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The SWiFT Benchmarks

Part of IEA Wind Task 31 Phase 3 (2018-2019)
Meeting #3 – December 18, 2018 08:00 MDT

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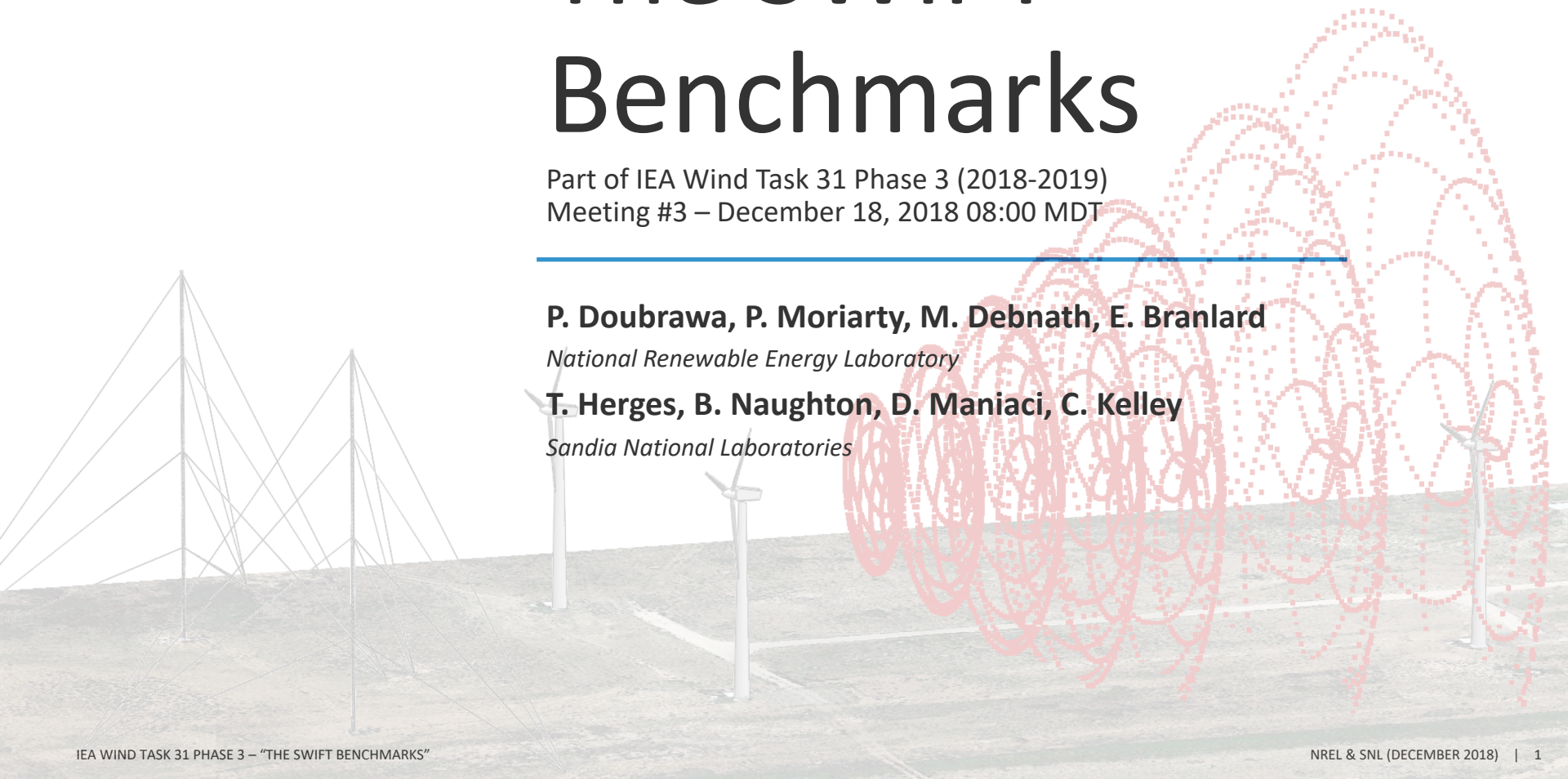
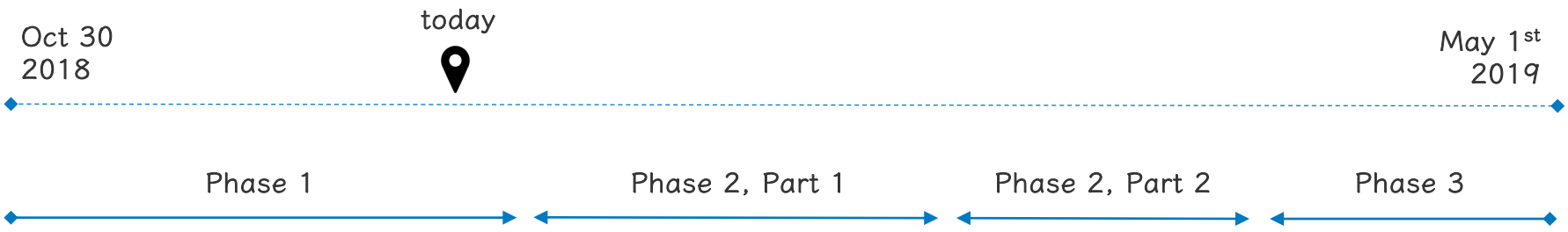


