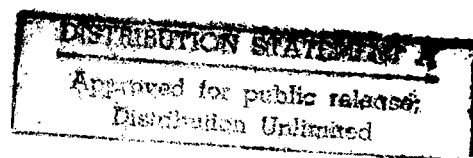


UNITED STATES AIR FORCE
RESEARCH LABORATORY

USER'S GUIDE FOR THE PREPARATION AND ORGANIZATION OF SCIENTIFIC & TECHNICAL PUBLICATIONS

July 1998

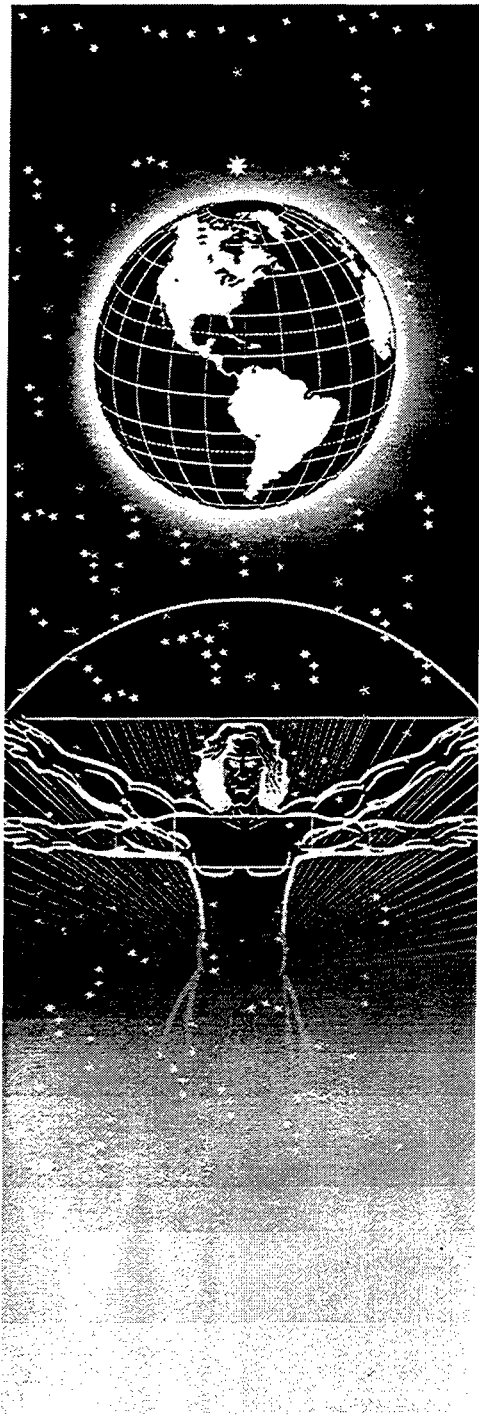
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Air Force Research Laboratory
Human Effectiveness Directorate
Integration and Operations Division
Wright-Patterson AFB OH 45433-7008

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Preface

This guide was carefully prepared and organized by Patricia Lewandowski. It is a collection of material, most original, some borrowed from other organizations, but designed to present in “picture” format everything you may need to know to prepare a Scientific or Technical Publication.

Many thanks to Ms. Ernestine West for painstakingly taking Ms. Lewandowski’s material and designing and translating it onto paper in a most professional manner.

The Scientific and Technical Information Office (STINFO), Human Effectiveness Directorate, Integration and Operations Division, has created a Style Guide for your use in the preparation, organization and distribution of technical publications prepared by our in-house scientists and engineers, as well as our DoD contractors. The documents are representative of our product to the outside world and play an extremely important “marketing” role for future customer interest as well as possible technology transfer to the commercial world.

It is the responsibility of everyone involved in this process to ensure the best possible quality of the end product in the most efficient manner possible. It is for that reason this guide has been written.

Please use this guide to prepare technical material for publication. It is concise and full of illustrations on “HOW TO” prepare quality products in a timely manner.

Provided there are any, the STINFO will include any changes, updates, etc to this Guide in the STINFO Quarterly Newsletter.

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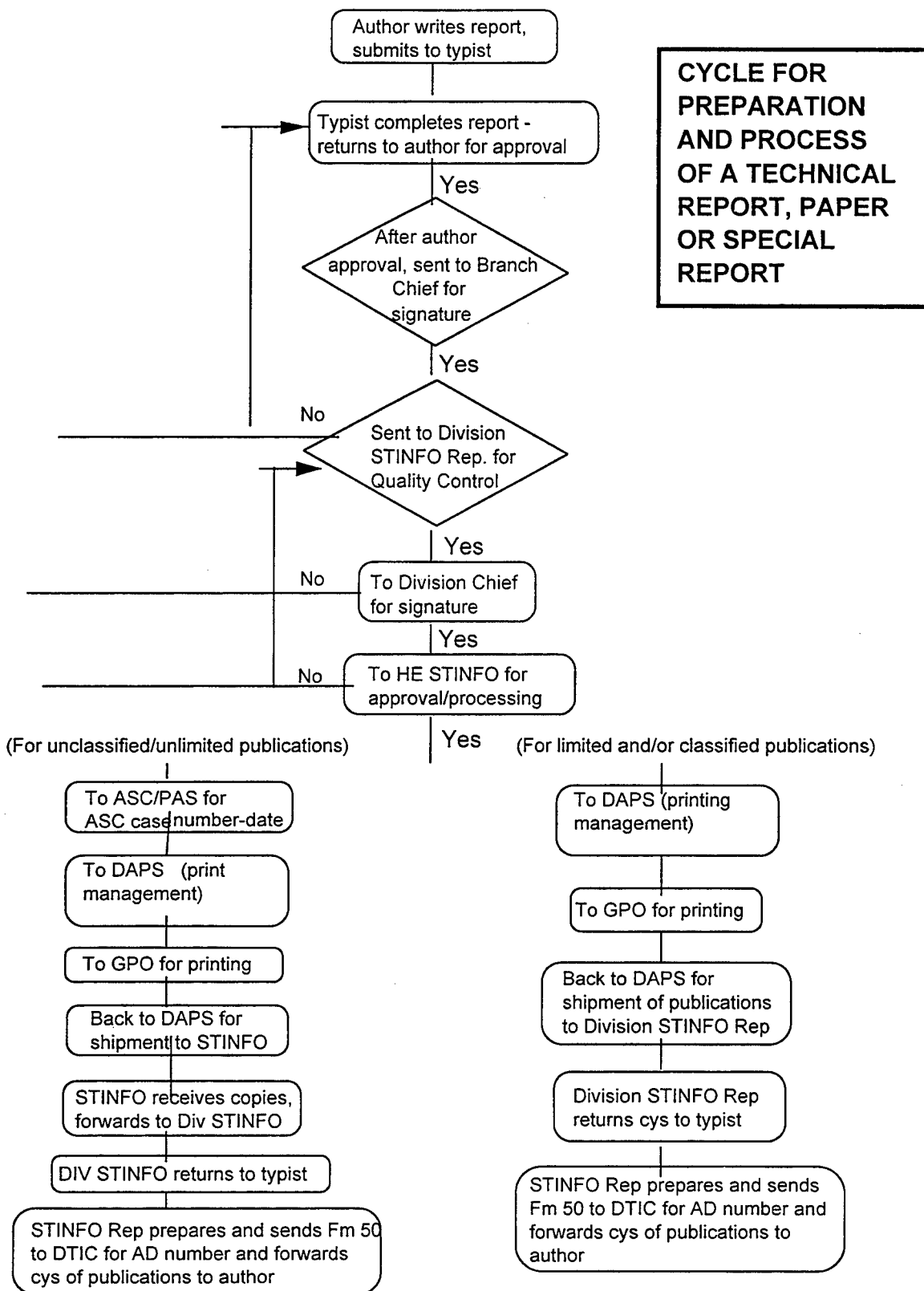
- A. UNCLASSIFIED/UNLIMITED (In-House)
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- E. LIMITED (Animal Use)

SECTION 1

CYCLE FOR PREPARATION OF REPORTS



SECTION 2

EXAMPLES OF TYPES OF REPORTS TO BE CLEARED

TYPES OF MATERIAL THAT MUST BE CLEARED

- 1. TECHNICAL REPORTS**
- 2. SPECIAL REPORTS**
- 3. ABSTRACTS**
- 4. CONFERENCE PROCEEDINGS**
- 5. ORAL PRESENTATIONS**
- 6. JOURNAL ARTICLES**
- 7. OTHER (ie., POSTER SESSIONS, VIDEOTAPES
FILM SCRIPTS, BOOKS, BOOK CHAPTERS, ETC.)**

TYPES OF REPORTS

The results of research and development (R&D) conducted or sponsored by the Air Force Research Laboratory (AFRL) may be published in a variety of ways -- technical reports, articles in professional journals, conference or symposium proceedings, lecture series books or a single chapter in a book, and special reports. The choice of a publication medium should be governed by the nature of the information involved and its use. The ultimate decision on how and where to publish normally will be made by the monitor/author within the established policy of AFRL and its respective organizations.

