Array Group	Var name	Value	Readable	Modularized	Conversion Fxn	Comments	Stylistics Rules:					
	igfpadd	40	**weight_fraction_addl_payl**	fuselage.added_payload.W		weight of misc equipment (attendants, galleys, IFE, (	- caps only for initialisms(e.g., BPR, AR)/symbol-type (e.g., Tt4, CL, Cp) names					
	igxapu	99	x_APU	fuselage.APU.x		"	- go from general to specific (e.g., poly_eff_HPC, not HPC_poly_eff)					
	igfapu	54	**weight_fraction_APU**	fuselage.APU.W		weight of auxliary power unit normalized by MTOW	- no spaces, only underscores					
	igEIhbend	191		fuselage.bendingmaterial_h.EIh			- remember: array groups are disappearing. no repeated quantities					
	igEIvbend	193		fuselage.bendingmaterial_h.EIv								
	igWhbend	15	weight_bendingmaterial_hor	fuselage.bendingmaterial_h.weight.W		Weight of horizontal-axis bending material (i.e., adde	**Process:**					
	igxhbend	89	x_bending_material_horiz	fuselage.bendingmaterial_h.weight.x		assumed axial location of added structural material t	1) fill in from default_input.toml and read_input.jl					
	igrhobend	154	**density_fuse_bending**	fuselage.bendingmaterial_h.ρ		"	- edits allowed^ to comply with stylistic rules, will need to edit in these files + commit					
	igsigbend	146	**stress_allow_fuse_bendin**	fuselage.bendingmaterial_h.σ		also fuselage.bendingmaterial_v.σ	- some of the auto-fills from Adi's start need edits					
	igWvbend	16	weight_bendingmaterial_ver	fuselage.bendingmaterial_v.weight.W		Weight of vertical-axis bending material	2) fill in the blanks. comments useful for anything ambiguous/dubious					
	igxvbend	90	x_bending_material_vert	fuselage.bendingmaterial_v.weight.x		assumed axial location of added structural material t	**- bold anything that is different from read_input.jl (would need update)**					
	igGJcone	195		fuselage.cone.GJ								
	igtcone	187		fuselage.cone.thickness			**Progress:**					
	igWcone	14	weight_tailcone	fuselage.cone.weight			510	in total				
	igxfix	98	x_fixed_weight	fuselage.fixed.x		"	172	complete / filled in				
	igWfix	6	weight_fixed	fuselage.fixed.W		Cockpit, pilots, etc. NOT OEW	34%					
	igtfloor	189		fuselage.floor.thickness								
	igWppfloor	63	**weight_floor_per_area**	fuselage.floor.W_per_area		weight density by floor area (includes planking, not structure)						
	igWfloor	13	weight_floor	fuselage.floor.W								
	igxhpesys	100	x_HPE_sys	fuselage.HPE_sys.x		", hydraulic, pneumatic, electrical system						
	igfhpesys	55	**weight_fraction_HPE_sys**	fuselage.HPE_sys.W		weight of hydraulic/pneumatic/electrical systems normalized by MTOW (or WMTO)						
	igWinsul	12	weight_insulation	fuselage.insulation.W								
	igWppinsul	62	**weight_window_insul_per**	fuselage.insulation_W_per_area		weight density by area of cabin insulation (shell surface)						
	igwfb	107	**dy_webs**	fuselage.layout.bubble_center_y_offset		fuselage center-to-web distance						
	igdRfuse	109	delta_radius_fuselage	fuselage.layout.cross_section.bubble_lower_downward_		additional vertical drop distance for fuselage fairing						
	igRfuse	108	**radius_fuselage**	fuselage.layout.cross_section.radius								
	ighfloor	110	**dz_floor**	fuselage.layout.floor_depth		height of floor structure (i-beam)						
	ignfweb	106	**N_webs**	fuselage.layout.n_webs		number of fuselage "webs", interfaces between cylinders/"bubbles" (= 0 for traditional Tube+Wing)						
	iganose	80	**fuselage_shape_exponent**	fuselage.layout.nose_radius								
	igbtail	81	**fuselage_shape_exponent**	fuselage.layout.tail_radius								
	iglambdac	111	**taper_tailcone**	fuselage.layout.taper_tailcone		taper ratio of tailcone						
	igtfweb	188		fuselage.layout.thickness_webs								
	igxconend	88	x_cone_end	fuselage.layout.x_cone_end		endpoint of tailcone primary structure, different from xend						
	igxend	83	**x_end_tip**	fuselage.layout.x_end		rear tip of fuselage, aero						
	igxblend2	85	x_end_cylinder	fuselage.layout.x_end_cylinder		"						
	igxnose	82	x_nose_tip	fuselage.layout.x_nose		location of front tip (usually 0), units of length						
	igxshell2	87	x_pressure_shell_aft	fuselage.layout.x_pressure_shell_aft		(") end						
	igxshell1	86	x_pressure_shell_fwd	fuselage.layout.x_pressure_shell_fwd		pressurized fuselage-shell cylinder start						
	igxblend1	84	x_start_cylinder	fuselage.layout.x_start_cylinder		blending points						
	igxWfuse	27	moment_fuselage	fuselage.moment		aircraft pitching moment contribution from fuselage weight						
	igrEshell	150	**ratio_young_mod_fuse_be**	fuselage.ratio_young_mod_fuse_bending		ratio of young's modulus for fuselage bending-stiffening material ("stringer") and skin						
	igfseat	41	**weight_fraction_seat**	fuselage.seat.W		weight of seats normalized by max payload weight (Wpaymax)						
	igEIhshell	190		fuselage.shell.EIh								
	igEIvshell	192		fuselage.shell.EIv								
	igGJshell	194		fuselage.shell.GJ								
	igWshell	10	weight_shell	fuselage.shell.weight		Shell components include skin, stringer, frame, and web						
	igtskin	186		fuselage.skin.thickness								
	igrhoskin	153	**density_skin**	fuselage.skin.ρ		material densities						
	igsigskin	145	**stress_allow_fuse_skin**	fuselage.skin.σ		stress allowables for specific parts						
	igWfuse	17	weight_fuselage	fuselage.weight								
	igfframe	59	**weight_fraction_frame**	fuselage.weight_frac_frame		weight of stiffening frames normalized by skin weight						
	igffadd	60	**weight_fraction_skin_addl**	fuselage.weight_frac_skin_addl		additional weight of skin (local reinf., fasteners, etc.) normalized by skin weight						
	igfstring	58	**weight_fraction_stringers**	fuselage.weight_frac_stringers		weight of stiffening stringers normalized by skin weight						
	igWpwindow	61	**weight_windows_per_leng**	fuselage.window.W_per_length		linear weight density of windows (N/m)						
	igWwindow	11	weight_windows	fuselage.window.W								
	igCLhNrat	161		htail.CL_CLmax								
	igCLhmax	127	**CL_htail_max**	htail.CL_max		used in sizing						
	igCLhCGfwd	125	**CL_htail_at_max_forward_**	htail.CL_max_fwd_CG		lift coefficient for htail in a sizing case (CG as far fwd as possible)						
	igdxWhtail	31	moment_htail_dist	htail.outboard.dxW		" of the horizontal tail						
	igEIch	180		htail.outboard.EI_bending								
	igEInh	181		htail.outboard.EI_normal								
	igGJh	182		htail.outboard.GJ								
	igARh	211	**AR_htail**	htail.layout.AR								
	igbh	213	span_htail	htail.layout.b								
	igboh	214		htail.outboard.layout.b								
	ighboxh	139	**height_c_wbox_htail**	htail.outboard.layout.chord_thickness								
	igwboxh	138	**width_c_wbox_htail**	htail.layout.box_width								
	igxhbox	96	**x_htail_box**	htail.layout.box_x		"						
	igcoh	216		htail.layout.chord								
	igrhh	140	**rh_taper_htail**	htail.layout.hweb_to_hbox		taper parameter for spar box web						
	igSh	212		htail.layout.S								
	igsweeph	217	Htail Sweep	htail.layout.sweep								
	igxhtail	91	**x_htail**	htail.layout.x		assumed axial location of lumped mass centroid for horizontal stabilizer						
	igzhtail	105	**z_htail**	htail.layout.z		assumed vertical position of horizontal tail for Trefftz plane analysis						
	iglambdah	215		htail.outboard.layout.λ								
	igSMmin	130	**fraction_static_margin**	htail.SM_min		sets margin for pitch stability req't, fraction of mean aerodynamic chord						
	igtbcaph	170		htail.outboard.thickness_cap								
	igtbwebh	171		htail.outboard.thickness_web								
	igVh	210	Tail Vh	htail.volume								
	igWhtail	24	weight_htail	htail.weight								
	igfhadd	52	**weight_fraction_htail_addl**	htail.weight_fraction_added		add'l weight of horizontal tail stabilizer normalized by horizontal tail weight (Whtail)						
	igCLvmax	128	**CL_vtail_max**	vtail.CL_max		used in sizing						
	igdxWvtail	32	moment_vtail_dist	vtail.outboard.dxW		" of the vertical tail						
	igEIcv	183		vtail.outboard.EI_bending								
	igEInv	184		vtail.outboard.EI_normal								
	igGJv	185		vtail.outboard.GJ								
	igARv	219	**AR_vtail**	vtail.layout.AR								
	igbv	221	span_vtail	vtail.layout.b								
	igbov	222		vtail.outboard.layout.b								
	ighboxv	142	**height_c_wbox_vtail**	vtail.outboard.layout.chord_thickness								
	igwboxv	141	**width_c_wbox_vtail**	vtail.layout.box_width								
	igxvbox	97	**x_vtail_box**	vtail.layout.box_x		"						
	igcov	224		vtail.layout.chord								
	igrhv	143	**r_h_taper_vtail**	vtail.layout.hweb_to_hbox								
	igSv	220		vtail.layout.S								
	igsweepv	225		vtail.layout.sweep								
	igxvtail	92	**x_vtail**	vtail.layout.x		assumed axial location of lumped mass centroid for vertical stabilizer						
	iglambdav	223		vtail.outboard.layout.λ								
	ignvtail	226		vtail.ntails								
	igtbcapv	172		vtail.outboard.thickness_cap								

