

aiaa – a L^AT_EX Class and B_IB_TE_X Style for AIAA* Conference Papers and Journal Submission/Simulation[†]

bil kleb[‡]

1999/02/22

Abstract

This document describes the `aiaa` distribution which is centered around a modification of the standard L^AT_EX article class, `article.cls`. The new class produces AIAA-conformant¹ conference papers and journal submittals—it will even simulate the typesetting of journal articles and notes for length-determination purposes. This distribution also contains a (mostly) AIAA-compliant bibliographic style sheet, sample documents, a sample presentation, and other test equipment.

Contents

1	Introduction	2
2	Userguide	2
2.1	Requirements	2
2.2	Setup	2
2.3	Usage	3
2.4	General Commands	3
2.4.1	New Behavior from Old Commands	3
2.4.2	New Commands	4
2.5	Layout-specific Commands	5
2.5.1	Header and Footer Information	6
2.5.2	Cover-page Information	6
2.5.3	Copyright and Other Document Notices	6
3	Known Problems	7
4	Acknowledgements	8
5	Sending a Bug Report	8

*The American Institute of Aeronautics and Astronautics.

[†]This document describes `aiaa` version 2.4 which was born on 1999/02/22.

[‡]Research Scientist, NASA Langley Research Center, Hampton, Virginia.

¹Note this distribution is not a product of, nor endorsed by, the AIAA.

1 Introduction

The `aiaa` distribution consists of a \LaTeX class and various other files which are supposed to simplify the task of producing an AIAA conference paper and the subsequent journal submission. For instance, with a simple, one-word option in the beginning of the document, a manuscript can take the form of a two-column conference paper replete with cover-page or a double-spaced journal submission manuscript with figures and tables at the end, including the required caption lists.

2 Userguide

I apologize for the sparseness of this documentation; but, hey, this is not in my job description. ;) Hopefully the sample documents `smpaiaa.tex`, `smpsubf.tex`, and `smptalk.tex` provide suitable documentation through example.

2.1 Requirements

The `aiaa` distribution was developed using $\LaTeX_{2\epsilon}$ of 1995/12/01, patch level 1, running \TeX 3.14159 and `dvips` 5.58f—the $\text{te}\TeX$ distribution 0.3.3.² So anything more recent should work, but anything older: no guarantees. In particular, your `graphicx` package needs to be newer than September 1995 so that the `keepaspectratio` command is available.

The `aiaa` class depends on having access to a number of packages.³ If your local site does not have all the packages necessary, they can be obtained from your nearest Comprehensive TeX Archive Network (CTAN) site. In fact, chances are that this is where you found this distribution. Details on how to obtain packages from a CTAN site are available at <http://www.tug.org/> or various \LaTeX reference books [1, 2]. Especially helpful in locating various \LaTeX packages is the `Catalogue.html` web page found in the `help/Catalogue` directory of CTAN.

2.2 Setup

If you have not already run `aiaa.ins` through \LaTeX , do so. The `docstrip` utility (part of \LaTeX) will rip the code segments out of `aiaa.dtx` and save them in several files. If you encounter an error on installation like:

```
! Undefined control sequence
\batchLine -> generate
      {\file {aiaa.cls}{\from{aiaa.dtx}{class}}}
1.728 \processbatchFile
```

this means that your `docstrip` is very old and that you will need to update your entire \LaTeX distribution to take advantage of the `aiaa` package.

²The `aiaa` distribution has also been demonstrated on a Mac running the $\text{Oz}\TeX$ \TeX distribution and a PC running the $\text{Mik}\TeX$ \TeX distribution.

³When you process a file with \LaTeX , it will let you which packages it is missing. The less common ones are `dropping` and `caption2` while the other required packages: `lastpage`, `setspace`, `endfloat`, `overcite`, `graphicx`, and `fancyhdr` are usually bundled with most \LaTeX distributions.

Move the files `aiaa.cls`, `aiaa9pt.sty`, `aiaaenf.cfg`, and `aiaalgo.eps` to a directory searched by \TeX ⁴ and the file `aiaa.bst` to a directory searched by $\text{Bib}\TeX$.⁵ Once things are installed, try to \LaTeX the sample AIAA paper in the `demo/paper` directory, `smpaiaa.tex`. It should produce something similar to `smpaiaa.ps`.

