# Supermarine Swift FR5 aerodynamic model

 $Built\ using\ VSPAERO;\ Aerodynamic\ Datum\ (6,0,-0.02)M,\ 2020-06-23\ 16:46:\ Richard\ Harrison,\ rjh@zaretto.com,\ ZDAT/AED/2019/09-09$ 

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AeroDetail=High, ExternalTanks, Flaps, Gear, GroundEffect, Mach, WakeIterations=3

# Model summary

CYRB         alpha,beta         DRAG         BASE DRAG           CYXDADMN         mach,alpha         DRAG         DRAG CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CYXDADMN         mach,alpha         DRAG         DRAG CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION           CYXDAD         alpha,beta         DRAG         DRAG DIXCREMENT DUE TO ALLERON DEFLECTION           CYXDAD         alpha,beta         DRAG         DRAG DIXCREMENT DUE TO GARA           CYXDAD         alpha,beta         DRAG         DRAG INCREMENT DUE TO GEAR           CYXDAD         mach,alpha         DRAG         DRAG INCREMENT DUE TO GROUND EFFECT           CYXDAD         mach,alpha         DRAG         DRAG INCREMENT DUE TO MACH           CYXDAD         mach,alpha         LIFT         BSE LIFT           CYZDADNN         mach,alpha         LIFT         BSE LIFT           CYZDADNN         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CYZDADNN         mach,alpha         LIFT         LIFT INCREMENT DUE TO ALLERON DEFLECTION           CYZDAD         mach,alpha         LIFT         LIFT INCREMENT DUE TO TALPS           CYZDAD         alpha,beta         LIFT         LIFT INCREMENT DUE TO ALLERON DEFLECTION           CYZDAD         mach	Dependent variable	Independent variables	Axis	Description
CEXADRONN         mach, alpha         DRAG         DRAG CHANGE DUE TO MACH DUE TO RUDDER DERECTION           CEXDAD         alpha, beta         DRAG         DRAG INCREMENT DUE TO ALLERON DEPLECTION           CEXFLAPS         alpha, beta         DRAG         DRAG INCREMENT DUE TO GLAPS           CEXCEAR         alpha, beta         DRAG         DRAG INCREMENT DUE TO GROUND EFFECT           CEXDAD         mach, alpha         DRAG         DRAG INCREMENT DUE TO GROUND EFFECT           CEXDRO         alpha, deva toor         LIFT         BASE LIFT           CEZDADNN         mach, alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CEZDRONN         mach, alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION           CEZDRONN         mach, alpha         LIFT         LIFT INCREMENT DUE TO GLAPS           CEZDRO         alpha, beta         LIFT         LIFT INCREMENT DUE TO GRAR           CEZDRO         alpha, beta         LIFT         LIFT INCREMENT DUE TO GROUND EFFECT           CEZDRO         hmrc, alpha         LIFT INCREMENT DUE TO GROUND EFFECT           CEZDRO         alpha, beta         LIFT INCREMENT DUE TO GROUND EFFECT           CEZDRO         alpha, beta         LIFT INCREMENT DUE TO GROUND EFFECT           CEYANI         <	CFXB	alpha,beta	DRAG	BASE DRAG
CEXIDAD alpha, beta DRAG DRAG INCREMENT DUE TO ALLERON DEFLECTION  CEXIFLAPS alpha, beta DRAG DRAG INCREMENT DUE TO FLAPS  CEXIGEAR alpha, beta DRAG DRAG INCREMENT DUE TO GEAR  CEXIDGE hmrc, alpha DRAG DRAG INCREMENT DUE TO GROUND EFFECT  CEXIMI mach, alpha DRAG DRAG INCREMENT DUE TO GROUND EFFECT  CEXIMI mach, alpha DRAG DRAG INCREMENT DUE TO MACH  CEXIDRD alpha, beta DRAG DRAG INCREMENT DUE TO MACH  CEXIDRD alpha, beta DRAG DRAG INCREMENT DUE TO MACH DUE TO ALLERON DEFLECTION  CEZDADMIN mach, alpha LIFT LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CEZDADMIN mach, alpha LIFT LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CEZDAD alpha, beta LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION  CEZDAD alpha, beta LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION  CEZDAD alpha, beta LIFT LIFT INCREMENT DUE TO GEAR  CEZDAG alpha, beta LIFT LIFT INCREMENT DUE TO GEAR  CEZDAG alpha, beta LIFT LIFT INCREMENT DUE TO GROUND EFFECT  CEZMN mach, alpha LIFT LIFT INCREMENT DUE TO MACH  CEZDAD alpha, beta LIFT LIFT INCREMENT DUE TO MACH  CEZDAG alpha, beta LIFT LIFT INCREMENT DUE TO MACH  CEZDAG alpha, beta LIFT LIFT INCREMENT DUE TO MACH  CEZDAG alpha, beta LIFT LIFT INCREMENT DUE TO MACH  CEZDAG alpha, beta LIFT LIFT INCREMENT DUE TO MACH DUE TO MACH DUE TO ALLERON DEFLECTION  CMMQ alpha, beta PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CMMDADMN mach, alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO BUDDER DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO BUDDER DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO BUDDER DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO BUDDER DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO BUDDER DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO BUDDER DEFLECTION  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO BUDDER DEFLECTION  CMMDAD alpha, b	CFXDADMN	mach,alpha	DRAG	DRAG CHANGE DUE TO MACH DUE TO AILERON DEFLECTION
CFXFLAPS alpha,beta DRAG DRAG INCREMENT DUE TO FLAPS CFXGEAR alpha,beta DRAG DRAG INCREMENT DUE TO GEAR CFXDGE hmrc,alpha DRAG DRAG INCREMENT DUE TO GROUND EFFECT CFXMN mach,alpha DRAG DRAG INCREMENT DUE TO MACH CFXDRD alpha,beta DRAG DRAG INCREMENT DUE TO MACH CFXDRD alpha,beta DRAG DRAG INCREMENT DUE TO RUDDER DEFLECTION CFZB alpha,beta DIFT LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION CFZDADMN mach,alpha LIFT LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION CFZDADMN alpha,beta LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION CFZDADAD alpha,beta LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION CFZPLAPS alpha,beta LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION CFZPLAPS alpha,beta LIFT LIFT INCREMENT DUE TO GROUND EFFECT CFZMA mach,alpha LIFT LIFT INCREMENT DUE TO GROUND EFFECT CFZMA mach,alpha LIFT LIFT INCREMENT DUE TO MACH DUE TO MA	CFXDRDMN	mach,alpha	DRAG	DRAG CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION
CFXGEAR         alpha,beta         DRAG         DRAG INCREMENT DUE TO GEAR           CFXDGE         hmrc,alpha         DRAG         DRAG INCREMENT DUE TO GROUND EFFECT           CFXMN         mach,alpha         DRAG         DRAG INCREMENT DUE TO MACH           CFXDRD         alpha,beta         DRAG         DRAG INCREMENT DUE TO RUDDER DEFLECTION           CFZDADMN         alpha,beta         LIFT         BASE LIFT           CFZDADMN         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CFZDADMN         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION           CFZDADMN         mach,alpha         LIFT         LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION           CFZDAD         alpha,beta         LIFT         LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION           CFZDAD         alpha,beta         LIFT         LIFT LIFT INCREMENT DUE TO GROUND EFFECT           CFZDAD         alpha,beta         LIFT         LIFT LIFT INCREMENT DUE TO RUDDER DEFLECTION           CFZDAD         alpha,beta         LIFT         LIFT INCREMENT DUE TO RUDDER DEFLECTION           CFZDAD         alpha,beta         LIFT         LIFT INCREMENT DUE TO RUDDER DEFLECTION           CMMQ         alpha,beta         PITCH         PITCH DAMPING D	CFXDAD	alpha,beta	DRAG	DRAG INCREMENT DUE TO AILERON DEFLECTION
CFXDGE         hmrc,alpha         DRAG         DRAG INCREMENT DUE TO GROUND EFFECT           CFXWN         mach,alpha         DRAG         DRAG INCREMENT DUE TO MACH           CFXDRD         alpha,beta         DRAG         DRAG INCREMENT DUE TO RUDDER DEFLECTION           CFZB         alpha,beta         LIFT         BASE LIFT           CFZDADMN         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CFZDADM         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION           CFZDAD         alpha,beta         LIFT         LIFT INCREMENT DUE TO ALLERON DEFLECTION           CFZGARA         alpha,beta         LIFT         LIFT INCREMENT DUE TO GEAR           CFZGEAR         alpha,beta         LIFT         LIFT INCREMENT DUE TO GROUND EFFECT           CFZNN         mach,alpha         LIFT         LIFT INCREMENT DUE TO GROUND EFFECT           CFZDRD         alpha,beta         LIFT         LIFT INCREMENT DUE TO MACH           CFZDRD         alpha,beta         LIFT INCREMENT DUE TO RUDDER DEFLECTION           CMMI         alpha,beta         PITCH DAMPING DERLACTIVE           CMMQ         alpha,beta         PITCH PITCH DAMPING DERLACTIVE           CMMDADA         alpha,beta         PITCH PITCH MOMENT CHANG	CFXFLAPS	alpha,beta	DRAG	DRAG INCREMENT DUE TO FLAPS