Array Group	Var name	Value	Readable	Modularized	Conversion Fxn	Comments			Stylistics Rules:			
	igtbwebv	173		vtail.outboard.thickness_web								
	igVv	218	Vertical tail volume	vtail.volume								
	igWvtail	25	weight_vtail	vtail.weight								
	igfvadd	53	**weight_fraction_vtail_addl**	vtail.weight_fraction_added		add'l weight of vertical tail stabilizer normalized by vertical tail weight (Whtail)						
	igdxWwing	29	moment_wing_dist	wing.dxW		aircraft pitching moment contribution from the weight distribution of the wing						
	igEcap	151	**young_mod_wing_cap**	wing.inboard.caps.material.E		material stiffness						
	igtbcapo	166		wing.inboard.caps.thickness								
	igWcap	19	weight_wingcap	wing.inboard.caps.weight.W		"=wing.outboard.caps.weight.W"						
	igrhocap	155	**density_wing_tail_cap**	wing.inboard.caps.ρ		"						
	igsigcap	147	**stress_allow_wing_cap**	wing.inboard.caps.σ		"						
	igdyWinn	35	moment_innerwing_structwe	wing.inboard.dyW		wing root moment contribution from wing weight inboard of engine						
	igSomax	162		wing.inboard.max_shear_load								
	igMomax	163		wing.inboard.moment								
	igElco	174		wing.inboard.web_cap.EI_bending								
	igElno	175		wing.inboard.web_cap.EI_normal								
	igGJo	176		wing.inboard.web_cap.GJ								
	igtbwebo	167		wing.inboard.webs.thickness								
	igWweb	18	weight_wingweb	wing.inboard.webs.weight.W		"=wing.outboard.webs.weight.W"						
	igrhoweb	156	**density_wing_tail_web**	wing.inboard.webs.ρ		"						
	igtauweb	148	**shear_allow_wing_web**	wing.inboard.webs.σ		"						
	igWinn	33	weight_wing_inner	wing.inboard.weight		includes structure and fuel weight of the inner wing segments						
	igAR	200	**AR_wing**	wing.layout.AR								
	igb	202	**span_wing**	wing.layout.b								
	igbs	204		wing.inboard.layout.b								
	igbo	203	Wing Center Box Halfspan	wing.outboard.layout.b								
	igwbox	134	**width_c_wbox_wing**	wing.layout.box_width_chord		length of spar box along local chord-perpendicular axis, normalized by local perpendicular chord						
	igco	208		wing.layout.chord								
	igrh	137	**rh_taper_wing**	wing.layout.hweb_to_hbox		taper parameter for spar box web						
	ighboxo	135	**height_c_wbox_wing_root**	wing.layout.root_chord_thickness		max height of spar box normalized by local perpendicular chord						
	igS	201		wing.layout.S								
	ighboxs	136	***height_c_wbox_wing_spa***	wing.layout.spanbreak_chord_thickness		***<???? (decide on shorthand)***						
	igXaxis	133	**x_c_wbox_wing**	wing.layout.spar_box_x_c		spar box axis location along chord*, normalized by chord* = x/c (axis is rotated by sweep angle), *perpendicular chord, see 2.6.3 and 2.5						
	igsweep	209	Wing Sweep	wing.layout.sweep								
	igxwing	94	x_wing	wing.layout.x		center of aerodynamic pressure where moment distributions match, assumed to be at geometric centroid						
	igxwbox	95	x_wing_box	wing.layout.box_x		assumed axial location of lumped mass centroid						
	igzwing	104	z_wing	wing.layout.z		assumed vertical position of wing at centerline for Trefftz plane analysis						
	igetas	205	Panel Break Location	wing.ηs								
	iglambdas	207	Inner Panel Taper Ratio	wing.inboard.layout.λ								
	iglambdat	206	Outer Panel Taper Ratio	wing.outboard.layout.λ								
	igtbcaps	168		wing.outboard.caps.thickness								
	igcosLs	113	cos_lambda_strut	wing.outboard.cos_lambda_strut		cosine of strut sweep angle						
	igdyWout	36	moment_outerwing_structwe	wing.outboard.dyW		wing root moment contribution from wing weight outboard of engine						
	igSsmax	164		wing.outboard.max_shear_load								
	igMsmax	165		wing.outboard.moment								
	igElcs	177		wing.outboard.web_cap.EI_bending								
	igElns	178		wing.outboard.web_cap.EI_normal								
	igGJs	179		wing.outboard.web_cap.GJ								
	igtbwebs	169		wing.outboard.webs.thickness								
	igWout	34	weight_wing_outer	wing.outboard.weight		" of the outer wing segments						
	igAstrut	229		wing.strut.A								
	igcstrut	230		wing.strut.chord								
	igdxWstrut	30	moment_strut_dist	wing.strut.dxW		" of the struts						
	igrVstrut	76	**local_velocity_ratio_strut**	wing.strut.local_velocity_ratio								
	igEstrut	152	**young_mod_strut**	wing.strut.material.E		"						
	igrhostrut	157	**density_strut**	wing.strut.material.ρ		"						
	igsigstrut	149	**stress_allow_strut**	wing.strut.material.σmax								
	igSstrut	114	area_strut	wing.strut.S		strut wetted area (approx)						
	ighstrut	228		wing.strut.thickness_to_chord		Strut thickness to chord						
	igWstrut	26	weight_strut	wing.strut.weight								
	igzs	227		wing.strut.z								
	igWwing	20	weight_wing	wing.weight								
	igfaile	47	**weight_fraction_ailerons**	wing.weight_frac_ailerons		weight of wing ailerons normalized by add'l wing mass (Wwadd)						
	igfwatt	51	**weight_fraction_wattach**	wing.weight_frac_attachments		weight of wing attachment hardware normalized by add'l wing mass (Wwadd)						
	igfflap	45	**weight_fraction_flaps**	wing.weight_frac_flap		weight of wing flaps normalized by add'l wing mass (Wwadd)						
	igflete	48	**weight_fraction_lete**	wing.weight_frac_leading_trailing_edge		weight of wing leading and trailing edges normalized by add'l wing mass (Wwadd)						
	igfribs	49	**weight_fraction_ribs**	wing.weight_frac_ribs		weight of wing ribs normalized by add'l wing mass (Wwadd)						
	igfslat	46	**weight_fraction_slats**	wing.weight_frac_slat		weight of wing slats normalized by add'l wing mass (Wwadd)						
	igfspoi	50	**weight_fraction_spoilers**	wing.weight_frac_spoilers		weight of wing spoilers normalized by add'l wing mass (Wwadd)						
i, discrete vars	iifuel	1	fuel_type									
	iifwcen	2	fuel_in_wingcen									
	iiwplan	3										
	iiengloc	4										
	iiengwgt	5										
	iiBLlc	6										
	iifclose	7										
	iiHTsize	8		htail.size								
	iiVTsize	9		vtail.size								
	iixwmove	10										
	iifwing	11	fuel_in_wing									
	iicalcCMVf	12										
	iiengtype	13										
	iiopt	14										
	iiaircraftclass	15										
	iiengmodel	15										
	~~iitotal~~	~~16~~	-									
g, geometry	igFOpt	1				not used						
	igPFEI	2	PFEI			passenger-fuel emissions index aka passenger fuel energy intensity ([energy of fuel burned]/pax-km)						
	igRange	3	range									Incorrect - PFEI is "Payload Fuel Efficiency Index"
	igWMTO	4	weight_max_takeoff			MTO is a pretty widely used initialism outside of TASOPT, so could be retained						
	igWpay	5	weight_payload									
	igWfuel	7	**weight_fuelmax_usable**			**<don't like this phrasing, review**						
	igWfmax	8	**weight_fuelmax_all**									
	igrWfmax	9	fuel_usability_factor									
	igWebare	21	weight_engine_bare									
	igWnace	22	weight_nacelle									
	igWeng	23	weight_engine									
	igdxWfuel	28	moment_fuel_dist			aircraft pitching moment contribution from the weight distribution of the fuel, is scaled by r_fuel						
	igxCGfwd	37	xCG_min			most-forward CG location based on payload/balance calcs						
	igxCGaft	38	xCG_max			most-rearward CG location based on payload/balance calcs						
	igfreserve	39	fuel_reserves			fuel margin as a fraction of mission fuel burn						

