A User Guide for the new developed program for AVA study at the post-CFD phase

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Introduction

- In a traditional method, when working on an AVA project, we need using loads of scripts to output or export result data from Ensight after getting the simulation cases. The results we want normally can be classified by three parts, VR testpoints, contour plots and vector plots respectively.

- However, we have to modify the scripts every time for different projects as the wind directions and the testpoints are different. Editing such scripts manually is very dull and time-consuming.

- Therefore, as for this reason, a new program for the post-CFD data processing of AVA project is developed, which can solve the aforesaid problem easily and streamline our work.

- This program is designed to create scripts by Excel which can connect to Ensight perfectly and it also can load the data exported from Ensight. So by using this new method, what you need to do is just input some key parameters and several clicks and your work is done.

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Key functions of the program

- This program is developed by using Excel VBA, which can output scripts for Ensight as well as load data exported from Ensight.

  - This program can generate almost all the scripts you will use in Ensight, including loading cases, exporting VR testpoints, outputting contour plots and vector plots.

  - This program can also load VR testpoint data and calculate Combine VR, SVR and LVR

  - This program can extract and process the data for specific Focus Areas

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Instructions for the program

Input the case parameters

Baseline			Where to save the scripts?	Default
Load Case	Directory of Ensight Case File	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\	Load 2m Topo? (Y/N)	Y
	Body Name in the Case	INNER	If Y, Input the Location	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Res
	Iteration Step	00800	If Y, Input the Name	Baseline_Topo_2m
Create Variable	Variable	Velocity_for_Vector	Vel. at Infinity Level	7.2
Export Result	Result Saving Directory	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Baseline\Ensight\Result		
	Directory of Testpoints Source File (P and O Points)	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\T	Directory of Testpoints Target File (P and O Points)	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Baseline\Ensight\Result
	Name of Testpoints Source File (P Points)	P	Name of Testpoints Target File (P points)	Perimeter
	Name of Testpoints Source File (O Points)	O	Name of Testpoints Target File (O points)	Overall
	Name of Testpoints Source File (S Points)	NA	Name of Testpoints Target File (S points)	Special
	Legend Range	0.6	Legend Color	White

Don't change anything in the gray cells

Input information in the orange cells

All the contents in the orange cells should be filled in this section and the following slides would explain the meanings of some of the key parameters.

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Input the case parameters

Don't change anything in the gray cells

Input information in the orange cells

Baseline					
Load Case	Directory of Ensight Case File	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\	Where to save the scripts?	Default	
			Load 2m Topo? (Y/N)	Y	
	Body Name in the Case	INNER	If Y, Input the Location	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Res
	Iteration Step	00800	If Y, Input the Name	Baseline_Topo_2m
Create Variable	Variable	Velocity_for_Vector	Vel. at Infinity Level	7.2
Export Result	Result Saving Directory	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Baseline\Ensight\Result		
	Directory of Testpoints Source File (P and O Points)	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\T	Directory of Testpoints Target File (P and O Points)	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Baseline\Ensight\Result
	Name of Testpoints Source File (P Points)	P	Name of Testpoints Target File (P points)	Perimeter
	Name of Testpoints Source File (O Points)	O	Name of Testpoints Target File (O points)	Overall
	Name of Testpoints Source File (S Points)	NA	Name of Testpoints Target File (S points)	Special
	Legend Range	0.6	Legend Color	White

When you enter "Default", all the scripts created will be saved in the same directory of this Excel file. Otherwise, you can enter a location path where you want to save.

If Y, give the file location and file name then the script created will contain the commands to load a topography

In this module, it is assumed that all your testpoint files exported from Rhino, e.g. P points, O points and S points are saved in the same directory.

If there is no S points, just enter "NA" instead.

Warns: It is better that you don't change any information of the testpoint files from Rhino and export P, O and S points separately.

