

CODECHECK certificate 2026-001

<https://doi.org/10.5281/zenodo.18890103>



Item	Value
Title	Flow Field Analysis of a Leading-Edge Inflatable Kite Rigid Scale Model Using Stereoscopic Particle Image Velocimetry
Authors	Jelle Poland (0000-0003-3164-5648), Erik Fritz (0000-0003-1486-3643) and Roland Schmehl (0000-0002-4112-841X)
Publication	https://doi.org/10.5194/wes-2025-217
Codecheckers	Josip Grguric (0009-0003-3725-9454) Yasel Quintero (0009-0005-9240-7370)
Date of check	2026-03-03
Summary	Partial reproduction
Codecheck repository	https://github.com/codecheckers/kite_piv_analysis

Table 1: CODECHECK summary

Summary

This codecheck resulted in a partial reproduction of the figures presented in the publication. The authors provided a GitHub repository containing all the necessary code and instructions for reproducing the figures.

Given the runtime of the program is approximately 21 hours, the code was executed on an HPC cluster. Two minor changes were made to the code: 1) the NumPy function “trapz” was renamed “trapezoid”, and 2) LaTeX rendering was disabled, as suggested by the author, since it was not available on the HPC system used.

Output	Comment
fig04_plane_location.pdf	manuscript Figure 4
fig06_qualitative_comparison_CFD_PIV.pdf	manuscript Figure 6
fig07_bounds_CFD_PIV_single_row.pdf	manuscript Figure 7
fig08_gamma_distribution_std.pdf	manuscript Figure 8

Table 2: Summary of output files generated

CODECHECKER notes

Reproducing the figures in the publication was straightforward due to the clear instructions provided in the project repository. Two minor modifications to the code were required for a successful execution; these are described below.

Running the code

Given the long execution time (approximately 21 hours), we ran the code on the Delft Blue High Performance Computer.

During execution, we encountered a minor issue related to the NumPy function **np.trapz**, which has been renamed in recent versions. The fix was trivial and is described in the following section.

Because LaTeX is not installed in DelftBlue, we disabled LaTeX figure rendering in the function **set_plot_style** in **src/kite_piv_analysis/plot_styling.py**. Specifically, the following change was applied:

```
plt.rcParams.update(  
{  
    "text.usetex": False,  
    "font.family": "serif",  
    # "font.serif": ["Computer Modern Roman"],
```

Since the compute nodes on Delft Blue are disconnected from the internet, it was necessary to create the virtual environment with all dependencies in advance.

The job was submitted to the cluster using the following SLURM submission script:

```
#!/bin/bash  
#SBATCH --job-name="codehcheck"  
#SBATCH --time=24:00:00  
#SBATCH --ntasks=1  
#SBATCH --cpus-per-task=1  
#SBATCH --mem-per-cpu=1G  
#SBATCH --partition=compute  
  
module load 2025  
module load python  
  
source venv/bin/activate  
  
export PYTHONUNBUFFERED=1  
  
srun python ./src/kite_piv_analysis/_main_process_and_plot.py
```

The generated output figures are stored in **results/paper_plots_21_10_2025**.

It should be noted that the figures are created until the very end of the execution runtime. If an error is encountered at an earlier stage, the plotting routine will not be executed and no figures will be generated.

NumPy Trapz and Trapezoid bug

While running the code, we encountered an issue in which **np.trapz** was not recognized as a function defined within NumPy. After some investigation, we noticed that with higher versions of NumPy, more specifically versions equal to or greater than 2.0.0, **np.trapz** is deprecated.

This has two reasons it is happening:

1. The project does not specify which NumPy version is the maximum or minimum. This can be changed within the **pyproject.toml**, under the dependencies section.
2. The project states that any python version ≥ 3.8 can be used. Because of point #1, python will try to install the newest possible version of any dependency (if a version is not specified). Coincidentally, if you had specified that only python version 3.8 can be used, then the maximum NumPy version it could install would be 1.24.4

What we can recommend are two potential solutions.

