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# HFM Integration and Demonstration Functional Area Q3 FY18 - Q4 FY20 Plan

## Planning Team Members

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## HFM Integration and Demonstration FY20 Target Use Cases

The overall goal of this task is to demonstrate wind farm and wind turbine simulations at a level of fidelity that is needed to advance the scientific understanding of wind plant physics. In order to accomplish this objective, Nalu will need to have the ability to:

**Use Case 1:** Simulate large wind farms using actuator lines and OpenFAST to model the turbines and LES to model aerodynamics.

**Use Case 2:** Simulate two or more blade-resolved turbines with wake interactions using OpenFAST's FEA capabilities to model turbines and hybrid RANS-LES to model aerodynamics.

Demonstrating the two use cases listed above will require that the HFM integration and demonstration team integrates, verifies, validates, and demonstrates several components of Nalu as described in detail in the [associated Gantt chart spreadsheet](#).

## Key credibility assertion steps that need to be executed

In order to demonstrate the credibility of the Nalu code, the team will need to demonstrate and, as much as possible, validate actuator line and blade resolved simulations. Detailed verification of specific components of Nalu will be performed by other Functional Area teams, and the ultimate success of this Functional Area's work is thus dependent on the work of these other Functional Areas.

The specific steps that this Functional Area will take to demonstrate capability are described in the Gantt chart spreadsheet ([https://github.com/lawsonro3/hfm\\_integration\\_demonstration\\_plan/blob/master/gantt\\_chart.xlsx](https://github.com/lawsonro3/hfm_integration_demonstration_plan/blob/master/gantt_chart.xlsx)). Dependencies on other Functional Areas are also noted in this spreadsheet.

## Publications

In order to disseminate the results of our work to the wind R&D community, the HFM Integration and Demonstration team plans the following publications:

- One journal publication/s describing the ABL and actuator line wind farm simulation work. **Estimated date: Q4 FY19**
- One conference or journal publication actuator line and Nalu UQ work. **Estimated date: Q3 FY19**
- One publication on the blade resolved simulation work. **Estimated date: Q4 FY20**

- Other conference papers and presentations as appropriate