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Input the case parameters

Baseline				
Load Case			Where to save the scripts?	Default
	Directory of Ensight Case File	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\	Load 2m Topo? (Y/N)	Y
	Body Name in the Case	INNER	If Y, Input the Location	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Res
	Iteration Step	00800	If Y, Input the Name	Baseline_Topo_2m
Create Variable	Variable	Velocity_for_Vector	Vel. at Infinity Level	7.2
Export Result	Result Saving Directory	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Baseline\Ensight\Result		
	Directory of Testpoints Source File (P and O Points)	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\T	Directory of Testpoints Target File (P and O Points)	D:\Project2\HKHA_ChoiWingRoad\AVA_20151012\Analysis\Baseline\Ensight\Result
	Name of Testpoints Source File (P Points)	P	Name of Testpoints Target File (P points)	Perimeter
	Name of Testpoints Source File (O Points)	O	Name of Testpoints Target File (O points)	Overall
	Name of Testpoints Source File (S Points)	NA	Name of Testpoints Target File (S points)	Special
	Legend Range	0.6	Legend Color	White

Enter a directory where you want to save the output result from Ensight, e.g. contour plots, vector plots.

Enter a directory where you want to save the testpoint result files from Ensight, e.g. VR of P points, VR of O points and VR of S points. It is also possible if you like to change the name of the testpoint file.

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Input the wind parameters

Don't change anything in the gray cells

Input information in the orange cells

No.	Case No.	Wind Direction	Angle	Freq. of Annual	Freq. of Summer	Annual Wind	Summer Wind
1	1	N	0	12.0%	2.5%	Y	Y
2	2	NNE	22.5	8.2%	2.2%	Y	Y
3	3	NE	45	8.7%	2.6%	Y	Y
4	4	ENE	67.5	14.9%	4.9%	Y	Y
5		E	90	23.0%	13.8%		
6		ESE	112.5	4.8%	7.9%		
7		SE	135	3.1%	6.5%		
8		SSE	157.5	3.0%	6.3%		
9		S	180	4.4%	10.0%		
10		SSW	202.5	3.1%	8.3%		
11		SW	225	4.9%	14.4%		
12		WSW	247.5	3.3%	9.5%		
13		W	270	2.6%	6.6%		
14		WNW	292.5	1.0%	2.0%		
15		NW	315	1.6%	1.3%		
16		NNW	337.5	1.5%	1.3%		
				Sum		43.8%	12.2%

2 Sum

1 Just enter "Y", if you are studying a wind from that direction. If not, enter "N" or just leave it "empty".

2 And press "Sum" when you input all winds you want to study

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Input the information for Focus Areas and Test Points

Focus Areas	Test Points
A	P1
	P2
	P3
	P4
B	O1
	O2
	O3
	O4
C	P5
	P6
	O5
	O6

Type the name of your focus area and its testpoint name. You are suggested to follow the format shown in this sample. There is no problem, if your testpoints are not consecutive for a specific focus area. However, <u>Spaces between testpoints should be avoided.</u>

