Abstract—Please include a brief abstract here. The abstract should be limited to 50–200 words and should concisely state what was done, how it was done, principal results, and their significance.

I. INTRODUCTION

This MS Word template, saved in a format that is fully compatible with “Word 97-2003” for the PC, provides authors with most of the formatting specifications (e.g. margins, column widths, line spacing, and text fonts) needed for preparing electronic versions of their papers. Please do not alter any of the formatting in this template when you prepare your paper.

II. PREPARING YOUR PAPER

AP-S summary papers are limited to two pages. Any submitted paper that exceeds this limit will be rejected. The page format is two-column, as illustrated here. Do not add any kind of pagination anywhere in the paper. Do not manually number the headings – the template will do that for you.

Please take note of the following items when preparing your paper:

A. Authors and Affiliations

The template is designed so that author affiliations are not repeated each time for multiple authors of the same affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization). This template was designed for two affiliations, but can be customized for fewer or more as described below.

1) For author/s of only one affiliation: Adjust the template as described below.

   a) Highlight all author and affiliation lines.

   b) Select the Columns icon from the MS Word Standard toolbar and then select “1 Column” from the selection palette.

   c) Delete the author and affiliation lines for the second affiliation.

2) For author/s of more than two affiliations: Adjust the template as described below.

   a) Highlight all author and affiliation lines.

   b) Select the Columns icon from the MS Word Standard toolbar and then select “1 Column” from the selection palette.

   c) Highlight author and affiliation lines of affiliation 1 and copy this selection.

   d) Insert one hard return immediately after the last character of the last affiliation line. Then paste the copy of affiliation 1. Repeat as necessary for each additional affiliation.

   e) Place your cursor to the right of the last character of the last affiliation line of an even numbered affiliation (e.g., if there are five affiliations, place your cursor at end of fourth affiliation). Drag the cursor up to highlight all of the above author and affiliation lines. Go to Column icon and select “2 Columns”. If you have an odd number of affiliations, the final affiliation will be centered on the page; all previous will be in two columns.

B. Headings

Primary section headings within the paper are enumerated by Roman numerals and are centered above the text. Secondary section headings are enumerated by capital letters followed by periods (“A.”, “B.”, etc.) and are flush left above their sections. The first letter of each word is capitalized. Tertiary section headings are enumerated by Arabic numerals followed by a parenthesis. They are indented, run into the text in their sections, and are followed by a colon.

C. Equations

All equations should be labeled in consecutive numerical order. Equation numbers, within parentheses, should be aligned on the right side of the column, as in (1), using a right tab stop. Punctuate equations with commas or periods when they are part of a sentence, as in

\[ \alpha + \beta = \chi. \]  

Note that the equation is centered using a center tab stop. Be sure that the symbols in your equation have been defined before or immediately following the equation. Use “(1)”, not “Eq. (1)” or “equation (1)”, except at the beginning of a sentence: “Equation (1) is . . .”
D. Figures and Tables

Place each figure and table within the width of a single column, as in Fig. 1 and Table I below. Large figures and tables may span across both columns. Figure captions are below the figures. Table headings appear above the tables (note the capitalization). Insert figures and tables after they are cited in the text. It is helpful to the reader if your captions, when read in succession, form a quick summary of your paper so as to attract the interest of your target audience. Make sure your graphs and figures still make sense when printed entirely in black and white. If possible, it is preferred to label multiple curves directly rather than using tiny data markers and including a complicated legend look-up table. Make sure you use san-serif fonts large enough to be read easily when printed. Do not reference figures as “Figure 1” or “Fig-1”.

We suggest that you use a text box to insert a graphic (which is ideally a 300 dpi TIFF or EPS file, with all fonts embedded) because this method is less likely to disrupt formatting.

This textbox has a visible outline for illustrative purposes only. Most figures will look best with the “no color” option selected for the outline of the textbox.

![Image of a figure caption.](https://example.com/image.jpg)

**Fig. 1. Example of a figure caption.**

**TABLE I. EXAMPLE OF A TABLE HEADING.**

<table>
<thead>
<tr>
<th>Table Head</th>
<th>Table Column Head</th>
<th>Subhead</th>
<th>Subhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>copy</td>
<td>More table copy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table Column Head*

A sample of a Table footnote.

E. Abbreviations and Acronyms

Always define technical abbreviations and acronyms the first time you use them in the text, no matter how simple they are, even if you have already defined them in the abstract. Abbreviations such as “e.g.” and “i.e.” are used without definition, but don’t forget that “e.g.” means “for example” and “i.e.” means “in other words”. Do not confuse the two. Do not define (or re-define!) standard IEEE abbreviations for units.

F. Units and Numbers

The International System of Units (SI units) is used in IEEE publications. Unit symbols should be used with measured quantities, e.g., 1 mm, but not when unit names are used in text without quantities, e.g., “a few millimeters.” Use a zero before decimal points: “0.25”, not “.25”. Include a space between the number and the unit label when used as a noun. Replace the space with a hyphen when used as an adjective. For example, “The 10-GHz antennas now operate at 9.8 GHz.” The hyphen makes it clear that we are specifying frequency and not the number of antennas.

G. References

All references should be labeled in consecutive numerical order [1]–[3]. When citing references within the text, refer simply to the reference number enclosed by square brackets, as in [1]. Do not use “Ref. [1]” or “reference [1]” except at the beginning of a sentence: “Reference [1] was the first…” Note that an “en-dash”, not a hyphen, should be used between numbers to indicate a range of numbers, as in the beginning of this paragraph. For example, write “pp. 1–4”, not “pp. 1-4”. Note the space between “pp.” and the page numbers.

A numbered list of references must be provided at the end of the paper. The list should be arranged in the order of citation in text, not in alphabetical order. Each reference should be given a unique reference number. Do not list references that are not cited in the text. Include all authors’ names on a paper in the reference list; do not use “et al.”. Papers that have not been published, even if they have been submitted for publication, are cited as “unpublished” [3]. Papers that have been accepted for publication are cited as “in press”. Capitalize only the first word in a paper title except for proper nouns and element symbols.

H. Style Issues

For detailed information on paper preparation, we highly recommend exploring the IEEE Author Digital Toolbox, [http://www.ieee.org/publications_standards/publications/authorship/authors_journals.html](http://www.ieee.org/publications_standards/publications/authors_journals.html). In particular, download and read the IEEE Style Manual. View the material on figure preparation. We also recommend submitting your paper to the IEEE Reference Preparation Assistant to verify the correctness of your references. If English is a second language, please consider having a native English speaker proof read your paper. Fee based professional editing services are available at the above link.

Careful attention to these matters results in a polished and professional appearance, imparting a first impression to your prospective reader that is simply priceless.

**ACKNOWLEDGEMENT**

An acknowledgement statement, if applicable, goes here. This section head is not numbered and is always singular, i.e., never “Acknowledgements”.

**REFERENCES**