TECHNICAL REPORTS (TRs)

TRs are the documented results of DoD-sponsored research and development (R&D) projects. Technical reports (excluding technical management reports) include journal articles, symposia proceedings, handbooks and user guides. TRs are normally final reports and document empirical findings that definitively resolve one or more research issues. TRs may include state-of-the-art reviews, dissertations, theses, or literature collections (including abstracts or bibliographies).

A technical report will be the method of publication when the following condition applies: The research results reported are of special significance or immediate applicability to the Air Force or other Government organizations and contractors.

A technical report may be used to report any research findings if an author prefers this method. This medium has many advantages.

- a. A lengthy delay in publication time can be avoided through the expeditious production of technical reports.
- b. No limitations are imposed on length or detail of the material included.
- c. Distribution can be made directly to those having a need for the information.
- d. The material can be reproduced with no copyright involvement as occurs with the articles published in professional journals.

SPECIAL REPORTS (SRs)

Special reports are reports tailored to specific USAF users and summarize R&D findings, conclusions, and recommendations for implementation in concise, non-technical language with full documentation appended or cited.

SECTION 3

WHAT TO DO WITH A JOURNAL ARTICLE

WHAT TO DO WITH A JOURNAL ARTICLE

THE MATERIAL INCLUDED IN THIS SECTION PERTAINS TO THE CLEARED JOURNAL ARTICLE WHEN BEING RETURNED TO THE AUTHOR. A LETTER FROM THE STINFO OFFICE WILL BE PROVIDED ALONG WITH FORM LETTERS DETAILING SPECIFIC INSTRUCTIONS TO THE AUTHOR CONCERNING HOW TO OBTAIN AND PAY FOR REPRINTS OF FUTURE JOURNAL ARTICLES.

FROM: AFRL/HEO(STINFO)
2245 Monahan Way,
Wright-Patterson AFB OH 45433-7008

SUBJ: Instructions for Handling Charges Associated with a Journal Article

TO:

1. In the event the attached Journal Article is published, the following instructions apply should charges of any kind by the Journal's Publisher be incurred:

- a. Forward all documentation regarding charges to AFRL/HEO(STINFO) for processing.**
- b. Do not complete any sections of the documentation.**
- c. Include on a separate sheet of paper the title of the article, manuscript # (if any), authors, number of pages and number of reprint copies to be ordered.**

2. Most charges are now paid for by using the Government IMPAC Visa credit card issued to the STINFO officer. However, any communication with the publisher regarding any charges cannot be misconstrued as an order. The publisher must wait for an official purchase order from the authorized contracting agent for the Government, AFRL/HEO(STINFO). Examples of such communications are: galley proofs of your articles; reprint reservation forms; special charges for graphic services, such as use of color illustrations or production of half-tone films; and acceptance page or publication charges.

PATRICIA M. LEWANDOWSKI
Directorate STINFO Team Leader
Integration and Operations Division

SAMPLE OF A PREPARED JOURNAL ARTICLE

SAMPLE OF PREPARED JOURNAL ARTICLE

Cell Cycle and Growth Effects of Trichloroacetic Acid in WB344 Cells

STEPHEN R. CHANNEL and BARRY L. HANCOCK

Toxicology Division (OL-AL/OETA)
Armstrong Laboratory
Wright Patterson AFB, OH 45433

ABSTRACT

Studies were conducted to describe the effects of trichloroacetic acid on progression through cell cycle compartments of a rat diploid hepatic cell line (WB344). Methods included bromodeoxyuridine pulse labeling of cell cultures and flow cytometric analysis of DNA. At dosages derived from physiologically based pharmacokinetic (PBPK) models of human exposure to the parent compound trichloroethylene (TCE), TCA appears to inhibit progression through G2M phase. However, under continuous treatment, cells have the same potential doubling time (T_{pot}) as controls and colony forming ability is not impaired. Cytotoxicity studies indicate that TCA inhibits protein synthesis in a dose dependent manner and increases cell membrane permeability. DNA alterations, such as aneuploidy, were not observed, nor were mitogenic effects evident. From these data it appears TCA, at doses 2 to 5 fold higher than PBPK-derived tissue levels, is directly cytotoxic and can inhibit protein synthesis. These effects seem to be reversible once TCA is removed. This implies that a threshold may exist beyond which tumorigenesis could result from simple cell killing.

INTRODUCTION

Trichloroacetic acid (TCA) is a major metabolite of the common ground water pollutants trichloroethylene (TCE) and tetrachloroethylene (PER) (for review see USPHS, 1988a, 1988b). Although not acutely toxic at the levels generally found in contaminated water supplies, TCE raises concern because it has demonstrated ability to cause various tumors in whole animal (rodent) bioassays (Kimbrough et al., 1985). Trichloroacetic acid (TCA), like its parent compound, has demonstrated tumorigenic potential in B6C3F1 mice (Bull et al., 1990). Many recent studies of the mechanism of carcinogenesis have focused on the central role of cell proliferation in chemically induced tumors. Moolgavkar (1990), among others, has proposed a two stage model incorporating cell proliferation rates and other parameters to be used in predicting risk of cancer resulting from chemical exposure.

KEY WORDS: cell cycle; trichloroacetic acid; carcinogenesis model

SECTION 4

ELEMENTS TO INCLUDE IN TRs, and SRs

ELEMENTS TO INCLUDE IN TECHNICAL REPORTS, AND SPECIAL REPORTS

- 1. COVER**
- 2. NOTICES PAGE (See Sample)**
- 3. PAGE NUMBERS**
- 4. SPACING (Note: 1-1/2 line space - block style
1 single space - indent style)**
- 5. SF FORM 298**
- 6. SUMMARY and/or PREFACE**
- 7. TABLE OF CONTENTS**
- 8. HEADINGS**
- 9. FIGURES & TABLES**
- 10. REFERENCE MATERIAL**
- 11. DISTRIBUTION STATEMENTS**

SECTION 5

FORMAT FOR AIR FORCE RESEARCH LABORATORY PUBLICATIONS

FORMAT FOR AFRL PUBLICATIONS:

American National Standards Institute ANSI/NISO Z39.18-1995, Scientific and Technical Reports: Elements, Organization, and Design specifies the format for scientific and technical reports prepared by or for the Department of Defense. AFRL reports must be prepared in accordance with this standard.

PLEASE NOTE: IN ADDITION TO THE STANDARD, THIS USER'S GUIDE HAS BEEN PREPARED TO PROVIDE DETAILED INSTRUCTIONS FOR SPECIFIC AIR FORCE REQUIREMENTS. THESE ADDITIONAL INSTRUCTIONS ENHANCE THE BASIC REQUIREMENTS SET FORTH IN THE AMERICAN NATIONAL STANDARDS INSTITUTE STANDARD (ANSI/NISO Z39.18-1995).

COVER:

Type report number on the upper left-hand corner of cover page. Format for cover should be consistent throughout each organization, but must contain information required by ANSI/NISO Z39.18-1995.

NOTICES (INSIDE FRONT COVER):

The inside front cover, "Notices Page," contains the review and approval statement as well as special notices such as the animal care statement or human volunteer statement, if applicable.

When it is necessary to call attention to certain aspects of a report, such as its security classification, restricted distribution, or proprietary information, appropriate notices shall be placed on the cover and title page. Technical reports are seldom copyrighted. However, for those that are, U.S. Copyright Law specifies that the copyright notice shall appear "on the title page or the page immediately following" and shall consist of the word copyright or the symbol C, accompanied by the year of publication and the name of the copyright proprietor. The order of appearance is not important so long as all three elements appear. The recommended location is the back of the title page.

Disclaimers and similar notices shall be avoided whenever possible; however, if needed, they are located on the inside front cover.

The standard "DISCLAIMER STATEMENT" for contractor format being accepted can only be used if the CDRL clearly specifies acceptance. The statement to be used is as follows:

This Technical Report is published as received and has not been edited by the Air Force Research Laboratory, Human Effectiveness Directorate.

PAGE NUMBERS:

Number all front matter in lower case Roman numerals. The Standard Form 298, Report Documentation Page, should be pages i and ii. The body of the report should be numbered consecutively at the bottom center in Arabic numerals, beginning with a right-hand page.

SPACING:

Use double spacing throughout the text in all manuscripts submitted for editing. Use single or 1-1/2 line spacing for camera-ready copy.

STANDARD FORM 298, REPORT DOCUMENTATION PAGE:

A completed SF 298 is included as the first right-hand page after the cover in each report (page i and ii). Confine abstract to the form. Do not use continuation sheets. Forms are available from your local Publications Distribution Office (PDO), or in electronic format using FormFlow. Instructions for completion are included with each form.

ABSTRACT:

An abstract presents a concise statement (approximately 200 words) of the purpose, scope, and major findings of the report. It must be understandably independent of the rest of the report. It must contain no undefined symbols and make no reference by number to references or illustrative material. Z39.14-1979, American National Standard for Writing Abstracts, is the standard guide for preparing abstracts for scientific and technical reports.

SUMMARY:

A summary is optional but may be included to explain the reason for the initiation of the work and to outline principal conclusions and recommendations. A summary may be used to give more information on the content of the report than can be presented in the abstract on the SF 298.

