APPENDIX - A: PRESSURE CONTOURS
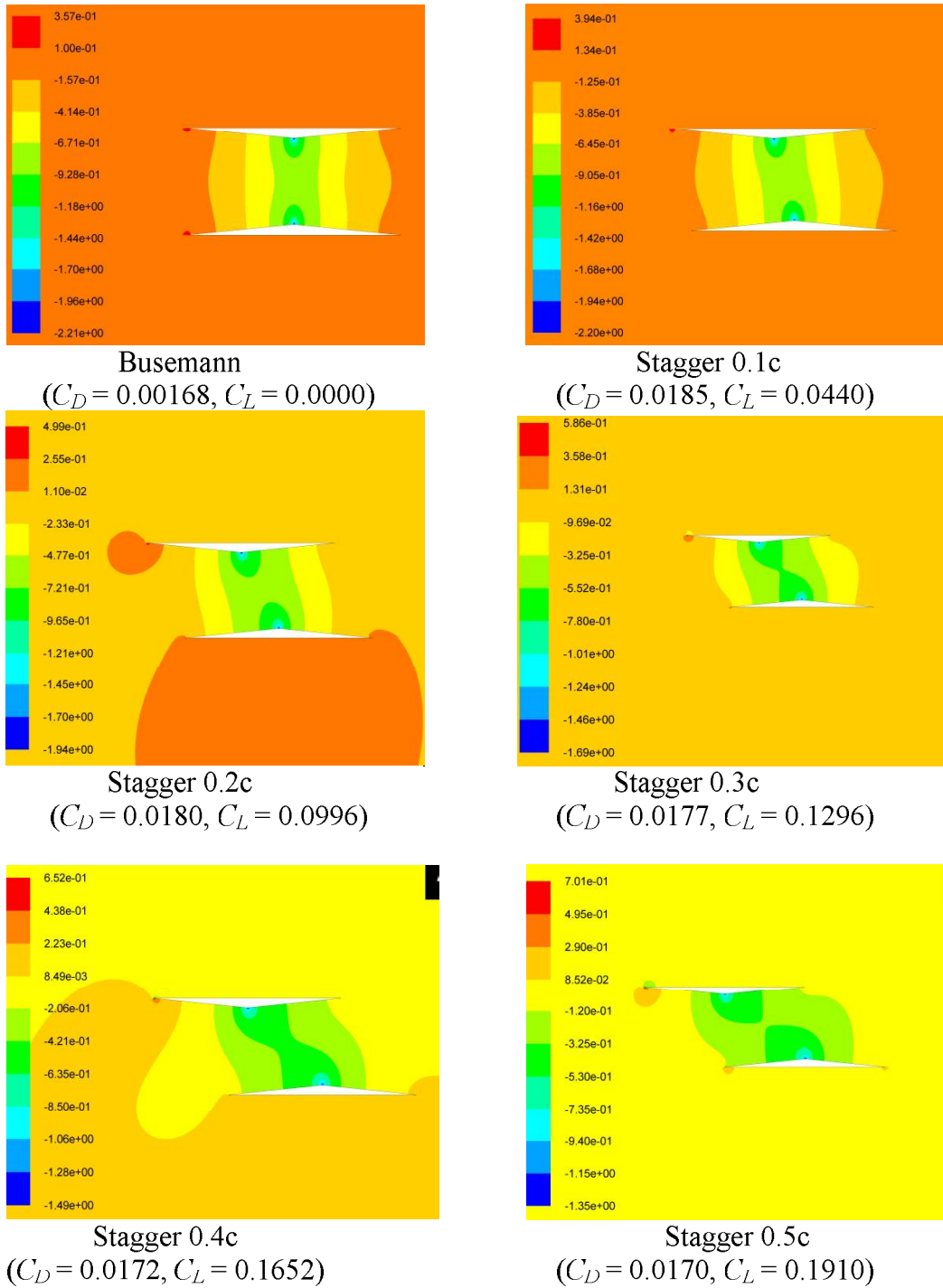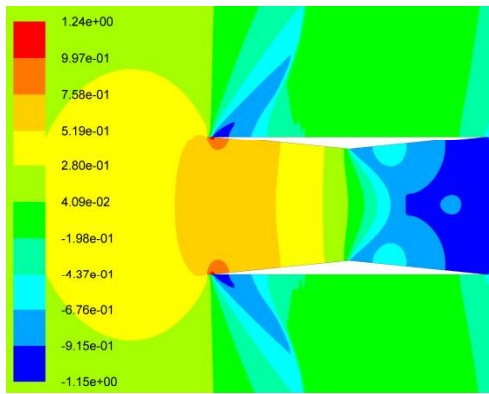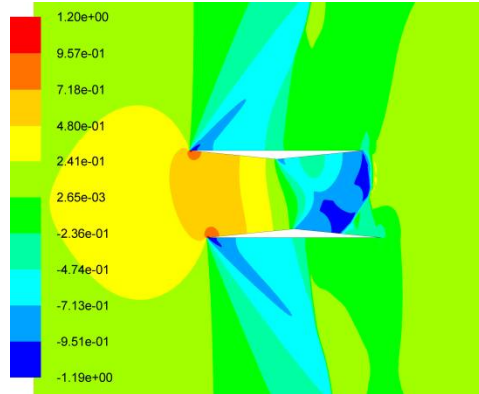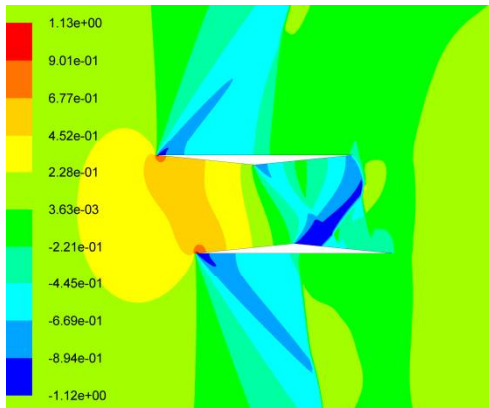

Busemann
($C_D = 0.00168$, $C_L = 0.0000$)

Stagger 0.1c
($C_D = 0.0185$, $C_L = 0.0440$)

Stagger 0.2c
($C_D = 0.0180$, $C_L = 0.0996$)

Stagger 0.3c
($C_D = 0.0177$, $C_L = 0.1296$)

Stagger 0.4c
($C_D = 0.0172$, $C_L = 0.1652$)

Stagger 0.5c
($C_D = 0.0170$, $C_L = 0.1910$)

Figure A.1 C_p Variation for different Stagger distances at $M_\infty = 0.5$, $\alpha = 0°$.
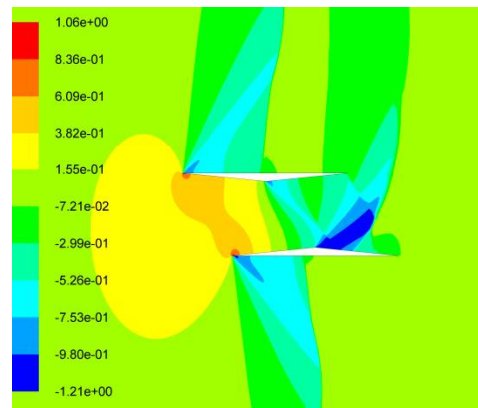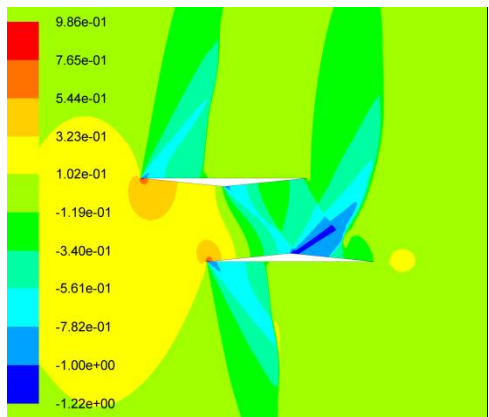
Busemann
(C_D = 0.1428, C_L = 0.0000)
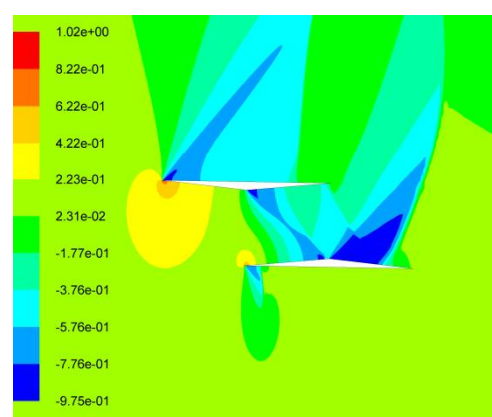
Stagger 0.1c
(C_D = 0.1193, C_L = 0.0502)

Stagger 0.2c
(C_D = 0.0959, C_L = 0.1330)

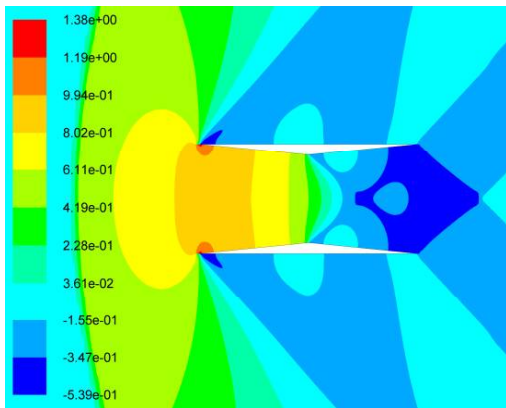Stagger 0.3c
(C_D = 0.0862, C_L = 0.2748)

Stagger 0.4c
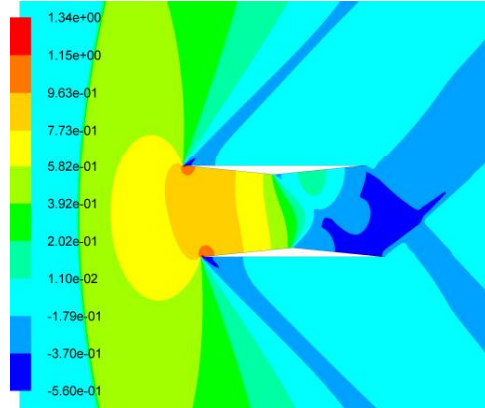(C_D = 0.0724, C_L = 0.3236)

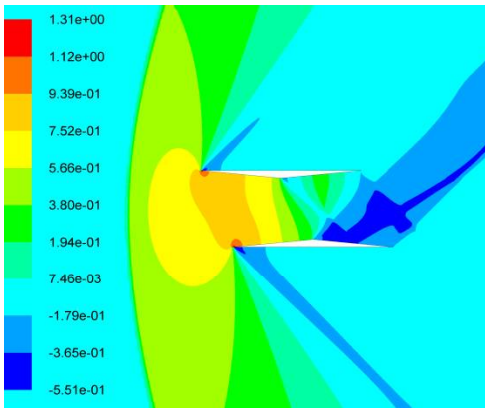Stagger 0.5c
(C_D = 0.0651, C_L = 0.4740)

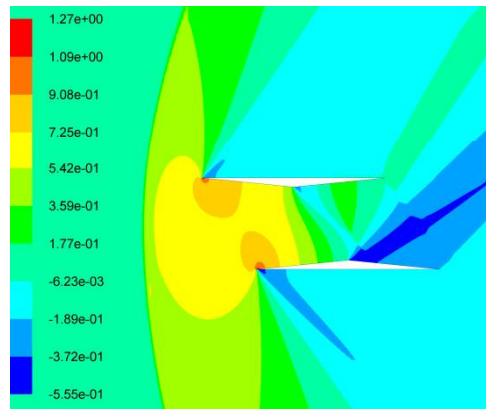Figure A.2 C_p Variation for different Stagger distances at M_∞ = 0.9, α = 0º

Busemann
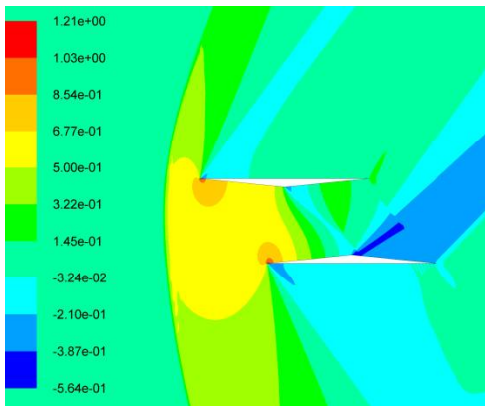(C_D = 0.1122, C_L = 0.0000)

Stagger 0.1c
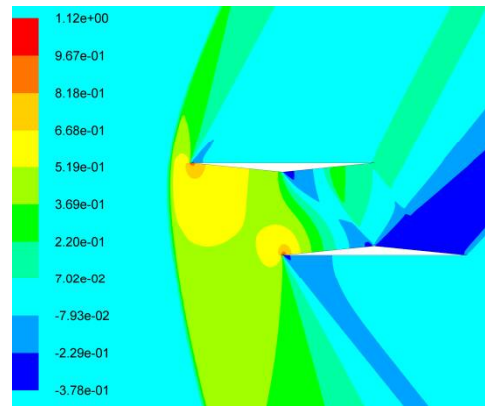(C_D = 0.1069, C_L = 0.1365)

Stagger 0.2c
(C_D = 0.0950, C_L = 0.2250)

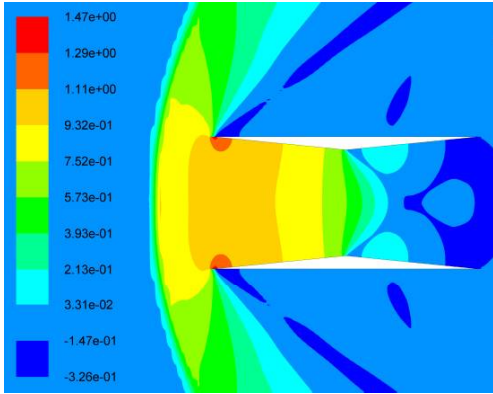Stagger 0.3c
(C_D = 0.0838, C_L = 0.2715)

