

# DWM-FAST Compiling Introduction

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This document will introduce the approaches to build a single DWM-FAST program in Visual Studio, a DWM driver program in Visual Studio, and the approach to run the DWM driver program to simulate the wake interactions in a wind farm.

**DWM-FAST** is the main DWM program embedded in FAST that simulates the wake of a single wind turbine.

**DWM-Driver** is a driver program that manages a series of DWM-FAST simulations for multiple wind turbines in a wind farm.

## 1 Build DWM-FAST in Visual Studio

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To build the DWM-FAST in visual studio, Fig 1.1 below shows the composition of the source files. Fig 1.2 presents the project property setting. More information related to compiling the DWM-FAST can be found in the document “**CompilingInstructions FASTv8.pdf**” distributed with the FAST 8.

In the Command Arguments, DWM means the FAST will call the DWM module to simulate the wake behind the turbine, otherwise, it will only simulate the turbine performance.

The first number in the Command Arguments is the wind turbine index, the 1st turbine corresponds to 1, 2nd turbine corresponds to 2, and so on. To note, “0” means it is the initial simulation which is used to determine the turbine correlations in the wind farm. The “0” case must be run (usually in the driver program) in order to calculate the wake sector angle to determine which upwind turbines affect which downwind turbines.

## 2 Build DWM-Driver in Visual Studio

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To build the DWM-Driver in visual studio, Fig 2.1 below shows the composition of the source files. Fig 2.2 presents the project property setting.

All the turbines are simulated sequentially, thus if one wants to run the DWM-FAST using debug mode for a certain turbine to look into the turbine performance details, in the debug mode of the driver program, one can stop the simulation just before the

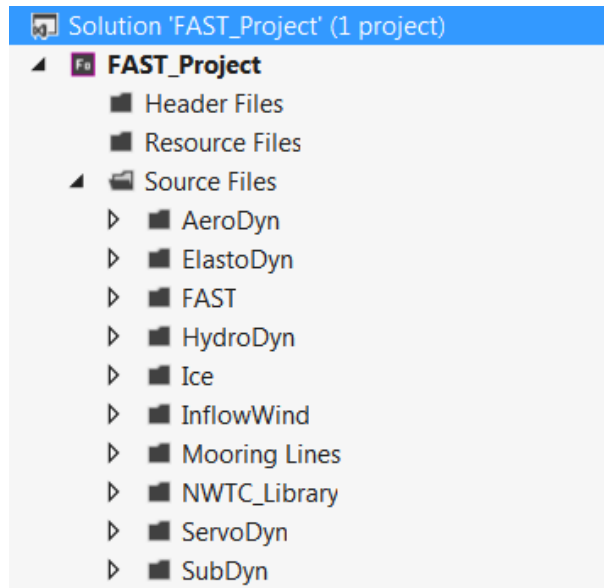


Figure 1.1: *DWM-FAST source files*

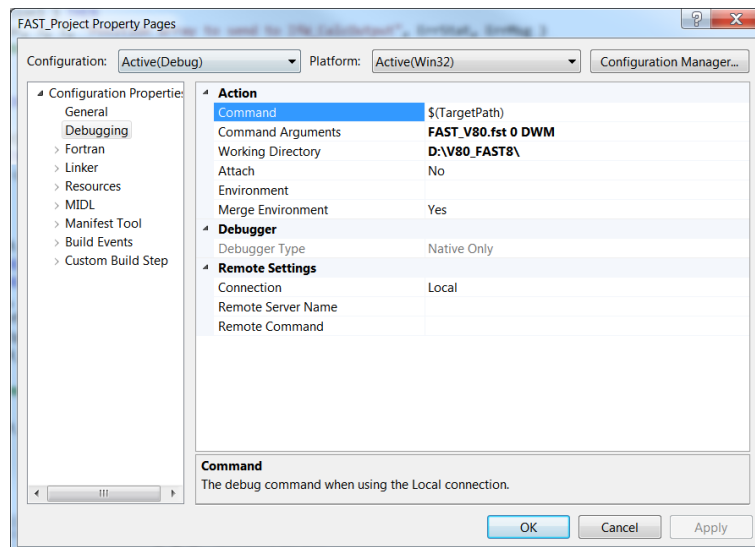
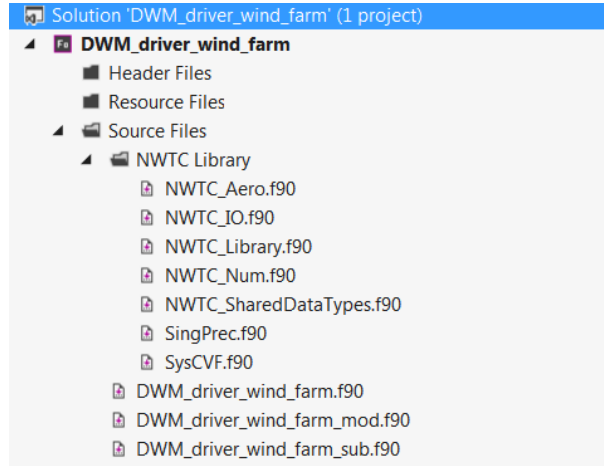


Figure 1.2: *DWM-FAST project setting*



**Figure 2.1:** *DWM driver program source files*

interested turbine is called in the loop (indicated by the corresponding turbine index  $i$ ), and switch to the DWM-FAST with debug mode to see how the turbine performs.

### 3 DWM-Driver input file

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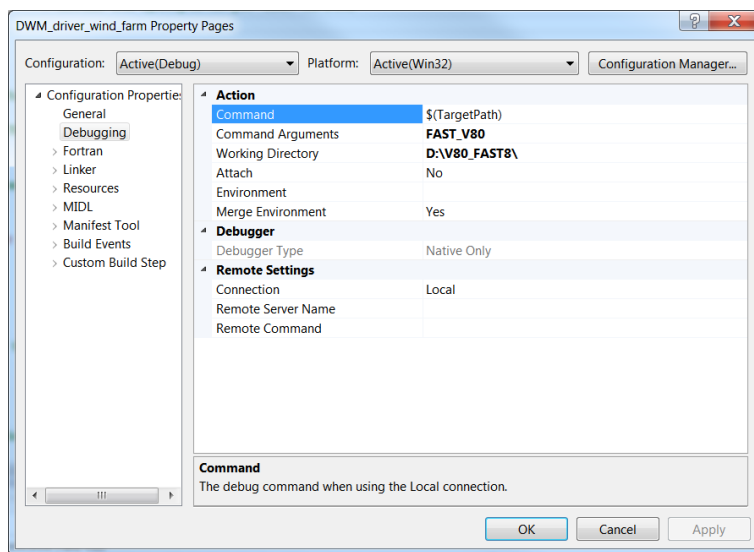
An input text file is used to set the DWM and the wind farm parameters. More information can be found from the DWM Users guide: Version 2.01, under the section “Input File”.

### 4 File folder structure and output files

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In the target folder where the FAST input files are, create the sub-folder named “DWM-driver” and “DWM-results” in advance. Then put the driver program input text file under the sub-folder “DWM-driver”. After the simulations are finished, all the simulation results will be created under the sub-folder “DWM-results”.

Besides the normal FAST output files that write the power and loads results, DWM also writes out several text files as the output files. They have the root name of the turbine index and some keywords indicating what kind of results are stored in these text files. More information related to the output files can be found from the DWM-FAST Users guide: Version 2.01, under the section “Output Files”.



**Figure 2.2:** *DWM driver program setting*