

AIR FORCE RESEARCH LABORATORY (AFRL) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/ NATIONAL INFORMATION STANDARDS ORGANIZATION (NISO)-BASED GUIDE TO FORMATTING TECHNICAL REPORTS

February 2018

HEADQUARTERS AFRL DIRECTOR OF STAFF INTEGRATION AND OPERATIONS DIVISION INFORMATION MANAGEMENT WRIGHT-PATTERSON AFB, OH 45433

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1.0 COMPONENTS OF A TECHNICAL REPORT

The United States Air Force uses ANSI/NISO Z39.18 as a formatting guide for technical reports. This guidance highlights fundamental formatting recommendations addressed in the ANSI/NISO standard, as shown in Table 1. Full component descriptions are available in the ANSI/NISO Z39.18 which can be found at the link below:

http://groups.niso.org/apps/group_public/download.php/12038/Z39_18_2005_R2010

| COMPONENT | RESPONSIBLE PARTY | INCLUSION STATUS | |
|-------------------------------------|--|--|--|
| | FRONT MATTER | | |
| (page numbering | g sequentially with Roman numerals b | peginning with Table of Contents) | |
| Cover or Title | Government Work Unit Manager | | |
| | (WUM) | Required | |
| Notice and Signature Page | Government WUM | Required | |
| Notice to Accompany the | Defense Technical information | | |
| Dissemination of Export-Controlled | Center (DTIC) will add this to | | |
| Technical Data (See Appendix B) | technical report. | | |
| Standard Form (SF) 298, Report | Report Author | Required | |
| Documentation Page | | | |
| Table of Contents | Report Author | Required | |
| List(s) of Figures and Tables | Report Author | Conditional (include when there are more | |
| | | than five figures and/or tables) | |
| Foreword | Report Author | Optional | |
| Preface | Report Author | Optional | |
| Acknowledgements | Report Author | Optional | |
| | BODY | | |
| (page numb | bering sequentially beginning with the | Arabic numeral 1) | |
| Summary | Report Author | Required | |
| Introduction | Report Author | Required | |
| Methods, Assumptions, and | | | |
| Procedures | Report Author | Required | |
| Results and Discussion | Report Author | Required | |
| Conclusions | Report Author | Required | |
| Recommendations | Report Author | Conditional (include when purpose of report | |
| | 1 | is to suggest a course of action) | |
| References | Report Author | Conditional (use if references are provided) | |
| | BACK MATTER | | |
| (page n | umbering continues sequentially from | body of report) | |
| Appendices | Report Author | Conditional (Include when needed to | |
| | | supplement Results and Discussion) | |
| Bibliography | Report Author | Conditional | |
| List of Symbols, Abbreviations, and | Report Author | Conditional (include if used in any other | |
| Acronyms | 1 | component of the report) | |
| Glossary of Terminology | Report Author | Conditional (Include if report | |
| , 6, | * | incorporates terms unfamiliar to the | |
| | | intended audience) | |
| Index | Report Author | Optional | |
| Distribution List | Report Author/Government WUM | Conditional (Some technology | |
| | | directorates control access) | |
| Back Cover | Report Author | Required for classified reports only | |

Table 1. Components of a Technical Report

2.0 FRONT MATTER

- 2.1 Cover Page (see Table 2 and Figure 1)
 - AFRL Shield, upper left-hand corner
 - Technical Report Document Number
 - Main Title
 - Subtitle (if applicable)
 - Author Name(s) (First Name/Last Name)
 - Wing/Technical Directorate or Prime Contractor Company Name (address can be added. Just be consistent).
 - Subcontractor Company Name (if applicable) (address can be added, just be consistent).
 - Report Date (Month followed by four-digit year)
 - Type of Report (interim or final)
 - Distribution Statement and reasons for the statement's assignment (see Department of Defense Instruction (DoDI) 5230.24).
 - Warning Statement for Export Control (if applicable)
 - Destruction Notice
 - Pointer Text to other limits
 - Notice of Copyright (if applicable)
 - Sponsoring Directorate