DRAG INCREMENT DUE TO MACH  CEXIND  Alpha, beta  DRAG DRAG INCREMENT DUE TO RUDDER DEFLECTION  CEZDA  Alpha, beta  Alpha, beta  DRAG DRAG INCREMENT DUE TO RUDDER DEFLECTION  CEZDA  Alpha, beta  LIFT LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CEZDADM  Mach, alpha  LIFT LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CEZDAD  Alpha, beta  LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION  CEZLAPS  Alpha, beta  LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION  CEZDAD  Alpha, beta  LIFT LIFT INCREMENT DUE TO GEAR  CEZDAG  CEZDAD  Alpha, beta  LIFT LIFT INCREMENT DUE TO GEAR  CEZDAD  Alpha, beta  LIFT LIFT INCREMENT DUE TO GEAR  CEZDAD  Alpha, beta  LIFT LIFT INCREMENT DUE TO MACH DUE TO MACH DUE TO MACH  CEZDAD  Alpha, beta  LIFT LIFT INCREMENT DUE TO DEFLECTION  CMM1 Alpha, beta  LIFT LIFT INCREMENT DUE TO MACH  CEZDAD  Alpha, beta  LIFT LIFT INCREMENT DUE TO MACH  CEZDAD  Alpha, beta  LIFT LIFT INCREMENT DUE TO MACH  CMMDADMN  Mach, alpha  PITCH PITCH DAMPING DEFLACTION  CMMDADMN  Mach, alpha  PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CMMDADMN  Mach, alpha  PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CMMDADA  Alpha, beta  PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMDADA  Alpha, beta  PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDADA  Alpha, beta  PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDADA  Alpha, beta  PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDADA  Alpha, beta  PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDADA  Alpha, beta  PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDADA  Alpha, beta  PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDADA  Alpha, beta  PITCH PITCH MOMENT INCREMENT DUE TO GEAR  CMMDGE  MINCREMENT DUE TO GROUND EFFECT  CMMDADA  Alpha, beta  PITCH PITCH MOMENT INCREMENT DUE TO GROUND EFFECT  CMMDADA  Alpha, beta  PITCH PITCH MOMENT INCREMENT DUE TO GROUND EFFECT  CMMDADA  Alpha, beta  PITCH PITCH MOMENT INCREMENT DUE TO GROUND EFFECT  CMMDADA  Alpha, beta  PITCH PITCH INGROMENT INCREMENT DUE TO GROUN	CFXGEAR	alpha,beta	DRAG	DRAG INCREMENT DUE TO GEAR
CFXDRD         apha,beta         DRAG         DRAG INCREMENT DUE TO RUDDER DEFLECTION           CFZB         apha,eevator         LIFT         BASE LIFT           CFZDADMN         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CFZDRDNN         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION           CFZDAD         alpha,beta         LIFT         LIFT INCREMENT DUE TO ALLERON DEFLECTION           CFZGEAR         alpha,beta         LIFT         LIFT INCREMENT DUE TO GROWND EFFECT           CFZDGE         hmrc,alpha         LIFT         LIFT INCREMENT DUE TO GROWND EFFECT           CFZMN         mach,alpha         LIFT         LIFT INCREMENT DUE TO RUDDER DEFLECTION           CFZDRD         alpha,beta         LIFT         LIFT INCREMENT DUE TO RUDDER DEFLECTION           CFZDRD         alpha,beta         LIFT         LIFT INCREMENT DUE TO RUDDER DEFLECTION           CMMQ         alpha,beta         PITCH         BASE PITCHING MOMENT           CMMQ         alpha,beta         PITCH         PITCH DAMPING DERIVATIVE           CMMDADMN         mach,alpha         PITCH         PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CMMDAD         alpha,beta         PITCH         PITCH MOMENT DUE TO ALLERON	CFXDGE	hmrc,alpha	DRAG	DRAG INCREMENT DUE TO GROUND EFFECT
Apha,devator LIFT BASE LIFT CFZDADNN mach,alpha LIFT LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION CFZDRDNN mach,alpha LIFT LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION CFZDAD alpha,beta LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION CFZEAR alpha,beta LIFT LIFT INCREMENT DUE TO FLAPS CFZGEAR alpha,beta LIFT LIFT INCREMENT DUE TO GEAR CFZDGE hmrc,alpha LIFT LIFT INCREMENT DUE TO GEAR CFZDRD mach,alpha LIFT LIFT INCREMENT DUE TO GROUND EFFECT CFZMN mach,alpha LIFT LIFT INCREMENT DUE TO MACH CFZDRD alpha,beta LIFT LIFT INCREMENT DUE TO RUDDER DEFLECTION CMM1 alpha,devator PITCH BASE PITCHING MOMENT CMMQ alpha,beta PITCH PITCH DAMPING DERIVATIVE CMMDADANN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION CMMDRDNN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION CMMDADAD alpha,beta PITCH PITCH MOMENT TO ALLERON DEFLECTION CMMDADAD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION CMMDADAD alpha,beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION CMMDADA alpha,beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION CMMGEAR alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GEAR CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GEAR CMMDRO mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GEAR	CFXMN	mach,alpha	DRAG	DRAG INCREMENT DUE TO MACH
CFZDADMN         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CFZDRDM         mach,alpha         LIFT         LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION           CFZDAD         alpha,beta         LIFT         LIFT INCREMENT DUE TO ALLERON DEFLECTION           CFZGEAR         alpha,beta         LIFT         LIFT INCREMENT DUE TO GEAR           CFZDGE         hmrc,alpha         LIFT         LIFT INCREMENT DUE TO GROUND EFFECT           CFZMN         mach,alpha         LIFT         LIFT INCREMENT DUE TO MACH           CFZDRD         alpha,beta         LIFT         LIFT INCREMENT DUE TO RUDDER DEFLECTION           CMM1         alpha,beta         LIFT         LIFT INCREMENT DUE TO RUDDER DEFLECTION           CMMQ         alpha,beta         PITCH         PITCH DAMPING DERIVATIVE           CMMDADMN         mach,alpha         PITCH         PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION           CMMDRDMN         mach,alpha         PITCH         PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION           CMMALPHADOT         alpha,beta         PITCH         PITCH MOMENT DUE TO ALLERON DEFLECTION           CMMDAD         alpha,beta         PITCH         PITCH MOMENT DUE TO RUDDER DEFLECTION           CMMGEAR         alpha,beta	CFXDRD	alpha,beta	DRAG	DRAG INCREMENT DUE TO RUDDER DEFLECTION
CFZDRDMN mach,alpha LIFT LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CFZDAD alpha,beta LIFT LIFT INCREMENT DUE TO ALLERON DEFLECTION  CFZGEAR alpha,beta LIFT LIFT INCREMENT DUE TO FLAPS  CFZGEAR alpha,beta LIFT LIFT INCREMENT DUE TO GEAR  CFZDGE hmrc,alpha LIFT LIFT INCREMENT DUE TO GROUND EFFECT  CFZMN mach,alpha LIFT LIFT INCREMENT DUE TO GROUND EFFECT  CFZMN alpha,beta LIFT LIFT INCREMENT DUE TO RUDDER DEFLECTION  CMM1 alpha,beta LIFT LIFT INCREMENT DUE TO RUDDER DEFLECTION  CMMQ alpha,beta PITCH PITCH DAMPING DERIVATIVE  CMMDADMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CMMALPHADOT alpha,beta PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CMMALPHADOT alpha,beta PITCH PITCH MOMENT DERIVATIVE FOR ALPHA DOT  CMMDRDR alpha,beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMGEAR alpha,beta PITCH PITCH MOMENT DUE TO BELECTION  CMMGEAR alpha,beta PITCH PITCH MOMENT DUE TO BELECTION  CMMGEAR alpha,beta PITCH PITCH MOMENT DUE TO BELECTION  CMMGEAR alpha,beta PITCH PITCH MOMENT DUE TO GEAR  CMMDGE hmrc,alpha PITCH PITCH MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCH MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCH MOMENT INCREMENT DUE TO GROUND EFFECT	CFZB	alpha,elevator	LIFT	BASE LIFT
CFZDAD alpha, beta LIFT LIFT INCREMENT DUE TO ALERON DEFLECTION  CFZFLAPS alpha, beta LIFT LIFT INCREMENT DUE TO FLAPS  CFZGEAR alpha, beta LIFT LIFT INCREMENT DUE TO GEAR  CFZDGE hmrc, alpha LIFT LIFT INCREMENT DUE TO GEAR  CFZDGE hmrc, alpha LIFT LIFT INCREMENT DUE TO GROUND EFFECT  CFZMN mach, alpha  CFZDRD alpha, beta LIFT LIFT INCREMENT DUE TO RUDDER DEFLECTION  CMM1 alpha, elevator PITCH BASE PITCHING MOMENT  CMMQ alpha, beta PITCH PITCH DAMPING DERIVATIVE  CMMDADMN mach, alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CMMDADMN mach, alpha  PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMALPHADOT alpha, beta PITCH PITCH MOMENT DERIVATIVE FOR ALPHA DOT  CMMDADA alpha, beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDADA alpha, beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDADA alpha, beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMCLAPS alpha, beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMGEAR alpha, beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMGEAR alpha, beta PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMGEAR alpha, beta PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMGEAR alpha, beta PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMOBE hmrc, alpha  PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CMMMOBE hmrc, alpha  PITCH PITCHING MOMENT INCREMENT DUE TO MACH	CFZDADMN	mach,alpha	LIFT	LIFT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION
CFZFLAPS apha,beta LIFT LIFT INCREMENT DUE TO FLAPS CFZGEAR apha,beta LIFT LIFT INCREMENT DUE TO GEAR CFZDGE hmrc,alpha LIFT LIFT INCREMENT DUE TO GROUND EFFECT CFZMN mach,alpha LIFT LIFT INCREMENT DUE TO MACH CFZDRD alpha,beta LIFT LIFT INCREMENT DUE TO RUDDER DEFLECTION CMM1 apha,elevator PITCH BASE PITCHING MOMENT CMMQ alpha,beta PITCH PITCH AMMENT CHANGE DUE TO MACH DUE TO ALIERON DEFLECTION CMMDADMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALIERON DEFLECTION CMMDADMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION CMMDADADMN apha,beta PITCH PITCH MOMENT DUE TO ALIERON DEFLECTION CMMDADDAD alpha,beta PITCH PITCH MOMENT DUE TO ALIERON DEFLECTION CMMDAD alpha,beta PITCH PITCH MOMENT DUE TO ALIERON DEFLECTION CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT	CFZDRDMN	mach,alpha	LIFT	LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION
CFZGEAR apha,beta LIFT LIFT INCREMENT DUE TO GEAR  CFZDGE hmrc,alpha LIFT LIFT INCREMENT DUE TO GROUND EFFECT  CFZMN mach,alpha LIFT LIFT INCREMENT DUE TO ROUND EFFECT  CFZMN mach,alpha LIFT LIFT INCREMENT DUE TO MACH  CFZDRD alpha,beta LIFT LIFT INCREMENT DUE TO RUDDER DEFLECTION  CMM1 alpha,elevator PITCH BASE PITCHING MOMENT  CMMQ alpha,beta PITCH PITCH DAMPING DERIVATIVE  CMMDADMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMDRDMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMALPHADOT alpha,beta PITCH PITCH MOMENT DERIVATIVE FOR ALPHA DOT  CMMDAD alpha,beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMFLAPS alpha,beta PITCH PITCH MOMENT DUE TO TO ALLERON DEFLECTION  CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS  CMMGGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMD mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CMMIN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH	CFZDAD	alpha,beta	LIFT	LIFT INCREMENT DUE TO AILERON DEFLECTION
CFZDGE       hmrc,alpha       LIFT       LIFT INCREMENT DUE TO GROUND EFFECT         CFZMN       mach,alpha       LIFT       LIFT INCREMENT DUE TO MACH         CFZDRD       alpha,beta       LIFT       LIFT INCREMENT DUE TO RUDDER DEFLECTION         CMM1       alpha,beta       PITCH       BASE PITCHING MOMENT         CMMQ       alpha,beta       PITCH       PITCH DAMPING DERIVATIVE         CMMDADMN       mach,alpha       PITCH       PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION         CMMDRDMN       mach,alpha       PITCH       PITCH MOMENT DERIVATIVE FOR ALPHA DOT         CMMALPHADOT       alpha,beta       PITCH       PITCH MOMENT DUE TO ALLERON DEFLECTION         CMMDRD       alpha,beta       PITCH       PITCH MOMENT DUE TO RUDDER DEFLECTION         CMMDRD       alpha,beta       PITCH       PITCH MOMENT DUE TO RUDDER DEFLECTION         CMMFLAPS       alpha,beta       PITCH       PITCHING MOMENT INCREMENT DUE TO FLAPS         CMMGEAR       alpha,beta       PITCH       PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT         CMMMN       mach,alpha       PITCH       PITCHING MOMENT INCREMENT DUE TO MACH         CML1       alpha,beta       BASE ROLLING MOMENT INCREMENT DUE TO MACH	CFZFLAPS	alpha,beta	LIFT	LIFT INCREMENT DUE TO FLAPS
CFZMN       mach,alpha       LIFT       LIFT INCREMENT DUE TO MACH         CFZDRD       alpha,beta       LIFT       LIFT INCREMENT DUE TO RUDDER DEFLECTION         CMM1       alpha,beta       PITCH       BASE PITCHING MOMENT         CMMQ       alpha,beta       PITCH       PITCH DAMPING DERIVATIVE         CMMDADMN       mach,alpha       PITCH       PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION         CMMDRDMN       mach,alpha       PITCH       PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION         CMMDAD       alpha,beta       PITCH       PITCH MOMENT DERIVATIVE FOR ALPHA DOT         CMMDAD       alpha,beta       PITCH       PITCH MOMENT DUE TO ALLERON DEFLECTION         CMMDRD       alpha,beta       PITCH       PITCH MOMENT DUE TO RUDDER DEFLECTION         CMMFLAPS       alpha,beta       PITCH       PITCHING MOMENT INCREMENT DUE TO FLAPS         CMMGEAR       alpha,beta       PITCH       PITCHING MOMENT INCREMENT DUE TO GEAR         CMMDGE       hmrc,alpha       PITCH       PITCHING MOMENT INCREMENT DUE TO MACH         CML1       alpha,beta       ROLL       BASE ROLLING MOMENT INCREMENT DUE TO MACH	CFZGEAR	alpha,beta	LIFT	LIFT INCREMENT DUE TO GEAR
CFZDRD alpha, beta LIFT LIFT INCREMENT DUE TO RUDDER DEFLECTION  CMM1 alpha, elevator PITCH BASE PITCHING MOMENT  CMMQ alpha, beta PITCH PITCH DAMPING DERIVATIVE  CMMDADMN mach, alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO ALLERON DEFLECTION  CMMDRDMN mach, alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMALPHADOT alpha, beta PITCH PITCH MOMENT DERIVATIVE FOR ALPHA DOT  CMMDAD alpha, beta PITCH PITCH MOMENT DUE TO ALLERON DEFLECTION  CMMDRD alpha, beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMFLAPS alpha, beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMGEAR alpha, beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR  CMMDGE hmrc, alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach, alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach, alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha, beta ROLL BASE ROLLING MOMENT INCREMENT DUE TO MACH	CFZDGE	hmrc,alpha	LIFT	LIFT INCREMENT DUE TO GROUND EFFECT
CMM1 alpha,elevator PITCH BASE PITCHING MOMENT  CMMQ alpha,beta PITCH PITCH DAMPING DERIVATIVE  CMMDADMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION  CMMDRDMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMALPHADOT alpha,beta PITCH PITCH MOMENT DERIVATIVE FOR ALPHA DOT  CMMDAD alpha,beta PITCH PITCH MOMENT DUE TO AILERON DEFLECTION  CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMFLAPS alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS  CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CML1 alpha,beta ROLL BASE ROLLING MOMENT INCREMENT DUE TO MACH	CFZMN	mach,alpha	LIFT	LIFT INCREMENT DUE TO MACH
CMMQalpha,betaPITCHPITCH DAMPING DERIVATIVECMMDADMNmach,alphaPITCHPITCH MOMENT CHANGE DUE TO MACH DUE TO AILERON DEFLECTIONCMMDRDMNmach,alphaPITCHPITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTIONCMMALPHADOTalpha,betaPITCHPITCH MOMENT DERIVATIVE FOR ALPHA DOTCMMDADalpha,betaPITCHPITCH MOMENT DUE TO AILERON DEFLECTIONCMMDRDalpha,betaPITCHPITCH MOMENT DUE TO RUDDER DEFLECTIONCMMGEARalpha,betaPITCHPITCHING MOMENT INCREMENT DUE TO FLAPSCMMDGEhmrc,alphaPITCHPITCHING MOMENT INCREMENT DUE TO GROUND EFFECTCMMMNmach,alphaPITCHPITCHING MOMENT INCREMENT DUE TO MACHCML1alpha,betaROLLBASE ROLLING MOMENT INCREMENT DUE TO MACH	CFZDRD	alpha,beta	LIFT	LIFT INCREMENT DUE TO RUDDER DEFLECTION
CMMDADMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION  CMMDRDMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMALPHADOT alpha,beta PITCH PITCH MOMENT DERIVATIVE FOR ALPHA DOT  CMMDAD alpha,beta PITCH PITCH MOMENT DUE TO AILERON DEFLECTION  CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMFLAPS alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS  CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR  CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMM1	alpha,elevator	PITCH	BASE PITCHING MOMENT
CMMDRDMN mach,alpha PITCH PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION  CMMALPHADOT alpha,beta PITCH PITCH MOMENT DERIVATIVE FOR ALPHA DOT  CMMDAD alpha,beta PITCH PITCH MOMENT DUE TO AILERON DEFLECTION  CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMFLAPS alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS  CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR  CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMQ	alpha,beta	PITCH	PITCH DAMPING DERIVATIVE
CMMALPHADOT alpha,beta PITCH PITCH MOMENT DERIVATIVE FOR ALPHA DOT  CMMDAD alpha,beta PITCH PITCH MOMENT DUE TO AILERON DEFLECTION  CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMFLAPS alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS  CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR  CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMDADMN	mach,alpha	PITCH	PITCH MOMENT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION
CMMDAD alpha,beta PITCH PITCH MOMENT DUE TO AILERON DEFLECTION  CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMFLAPS alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS  CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR  CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMDRDMN	mach,alpha	PITCH	PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION
CMMDRD alpha,beta PITCH PITCH MOMENT DUE TO RUDDER DEFLECTION  CMMFLAPS alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS  CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR  CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMALPHADOT	alpha,beta	PITCH	PITCH MOMENT DERIVATIVE FOR ALPHA DOT
CMMFLAPS alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO FLAPS  CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR  CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMDAD	alpha,beta	PITCH	PITCH MOMENT DUE TO AILERON DEFLECTION
CMMGEAR alpha,beta PITCH PITCHING MOMENT INCREMENT DUE TO GEAR  CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMDRD	alpha,beta	PITCH	PITCH MOMENT DUE TO RUDDER DEFLECTION
CMMDGE hmrc,alpha PITCH PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT  CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMFLAPS	alpha,beta	PITCH	PITCHING MOMENT INCREMENT DUE TO FLAPS
CMMMN mach,alpha PITCH PITCHING MOMENT INCREMENT DUE TO MACH  CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMGEAR	alpha,beta	PITCH	PITCHING MOMENT INCREMENT DUE TO GEAR
CML1 alpha,beta ROLL BASE ROLLING MOMENT	CMMDGE	hmrc,alpha	PITCH	PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT
	CMMMN	mach,alpha	PITCH	PITCHING MOMENT INCREMENT DUE TO MACH
CMLP alpha,beta ROLL ROLL DAMPING DERIVATIVE	CML1	alpha,beta	ROLL	BASE ROLLING MOMENT
	CMLP	alpha,beta	ROLL	ROLL DAMPING DERIVATIVE