Array Group	Var name	Value	Readable	Modularized	Conversion Fxn	Comments	Stylistics Rules:
	igfeadd	42	**weight_fraction_engine_addl**			weight of engine accessories and fuel system normalized by bare engine weight (Webare)	
	igfpylon	43	**weight_fraction_pylon**			weight of pylon normalized by unmounted engine weight (Weng1)	
	igfnace	44	weight_fraction_nace			**unclear if this is actually used, how it's normalized**	
	igflgnose	56	**weight_fraction_LG_nose**			weight of nose landing gear normalized by MTOW	
	igflgmain	57	**weight_fraction_LG_main**			weight of main landing gear normalized by MTOW	
	igNlift	64	**loading_factor_Nlift**			load case sizing parameter for most of the aircraft structure	
	igNland	65	**loading_factor_Nland**			load case sizing parameter for the aircraft floor (emergency landing)	
	igVne	66	**speed_never_exceed**			prescribed top speed used in tail structure sizing	
	igneng	67	number_of_engines				
	igGearf	68	gear_ratio			turbofan gear ratio	
	igfTt4CL1	69	Tt4_frac_bottom_of_climb			interpolating fraction b/w Tt4 at TO and cruise, bottom of climb	
	igfTt4CLn	70	Tt4_frac_top_of_climb			interpolating fraction b/w Tt4 at TO and cruise, top of climb	
	igHTRf	71	**HTR_fan**			blade hub-tip ratio	
	igHTRlc	72	**HTR_LPC**				
	igHTRhc	73	**HTR_HPC**				
	igrSnace	74	**wetted_area_ratio_nacelle**			external wetted area normalizeld by fan area, empirical value	
	igrVnace	75	**local_velocity_ratio_nacelle**				
	igfSnace	77	wetted_area_fraction_nacelle			normalized by WING area	
	igpcabin	78	cabin_pressure				
	igdeltap	79	cabin_overpressure				
	igxeng	93	x_engines			assumed axial location of lumped mass centroid	
	igxlgnose	101	x_nose_landing_gear			assumed axial location of lumped mass centroid	
	igdxlgmain	102	x_main_landing_gear_offset			"	
	igyeng	103	**y_engine_critical**			assumed lateral location of most-outboard engine for engine-out tail-sizing case	
	igcabVol	112	volume_cabin				
	igrpayfwd	115	ratio_payload_fwd			fraction of payload normalized by max value, loaded on fwd segment (xi = 0) used in stability calcs	
	igrpayaft	116	ratio_payload_aft			fraction of payload normalized by max value, loaded on aft segment (xi = 1), used in stability calcs	
	igxNP	117	x_NP			axial location on centerline of aerodynamic neutral point	
	igCMVf1	118	**moment_fuselage_volume_derivative**			used to calculate fuselage contribution to overall aerodynamic pitching moment	
	igCLMf0	119	**lift_fuselage_zero_moment**			"	
	igdepsda	120	**downwash_factor_htail**			used to calculate htail lift contribution to overall aircraft pitching moment, accounts for main wing downwash. d(epsilon)/d(alpha)	
	igdCLnda	121	dCLnacelle_dalpha			lift curve slope for nacelle, used to calculate its contribution to overall aircraft pitching moment, d(CL_nacelle)/d(alpha)	
	igdCLhdCL	122	dCLhtail_dCL			lift derivative of htail wrt overall lift, used to calculate pitch stability	
	igdCLndCL	123	dCLnacelle_dCL			lift derivative of nacelle wrt overall lift, used to calculate pitch stability	
	igCLhspec	124	CL_htail_spec			prescribed lift coefficient for tail, used in balance calculations if ixwmove flag = 1	
	igCLveout	126	**CL_vtail_at_engine_out**			lift coefficient for vtail in a sizing case (one engine out case; critical engine assumed)	
	igfCDhcen	129	**fraction_CD_htail_center**			fraction of htail in-board section (<eta_0) producing drag	
	igrMh	131	**inertial_relief_factor_htail**			part of bending analysis	
	igrMv	132	**inertial_relief_factor_vtail**			"	
	igsigfac	144	**k_stresses**			convenience factor to scale all stresses	
	igrhofuel	158	**density_fuel**			"	
	igrcls	159	-			unused? supplanted by iarcls	
	igrclt	160	-			", iarclt	
	igfLo	196		wing.inboard.lift_rolloff			
	igfLt	197		wing.outboard.lift_rolloff			
	igfLn	198					
	igcma	199					
	igfBLlw	231					
	igfBLlf	232					
	igdfan	233					
	igdlcomp	234					
	igdhcomp	235					
	iglnace	236					
	igA5	237					
	igA7	238					
	igTmetal	239	Max Tmetal				
	igcdefan	240					
	igCDgear	241					
	igCDspoil	242					
	igmuroll	243	rolling_resistance_coeff				
	igmubrake	244	braking_resistance_coeff				
	ighobst	245					
	iglBFmax	246					
	igbmax	247	maxSpan			**should change to max_span**	
	iggtocmin	248	minimum_top-of-climb_gradient				
	igdBSLmax	249					
	igdBCBmax	250					
	igmofWpay	251					
	igmofWMTO	252					
	igPofWpay	253					
	igPofWMTO	254					
	igWtshaft	255					
	igWgen	256					
	igWinv	257					
	igWmot	258					
	igWfan	259					
	igWftank	260					
	igxtshaft	261					
	igxgen	262					
	igxinv	263					
	igxmot	264					
	igxfan	265					
	igxftank	266					
	igxcables	267					
	igWcables	268					
	igxcat	269					
	igWcat	270					
	igWtesys	271					
	igxWtesys	272					
	iglftank	273					
	igWinsftank	274					
	igxWftank	275					
	igRftank	276					
	igWc3des	277					

