TITLE IN CAPITAL LETTERS

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Abstract

A one-paragraph abstract of approximately 150 words is required. It should be a summary, not an introduction, and be complete in itself. It should not contain any numerical references to figures or references contained in the paper. The abstract should indicate the subject covered in the paper and should state the objectives of the investigation. Newly observed facts and conclusions must be stated in summary form. Readers should not have to read the paper to understand the abstract.

1. NOTATION

This section is optional if only a few symbols or simple equations are used. In this case, the symbols should be defined in the text when introduced. If more than a few symbols or equations are used, a Notation section should be included. It should list and define the symbols used (including metric units). Place the symbols in alphabetical order, English first, Greek next, and then subscripts. If used, this section is the first section in the two-column format. Symbols must be formatted as in equations.

Note that there is a non-visible footnote at the end of the title of this section ("NOTATION") in order to force the copyright statement below. Do not remove.

The following example uses an unframed table.

Symbols

R	Rotor radius, m
P_i	Induced power, kW
β_p	Precone angle, deg
Ω, Ω_{TR}	Main, tail rotor speed of rotation, rad/s

Acronyms:

ERF	European Rotorcraft Forum
VFS	Vertical Flight Society

2. INTRODUCTION

The introduction should introduce the subject, provide some background, including a brief assessment of prior work by others (citing relevant references), and an explanation of how the paper contributes to the field. It is not a summary. The introduction tells what has been done, what needs to be done, and how the present results relate to past work and present needs.

3. MAIN BODY

3.1. General

Paper format is A4 (210 mm × 297 mm) with left and right margins of 20 mm, top margin of 25 mm and bottom margin of 30 mm. Do not use headers, footers or page numbers. Papers must not exceed 30 pages in length, otherwise they are not eligible for the best paper awards. They must be submitted as pdf files not exceeding 15 MB in size and must be written in English language.

3.2. Layout

This layout serves as ERF paper template. Arial font must be used, with the exception of formulae and symbols. The paper title, author information and abstract title are centered with the abstract body left and right justified. All of them are in a single column format, the rest of the paper in two-column format with 5 mm column separation, right and left justified. All headers and text have 0 pt separation above and 6 pt below, the line separation factor is 1.15. The title is written in CAPITALS of 14 pt font size, all other material in 10 pt. Black color is used.

3.3. Structure

Section headers are numbered 1., 2., etc. and are set in CAPITALS while subsection and further levels are numbered as shown, not capitalized, and all of them in **bold**. Automatic hyphenation is used in all text.

3.4. Equations

Unless only a few are used, all equations must be numbered in the order introduced and referred to in the text by number, e.g. Eq. (1). Equations and/or symbols may be presented in any suitable form; however, clarity for the printer is essential. Special symbols should be identified.

(1) $$F_{crit} = \gamma \frac{2\pi E t^2 \cos^2 \alpha}{\sqrt{3\left(1-\mu^2\right)}}$$

3.5. Footnotes

Use acronyms and footnotes sparingly. They should be marked by symbols such as an asterisk, cross, plus, or any other suitable mark.

4. FIGURES AND TABLES

4.1. General

Figures and tables should be inserted in the main body as floating bodies. Each of them should be placed as soon after its reference in the text, but not before, as is practical. If including them within the main body proves too difficult, grouping all figures together after the last main body section is acceptable. The same applies to tables. Depending on the figure or table size they may as well span over both columns. Note that figures and tables should all be within the main body or all at its end for consistency. Figure captions are placed underneath the figure, table captions on top of the tables. Do not separate figure or table from their caption by line break.

4.2. Figures

Illustrations and graphics used in figures must be clear and sharp. Converting to PDF files can sometimes affect the resolution of images: If you do the conversion to PDF, carefully review the conversion of all images. Lettering should be large enough to be legible, at least the same as this text. Illustrations/figures showing plotted data should have axes labeled with appropriate names and units. A legend should be included to identify plotted lines and data when needed. Additional information or parameter values related to a figure should generally be placed in the figure caption rather than on the figure itself. Each figure must be numbered, have a caption, and be cross-referenced in the text, such as shown in Figure 1. Graphs may use colored lines.

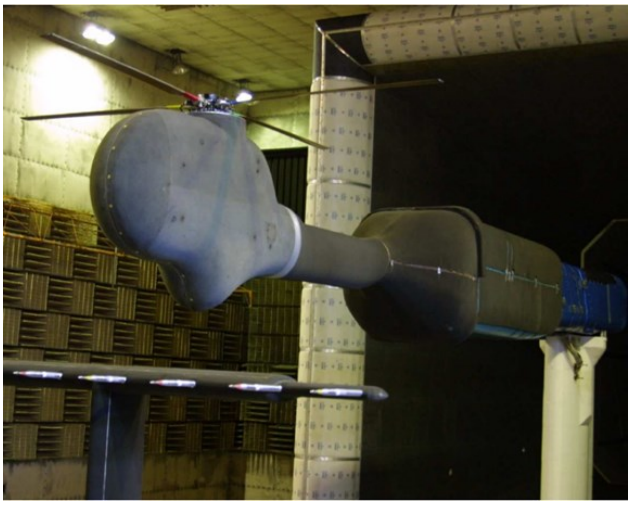

Figure 1: The HART II hingeless model rotor in the DNW-LLF 8 m × 6 m open jet configuration. Credits: DNW

4.3. Tables

The number of tables should be kept to a minimum. Each table must have a number and a caption and should be cited in numerical order in the text, see Table 1. Tables should be simple and arranged in the following format. Type a double line at the top and bottom of each table and a single line under the column headings. Table footnotes should be placed under the bottom double line and should be indicated by the letters a, b, c, etc.