Status

More info: https://wakebench-swift.readthedocs.io



Code Calibration

Objective

Provide an opportunity for model calibration before the blind comparison (wake is **not** included)

Provided

- Turbine model
- Mean atmospheric state

Requested

- Simulation setup
- Flow upstream
- Wind turbine response

End of Phase

January 18, 2019

Next Meeting

January

Questions?

Use the forum! Find the thread "SWiFT Benchmarks" at https://wind.nrel.gov/forum/wind/

- 16 participants
  - 4 SSAM
  - 1 DWMT
  - 2 RANS
  - 8 LES
  - 1 DES

SNL SWIFT V27
Notes on FAST7 and OpenFAST models

D.Maniaci, C. Kelley, E. Branlard

Release location

With some delays, the OpenFAST2 model is now released:

https://github.com/NREL/wakebench_swift

folder: `wt_data/v1/OpenFAST_model`

The definitions of the radii are different
(but the values provided are consistent)

- FAST7: `r` is with respect to the rotor apex; the aerodynamic control points are located at `r+dr/2`

(see `wt_data/v1/Raw_model/Blade_Aero.csv`)

- OpenFAST: `BldSpan` is with respect to the root of the blade and corresponds to the aerodynamic control points.

(see `wt_data/v1/Raw_model/Blade_Aero_OF2.csv`)

(The blade length is 13m, the hub radius is 0.5, the total rotor radius is 13.5m)

