# Standard Simulation Variable Names

Modeling and Simulation Technical Committee

August 2006

This table is meant to contain simulation variables that are independent of the particular vehicle type being simulated. These variables are tailored towards aircraft simulation.

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | eulerAngle_d(3)<br>eulerAngle_r(3)<br>(euler_angle_d(3)) | Vector of the roll, pitch, and yaw Euler angles defined below | | | | | | |
| 1 | □ | PHI | rollEulerAngle_d<br>rollEulerAngle_r<br>(roll_euler_angle_d) | Roll Euler Angle, FE (flat earth or local) Frame | RWD | | -180 | 180 | 2 | |
| 2 | □ | THET | pitchEulerAngle_d<br>pitchEulerAngle_r | Pitch Euler Angle, FE (flat earth or local) Frame | ANU | | -90 | 90 | 2 | |
| 3 | □ | PSI | yawEulerAngle_d<br>yawEulerAngle_r | Yaw Euler Angle, FE (flat earth or local) Frame | ANR | | -180 | 180 | 2 | |
| | | | eulerAngleRate_d(3)<br>eulerAngleRate_r(3)<br>(euler_angle_rate_d(3)) | Vector of the roll, pitch, and yaw Euler angle rates defined below | | | | | | |
| 7 | p | PHID | rollEulerAngleRate_rs-1 | Euler roll rate, FE (flat earth or local) frame | RWD | | | | | |
| 8 | q | THED | pitchEulerAngleRate_rs-1 | Euler pitch rate, FE (flat earth or local) frame | ANU | | | | | |
| 9 | r | PSID | yawEulerAngleRate_rs-1 | Euler yaw rate, FE (flat earth or local) frame | ANR | | | | | |
| 10 | | SPHI | rollEulerAngleSine | Sine Of Euler Roll Angle | RWD | | -1.0 | 1.0 | | |
| 11 | | CPHI | rollEulerAngleCosine | Cosine Of Euler Roll Angle | RWD | | -1.0 | 1.0 | | |
| 12 | | STHT | pitchEulerAngleSine | Sine Of Euler Pitch Angle | ANU | | -1.0 | 1.0 | | |
| 13 | | CTHT | pitchEulerAngleCosine | Cosine Of Euler Pitch Angle | ANU | | -1.0 | 1.0 | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| 14 | | SPSI | yawEulerAngleSine | Sine Of Euler Yaw Angle | ANR | | -1.0 | 1.0 | | |
| 15 | | CPSI | yawEulerAngleCosine | Cosine Of Euler Yaw Angle | ANR | | -1.0 | 1.0 | | |
| | | | TEToB(3,3) | The FE to Body transformation matrix composed of the elements defined below | | | | | | |
| 16 | | T11 | FEToBT11 | CTHT*CPSI (FE To B) axis transformation element | | | | | | |
| 17 | | T21 | FEToBT21 | SPHI*STHT*CPSI - CPHI*SPSI (FE To B) axis transformation element | | | | | | |
| 18 | | T31 | FEToBT31 | CPHI*STHT*CPSI + SPHI*SPSI (FE to B) axis transformation element | | | | | | |
| 19 | | T12 | FEToBT12 | CTHT*SPSI (FE to B) axis transformation element | | | | | | |
| 20 | | T22 | FEToBT22 | SPHI*STHT*SPSI + CPHI*CPSI (FE to B) axis transformation element | | | | | | |
| 21 | | T32 | FEToBT32 | CPHI*STHT*SPSI - SPHI*CPSI (FE to B) axis transformation element | | | | | | |
| 22 | | T13 | FEToBT13 | -STHT (FE to B) axis transformation element | | | | | | |
| 23 | | T23 | FEToBT23 | SPHI*CTHT (FE to B) axis transformation element | | | | | | |
| 24 | | T33 | FEToBT33 | CPHI*CTHT (FE to B) axis transformation element | | | | | | |
| 25 | | ALFA | angleOfAttack_d | Angle Of Attack, Body axis | ANU | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | angleOfAttack_r | | | | | | | | |
| 26 | | BETA | angleOfSideslip_d | Sideslip Angle, Body axis | ANL | | | | | | |
| | | | angleOfSildesip_r | | | | | | | | |