A summary typically contains between 500 and 1000 words. Although the summary depends on the text, in that it introduces no new information, it is independent of the text from the reader's point of view. All symbols and abbreviations must be defined and unusual terms must be explained. The summary will not contain figures, illustrations, tables, or references.

PREFACE:

The Preface will include necessary administrative information such as contractor name, contractor address, contract number, inclusive dates of research reported, project manager, office symbol, credit for use of copyrighted material, and acknowledgement of significant assistance received. Also, report numbers and titles of associated efforts will be included.

The Preface will be page iii/iv (Blank), if a Summary is not used. If necessary, the Preface will be continued on the reverse (page iv).

TABLE OF CONTENTS:

A table of contents is seldom used in a report of eight pages or less. List principal headings as they appear in the report and the page numbers on which the headings occur. A table of contents begins on a new odd-numbered right-hand page.

HEADINGS: (Note: The Air Force prefers not to have numbers on headings)

Title of Paper: Capital letters, typed at the top of the first page, centered.

Main Headings: Capital letters, centered.

Secondary Headings: Lowercase letters except for the first letter of all principal words, centered.

Tertiary: Initial caps, at left margin, underlined.

Note: You may continue headings to the fourth level if absolute necessary.

(SAMPLE HEADINGS)

METHODS AND MATERIALS (main heading)

Design of Equipment (secondary heading)

Types of Equipment (third heading)

Brands of Equipment (fourth heading)

FIGURES:

Size: The desired size depends on the legibility of printed material on the figure and the amount of detail. To fit upright on a page in a report, the horizontal dimension (base image) should not exceed 6 1/2 inches. To fit lengthwise on a page, the horizontal dimension should not exceed 9 inches.

TABLES:

Numbering: Number tables consecutively in Arabic numerals preceded by the word "Table." Number the tables within appendices with the appendix designation (for example, in Appendix A, the tables will be numbered A-1, A-2, A-3).

Lines: Use a horizontal line to separate the column boxheads from the body of the table. Avoid other vertical and horizontal lines wherever spacing can be used effectively.

Headings: Give the table number followed by the table heading. All major words in the table heading have the first letter capitalized. Headings are placed above tables. Column headings within the table are in lowercase letters except for the first letter of the first word and any proper nouns.

Table 1. Effects of a Prolonged
Exposure to Oxygen in a
Weightless Environment

Oxygen debt ^a	Ambient _(mm)
--------------------------	-------------------------

(Table information is inserted under column headings)

Superscript letters 1, b, c, etc., indicate footnotes to

Figure 1. Sample Table Layout

FOOTNOTES IN TEXT:

Explanatory footnotes are included in a report to clarify text information and should be as brief and clear as possible. To avoid preparing footnotes, an author may incorporate material into the text by enclosing it in parentheses or by placing it in a separate paragraph.

When used to clarify information, footnotes are keyed to the text of the report with superscript Arabic numbers. Footnotes are placed at the bottom of a page and separated from the text by a 12-space horizontal line. The footnote marking sequence starts over on each new page. If a footnote runs longer than its page margin, it is completed at the bottom of the subsequent page, preceding any footnotes from the next page. When a footnote is needed to clarify tabular information, a superscript sequence of lowercase letters or symbols should be used to avoid confusion with text footnotes. Footnotes do not appear in an abstract. The Chicago Manual of Style (13th edition) provides additional information on footnoting.

Footnotes should be typed flush left at the foot of the page on which their reference numbers or symbols appear.

Example:

1. Swanson, Ellen, Mathematics into Type: Copyediting and Proofreading of Mathematics for Editorial Assistants and Authors (rev. ed.). Providence, RI: American Mathematical Society, 1979.

The referenced footnote number or symbol in the text is typed a half-space above the appropriate line of text without any type of restrictive mark or punctuation. Footnotes to tables should be typed directly below the table.

REFERENCE MATERIAL:

Text Reference: Refer to bibliographic information by placing the reference number (as listed at the end of the report) in parentheses and on the line of type (not superscript). When several references are cited at one time, place their numbers in consecutive order, separated by commas, within one pair of parentheses. If authors are named in the text, place the appropriate number of the bibliographic item after the author's name. Example: "Freidman (4) described c...." Note: Format of the American Psychological Association (APA) may be used in lieu of the above.

Appendices: When one or more appendices are used, designate them Appendix A, Appendix B, etc. Number figures, tables, and equations with the letter designation of the appendix in which they fall (for example, A-1, B-1). Title each appendix. However, even though the option to page number the appendices A-1, A-2, etc. is offered, sequential page numbering at the bottom center of the page must continue throughout the entire report. (See sample appendix pages in back of guide.)

Glossary of Terms: Define unusual terms either in the text or as a footnote the first time they are used in the text. When many such terms are used, list them in alphabetical order with definitions in a glossary.

SECTION 6

DISTRIBUTION LIMITATION STATEMENTS/ EXAMPLES OF CODES - RATIONALE

Selection of a distribution statement is required for completion of the SF 298, Report Documentation Page, and the HSC Form 5, Technical Publication/Presentation Control Record.

See the "Distribution Limitation Statements" and the "Explanation of Codes - Rationale" before selecting the appropriate distribution statement.

DISTRIBUTION LIMITATION STATEMENTS

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

Technical reports with Statement A will be made available to the general public and to foreign nations. Never use Statement A on classified reports.

Unclassified/limited or classified documents do not require public affairs ASC/PA review since they are not being released to the public.

DISTRIBUTION STATEMENT B: Distribution authorized to US Government agencies only; (fill in reason) (date of determination). Other requests for this document shall be referred to (insert controlling DoD office).

Reason - Foreign Government Information, Proprietary Information, Test and Evaluation, Contractor Performance Evaluation, Critical Technology, Premature Dissemination, Administrative/Operational Use, Specific Authority.

Foreign Government Information - limits distribution according to the desires of the foreign government that furnished the technical information.

Proprietary Information - protects information not owned by the US Government and not protected by a contractor's "limited rights" statement, but received with the understanding that it not be routinely transmitted outside the US Government.

Test and Evaluation - protects results of test and evaluation of commercial products or military hardware when such disclosure may cause unfair advantage or disadvantage to the manufacturer of the product.

Contractor Performance Evaluation - protects information in management reviews, records of contract performance evaluation, or other advisory documents evaluating programs of contractors.

Critical Technology - protects information and technical data that advance current technology or describe new technology in an area of significant, or potentially significant, military application or adversary documents evaluating programs of contractors.

Premature Dissemination - protects information on systems or hardware in the developmental or conceptual stage to prevent premature disclosure that might jeopardize the inventor's right to obtain a patent.

Administrative or Operational Use - protects technical or operational data or information from automatic dissemination under the International Exchange Program (IEP) or by other means. This protection covers publications required solely for official use or strictly for administrative or operational purposes.

Specific Authority - protects information not specifically included in the above reasons, but which requires protection according to valid documented authority such as Executive Orders (EOs), classification guidelines, or regulatory documents.

Notes: All technical data marked with a contractor's restrictive marking claim will be marked with Distribution Statement B. Any technical document which includes particular Foreign Military Sales (FMS) item information or technology shall be marked with Distribution B.

DISTRIBUTION STATEMENT C: Distribution authorized to US Government agencies and their contractors (fill in reason) (date of determination). Other requests for this document shall be referred to (insert controlling DoD office).

Reason - Foreign Government Information, Critical Technology, Administrative or Operational Use, Specific Authority.

Notes: Any technical document which contains technical information on the technologies listed as requiring control, but less than absolute control, in the MCTL, shall be marked with Distribution Statement C.

DISTRIBUTION STATEMENT D: Distribution authorized to the Department of Defense and DoD contractors only (fill in reason) (date of determination). Other requests for this document shall be referred to (insert controlling DoD office).

Reason - Foreign Government Information, Critical Technology, Administrative or Operational Use, Specific Authority.

DISTRIBUTION STATEMENT E: Distribution authorized to DoD components only (fill in reason) (date of determination). Other requests for this document shall be referred to (insert controlling DoD office).

Reason - Direct Military Support, Foreign Government information, Proprietary Information, Test and Evaluation, Contractor Performance Evaluation, Critical Technology, Premature Dissemination, Software Documentation, administrative or Operational Use, Specific Authority.

- **Direct Military Support** - protects technologies of significance for military purposes that release may jeopardize an important technological or operational military advantage for the U.S. as designated by the DoD, or in those cases where a specific decision is made by the program office responsible for the project that only DoD components should have access to the document.
- **Software Documentation** - protects software documentation and data releasable only under AFR 300-6.

Notes: Any technical document which contains technical information on the technologies listed as requiring absolute control in the MCTL shall be marked with Distribution Statement E. Deficiency reporting data, and Accident Investigation Information will be marked with Distribution Statement E.

DISTRIBUTION STATEMENT F: Further distribution only as directed by (insert controlling DoD office) (date of determination) or higher DoD authority.

Reason - Direct Military Support, Special Dissemination and Reproduction.

Special Dissemination and Reproduction - protects information subject to special dissemination limitations specified by paragraph 4-505, DoD Regulation 5200.1-R.

Notes: Distribution Statement F usually is used only on classified technical documents, but may be used on unclassified technical documents when specific authority exists.