CMLBETADOT	alpha,beta	ROLL	ROLL MOMENT DERIVATIVE FOR BETA DOT
CMLDADMN	mach,alpha	ROLL	ROLLING MOMENT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION
CMLDRDMN	mach,alpha	ROLL	ROLLING MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION
CMLDAD	alpha,beta	ROLL	ROLLING MOMENT DUE TO AILERON DEFLECTION
CMLDRD	alpha,beta	ROLL	ROLLING MOMENT DUE TO RUDDER DEFLECTION
CMLR	alpha,beta	ROLL	ROLLING MOMENT DUE TO YAW RATE
CMLFLAPS	alpha	ROLL	ROLLING MOMENT INCREMENT DUE TO FLAPS
CMLGEAR	alpha,beta	ROLL	ROLLING MOMENT INCREMENT DUE TO GEAR
CMLMN	mach,alpha	ROLL	ROLLING MOMENT INCREMENT DUE TO MACH
CFYB	alpha,beta,elevator	SIDE	BASE SIDEFORCE
CYDAD	alpha,beta	SIDE	SIDE FORCE DUE TO AILERON DEFLECTION
CFYP	alpha,beta	SIDE	SIDE FORCE DUE TO ROLL RATE
CYDRD	alpha,beta	SIDE	SIDE FORCE DUE TO RUDDER DEFLECTION
CFYR	alpha,beta	SIDE	SIDE FORCE DUE TO YAW RATE
CYDADMN	mach,alpha	SIDE	SIDEFORCE CHANGE DUE TO MACH DUE TO TO AILERON DEFLECTION
CYDRDMN	mach,alpha	SIDE	SIDEFORCE CHANGE DUE TO MACH DUE TO TO RUDDER DEFLECTION
CFYFLAPS	alpha	SIDE	SIDEFORCE INCREMENT DUE TO FLAPS
CFYGEAR	alpha,beta	SIDE	SIDEFORCE INCREMENT DUE TO GEAR
CFYMN	mach,alpha	SIDE	SIDEFORCE INCREMENT DUE TO MACH
CMN1	alpha,beta,elevator	YAW	BASE YAWING MOMENT
CMNR	alpha,beta	YAW	YAW DAMPING DERIVATIVE
CMNBETADOT	alpha	YAW	YAW MOMENT DERIVATIVE FOR BETADOT
CMNP	alpha,beta	YAW	YAW MOMENT DUE TO ROLL RATE
CMNDADMN	mach,alpha	YAW	YAWING MOMENT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION
CMNDRDMN	mach,alpha	YAW	YAWING MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION
CMNDAD	alpha,beta	YAW	YAWING MOMENT DUE TO AILERON DEFLECTION
CMNDRD	alpha,beta	YAW	YAWING MOMENT DUE TO RUDDER DEFLECTION
CMNFLAPS	alpha	YAW	YAWING MOMENT INCREMENT DUE TO FLAPS
CMNGEAR	alpha,beta	YAW	YAWING MOMENT INCREMENT DUE TO GEAR
CMNMN	mach,alpha	YAW	YAWING MOMENT INCREMENT DUE TO MACH

# Coefficient Buildup

Axis	Buildup
DRAG	CFXB + CFXDAD*aileron + CFXDRD*rudder + CFXGEAR*gear + CFXFLAPS*flaps + CFXDGE + CFXMN + CFXDADMN*aileron + CFXDRDMN*rudder
ROLL	CML1 + CMLDAD*aileron + CMLDRD*rudder + CMLGEAR*gear + CMLFLAPS*beta*flaps + CMLMN + CMLDADMN*aileron + CMLDRDMN*rudder + CMLBETADOT*BETADOT-L + CMLP*PB + CMLR*RB
SIDE	CYDAD*aileron + CYDRD*rudder + CFYGEAR*gear + CFYFLAPS*flaps*beta + CFYB + CFYMN + CYDADMN*aileron + CYDRDMN*rudder + CFYP*PB + CFYR*RB
LIFT	CFZDAD*aileron + CFZDRD*rudder + CFZGEAR*gear + CFZFLAPS*flaps + CFZB + CFZDGE + CFZMN + CFZDADMN*aileron +

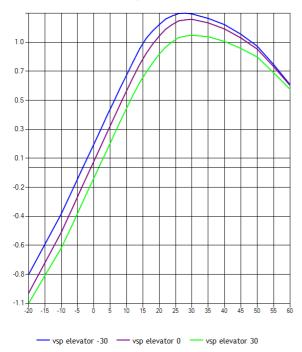
PITCH CMMDAD\*aileron + CMMDRD\*rudder + CMMGEAR\*gear + CMMFLAPS\*flaps + CMM1 + CMMDGE + CMMMN + CMMDADMN\*aileron + CMMDRDMN\*rudder + CMMALPHADOT\*ALPHADOT-L + CMMQ\*QB

YAW CMNDAD\*aileron + CMNDRD\*rudder + CMNGEAR\*gear + CMNFLAPS\*flaps\*beta + CMN1 + CMNMN + CMNDADMN\*aileron + CMNDRDMN\*rudder + CMNBETADOT\*BETADOT-L + CMNR\*RB + CMNP\*PB

# LIFT

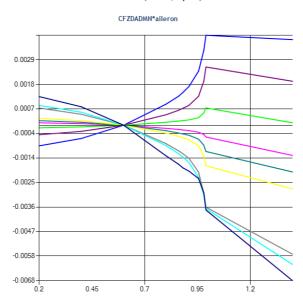
BASE LIFT

### CFZB(alpha, elevator)



### LIFT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION

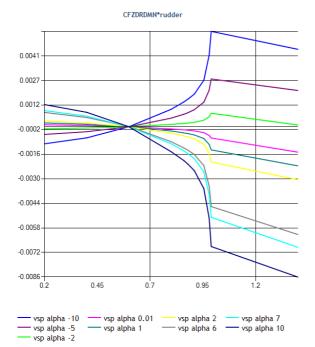
### CFZDADMN(mach,alpha)





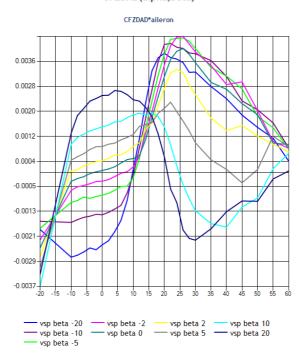
### LIFT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION

### CFZDRDMN(mach,alpha)



### LIFT INCREMENT DUE TO AILERON DEFLECTION

### CFZDAD(alpha,beta)

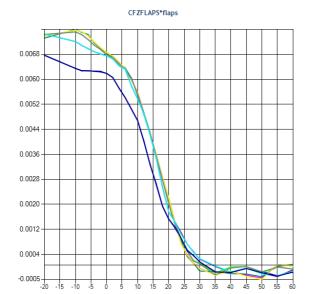


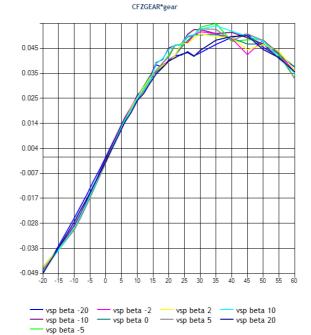
### LIFT INCREMENT DUE TO FLAPS

### LIFT INCREMENT DUE TO GEAR

### CFZFLAPS(alpha,beta)

### CFZGEAR(alpha,beta)





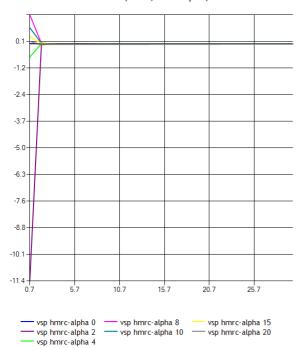
### LIFT INCREMENT DUE TO GROUND EFFECT

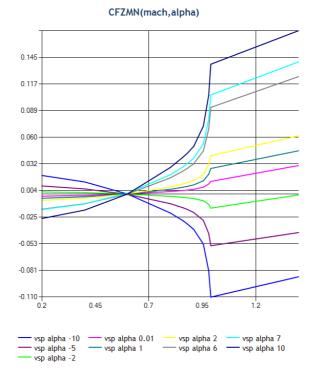
vsp beta -20
 vsp beta -2
 vsp beta 2
 vsp beta 10
 vsp beta 0
 vsp beta 5
 vsp beta 20

vsp beta -5

### LIFT INCREMENT DUE TO MACH

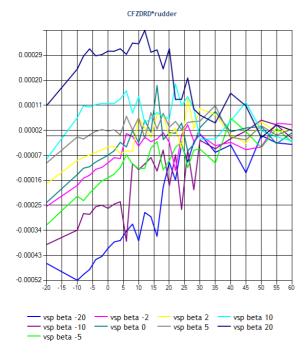
### CFZDGE(hmrc,hmrc-alpha)





### LIFT INCREMENT DUE TO RUDDER DEFLECTION

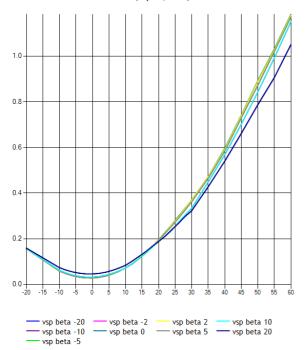
### CFZDRD(alpha,beta)



# **DRAG**

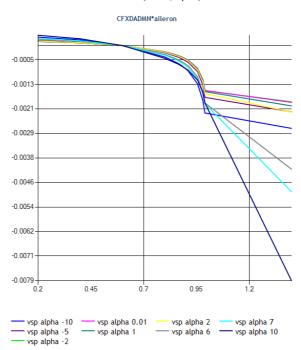
### BASE DRAG

### CFXB(alpha,beta)



### DRAG CHANGE DUE TO MACH DUE TO AILERON DEFLECTION

### CFXDADMN(mach,alpha)

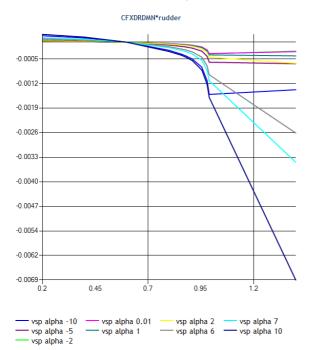


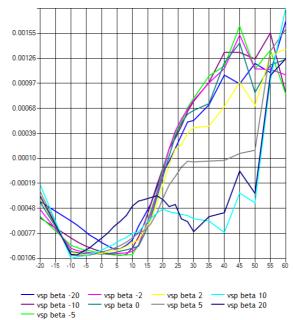
### DRAG CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION

### DRAG INCREMENT DUE TO AILERON DEFLECTION

### CFXDRDMN(mach,alpha)

# CFXDAD(alpha,beta) CFXDAD\*aileron



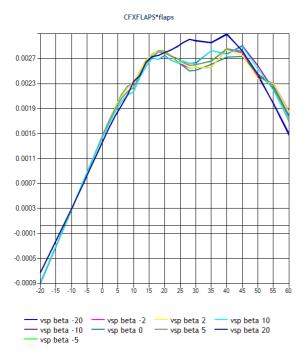


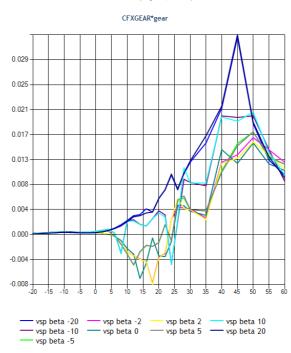
### DRAG INCREMENT DUE TO FLAPS

# DRAG INCREMENT DUE TO GEAR

### CFXFLAPS(alpha,beta)

### CFXGEAR(alpha,beta)

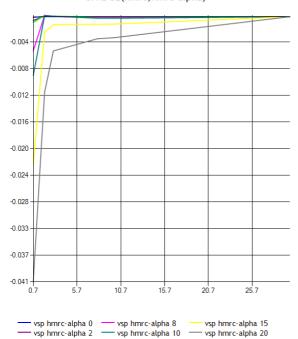




### DRAG INCREMENT DUE TO GROUND EFFECT

# DRAG INCREMENT DUE TO MACH CFXMN(mach,alpha)

### CFXDGE(hmrc,hmrc-alpha)



# 

### DRAG INCREMENT DUE TO RUDDER DEFLECTION

vsp hmrc-alpha 4

### CFXDRD(alpha,beta)



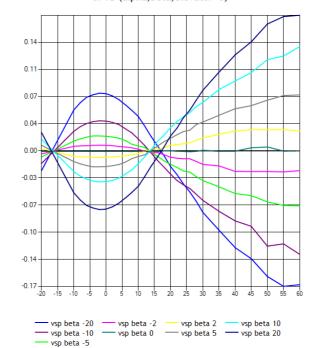
# SIDE

### **BASE SIDEFORCE**

### CFYB (alpha,beta,elevator=-30)

# 0.14 0.11 0.07 0.04 0.00 -0.03 -0.07 -0.10 -0.14 -0.18

# **BASE SIDEFORCE** CFYB (alpha,beta,elevator=0)



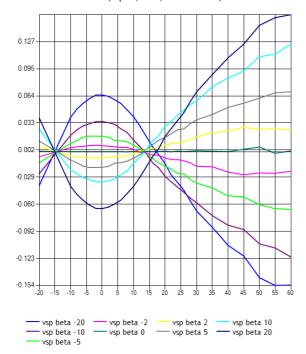
### vsp beta -20 vsp beta -2 vsp beta 2 vsp beta 10 vsp beta 0 vsp beta 5 vsp beta 20 --- vsp beta -5

### BASE SIDEFORCE

15 20 25 30 35

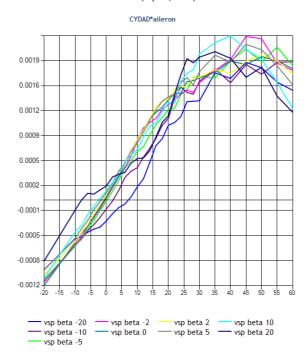
-15 -10

### CFYB (alpha,beta,elevator=30)



### SIDE FORCE DUE TO AILERON DEFLECTION

### CYDAD(alpha,beta)

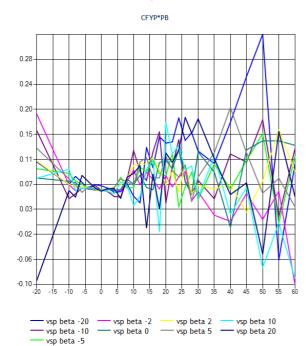


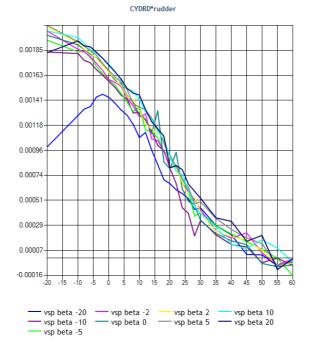
### SIDE FORCE DUE TO ROLL RATE

### SIDE FORCE DUE TO RUDDER DEFLECTION

### CFYP(alpha,beta)

### CYDRD(alpha,beta)

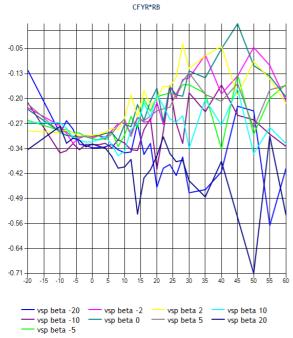




### SIDE FORCE DUE TO YAW RATE

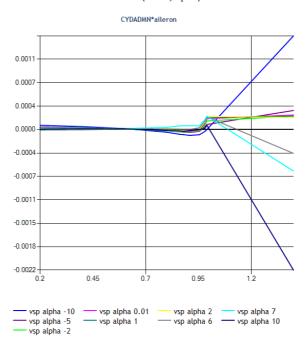
### CFYR(alpha,beta)

### J. ...(.....)200



# SIDEFORCE CHANGE DUE TO MACH DUE TO TO AILERON DEFLECTION

### CYDADMN(mach,alpha)

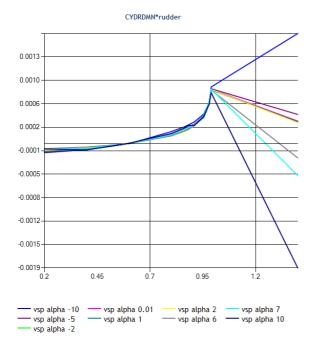


# SIDEFORCE CHANGE DUE TO MACH DUE TO TO RUDDER DEFLECTION

### SIDEFORCE INCREMENT DUE TO FLAPS

### CYDRDMN(mach,alpha)





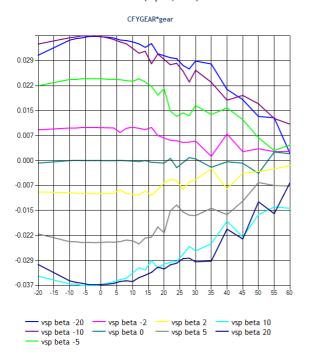


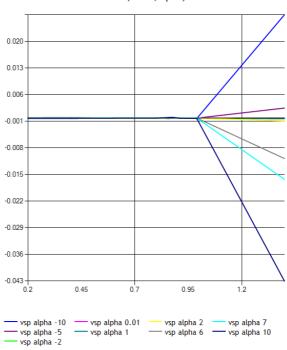
### SIDEFORCE INCREMENT DUE TO GEAR

### SIDEFORCE INCREMENT DUE TO MACH

### CFYGEAR(alpha,beta)



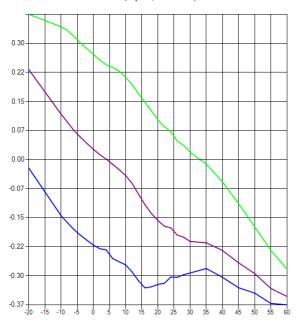




# **PITCH**

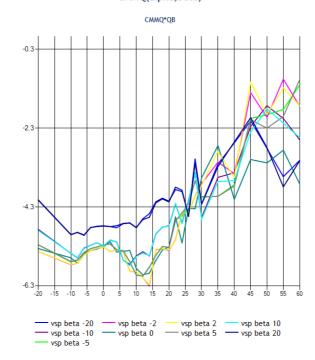
### BASE PITCHING MOMENT

### CMM1(alpha, elevator)



### PITCH DAMPING DERIVATIVE

### CMMQ(alpha,beta)

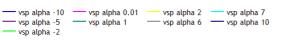


# PITCH MOMENT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION

- vsp elevator -30 - vsp elevator 0 - vsp elevator 30

# CMMDADMN(mach,alpha) CMMDADMN\*aileron

# 0.0084 0.0066 0.0048 0.0013 -0.0004 -0.0022 -0.0039



0.95

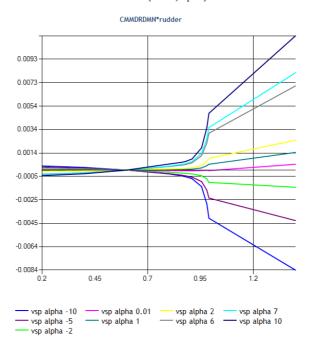
1.2

-0.0074 0.2

0.45

# PITCH MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION

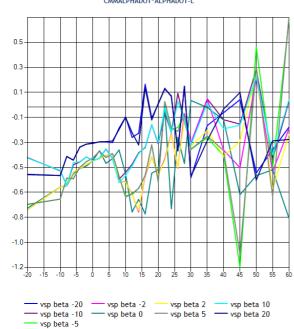
### CMMDRDMN(mach,alpha)



### PITCH MOMENT DERIVATIVE FOR ALPHA DOT

### CMMALPHADOT(alpha,beta)

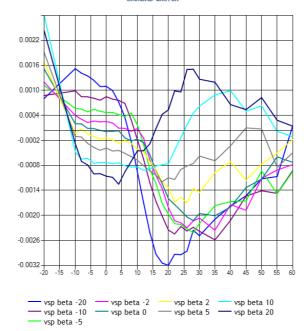
### CMMALPHADOT\*ALPHADOT-L



### PITCH MOMENT DUE TO AILERON DEFLECTION

### CMMDAD(alpha,beta)

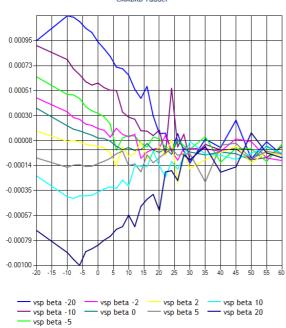
### CMMDAD\*aileron



### PITCH MOMENT DUE TO RUDDER DEFLECTION

### CMMDRD(alpha,beta)

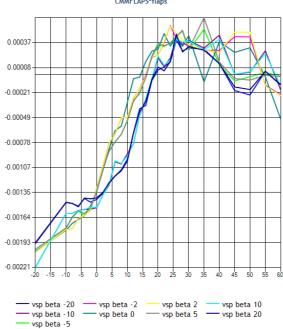
### CMMDRD\*rudder



### PITCHING MOMENT INCREMENT DUE TO FLAPS

### CMMFLAPS(alpha,beta)

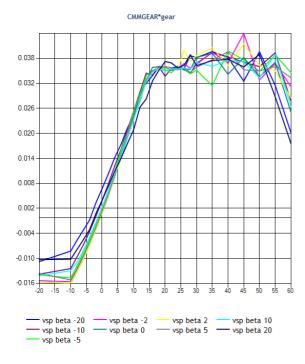
### CMMFLAPS\*flaps



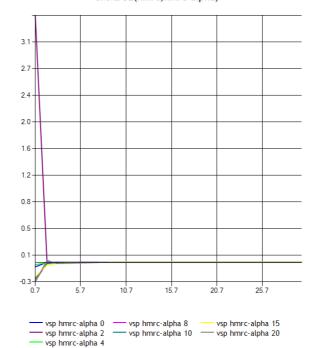
### PITCHING MOMENT INCREMENT DUE TO GEAR

### PITCHING MOMENT INCREMENT DUE TO GROUND EFFECT

### CMMGEAR(alpha,beta)

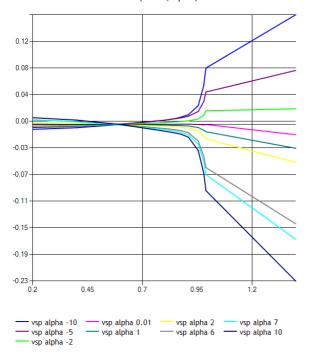


### CMMDGE(hmrc,hmrc-alpha)



### PITCHING MOMENT INCREMENT DUE TO MACH

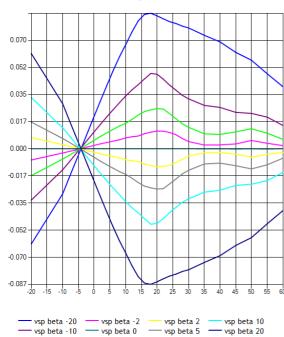
### CMMMN(mach,alpha)



# **ROLL**

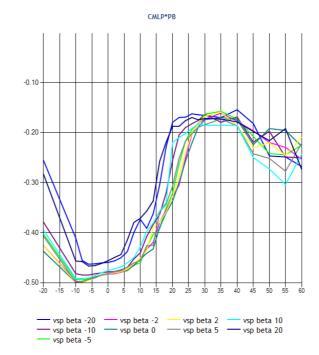
### BASE ROLLING MOMENT

### CML1(alpha,beta)



### ROLL DAMPING DERIVATIVE

### CMLP(alpha,beta)

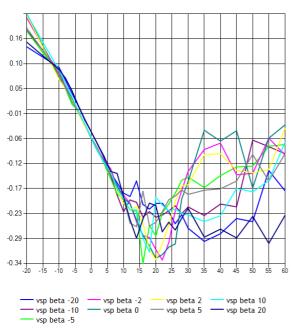


### ROLL MOMENT DERIVATIVE FOR BETA DOT

vsp beta -5

### CMLBETADOT(alpha,beta)

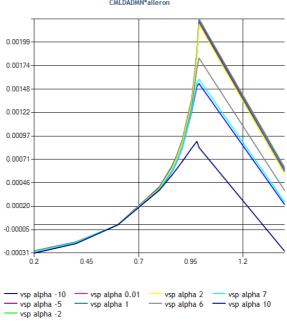
### CMLBETADOT\*BETADOT-L



### ROLLING MOMENT CHANGE DUE TO MACH DUE TO AILERON **DEFLECTION**

### CMLDADMN(mach,alpha)

### CMLDADMN\*aileron

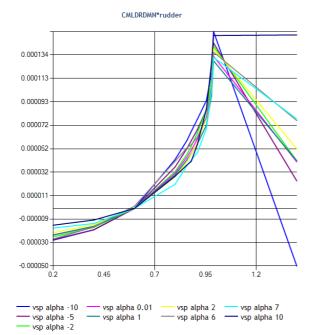


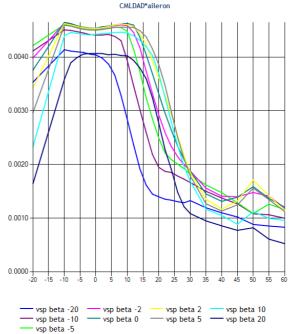
# ROLLING MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION

### ROLLING MOMENT DUE TO AILERON DEFLECTION

### CMLDRDMN(mach,alpha)





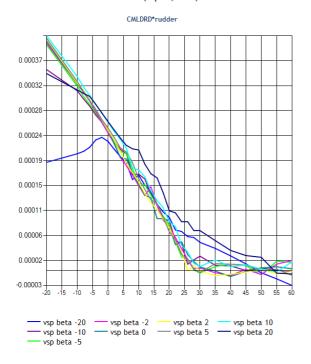


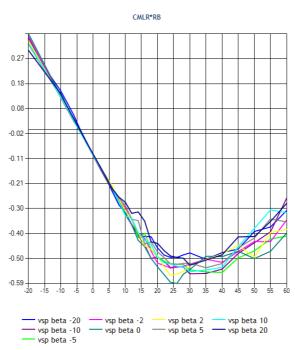
### ROLLING MOMENT DUE TO RUDDER DEFLECTION

### ROLLING MOMENT DUE TO YAW RATE

### CMLDRD(alpha,beta)

### CMLR(alpha,beta)





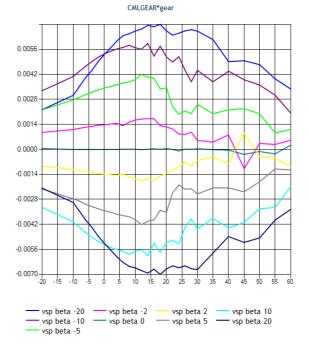
### ROLLING MOMENT INCREMENT DUE TO FLAPS

