NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Sandia National Laboratories

The SWiFT Benchmarks

Part of IEA Wind Task 31 Phase 3 (2018-2019)
Meeting #2 – November 27, 2018 08:00 MDT

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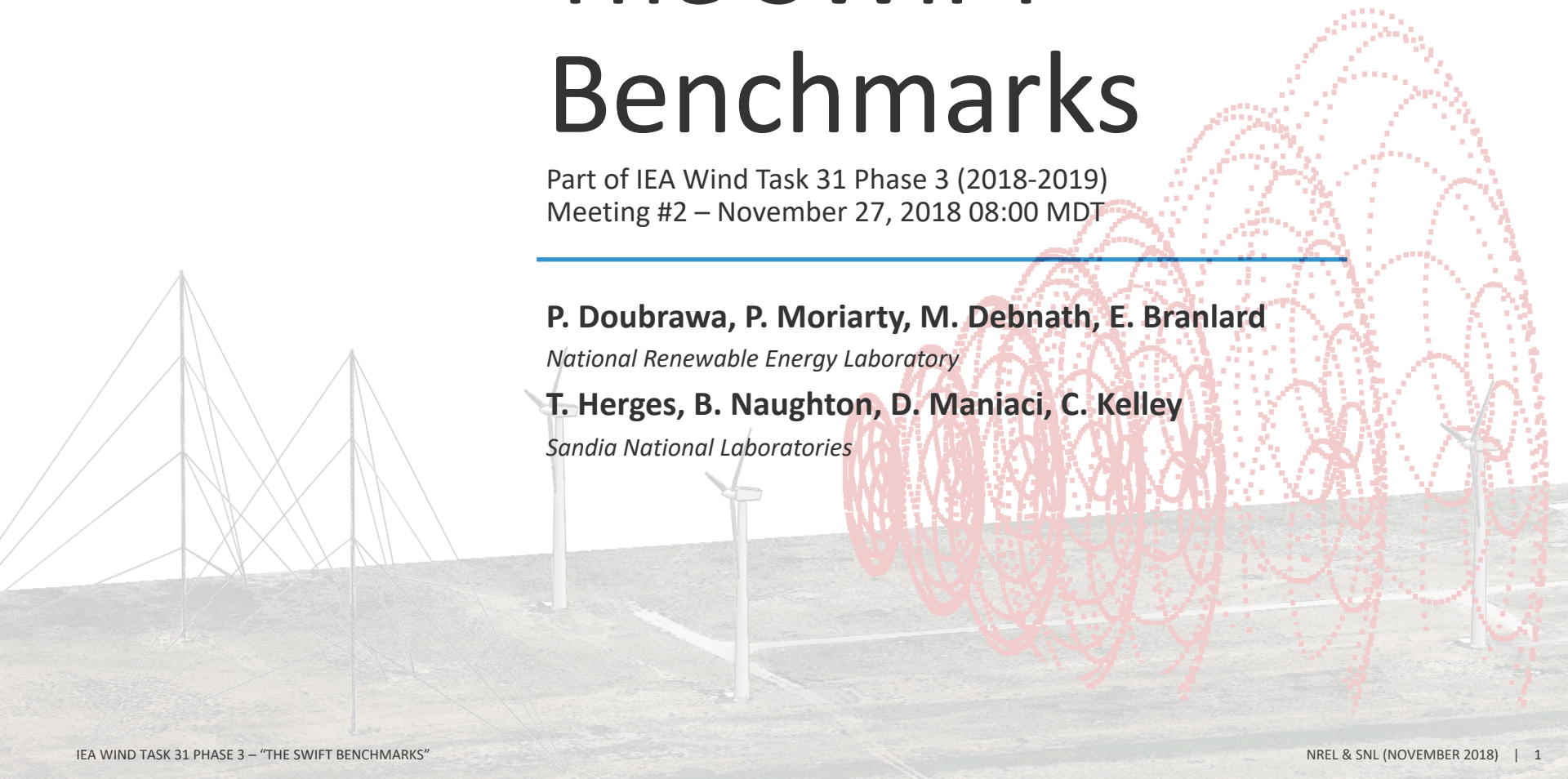
Sandia National Laboratories



