

PIV Data Release
November 15, 2020

The PIV data consist of planar velocity measurements made in the wing-fuselage juncture of the F6 wing with leading-edge horn. Each file contains data acquired at a single, longitudinal station and the filename includes identifiers such as the test number, angle of attack, and location. The files are written in Tecplot ASCII (*.dat) format and include a header followed by the data. The header provides the title, variables, title of the specific zone, and other specifiers such as the number of points in the I, J, and K directions, zonetype, datapacking format, and datatype. Example header parameters and definitions for a typical file are given in the Table 1.

Header Parameter	Parameter Definition/Values	
TITLE	"Juncture Flow Test 653 - PIV Results"	
VARIABLES	X ¹	Longitudinal distance, mm
	Y ¹	Lateral distance, mm; positive Y is toward the starboard side of the model
	Z ¹	Vertical distance, mm; positive Z is upward, normal to the waterline of the model
	u	Velocity in the X direction normalized by the tunnel freestream velocity
	v	Velocity in the Y direction normalized by the tunnel freestream velocity
	w	Velocity in the Z direction normalized by the tunnel freestream velocity
	uu	Reynolds normal stress normalized by the tunnel freestream velocity squared
	vv	Reynolds normal stress normalized by the tunnel freestream velocity squared
	ww	Reynolds normal stress normalized by the tunnel freestream velocity squared
	uv	Reynolds shear stress normalized by the tunnel freestream velocity squared
	uw	Reynolds shear stress normalized by the tunnel freestream velocity squared
	vw	Reynolds shear stress normalized by the tunnel freestream velocity squared
	iblack ²	0 for invalid data points and 1 for valid data points
ZONE T	"T653R227a50x2852.6_PIV"	
STRANDID	0	
SOLUTIONTIME	0	
I	302 (typical value)	
J	227 (typical value)	
K	1	
ZONETYPE	ORDERED	
DATAPACKING	POINT	
DT	SINGLE	

Table 1. Definitions of parameters used in file header.

¹ All distances are relative to the origin of the body-fixed coordinate system which is located at the nose of the model.

² A mask was applied during image processing to restrict velocity calculations to the region of interest in the wing-body juncture and a second mask was used for parts of the images where the window frame blocked the particles. The "iblack" variable denotes where valid data exists.

Table 2 provides the angle of attack, longitudinal (X) location, Z_o , and filename for the PIV planes included in data released to date. Note that although the original intent was to duplicate the LDV measurement locations as much as possible, there are slight differences for some locations. Based on the thickness of the lightsheet used for the PIV measurements and the positioning accuracy of the translation system, these differences in location are mostly within the uncertainty of the measurement position (0.5 mm) and should not make a significant difference in comparisons with simulation results extracted at the LDV locations.

Also note that for some files, a minor artifact may appear on some edges when the data are plotted as a contour. This is due to how the mask was applied during processing and has no impact on the data further inboard near the wing-fuselage juncture.

AOA (deg)	X (mm)	Filename
5	2833.6	T653a50x2833.6_PIV.dat
	2843.2	T653a50x2843.2_PIV.dat
	2852.8	T653a50x2852.8_PIV.dat
	2893.4	T653a50x2893.4_PIV.dat
7.5	2836.6	T653a75x2836.6_PIV.dat
	2893.4	T653a75x2893.4_PIV.dat
-2.5	2899.6	T653am25x2899.6_PIV.dat

Table 2. PIV data released to date.