Table 1: Leonardo AW609 Aircraft Characteristics.

Characteristic	English	Metric
Engines	2 x P&WC[a] PT6C-67A turboshaft	
Passengers	6 to 9 pax + 1-2 crew	
Engine Power	2 x 1,940 shp	2 x 1,450 kW
Wingspan	33.8 ft	10.3 m
Length	46 ft	14.0 m
Height	15 ft	4.5 m
Proprotor Radius	13 ft	3.95 m
Max Useful Load	5,500 lb	2,500 kg
Max Gross Weight	16,000 lb	6,974 kg
Range	750 nm	1,389 km
Service ceiling	25,000 ft	11,364 m
Vmax (at cruise)	275 kt	509 km/h

[a]P&WC: Pratt & Whitney Canada

5. CONCLUSIONS

The most important results of the paper should be summarized as a concise list of numbered items:

1. Conclusions should be supported by development in the main text and no new material should be introduced in this section.
2. If the paper did not result in specific conclusions, then the section may be entitled "Concluding Remarks" or "Concluding Recommendations", with brief summary comments as appropriate.
3. Author (and coauthor etc.) contact should be placed at the end of the conclusions.

Author contact:

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6. APPENDIX

Appendices can be attached to the end of the paper and should be used for highly specialized data, derivations, etc. They should be lettered (A, B, C, …) if more than one is used. Each appendix must be cited in the main text. All appendices are part of the total number of pages.

7. ACKNOWLEDGMENTS

If used, this should be placed at the end of the paper, before the references. If used, one or more acknowledgments to contributors, a sponsor or technical monitor should be placed at the end of the paper, before the references section. Also include any research or project support or funding sources here.

8. REFERENCES

All reference material should be grouped in the final section of the paper, numbered, and placed in the order cited in the text. Reference only that material which is readily available to the reader. Do not include classified material, internal company memoranda, or reports unavailable to the reader.

The references should be cited in the text as: "This approach is discussed in Ref. 1. …" or "Leishman (Ref. 2) showed that…". or "Reference 3 discusses the approach …" Do not use the superscript citation style, such as "Johnson[1] showed that…".

For a book, the book title should be italicized. Include the names of all authors with initials (the use of *et al.* is not acceptable for use in the reference list). The publisher and place of publication should be stated. Inclusive page numbers and/or chapter number should always be included. Examples Refs. 1 and 2. For a section in a book the style of Ref. 3 should be used.

For a journal reference the title of the journal is italicized. All authors must be stated (again, do not use *et al.* for multiple authors). The volume, number and page numbers of the article must be given. Include the digital object identifier (DOI), if known. The following style should be used, Refs. 4, 5.

For a report, the style of Refs. 6, 7 should be used.

For a conference paper, the paper number (where available), proceedings volume information, and the location of the meeting should be given. Note: prior to 2019, VFS was known as AHS (American Helicopter Society). Examples of this style are shown in Refs. 8, 9.

1. Johnson, W., *Helicopter Theory*, Princeton University Press, Princeton, NJ, 1980, pp. 808–813.
2. Leishman, J. G., *Principles of Helicopter Aerodynamics*, Cambridge University Press, New York, NY, 2000, Chapter 10.
3. Friedmann, P. P., and Hodges, D. H., "Rotary-Wing Aeroelasticity with Application to VTOL Vehicles," *Flight-Vehicle Materials, Structures, and Dynamics*, edited by A. K. Noor and S. L. Venneri, Vol. 5, Part II, Chap. 6, American Society of Mechanical Engineers, New York, NY, 1993, pp. 299–391.
4. Yeo, H., Potsdam, M., and Ormiston, R. A., "Rotor Aeroelastic Stability Analysis Using Coupled Computational Fluid Dynamics/Computational Structural Dynamics," *Journal of the American Helicopter Society*, Vol. 56, (4), Oct. 2011, pp. 1884–2013. DOI: 10.4050/JAHS.56.042003.
5. Marchman, J. F., III, and Uzel, J. N., "Effect of Several Wing Tip Modifications on a Trailing Vortex," *Journal of Aircraft*, Vol. 9, (9), 1972, pp. 684–686.
6. Carpenter, P. J., and Friedovich, B., "Effect of a Rapid Blade-Pitch Increase on the Thrust and Induced-Velocity Response of a Full-Scale Helicopter Rotor," NACA TN 3044, 1953.

7. Johnson, W., “A Comprehensive Analytical Model of Rotorcraft Aerodynamics and Dynamics, Part I: Analytical Development,” NASA TM 81182, 1980.

8. Sadler, S. G., “A Method for Predicting Helicopter Wake Geometry, Wake-Induced Inflow and Wake Effects on Blade Airloads,” American Helicopter Society 27th Annual Forum Proceedings, Washington, DC, May 1971.

9. Brentner, K. S., and Jones, H. E., “Noise Prediction for Maneuvering Rotorcraft,” Paper AIAA 2000–2031, 6th AIAA/CEAS Aeroacoustics Conference Proceedings, Lahaina, HI, June 12–14, 2000.

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