Stagger 0.4c
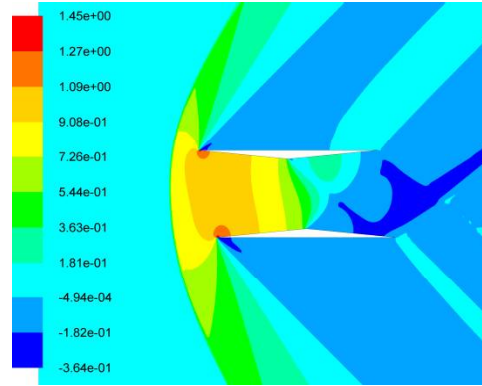(C_D = 0.0727, C_L = 0.2980)
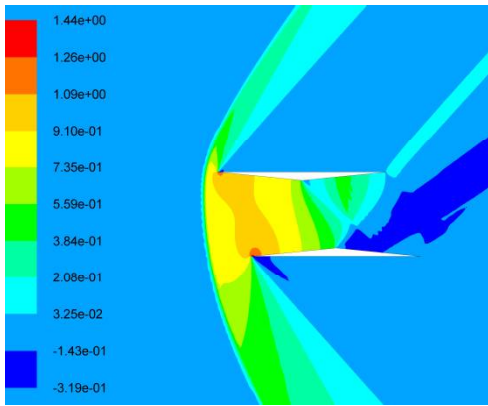
Stagger 0.5c
(C_D = 0.0607, C_L = 0.3010)

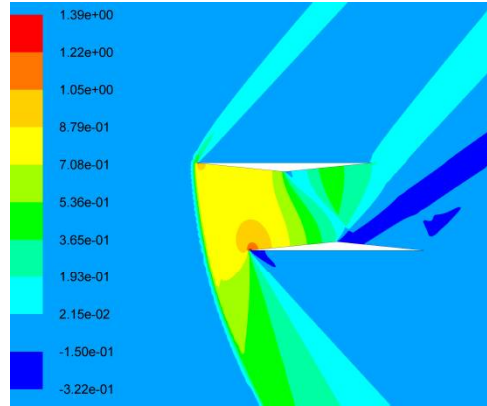Figure A.3 C_p Variation for different Stagger distances at M_∞ = 1.2, α = 0°.
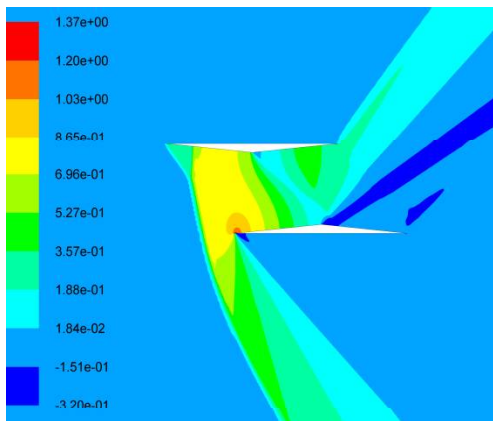
Busemann
(C_D = 0.1044, C_L = 0.0000)

Stagger 0.1c
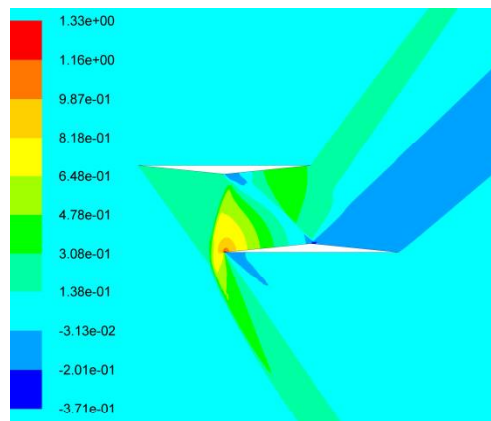(C_D = 0.0995, C_L = 0.1274)

Stagger 0.2c
(C_D = 0.0878, C_L = 0.1930)

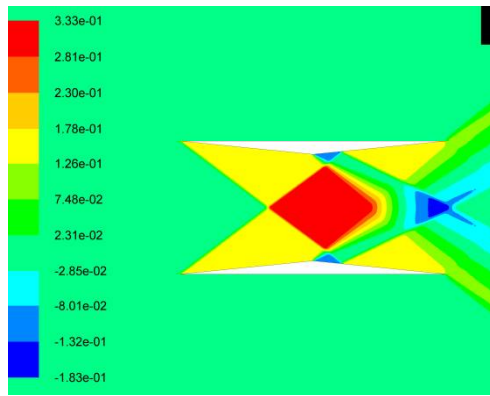Stagger 0.3c
(C_D = 0.0760, C_L = 0.2180)
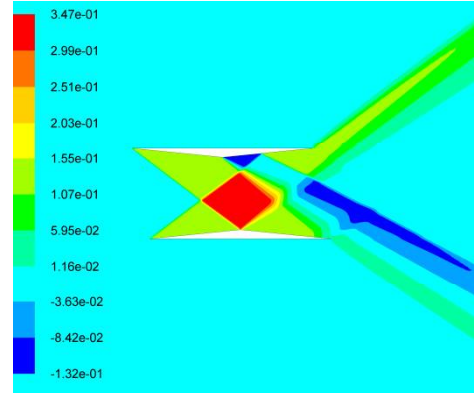
Stagger 0.4c
(C_D = 0.0578, C_L = 0.1584)

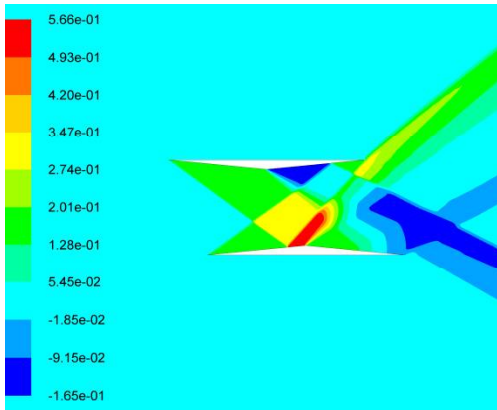Stagger 0.5c
(C_D = 0.0367, C_L = 0.0790)

Figure A.4 C_p Variation for different Stagger distances at M_∞ = 1.4, α = 0°.
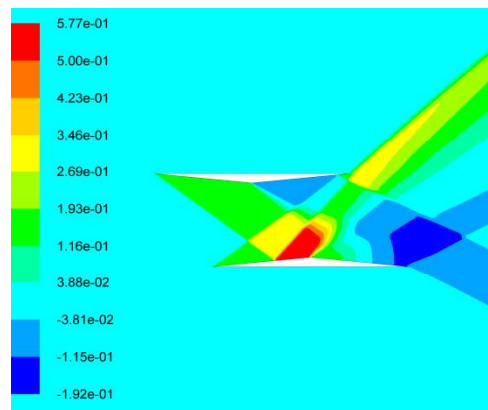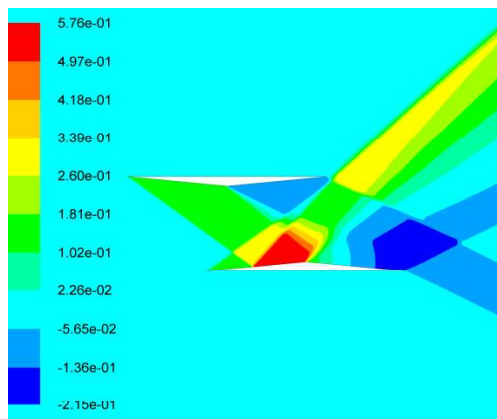
Busemann
($C_D = 0.0124$, $C_L = 0.0000$)

Stagger 0.1c
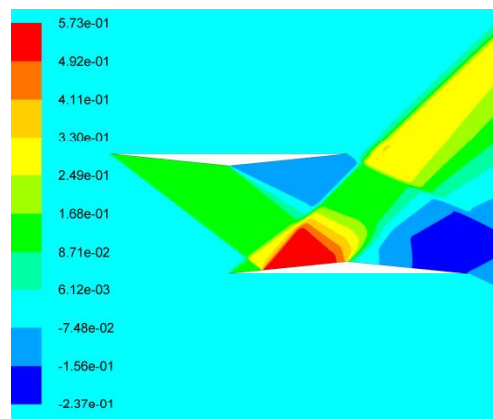($C_D = 0.0135$, $C_L = -0.0476$)

Stagger 0.2c
($C_D = 0.0222$, $C_L = -0.0910$)

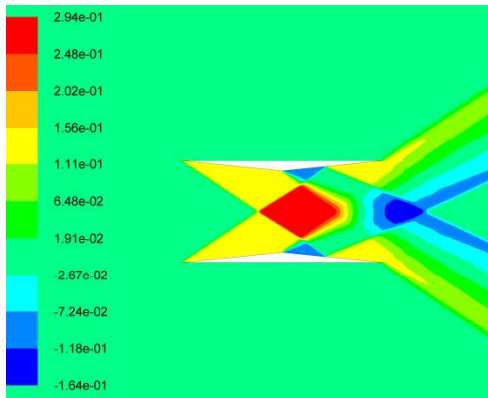Stagger 0.3c
($C_D = 0.0320$, $C_L = -0.1255$)

Stagger 0.4c
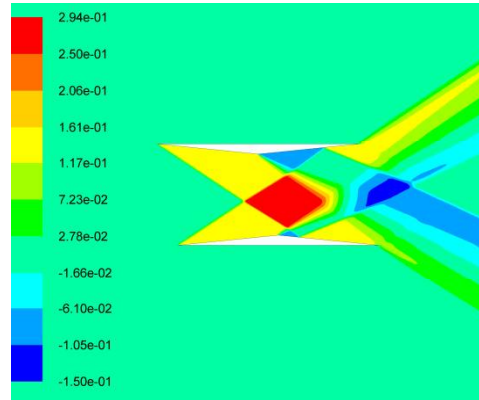($C_D = 0.0410$, $C_L = -0.1394$)
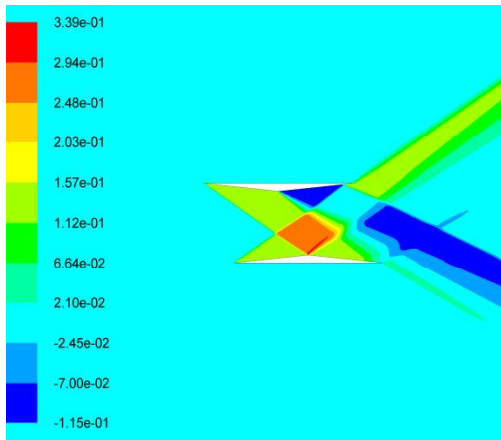
Stagger 0.5c
($C_D = 0.0478$, $C_L = -0.1322$)

Figure A.5 C_p Variation for different Stagger distances at $M_\infty = 1.9$, $\alpha = 0°$.
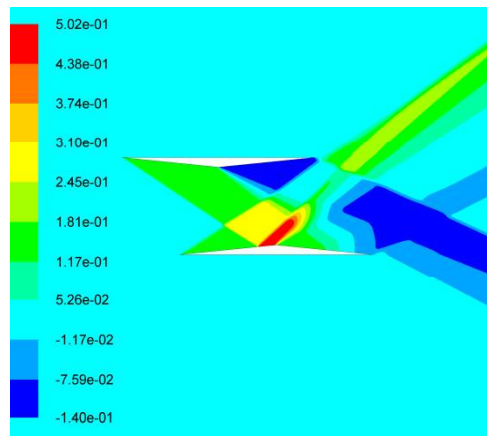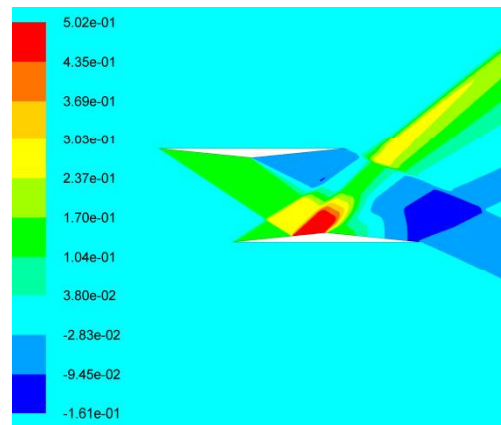
Busemann
($C_D = 0.0161$, $C_L = 0.0000$)

Stagger 0.1c
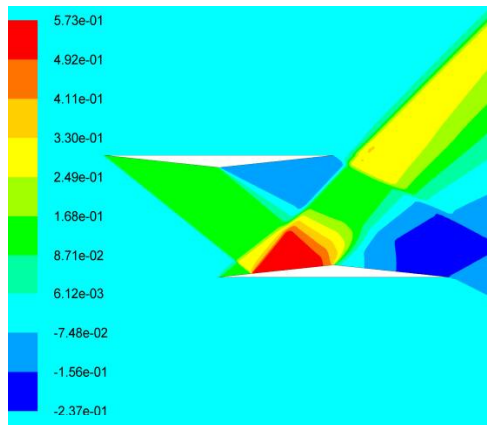($C_D = 0.0163$, $C_L = -0.0495$)

Stagger 0.2c
($C_D = 0.0175$, $C_L = -0.0910$)

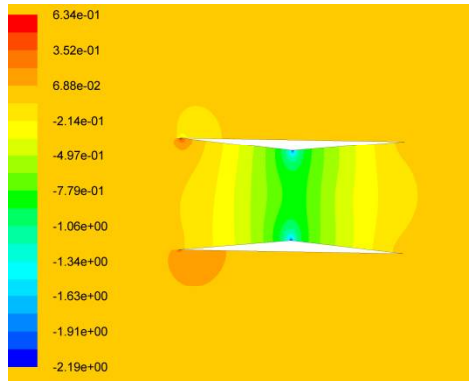Stagger 0.3c
($C_D = 0.0240$, $C_L = -0.1184$)

Stagger 0.4c
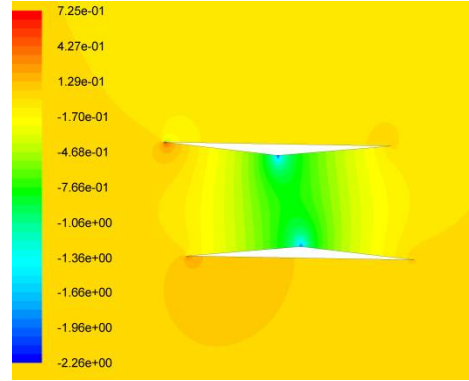($C_D = 0.0300$, $C_L = -0.1246$)