| 29 | | ALFD | angleOfAttackRate_rs-1 | Angle Of Attack Rate, Body axis | ANU | | | | | | |
| 30 | | BETD | angleOfSideslipRate_rs-1 | Sideslip Angle Rate | ANR | | | | | | |
| 31 | | SALPH | sineAngleOfAttack | Sine Of Angle Of Attack | ANU | | -1.0 | 1.0 | | | |
| 32 | | CALPH | cosineAngleOfAttack | Cosine Of Angle Of Attack | ANU | | -1.0 | 1.0 | | | |
| | | | (cosine_angle_of_attack) | | | | | | | | |
| 33 | | SBETA | sineAngleOfSideslip | Sine Of Sideslip Angle | ANL | | -1.0 | 1.0 | | | |
| | | | (sine_angle_of_attack) | | | | | | | | |
| 34 | | CBETA | cosineAngleOfSideslip | Cosine Of Sideslip Angle | ANL | | -1.0 | 1.0 | | | |
| | | | (cosine_angle_of_sideslip) | | | | | | | | |
| 35 | $\gamma_V$ | GAMV | flightPathAngle_r | Flight Path Angle Above Horizon | ANU | | -p/2 | p/2 | 10) | 3 | |
| | | | flightPathAngle_d | | | | | | 1.3.5.2 | | |
| | | | (flight_path_angle_r) | | | | | | | | |
| 36 | $\gamma_H$ | GAMH | flightPathAzimuth_r | Flight Path Angle In Horizon Plane | CWFN | | -p | p | 10) | 3 | |
| | | | flightPathAzimuth_d | | | | | | 1.3.5.1 | | |
| | | | (flight_path_azimuth_r) | | | | | | | | |
| | | | (Ground_Track_Velocity_Angle) | | | | | | | | |
| | | | s_bodyAngularRate_rs-1(3) | Vector of body axis angular rates | | | | | | | |
| | | | s_bodyAngularRate_ds-1(3) | comprised of the three components as | | | | | | | |
| | | | (s_body_angular_rate_rs-1(3)) | defined below. | | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | p | s_PB | s_bodyRollRate_rs-1<br>s_bodyRollRate_ds-1<br>(s_body_roll_rate_rs-1) | State, Aircraft Roll Velocity, Body Frame | RWD | | | | 10)<br>1.4.6 | 3 | |
| 38 | q | s_QB | s_bodyPitchRate_rs-1<br>s_bodyPitchRate_ds-1<br>(s_body_pitch_rate_rs-1) | State, Aircraft Pitch Velocity, B-frame | ANU | | | | 10)<br>1.4.6 | 3 | |
| 39 | r | s_RB | s_bodyYawRate_rs-1<br>s_bodyYawRate_ds-1<br>(s_body_yaw_rate_rs-1) | State, Aircraft Yaw Velocity, B-frame | ANR | | | | 10)<br>1.4.6 | 3 | |
| | | | sd_bodyAngularAcceleration_rs-2(3)<br>sd_bodyAngularAcceleration_ds-2(3)<br>(sd_body_angular_acceleration_rs-2(3)) | Vector of body axis angular accelerations comprised of the three components as defined below. | | | | | | | |
| 40 | p | sd_PBD | sd_bodyRollAcceleration_rs-2<br>sd_bodyRollAcceleration_ds-2<br>(sd_body_roll_acceleration_rs-2) | State derivative, Aircraft Roll Acceleration, B-frame | RWD | | | | | | |
| 41 | q | sd_QBD | sd_bodyPitchAcceleration_rs-2<br>sd_bodyPitchAcceleration_ds-2<br>(sd_body_pitch_acceleration_rs-2) | State derivative, Aircraft Pitch Accel, B-frame | ANU | | | | | | |
| 42 | r | sd_RBD | sd_bodyYawAcceleration_rs-2<br>sd_bodyYawAcceleration_ds-2<br>(sd_body_yaw_acceleration_rs-2) | State derivative, Aircraft Yaw Acceleration, B-frame | ANR | | | | | | |
| | | | s_bodyVelocity_fs-1(3) | Vector of body axis translational velocities | | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | s_bodyVelocity_ms-1(3)<br>(s_body_velocity_fs-1(3)) | comprised of the three components as defined below. | | | | | | | |
| 43 | $U_B$ | s_UB | s_bodyXVelocity_fs-1<br>s_bodyXVelocity_ms-1<br>(s_body_x_velocity_fs-1) | State, X-velocity B-frame. | FWD | | | | 10)<br>1.4.4 | 3 | |