Focus Areas	Test Points
A	P1
Bad Example	P2
	P3
	P4
✕	✕ ✕
B	O1
	O2
	O3
	O4

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Working Procedure
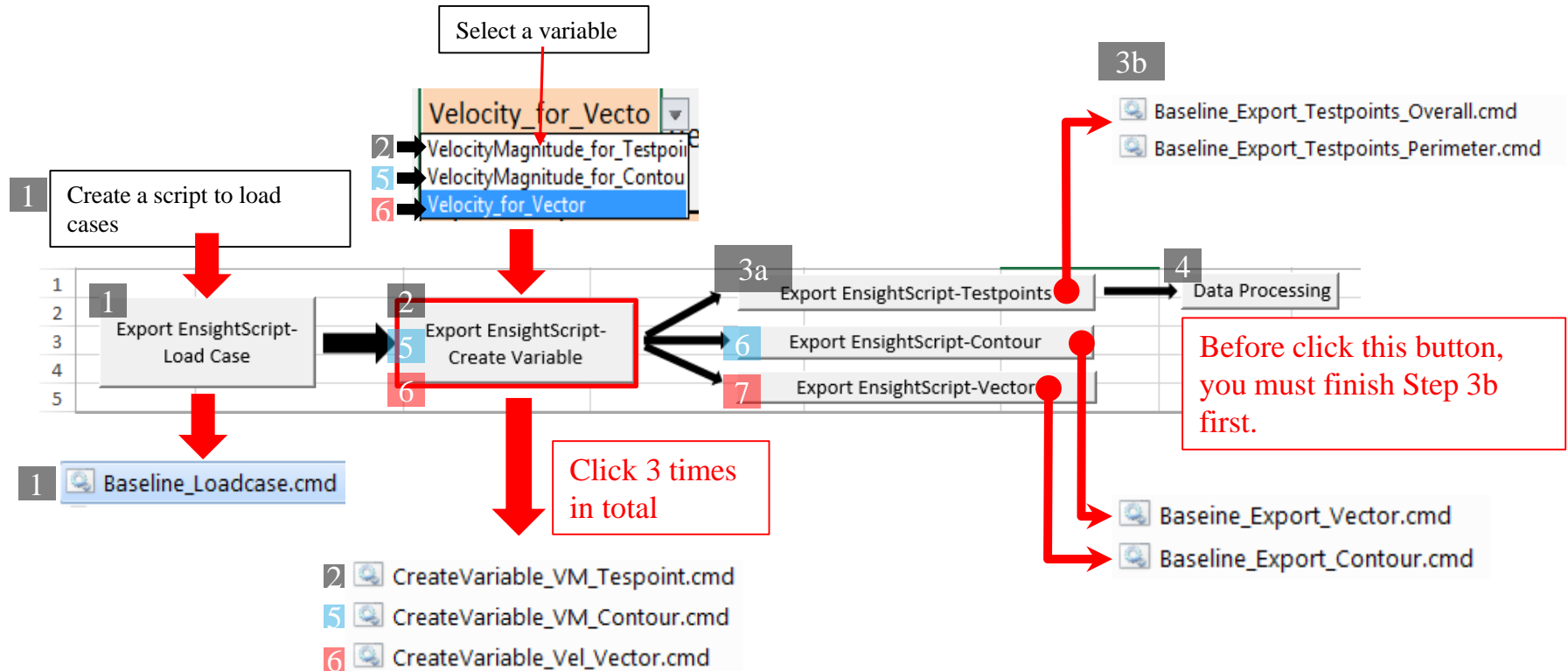
Testpoint-checking

Baseline	query_interact:	query	xyz		
	query_interact:	#_displayed	30		
P1	query_interact:	create	639.8	139.75	61.79
P2	query_interact:	create	638.05	150.82	61.8
P3	query_interact:	create	637.17	161.15	61.79
P4	query_interact:	create	635.76	171.21	61.77
P5	query_interact:	create	633.05	181.45	61.7
P6	query_interact:	create	629.92	191.13	61.68
P7	query_interact:	create	624.64	200.45	61.73
P8	query_interact:	create	617.39	206.51	61.72
P9	query_interact:	create	605.22	210.78	61.76
P10	query_interact:	create	592.04	212.92	61.77
P11	query_interact:	create	580.09	211.34	61.76
P12	query_interact:	create	569.12	207.79	61.71
P13	query_interact:	create	558.82	201.68	61.68
P14	query_interact:	create	548.38	196.84	61.65
P15	query_interact:	create	538.36	191.57	61.6
P16	query_interact:	create	531.19	182.97	61.58
P17	query_interact:	create	527.18	174.05	61.59
P18	query_interact:	create	524.1	163.35	61.57
P19	query_interact:	create	530	154.25	61.7
P20	query_interact:	create	534.67	146.41	61.75
P21	query_interact:	create	540.94	137.58	61.84
P22	query_interact:	create	546.92	128.47	62.09
P23	query_interact:	create	554.01	120.03	62.46
P24	query_interact:	create	566.07	121.24	63.1
P25	query_interact:	create	577.11	123.84	62.81
P26	query_interact:	create	587.48	125.68	62.17
P27	query_interact:	create	599.13	128.1	61.73
P28	query_interact:	create	609.86	130.3	61.46
P29	query_interact:	create	621.49	132.28	61.42
P30	query_interact:	create	631.07	134.16	61.58