DISTRIBUTION STATEMENT X: Distribution authorized to US Government agencies and private individuals or enterprises eligible to obtain export-controlled technical data in accordance with regulations implementing 10 U.S.C. 140c, (date of determination). Other requests must be referred to (insert controlling DoD office).

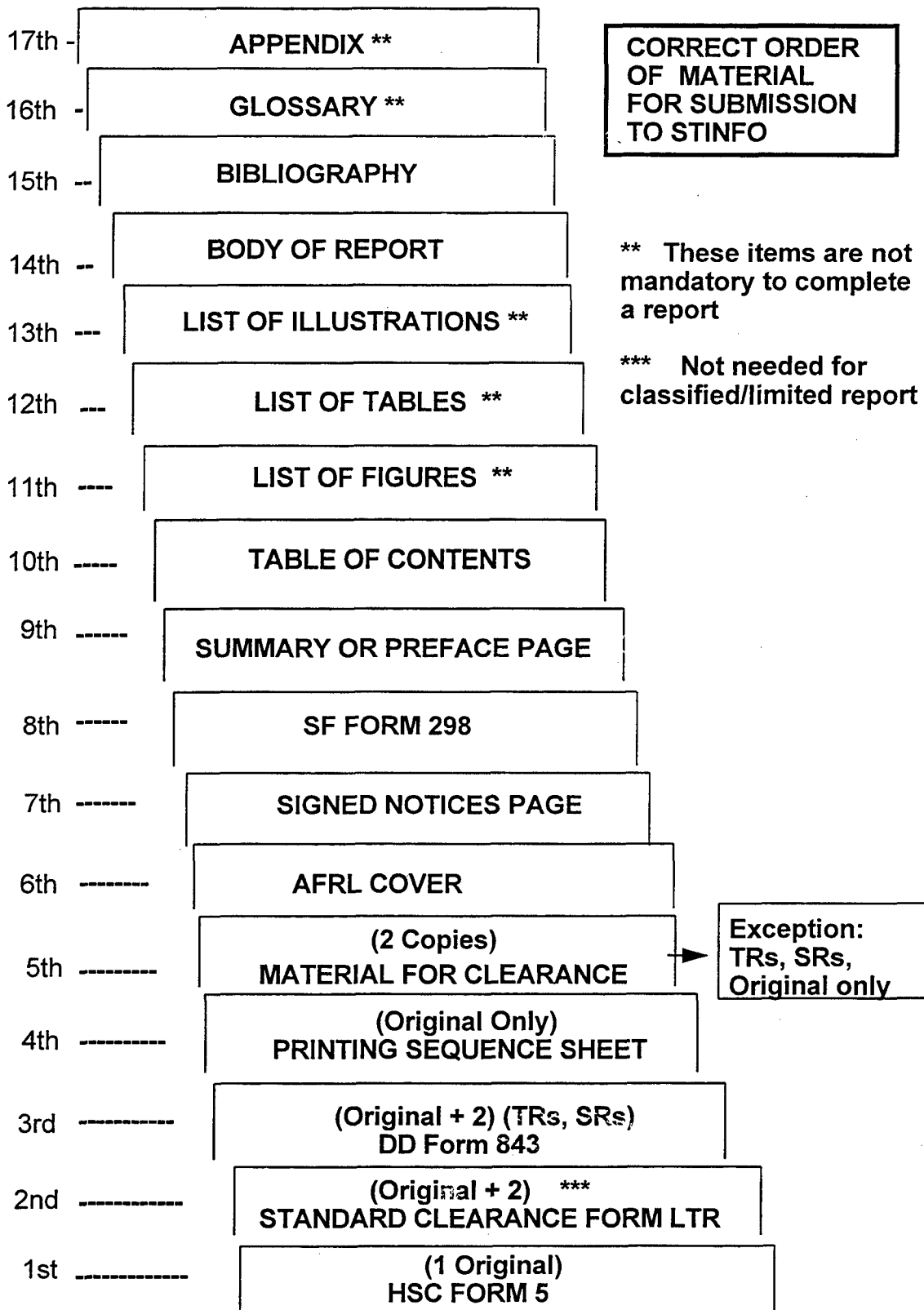
Reason - Export-Controlled Data.

- **Export-Controlled Data** - protects data subject to DoD Directive 5230.25, when distribution statements B, C, D, E, or F are not used. Note that Distribution Statement X is never used on classified documents.

EXPLANATION OF CODES - RATIONALE

Statement	
A	Approved for public release; distribution is unlimited. This statement will be used only on unclassified reports that have been approved for public release by ASC/PA. Submit a standard form letter (3 cys) signed by the STINFO Office requesting release approval.
B	Distribution limited to US Government Agencies only; (fill in reason); (date statement applied). Other requests for this document must be referred to (your symbol/address). This statement may be used on unclassified/classified reports. Rationale - foreign government information, proprietary information, test and evaluation, contractor performance evaluation, administrative/operational use, specific authority, critical technology, or premature dissemination.
C	Distribution limited to US Government Agencies and their Contractors; (fill in reason); (date statement applied). Other requests for this document shall be referred to (your symbol/address). This statement may be used on unclassified/classified reports. Rationale - critical technology, administrative/operational use or specific authority.
D	Distribution limited to DoD and DoD Contractors only; (fill in reason); date statement applied). Other requests for this document shall be referred to (your symbol/address). This statement may be used on unclassified/classified reports. Rationale - critical technology, specific authority, or administrative/operational use.
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F	Further distribution only as directed by (your symbol/address) or higher DoD authority. This statement may be used on unclassified/classified reports. Rationale - special dissemination (classified reports) or specific authority, foreign government information, proprietary information, test and evaluation, contractor performance evaluation, critical technology, direct military support or administrative/operational use, premature dissemination (unclassified reports).
X	Distribution authorized to US Government Agencies and private individuals or enterprises eligible to obtain export-controlled technical data in accordance with regulations implementing 10 U.S.C. 140c (date of determination). Other requests for this document shall be referred to (your symbol/address). This statement will be used on unclassified/export-controlled information only.

SECTION 7
CORRECT ORDER OF MATERIAL FOR
SUBMISSION TO STINFO



SECTION 8

EXAMPLES OF AND INSTRUCTIONS FOR SUBMISSION OF MATERIAL TO STINFO

SECURITY AND POLICY REVIEW PROCEDURES
INTERNALLY GENERATED MATERIAL
FOR
PUBLIC RELEASE CLEARANCE

as of 1 May 1997

MINIMUM LEAD TIMES

15 working days prior to the date of presentation, publication, or intended release, if material can be cleared at the ASC level. (See Atch 1)

35 working days prior for items released in the Washington DC area, or in instances where higher headquarters review will be required. (See Atch 1)

ABSTRACTS Clearance of an abstract is just that. It does not clear, authorize or imply clearance of the main presentation. That material must also be submitted and cleared properly.

BRIEFINGS AND PRESENTATIONS Visuals submitted for clearance must be accompanied by text. Releasability can be determined only on the basis of the review of the complete presentation. Submittal of notes or outlines, vugraphs or slides alone is unacceptable and such packages **will be returned without action.**

VIDEOTAPES Provide **three copies.** Also provide **11 copies of the script.** If there is no audio you must provide a scene description.

SOFTWARE RELEASE Guidance has already been provided. Remember to use the software clearance letter and follow the guidance as described in the letter.

R&D APPLICATIONS-OTHER AGENCIES/SERVICE PROGRAMS If the material submitted for public release discusses other programs (e.g., JPATS, F-22, C-17), those offices **must** review. ASC/PA will obtain the necessary coordination and review from the cognizant office.

FOR ADDITIONAL INFORMATION OR QUESTIONS PLEASE CALL YOUR STINFO OFFICE.

CHECKLIST FOR
HIGHER HEADQUARTERS REVIEW

Generally, information must be reviewed and cleared at higher headquarters if it:

- . Originates, or is proposed for release, at the seat of the U.S. Government (This includes displays, exhibits, speeches, etc., but usually does not apply to technical papers intended for presentation at conferences and meetings.) YES _____ NO _____
- . Is, or has the potential to become, an item of national interest or has foreign policy implications. YES _____ NO _____
- . Concerns high-level military, DOD, or U.S. Government policy. YES _____ NO _____
- . Concerns subjects or potential controversy among DOD components or with other federal agencies. YES _____ NO _____
- . Concerns the following subject areas:
 - . New weapons, weapon systems, or significant modifications or improvements to existing weapons or systems, equipment, or techniques. YES _____ NO _____
 - . Military operations, operations security, potential operations, and significant exercises. YES _____ NO _____
 - . National command authorities and command posts. YES _____ NO _____
 - . Military applications in space; nuclear weapons, including weapon effects research; chemical warfare; defense biological and toxin research; and high-energy lasers and particle beam technology. YES _____ NO _____
 - . Material, including that submitted by defense contractors, including militarily critical technology. YES _____ NO _____
 - . Communications security, signals intelligence, and computer security. YES _____ NO _____
 - . Others as OATSD/PA may designate.