Stagger 0.5c
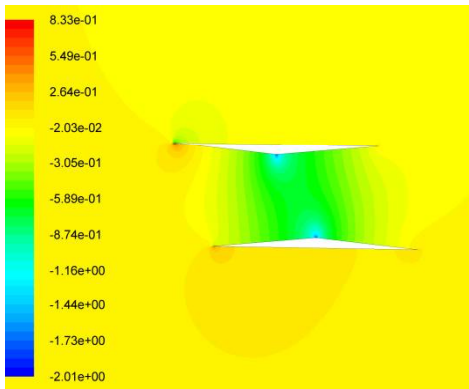($C_D = 0.0363$, $C_L = -0.1254$)

Figure A.6 C_p Variation for different Stagger distances at $M_\infty = 2.1$, $\alpha = 0°$.
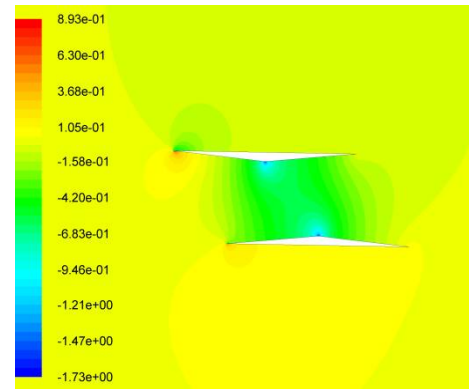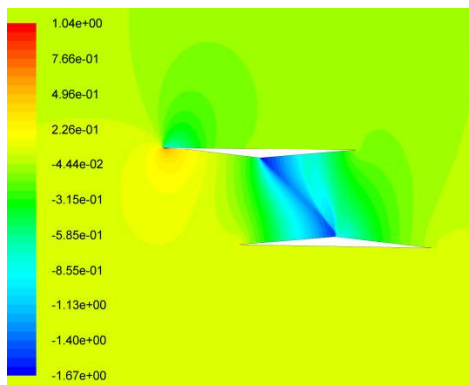
Busemannn
(C_D = 0.0210, C_L = 0.1410)

Stagger 0.1c
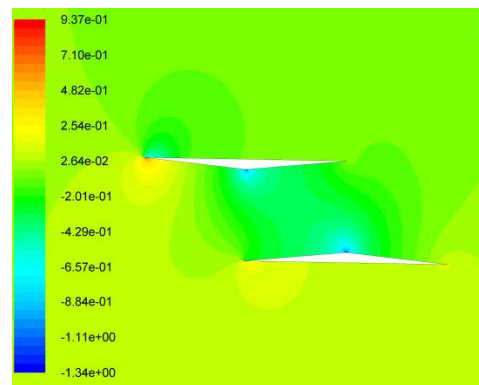(C_D = 0.0206, C_L = 0.1890)

Stagger 0.2c
(C_D = 0.0214, C_L = 0.2444)

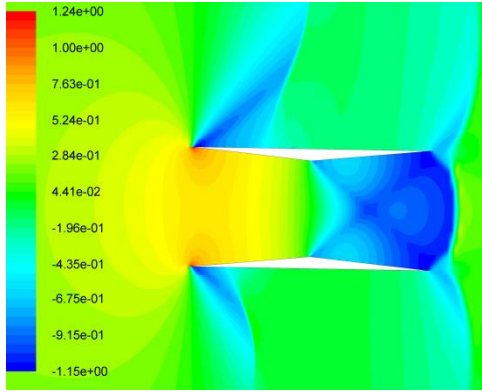Stagger 0.2c
(C_D = 0.0221, C_L = 0.2881)

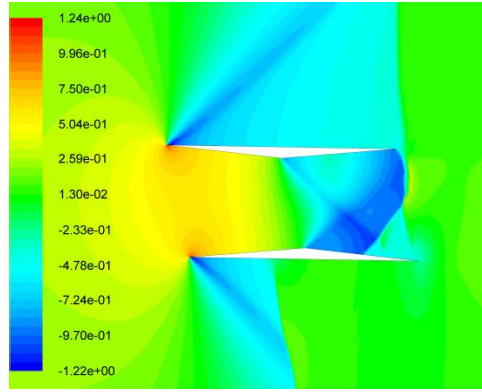Stagger 0.4c
(C_D = 0.0265, C_L = 0.3012)

Stagger 0.5c
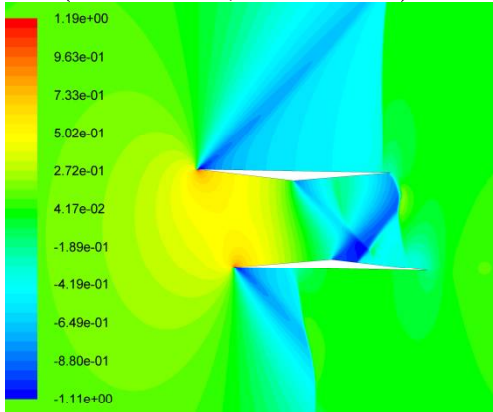(C_D = 0.0236, C_L = 0.3583)

Figure A.7 C_p Variation for different Stagger distances at M_∞ = 0.5, α = 1°.
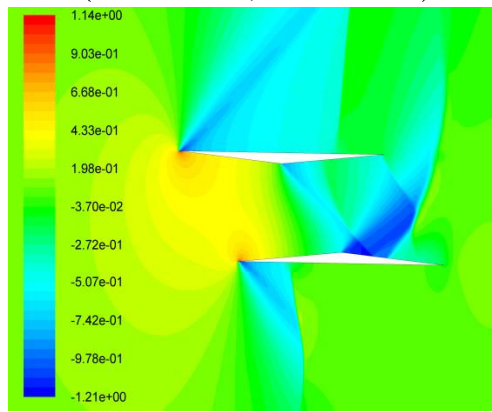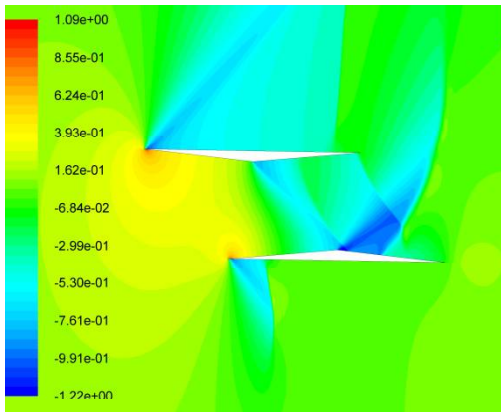
Busemann
($C_D = 0.1442$, $C_L = 0.1794$)

Stagger 0.1c
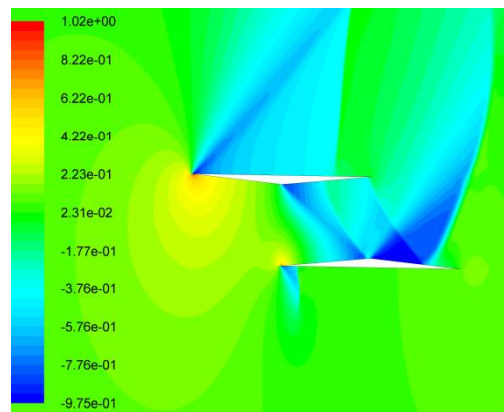($C_D = 0.1250$, $C_L = 0.4000$)

Stagger 0.2c
($C_D = 0.1037$, $C_L = 0.4525$)

Stagger 0.3c
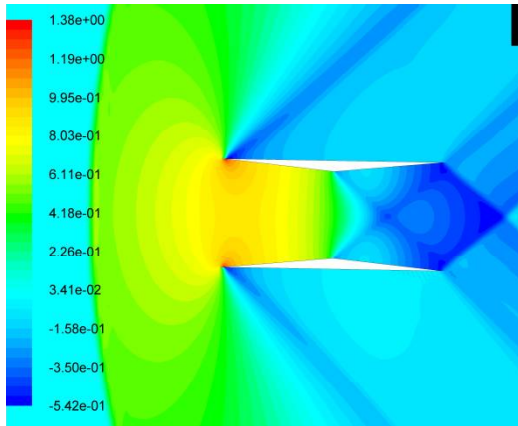($C_D = 0.0970$, $C_L = 0.5890$)

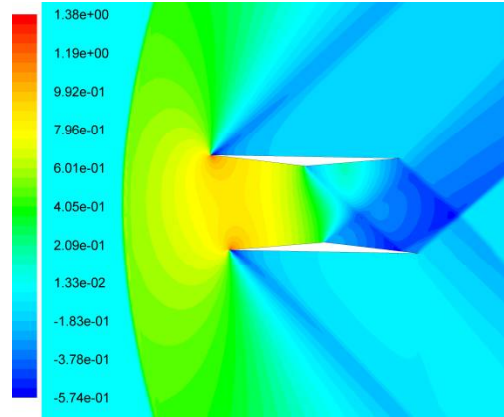Stagger 0.4c
($C_D = 0.0832$, $C_L = 0.6831$)

Stagger 0.5c
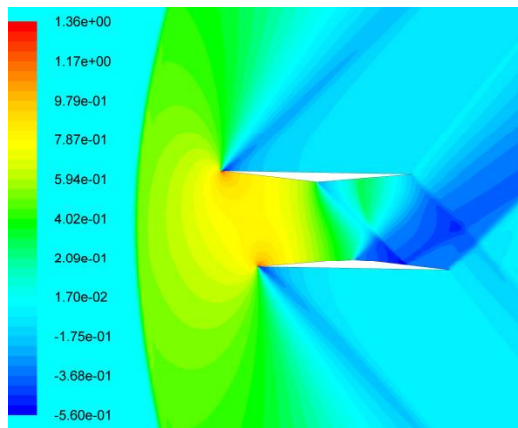($C_D = 0.0783$, $C_L = 0.8028$)

Figure A.8 C_p Variation for different Stagger distances at $M_\infty = 0.9$, $\alpha = 1°$.
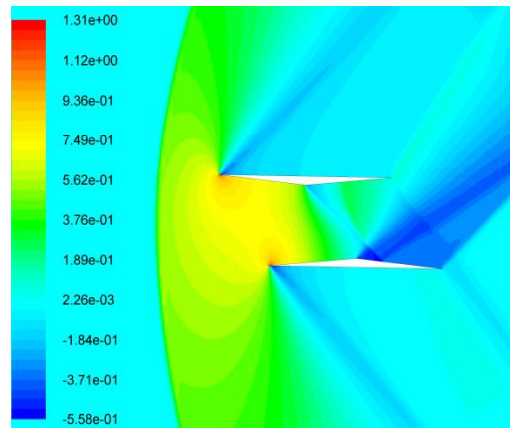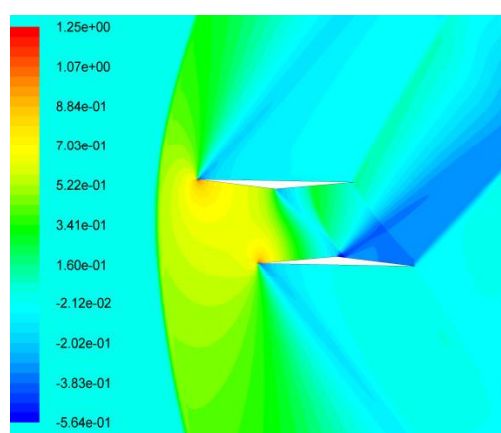
Busemann
($C_D = 0.1136$, $C_L = 0.0932$)
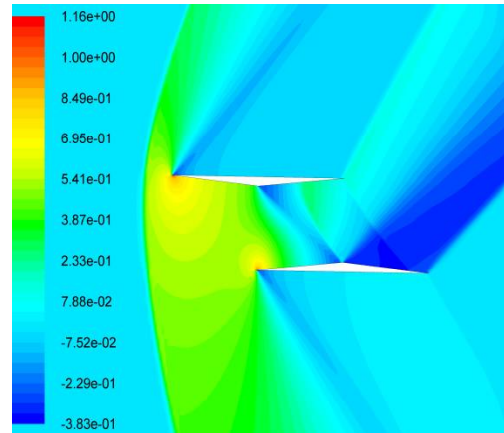
Stagger 0.1c
($C_D = 0.1108$, $C_L = 0.2420$)

Stagger 0.2c
($C_D = 0.1010$, $C_L = 0.3240$)

Stagger 0.3c
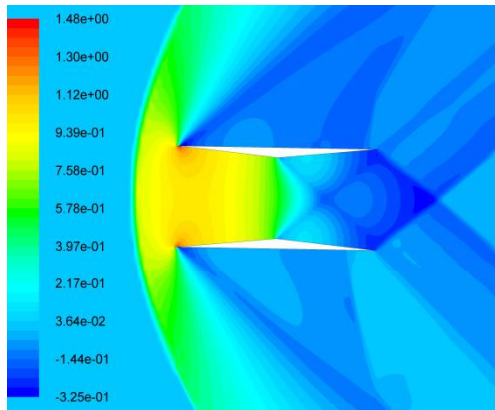($C_D = 0.0908$, $C_L = 0.3790$)

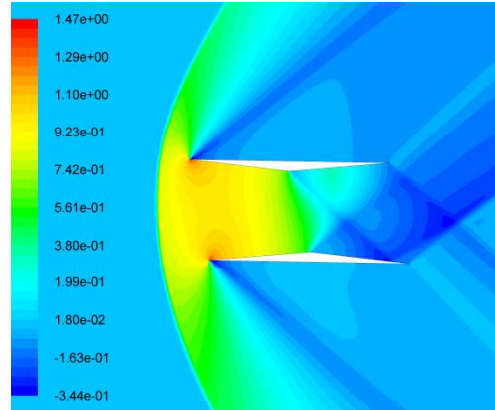Stagger 0.4c
($C_D = 0.0807$, $C_L = 0.4121$)