Check P points

	query_interact:	query	xyz		
	query_interact:	#_displayed	95		
O1	query_interact:	create	468	273	70.32
O2	query_interact:	create	490	258	68.02
O3	query_interact:	create	511	245	65.04
O4	query_interact:	create	534	238	64.9
O5	query_interact:	create	559	236	63.07
O6	query_interact:	create	584	241	62.85
O7	query_interact:	create	606.12	241.76	64.03
O8	query_interact:	create	613.5	227.22	62.8
O9	query_interact:	create	427	245	63.85
O10	query_interact:	create	434	234	62.51
O11	query_interact:	create	449	240	62.94
O12	query_interact:	create	466	235	62.56
O13	query_interact:	create	487	231	62.86
O14	query_interact:	create	496	215	62.34
O15	query_interact:	create	488	202	61.78
O16	query_interact:	create	475	211	61.54
O17	query_interact:	create	454	209	61.46
O18	query_interact:	create	441	220	61.65
O19	query_interact:	create	417	228	62.15
O20	query_interact:	create	405	205	61.16
O21	query_interact:	create	423	199	59.9
O22	query_interact:	create	442	192	58.75
O23	query_interact:	create	462	187	60.42
O24	query_interact:	create	482	184	62.01
O25	query_interact:	create	503	185	62.1
O26	query_interact:	create	520.26	187.99	61.89
O27	query_interact:	create	642.49	124.9	61.89
O28	query_interact:	create	645.39	109.28	61.7
O29	query_interact:	create	650	90	61.32
O30	query_interact:	create	656	70	61.35
O31	query_interact:	create	661	51	61.53
O32	query_interact:	create	667	33	62.19
O33	query_interact:	create	673	14	62.56
O34	query_interact:	create	429	157	33.34
O35	query_interact:	create	444	148	30.88
O36	query_interact:	create	425	139	24.21