Status

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

Oct 30 2018 — today — May 1st 2019

Phase 1 | Phase 2, Part 1 | Phase 2, Part 2 | Phase 3

Code Calibration

Objective

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

Provided

- Turbine model
- Mean atmospheric state

Requested

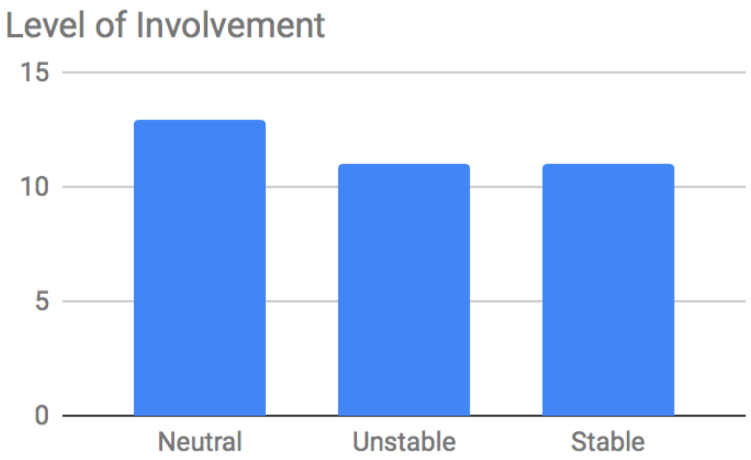
- Simulation setup
- Flow upstream
- Wind turbine response

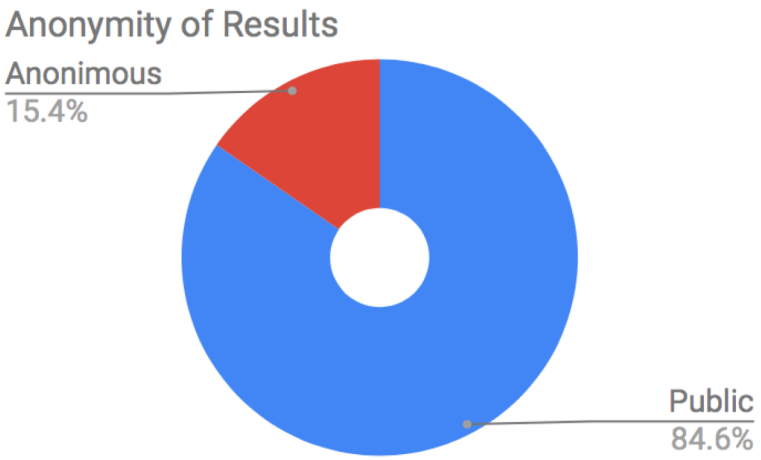
End of Phase

Friday December 21, 2018

Generate your inflow and run a turbine simulation before the holidays!

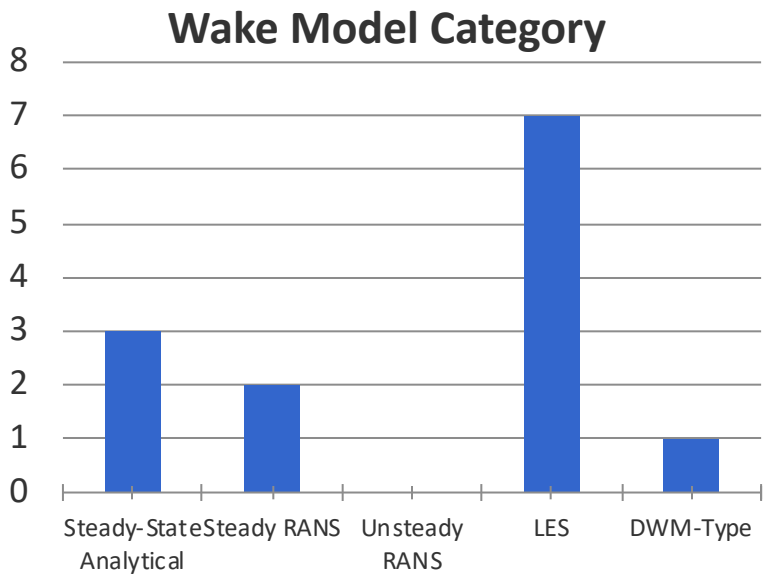
Current Participants – Involvement Plans