If you answer YES to any one of the above categories, PA will send the material to higher headquarters for review. If you answer NO to all the categories, the 15-day lead time will be in effect. Use the checklist to determine if your material falls into one of the above categories. REMEMBER, allow an additional one day lead time for processing through the Directorate STINFO office.

HOW TO OBTAIN APPROVAL FOR RELEASE OF SOFTWARE DOCUMENTATION

GUIDANCE:

The following guidance must be strictly adhered to before requesting public release of software.

- (a) This form is for use only for software, and any accompanying documentation that may be released to the general public without restriction.
- (b) Request must be limited to non-sensitive R&D software with no restrictions as to either object code or source code.
- (c) Manuals and other documentation which document the functionality of the software **must** accompany the program.
- (d) The following statement and disclaimer shall be prominently marked (the disclaimer in uppercase) on any software packaging and documentation, and displayed, if possible, by the software:

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.

“THIS SOFTWARE AND ANY ACCOMPANYING DOCUMENTATION IS RELEASED “AS IS.” THE U.S. GOVERNMENT, ITS CONTRACTORS AND THEIR SUBCONTRACTORS MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, CONCERNING THIS SOFTWARE AND ANY ACCOMPANYING DOCUMENTATION, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL THE U.S. GOVERNMENT, ITS CONTRACTORS AND THEIR SUBCONTRACTORS BE LIABLE FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR SOFTWARE AND ANY ACCOMPANYING DOCUMENTATION, EVEN IF INFORMED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES.”

This guidance does not apply to release of software and documentation pursuant to a cooperative research and development agreement (CRADA) under 15 U.S.C. 3710a, or other written agreements containing specific terms and conditions regarding use.

MEMORANDUM FOR AFRL/HEO

FROM: AFRL/HEO (STINFO)

SUBJECT: Request for Public Release Approval--Software Documentation

1. Please review the attached software for public release approval (ASC Policy Memorandum). The following information is provided in support of this request:

TITLE: _____

ABSTRACT (Description of Software Functions and Performance):

SOFTWARE--TYPE/LANGUAGE/MEDIUM (Circle Appropriate Category):

<u>TYPE</u>	<u>LANGUAGE</u>	<u>MEDIUM</u>
--Engineering Applications	--FORTRAN	--Hard Copy (source listing)
--Operating System (Hardware Interface)	--C, C+, etc.	--Program on disk (source or executable)
--Word Processing	--Other (Specify) _____	
--Data Base		
--Other (Specify) _____		

DOCUMENTATION--MUST INCLUDE MANUALS/TECH REPORTS, ETC. (Describe documentation and how it relates to software): _____

PROGRAM DEVELOPED BY:

Entirely by Contractor (Name & Contract Number) _____
Entirely by DoD Employee (OPR/Title & Organization) _____
Jointly by Contractor and DoD Employee (Name/Contract Number, OPR/Title & Organization) _____

INTENDED USE AND DATE NEEDED: _____

ASC/PA APPROVAL

PATRICIA M. LEWANDOWSKI
Directorate STINFO Team Leader
Integration and Operations Division

CERTIFICATION STATEMENTS:

1. I certify the software is UNCLASSIFIED and appropriate for world-wide public release.
2. I certify export restrictions (i.e. Militarily Critical Technologies List (MCTL), Munitions List--International Traffic in Arms Regulation (ITAR) and Commerce Control List (CCL) have been considered prior to requesting public release.
3. I certify the software contains no Air Force database algorithms or other information not releasable to the general public.
4. I certify that (CIRCLE LETTERS OF ALL APPLICABLE STATEMENTS):
 - (a) The software and any accompanying documentation was developed in whole or in part by U.S. Government employees as part of their official duties.
 - (b) The software and any accompanying documentation was developed in whole or in part by contractor or contractor employees entirely at U.S. Government expense and the contractor(s) or subcontractor(s) has not asserted any copyright or other intellectual property rights to the software and documentation.
 - (c) The software and any accompanying documentation includes either public domain software or "freeware" software and, in the case of "freeware" software, a copy of the applicable freeware license (copy attached) accompanies the software.
 - (d) The software and any accompanying documentation was developed in whole or in part at private expense and the owners of all rights in the software have indicated in writing (copy attached) that the software and any accompanying documentation may be released to the general public without restriction.
5. List any additional comments unique to this request which makes this software clearable:

_____ OPR: Name (Printed & Signed)	_____ OFFICE SYMBOL	_____ PHONE	_____ DATE
---------------------------------------	------------------------	----------------	---------------

_____ DIVISION: NAME (Printed & Signed) OR EQUIVALENT	_____ OFFICE SYMBOL	_____ PHONE	_____ DATE
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APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.

"THIS SOFTWARE AND ANY ACCOMPANYING DOCUMENTATION IS RELEASED "AS IS." THE U.S. GOVERNMENT, ITS CONTRACTORS AND THEIR SUBCONTRACTORS MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, CONCERNING THIS SOFTWARE AND ANY ACCOMPANYING DOCUMENTATION, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL THE U.S. GOVERNMENT, ITS CONTRACTORS AND THEIR SUBCONTRACTORS BE LIABLE FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR SOFTWARE AND ANY ACCOMPANYING DOCUMENTATION, EVEN IF INFORMED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES."

PREPARATION OF HSC FORM 5

1. TITLE: Self-Explanatory.
 2. MATERIAL IS FOR: Mark one or more of these boxes. (Refer to section in Guide, "Material to be Cleared", for detailed description of each category.)
 3. AUTHORS: Self-Explanatory.
 4. NAME OF JOURNAL OR DETAILS: This block must be completed if material for clearance is a journal article, abstract, oral presentation or conference proceedings. Be sure to include location where material will be presented and dates of conference, symposium, meeting, etc. The block marked Refereed? **MUST** be used for Journal Articles & Conference Proceedings.
 5. PROJECT/TASK/WORK UNIT NUMBER: This block **MUST** be completed. Material will be returned without action if Block 5 is left blank.
 6. CONTRACT NUMBER: Please include if there is one.
 7. PROTOCOL NUMBER: Please include if there is one.
 8. Self-Explanatory.
 9. Self-Explanatory
 10. DISTRIBUTION STATEMENT: Select appropriate box and mark with an X.
 11. SECURITY CLASSIFICATION: Select appropriate box and mark with an X.
 12. Self-Explanatory.
 13. Self-Explanatory.
 14. Self-Explanatory.
 15. NOTE: A Special Distribution List will now be included when submitting a Special Report. Attach the list to the HSC Form 5 when sending through approval cycle.
 16. Self-Explanatory. (NOTE: There are two parts, mark both.)
 17. LEAVE BLANK.
 18. Self-Explanatory. However, **MANDATORY** signatures on HSC Form 5 are the following:
BRANCH (if applicable)
DIVISION STINFO
DIVISION CHIEF
 19. Self-Explanatory.
- REMARKS: Use this space to annotate any special information either for internal use or for the STINFO Office.

TECHNICAL PUBLICATION / PRESENTATION CONTROL RECORD				
1. TITLE		2. MATERIAL IS FOR ☐ TECHNICAL REPORT ☐ TECHNICAL PAPER ☐ SPECIAL REPORT ☐ PUBLICATION IN A JOURNAL ☐ ORAL PRESENTATION ☐ PROCEEDINGS ☐ ABSTRACT ☐ OTHER (Specify)		
3. AUTHOR(S) (LAST NAME, FIRST NAME, MI, RANK - LEAD AUTHOR FIRST)		4. NAME OF JOURNAL OR DETAILS (Date and place) OF ORAL PRESENTATION (Indicate if Foreign) Referred? ☐ Yes ☐ No		
5. PROJECT/TASK/WORK UNIT NO.	6. CONTRACT NO.	7. PROTOCOL NUMBER		
8. AUTHOR/CONTRACT MONITOR (NAME/OFFICE SYMBOL/EXT)		9. CONTRACTOR		
10. DISTRIBUTION STATEMENT (AFI 61-204) (Select distribution statement from reverse) ☐ A* (Public release) ☐ B ☐ C ☐ D ☐ E ☐ F ☐ EXPORT CONTROLLED				
11. SECURITY CLASSIFICATION ☐ UNCLASSIFIED ☐ OTHER (Specify) ☐ DESTRUCTION NOTICE			SSIR REPORT ☐ ☐ PHASE I ☐ PHASE II	
12. RELEASE FOR PUBLICATION REQUIRED FROM ANOTHER AGENCY ☐ YES ☐ NO If yes, attach copy of release				
13. JOINT PUBLICATION WITH ANOTHER GOVT. ORGANIZATION ☐ YES ☐ NO If yes, attach copy of other organization's release				
14. RELEASE FOR USE OF COPYRIGHTED MATERIAL ON THIS PAGE IS REQUIRED (attach copy of release)				
15. SPECIAL DISTRIBUTION LIST ☐ YES (Include list) ☐ NO			17. PUBLICATION NO.	
16. LAST PUBLICATION FOR WORK UNIT ☐ YES ☐ NO			☐ INTERIM ☐ FINAL	
18. I HAVE REVIEWED THE ATTACHED MATERIALS AND HAVE DETERMINED THEY ARE TECHNICALLY ACCEPTABLE				
OFFICE	SIGNATURE	OFFICE SYMBOL	DATE IN	DATE OUT
AUTHOR/CONTRACT MONITOR				
FUNCTION/SECTION (if applicable)				
BRANCH (if applicable)				
DIVISION TECHNICAL DIRECTOR				
DIVISION CHIEF				
DATA SCIENCES (if locally required)				
VETERINARY SCIENCES (for animal research)				
STINFO				
CHIEF SCIENTIST				
19. EDITING AND FINAL PROCESSING				
DATE IN	TO	DATE OUT	COMMENT	SIGNATURE
FOREIGN DISCLOSURE				
EDITING				
PUBLIC AFFAIRS				
COMPOSITION				
AUTHOR PROOF				
STINFO				
FINAL EDIT				
PRINT				
DIST (DTIC)				
REMARKS:		ALDICE ☐ EXT ☐ NO EXT ☐ 		
*I HAVE REVIEWED ATTACHED MATERIAL AND HAVE DETERMINED THAT IT IS UNCLASSIFIED, TECHNICALLY ACCURATE AND SUITABLE FOR RELEASE.				