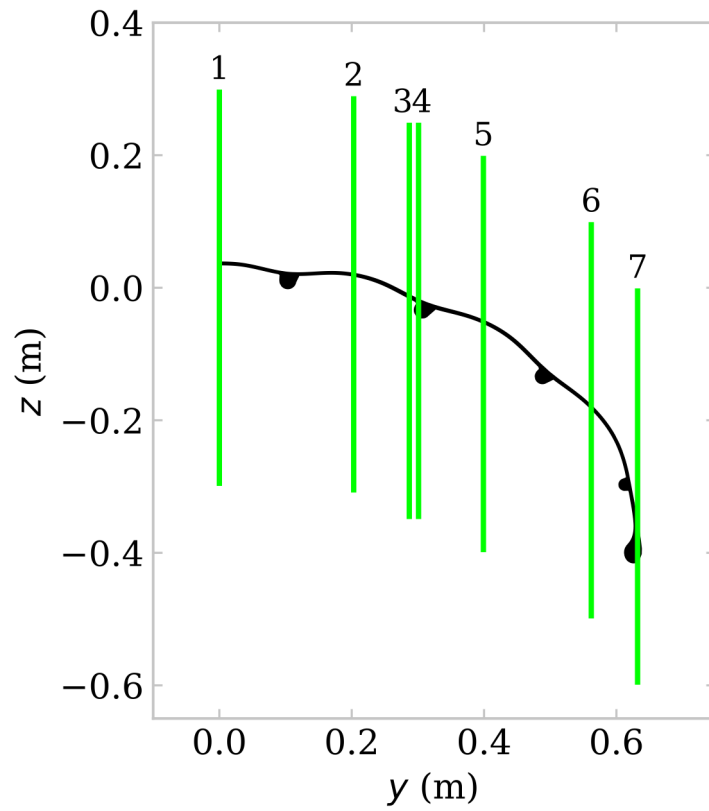
1. In the instructions, ensure that a NumPy version smaller than 2.0.0 is used when installing it (for example 1.24.4 is stated to work for all python versions ≥ 3.8).
2. Change the references from **np.trapz** to **np.trapezoid** and ensure python versions used are above or equal to 3.9. These references were found in **calculating_circulation.py** and **force_from_noca.py**

For the purpose of this codecheck, we used solution #2 which replaces the function references. This resolved the issue, and the code ran without further problems.

Manifest Files

fig04_plane_location.pdf

Comment: Figure 4 in the manuscript.



Comment: Figure 6 in the manuscript.

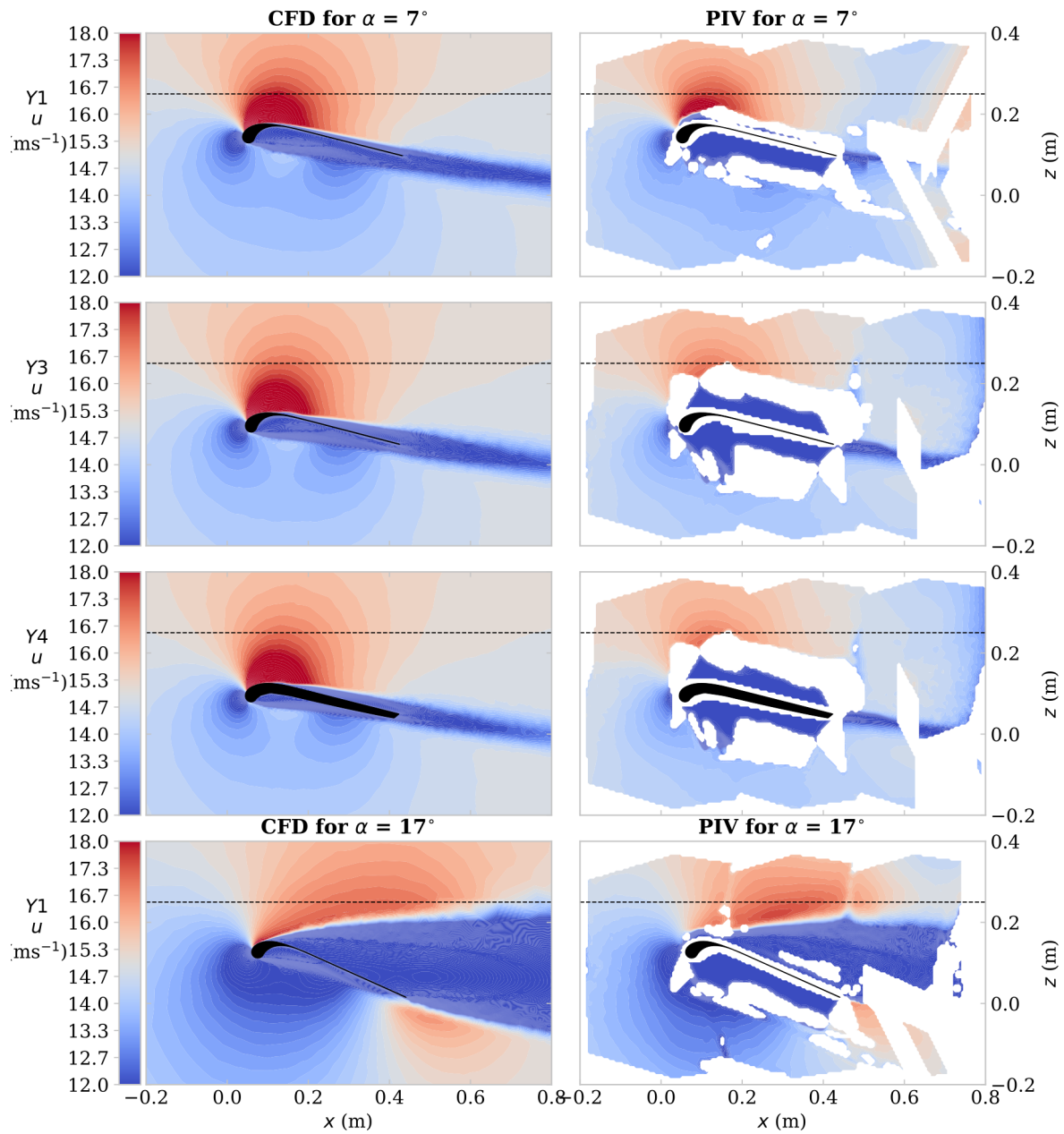


fig07_bounds_CFD_PIV_single_row.pdf

Comment: Figure 7 in the manuscript.

