# 57:020 Fluids 2014 Fall EFD Lab3 E-PIV/FLOWCOACH DATA POST-PROCESSING

INSTRUCTIONS

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# 1. Converting Data File to Tecplot Input File

- 1.1 Create a new folder. This will be the working folder and every file you need will be saved to it.
- 1.2 Open a text pad file and copy the velocity vector data you downloaded from the class website into the text pad file, then add the header:



Save the text pad file to the new folder you created. Then click on file-rename and change the name from Document1.txt to velocity\_vec.dat as shown below.

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File Edit Search View Too	; Macros Configure Window Help
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Document Selector 4 ×	Document1.txt ×
Document 1 bd	<pre>variables = x, y, u, v zone 1 = 63, j = 47 1.57 1.91 -4.2000 22.0000 3.30 1.91 -1.8000 1.9000 5.04 1.91 -0.5500 -0.4600 6.78 1.91 0.1900 -1.1000 8.52 1.91 2.2000 -0.6200 10.30 1.91 4.7000 -0.7600 12.00 1.91 6.3000 -1.8000 13.70 1.91 6.9000 -1.8000 15.50 1.91 7.9000 -1.9000 17.20 1.91 12.0000 -1.7000 19.00 1.9 22.40 1.9 22.40 1.9 22.40 1.9 22.40 1.9 22.40 1.9 22.40 1.9 22.40 1.9 23.90 1.91 18.0000 -1.5000 34.60 1.91 18.0000 -1.5000 34.60 1.91 16.0000 -0.8800 36.30 1.91 16.0000 -0.7500 39.80 1.91 17.0000 -0.7500 39.80 1.91 17.0000 -1.0000 41.60 1.91 14.0000 -0.0320 43.30 1.91 14.0000 -0.3600 </pre>
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1.3 Right click on the flow coach Tecplot macro file and save link as to save the file to the created folder.

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	Lab2 PIV data week 2	Lab3 PIV dat Lab3 PIV data t Supplementary docur	Inspect Element (Q) week 2 ments

Make sure that the macro file will open with Tecplot 360 EX 2014R1.



If the Tecplot 360 EX 2014R1 is not the default opening program then follow the steps below to make it the default opening program.

Right click on the macro file then open with and browse and scroll down to click on tecplot



Then, open Tecplot 360 EX 2014R1 and click on bin and click on tec360.exe to choose Tecplot 360 EX 2014R1 as your default opening program.

Open with			E		X
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\rm Downloads	💷 ffmpeg.exe	6/22/2014 2:31 AM	Application	4,849 KB	
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	🛐 helpviewer.exe	6/23/2014 2:35 AM	Application	229 KB	
🥃 Libraries	Ipkview.exe	6/23/2014 2:39 AM	Application	29 KB	
Documents	pltview.exe	6/23/2014 2:35 AM	Application	15 KB	
👌 Music	💷 preplot.exe	6/23/2014 2:39 AM	Application	265 KB	
Pictures	💷 rlmutil.exe	6/22/2014 2:38 AM	Application	1,111 KB	
😸 Videos	szpltview.exe	6/23/2014 2:37 AM	Application	425 KB	
	🔘 tec360.exe	6/23/2014 3:02 AM	Application	4,287 KB	
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			Oper	Ca	ncel

1.4 Right click on the Clark-y geometry lab3 Tecplot data file and save link as to save the file to the created folder.

nstructions	EFD Report Instructions (PDF, DOC); CFD Report Instructions (PDF, DOC)							
	EFD Labl	EFD Lab2	EFD Lab3					
			Pre lab3 Questions Lab3 Lecture					
		Pre lab2 Questions Lab2 Lecture	Lab3 Exercise invotes Lab3 Data Reduction Sheet (Lift and drag) Lab3 Data Reduction Sheet (PIV-0deg.) Lab3 Data Reduction Sheet (PIV-16deg.) Lab3 Data Reduction Sheet (FI0wCoach-0deg.)					
	Pre lab1 Questions	Lab2 Exercise Notes (DOC file)	Lab3 Data Republion Sneet (HowCoach-Todeg.) Lab3 Tecplot Macro File (ePIV)					
	Lab1 Lecture	Lab 2 Data Reduction Sheet (smooth) Lab 2 Data Reduction Sheet (rough)	Lab3 Tecplot Macro File (FlowCoach) Lab3 Tecplot Data File (ePIV/ElowCoach-Clark-Y.ceometry)					
	Lab1 Exercise Notes (DOC file)	Lab 2 Data Reduction Sheet (ePIV) Lab 2 Data Reduction Sheet (FlowCoach)	Open Link in New <u>Tab</u>					
	Lab1 Data Reduction Sheet	EFDIab2-Template.doc	Lab3 Concepts Bookmark This Link					
	EFDIab1-Template.doc	Lab2 Concepts	Lab3 result for. Save Link As					
	Lab1 Concepts	Lab2 data week 1	Lab3 result for Conv Link Location					
	Lab1 PIV data	Lab2 PIV data week 1	Lab3 result for. This Frame					
		Lab2 data week 2	Lab3 PIV c Inspect Element (Q)					
		Lab2 PIV data week 2	Lab3 PIV data week 2					
			Supplementary documents 1) <u>Clark-Y ePIV/FlowCoach data postorocess instructions</u> 2) <u>Reference speed for Re</u> 3) <u>Lab3 Exercise Notes, Appendix C</u>					

#### 2.1 DATA POSTPROCESSING BY USING TECPLOT MACRO

FILES Open the working folder you have created in step one and double click on the macro file.