Array Group	Var name	Value	Readable	Modularized	Conversion Fxn	Comments			Stylistics Rules:				
	igdafttfan	278											
	iglnaceaft	279											
	igfuseVol	280											
	igneout	281											
	igyeout	282											
	igyeinn	283											
	iglftankin	284											
	igLHVfuel	285											
	igWfburn	286											
	igWaftfan	287											
	igWfanGB	288											
	igWaftfanGB	289											
	igWrect	290											
	igWtms	291											
	igfanPCT	292											
	iggamVtarget	293											
	igWpaymax	294											
	ig_YC	295											
	ig_YH	296											
	ig_YO	297											
	ig_YN	298											
	ig_MW	299											
	ighfuel	300											
	igTfuel	301											
	igtotal	301											
m, mission	imwOpt	1											
	imRange	2											
	imWpay	3											
	imWperpax	4	weight_per_pax										
	imaltTO	5											
	imT0TO	6											
	imWTO	7											
	imWfuel	8	**weight_fuel_mission**										
	imPFEI	9											
	imV1	10											
	imV2	11											
	imtTO	12											
	imFTO	13											
	iml1	14											
	imlTO	15											
	imlBF	16											
	imlCB	17											
	imgamVTO	18											
	imgamVBF	19											
	imgamVCB	20											
	imgamVDE1	21											
	imgamVDEn	22											
	imthCB	23											
	imxCB	24											
	imzCB	25											
	imxFO	26											
	imzFO	27											
	imdBSL	28											
	imdBCB	29											
	imdBFO	30											
	imfexcdw	31											
	imfexcdt	32											
	imfexcdf	33											
	imtotal	33											
a, aero	iaalt	1											
	iatime	2											
	iaRange	3											
	iafracW	4											
	iaWbuoy	5											
	iaMach	6											
	iaReunit	7											
	iagamV	9											
	iaCL	10											
	iaCD	11											
	iaCDi	12											
	iaDAfsurf	13											
	iaDAfwake	14											
	iaKAfTE	15											
	iaPAfinf	16											
	iaCDfuse	17											
	iaCDwing	18											
	iaCDhtail	19											
	iaCDvtail	20											
	iaCDnace	21											
	iaCDstrut	22											
	iaCDover	23											
	iaCfnace	24											
	iarcls	25											
	iarclt	26											
	iaclpo	27											
	iaclps	28											
	iaclpt	29											
	iacmpo	30											
	iacmps	31											
	iacmpt	32											
	iafduo	33											

Array Group	Var name	Value	Readable	Modularized	Conversion Fxn	Comments			Stylistics Rules:				
	iafdus	34											
	iafdut	35											
	iaclpmax	36											
	iaCLh	37											
	iaCMw0	38											
	iaCMw1	39											
	iaCMh0	40											
	iaCMh1	41											
	iaCMwing	42											
	iaCMfuse	43											
	iaCMtail	44											
	iaxCG	45											
	iaxCP	46											
	iaxNP	47											
	iafexcdw	48											
	iafexcdt	49											
	iafexcdf	50											
	iacdfw	51											
	iacdpw	52											
	iaspaneff	53											
	iaRerefw	54											
	iaaRexp	55											
	iacdft	56											
	iacdpt	57											
	iaRereft	58											
	iacdfs	59											
	iacdps	60											
	iaRerefs	61											
	iadCDBLlf	62											
	iadCDBLlw	63											
	iaROC	64											
	iatotal	64											
e, engine	iehfuel	1											
	ieTfuel	2	fuel_temp										
	ieff	3											
	iepid	4											
	iepib	5											
	iepifn	6											
	iepitn	7											
	ieBPR	8											
	ieepolf	9											
	ieepollc	10											
	ieepolhc	11											
	ieepolht	12											
	ieepollt	13											
	ieetab	14											
	iepifK	15											
	ieepfK	16											
	ieNf	17											
	ieN1	18											
	ieN2	19											
	ieNbf	20											
	ieNblc	21											
	ieNbhc	22											
	iembf	23											
	iemblc	24											
	iembhc	25											
	iepif	26											
	iepilc	27											
	iepihc	28											
	ieNbfD	29											
	ieNblcD	30											
	ieNbhcD	31											
	ieNbhtD	32											
	ieNbltD	33											
	iembfD	34											
	iemblcD	35											
	iembhcD	36											
	iembhtD	37											
	iembltD	38											
	iepifD	39											
	iepilcD	40											
	iepihcD	41											
	iepihtD	42											
	iepiltD	43											
	ieM2	44											
	ieM25	45											
	ieM0	46											
	iep0	47											
	iea0	48											
	ierho0	49											
	iemu0	50											
	ieT0	51											
	ieu0	52											
	ieTt0	53											
	ieht0	54											
	iept0	55											
	iecpt0	56											
	ieRt0	57											
	ieTt18	58											
	ieht18	59											
	iept18	60											
	iecpt18	61											
	ieRt18	62											
	ieTt19	63											
	ieht19	64											
	iept19	65											
	iecpt19	66											
	ieRt19	67											
	ieTt2	68											