Stagger 0.5c
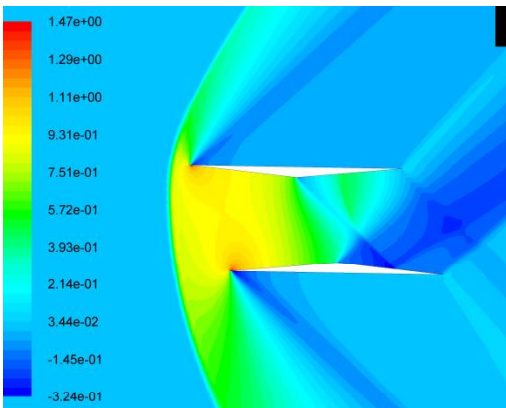($C_D = 0.0698$, $C_L = 0.4290$)

FigureA.9 C_p Variation for different Stagger distances at $M_\infty = 1.2$, $\alpha = 1°$.
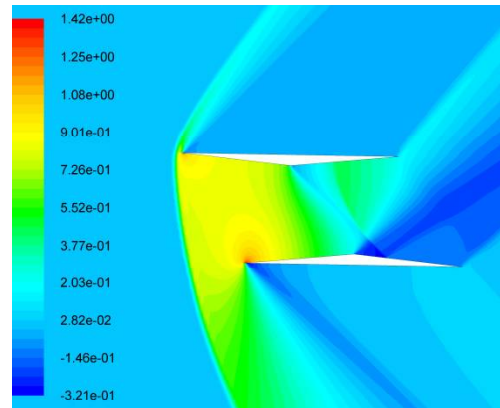
Busemann
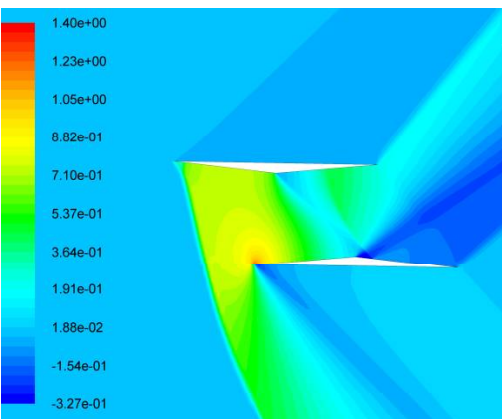(C_D = 0.1055, C_L = 0.0771)
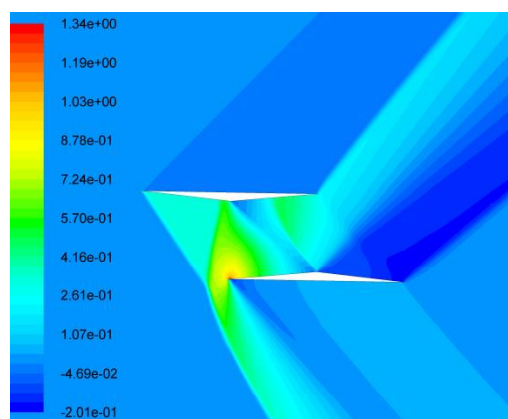
Stagger 0.1c
(C_D = 0.1025, C_L = 0.1973)

Stagger 0.2c
(C_D = 0.0930, C_L = 0.2720)

Stagger 0.3c
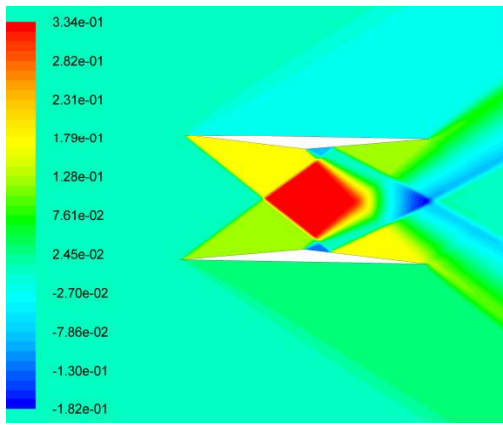(C_D = 0.0819, C_L = 0.3015)

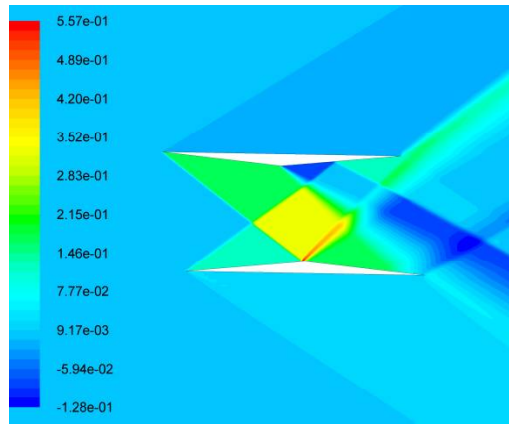Stagger 0.4c
(C_D = 0.0676, C_L = 0.2774)
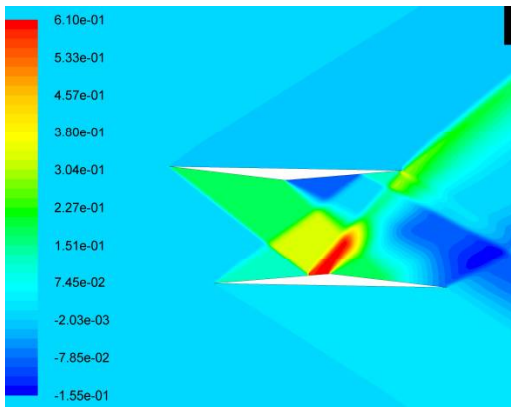
Stagger 0.5c
(C_D = 0.4245, C_L = 0.1835)

Figure A.10 C_p Variation for different Stagger distances at M_∞ = 1.4, α = 1°.
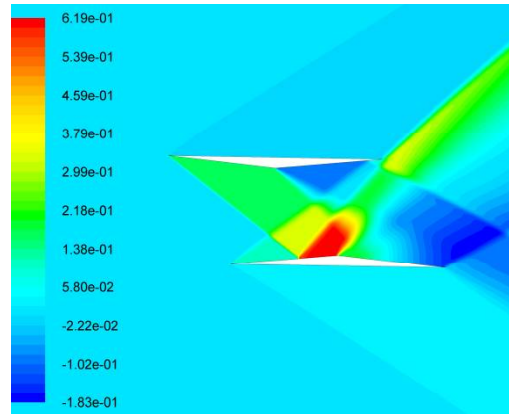
Busemann
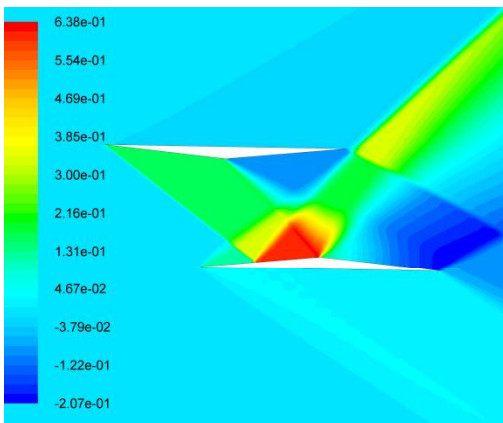($C_D = 0.0134$, $C_L = 0.0534$)
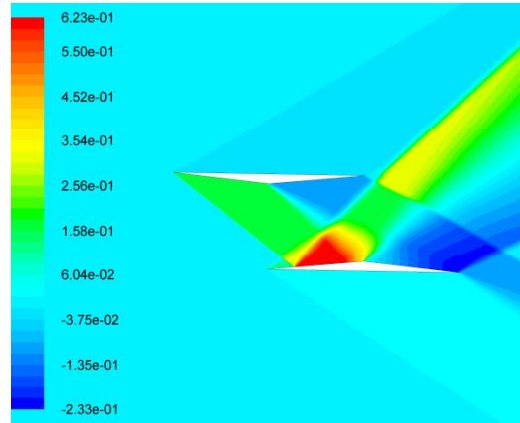
Stagger 0.1c
($C_D = 0.0140$, $C_L = 0.0035$)

Stagger 0.2c
($C_D = 0.0216$, $C_L = -0.0335$)

Stagger 0.3c
($C_D = 0.0314$, $C_L = -0.0683$)

Stagger 0.4c
($C_D = 0.0410$, $C_L = -0.0820$)

Stagger 0.5c
($C_D = 0.0480$, $C_L = -0.0773$)

Figure A.11 C_p Variation for different Stagger distances at $M_\infty = 1.9$, $\alpha = 1°$.

Busemann
(C_D = 0.0170, C_L = 0.0539)

Stagger 0.1c
(C_D = 0.0155, C_L = 0.0012)

Stagger 0.2c
(C_D = 0.0157, C_L = -0.0343)

Stagger 0.3c
(C_D = 0.0223, C_L = -0.0620)

Stagger 0.4c
(C_D = 0.0288, C_L = -0.0711)
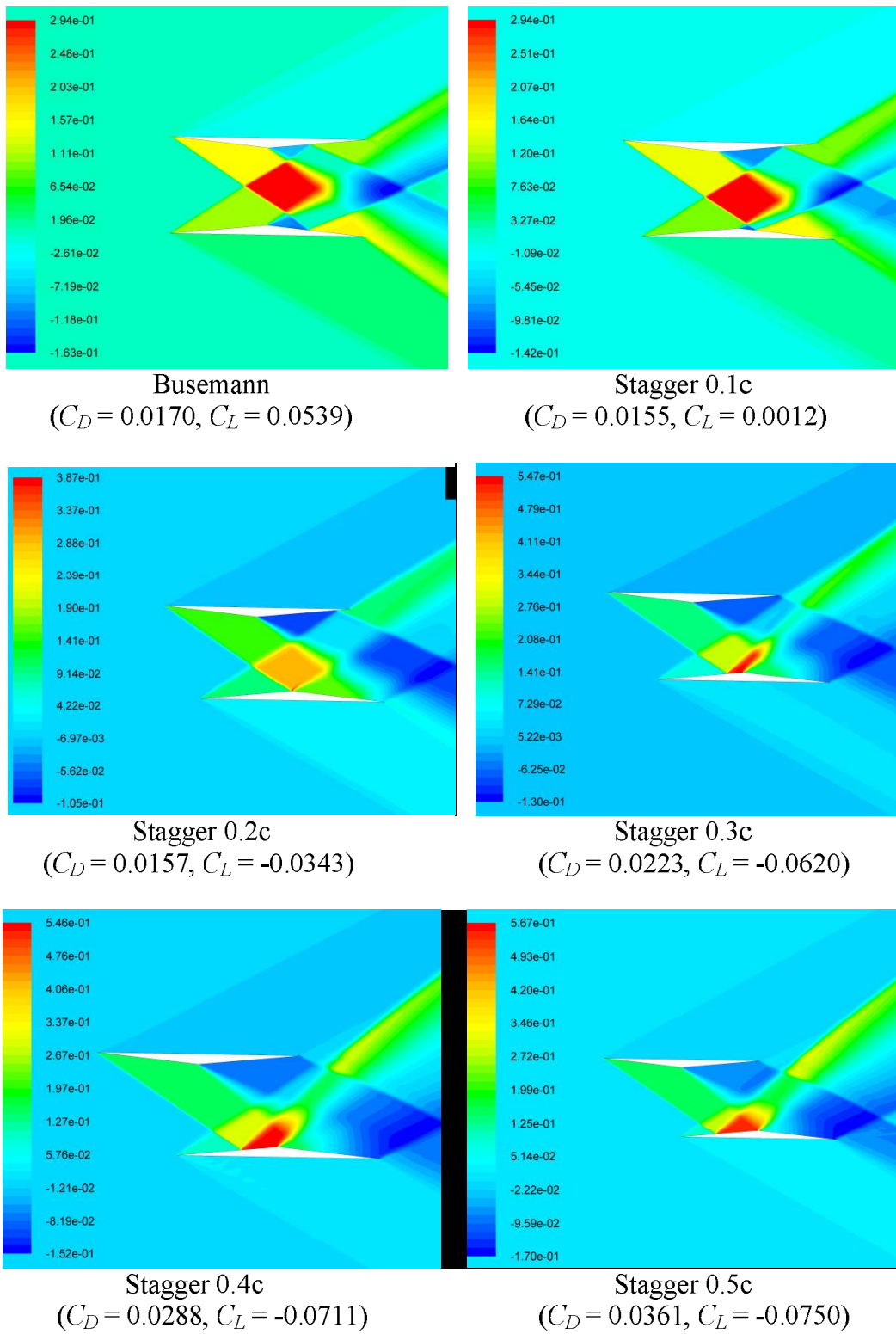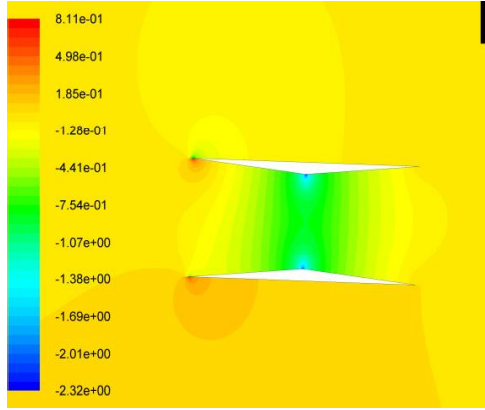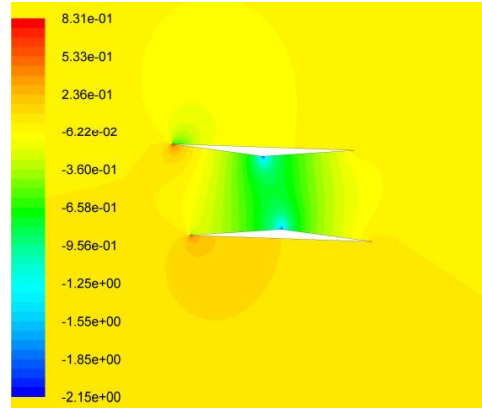
Stagger 0.5c
(C_D = 0.0361, C_L = -0.0750)
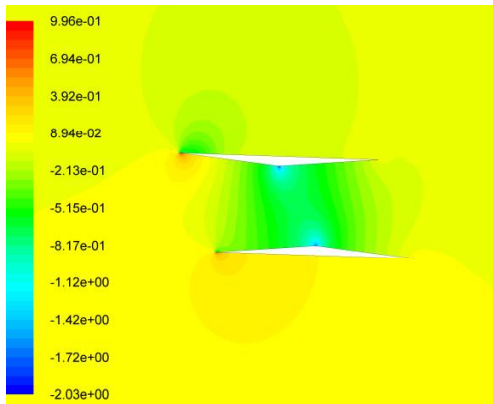
Figure A.12 C_p Variation for different Stagger distances at M_∞ = 2.1, α = 1°.
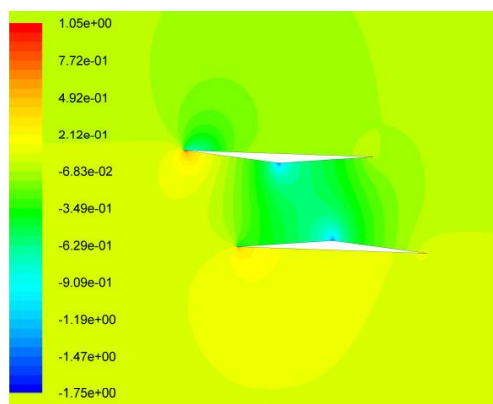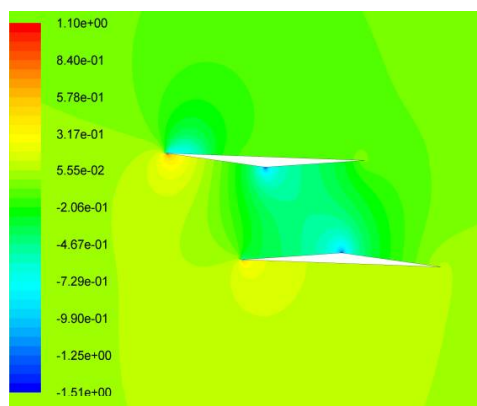
Busemann
(C_D = 0.0250, C_L = 0.2860)