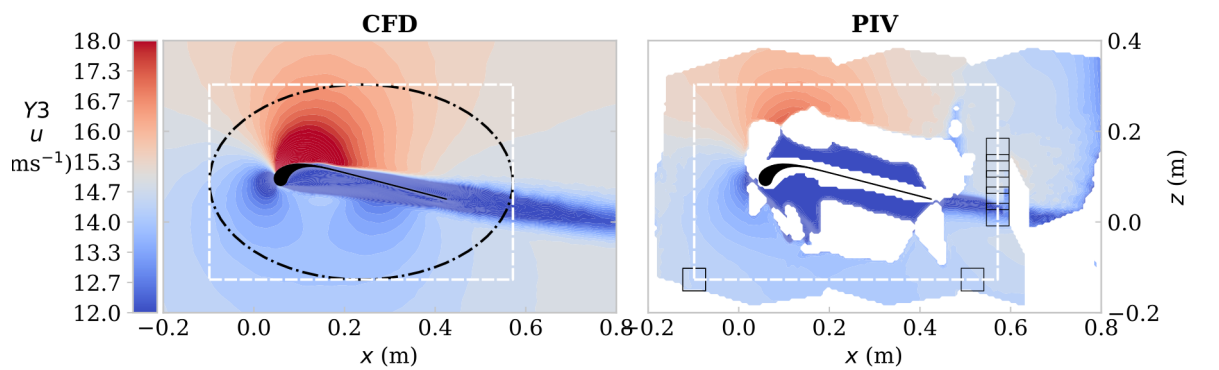
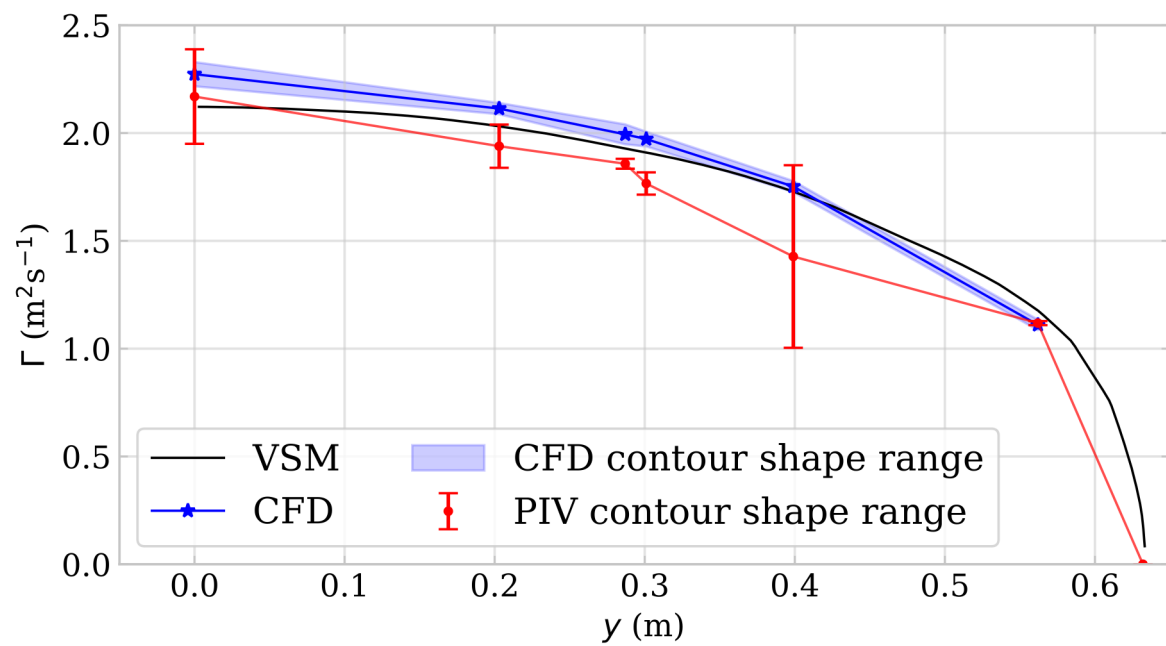


fig08_gamma_distribution_std.pdf

Comment: Figure 8 in the manuscript.



Acknowledgements

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Citing this document

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