Table 2. Cover Page Elements

| Component | Explanation |
|-------------------------|--|
| AFRL Shield | Located in upper left-hand corner. |
| Technical Report Number | Assigned by the directorate Science & Technical Information (STINFO) Office upon receipt. |
| Main Title | Accurate and specific to describe the contents of the report. |
| Subtitle | If applicable; Used for a delivery or task order (DO-TO) or volume title in a series. |
| Author Name(s) | Full names to include middle initial(s). |
| Company Name | Primary performing company name. |
| Report Date | Month and four-digit year. |
| Special Report Type | i.e., Small Business Innovative Research (SBIR), Small Business Technology Transfer (STTR) Broad Agency Announcement (BAA), etc. |
| Distribution Statement | Per the contract. |
| Data Rights Notice | Whenever Proprietary Information appears as a reason in a distribution statement, a description of the type of data rights in the report is provided parenthetically after the reason- Limited Rights Data, SBIR Data Rights, Government Purpose Rights Data Restricted Rights, etc. |
| Warning | Standard export control warning (if applicable) |
| Destruction Notice | Standard destruction notice, one for unclassified data and a different one for classified data. |
| Copy Right Notice | Asserted copyrights, if any. |
| Classification Caveats | For classified documents, derived from and declassification information. |
| Sponsoring Directorate | Address supplied by your local STINFO Office. |



AFRL-RH-WP-TR-2017-XXXX

Be consistent with the font size (i.e., Main Title-16 pt/Bold, all caps; Subtitle- 14 pt/bold)

MAIN TITLE

Subtitle (if applicable)

Author(s) First name/Last name

Contractor Company Name (if applicable)

Author(s) First name/Last name

Subcontractor Company Name (if applicable)

Month/Year

Final Report

THIS IS A SMALL BUSINESS INNOVATION RESEARCH (SBIR) PHASE I REPORT

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Figure 1. Sample of a Cover Sheet

2.2 Pages Following Coversheet

- The appropriate Notice Page or Pages (see Appendix A).
- Standard Form (SF) 298, Report Document Page (see Figure 2).
- Typically, three sections follow the SF 298 in this succession: Table of Contents, List of Figures, and List of Tables.

2.2.1. SF 298

The accuracy and completeness of the SF 298 are critical to the report so that the document will be more easily retrieved from Defense Technical Information (DTIC) or other databases. The Contractor/Author shall complete Blocks 1 - 5b, 6 - 8, 12 - 15 of SF 298 and submit per Contract Data Requirements List (CDRL) requirements. See Table 3 and Figure 2. Here is the link for SF 298: <u>https://app_gsagov_prod_rdcgwaajp7wr.s3.amazonaws.com/SF%20298.pdf</u>

| Block No./Component | Explanation |
|---|---|
| | Month/year of the report, typically the month of or following the ending period of the |
| 1 Report Date | performance month. Ensure this date matches the date on the cover. |
| 2 Report Type | Final or Interim |
| 3 Dates Covered (From-To) | The period during which the technical effort was performed. |
| 4 Title/Subtitle | Should match the cover title/subtitle. Use a distinctive title and subtitle that distinguished the report from others that cover the same general topic, as when more than one report is produced |
| | that has the same overall title. |
| 5a – 5b Contract and funding information | Information should be in the contract. If not, the AFRL Program Manager (PM) or STINFO Officer/Liaison will provide. |
| 5c – 5f Contract information | AFRL WUM or STINFO Officer/Liaison will provide. |
| 6. Authors | The author or authors' first and last names (initials are acceptable) |
| 7. Performing Organization Name(s) and Address(es) | The organization(s) or company(ies) that performed the work. Most commonly, the name and address of only the prime contractor appears here. |
| | The number assigned to the document by the contractor or if in-house-authored, the number |
| 8. Performing Organization Report Number | assigned to the document (see Block 11 description) |
| 9. Sponsoring/Monitoring Agency (Name(s) and Address(es) | The organization providing technical oversight for the contract. Occasionally, an effort is co- sponsored, such as when an effort is co-funded by multiple government agencies, such as a |
| | division within the Defense Advanced Research Projects Agency (DARPA) |
| 10. Sponsoring/Monitoring Agency Acronym(s) | Branch-level AFRL symbol or other controlling Department of Defense (DoD) office (CDO) descriptive acronym. |
| 11. Sponsoring/Monitoring Agency Report Number(s) | The complete AFRL document number assigned by the directorate STINFO. Ex: AFRL-RD- PS-TR-2017-0010-TR |
| 12. Distribution/Availability Statement | See Appendix A. |
| 13. Supplementary Notes | Export control notice; SBIR information; references to previous editions or related volumes; copyright notice; special grant numbers; references to related documents, etc. |
| 14. Abstract | The overall purpose of the research and/or its applications, including major results and conclusions |
| 15. Subject Terms | Terms and key words that make the report accessible, making it appear in search retrieval lists. |
| 16. Security Classification | The classification of the whole document. |
| 17. Limitation of Abstract | Same as report (SAR) (Enter SAR) |
| 18. Number of Pages | Total number of pages including front matter. |
| 19a. Name of Responsible Person | Controlling DoD PM. |
| 19b. Telephone Number | Controlling DoD PM. (Leave blank for Distribution A documents) |