Stagger 0.1c
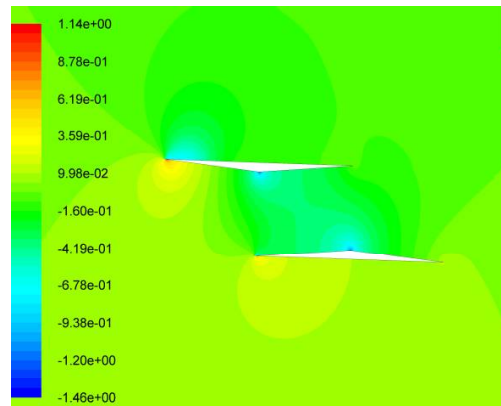(C_D = 0.0277, C_L = 0.3365)

Stagger 0.2c
(C_D = 0.0300, C_L = 0.4007)

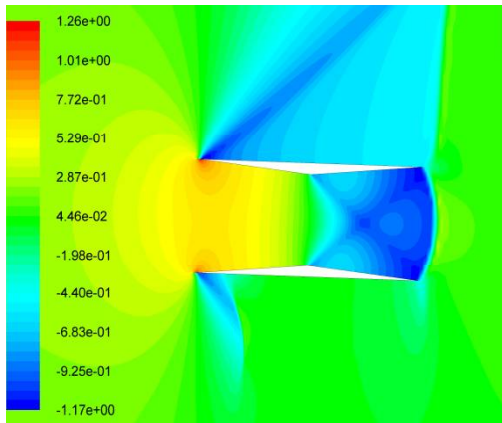Stagger 0.3c
(C_D = 0.0321, C_L = 0.4487)

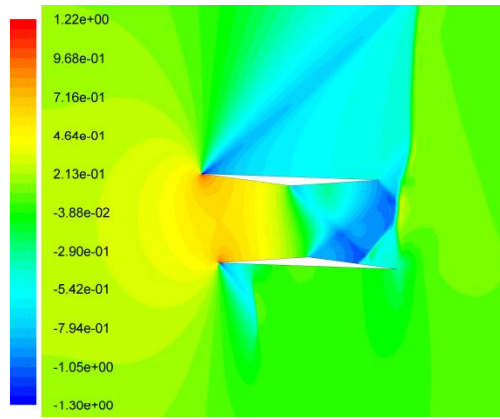Stagger 0.4c
(C_D = 0.0345, C_L = 0.4980)

Stagger 0.5c
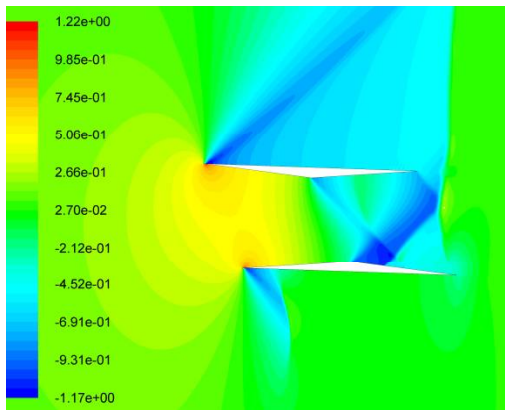(C_D = 0.0364, C_L = 0.5383)

Figure A.13 C_p Variation for different Stagger distances at M_∞ = 0.5, α = 2°.
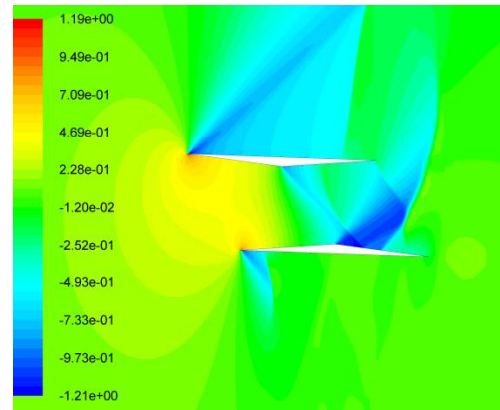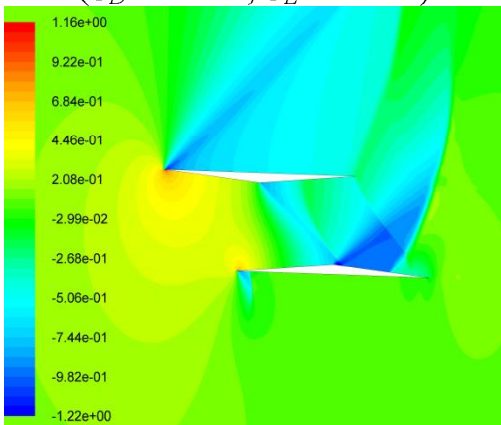
Busemann
($C_D = 0.1602$, $C_L = 0.5392$)

Stagger 0.1c
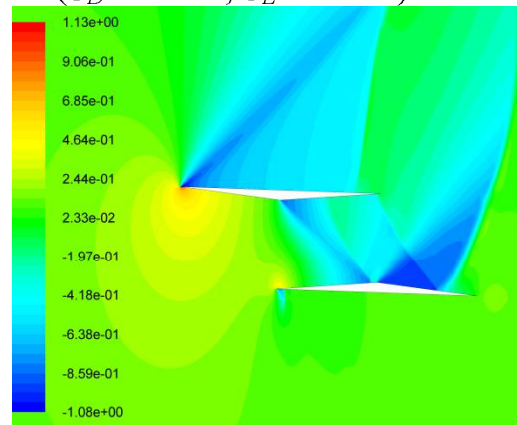($C_D = 0.1425$, $C_L = 0.6332$)

Stagger 0.2c
($C_D = 0.1234$, $C_L = 0.6782$)
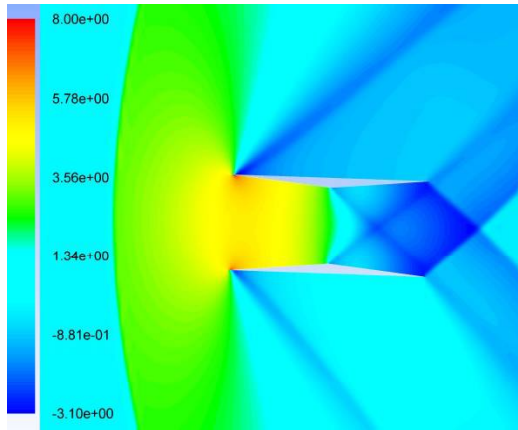
Stagger 0.3c
($C_D = 0.1158$, $C_L = 0.7710$)

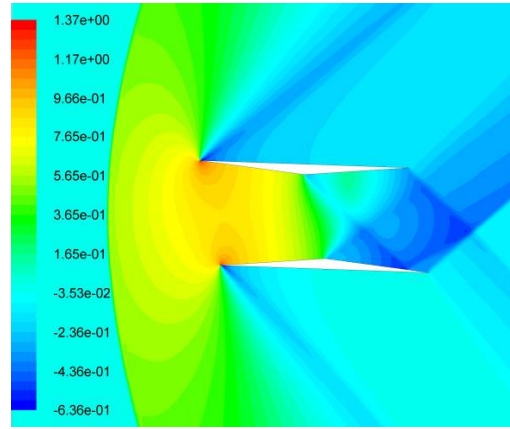Stagger 0.4c
($C_D = 0.1130$, $C_L = 0.9544$)

Stagger 0.5c
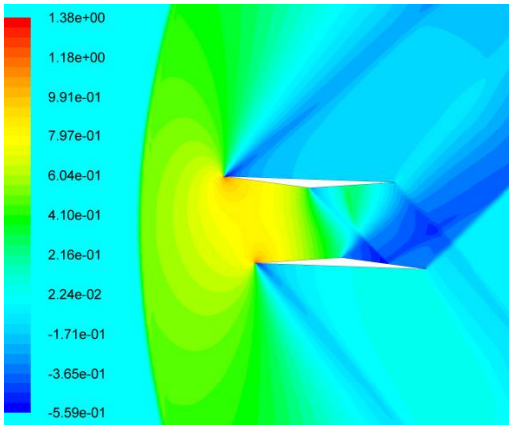($C_D = 0.1028$, $C_L = 1.0063$)

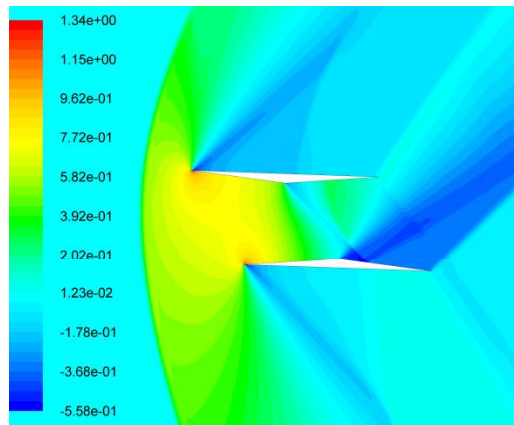Figure A.14 C_p Variation for different Stagger distances at $M_\infty = 0.9$, $\alpha = 2°$.
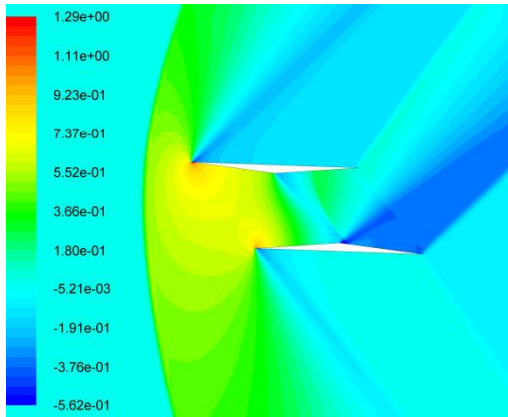
Busemann
($C_D = 0.1035$, $C_L = 0.2257$)
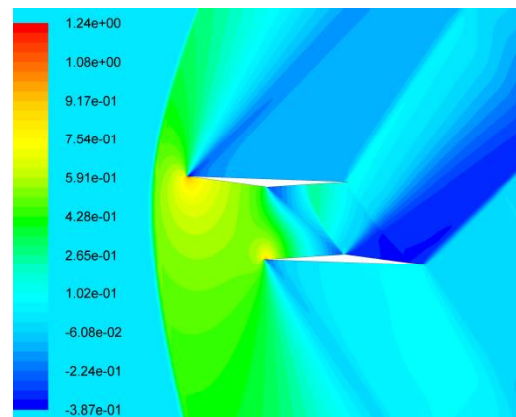
Stagger 0.1c
($C_D = 0.1180$, $C_L = 0.3430$)

Stagger 0.2c
($C_D = 0.1105$, $C_L = 0.4300$)

Stagger 0.3c
($C_D = 0.1008$, $C_L = 0.4578$)

Stagger 0.4c
($C_D = 0.0922$, $C_L = 0.5121$)

Stagger 0.5c
($C_D = 0.0835$, $C_L = 0.5476$)

Figure A.15 C_p Variation for different Stagger distances at $M_\infty = 1.2$, $\alpha = 2°$.