2.3 Usage

The `aiaa` class is invoked by including

```
\documentclass[options]{aiaa}
```

at the beginning of your document. The package recognizes the following options: `submit`, `paper`, `article`, `note`, and `cover`. The `paper` option is the default and the `submit` option overrides any other option. The `cover` option produces a cover-page for conference papers or simulated journal reprints. In addition, any options that the standard \LaTeX article class accepts can be also inserted, *e.g.*, `draft`.⁶ Note, when using the `note` option, your title and author information may need to be modified with extra line breaks (`\`) since this information is no longer allowed to span both columns and may overflow the short `tex twidth` available. Other than this, the document is written just like one were using the standard \LaTeX article document class; and thus, I don't have to write much more on usage since it has already been documented by others in various \LaTeX books [1, 2, 3]. However, some of the old commands have slightly different behaviors and there are a few new commands designed to make life a little brighter; these are discussed in the following sections.

2.4 General Commands

Several standard \LaTeX commands have been modified to behave differently under the new class. In addition, several new commands have been introduced to ease document preparation. Both types are discussed in the following subsections.

2.4.1 New Behavior from Old Commands

`\abstract` The `\abstract` command has been redefined within the `aiaa` class to behave as part of the `\maketitle` sequence. Simply load `\abstract` as you would `\title` or `\author`, and as long as you have not selected the options `submit` or `note` (which do not allow for abstracts), the text loaded into the `\abstract` command will be typeset, indented and centered, underneath the title/author section. Remember `\abstract` must be loaded **before** `\maketitle` is invoked. This is typically done

⁴For a Unix $\text{te}\TeX$ installation, a privileged user could put these files in a directory named something like `/usr/local/teTeX/texmf/tex/latex/aiaa` for the entire site to use, remembering to run `texhash` to re-configure $\text{te}\TeX$ to search the new directory; or, a lowly user could make their own directory, *e.g.*, `~/tex/inputs`, put the files in there, and set the environment variable `TEXINPUTS` via `'setenv TEXINPUTS ~/tex/inputs:'`. The colon represents the system search path so, in this case, the user files take precedence. On a Mac or PC installation put these files in a folder named something like `TeX-inputs`.

⁵Similar to preceding footnote, only on Unix use the environment variable `BSTINPUTS` for the bibliographic style file and `BIBINPUTS` for the bibliographic database; for Mac's, use the `BibTeX-inputs` folder, failing that try using the `TeX-inputs` folder.

⁶The `draft` option replaces figures with a labeled box of the appropriate size.

in the preamble⁷ of your L^AT_EX document.

`\date` The *aiaa* class automatically nulls the `\date` command used by `\maketitle`. Standard L^AT_EX behavior of `\maketitle` is to typeset the current date as part of the title section if one is not given. So, normal one has to issue the command: `\date{}` when producing AIAA papers. When using the *aiaa* class, this is no longer necessary; this command has already been issued.

`\and` Suffice it to say that `\maketitle` and `\and` have also been hacked, the ramifications of which I have yet to determine.

`\maketitle`
`\section`
`\subsection`
`\subsubsection`
`\paragraph`
`\subparagraph` One no longer has to use the starred versions of these commands to defeat the numbering of sections. The counter `secnumdepth` has been set to `-2` via, `\setcounter{secnumdepth}{-2}` so that even the unstarred versions of the sectioning commands never produce a number.⁸ In addition, the fonts, sizes, and positions normally produced by these commands have been modified to make the output similar to a typeset journal article. In other words, we take advantage of the fact that you are not using a typewriter, *e.g.*, AIAA-suggested underlining for section names, etc. is replaced by the typesetting-capable equivalent.

2.4.2 New Commands

`\thanksibid` The command `\thanksibid` is very similar to the standard `\thanks` command which is used when footnoting the author affiliations within the `\author` field. The distinction is that the `\thanksibid` command allows one to repeat a given footnote symbol without repeating the associated footnote text. Example of use:

```
\author{%
Peter Gnoffo\thanks{Some thanks for a peter.},
Bill Kleb\thanks{Some thanks for a bill.},
Bill Wood\thanksibid{2}, and % use same footnote as for second author.
Marge Mithus\thanks{Some thanks for a marge.}
}
```

Thus, `\thanksibid{2}` would only produce a footnote symbol at the end of Bill Wood's name and it would not generate another footnote. Note that using the `\thanksibid` command does not increment the footnote counter, so for the case given above, an argument of '4' would not be a valid choice. This command was developed so that when you have *aiaa* make a cover sheet, extraneous footnote symbols will not be present.