Array Group	Var name	Value	Readable	Modularized	Conversion Fxn	Comments			Stylistics Rules:				
	ieht2	69											
	iept2	70											
	iecpt2	71											
	ieRt2	72											
	ieTt21	73											
	ieht21	74											
	iept21	75											
	iecpt21	76											
	ieRt21	77											
	ieTt25	78											
	ieht25	79											
	iept25	80											
	iecpt25	81											
	ieRt25	82											
	ieTt3	83											
	ieht3	84											
	iept3	85											
	iecpt3	86											
	ieRt3	87											
	ieTt4	88											
	ieht4	89											
	iept4	90											
	iecpt4	91											
	ieRt4	92											
	ieTt41	93											
	ieht41	94											
	iept41	95											
	iecpt41	96											
	ieRt41	97											
	ieTt45	98											
	ieht45	99											
	iept45	100											
	iecpt45	101											
	ieRt45	102											
	ieTt49	103											
	ieht49	104											
	iept49	105											
	iecpt49	106											
	ieRt49	107											
	ieTt5	108											
	ieht5	109											
	iept5	110											
	iecpt5	111											
	ieRt5	112											
	ieTt7	113											
	ieht7	114											
	iept7	115											
	iecpt7	116											
	ieRt7	117											
	ieTt9	118											
	iept9	119											
	iep2	120											
	ieT2	121											
	ieR2	122											
	iecp2	123											
	ieu2	124											
	ieA2	125											
	iep25	126											
	ieT25	127											
	ieR25	128											
	iecp25	129											
	ieu25	130											
	ieA25	131											
	iep5	132											
	ieT5	133											
	ieR5	134											
	iecp5	135											
	ieu5	136											
	ieA5	137											
	iep6	138											
	ieT6	139											
	ieR6	140											
	iecp6	141											
	ieu6	142											
	ieA6	143											
	iep7	144											
	ieT7	145											
	ieR7	146											
	iecp7	147											
	ieu7	148											
	ieA7	149											
	iep8	150											
	ieT8	151											
	ieR8	152											
	iecp8	153											
	ieu8	154											
	ieA8	155											
	ieu9	156											
	ieA9	157											
	ieepf	158											
	ieeplc	159											
	ieephc	160											
	ieepht	161											
	ieeplt	162											
	ieetaf	163											
	ieetalc	164											
	ieetahc	165											
	ieetaht	166											
	ieetalt	167											
	iemcore	168											

Array Group	Var name	Value	Readable	Modularized	Conversion Fxn	Comments			Stylistics Rules:				
	iemofft	169											
	iePofft	170											
	iePhiinl	171											
	ieKinl	172											
	ieepsl	173											
	ieepsh	174											
	ieFe	175											
	ieFsp	176											
	ieTSFC	177											
	ieA5fac	178											
	ieA7fac	179											
	iedTstrk	180											
	ieStA	181											
	ieMtexit	182											
	ieM4a	183											
	ieruc	184											
	ieefilm	185											
	ietfilm	186											
	iefc	187											
	ieepsc1	188											
	ieepsc2	189											
	ieepsc3	190											
	ieepsc4	191											
	ieTmet1	192											
	ieTmet2	193											
	ieTmet3	194											
	ieTmet4	195											
	iedeNOx	196											
	iemdotf	197											
	iePLH2	198											
	ieyg	199											
	ieemot	200											
	ieeinv	201											
	ieecable	202											
	ieegen	203											
	ieethermal	204											
	iePinmot	205											
	iePininv	206											
	iePincable	207											
	iePingen	208											
	iePinthermal	209											
	ieEINOx1	210											
	ieEINOx2	211											
	ieFAR	212											
	ieOPR	213											
	ieWc3	214											
	ieHrejmot	215											
	ieHrejinv	216											
	ieHrejcab	217											
	ieHrejgen	218											
	ieHrejtot	219											
	ieHexcess	220											
	iegsFnsplit	221											
	iegsMotShP	222											
	iegsmdotf	223											
	iegsWin	224											
	iegsRlineF	225											
	iegsBPR	226											
	iegsRlinelc	227											
	iegsRlinehc	228											
	iegsPRhtrb	239											
	iegsPRltrb	230											
	iegsNmechH	231											
	iegsGBtrq	232											
	iegsNmechL	233											
	iegsNmechF	234											
	iegsPodWin	235											
	iegsPodRlineF	236											
	iegsPodGBtrq	237											
	iegsPodMotNme	238											
	iegsPodFanNme	239											
	ietotal	239											
p, flight points	ipstatic	1											
	iprotate	2											
	iptakeoff	3											
	ipcutback	4											
	ipclimb1	5											
	ipclimb2	6											
	ipclimb3	7											
	ipclimb4	8											
	ipclimb5	9											
	ipcruise1	10											
	ipcruise2	11											
	ipdescent1	12											
	ipdescent2	13											
	ipdescent3	14											
	ipdescent4	15											
	ipdescent5	16											

Array Group	Var name	Value	Readable	Modularized	Conversion Fxn	Comments			Stylistics Rules:				
	iptest	17											
	iptotal	17											
	ipclimbn	ipclimb5	# last climb point										
	ipcruisen	ipcruise2	# last cruise point										
	ipdescentn	ipdescent5	# last descent point										

iaalt	cruise_altitude					Stylistics Rules:				
iaCL	cruise_CL					- caps only for initialisms(e.g., BPR, AR)/symbol-type (e.g., Tt4, CL, Cp) names				
iafexcdf	fuse_excrescence_drag_factor					- go from general to specific (e.g., poly_eff_HPC, not HPC_poly_eff)				
iafexcdw	wing_excrescence_drag_factor					- no spaces, only underscores				
iaMach	Mach_Number									
iarcls	Wing_break/root_cl_ratio									
ieA5fac	Core_Nozzle_area									
ieA7fac	Fan_Nozzle_area									
ieBPR	BPR									
ieepolf	Fan Polytropic Efficiency									
ieepolhc	HPC Polytropic Efficiency									
ieepolht	HPT Polytropic Efficiency									
ieepollc	LPC Polytropic Efficiency									
ieepollt	LPT Polytropic Efficiency									
ieetab	Combustion Efficiency									
iepib	Burner PR									
iepid	Diffuser PR									
iepif	FPR									
iepifn	Fan Nozzle PR									
iepihc	HPC PR									
iepilc	LPC PR									
iepitn	Core Nozzle PR									
ieTt4	Tt4									
igAR	AR									
igbo	Wing Center Box Halfspan									
igCLhmax	CLh max									
igCLvmax	CLv max									
igdepsda	Htail Downwash factor									
igetas	Panel Break Location									
igflgmain	Landing gear main weight fraction									
igfpadd	Additional Payload Weight Fraction									
igfreserve	Fuel Reserves									
igGearf	Gear Ratio									
ighboxs	Spanbreak Thickness to chord									
iglambdas	Inner Panel Taper Ratio									
iglambdat	Outer Panel Taper Ratio									
igNlift	Nlift Max vertical load factor- wing bending loads									
igpcabin	Cabin Pressure									
igRfuse	Fuselage Radius									
igrh	wing hweb_to_hbox									
igrhobend	fuse_stringer_density									
igrhocap	Wing Tail Cap Density									
igrhoskin	Skin Density									
igrSnace	nacelle_pylon_wetted_area_ratio									
igrVnace	nacelle_local_velocity_ratio									
igsigbend	sigma_fuse_bending									
igsigcap	Sigma Caps									
igsigfac	Stress Factor									
igsweep	Wing Sweep									
igsweeph	Htail Sweep									
igTmetal	Max Tmetal									
igVh	Tail Vh									
igVne	Never Exceed Speed (Vne)									
igVv	Vertical tail volume									
igWpaymax	Max Payload Weight									
igxblend2	x_end_cylinder									
igxconend	x_cone_end									
igxend	x_end									
igxhbox	HTail x position									
igxshell2	X pressure_shell_aft									
igxvbox	VTail x position									
imRange	Range									
imWpay	Payload Weight									