Busemann
($C_D = 0.1189$, $C_L = 0.2017$)

Stagger 0.1c
($C_D = 0.1085$, $C_L = 0.2882$)

Stagger 0.2c
($C_D = 0.1008$, $C_L = 0.3502$)

Stagger 0.3c
($C_D = 0.0907$, $C_L = 0.3830$)

Stagger 0.4c
($C_D = 0.0781$, $C_L = 0.3812$)

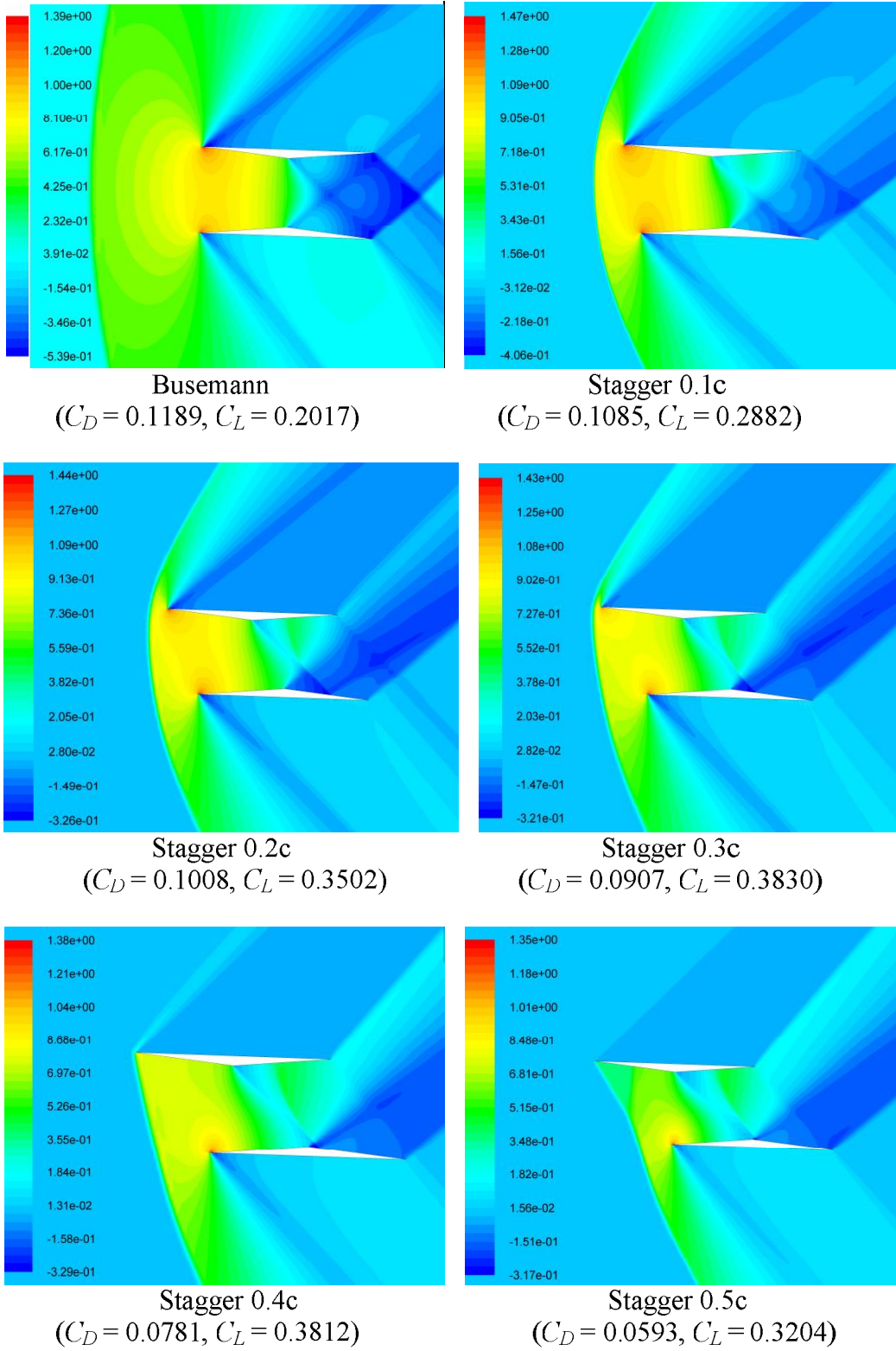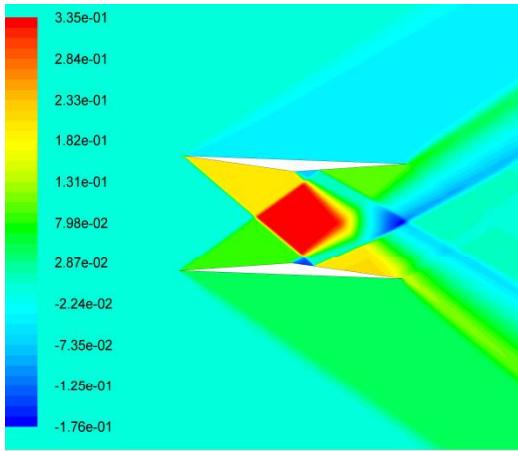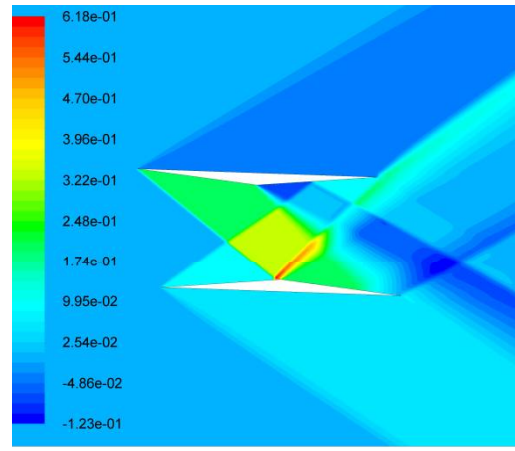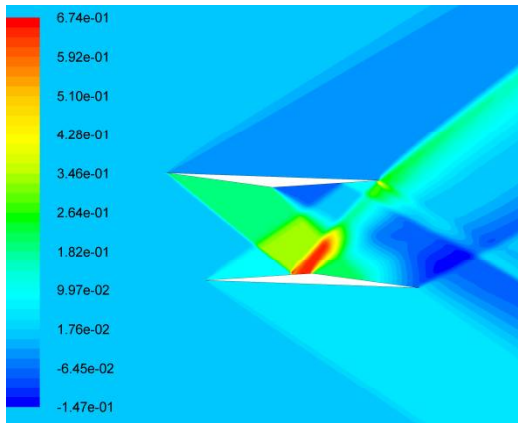Stagger 0.5c
($C_D = 0.0593$, $C_L = 0.3204$)

Figure A.16 C_p Variation for different Stagger distances at $M_\infty = 1.4$, $\alpha = 2°$.
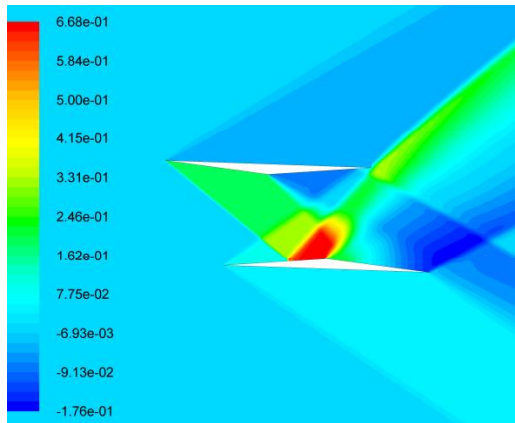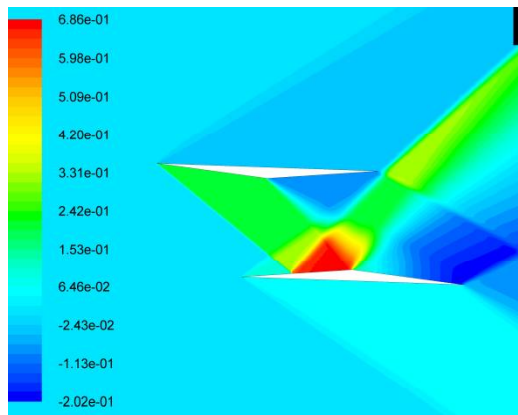
Busemann
($C_D = 0.0162$, $C_L = 0.1067$)

Stagger 0.1c
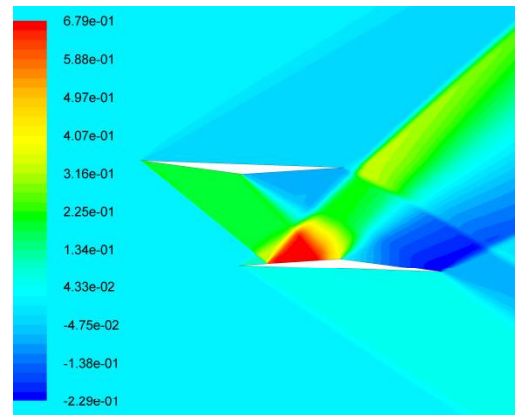($C_D = 0.0163$, $C_L = 0.0561$)

Stagger 0.2c
($C_D = 0.0230$, $C_L = 0.0260$)

Stagger 0.3c
($C_D = 0.0330$, $C_L = -0.0095$)

Stagger 0.4c
($C_D = 0.0430$, $C_L = -0.0236$)

Stagger 0.5c
($C_D = 0.0502$, $C_L = -0.0215$)

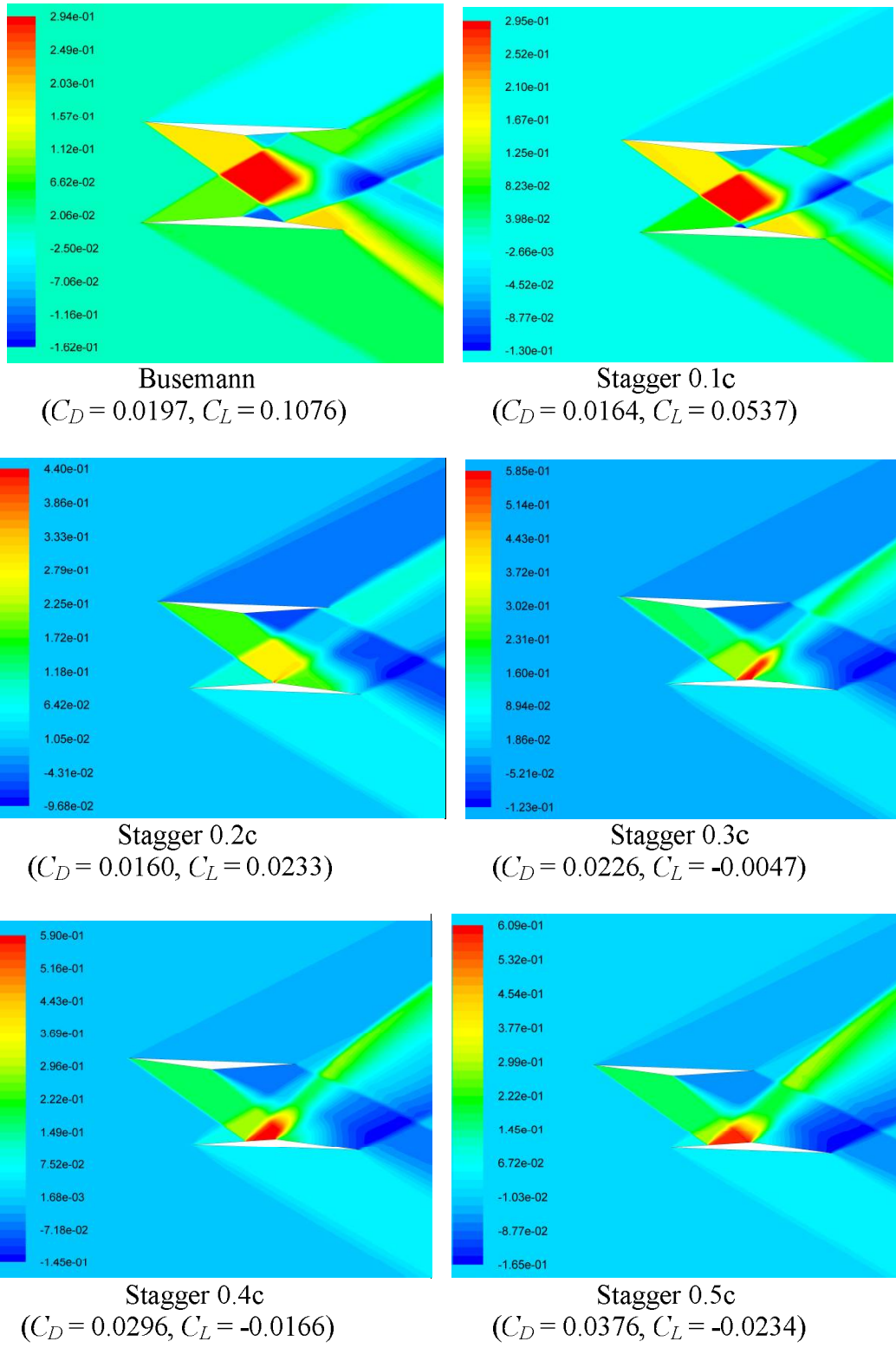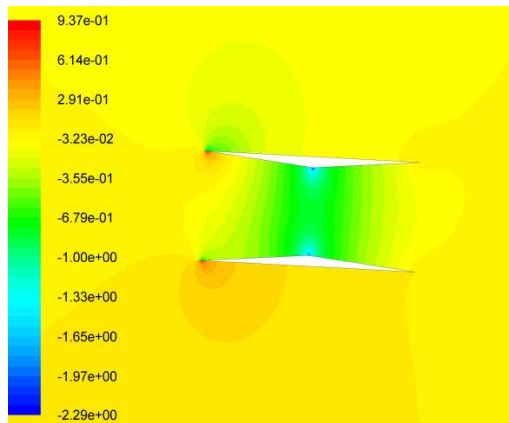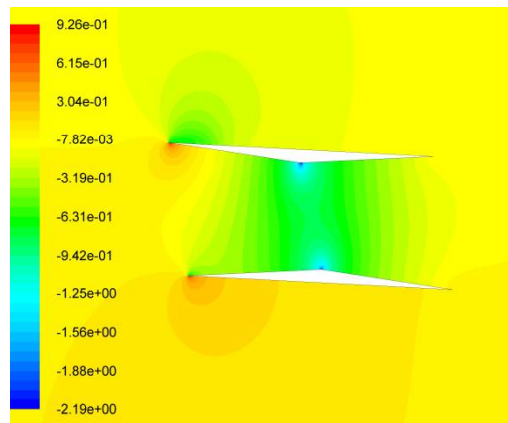Figure A.17 C_p Variation for different Stagger distances at $M_\infty = 1.9$, $\alpha = 2°$.