PREPARATION OF CLEARANCE LETTER

(Used only for Unclassified/Unlimited)

1. Always use the most current, electronic clearance form letter available from the STINFO Office.

2. Para 1a - List the contract number(s) and company name(s) of all authors listed in para 1f. (NOTE: Make sure that if Para 1a is used, all information pertaining to DD Form 254 and Security Classification Guide is marked appropriately.

Para 1b - Select the type of information to be cleared, such as those suggested, but not limited to, in parentheses.

Para 1c - This information is MANDATORY if the clearance is for an abstract, oral presentation, video, film or conference proceeding.

Para 1d - MANDATORY (enter date you need clearance).

Para 1e - Enter the exact title of the information as it will appear in print.

Para 1f - List all authors, identifying them by their organizational symbol or contractor/company name.

Para 1g - Make sure 1st author or monitor reads this statement and complies.

Para 3 - The individual applying for the clearance should read this paragraph and understand its contents.

Para 4 - It is MANDATORY to mark an X in one of the three selections. Clearance requestor must sign and date.

Para 5 - Complete each item including yes or no to DARPA funded & SBIR funded questions, if applicable.

MEMORANDUM FOR ASC/PAS

FROM: AFRL/HEO (STINFO)

SUBJECT: Request for Public Release Approval (AFI 35-205)

1. Please review the attached material for public release approval. The following information is provided in support of this request:

a. **CONTRACT NO. and company name:** _____

Contains DD 254 Yes _____ No _____
Refers to Security Classification Guide Yes _____ No _____

b. **TYPE OF INFORMATION:** (abstract, journal article, presentation, film/script, technical report, technical paper, special report, poster session, etc.): _____

c. **PRESENTATION TO:** (i.e., for conferences or presentations, give sponsoring organization or technical society, location (city & state), and exact date) **(BE SPECIFIC)**

NOTE: FOR CLOSED SESSIONS -- PUBLIC RELEASE APPROVAL IS NOT REQUIRED!

d. **PUBLICATION AND/OR SUBMITTAL DEADLINE:** _____

e. **TITLE:** _____

f. **AUTHOR(S):** (name, title, organization of all authors): _____

g. **IF CO-AUTHORED BY OTHER GOVERNMENT ENTITIES (i.e., ARMY, NAVY, NASA, DARPA, ETC.), YOU MUST OBTAIN THEIR COORDINATION FIRST, THEN ATTACH A SIGNED STATEMENT TO THIS CLEARANCE LETTER WHICH AUTHORIZES PUBLIC RELEASE OF THE INFORMATION BY THE OTHER ENTITY. FAILURE TO COMPLY WITH THIS REQUIREMENT WILL RESULT IN DELAY OF CLEARANCE.**

2. The information contained in this material is complete with figures/legible photos/text with briefing charts/videos and scripts.

ASC/PAS APPROVAL

PATRICIA M. LEWANDOWSKI
Directorate STINFO Team Leader
Integration and Operations Division

3. This information is unclassified, technically accurate, nonproprietary and considered suitable for public release. It contains no computer software, owned or developed by or for the government. Export restrictions (i.e., MCTL, Munitions List (ITAR) and CCL) and current AF/DoD Policy have been considered prior to requesting public release approval.

4. Check all items that apply to references--sign and date:

() All references are unclassified/unlimited and are available to the public.

() Reference #s _____ are subject to distribution limitation. No limited information from these references is included in this document being submitted for clearance.

() No references are contained in attached material.

Signature of requester

Date

5. The technology contained in this material submitted for release:

a. Is (circle all that apply)

(1) being applied

(2) nearing application (maturing)

(3) _____ years or more away from application

b. Resulted from technical efforts funded under Program Element _____ (identify PE, i.e., 6.1, 6.2, 6.3, etc.).

DARPA FUNDED, has management responsibility been transferred to a Wright-Patterson organization? Yes ____ No ____

SMALL BUSINESS (SBIR) FUNDED (6.5), is contractor waiver letter on file granting permission to release information? Yes ____ No ____

6. **GOVERNMENT POINT OF CONTACT FOR ALL DIRECTORATE (AL/CF AND AL/OE) CLEARANCE REQUESTS IS:** Patricia M. Lewandowski, AL/AFRL/HEO(STINFO), extension 53921.

**PREPARATION OF DD Form 843
(Requisition for Printing and Binding Service)**

(Used for TRs and SRs only)

PREPARE AN ORIGINAL + 2 COPIES TO GO FORWARD

DATE: Always type current (today's date, i.e., 13 May 93).

TO: See Sample

THRU: See Sample

FROM: See Sample

1. Self-Explanatory
2. AFRL-(leave remainder blank)
3. See Sample
4. Always complete 4b. **DATE:** Allow at least four weeks from current date.
QUANTITY: Request enough to fulfill distribution requirements.
5. Always complete 5a Standard size is 8 1/2" WIDTH X 11" LENGTH.
6. Always include total number of pages to be printed, not just the "numbered" pages.
7. Leave Blank.
8. See Sample.
9. See Sample.
10. Leave Blank.
11. See Sample (type STINFO symbol).
12. Self-Explanatory.
13. See Sample. Type statement as sample indicates except when preparing a classified TR to print. In this instance, change from "light blue" cover to "pink" cover stock. SR is "white" cover stock.
14. Use this standard statement:

**DELIVER ORIGINAL + TWO COPIES TO: AFRL/HEO (STINFO/Pat Lewandowski,
Bldg 29, 2245 Monahan Way, Wright-Patterson AFB, OH 45433-7008.**

**DELIVER REMAINING COPIES TO _____, Bldg # _____, Street
(Your office symbol)**

15. Leave Blank

16. _____
(Writer's typed name, signature and date)