Category	Var Name	Value	Comments	New Name?
indices for integer variables and flags				
	iifuel	1	# index specifying the fuel (see gasfun.f) 0 = JetA 1 = LH2	
	iifwcen	2	# 0 = no fuel in center box 1 = fuel in center box	
	iiwplan	3	# 0 = bare wing 1 = cantilever with engine 2 = strut braced	
	iiengloc	4	# 1 = engines on wing 2 = engines on fuselage	
	iiengwgt	5	# 1 = basic tech eng. weight 2 = advanced tech eng. weight	
	iiBLIc	6	# 0 = core in clean flow 1 = core ingests KE defect	
	iifclose	7	# 0 = fuse tapers to point 1 = tapers to edge	
	iiHTsize	8	# 1 = set Sh via Vh 2 = set Sh via CLh at forward CG trim	
	iiVTsize	9	# 1 = set Sv via Vv 2 = set Sv via CLv at engine-out trim	
	iixwmove	10	# 0 = wing centroid fixed 1 = move wing to balance	
	iifwing	11	# 0 = no fuel in wing (for LH2) 1 = fuel in wing	
	iicalcCMVf	12		
	iiengtype	13	# 0 = Turboelectric engine; 1 = Turbofan engine	
	iiopt	14	# 0 = run sizing loop only; 1 = run optimization procedure	
	iiaircraftclass	15	# 737 = 737 size aircraft; 777 = 777 size aircraft	
	iiengmodel	15		
	iitotal	16		
indices for missions to be examined				
	imwOpt	1		
	imRange	2		
	imWpay	3		
	imaltTO	4		
	imT0TO	5		
	imWTO	6		
	imWfuel	7		
	imPFEI	8		
	imV1	9		
	imV2	10		
	imtTO	11		
	imFTO	12		
	iml1	13		
	imlTO	14		
	imlBF	15		
	imlCB	16		
	imgamVTO	17		
	imgamVBF	18		
	imgamVCB	19		
	imgamVDE1	20		
	imgamVDEn	21		
	imthCB	22		

	imxCB	23					
	imzCB	24					
	imxFO	25					
	imzFO	26					
	imdBSL	27					
	imdBCB	28					
	imdBFO	29					
	imfexcdw	30					
	imfexcdt	31					
	imfexcdf	32					
	imtotal	32					
indices for geometry (airframe) variables and other sizing variables							
	igFOpt	1					
	igPFEI	2					
	igRange	3					
	igWMTO	4					
	igWpay	5					
	igWfix	6					
	igWfuel	7					
	igWfmax	8					
	igrWfmax	9					
	igWshell	10					
	igWwindow	11					
	igWinsul	12					
	igWfloor	13					
	igWcone	14					
	igWhbend	15					
	igWvbend	16					
	igWfuse	17					
	igWweb	18					
	igWcap	19					
	igWwing	20					
	igWebare	21					
	igWnace	22					
	igWeng	23					
	igWhtail	24					
	igWvtail	25					
	igWstrut	26					
	igxWfuse	27					
	igdxWfuel	28					
	igdxWwing	29					
	igdxWstrut	30					
	igdxWhtail	31					

	igdxWvtail	32					
	igWinn	33					
	igWout	34					
	igdyWinn	35					
	igdyWout	36					
	igxCGfwd	37					
	igxCGaft	38					
	igfreserve	39					
	igfpadd	40					
	igfseat	41					
	igfeadd	42					
	igfpylon	43					
	igfnace	44					
	igfflap	45					
	igfslat	46					
	igfaile	47					
	igflete	48					
	igfribs	49					
	igfspoi	50					
	igfwatt	51					
	igfhadd	52					
	igfvadd	53					
	igfapu	54					
	igfhpesys	55					
	igflgnose	56					
	igflgmain	57					
	igfstring	58					
	igfframe	59					
	igffadd	60					
	igWpwindow	61					
	igWppinsul	62					
	igWppfloor	63					
	igNlift	64					
	igNland	65					
	igVne	66					
	igneng	67					
	igGearf	68					
	igfTt4CL1	69					
	igfTt4CLn	70					
	igHTRf	71					
	igHTRlc	72					
	igHTRhc	73					
	igrSnace	74					
	igrVnace	75					

	igrVstrut	76					
	igfSnace	77					
	igpcabin	78					
	igdeltap	79					
	iganose	80					
	igbtail	81					
	igxnose	82					
	igxend	83					
	igxblend1	84					
	igxblend2	85					
	igxshell1	86					
	igxshell2	87					
	igxconend	88					
	igxhbend	89					
	igxvbend	90					
	igxhtail	91					
	igxvtail	92					
	igxeng	93					
	igxwing	94					
	igxwbox	95					
	igxhbox	96					
	igxvbox	97					
	igxfix	98					
	igxapu	99					
	igxhpesys	100					
	igxlgnose	101					
	igdxlgmain	102					
	igyeng	103					
	igzwing	104					
	igzhtail	105					
	ignfweb	106					
	igwfb	107					
	igRfuse	108					
	igdRfuse	109					
	ighfloor	110					
	iglambdac	111					
	igcabVol	112					
	igcosLs	113					
	igSstrut	114					
	igrpayfwd	115					
	igrpayaft	116					
	igxNP	117					
	igCMVf1	118					
	igCLMf0	119					

	igdepsda	120					
	igdCLnda	121					
	igdCLhdCL	122					
	igdCLndCL	123					
	igCLhspec	124					
	igCLhCGfwd	125					
	igCLveout	126					
	igCLhmax	127					
	igCLvmax	128					
	igfCDhcen	129					
	igSMmin	130					
	igrMh	131					
	igrMv	132					
	igXaxis	133					
	igwbox	134					
	ighboxo	135					
	ighboxs	136					
	igrh	137					
	igwboxh	138					
	ighboxh	139					
	igrhh	140					
	igwboxv	141					
	ighboxv	142					
	igrhv	143					
	igsigfac	144					
	igsigskin	145					
	igsigbend	146					
	igsigcap	147					
	igtauweb	148					
	igsigstrut	149					
	igrEshell	150					
	igEcap	151					
	igEstrut	152					
	igrhoskin	153					
	igrhobend	154					
	igrhocap	155					
	igrhoweb	156					
	igrhostrut	157					
	igrhofuel	158					
	igrcls	159					
	igrclt	160					
	igCLhNrat	161					
	igSomax	162					
	igMomax	163					

	igSsmax	164					
	igMsmax	165					
	igtbcapo	166					
	igtbwebo	167					
	igtbcaps	168					
	igtbwebs	169					
	igtbcaph	170					
	igtbwebh	171					
	igtbcapv	172					
	igtbwebv	173					
	igElco	174					
	igElno	175					
	igGJo	176					
	igElcs	177					
	igElns	178					
	igGJs	179					
	igElch	180					
	igElnh	181					
	igGJh	182					
	igElcv	183					
	igElnv	184					
	igGJv	185					
	igtskin	186					
	igtcone	187					
	igtfweb	188					
	igtfloor	189					
	igElhshell	190					
	igElhbend	191					
	igElvshell	192					
	igElvbend	193					
	igGJshell	194					
	igGJcone	195					
	igfLo	196					
	igfLt	197					
	igfLn	198					
	igcma	199					
	igAR	200					
	igS	201					
	igb	202					
	igbo	203					
	igbs	204					
	igetas	205					
	iglambdat	206					
	iglambdas	207					

	igco	208					
	igsweep	209					
	igVh	210					
	igARh	211					
	igSh	212					
	igbh	213					
	igboh	214					
	iglambdah	215					
	igcoh	216					
	igsweeph	217					
	igVv	218					
	igARv	219					
	igSv	220					
	igbv	221					
	igbov	222					
	iglambdav	223					
	igcov	224					
	igsweepv	225					
	ignvtail	226					
	igzs	227					
	ighstrut	228					
	igAstrut	229					
	igcstrut	230					
	igfBLIw	231					
	igfBLIf	232					
	igdfan	233					
	igdlcomp	234					
	igdhcomp	235					
	iglnace	236					
	igA5	237					
	igA7	238					
	igTmetal	239					
	igcdefan	240					
	igCDgear	241					
	igCDspoil	242					
	igmuroll	243					
	igmubrake	244					
	ighobst	245					
	iglBFmax	246					
	igbmax	247					
	iggtocmin	248					
	igdBSLmax	249					
	igdBCBmax	250					
	igmofWpay	251					