Table 3. Explanation of SF 298 Components

| SAMF | LE REPORT | DOCUMENT | ATION PAGE | | Form Approved OMB No. 0704-0188 |
|--|---|--|--|---|--|
| data needed, and completing this burden to Department of I 4302. Respondents should be | and reviewing this collection of Defense, Washington Headquar e aware that notwithstanding an | nformation. Send comments reg ters Services, Directorate for Info | garding this burden estimate or a ormation Operations and Report on shall be subject to any penalt | any other aspect of this s (0704-0188), 1215 Je y for failing to comply w | arching existing data sources, gathering and maintaining the collection of information, including suggestions for reducing fferson Davis Highway, Suite 1204, Arlington, VA 22202- ith a collection of information if it does not display a currently |
| 1. REPORT DATE (DATE (DATE)) 11/10/2016 | D-MM-YYYY) | 2. report type FINAL | | | DATES COVERED (From - To) 03 March 2015 – 11 December 2017 |
| 4. TITLE AND SUBTI | ĨLE | | | 58 | a. contract number A8650-15-D-1111 |
| Comparative As | sessment of Torso | and Seat Mounte | ed Restraint System | | D. GRANT NUMBER |
| (Ensure this titl | e matches the co | ver sheet title) | | | . PROGRAM ELEMENT NUMBER 5502F |
| 6. AUTHOR(S) | | | | 50 | I. PROJECT NUMBER |
| First Name(s)/La | ast Name(s) | | | 5 e 0 | 005 •. TASK NUMBER 001 |
| | | | | | . WORK UNIT NUMBER |
| 7. PERFORMING OR | GANIZATION NAME(S) | AND ADDRESS(ES) | | | PERFORMING ORGANIZATION REPORT NUMBER |
| ABC Research | | | | | |
| 123 Any Street | | | | | |
| City, State Zip | | | | | |
| Air Force Resea | rch Laboratorv | | ock 7 is the same as 1 | Block 9, | . SPONSOR/MONITOR'S ACRONYM(S) |
| Airman Systems Wright-Patterson | | just fill in Blo | ck 7. | | <u>FRL/RHC</u> . sponsor/monitor's report |
| 45433 | I All Polee Dase | | | | NUMBER(S) |
| | | | | A | FRL-RH-WP-TR-2017-0011 |
| DISTRIBUTION | | B. Distribution au | | | agencies only; Proprietary ember 2017. Other requests for |
| · · · · · · · · · · · · · · · · · · · | 0 / | • | nt-Patterson Air Fe | | 1 |
| 13. SUPPLEMENTAR | | | | D | |
| | | | | | SBIR) Phase I report. EXPORT |
| 14. ABSTRACT | . Include Copy | Right material in | this block, if app | plicable. | |
| | developed under a | a SBIR contract fo | or topic ABC. | | |
| - | - | | - | | |
| 15. SUBJECT TERMS | ; | | | | |
| SBIR | | | | | |
| 16. SECURITY CLAS | SIFICATION OF: | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON AFRLWUM |
| a. REPORT | b. ABSTRACT | c. THIS PAGE | SAR | 77 | 19b. TELEPHONE NUMBER (include area |
| Unclassified | Unclassified | Unclassified | ~**** | , , | code) |
| | | | | | |
| | 1 | 1 | 1 | | Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std. Z39.18 |