17. STINFO Officer's typed name. DO NOT TYPE DATE. See Sample.

REQUISITION FOR PRINTING AND BINDING SERVICE				☐ FUND APPROPRIATED ☐ NON-APPROPRIATED		DATE 98/08/21		ACTIVITY ORDER NUMBER		PLANT USE ONLY		JOB NUMBER							
TO: DAPS, BLDG 281 AREA A, DOOR 18						THRU: (Appropriate Printing Control Authority) AFRL/HEO(STINFO)				FROM: (Originating Agency and Person to contact & telephone extension) AFRL/XXXX J. Doe) 52000									
1. TITLE OF PUBLICATION "How to prepare a DD Form 843"								2. NUMBER AND DATE AFRL/HE-WP-TR-1998-0000 98/07/28											
3. PURPOSE, FUNCTION, ECONOMIES EFFECTED AND CONCURRENCES Reproduction of an AFRL Technical Report																			
4. QUANTITY IN:																			
SHEETS		SETS		BOOKS		PADS		OTHER (Specify in item 13)		5. SIZE OF PUBLICATION									
a. PARTIAL DELIVERY REQUESTED				b. COMPLETE DELIVERY REQUESTED				a. TRIM SIZE		b. FOLDED TO		6. NUMBER OF PAGES 200							
DATE		QUANTITY		DATE		QUANTITY		WIDTH		LENGTH				WIDTH		LENGTH			
				98/07/28		100		8-1/2"		11"									
7. BINDING (Use item 13 for additional instructions)																			
☐ LOOSE		☐ SIDE STITCHED		☐ PAD ☐ TOP ☐ LEFT ☐ RIGHT ☐ BOTTOM		COP-IES		BASIS WEIGHT		KIND		COLOR		COLOR INK		FACE ONLY		HEAD TO	
☐ GLUED		☐ SADDLE STITCHED				SHEETS IN PAD		SETS IN PAD		SHEETS IN SET									
☒ OTHER TAPE BIND																			
10. PUNCHING																			
NR HOLES		DIAMETER		C TO C		KIND		POSITION											
11. MATERIAL DISPOSITION																			
☐ HOLD		☐ DESTROY		RETURN TO															
NEGATIVES																			
ORIGINALS				AFRL/HEO (STINFO)															
12. CLASSIFICATION UNCLASSIFIED/UNLIMITED																			
13. ADDITIONAL INSTRUCTIONS. DUMMY ATTACHED YES ☐ NO ☐ (Perforations, scoring, prenumbering, etc.)																			
Cover Page, Notices, and Back Cover to be run on light blue cover stock. Follow the AFRL Technical Report Format. DO NOT TYPESET COVER! Please call P. Lewandowski, 53921 for an estimate of charges.																			
14. DISTRIBUTION INSTRUCTIONS (If desired, also indicate person to be notified when job is completed.)																			
Deliver orig - 2 copies to: AFRL/HEO(STINFO/P. LEWANDOWSKI) 2245 MONAHAN WAY, BLDG 29 WRIGHT-PATTERSON AFB, OH 45433-7008 Deliver remaining copies to: (Your Division STINFO Representative's address) *Blue Cover Stock for Unclassified Technical Reports. Pink Cover Stock for Classified Technical Reports. White Cover Stock for Special Reports.																			
15. APPROPRIATION CHARGEABLE IMPAC CREDIT CARD																			
CERTIFICATION THAT THE USE OF MORE THAN ONE COLOR IS IN ACCORDANCE WITH DEPARTMENTAL REGULATIONS. THAT THE ILLUSTRATIONS USED IN THIS PUBLICATION ARE NECESSARY AND RELATE ENTIRELY TO THE PUBLIC SERVICE. THAT THIS WORK IS AUTHORIZED BY REGULATIONS AND IS NECESSARY TO THE CONDUCT OF OFFICIAL BUSINESS.																			
16. ORIGINATOR (Typed Name, Signature and Date) PATRICIA M. LEWANDOWSKI 98/08/21																			
17. ACTION BY PRINTING CONTROL AUTHORITY																			
☐ APPROVED ☐ DISAPPROVED TYPED NAME, SIGNATURE AND DATE 7/28/98 PATRICIA M. LEWANDOWSKI Scientific & Technical Info Off.																			
FOR PLANT USE ONLY		18. DATE RECEIVED		19. PRIORITY		23. PRESS SIZE		HOURS IN USE		NUMBER OF MASTERS		PRESS IMPRESSIONS		PRODUCTION UNITS					
						X													
						X													
						X													
								X											
20. DATE PROMISED		21. DATE COMPLETED		22. DATE DELIVERED															
24. RECEIVED BY																			
25. ORGANIZATION SYMBOL																			
26. DATE																			
RECEIPT OF COMPLETED JOB 24. RECEIVED BY 25. ORGANIZATION SYMBOL 26. DATE																			

INSTRUCTIONS FOR COMPLETING THE PRINTING SEQUENCE SHEET

COVER 1 - FRONT COVER

COVER 2 - NOTICES PAGE OR INSIDE FRONT COVER

COVER 3 - INSIDE BACK COVER

COVER 4 - OUTSIDE BACK COVER

LINE 1 - SF 298 (Front)

LINE 2 - SF 298 (Back) with "0" - leave blank

LINE 3 - SUMMARY

LINE 4 - PREFACE

LINE 5 - TABLE OF CONTENTS

LINE 6 - LIST OF FIGURES

LINE 7 - LIST OF TABLES

LINE 8 - BLANK

**LINE 9 - INTRODUCTION (which is Page 1 in body of
report)**

**ENTER EACH PAGE AS A SEPARATE LINE UNTIL THE ENTIRE
REPORT HAS BEEN ACCOUNTED FOR. THE LINE NUMBER TELLS THE
ACTUAL NUMBER OF PAGES IN THE REPORT. THIS LINE NUMBER IS
THE PAGE COUNT USED ON THE DD 843 AND THE SF 298.**

PRINTING SEQUENCE SHEET

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FO - Fold Out

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Classification: _____CC - Camera Copy
NF - Negative Furnished

0 - Blank

L I N E	Face Page No.	Code or Remarks	L I N E	Back Page No.	Code or Remarks	L I N E	Face Page No.	Code or Remarks	L I N E	Back Page No.	Code or Remarks
	Blue Cover 1			Blue Cover 2	Notices		Blue Cover 3	0		Blue Cover 4	0
1			2			61			62		
3			4			63			64		
5			6			65			66		
7			8			67			68		
9			10			69			70		
11			12			71			72		
13			14			73			74		
15			16			75			76		
17			18			77			78		
19			20			79			80		
21			22			81			82		
23			24			83			84		
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Negatives

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Negatives

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Manuscripts

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129			130			189			190		
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PREFACE

This report was prepared in the Crew System Interface Division, Human Effectiveness Directorate, of the Air Force Research Laboratory, Wright Patterson Air Force Base, Ohio. The work was performed under Project 7184, "Man-Machine Integration Technology," Task 718411, "Design Parameters for Visually-Coupled Display Systems." Thanks are due to coworkers for encouragement in organizing notes into this report. The assistance of Miss Yolanda Crawford and Miss Sheila Radford in preparing the manuscript is sincerely appreciated.

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- Buchroeder, R. A., Helmet-mounted Displays, Tutorial T2 SPIE 1987 Technical Symposium 21 May 1987.
- Chisum, G. T. and P. E. Morway, Visual Accommodation Responses in a Virtual Image Environment, NADC 79216-60, 1977 (NTIS AD-A074415.)
- D. H. Close, A. Au, and A. Graube Holographic Lens for Pilot's Head-up Display, Hughes Aircraft, August 1974 (NTIS AD-787605).
- Dekker, F. E. D., "Head-up Display Symbology," Problems of the Cockpit Environment, AGARD CP-55, November 1968.
- Doucette, A. R., "Design Decisions for a Head-up Display," IEEE Spectrum, 13 August 1976, 28-32.
- Egan, D. E. and J. E. Goodson, Human Factors Engineering for Head-up Displays: A Review of Military Specifications and Recommendations for Research, NAMRL Monograph 23 April 1978.
- Fischer, E., R. F. Haines, and T. A. Price, Cognitive Issues in Head-Up Displays, NAMRL Monograph 23, April 1978.
- Fry, Glenn A. Geometrical Optics, Chilton Book Company, New York 1969.
- Gibson, C. P., "Binocular Disparity and Head-up Displays," Human Factors 22, 1980, 435-444.
- Gibson, C. P., Collimation and the Human Visual System--A Review and Literature Search, RAE TM-FS-173, April 1978.
- Ginsburg, A. P., W. L. Martin, and H. C. Self, "Contrast Sensitivity Performance Assessment of HUD Display Systems," Proceedings of the 2nd Symposium on Aviation Psychology, Ohio State University, April 1983, pp. 473-480.
- Gold, T. and A. Hyman, Visual Requirements Study for Head-up Displays, JANAIR 680712, March 1970.
- Gold, T. and R. F. Perry. Visual Requirements Study for Head-up Displays, JANAIR 700407, March 1972.
- Hull, J. C., R. T. Gill, and S. N. Roscoe, "Lotus of the Stimulus to Visual Accommodation: Where in the World, or Where in the Eye?," Human Factors 24, 1982, 311-319.
- Kane, R. S., Study of Requirements for Head-up Displays (HUD), NASA CR-66912, March 1970.
- Kingslake, R. (Editor), Applied Optics and Optical Engineering, Volume 3, Academic Press, New York, 1965.
- Leitner E. F. and R. F. Haines, Magnitude of Visual Accommodation to a Head-up Display, NASA TP-1796, February 1981.

GLOSSARY

Aberration. An error or defect in an image. Rays of light from an object do not converge precisely at the corresponding image points, the conjugate points.

Alphanumeric. Letters and numerals.

Aperture. An opening that limits the amount of light passing into or out of an optical element or system.

Apparent Field of view. (1) The field of view as it appears to an observer looking into an eyepiece. (2) The angle subtended at the eye by the display. When the display is not circular, FOV may be defined as the angular diagonal of the display or by the vertical and horizontal angular subtenses at an observer's eye.

Beamsplitter. An optical device that transmits part of the incident light and reflects part of it. It may be wavelength-neutral, or it may be selective, i.e., have different wavelength compositions in the reflected transmitted energies.

Cathode ray tube (CRT). An evacuated (or vacuum) tube in which a thin beam of high-speed electrons scans over a layer of phosphor coated on the back of a transparent faceplate, causing the phosphor to emit light (glow). A type of picture tube, such as found on most current television receiving sets and HMDs.

Combiner. a beamsplitter that permits superimposition upon an external scene of an image from a CRT or other image source.

Compound magnifier. An optical system containing an objective for projecting a real primary image and an eyepiece for magnifying the primary image to present to an observer a virtual display image.

Cornea. The transparent lens-shaped front surface of the eyeball. The first optical surface of the eye.

Dichroic Coating. (Dichroic means two-color). An extremely thin wavelength-selective coating on an optical element. Such a coating that reflects part of the electromagnetic spectrum, e.g., a narrow band of green, and transmits the remainder of the spectrum. Dichroic beamsplitters are used on some helmet-mounted displays to reflect most of the green from a narrow-band green-emitting CRT phosphor, while transmitting most of the light from the outside scene, except for a narrow band of green..

Electromagnetic. Pertaining to that type of radiation which includes X-rays, ultraviolet, visible light, infrared, and radio and television broadcast wavelengths. Called electromagnetic because such radiant energy consists of transverse electric and magnetic oscillating fields propagating together through space.