| 44 | $V_B$ | s_VB | s_bodyYVelocity_fs-1<br>s_bodyYVelocity_ms-1<br>(s_body_y_velocity_fs-1) | State, Y-velocity B-frame | RT | | | | 10)<br>1.4.4 | 3 | |
| 45 | $W_B$ | s_WB | s_bodyZVelocity_fs-1<br>s_bodyZVelocity_ms-1<br>(s_body_z_velocity_fs-1) | State, Z-velocity B-frame | DWN | | | | 10)<br>1.4.4 | 3 | |
| | | | bodyTurbulenceVelocity_fs-1(3)<br>bodyTurbulenceVelocity_ms-1(3)<br>(body_turbulence_velocity_fs-1(3)) | Vector of body axis translational turbulence velocities comprised of the three components as defined below. | | | | | | | |
| 46 | $U_{TURB}$ | UTURB | bodyXTurbulenceVelocity_fs-1<br>bodyXTurbulenceVelocity_ms-1<br>(body_x_turbulence_velocity_fs-1) | X-velocity Turb. Component, B-frame | FWD | | | | | | |
| 47 | $V_{TURB}$ | VTURB | bodyYTurbulenceVelocity_fs-1<br>bodyYTurbulenceVelocity_ms-1<br>(body_y_turbulence_velocity_fs-1) | Y-velocity Turb. Component, B-frame | RT | | | | | | |
| 48 | $W_{TURB}$ | WTURB | bodyZTurbulenceVelocity_fs-1<br>bodyZTurbulenceVelocity_ms-1<br>(body_z_turbulence_velocity_fs-1) | Z-velocity Turb. Component, B-frame | DWN | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| | | | FEVelocity_fs-1(3)<br>FEVelocity_ms-1(3)<br>(FE_velocity_fs-1(3)) | Vector of Fixed Earth (FE) axis translational velocities comprised of the three components as defined below. | | | | | | |
| 49 | $V_N$ | VN | FEXVelocity_fs-1<br>FEXVelocity_ms-1<br>(FE_x_velocity_fs-1) | Northward Velocity Over Fixed Earth (FE) axis system [flat, non-rotating earth] | NORTH | | | | | |
| 50 | $v_E$ | VE | FEYVelocity_fs-1<br>FEYVelocity_ms-1<br>(FE_y_velocity_fs-1) | Eastward Velocity Over Fixed Earth (FE) axis system [flat, non-rotating earth] | EAST | | | | | |
| 51 | $V_D$ | VD | FEZVelocity_fs-1<br>FEZVelocity_ms-1<br>(FE_z_velocity_fs-1) | Downward Velocity Toward Earth Ctr,.(FE) axis system [flat, non-rotating earth] | DOWN | | | | | |
| | | | GEVelocity_fs-1(3)<br>GEVelocity_ms-1(3)<br>(GE_velocity_fs-1(3)) | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 49 | $V_N$ | VNGE | GEXVelocity_fs-1<br>GEXVelocity_ms-1<br>(GE_x_velocity_fs-1) | Northward Velocity Over Geocentric Earth Fixed Axis System (GE) [oblate spheroid rotating earth] | NORTH | | | | | |
| 50 | $v_E$ | VEGE | GEYVelocity_fs-1<br>GEYVelocity_ms-1 | Eastward Velocity Over Geocentric Earth Fixed Axis System (GE) [oblate spheroid | EAST | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | (GE_y_velocity_fs-1) | rotating earth] | | | | | | |
| 51 | $V_D$ | VDGE | GEZVelocity_fs-1<br>GEZVelocity_ms-1<br>(GE_z_velocity_fs-1) | Downward Velocity Toward Earth Center,Geocentric Earth Fixed Axis System (GE) [oblate spheroid rotating earth] | DOWN | | | | | |
| 52 | $V_T$ | VDOT | totalInertialAccel_fs-2<br>totalInertialAccel_ms-2<br>(total_inertial_accel_fs-2) | Rate of change of inertial velocity, FE (flat earth or local) frame or GE frame, whichever applies | NSC | | | | | |
| 53 | $V_T$ | VT | totalInertialVelocity_fs-1<br>totalInertialVelocity_fs-1<br>(total_inertial_velocity_fs-1) | Total Velocity, FE (flat earth or local) frame or GE frame, whichever applies | NSC | | | | | |
| 54 | $V_{RG}$ | VG | groundSpeed_fs-1<br>groundSpeed_ms-1<br>(ground_speed_fs-1) | Vehicle velocity relative to the ground, