

# Style File for Vertical Flight Society Meeting Proceedings

## Version 1.21, 2023/09/24

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### ABSTRACT

This style file is for abstracts and proceedings of The Vertical Flight Society Meetings. It can be used either as a package with the `article` document class or as its own document class. It is current as of the Author's Guide for VFS Forum 76. It formats headings, captions, citations, and footnotes and provides commands to assist in the creating the title block, nomenclature section, and table footnotes. The available commands and features are described in this document with examples. Instructions and sample references for the included `BIBTEX` style file are also provided. The style file takes advantage of custom fields *location*, *days*, and *doi* for proceedings entries and specifying digital objects.

### FILE LIST

#### Included Files:

|                |                                                                             |
|----------------|-----------------------------------------------------------------------------|
| README         | text instructions                                                           |
| ahsmeeting.cls | $\LaTeX$ document class                                                     |
| ahsmeeting.sty | $\LaTeX$ style file                                                         |
| ahs.bst        | $BIBTEX$ style file                                                         |
| ahsrefs.bib    | sample $BIBTEX$ database file                                               |
| manual.tex     | source for PDF manual                                                       |
| manual.pdf     | manual for style file (this file)                                           |
| template.tex   | source for paper template—should be processed with <code>pdflatex</code>    |
| abstract.tex   | source for abstract template—should be processed with <code>pdflatex</code> |
| template.pdf   | paper template which matches MS Word template                               |
| abstract.pdf   | abstract template which matches MS Word template                            |
| 40x80.jpg      | image of LRTA in wind tunnel for template document                          |

#### Required Packages:

`cite.sty`  
`times.sty`  
`helvet.sty`  
`mathptmx.sty`  
`ifthen.sty`

### OVERVIEW/QUICK START

The package can be used as a document class or as a package with the `article` document class. The class file `ahsmeeting.cls` is only a wrapper to load the `article` document class with appropriate options. If processed as a package with the `article` document class, the appropriate options to conform to the VFS guidelines are `[twocolumn, 10pt, letterpaper, notitlepage]`. Of these, `notitlepage` and `letterpaper` are defaults

The command `\meeting{}` places this footnote here. It is used for the meeting name and copyright statement or declaration of government work. `\nomeeting` removes it.

for the `article` document class. If processed as a document class, these options are selected by default. All other options and features are the same regardless of the mode in which `ahsmeeting` is invoked.

Without doing anything else, beginning the document file with:

```
\documentclass{ahsmeeting}
```

or

```
\documentclass[twocolumn,10pt]{article}
\usepackage{ahsmeeting}
```

and setting the source footnote with the `\meeting{}` command for papers and

```
\documentclass[onecolumn,10pt]{article}
\usepackage{ahsmeeting}
```

and issuing the `\nomeeting` command for abstracts will provide all of the required formatting. If  $BIBTEX$  is used, add

```
\bibliographystyle{ahs}
```

to the preamble to invoke the proper reference formatting style. The  $BIBTEX$  features are described starting on page 5. The commands and features below are provided to assist in writing and make small changes within the AHS guidelines to suit the author's preference.

### REQUIREMENTS AND OPTIONS

The style file requires five other packages that must be present on the processing system, `cite`, `times`, `helvet`, `mathptmx`, and `ifthen`. The package `cite` provides more advanced formatting for bibliographic citations. `times`, `helvet`, and `mathptmx` provide Times for the serif and equations fonts and `helvet` provides Helvetica for the default sans serif font. They are automatically loaded by the style file and do not need to be called out in the document.

The `hyperref` package is strongly recommended to provide hyperlinks in the final document, but is not included as a formal requirement. Because it re-defines many environments, it is generally best for `hyperref` to be the last package loaded, *after* `ahsmooting`. The output is visually better if `hyperref` is loaded with the `colorlinks=true` option. The default is to draw a colored box around the link text rather than coloring the link text itself. Load with:

```
\usepackage[colorlinks=true]{hyperref}
```

A top-level option is the decision to process the document with  $\text{T}_{\text{E}}\text{X}/\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  or  $\text{PDF}_{\text{T}}\text{E}_{\text{X}}/\text{PDFL}^{\text{A}}\text{T}_{\text{E}}\text{X}$  and the resulting impact on figures. PostScript (PS) and Encapsulated PostScript (EPS) are the only image formats supported by  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ . Conversely,  $\text{PDFL}^{\text{A}}\text{T}_{\text{E}}\text{X}$  supports several image formats, including PDF, JPG, JBIG2, and PNG, but *not* EPS. This is independent of the style file and is the author's choice.

## Package Options

The `bigtitle` option causes the title block to use larger fonts. The default is `\large` for the title and normal font for the authors; `bigtitle` increments those sizes to `\Large` for the title and `\large` for the author block. The `smalltitle` command provides the smaller sizing, `\large` for the title and `\normalsize` for the author block. The font sizes in the title block are the author's discretion and can be overridden in the `\title{}` and `\author{}` commands, however VFS's template document features a larger font, so `bigtitle` is default.

The `bigsection` option causes the section headings to use a larger font, `smallsection` makes section headings the same size as the body text. `bigsection` is default.

The `SECTION` option causes section headings to be converted to all caps. This is default to match the VFS template document. The option `section` causes section headings to be output as typed.

The `absheading` option places the word "Abstract" as a section heading above the abstract. It is in title case unless the `SECTION` option is also present. `absheading` is default.

The options `jahsabs` and `plainabs` control the abstract block itself. By default, the abstract is indented 0.25" but not bold. The `plainabs` option causes the abstract block to be the full page width in standard type. The `jahsabs`, indents the abstract block 0.25" on the right and left and prints the abstract in bold, similar to abstracts in the *Journal of the American Helicopter Society*. `plainabs` is default.

The `draft` option is useful for version control of drafts of your paper while it is being written. It produces a box with the date the document was produced at the top of every page,

DRAFT: AUGUST 29, 1997 AT 2:14 AM

You can also place the `\draft` command in the preamble to activate this feature. **Using the package option will invoke draft features for other packages (e.g. `graphicx`) and the article document class itself. The preamble command will only enable the `ahsmooting` draft features.**

The `plaincite` option is passed to the `cite` package to negate its effects.

## COMMANDS AND FEATURES

### General Preamble Commands

Two commands are provided for the title page. The `\abstract{text}` command places the abstract in single column, full text width block. The word "Abstract" is not placed at the top by default unless the `absheading` package option is used. The `\meeting{text}` command places the meeting footnote at the bottom of the first column of the title page (see example). It is normally used for the meeting name and copyright statement. If no source footnote is desired, the `\nomeeting` command will remove it entirely (intended for writing abstracts which do not require the footnote).

The `\draft` command described previously may also be included in the preamble.

An additional command:

```
\diststatement[Other pages]{First page}
```

is provided to allow for a government or company distribution statement to be included on the first and potentially other pages, immediately below the page number. The default is that neither is shown. If the command is issued in the preamble, the first page statement is mandatory while the subsequent page statement in brackets is optional. This option is primarily for abstracts that do not have a meeting footnote. For papers, such a statement could be included as part of the meeting footnote or separately with the `\diststatement` command.

### Author Commands

Several commands are provided to format the author information in cases where multiple authors have common information. Commands for 2–4 authors plus a single author command are provided:

```
\singleauthor[width]{author}
\doubleauthor[width]{a1}{a2}{common}
\tripleauthor[width]{a1}{a2}{a3}{common}
\quadauthor[wid]{a1}{a2}{a3}{a4}{common}
\andnewline
```

Here, `a1–a4` are the author names with information unique to that author and `common` is the common information that should be centered between the authors. The optional argument `width` is a length for each name block. It defaults to 2 inches for one, two and three authors and 1.5 inches for four authors. It can be modified to improve spacing, but must be set small enough to fit within the text width. Internally the blocks are formatted as parboxes with width `width`, so each of the text arguments can have a single line or multiple lines broken with `\\`. An example with fictitious characters is given in Figure 1. The `\singleauthor` command is almost the same as simply entering the author information directly, but

can be useful to improve spacing of a single author block next to a multiple author block. Otherwise, the author 3 information from Figure 1 could be entered in the normal way.

One additional command `\andnewline` has also been added to force a new line between authors. Normally authors are placed on the same line and a new line is started only when the next author doesn't fit. If a different grouping of authors than the default is desired, use `\andnewline` in place of `\and` to force a line break where desired.

## Nomenclature Commands

Two commands are provided for formatting the nomenclature section. The first is to aid in generating the symbol list and takes the form

```
\symbolentry{symbol}{definition}
```

The command outputs the symbol and definition in two columns. By default, the first argument is output in math mode, but plain text symbols can be created with `\mbox{}`. For example,

```
\symbolentry{C_T}{Thrust Coefficient,
calculated by momentum theory equation
 $T/\rho A V_T^2$ }
\symbolentry{\mbox{i}}{Loop Count}
```

produces

|       |                                                                             |
|-------|-----------------------------------------------------------------------------|
| $C_T$ | Thrust Coefficient, calculated by momentum theory equation $T/\rho A V_T^2$ |
| i     | Loop Count                                                                  |

The definition column is in paragraph form, so manual line breaking is not necessary. The default symbol width is 0.5 inch. The definition column will be the remainder of the column, i.e. `\columnwidth-width`. To change the symbol width, use the command `\setsymbolwidth{width}`. It redefines the symbol width and automatically adjusts the description width to the remainder of the column. `\setsymbolwidth{width}` can be called either in the preamble or anywhere in the main text, but the nomenclature section will appear best with a single symbol width.

## Appendices

The command `\appendix` is provided to add a single appendix or multiple appendices, label them automatically, and allow cross-referencing, without corrupting subsequent Acknowledgments and References sections. Because normal sections are not numbered, some special handling is required for appendices or these subsequent sections will have letters also. Each time `\appendix` is called, a counter is incremented and the appropriate section heading is output. If the user labels the appendix, for example `\appendix\label{sec:firstappendix}`, it can be referenced by `\pageref{sec:firstappendix}` or

`\ref{sec:firstappendix}`. Note that the latter will not output anything if there is a single appendix. Only if there are multiple appendices will it output A, B, etc.

The author can choose to use the regular  $\LaTeX$  section commands `\section{Appendix}` or `\section{Appendix ?}`, where `?` is replaced by A, B, etc., as an alternative if cross-referencing is not needed.

## Document Features

The title page is formatted as previously discussed by the formatting commands for the abstract, copyright statement, and nomenclature if present. Heading guidance is only provided for section, sub-section, and sub-sub-section. The section headings are not numbered regardless of the \*-version, and the style file formats them as follows:

### SECTION

Text continues below heading, heading is centered and bold. Size is large for `bigsection` option (default), or normal size for `smallsection` option.

### Subsection

Text continues below heading, heading is at the left margin and bold.

**Sub-subsection** Text is inline with heading, heading is bold.

*Paragraph* Text is inline with heading, heading is italicized.

The (required) cite package is used for citation formatting. In conjunction with it, the style file formats references for single and multiple citations. Single citations are formatted as (Ref. 1) while multiple citations are formatted as (Refs. 1–5). The `\citenum` command produces only the number as in “see reference 2”. More information can be found in the documentation for the cite package. The citations themselves have superscripted numbers rather than the  $\LaTeX$  standard bracketed format (see References section below).

Table captions are above the table. Note that the format with double lines top and bottom and a single line between the column headings and the column data is controlled by the author. The example table in the Author Guide is relatively complex and is a good example to illustrate features of the style file. Table footnote marks are set to be lowercase letters, as shown in Tables 1 and 2. If the only footnotes are within the table itself, they can be called using the normal `\footnote` command if the table is placed within a minipage. The source for Table 1 illustrating this is shown in Figure 2.

If a footnote is needed in the caption, then the footnote mark and footnote text must be called separately, including footnotes within the table or the marks will be duplicated or in the wrong order. The source for Table 2 is shown in Figure 3.

|                                                                                     |                                                                                       |                                                                                             |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Aragorn, son of Arathorn</b><br>King of Gondor<br>Humans<br>Gondor, Middle Earth | <b>Boromir, son of Denethor</b><br>Captain of the White Tower<br>Gondor, Middle Earth | <b>Gimli, son of Glóin</b><br>Lord of the Glittering Caves<br>Dwarf<br>Erebor, Middle Earth |
| <b>Frodo Baggins</b><br>Ring Bearer                                                 | <b>Samwise Gamgee</b><br>Gardener<br>Hobbits<br>The Shire, Middle Earth               | <b>Peregrin Took</b><br>Nuisance                                                            |

The above block was typeset from source:

```
\author{\doubleauthor{\textbf{Aragorn son of Arathorn}} \ King of Gondor}
{\textbf{Boromir, son of Denethor}} \ Captain of the White Tower}
{Humans \ Gondor, Middle Earth}
\and
\singleauthor[2.2in]{\textbf{Gimli son of Glóin}} \
Lord of the Glittering Caves \ Dwarf \ Erebor, Middle Earth}
\and
\tripleauthor{\textbf{Frodo Baggins}} \ Ring Bearer}
{\textbf{Samwise Gamgee}} \ Gardener}
{\textbf{Peregrin Took}} \ Nuisance}
{Hobbits \ The Shire, Middle Earth}}
```

**Figure 1. Sample complex author block of fictional authors with source showing formatting with package commands.**

```
\begin{table}\caption{Footnoted Comparison of Vibration Data\protect\footnotemark[1]}
\label{tbl:xampl}
\newcommand{\exsep}{\hspace{0.2in}}
\begin{minipage}{\columnwidth}\centering
\begin{tabular}{ll@{\exsep}ll@{\exsep}lll} \hline\hline
\multicolumn{2}{r}{OH-58D\quad\,} & & & & & \\
\multicolumn{2}{l}{UH-1} & & & & & \\
\multicolumn{3}{l}{CH-58B 1} & & & & \\
Flight Condition & 2P & 4P & 2P & 4P & 6P & 12P \\\hline
Ground run & --- & --- & .3 & .11 & .46 & .02 \\
Hover & .12 & .17 & .16 & .26 & .55 & .04 \\
Climb & .13 & .21 & .27 & .40 & .40 & .05 \\
Transition & --- & --- & .34 & .34 & .80 & .09 \\
Level Flight\footnotemark[2] & & & & & & \\
& .21 & .35 & .28 & .35 & .40 & .03 \\\hline\hline
\end{tabular} \end{minipage}\vspace{0.5ex}
\footnotemark[1]\footnotetext{1}{Table from VFS Author Guide} \par
\footnotemark[2]\footnotetext{2}{Velocity of 120 kn}\par
\end{table}
```

**Figure 2. Source for Table 1 using footnotemark and footnotetext commands.**

**Table 1. Footnoted Comparison of Vibration Data<sup>a</sup>**

|                           | OH-58D |     | UH-1 |     | CH-58B 1 |     |
|---------------------------|--------|-----|------|-----|----------|-----|
| Flight Condition          | 2P     | 4P  | 2P   | 4P  | 6P       | 12P |
| Ground run                | —      | —   | .3   | .11 | .46      | .02 |
| Hover                     | .12    | .17 | .16  | .26 | .55      | .04 |
| Climb                     | .13    | .21 | .27  | .40 | .40      | .05 |
| Transition                | —      | —   | .34  | .34 | .80      | .09 |
| Level Flight <sup>b</sup> | .21    | .35 | .28  | .35 | .40      | .03 |

<sup>a</sup>Table from VFS Author Guide<sup>b</sup>Velocity of 120 kn**Table 2. Colored Comparison of Vibration Data**

|                           | OH-58D |     | UH-1 |     | CH-58B 1 |     |
|---------------------------|--------|-----|------|-----|----------|-----|
| Flight Condition          | 2P     | 4P  | 2P   | 4P  | 6P       | 12P |
| Ground run                | —      | —   | .3   | .11 | .46      | .02 |
| Hover                     | .12    | .17 | .16  | .26 | .55      | .04 |
| Climb                     | .13    | .21 | .27  | .40 | .40      | .05 |
| Transition                | —      | —   | .34  | .34 | .80      | .09 |
| Level Flight <sup>a</sup> | .21    | .35 | .28  | .35 | .40      | .03 |

<sup>a</sup>Velocity of 120 kn

Note that the caption `\footnotemark` command must be preceded by `\protect` or errors will result (Ref. 6).

The colored lines in Table 2 are produced using the `xcolor` package. It is *not* part of the VFS style file but can be used if the author wants to include color. To create the colored lines, include in the preamble<sup>1</sup>,

```
\usepackage[table]{xcolor}
```

and

```
\definecolor{halfgreen}{RGB}{0,128,0}
```

in the preamble, or at least before you want to use it. The “halfgreen” color matches the green in the MS Word template. The pre-defined color “green” in L<sup>A</sup>T<sub>E</sub>X is RGB [0,255,0] and is a much lighter green than the Microsoft “green.” The `\arrayrulecolor` command can be seen in the source code in Figure 3.

Figures are labeled with a bold **Figure** and tables with **Table** as in the Journal of the American Helicopter Society. Equations are L<sup>A</sup>T<sub>E</sub>X standard, with an equation number in parentheses at the right,

$$C_T = \frac{T}{\rho A V_T^2} = \frac{T}{\rho A (\Omega R)^2} \quad (1)$$

$$\vec{v} = \frac{d\vec{p}}{dt} \quad (2)$$

$$\dot{\vec{v}} = \frac{d\vec{v}}{dt} \quad (3)$$

Equations in equation arrays are numbered unless the `\nonumber` command is used.

<sup>1</sup>The location of `xcolor` relative to other package calls did not seem to matter. In this document it is last.

## BIBLIOGRAPHIC STYLE FILE

The bibliographic style file was designed around the references given in the author guidelines for both VFS meetings and the *Journal of the American Helicopter Society*, which includes (Refs. 1, 2, 4, 5, 7–13) as examples. It was designed to render these exactly. The `xampl.bib` database is included in most L<sup>A</sup>T<sub>E</sub>X distributions and can be used to see the various reference types are output with varying amounts of information supplied in the database.

The style file originated from the `makebst` utility and the `merlin.mbs` master bibliographic style file. Several custom modifications were made for specifics in VFS’s desired formatting, notably inclusion of locations and full dates for conference proceedings.

A detailed description of BIB<sub>T</sub>E<sub>X</sub> usage and the “unnamed, stack-based language” BIB<sub>T</sub>E<sub>X</sub> style files are written in can be found in (Ref. 14). This is a valuable reference to become a style hacker as the stack-based language is somewhat cryptic and thus difficult to decipher and modify without documentation. This level of detail is required only to modify the style file, though. The information required for a normal user to get started using BIB<sub>T</sub>E<sub>X</sub>, including the standard fields and reference types, can also be found among other places in the more easily located (Ref. 6).

It is important to note that author names can be supplied in one of three forms:

“First von Last”

“von Last, First”

“von Last, Jr, First”

The third form is required for names with suffixes, such as (Ref. 9), to render properly. It is included as “Marchman, III, James F.” in the database.

### New Fields

Three new fields were added, two to help the user conform to VFS’s guidelines while maintaining compatibility with other publications, and one for digital citations. BIB<sub>T</sub>E<sub>X</sub> ignores custom fields which are not used in the style file, so these fields can be included in a bibliographic database used for other publications without affecting documents produced with that publication’s style file. It is difficult with a fixed number of field types to produce the correct output for all possible circumstances. The three new fields are

**location** The location of a conference for the `inproceedings` entry.

**days** Days of a conference for the `inproceedings` entry. If the conference spans multiple months, the second month can be included in this field also.