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♥ IV_lab3		<b>▼ 4</b> 9 Se	arch PIV_lab3			٩
Organize 🔻 🛛 Burn	New folder		8==	•		0
☆ Favorites	Name	Date modified	Туре		Size	
🥅 Desktop	😰 Clark-Y.dat	11/6/2014 2:11 PM	DAT File			4 KI
🐌 Downloads	Lab3_Tecplot_Macro_File_(FlowCoach)	11/6/2014 8:37 AM	MCR File			3 KI
📃 Recent Places	🖻 velocity_vec.dat	11/7/2014 9:59 AM	DAT File			83 KI
<ul> <li>□ Libraries</li> <li>□ Documents</li> <li>□ Music</li> <li>□ Pictures</li> <li>□ Videos</li> <li>□ Computer</li> <li>○ Local Disk (C:)</li> <li>□ Local Disk (D:)</li> <li>□ Removable Disk (F:)</li> <li>□ Helshiekh (\\engin.u</li> <li>□ unix home (L:)</li> <li>○ Network</li> </ul>						
辑 Network						

Answer to following three prompts:

a) Type in '1' if your data file name is 'velocity\_vec.dat' or type in '2' for different file names.



b) Select the angle of attack according to the velocity vector file you are using.



Note that the default file name in the process b) is 'velocity\_vec.dat' in this case.

Typical example of output





Uncheck the shade box and check the edge box to display the airfoil.

🔯 Tecplot 360 EX 2014 R1	Note that the default the same in the process is a "relative, two dat" in the case	
File Edit View Plot Insert Animate	Data Frame Options Scripting Tools Analyze Help	
🗋 🔯 🔚 🖶 💽 🍾 🔍	♦ \$= & & & &         1   1       2	
Plot 0 × 20 Cartesian Show zone layers Mesh Contour Details Shade Vector Zone Style Solution time: 0 Details Show derived objects Show derived objects Details Details		
Auto redraw		
Plot Pages		

Export the figure file and save the layout file. See sections 3 and 4, respectively. Do not close the Tecplot window and continue to next section for streamlines plot.

#### 2.2 STREAMLINE PLOT

To generate the streamlines figure, click on the zone style



Zone Style										
Mesh C Zone Number	Contour Veo Zone Name	tor Sca Group Number	Show Zon	Share Show Edges	Edge Edints Edge Type	s Surfac Edge Color	es Effect Line Thickness	ts I-Index Border	J-Index Border	K-Ir Boi
1 2 3	ZONE 001 Upper body Lower body	1 1 1	<ul> <li>✓</li> <li>✓</li> </ul>		Borders Borders Borders		0.10% 0.10% 0.10%	Both Both Both	Both Both Both	Both Both Both
<									1	Þ
Selection cr	iteria:				Zones	Gro	oups	Clear	]	
								Close		lelp

Click on Edge, and check the first box under show edge. Then,

- 1) Turn off the 'Vector' check box
- 2) Turn on the 'Streamtraces' check box
- 3) Click the button to add a single or rake of streamlines
- 4) Click the button to edit streamlines if necessary



Export the figure file and save the layout file. See sections 3 and 4, respectively.

Typical example of streamline figure:

🧕 Tecplot 360 EX 2014 R1					
File Edit View Plot Insert Animate	e Data Frame Options	Scripting Tools Analyze Help			
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V Auto redraw					
Plot Pages					

## 2.3 VELOCITY MAGNITUDE CONTOUR PLOT

- 1) Turn off the 'Vector' and/or 'Streamtraces' check boxes
- 2) Turn on the 'Contour' check box





## 3. EXPORTING FIGURE FILES

Open image export window from the top menu, File\Export\,, then click OK.

S Export	23
Export format: PNG  Color	
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© Enter width: 512	
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Supersample factor (2-16): 3	
Convert to 256 colors	
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Choose the working folder and type representative name in figure file name area (ex:

'velocity \_contour\_0deg.png')

Select Export File	-			8 23
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File name: .png				Save
Files of type: PNG Files	(*.png)			Cancel Help

## 4. SAVING TECPLOT LAYOUT FILES

Open Tecplot layout file save window from the top menu under 'File\Save Layout\' or 'File\Save Layout as...' and type in layout file name (ex: 'streamline\_16deg.lay')

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