	igmofWMTO	252					
	igPofWpay	253					
	igPofWMTO	254					
	igWtshaft	255					
	igWgen	256					
	igWinv	257					
	igWmot	258					
	igWfan	259					
	igWftank	260					
	igxtshaft	261					
	igxgen	262					
	igxinv	263					
	igxmot	264					
	igxfan	265					
	igxftank	266					
	igxcables	267					
	igWcables	268					
	igxcat	269					
	igWcat	270					
	igWtesys	271					
	igxWtesys	272					
	iglftank	273					
	igWinsftank	274					
	igxWftank	275					
	igRftank	276					
	igWc3des	277					
	igdaftfan	278					
	iglnaceaft	279					
	igfuseVol	280					
	igneout	281					
	igyeout	282					
	igyeinn	283					
	iglftankin	284	#lftank input				
	igLHVfuel	285					
	igWfburn	286					
	igWaftfan	287					

	igWfanGB	288					
	igWaftfanGB	289					
	igWrect	290					
	igWtms	291					
	igfanPCT	292					
	iggamVtarget	293					
	igWpaymax	294					
	ig_YC	295					
	ig_YH	296					
	ig_YO	297					
	ig_YN	298					
	ig_MW	299					
	ighfuel	300					
	igTfuel	301					
	igtotal	301					
indices for turbo-electric systems - really just the electrical machines							
	ite_ratSM	1					
	ite_ratAg	2					
	ite_ratM	3					
	ite_ratSp	4					
	ite_ratW	5					
	ite_ratShft	6					
	ite_z	7					
	ite_kServ	8					
	ite_ratSd	9					
	ite_kpf	10					
	ite_wSd	11					
	ite_Nshrt	12					
	ite_hRS	13					
	ite_Tarm	14					
	ite_kst	15					
	ite_p	16					
	ite_Br	17					
	ite_BSat	18					
	ite_mu0	19					
	ite_rhoMag	20					
	ite_rhoCu	21					
	ite_rhoFe	22					
	ite_rhoSteel	23					

	ite_tauMax	24					
	ite_sigCu	25					
	ite_thetaCu	26					
	ite_psi	27					
	ite_pb0	28					
	ite_Bb0	29					
	ite_fb0	30					
	ite_epsb	31					
	ite_epsf	32					
	ite_lambda	33					
	ite_kw	34					
	ite_ks	35					
	ite_BAg	36					
	ite_rRoti	37					
	ite_hM	38					
	ite_lRot	39					
	ite_hAg	40					
	ite_areaArm	41					
	ite_Bsbi	42					
	ite_Bt	43					
	ite_mSBI	44					
	ite_mTeeth	45					
	ite_lArm	46					
	ite_NSz	47					
	ite_Wpmsm	48					
	ite_k1	49	# k1, k2, k3 are inverter ants for efficiency calcs				
	ite_k2	50					
	ite_k3	51					
	ite_Pinvdes	52	# Stores design inverter power				
	ite_SPdes	53	# Specific power at design				
	ite_effdes	54					
	ite_total	54					
indices for powertrain							
	ipt_nfan	1					
	ipt_ngen	2					
	ipt_nTshaft	3					
	ipt_pifan	4					
	ipt_piLPC	5					
	ipt_piHPC	6					
	ipt_ARgen	7					

	ipt_sigAgGen	8					
	ipt_ratSplitGen	9					
	ipt_ARmot	10					
	ipt_sigAgMot	11					
	ipt_ratSplitMot	12					
	ipt_Tt41	13					
	ipt_cpsi	14					
	ipt_wcat	15					
	ipt_lcat	16					
	ipt_deNOx	17					
	ipt_Wfan	18					
	ipt_Wmot	19					
	ipt_Winv	20					
	ipt_Wcables	21					
	ipt_Wgen	22					
	ipt_Wtshaft	23					
	ipt_Wnacelle	24					
	ipt_Wcatalyst	25					
	ipt_Wpttotal	26					
	ipt_NdesGen	27					
	ipt_NdesFan	28					
	ipt_NdesMot	29					
	ipt_fb0	30					
	ipt_epsb	31					
	ipt_epsf	32					
	ipt_lambda	33					
	ipt_kw	34					
	ipt_ks	35					
	ipt_BAg	36					
	ipt_rRoti	37					
	ipt_hM	38					
	ipt_lRot	39					
	ipt_hAg	40					
	ipt_areaArm	41					
	ipt_Bsbi	42					
	ipt_Bt	43					
	ipt_mSBI	44					
	ipt_mTeeth	45					
	ipt_lArm	46					

	ipt_NSz	47					
	ipt_Wpmsm	48					
	ipt_k1	49	# k1, k2, k3 are inverter ants for efficiency calcs				
	ipt_k2	50					
	ipt_k3	51					
	ipt_Pinvdes	52	# Stores design inverter power				
	ipt_time_NPSS	53					
	ipt_calls_NPSS	54					
	ipt_FanGR	55					
	ipt_Ptshaft	56					
	ipt_Fnsplit	57	# Thrust split between fuse mounted fans and wing podded fans				
	ipt_Rcable	58					
	ipt_Vcable	59					
	ipt_lcable	60					
	ipt_sigcon	61	# Conductance of conductor				
	ipt_alphacon	62	# Temp coeff				
	ipt_rholcable	63	# linear density kg/m				
	ipt_rhocon	64					
	ipt_Jmax	65					
	ipt_rhoins	66					
	ipt_Emax	67					
	ipt_kpf	68					
	ipt_Pelec_mot	69					
	ipt_Pelec_gen	70					
	ipt_total	70					
indices for aero variables at each mission point							
	iaalt	1					
	iatime	2					
	iaRange	3					
	iafracW	4					
	iaWbuoy	5					
	iaMach	6					
	iaReunit	7					
	iagamV	9					
	iaCL	10					
	iaCD	11					
	iaCDi	12					
	iaDAfsurf	13					

	iaDAfwake	14					
	iaKAfTE	15					
	iaPAfinf	16					
	iaCDfuse	17					
	iaCDwing	18					
	iaCDhtail	19					
	iaCDvtail	20					
	iaCDnace	21					
	iaCDstrut	22					
	iaCDover	23					
	iaCfnace	24					
	iarcls	25					
	iarclt	26					
	iaclpo	27					
	iaclps	28					
	iaclpt	29					
	iacmpo	30					
	iacmps	31					
	iacmpt	32					
	iafduo	33					
	iafdus	34					
	iafdut	35					
	iaclpmax	36					
	iaCLh	37					
	iaCMw0	38					
	iaCMw1	39					
	iaCMh0	40					
	iaCMh1	41					
	iaCMwing	42					
	iaCMfuse	43					
	iaCMtail	44					
	iaxCG	45					
	iaxCP	46					
	iaxNP	47					
	iafexcdw	48					
	iafexcdt	49					
	iafexcdf	50					
	iacdfw	51					
	iacdpw	52					
	iaspaneff	53					
	iaRerefw	54					
	iaaRexp	55					
	iacdft	56					
	iacdpt	57					