Entrance Pupil. The virtual image of the system aperture stop in object space formed by the optical elements preceding the stop. For example, the eye's entrance pupil is the virtual image of the real eye pupil (the iris) formed by the cornea and the aqueous humor.

Erector. A lens or prism system that turns an upside-down image over, making it erect. it corrects image orientation to make image orientation correspond to object orientation.

Eversion (reversing). Turning an image right-to-left to correct image orientation.

Exit pupil distance. The distance from the second or rear nodal point of the eyepiece to the exit pupil.

Exit Pupil. The image of the aperture stop formed by the optical elements following the stop. it is a uniform disc of light that contains all of the energy available for the display. The eye's entrance pupil should intercept some of the light that is used to form the exit pupil.

Eye Clearance (Eye Relief). The distance from the cornea of the eye to the nearest optical or mechanical element of the optical system. Eye clearance is less than eye relief, because the exit pupil should be at the eye entrance pupil which is approximately 2 1/4mm within the eye. The nearest optical element may be a beamsplitter rather than the eyepiece.

Eyepiece. An optical device consisting of one or more optical elements with focusing power that acts as a magnifier. It is used to magnify the primary image from the objective, thus providing a virtual display image for an observer. It is called an eyepiece because it is the part of the device nearest the eye.

Field of View (FOV). The angular subtense (usually measured in degrees or radians) of the display at the objective (true or instrument FOV) or at the eye (apparent FOV or AFOV).

Focal Length. (1). A measure of the light-bending or refractive power of a lens or other image-forming optical device, (2) The distance from the rear nodal point of a lens to the image projected by the lens when imaging an object at optical infinity or very distant. For distant objects, image dimensions are proportional to focal length. (3) The characteristic of a lens or a curved mirror that relates image distance to object distance according to the Gauss lens equation.

f-number. (Also called relative aperture). The ratio of focal length to effective aperture.

Helmet-Mounted Display (HMD). A system, usually electro-optical, mounted on a helmet to present images to an observer.

Appendix A

Study of the Effects of a Time Delay from System Initiation to Catapult Ignition on the Time Available for Parachute Recovery

A-1

Appendix A

Study of the Effects of a Time Delay from System Initiation to Catapult Ignition on the Time Available for Parachute Recovery.

A1. Assumed Conditions

The assumed ejection conditions were an airspeed of 200 KEAS, a zero roll angle at system initiation, a constant roll rate of 100 degrees per second, a 98th percentile male pilot, a level flight path (zero sink rate) and no active drogue for one set of curves and a very fast acting drogue for the second set of curves. The time delay from system initiation to catapult ignition was selected at 0.1 second intervals from 0.1 second up to 0.5 second. Graphs of the seat and occupant altitude as a function of time are presented in Figures A1 and A2 for the no drogue and the fast acting drogue trajectories respectively. It was decided to use the original ejection altitude for the evaluation of the time loss produced by an increased time from system initiation to catapult ignition and subsequent separation. The condition of no drogue and a constant roll rate of 150 degrees per second was also considered. The graphs of this condition for time delays of 0.1, 0.2 and 0.3 second are plotted in Figure A3.

A2. Evaluation of Results.

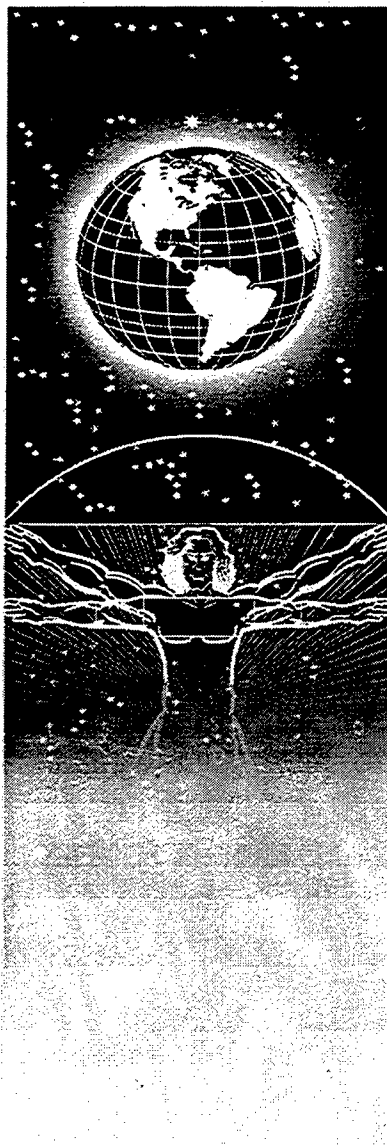
In figure A1 it is seen that the ration of time lost to the time delay for catapult ignition is 6 for the 0.1 second time interval between the 0.1 and 0.2 second delays (see example in Figure A1), is 7 for this same time interval between the 0.2 and 0.3 second delays, is 11 for this same interval between the 0.3 and 0.4 second delays and is 13 for this same interval between the 0.4 and 0.5 second delays. In Figure A2 it is seen that although the fast acting drogue reduces the trajectory peak altitudes and as a result reduces the time to reach the initial ejection altitude, it reduces the ratios of the time lost to the increase in the time delay to 4.5, 5.5, 6 and 7. In Figure A3 the ratios of the time lost to the increase in the time delay are 17.5 and 16 for the 0.1 second time intervals between the 0.1 and 0.2 second delays and between the 0.2 and 0.3 second delays respectively for 150 degrees per second roll rate, no drogue ejection conditions.

The maximum roll rate of a state-of-the-art at 200 KEAS is over 180 degrees per second according to Figure A and is over 150 degrees per second at 100 KEAS. From this data it is concluded that any time saving in an escape system sequencing prior to catapult separation is equivalent to over ten times any time saving which is made subsequent to that time. Thus, a strong emphasis should be placed on those subsystem improvements which will reduce the time from system initiation to catapult separation.

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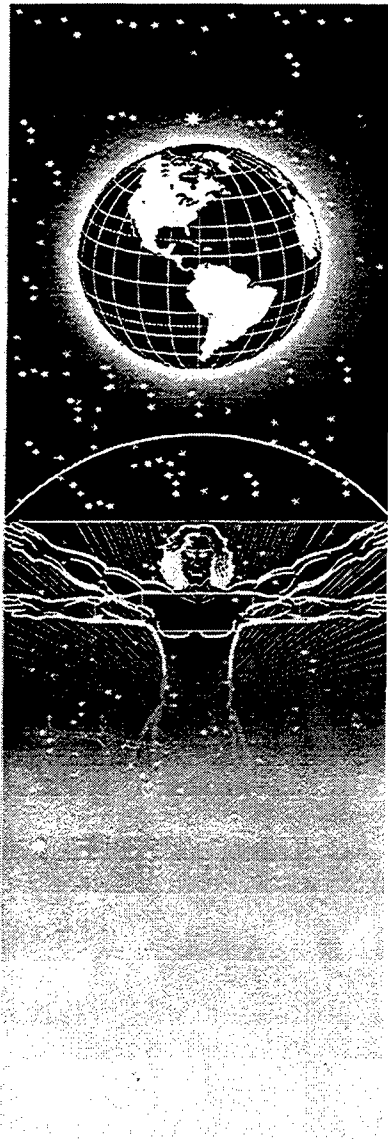
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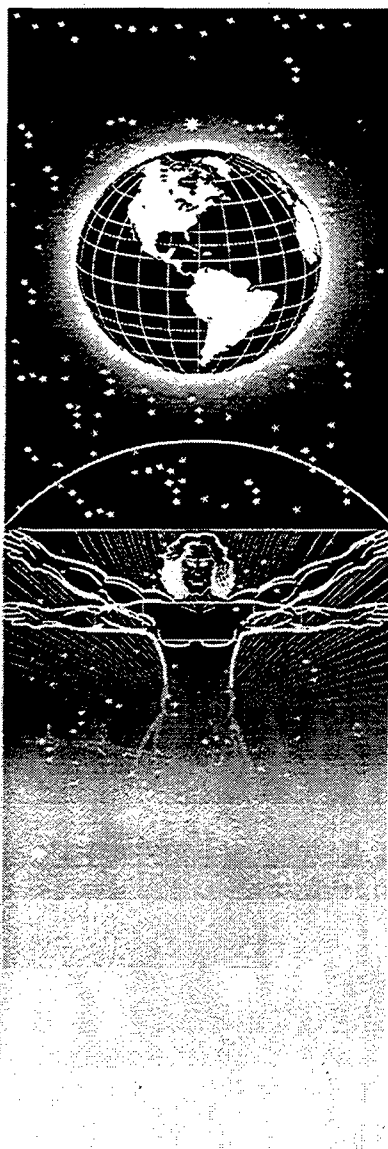
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AFRL-HE-WP-TR-1998-0000

The experiments reported herein were conducted according to the "Guide for the Care and Use of Laboratory Animals," Institute of Laboratory Animal Resources, National Research Council.

This report has been reviewed by the Office of Public Affairs (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

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The voluntary informed consent of the subjects used in this research was obtained as required by Air Force Instruction 40-402.

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