A 0K2

CZECH REPUBLIC
Distribuční a informační středisko R&T
VTÚL a PVO Praha
Mladoboleslavská ul.
197 06 Praha 9-Kbely AFB

DENMARK
Danish Defence Research Establishment
Ryvangs Allé 1, P.O. Box 2715
DK-2100 Copenhagen Ø

FRANCE
O.N.E.R.A. (ISP)
29 Avenue de la Division Leclerc
BP 72, 92322 Châtillon Cedex

GERMANY
Streitkräfteamt / Abteilung III
Fachinformationszentrum der Bundeswehr, (FIZBw)
Friedrich-Ebert-Allee 34
D-53113 Bonn

GREECE (Point of Contact)
Hellenic Ministry of National Defence
Defence Industry Research & Technology General Directorate
Technological R&D Directorate
D.Soutsou 40, GR-11521, Athens

HUNGARY
Department for Scientific Analysis
Institute of Military Technology
Ministry of Defence
H-1525 Budapest P O Box 26

ICELAND
Director of Aviation
c/o Flugrad
Reykjavik

ITALY
Centro di Documentazione Tecnico-Scientifica della Difesa
Via XX Settembre 123a
00187 Roma

LUXEMBOURG
See Belgium

NETHERLANDS
NDRCC
DGM/DWOO
P.O. Box 20701
2500 ES Den Haag

NORWAY
Norwegian Defence Research Establishment
Attn: Biblioteket
P.O. Box 25, NO-2007 Kjeller

POLAND
Chief of International Cooperation Division
Research & Development Department
218 Niepodleglosci Av.
00-911 Warsaw

PORTUGAL
Estado Maior da Força Aérea
SDFA - Centro de Documentação
Alfragide
P-2720 Amadora

SPAIN
INTA (RTO/AGARD Publications)
Carretera de Torrejón a Ajalvir, Pk.4
28850 Torrejón de Ardoz - Madrid

TURKEY
Millî Savunma Başkanliği (MSB)
ARGE Dairesi Başkanliği (MSB)
06650 Bakanliklar - Ankara

UNITED KINGDOM
Defence Research Information Centre
Kentigern House
65 Brown Street
Glasgow G2 8EX

UNITED STATES
NASA Center for AeroSpace Information (CASI)
Parkway Center
7121 Standard Drive
Hanover, MD 21076-1320

SALES AGENCIES

NASA Center for AeroSpace Information (CASI)
Parkway Center
7121 Standard Drive
Hanover, MD 21076-1320
United States

The British Library Document Supply Centre
Boston Spa, Wetherby
West Yorkshire LS23 7BQ
United Kingdom

Canada Institute for Scientific and Technical Information (CISTI)
National Research Council
Document Delivery
Montreal Road, Building M-55
Ottawa K1A 0S2, Canada

Requests for RTO or AGARD documents should include the word 'RTO' or 'AGARD', as appropriate, followed by the serial number (for example AGARD-AG-315). Collateral information such as title and publication date is desirable. Full bibliographical references and abstracts of RTO and AGARD publications are given in the following journals:

Scientific and Technical Aerospace Reports (STAR)
STAR is available on-line at the following uniform resource locator:
http://www.sti.nasa.gov/Pubs/star/Star.html
STAR is published by CASI for the NASA Scientific and Technical Information (STI) Program
STI Program Office, MS 157A
NASA Langley Research Center
Hampton, Virginia 23681-0001
United States

Government Reports Announcements & Index (GRA&I)
published by the National Technical Information Service
Springfield
Virginia 22161
United States
(also available online in the NTIS Bibliographic Database or on CD-ROM)

Printed by St. Joseph Ottawa/Hull
(A St. Joseph Corporation Company)
45 Sacré-Cœur Blvd., Hull (Québec), Canada J8X 1C6

ISBN 92-837-0019-8