Check O points

	query_inte	query	xyz	

Check S points

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Data Processing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Baseline	N	NNE	NE	ENE	E	ESE	SE	S	SSW	SW	WSW	W		Annaul	Summer
Frequency	12.0%	8.2%	8.7%	14.9%	23.0%	4.8%		4.4%		4.9%				80.9%	
					13.8%	7.9%	6.5%	10.0%	8.3%	14.4%	9.6%	6.6%			76.9%
P1	0.24	0.05	0.17	0.20	0.24	0.23	0.05	0.26	0.29	0.30	0.14	0.12		0.21	0.22
P2	0.23	0.05	0.17	0.16	0.15	0.28	0.16	0.10	0.16	0.24	0.18	0.17		0.17	0.18
P3	0.24	0.06	0.18	0.12	0.15	0.32	0.26	0.10	0.18	0.26	0.17	0.18		0.17	0.20
P4	0.26	0.06	0.21	0.12	0.29	0.40	0.38	0.12	0.22	0.23	0.39	0.43		0.22	0.29
P5	0.24	0.15	0.20	0.14	0.32	0.42	0.42	0.11	0.21	0.16	0.47	0.51		0.23	0.31
P6	0.24	0.22	0.20	0.16	0.37	0.47	0.48	0.07	0.21	0.32	0.51	0.55		0.27	0.35
P7	0.24	0.27							0.26	0.50	0.52	0.56		0.29	0.41
P8	0.25	0.32	0.19	0.17	0.45	0.57	0.59	0.09	0.55	0.57	0.54	0.59		0.32	0.47
P9	0.23	0.34	0.15	0.16	0.48	0.57	0.58	0.04	0.54	0.61	0.51	0.56		0.33	0.48
P10	0.19	0.32	0.12	0.15	0.49	0.55	0.54	0.15	0.61	0.63	0.49	0.52		0.32	0.50
P11	0.17	0.27	0.11	0.11	0.52	0.51	0.50	0.21	0.65	0.65	0.48	0.50		0.31	0.51
P12	0.11	0.19	0.08	0.04	0.49	0.41	0.39	0.30	0.62	0.61	0.43	0.43		0.27	0.47
P13	0.06	0.13	0.04	0.04	0.47	0.23	0.22	0.30	0.58	0.57	0.36	0.34		0.23	0.41
P14	0.03	0.05	0.07	0.04	0.47	0.20	0.12	0.32	0.59	0.58	0.38	0.34		0.22	0.40
P15	0.11	0.11	0.15	0.02	0.48	0.17	0.08	0.37	0.66	0.66	0.50	0.46		0.25	0.45
P16	0.17	0.19	0.22	0.02	0.37	0.09	0.09	0.36	0.46	0.45	0.41	0.41		0.23	0.35
P17	0.20	0.22	0.24	0.02	0.16	0.03	0.19	0.37	0.30	0.28	0.33	0.32		0.17	0.25
P18	0.23	0.24	0.24	0.09	0.12	0.11	0.34	0.44	0.29	0.26	0.20	0.14		0.18	0.24
P19	0.19	0.14	0.08	0.08	0.11	0.18	0.31	0.41	0.31	0.29	0.13	0.10		0.15	0.23
P20	0.18	0.08	0.03	0.07	0.08	0.13	0.30	0.34	0.29	0.28	0.10	0.14		0.12	0.21
P21	0.19	0.05	0.03	0.06	0.08	0.09	0.23	0.28	0.28	0.27	0.07	0.24		0.10	0.19
P22	0.20	0.03	0.03	0.07	0.10	0.11	0.14	0.21	0.25	0.27	0.17	0.33		0.11	0.19
P23	0.21	0.01	0.13	0.15	0.45	0.59	0.55	0.17	0.22	0.32	0.36	0.44		0.27	0.38
P24	0.03	0.06	0.16	0.19	0.48	0.62	0.58	0.05	0.11	0.16	0.18	0.10		0.25	0.28
P25	0.07	0.07	0.14	0.21	0.44	0.59	0.54	0.10	0.18	0.26	0.30	0.19		0.25	0.32
P26	0.06	0.05	0.13	0.22	0.44	0.58	0.53	0.20	0.30	0.34	0.35	0.24		0.26	0.37
P27	0.02	0.06	0.13	0.22	0.40	0.54	0.49	0.33	0.44	0.42	0.43	0.32		0.25	0.42
P28	0.02	0.07	0.11	0.19	0.31	0.48	0.41	0.35	0.45	0.42	0.45	0.38		0.22	0.40
P29	0.06	0.08	0.06	0.11	0.16	0.28	0.26	0.35	0.44	0.43	0.47	0.47		0.15	0.35

1 Check Zero

2 Combine_VR

3 SVR

4 LVR

5 Focus Area

1 Highlight the data less than 0.01

2 Calculate the Combined VR in various wind directions

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Data Processing

Annual

	Baseline	Opt1
SVR	0.220	0.212
LVR	0.168	0.163

Summer

	Baseline	Opt1
SVR	0.338	0.327
LVR	0.248	0.242

Annual Average VR

Focus Areas	Test Points	Baseline	Proposed_opt1
Choi Wing Lane		0.265	0.257
Choi Wing Road		0.219	0.204
Choi Tak Estate		0.159	0.156
Lui Ming Choi Primary School		0.071	0.077
Choi Ha Road		0.117	0.112
Ying On House		0.075	0.072
Ying Hong House		0.102	0.104
Road 1		0.159	0.193
Choi Hei Road Park		0.171	0.167
Choi Fook Estate		0.140	0.143

Summer Average VR

Focus Areas	Test Points	Baseline	Proposed_opt1
Choi Wing Lane		0.324	0.334
Choi Wing Road		0.309	0.297
Choi Tak Estate		0.224	0.229
Lui Ming Choi Primary School		0.142	0.140
Choi Ha Road		0.201	0.193
Ying On House		0.146	0.139
Ying Hong House		0.138	0.140
Road 1		0.219	0.226
Choi Hei Road Park		0.256	0.253
Choi Fook Estate		0.233	0.219

Summary

More Details for Checking

End

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