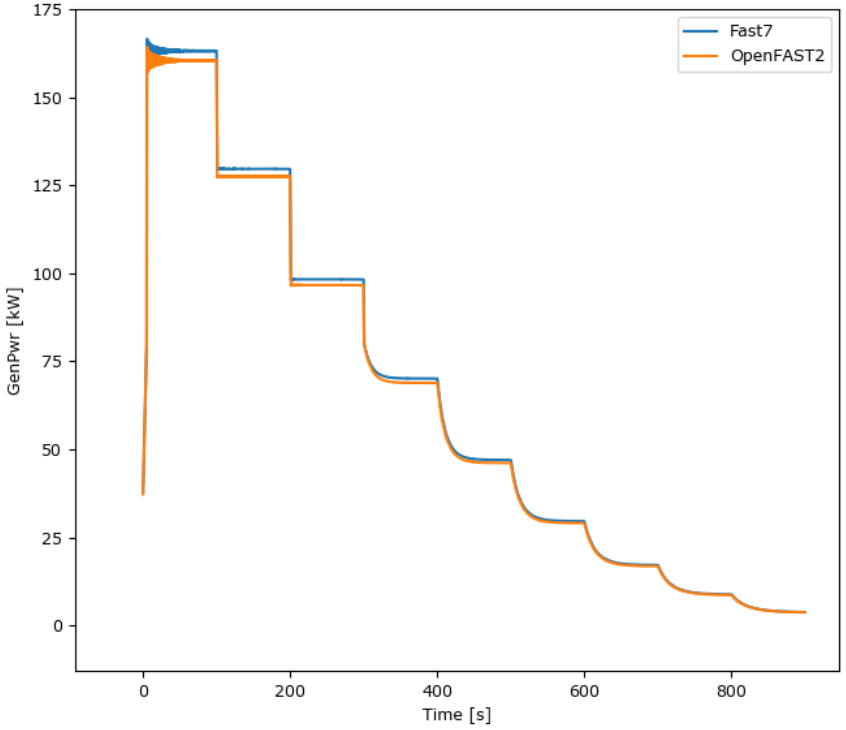
Beware of Cp and Ct

- FAST7: `RotCp` and `RotCt` contain some inertia contribution, they are not the aerodynamic Cp and Ct.

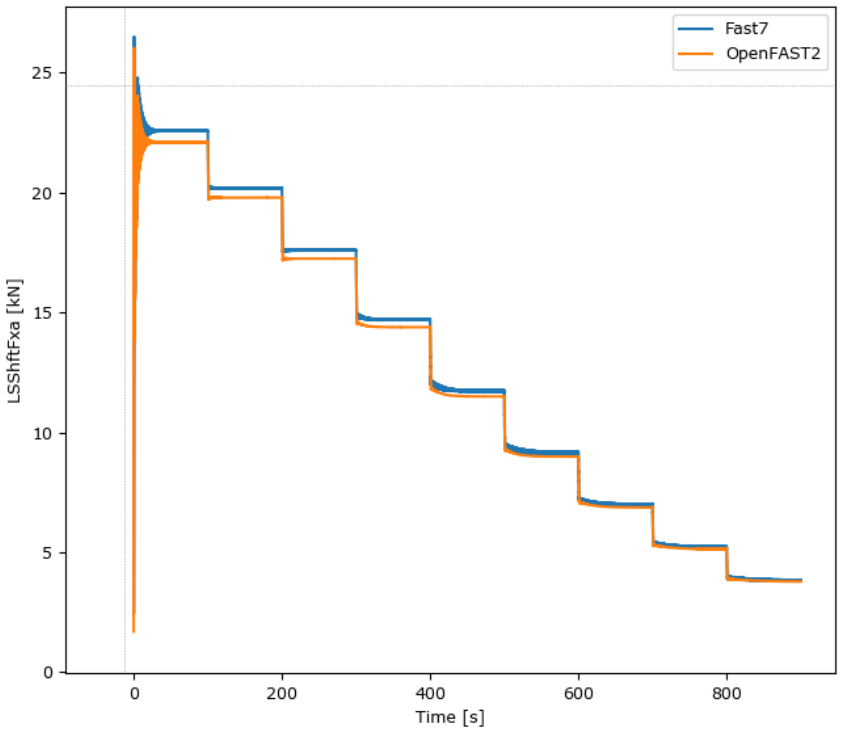
- OpenFAST : `RtAeroCp` and `RtAeroCt` are the aerodynamic Cp and Ct

Expected differences between the two models (wind steps from 11m/s to 3m/s)

Power



Thrust



Max difference around 2%.

Differences due to changes in aerodynamic model.

Last words

- The OpenFAST2 model is provided with tower shadow and aero loads on the tower, but you can deactivate it:

Without:

```
 8 0             TwrPotent
 9 False         TwrShadow
10 False         TwrAero
```

With:

```
 8 1             TwrPotent
 9 True          TwrShadow
10 True          TwrAero
```

- Running with Nalu and SOWFA, remember to turn off the induction model : i.e., set `WakeMod=0`

- Models for FAST8 (F8), OpenFAST1 (OF1) are also provided, but we recommend the OpenFAST2 (OF2) model.

Q&A

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