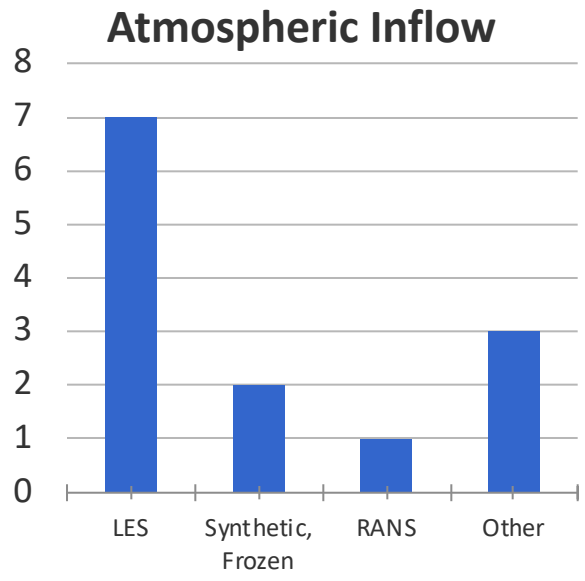


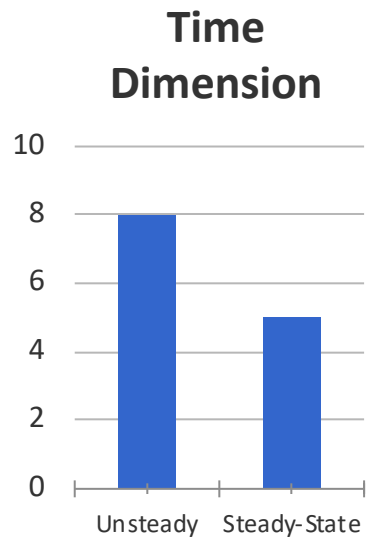


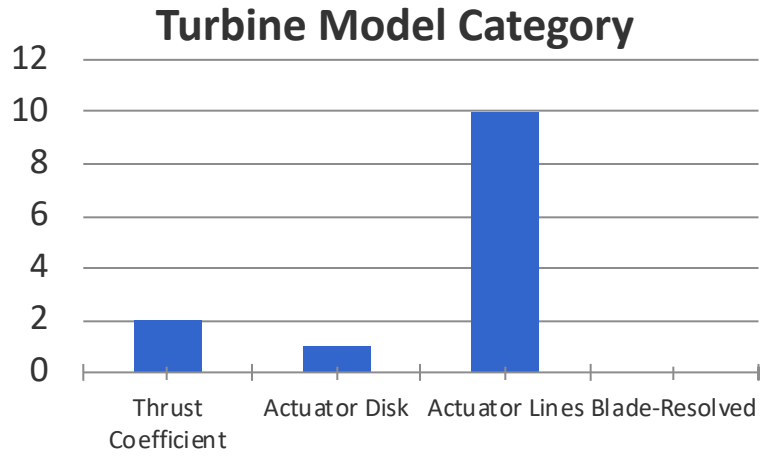
17 participants signed up

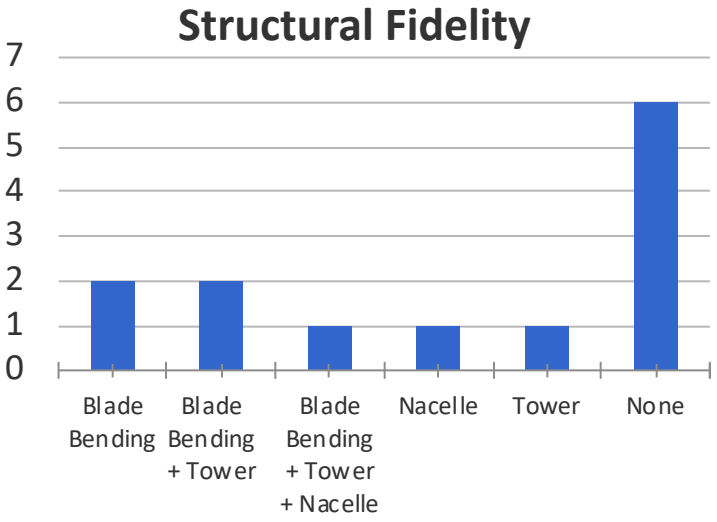
Current Participants – Simulation Plans

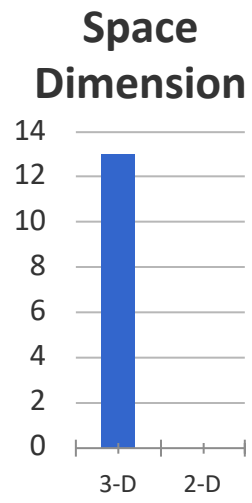












Requested data by December 21

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

1. Simulation setup

`<participant_id>_<YYYYMMDD>_simulation_setup.yaml`

```yaml
###############################################################################
# IEA Wind Task 31 "WakeBench"
# Work Package 2
# Phase 3
# The SWiFT Benchmarks
#
# Example file for simulation setup
# Guidelines:
# - The values provided herein are mere examples
# - You will need to add and remove parameters
# - Populate this file with all relevant parameters of your model
# - For each parameter, please include: name, value, unit, and description
# - For each time you submit new results to the benchmark, please update this
#    file to reflect your simulation settings
# - When relevant, add information about turbine_model and wake_model as well
###############################################################################
flow_model:
  name: "SOWFA"
  type: "LES"
  mesh:
    -
      name: "dx"
      value: 10.0
      unit: "m"
      description: "grid spacing along x"
    -
      name: "dy"
      value: 10.0
      unit: "m"
      description: "grid spacing along y"
    -
      name: "dz"
      value: 5.0
      unit: "m"
      description: "grid spacing along z"
      remarks: >
        if you have something to say about some variable,
        you can just add remark.
```