Figure 2. Sample SF 298

2.4 Table of Contents

Start pagination of Table of Contents with lower-case Roman numeral "i" as shown in Figure 3. Start listing contents that are in the Front Matter (e.g., List of Figures, List of Tables, Foreword, Preface, the Body of text, then Back Matter). Appendix labels should be in alphabetical order, and page numbers should continue from the previous section. If there is only one Appendix, just call it an Appendix. If a report contains more than five figures or tables, or some combination totaling more than five, a list of figures and/or tables is required. If less than five, it is optional.

TABLE OF CONTENTS

| Section | Page |
|-----------|--|
| List of F | Figures iv |
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| LIST O | F SYMBOLS, ABBREVIATIONS, AND ACRONYMS 59 |
| | i |

Figure 3. Table of Contents Example (border not required)

2.5 List of Figures

Continue pagination with lower-case Roman numerals as shown in Figure 4. List all figures found in text, excluding those that appear in any appendix (list appendix figures at the front of each appendix, if applicable).

LIST OF FIGURES

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| Figure 1 | Overall View of Propulsion Vehicle | 9 |
| Figure 2 | Motor Configuration | 25 |
| Figure 3 | Apparatus Used to Make Nozzle Tubes2 | .6 |

Figure 4. List of Figures Example (border provided for figure simulation only)

2.6 List of Tables

Continue pagination with lower-case Roman numerals as shown in Figure 5. List all Tables found in text, excluding those that appear in any appendix (list appendix tables at the front of each appendix, if applicable.)

| | LIST OF TABLES | |
|---------|--|------|
| | | Page |
| Table 1 | Some of the Upper-Stage Propulsion Options | |
| Table 2 | Results of Test Firing #1 | 25 |
| | Results of Test Firing #2 | |

Figure 5. List of Tables Example (border provided for figure simulation only)

3.0 BODY

3.1 Required Headings

Start the body of the text with the **Summary or Executive Summary (1.0)** and begin pagination with Page 1 (Arabic numerals) (see Figure 3).

3.2 References

References should be listed numerically, in the order they appear in the text. The Reference page should be at the end of the report (*not at the end of each section*). For works that are generally referred to throughout the report, without citing specific references from the work, create a Bibliography (in alphabetical order). Personal communications, unpublished speeches, or any other information not available for reference by the reader should not be included in the References – *footnote your citation instead*. References must be available to readers of the report. The examples below are a suggested format.

3.2.1. Papers / Journal Articles / Conference Presentations or Proceedings

Author's last name, then first name, Titles of papers are in quotation marks; Journal names or Conference names are in italics; Volume is bolded; Date follows comma (not within parenthesis); Page numbers (pp.) are last.

Examples:

Chidambaram, N., Dash, S., and Kenzakowski, D., "Scalar Variance Transport in the Turbulence Modeling of Propulsive Jets," *Journal of Propulsion and Power*, **17**, 1, Jan 2001, pp. 79-84.

Author(s), "Title of Article," Paper No. (if AIAA or CPIA paper, etc.), *Name of Conference*, Location, Date.

Chai, A.H., Cao, Z.T., Chen, H. P., "Monte Carlo Method Study of Terahertz Pulse, Propagation in Biological Tissue," *Proceedings of the 2005 IEEE, EMBS 27th Annual Conference,* Shanghai, China (2005).

3.2.2. URLs

The URL or other path information appears instead of the volume and number cited for a conventional journal. It is frequently useful to the reader to know the date when the material was accessed. In such cases, "Accessed [date]" would be appropriate wording.

Virillio, Paul, "Speed and Information: Cyberspace Alarm!" CTHEORY, URL: http://www.freedonia.com/ctheory/, last modified 19 September 1995. Accessed 17 November 1999

3.2.3. Technical Reports

Enter Author's last name, then first; Titles of reports are in italics; Next is report number; DTIC Accession Number, Distribution Code and/or PA Clearance/Date, Name and address of performing agency/organization; Date is last.

Example:

Author(s), Title, AFRL-PR-ED-TR-20XX-XXXX, Company, Inc., City, State, Jan 2006

In-House Author Example

Gaitonde, Datta, Advances in High-Fidelity Multiphysics Simulation, AFRL-RB-WP-TR-2008-3019; ADB123456, Distribution B, Wright-Patterson AFB: AFRL Air Vehicles Directorate, 2008

Gaitonde, Datta, Advances in High-Fidelity Multiphysics Simulation, AFRL-RB-330 WP-TR-2008-3019, XXABW Cleared XX/XX/XXXX; XXABW-XXXX-331 XXXX, Wright-Patterson AFB: AFRL Air Vehicles Directorate, 2008

3.2.4. Books

Enter Author's last name, then first name; Title of book can be **Bolded** or <u>Underlined</u>; Publisher's name and location (city and state); Date of publication; Page numbers last.

Example:

Author(s), **Book Title**, Harper & Rowe, New York, NY, 1993, pp. 36-38, 77, 98-101

Wylie, C.R., **Advanced Engineering Mathematics**, 7th ed, McGraw-Hill, New York, NY, 2005, pp 15-18

4.0 BACK MATTER

Pagination continues from the body. Include conditional and optional Back Matter in the order listed in the components table on page 1: Appendices, Bibliography, List of Symbols, Abbreviations, and Acronyms, Glossary, Index, Distribution List, and Back Cover.

4.1 Appendices

If there is only one appendix, the title Appendix would be without an alphabet letter (i.e., Appendix A, Appendix B). All tables and figures in that appendix are prefixed with A-, the "A" representing the word, Appendix. Each appendix should be referred to in the body text. Any references cited in an appendix must be listed as the last page of the appendix. Appendix page numbering is a sequential continuation of the Arabic text page numbering. Number figures, tables, equations, and references in an appendix with the letter of the appendix, followed by a hyphen and a sequential number, starting at 1, e.g., Figure A-1, A-2, B-1, B-2 for appendix figures, Table A-1, A-2, B-1, B-2 for appendix tables and A-1, B-1 for reference citations.

4.2 Symbols, Abbreviations and Acronyms

When first introduced in the report (title or text), completely write out abbreviations and acronyms, followed by the abbreviation or acronym in parentheses, e.i., Small Business Innovation Research (SBIR). Thereafter, use only the acronym/ abbreviation in the body text; i.e., SBIR only if they are proper names (e.g., Department of Defense). See Figure 6. Create an acronym list that lists and defines all acronyms and symbols that appear in your report. List all terms alphabetically, beginning with those starting with capital letters, followed by lower case (e.g., H2, HEDM, hcp). Follow alphabetical entries with Greek or special symbols. Capitalize definitions only if they are proper names (e.g. Department of Defense).

| LIST OF SYMBOLS, ABBREVIATIONS AND ACRONYMS | |
|---|---|
| Computerized Axial Tomography | |
| Communication Satellites | |
| a Polaroid [™] photopolymer | |
| Department of Defense | |
| dichromated gelatin | |
| hydrogen | |
| High Energy Density Matter | |
| | |
| L | Computerized Axial Tomography Communication Satellites a Polaroid [™] photopolymer Department of Defense dichromated gelatin |

Figure 6. Example of Lists of Symbols, Abbreviations and Acronyms

5.0 FORMAT REQUIREMENTS.

5.1 Type (Font) and Headings (Section Titles)

The recommended font is 12-point Times New Roman or Arial throughout the report. Figure 7 shows an example (format and spacing) of headings:

1.0 HEADING 1 IS ALL UPPER CASE AND BOLDED

- 1.1 Heading 2 is Bolded, Same Font Size as Text, Upper and Lower Case, Flush with Left Margin
- **1.1.1. Heading 3 is Boldface, Upper and Lower Case Letters,** *followed by a Period.* Then continue the copy.

Figure 7. Heading Formats

5.2 Spacing

Final reports should be single spaced. It isn't necessary to double-space between paragraphs if the first line of each paragraph is indented.

5.3 Margins

Leave 1-inch left, right, and top margins. Leave enough room at the bottom of each page to include page numbers and notices (applicable restrictive statements (i.e., Public Affairs (PA) Clearance, additional control markings, distribution statement, export control warning, etc., as applicable).

5.4 Numbering

Page numbers are centered at the bottom of the page, above the footer. Figure numbers and their captions are on the same line below figures, while table numbers and their captions are on the same line above the tables. (See Figure 4 and Figure 5).

6.0 PRESENTATION STYLES

6.1 Style for Equations, Figures, and Tables

All equations, figures and tables shall be crisp and easy to read as shown in Equation 1. Figure and Table Captions should be in at least an 8-point type (handwriting on figures and tables is not). List of figures and tables are numbered, worded, spelled and punctuated exactly as they are in the report.

6.1.1. Style for Equations

$$(1+x)^n = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \cdots$$
(1)

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \tag{2}$$

Equation 1. Sample Equations

6.1.2. Style for Figure Captions

Figure captions should be in title case letters using a consistent font, as shown in Figure 8 below. The Figure Caption describes the content without giving background information, results, or comments about the figure. Reference to figures and tables must appear in the text before the actual figure or table appears in the report. Where possible, integrate figures and tables into text and place figure/table as soon after the first mention of it as possible, before beginning a new subject. There should be two blank lines between Figures or Tables and text.

Sample Representation Only (border not required.)

Figure 8. Figure Caption is on Same Line as Figure Number

6.1.3. Style for Table Captions

Authors should use the style listed in section 4.1.2. As shown in Table 4, the caption line and caption number should be centered, bolded, with no period at the end of the caption.

| Table 4. Table Caption is on Same Line as Table Numbe | Table 4. | . Table (| Caption is or | 1 Same Line as | Table Number |
|---|----------|-----------|---------------|----------------|---------------------|
|---|----------|-----------|---------------|----------------|---------------------|

| NAME | ADDRESS | CITY, STATE |
|------|---------|-------------|
| | | |
| | | |
| | | |

7.0 **REFERENCES**

ANSI/NISO Z39.18-2005 (R2010), Scientific and Technical Reports – Preparation, Presentation and Preservation, 13 May 2010.

Defense Federal Acquisition Regulation Supplement (DFARS) and Procedures, Guidance, and Information (PGI).

DoDI 5230.24, Distribution Statements on Technical Documents, 01 November 2017.

8.0 LIST OF ACRONYMS & GLOSSARY

AFRL – Air Force Research Laboratory ANSI – American National Standards Institute BAA – Broad Agency Announcement **CDO** – Controlling DoD Office CDRL – Contract Data Requirements List **DARPA** – Defense Advanced Research Projects Agency **DoD** – Department of Defense **DoDI** – Department of Defense Instruction **DO-TO** – Delivery – Task Order **DTIC** – Defense Technical Information Center NISO – National Information Standards Organization PA – Public Affairs PM – Program Manager SAR – Same as Report SBIR - Small Business Innovative Research STINFO - Science & Technical Information STTR – Small Business Technology Transfer WUM – Work Unit Manager

APPENDIX A – Notice and Signature Pages

The following example notice page description would be used for a document NOT cleared for public release and for use with Controlled Unclassified Information (CUI) to which the Government has unlimited rights.

NOTICE AND SIGNATURE PAGE

Using Government drawings, specifications, or other data included in this document for any purpose other than Government procurement does not in any way obligate the U.S. Government. The fact that the Government formulated or supplied the drawings, specifications, or other data does not license the holder or any other person or corporation; or convey any rights or permission to manufacture, use, or sell any patented invention that may relate to them.

Qualified requestors may obtain copies of this report from the Defense Technical information Center (DTIC) (http://www.dtic.mil).

AFRL-RH-WP-TR-20XX-XXXX HAS BEEN REVIEWED AND IS APPROVED FOR PUBLICATION IN ACCORDANCE WITH THE ASSIGNED DISTRIBUTION STATEMENT.

Use Distribution Statements B, C, D, and E with this Notice and Signature Page.

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