	iaRereft	58					
	iacdfs	59					
	iacdps	60					
	iaRerefs	61					
	iadCDBLIf	62					
	iadCDBLIw	63					
	iaROC	64					
	iatotal	64					
indices for engine variables at each mission point							
	iehfuel	1					
	ieTfuel	2					
	ieff	3					
	iepid	4					
	iepib	5					
	iepifn	6					
	iepitn	7					
	ieBPR	8					
	ieepolf	9					
	ieepollc	10					
	ieepolhc	11					
	ieepolht	12					
	ieepollt	13					
	ieetab	14					
	iepifK	15					
	ieepfK	16					
	ieNf	17					
	ieN1	18					
	ieN2	19					
	ieNbf	20					
	ieNblc	21					
	ieNbhc	22					
	iembf	23					
	iemblc	24					
	iembhc	25					
	iepif	26					
	iepilc	27					
	iepihc	28					
	ieNbfD	29					
	ieNblcD	30					
	ieNbhcD	31					
	ieNbhtD	32					
	ieNbltD	33					
	iembfD	34					

	iemblcD	35					
	iembhcD	36					
	iembhtD	37					
	iembltD	38					
	iepifD	39					
	iepilcD	40					
	iepihcD	41					
	iepihtD	42					
	iepiltD	43					
	ieM2	44					
	ieM25	45					
	ieM0	46					
	iep0	47					
	iea0	48					
	ierho0	49					
	iemu0	50					
	ieT0	51					
	ieu0	52					
	ieTt0	53					
	ieht0	54					
	iept0	55					
	iecpt0	56					
	ieRt0	57					
	ieTt18	58					
	ieht18	59					
	iept18	60					
	iecpt18	61					
	ieRt18	62					
	ieTt19	63					
	ieht19	64					
	iept19	65					
	iecpt19	66					
	ieRt19	67					
	ieTt2	68					
	ieht2	69					
	iept2	70					
	iecpt2	71					
	ieRt2	72					
	ieTt21	73					
	ieht21	74					
	iept21	75					
	iecpt21	76					
	ieRt21	77					
	ieTt25	78					

	ieht25	79					
	iept25	80					
	iecpt25	81					
	ieRt25	82					
	ieTt3	83					
	ieht3	84					
	iept3	85					
	iecpt3	86					
	ieRt3	87					
	ieTt4	88					
	ieht4	89					
	iept4	90					
	iecpt4	91					
	ieRt4	92					
	ieTt41	93					
	ieht41	94					
	iept41	95					
	iecpt41	96					
	ieRt41	97					
	ieTt45	98					
	ieht45	99					
	iept45	100					
	iecpt45	101					
	ieRt45	102					
	ieTt49	103					
	ieht49	104					
	iept49	105					
	iecpt49	106					
	ieRt49	107					
	ieTt5	108					
	ieht5	109					
	iept5	110					
	iecpt5	111					
	ieRt5	112					
	ieTt7	113					
	ieht7	114					
	iept7	115					
	iecpt7	116					
	ieRt7	117					
	ieTt9	118					
	iept9	119					
	iep2	120					
	ieT2	121					
	ieR2	122					

	iecp2	123					
	ieu2	124					
	ieA2	125					
	iep25	126					
	ieT25	127					
	ieR25	128					
	iecp25	129					
	ieu25	130					
	ieA25	131					
	iep5	132					
	ieT5	133					
	ieR5	134					
	iecp5	135					
	ieu5	136					
	ieA5	137					
	iep6	138					
	ieT6	139					
	ieR6	140					
	iecp6	141					
	ieu6	142					
	ieA6	143					
	iep7	144					
	ieT7	145					
	ieR7	146					
	iecp7	147					
	ieu7	148					
	ieA7	149					
	iep8	150					
	ieT8	151					
	ieR8	152					
	iecp8	153					
	ieu8	154					
	ieA8	155					
	ieu9	156					
	ieA9	157					
	ieepf	158					
	ieeplc	159					
	ieephc	160					
	ieepht	161					
	ieeplt	162					
	ieetaf	163					
	ieetalc	164					
	ieetahc	165					
	ieetaht	166					

	ieetalt	167					
	iemcore	168					
	iemofft	169					
	iePofft	170					
	iePhiinl	171					
	ieKinl	172					
	ieepsl	173					
	ieepsh	174					
	ieFe	175	# now stores total thrust & NOT thrust per engine				
	ieFsp	176					
	ieTSFC	177					
	ieA5fac	178					
	ieA7fac	179					
	iedTstrk	180					
	ieStA	181					
	ieMtexit	182					
	ieM4a	183					
	ieruc	184					
	ieefilm	185					
	ietfilm	186					
	iefc	187					
	ieepsc1	188					
	ieepsc2	189					
	ieepsc3	190					
	ieepsc4	191					
	ieTmet1	192					
	ieTmet2	193					
	ieTmet3	194					
	ieTmet4	195					
	iedeNOx	196					
	iemdotf	197					
	iePLH2	198					
	ieyg	199					
	ieemot	200					
	ieeinv	201					
	ieecable	202					
	ieegen	203					
	ieethermal	204					
	iePinmot	205					
	iePininv	206					
	iePincable	207					

	iePingen	208					
	iePinthermal	209					
	ieEINOx1	210					
	ieEINOx2	211					
	ieFAR	212					
	ieOPR	213					
	ieWc3	214					
	ieHrejmot	215					
	ieHrejinv	216					
	ieHrejcab	217					
	ieHrejgen	218					
	ieHrejtot	219					
	ieHexcess	220					
	iegsFnsplit	221					
	iegsMotShP	222					
	iegsmdotf	223					
	iegsWin	224					
	iegsRlineF	225					
	iegsBPR	226					
	iegsRlinelc	227					
	iegsRlinehc	228					
	iegsPRhtrb	239					
	iegsPRltrb	230					
	iegsNmechH	231					
	iegsGBtrq	232					
	iegsNmechL	233					
	iegsNmechF	234					
	iegsPodWin	235					
	iegsPodRlineF	236					
	iegsPodGBtrq	237					
	iegsPodMotNm	238					
	iegsPodFanNm	239					
	ietotal	239					
max number of blade rows allowed by ieepsc* and ieTmet* indices above							
	ncrowx	ieTmet1					

indices for indexing mission points				
	ipstatic	1		
	iprotate	2		
	iptakeoff	3		
	ipcutback	4		
	ipclimb1	5		
	ipclimb2	6		
	ipclimb3	7		
	ipclimb4	8		
	ipclimb5	9		
	ipcruise1	10		
	ipcruise2	11		
	ipdescent1	12		
	ipdescent2	13		
	ipdescent3	14		
	ipdescent4	15		
	ipdescent5	16		
	iptest	17		
	iptotal	17		
	ipclimbn	ipclimb5	# last climb point	
	ipcruisen	ipcruise2	# last cruise point	
	ipdescentn	ipdescent5	# last descent point	
indices for indexing optimization parameters (to be sequenced over)				
	isRange	1		
	isMach	2		
	isNmax	3		
	issigfac	4		
	isCL	5		
	isAR	6		
	issweep	7		
	isetas	8		
	isT4CR	9		
	isT4TO	10		
	isTmetal	11		
	isOPR	12		
	isFPR	13		
	islBFmax	14		
	isbmax	15		
	isalt	16		
	istotal	16		
indices for indexing optimization variables				
	ioCL	1		

	ioAR	2					
	iosweep	3					
	iohboxo	4					
	iohboxs	5					
	iolams	6					
	iolamt	7					
	iorcls	8					
	iorclt	9					
	ioFPR	10					
	ioBPR	11					
	ioalt	12					
	ioT4CR	13					
	ioT4TO	14					
	ioOPR	15					
	iototal	15					