**doi** Digital Object Identifier (DOI) for electronic publications

```

\begin{table}\caption{Colored Comparison of Vibration Data}
\label{tbl:xampls}
\newcommand{\exsep}{\hspace{0.2in}}
\begin{minipage}{\columnwidth}\centering
\begin{tabular}{ll@{\exsep}ll@{\exsep}lll}\arrayrulecolor{halfgreen}\hline\hline
\multicolumn{2}{r}{OH-58D\quad\,} & & & & & \\
\multicolumn{2}{l}{UH-1} & & & & & \\
\multicolumn{3}{l}{CH-58B 1} & & & & \\
Flight Condition & 2P & & 4P & & 2P & & 4P & & 6P & & 12P & \\ \hline
Ground run & & --- & & --- & & .3 & & .11 & & .46 & & .02 & \\
Hover & & .12 & & .17 & & .16 & & .26 & & .55 & & .04 & \\
Climb & & .13 & & .21 & & .27 & & .40 & & .40 & & .05 & \\
Transition & & --- & & --- & & .34 & & .34 & & .80 & & .09 & \\
Level Flight\footnote{Velocity of 120 kn} & & & & & & & & & & & & & \\
& & .21 & & .35 & & .28 & & .35 & & .40 & & .03 & \\ \hline \hline
\end{tabular} \end{minipage} \end{table}

```

**Figure 3. Source for Table 2 using footnote command and minipage environment with colored array rules.**

**url** Uniform Resource Locator (web address), primarily for online citations.

Note that the `days` field was incorporated in a function `format.date` which formats the date for most if not all of the reference types, so if days are included in references other than conference proceedings, they will be output in the bibliography there as well. Normally, other types of references will only use month and year or year by itself.

To maintain compatibility with other publications that do not request these fields, provisions were included to incorporate this data in the standard fields. For example, month and days can be included in the `month` field and will render properly if the `days` field is empty. Dates with only a year or only a month and year will also be rendered properly.

For conferences which span days in two different months, database entries

```
month = {April}, days = {29--May 1},
```

or

```
month = {April 29--May 1}
```

will render properly. In general, using the macro forms for the months provides more flexibility in that the style files can choose to abbreviate months or not differently for different publications. For database entries, strings are concatenated with the `#` symbol, so the above date could be entered as

```
month = apr, days = "29--" # may # "~1"
```

or

```
month = apr # "~29--" # may # "~1"
```

to take advantage of this feature.

The conference location is most logically included in the `note` field if it is not to be placed in a custom field. The style file assumes that if the `location` field is empty, the conference location is in the `note` field and will adjust the output accordingly. The order of fields with `location` populated

is `author(s)`, `title`, `number`, `booktitle`, `location`, `date`, `note`. With `location` empty, it is `author(s)`, `title`, `number`, `booktitle`, `note`, `date`, so the location will appear in the correct position in the reference if it is in the `note` field.

In the package author's opinion, the most flexibility is achieved by using the custom field so that the `note` field can be used for other purposes both for VFS and other publications. If, on the other hand, another publication requires conference locations but its style file does not know about the custom field, it is best to leave the location in the `note` field.

The *Journal of the American Helicopter Society* along with an increasing number of other publications are now published in digital format, with each document receiving a Digital Object Identifier (DOI). An additional `doi` field is provided for this purpose. The macro to include the DOI has been included in such a way that it can be appended to any type of citation. For more information on DOIs, see [www.doi.org](http://www.doi.org) or [www.crossref.org](http://www.crossref.org).

To include DOIs, the normal citation is completed with a period and the DOI is shown afterward formatted as "DOI: entry." Formatted examples for a journal citation are shown in references 2,3.

Online publications are formatted as in reference 15 using a custom `online` citation type. Required fields for this entry are `author`, `title`, `publisher`, `url`, and what is known of the date, with the day of month in the `days` field (even though it is most likely a single-day date).

## Other Notes

Also for the `inproceedings` entry, the word "Proceedings" is automatically appended by the style file and should not be included in the database. Potentially, this could be checked during processing so it is not appended a second time if included in the database, but this feature is not currently

implemented. Other publications list conferences without the word “proceedings” so it should not be included.

Many distributions include the `xampl.bib` file which has examples of many different reference types with varying amounts of information supplied. This file can also be used to verify that the style file renders all reference types properly depending on the information given. Certain “minimal” references have superfluous commas or other issues which are difficult to avoid when the title is to be in quotes. In practice, such scant references should not appear in conference or journal papers.

## REFERENCES

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