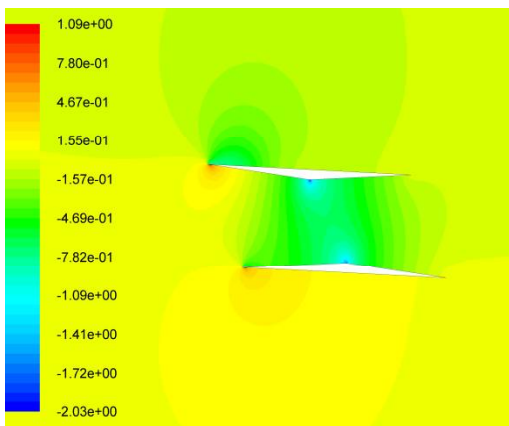Busemann
(C_D = 0.0197, C_L = 0.1076)

Stagger 0.1c
(C_D = 0.0164, C_L = 0.0537)

Stagger 0.2c
(C_D = 0.0160, C_L = 0.0233)

Stagger 0.3c
(C_D = 0.0226, C_L = -0.0047)

Stagger 0.4c
(C_D = 0.0296, C_L = -0.0166)

Stagger 0.5c
(C_D = 0.0376, C_L = -0.0234)

Figure A.18 C_p Variation for different Stagger distances at M_∞ = 2.1, α = 2º.
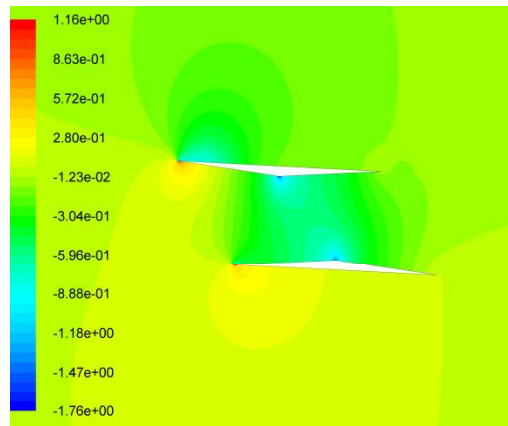
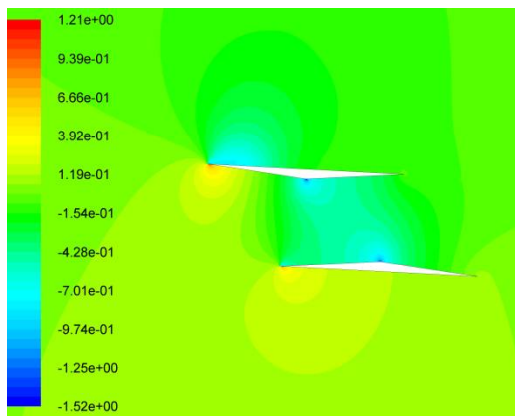Busemann
($C_D = 0.0355$, $C_L = 0.4251$)
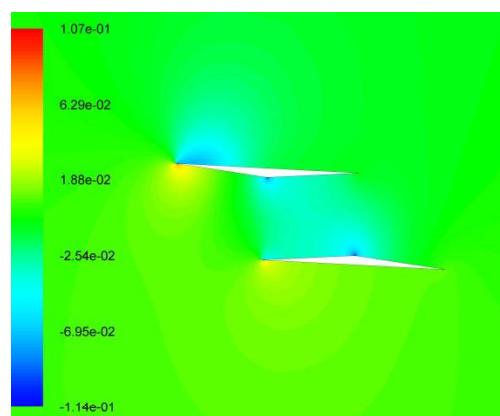
Stagger 0.1c
($C_D = 0.0385$, $C_L = 0.4695$)

Stagger 0.2c
($C_D = 0.0438$, $C_L = 0.5597$)

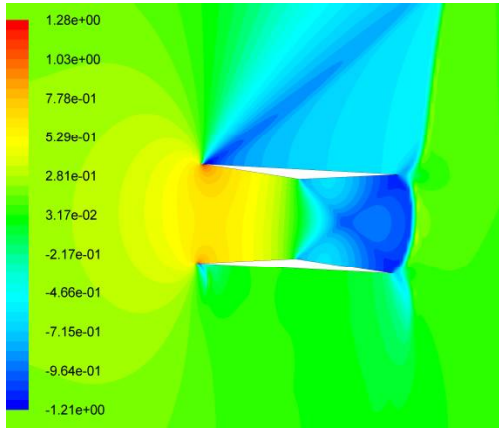Stagger 0.3c
($C_D = 0.0482$, $C_L = 0.6202$)

Stagger 0.4c
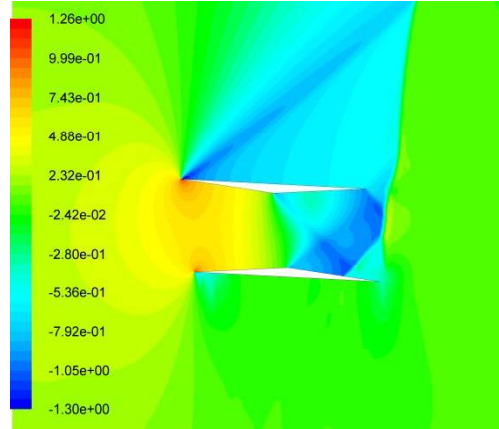($C_D = 0.0522$, $C_L = 0.6772$)

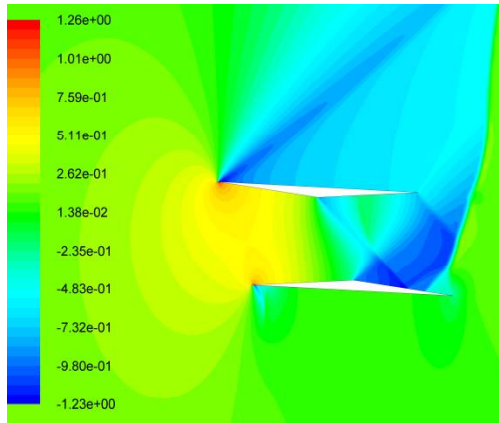Stagger 0.5c
($C_D = 0.0532$, $C_L = 0.8073$)

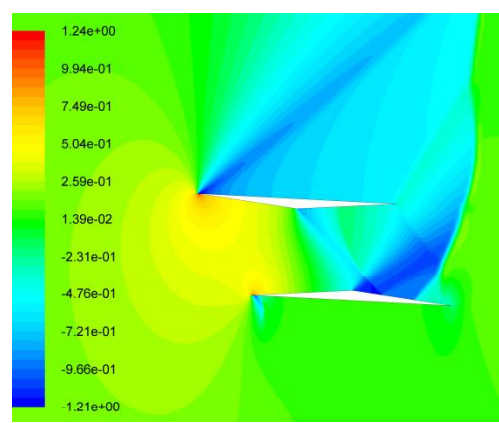Figure A.19 C_p Variation for different Stagger distances at $M_\infty = 0.5$, $\alpha = 3°$.

Busemann
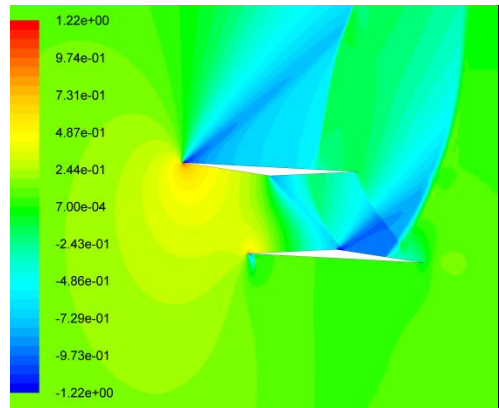($C_D = 0.1782$, $C_L = 0.6954$)
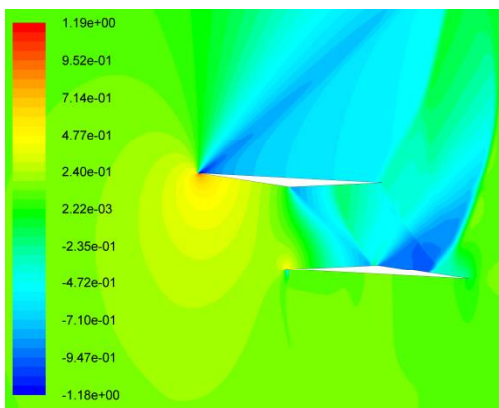
Stagger 0.1c
($C_D = 0.1637$, $C_L = 0.7579$)

Stagger 0.2c
($C_D = 0.1632$, $C_L = 0.9777$)

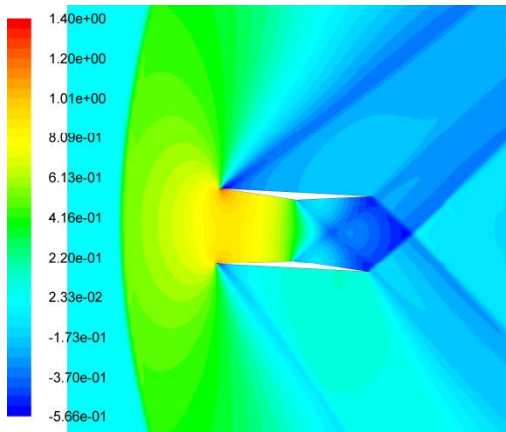Stagger 0.3c
($C_D = 0.1497$, $C_L = 1.0360$)

Stagger 0.4c
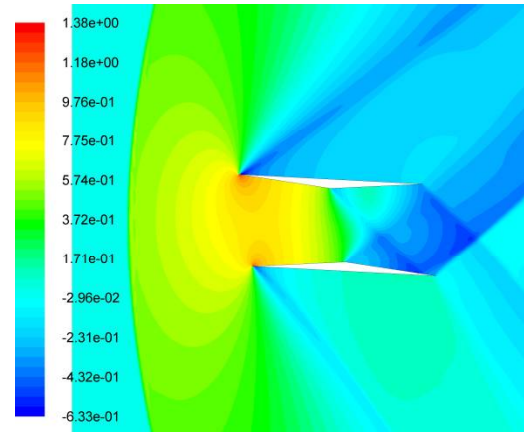($C_D = 0.1358$, $C_L = 1.0935$)

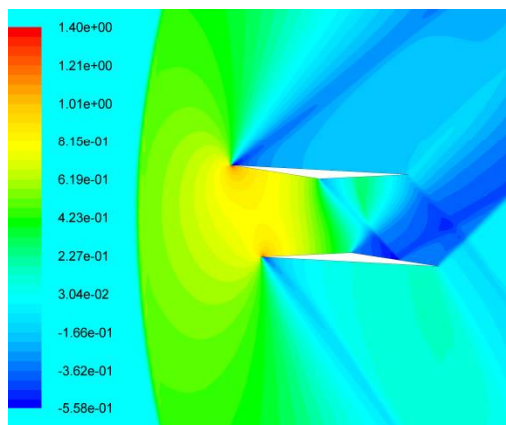Stagger 0.5c
($C_D = 0.1325$, $C_L = 1.1861$)

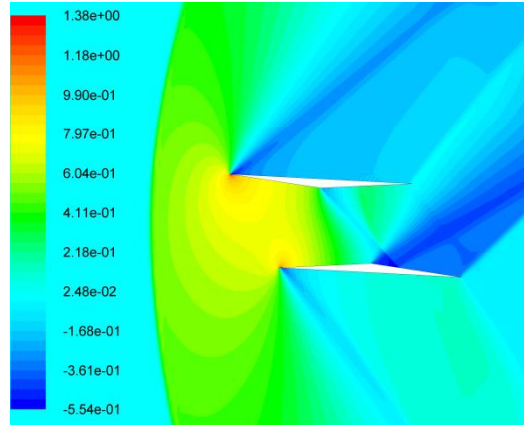FigureA.20 C_p Variation for different Stagger distances at $M_\infty = 0.9$, $\alpha = 3°$.

Busemann
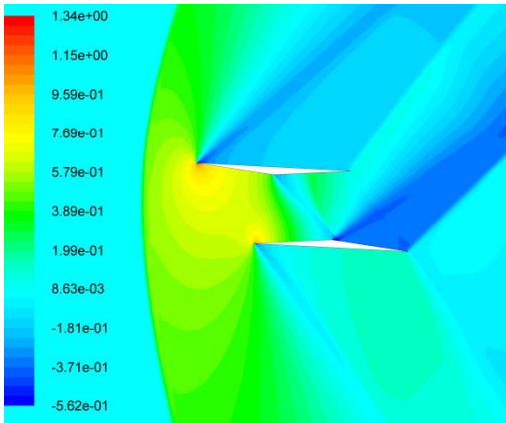($C_D = 0.1280$, $C_L = 0.3078$)

Stagger 0.1c
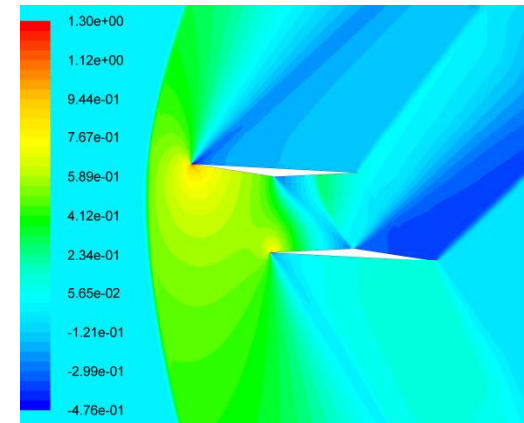($C_D = 0.1304$, $C_L = 0.4433$)

Stagger 0.2c
($C_D = 0.1240$, $C_L = 0.5390$)

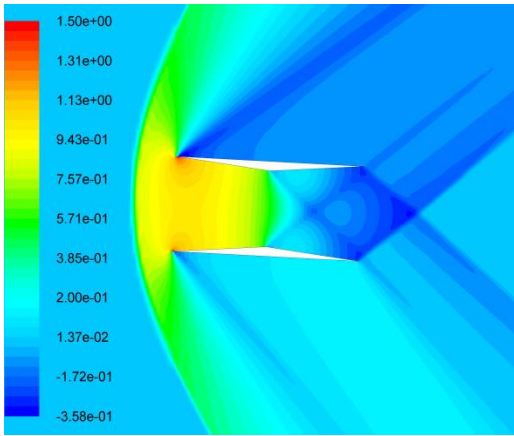Stagger 0.3c
($C_D = 0.1161$, $C_L = 0.5927$)

Stagger 0.4c
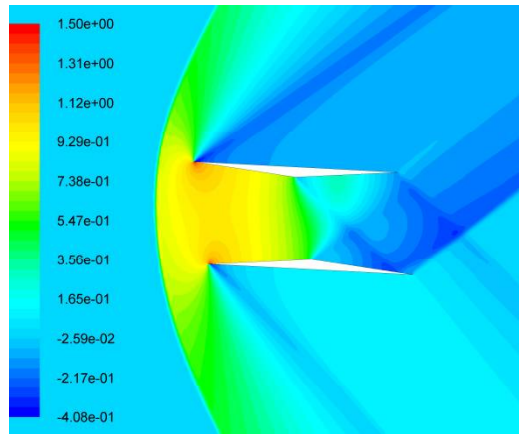($C_D = 0.1082$, $C_L = 0.6361$)