`\dropword` The command `\dropword` is used for the first word of the introduction, and for any option other than `submit`, will produce a 'dropped' capital for the beginning of the paragraph. Its use is simply:

```
\dropword First words of the introduction, etc.
```

Note: this command also capitalizes the remaining portion of the first word. This macro relies on the presence of the `dropping` package by Mats Dahlgren [4].

`\incfig` The `\incfig` command is used for including figures via David Carlisle's `graphicx` package [5]. The `\incfig` command is merely a shorter version of the original `\includegraphics` command along with a centering command, *i.e.*:

⁷The preamble is defined as anywhere between the `\documentclass{}` and `\begin{document}` commands.

⁸The `secnumdepth` counter controls how many nesting levels of section numbers should be produced. Of course you can defeat this by changing the counter back to its L^AT_EX *article* class default value of 3 which will number sections down to subsections.

```
\newcommand{\incfig}{\centering\includegraphics}
```

It is typically used for including Encapsulated Postscript files (*.eps) within a figure environment. For example, to include a figure named figa.eps residing in a figs subdirectory, one would use:

```
and \Figure{f:figurea} shows that things are purple.
\begin{figure}
  \incfig{figs/figa}
  \caption{This is the caption for figure a.}
  \label{f:figurea}
\end{figure}
\Figure{f:figurea} also shows that people are green.
```

For more information regarding the inclusion of external graphic files, see the file epslatex.ps in the info directory of the CTAN. Also, read the Graphics Guide that is part of the graphicx package.

subfigmatrix Via the subfigure package and a new environment, subfigmatrix, one can easily create a “matrix” of subfigures. The environment takes one argument: the number of columns across the matrix will be. For instance, to produce a matrix of four subfigures, two by two:

```
\begin{figure}
  \begin{subfigmatrix}{2}
    \subfigure[Subfigure one. ]{\incfig{one}\label{f:matrix_1}}
    \subfigure[Subfigure two. ]{\incfig{two}}
    \subfigure[Subfigure three.]{\incfig{three}}
    \subfigure[Subfigure four. ]{\incfig{four}\label{f:matrix_4}}
  \end{subfigmatrix}
  \caption{A ‘matrix’ of four subfigures.}
  \label{f:matrix}
\end{figure}
and with imbedded \label commands we can refer to
Figure~\ref{f:matrix} in entirety or specific subfigures like
subfigure~\ref{f:matrix_1} or subfigure~\ref{f:matrix_4}.
```

See the demonstration file smpsubf.tex which comes with this distribtuion for more extensive examples.

2.5 Layout-specific Commands

The following commands are used to load information for other commands that produce appropriate headers, footers, cover-page items, and document notices—*e.g.*, copyright conditions. All of these commands are normally set in the preamble of your document (similar to \author and \title). For a more modular, and perhaps cleaner approach, you could place all of it in a file, preamble.tex, and use \input{preamble} to include it in your main document.

2.5.1 Header and Footer Information

`\SubmitName` The commands `\SubmitName`, `\PaperNumber`, `\ArticleIssue`, `\ArticleHeader`,
`\PaperNumber`
`\ArticleIssue`
`\ArticleHeader`
`\NoteHeader`

and `\NoteHeader` are used to put appropriate items in the header and footer of each page, *e.g.*,

```
\SubmitName{Kleb}
\PaperNumber{96--0825}
\ArticleIssue{Vol.~32, No.~6, November--December 1995}% first page
\ArticleHeader{Kleb et al: Pitch-Over Maneuver}% subsequent pages
\NoteHeader{J.Spacecraft, Vol.~32, No.~6: Engineering Notes}
```

The command `\SubmitName` is used to mark the main author's name on all pages for the journal manuscript submission option: `submit`. The `\PaperNumber` is used to include the paper number for AIAA conference papers. The commands `\ArticleIssue`, `\ArticleHeader`, and `\NoteHeader` are used to create the appropriate headers when simulating a journal article or note. The contents of `\ArticleIssue` appear on the first page and the contents of `\ArticleHeader` appear on subsequent pages while for journal note simulations the contents of `\NoteHeader` is used for all pages.