Requested data by December 21

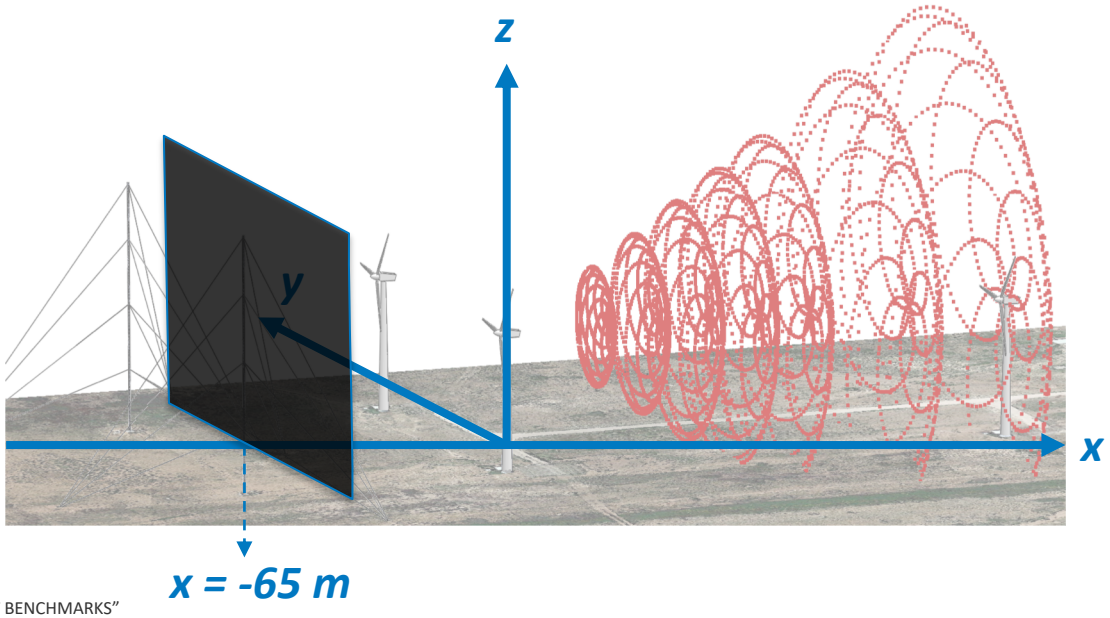
More info: https://wakebench-swift.readthedocs.io

2. Atmospheric Inflow

`<participant_id>_<YYYYMMDD>_uvw_<x>D.nc` or

`<participant_id>_<YYYYMMDD>_uvw_<x>D_steady_state.nc`

- Time series of *u, v, w* on upstream plane



Requested data by December 21

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3. Wind Turbine Response

`<participant_id>_<YYYYMMDD>_wtg_response.txt` or

`<participant_id>_<YYYYMMDD>_wtg_response_steady_state.txt`

```
################################################################################
# IEA Wind Task 31 "WakeBench"
# Work Package 2
# Phase 3
# The SWiFT Benchmarks
#
# Example file for wind turbine response for time-stepping simulation tools
# Guidelines:
# - For variable names, please use underscores (e.g., rotor_speed)
# - For units, please use spaces between each unit (e.g., "N m"), no
#   spaces between prefixes (e.g., "kW") or between exponents (e.g., "m s-1")
################################################################################
time,blade_root_bending_moment_y,pitch,power,rotor_speed,torque
0.0,-999.0,-999.0,-999.0,-999.0,-999.0
1.0,-999.0,-999.0,-999.0,-999.0,-999.0
2.0,-999.0,-999.0,-999.0,-999.0,-999.0
3.0,-999.0,-999.0,-999.0,-999.0,-999.0
4.0,-999.0,-999.0,-999.0,-999.0,-999.0
5.0,-999.0,-999.0,-999.0,-999.0,-999.0
6.0,-999.0,-999.0,-999.0,-999.0,-999.0
7.0,-999.0,-999.0,-999.0,-999.0,-999.0
8.0,-999.0,-999.0,-999.0,-999.0,-999.0
9.0,-999.0,-999.0,-999.0,-999.0,-999.0
10.0,-999.0,-999.0,-999.0,-999.0,-999.0
################################################################################
# Please add more lines so that time series is long enough to provide
#  converged results.
################################################################################
```

How to participate:

1. Sign up with google form: https://goo.gl/forms/cCMnRHAkXQ6VNm3c2
2. Familiarize yourself with the benchmarks
   - Bookmark the documentation: https://wakebench-swift.readthedocs.io
   - Bookmark the github page: https://github.com/NREL/wakebench_swift
   - Sign up for Q&A forum: https://wind.nrel.gov/forum/wind/
   - See story at Wind Vane blog https://thewindvaneblog.com
3. Start your simulations! Use the provided data to
   - Set up turbine model
   - Generate initial/boundary conditions
   - Run turbine simulation
   - Submit your results

Next Meeting
December

Questions?

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

Q&A

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