### ROLLING MOMENT INCREMENT DUE TO GEAR

### CMLFLAPS(alpha)

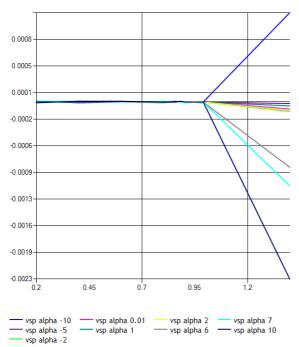






### ROLLING MOMENT INCREMENT DUE TO MACH

### CMLMN(mach,alpha)



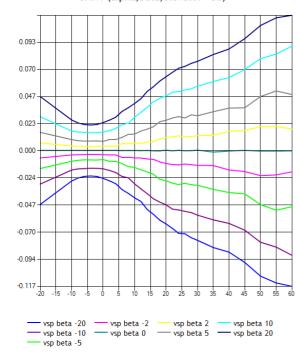


### BASE YAWING MOMENT

### BASE YAWING MOMENT

### CMN1 (alpha,beta,elevator=-30)

### CMN1 (alpha,beta,elevator=0)



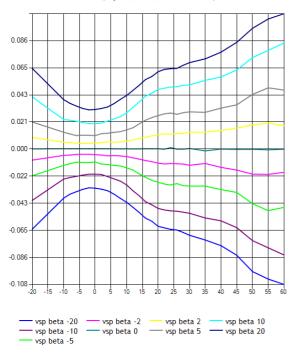


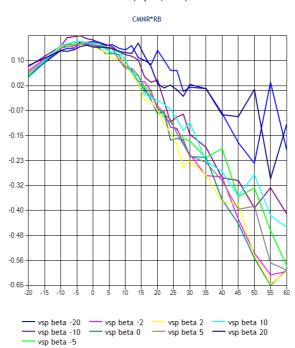
### BASE YAWING MOMENT

YAW DAMPING DERIVATIVE



### CMNR(alpha,beta)





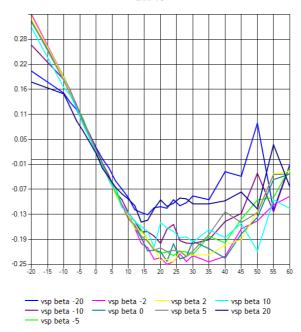
### YAW MOMENT DERIVATIVE FOR BETADOT

### YAW MOMENT DUE TO ROLL RATE

### CMNBETADOT(alpha)

# CMNP(alpha,beta)



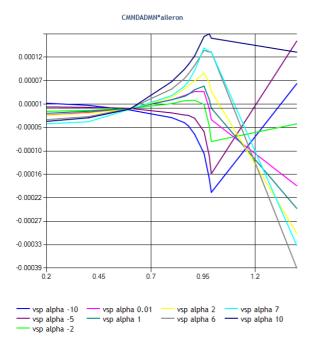


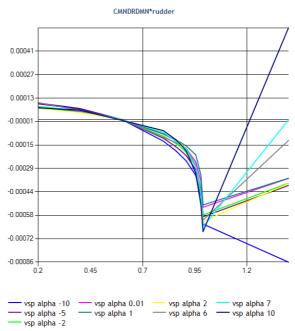
# YAWING MOMENT CHANGE DUE TO MACH DUE TO AILERON DEFLECTION

# YAWING MOMENT CHANGE DUE TO MACH DUE TO RUDDER DEFLECTION

### CMNDADMN(mach,alpha)

### CMNDRDMN(mach,alpha)





### YAWING MOMENT DUE TO AILERON DEFLECTION

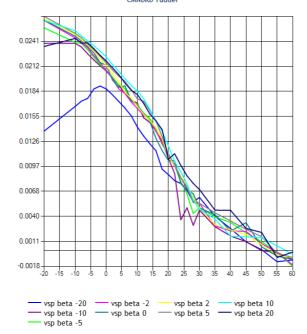
### CMNDAD(alpha,beta)

# CMNDAD\*aileron 0.00031 0.00020 0.00009 -0.00002 -0.00012 -0.00023 -0.00034 -0.00045 -0.00056 -0.00067 20 25 30 35 45 vsp beta -20 vsp beta -2 vsp beta 2 vsp beta 10 vsp beta 0 vsp beta 5 vsp beta 20

### YAWING MOMENT DUE TO RUDDER DEFLECTION

### CMNDRD(alpha,beta)

### CMNDRD\*rudder

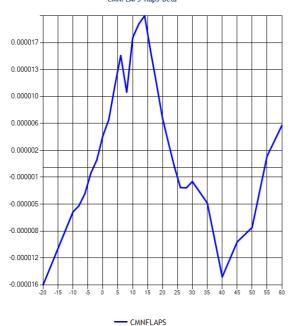


### YAWING MOMENT INCREMENT DUE TO FLAPS

vsp beta -5

### CMNFLAPS(alpha)

### CMNFLAPS\*flaps\*beta



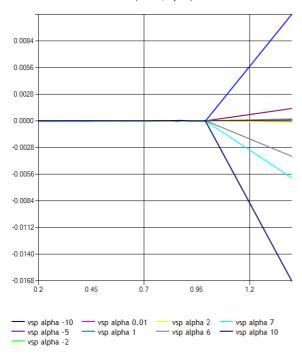
### YAWING MOMENT INCREMENT DUE TO GEAR

### CMNGEAR(alpha,beta)



### YAWING MOMENT INCREMENT DUE TO MACH

### CMNMN(mach,alpha)



### References

1. Richard Harrison, rjh@zaretto.com: swift Aerodynamic data built from vspaero; CG (5.8, 0, -0.02)M, ZDAT/AED/2019/09-09, 09 Sep 2019: http://www.zaretto.com/sites/zaretto.com/files/swift-data/rjh-zaretto-swift-aerodynamic-data-vspaero.pdf

# **Aircraft Metrics**

Element	X	Υ	Z	Unit
Aerodynamic Reference Point (CoP)	6.00	0.00	-0.02	М
Aircraft CG	5.80	0.00	-0.02	М
Element			Unit	
Wingspan	7.97		М	
Wing Area	21.40		M2	
Wing Incidence	0.00			
Chord	2.59		М	
Horiz Tail Arm	0.00			
CIMax	1.06		ND	

# Mass and balance

Element		Unit
Empty Weight	13758.00	LBS
IXX	14382.50	SLUG*FT2
IYY	62830.10	SLUG*FT2
IZZ	74666.90	SLUG*FT2
IXZ	413.20	SLUG*FT2

Element	X	Υ	Z	Unit	Weight
					•

# **Ground Reactions**

Element	X	Υ	Z	Unit	Index
NoseGear	2.51	0.00	-1.88	М	0
LeftMainGear	6.79	-2.47	-1.80	М	1
RightMainGear	6.79	2.47	-1.80	М	2
LeftWingTip	8.54	-4.74	-0.36	М	3
RightWingTip	8.54	4.74	-0.36	М	4
LeftHtailTip	12.37	-1.89	0.55	М	5
RightHtailTip	12.37	1.89	0.55	М	6
VtailTop	11.57	0.00	2.12	М	7
CentreFuselageTop	6.78	0.00	0.79	М	8
CentreFuselageBottom	6.78	0.00	-0.78	М	9
CanopyTop	3.34	0.00	1.07	М	10
Fuse0	0.00	0.00	0.00	М	11
Fuse1	0.99	0.00	-0.42	М	12
Fuse1Top	0.99	0.00	0.42	М	13
Fuse36	3.61	0.00	-0.72	М	14
Fuse83	8.36	0.00	-0.71	М	15
Fuse106	10.62	0.00	-0.66	М	16
Fuse127	12.77	0.00	-0.35	М	17

# Propulsion

Element	X	Y	Z	Unit	Feed
RR-AVON-114	12.00	0.00	0.00	М	FrontTank [0],CenterTank [1],RearTank [2],LeftWing [3],RightWing [4]

# Tanks

Element	X	Υ	Z	Unit	Capacity	Id	Priority	Standpipe
FrontTank	4.77	0.00	-0.03	М	862 LBS	0	3	10 LBS
CenterTank	5.64	0.00	-0.03	М	755 LBS	1	4	10 LBS
RearTank	6.53	0.00	-0.03	М	801 LBS	2	2	10 LBS
LeftWing	5.92	-1.59	-0.03	М	739 LBS	3	1	10 LBS
RightWing	5.92	1.59	-0.03	М	739 LBS	4	1	10 LBS

# Systems

### Name

swift-flight-controls

swift-hydraulics			
swift-engines			
swift-ecs			
swift-electrics			

# Independent variables

velocities/mach

# Name aero/alpha-deg aero/alphadot-rad\_sec-limited aero/beta-deg aero/pb aero/pb aero/qb aero/rb fcs/aleron-pos-deg fcs/elevator-pos-deg fcs/flap-pos-deg fcs/rudder-pos-deg fcs/rudder-pos-deg fcs/rudder-pos-deg fcs/rudder-pos-deg fcs/rudder-pos-deg fcs/rudder-pos-deg