2.5.2 Cover-page Information

<code>\CoverFigure</code> <code>\Conference</code> <code>\JournalName</code> <code>\JournalIssue</code> <code>\JournalPage</code>	<p>The commands <code>\CoverFigure</code>, <code>\Conference</code>, <code>\JournalIssue</code>, <code>\JournalPage</code>, and <code>\JournalName</code> provide information for producing cover-pages.</p> <pre>\CoverFigure{tstfig.eps} \Conference{31st AIAA Aerospace Sciences \ Meeting and Exhibit \ {\mfseries January 6--9, 1997/Reno, NV}}% note: non-bold date/loc. \JournalName{Journal of Spacecraft and Rockets} \JournalPage{715} \JournalIssue{Volume 32, Number 6}</pre>
---	---

The commands `\CoverFigure` and `\Conference` define a representative figure (optional) and conference name/date/location to be used on the cover-page of a conference paper, while the commands `\JournalName` and `\JournalIssue` are for the cover-page produced for journal article or note reprint simulations.

2.5.3 Copyright and Other Document Notices

<code>\PaperNotice</code> <code>\JournalNotice</code>	<p>A footnote describing the copyright conditions and other information about the document are incorporated via the <code>\PaperNotice</code> and <code>\JournalNotice</code> commands. These normally include one of the the copyright series of commands: <code>\CopyrightA</code>, <code>\CopyrightB</code>, <code>\CopyrightC</code>, or <code>\CopyrightD</code>, described below. To use, simply include something like the following in the your document's preamble:</p>
--	--

```
\PaperNotice{\CopyrightA{1996}}
\JournalNotice{Presented as Paper 96--0825 at the AIAA 34th
Aerospace Sciences Meeting, Reno,~NV,
Jan.~15--18,~1996; received Feb.~15,~1996;
revision received Nov.~25,~1996. \CopyrightC}
```

`\CopyrightA` The copyright commands will expand to one of the standard AIAA forms:
`\CopyrightB` A, B, C, or D. Note: they each have different arguments—or no arguments—
`\CopyrightC` depending on the requirements:
`\CopyrightD` `\CopyrightA{year}`
 `\CopyrightB{year}{full name or company}`
 `\CopyrightC`
 `\CopyrightD{year}`

See your AIAA copyright instructions for which form to use.

3 Known Problems

- The bibliographic style sheet `aiaa.bst` isn't fully tested; and thus, you may need to fiddle with your `.bbl` file for your final copy, *i.e.*, edit `file.bbl` after running a `LATEX`, `BIBTEX`, `LATEX` sequence, but before running `LATEX` the final time. Note, if you run `BIBTEX` after modifying `file.bbl`, you will lose your modifications when `LATEX` is run again. Therefore, it is best to turn off write-permission on `file.bbl` after you have it correct.
- When using the `submit` option for a document which contains subfigures,⁹ some of the subfigures may be clipped. In fact, the way the `submit` option deals with subfigures needs work—to put it mildly. The current work-around is to add `width` or `height` options to your `\incfig` commands until the figures fit properly. These options are explained in the documentation which comes with the `graphics` package [5].
- Currently you have to make subfigure captions appear in bold font explicitly, *e.g.*,

```
\subfigure[\bf Subfigure caption.]{\incfig{fig.eps}}
```

The next version of `subfigure` is supposed to remedy this.
- The notices come after the author footnotes. To produce the correct behavior requires significant changes to the `\maketitle` command.
- The simulated journal article modes use the standard, free, Computer Modern Fonts. The AIAA journals most likely use licensed (\$) fonts.
- The simulated journal cover-pages do not have anywhere near the correct font for the journal name—does anyone know where to get such a *free*, tall, bold, squashed helvetic-style font? It looks like Bitstream's Aurora condensed...
- (Not actually an `aiaa` problem.) Using the starred versions of `figure` and `table` environments (floats which span both columns) inter-mixed with the unstarred versions (single-column wide floats) often creates a situation where the figures or tables appear out of order. For the final copy, this can normally be corrected with judicious use of float position specifiers.¹⁰ Unfortunately, this is stock, documented behavior for `LATEX`. However, recently a package `fix2col` has become available which appears to rectify this behavior. It can be found on CTAN in the `macros/latex/contrib/supported/carlisle` directory.