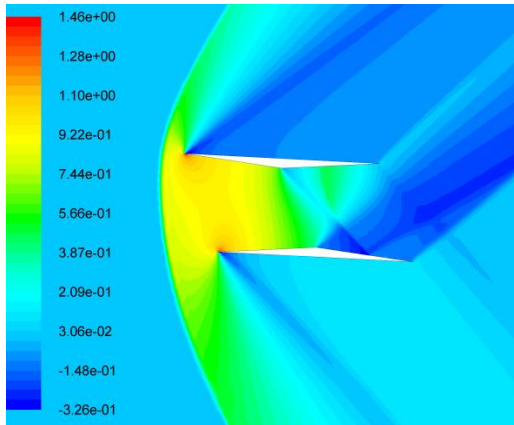Stagger 0.5c
($C_D = 0.1007$, $C_L = 0.6646$)

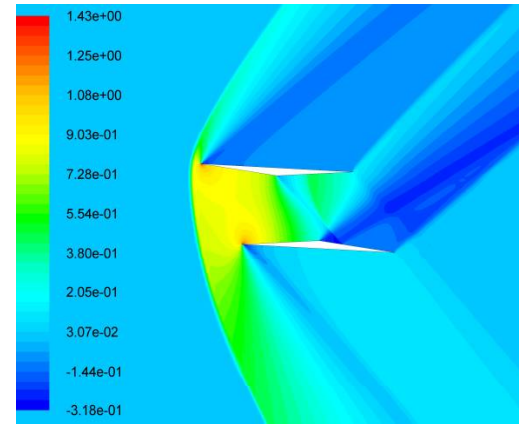Figure A.21 C_p Variation for different Stagger distances at $M_\infty = 1.2$, $\alpha = 3°$.
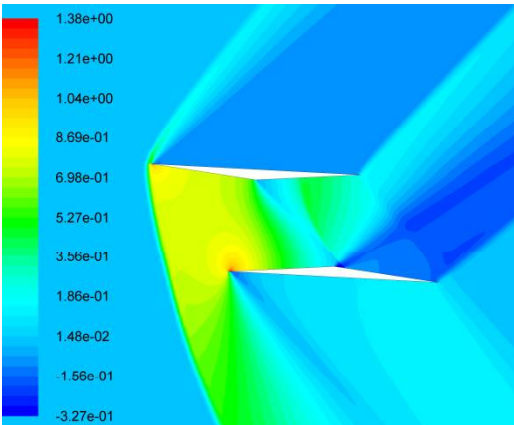
Busemann
($C_D = 0.1161$, $C_L = 0.2286$)

Stagger 0.1c
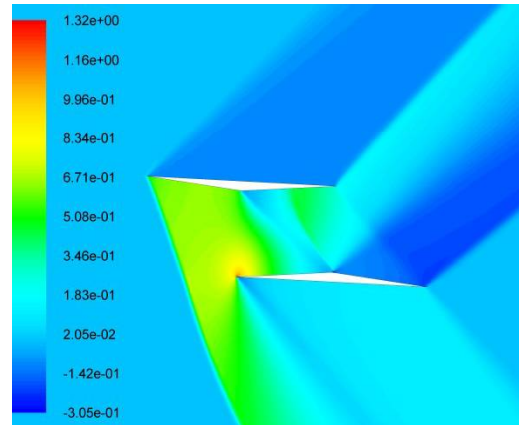($C_D = 0.1188$, $C_L = 0.3572$)

Stagger 0.2c
($C_D = 0.1114$, $C_L = 0.4287$)

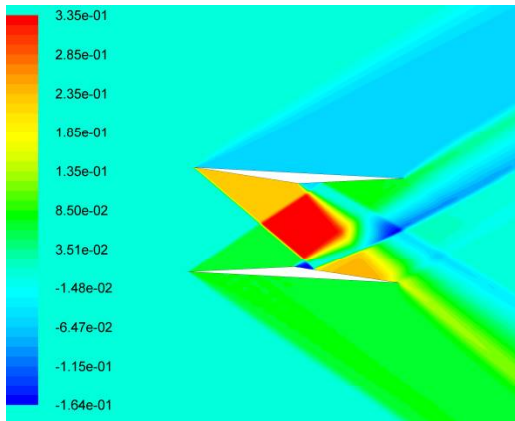Stagger 0.3c
($C_D = 0.1026$, $C_L = 0.4651$)

Stagger 0.4c
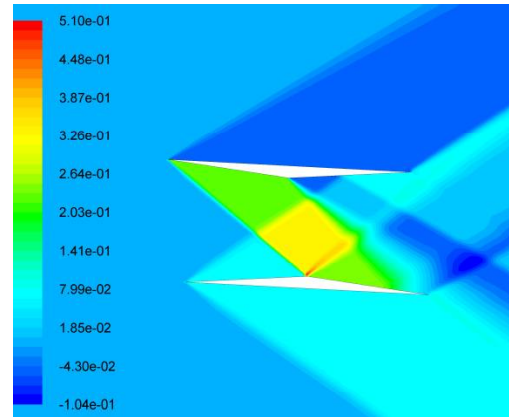($C_D = 0.0914$, $C_L = 0.4731$)

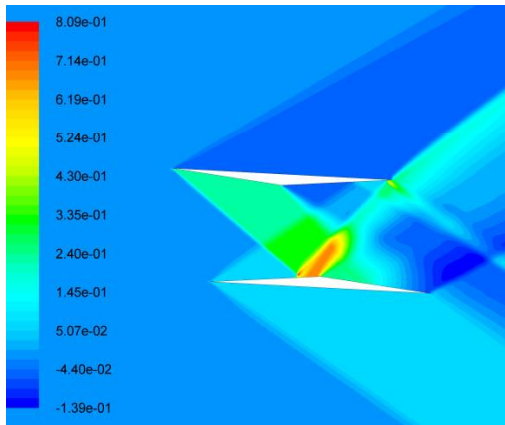Stagger 0.5c
($C_D = 0.0878$, $C_L = 0.4850$)

Figure A.22 C_p Variation for different Stagger distances at $M_\infty = 1.4$, $\alpha = 3°$.
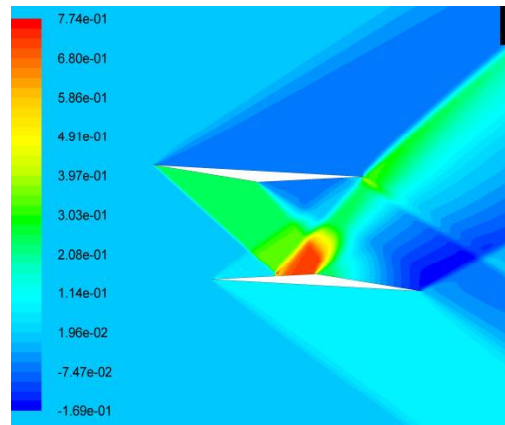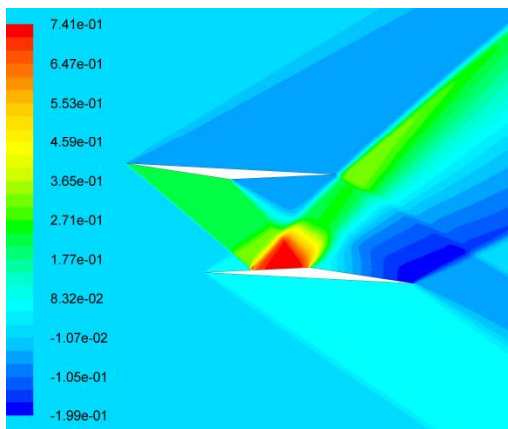
Busemann
(C_D = 0.0208, C_L = 0.1602)

Stagger 0.1c
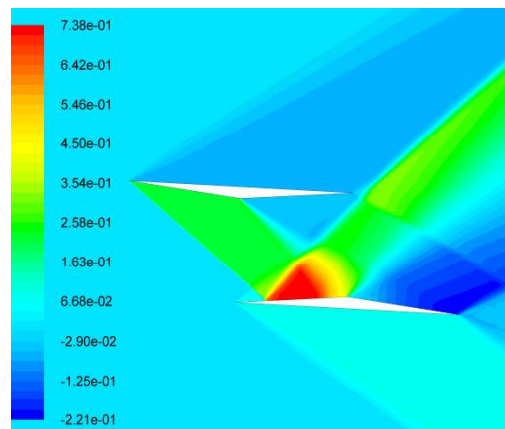(C_D = 0.0186, C_L = 0.1203)

Stagger 0.2c
(C_D = 0.0265, C_L = 0.0881)

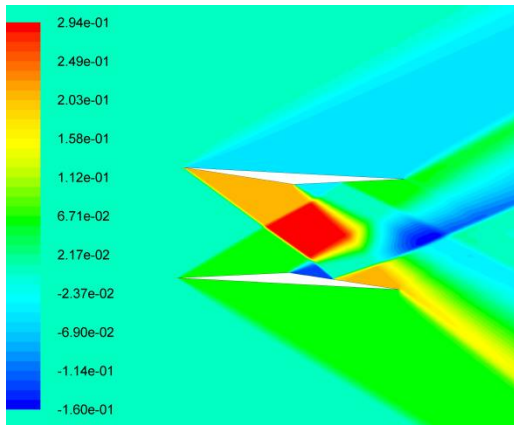Stagger 0.3c
(C_D = 0.0368, C_L = 0.0518)

Stagger 0.4c
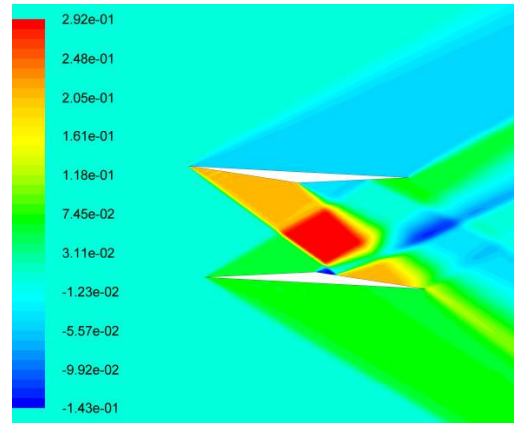(C_D = 0.0473, C_L = 0.0353)

Stagger 0.5c
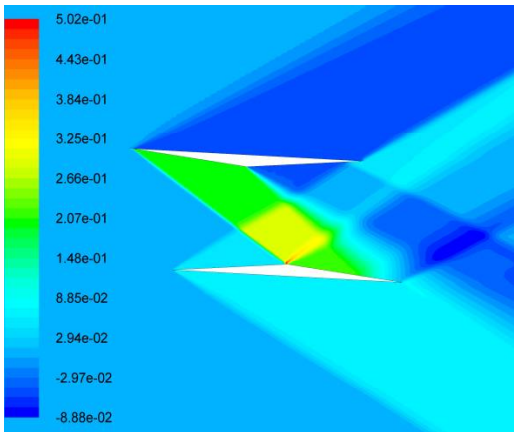(C_D = 0.0544, C_L = 0.0348)

Figure A.23 C_p Variation for different Stagger distances at M_∞ = 1.9, α = 3°.
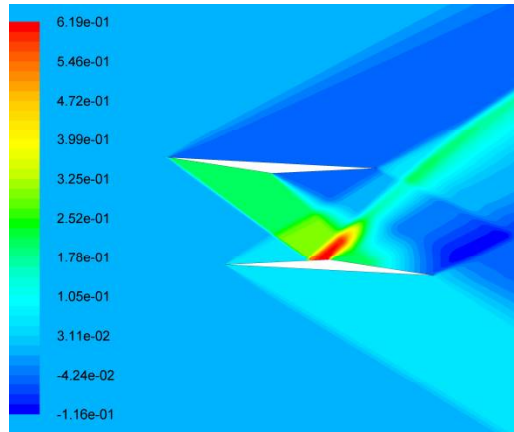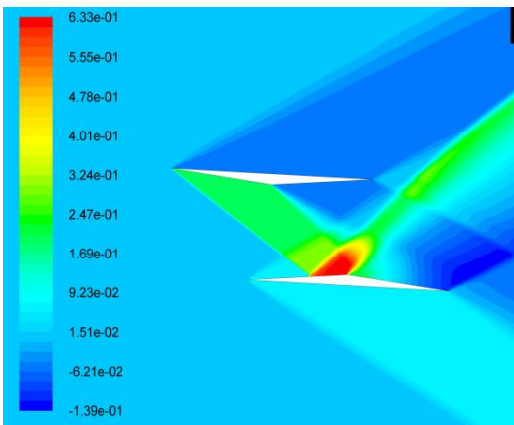
Busemann
(C_D = 0.0243, C_L = 0.1610)

Stagger 0.5c
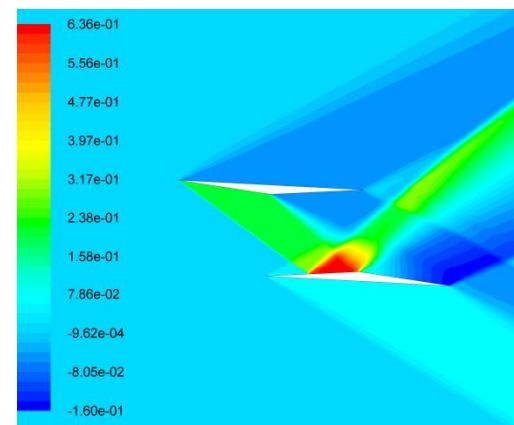(C_D = 0.0201, C_L = 0.1162)

Stagger 0.2c
(C_D = 0.0184, C_L = 0.0814)

Stagger 0.3c
(C_D = 0.0251, C_L = 0.0530)

Stagger 0.4c
(C_D = 0.0328, C_L = 0.0382)

Stagger 0.5c
(C_D = 0.0410, C_L = 0.0290)

Figure A.24 C_p Variation for different Stagger distances at M_∞ = 2.1, α = 3°.