⁹See sample documents `smpaiaa.tex` and `smpsubf.tex` for examples of subfigure use.

¹⁰Recall, **never** use just `[h]`, always give other options or that float might get 'stuck' and force it and all the following floats to the end of the document.

4 Acknowledgements

Bundling and documenting this `aiaa` distribution in `docstrip` format was done by using other packages as a model, particularly, Mats Dahlgren's `dropping` [4] and Jeff Goldberg *et al's* `endfloat` [6].

I want to thank the people of the `comp.text.tex` newsgroup, the $\text{T}_{\text{E}}\text{X}/\text{L}\text{A}\text{T}_{\text{E}}\text{X}$ Frequently Asked Questions maintainers, and various package authors for patiently answering my inane questions, in particular, but in no particular order:

- ▷ Donald Arsenau (`asnd@reg.triumf.ca`)
- ▷ Robin Fairbairns (`Robin.Fairbairns@cl.cam.ac.uk`)
- ▷ Piet van Oostrum (`piet@cs.ruu.nl`)
- ▷ Jeroen Nijhof (`nijhof@th.rug.nl`)
- ▷ Steven Douglas Cochran (`sdc+@cs.cmu.edu`)
- ▷ Jeffrey Goldberg (`J.Goldberg@cranfield.ac.uk`)
- ▷ Mark Wooding (`mdw@excessus.demon.co.uk`)
- ▷ Paul Foley (`mycroft@actrix.gen.nz`)
- ▷ David Kastrup (`dak@fsnif.neuroinformatik.ruhr-uni-bochum.de`)
- ▷ Jerry Leichter (`leichter@smarts.com`)
- ▷ P. W. Daly (`daly@linpwd.mpae.gwdg.de`)
- ▷ David Carlisle (`carlisle@goofy.zdv.Uni-Mainz.de`)
- ▷ Edward Sznyter (`sznyter@babel.com`)

5 Sending a Bug Report

The `aiaa` distribution is highly likely to contain bugs. Reports of bugs in the package are most welcome. However, I consider this to be a minimally “supported” package. I will do what I can, when I can—promising nothing. Before filing a bug report, please take the following actions:

1. Ensure your problem is not due to your own input file(s) styles sheet(s), or package(s);
2. Ensure your problem is not covered in the section “Known Problems” above;
3. Try to isolate the problem by writing a *minimal* $\text{L}\text{A}\text{T}_{\text{E}}\text{X}$ input file which reproduces the unexpected behavior. Include the command
`\setcounter{errorcontextlines}{50}`
in your input to provide extra context when things go awry;
4. Run your file through $\text{L}\text{A}\text{T}_{\text{E}}\text{X}$;
5. Send a description of your problem, the input file and the log file via e-mail to: `w.l.kleb@larc.nasa.gov`.

I am not in the business of answering generic $\text{T}_{\text{E}}\text{X}/\text{L}\text{A}\text{T}_{\text{E}}\text{X}$ questions; so if your problem appears to be such, I will let you know.

Enjoy(?) the everpresent deadline and enjoy your $\text{L}\text{A}\text{T}_{\text{E}}\text{X}$!

—bil

References

- [1] Michel Goossens, Frank Mittelbach, and Alexander Samarin. *The L^AT_EX Companion*. Addison-Wesley, Reading, Massachusetts, 1994.
- [2] Helmut Kopka and Patrick W. Daly. *A Guide to L^AT_EX 2_ε: Document Preparation for Beginners and Advanced Users*. 2nd ed. Addison-Wesley, Reading, Massachusetts, 1994.
- [3] Leslie Lamport. *L^AT_EX: A Document Preparation System*. 2nd ed. Addison-Wesley, Reading, Massachusetts, 1994.
- [4] Mats Dahlgren. `dropping`—A L^AT_EX Macro for Dropping the First Character(s) of a Paragraph. June 1996. (version 0.1) Electronic Documentation.
- [5] David Carlisle. Packages in the ‘graphics’ bundle. December 1995. Electronic Documentation.
- [6] James Darrell McCauley and Jeff Goldberg. The `endfloat` Package. October 1995. (version 2.4i) Electronic Documentation.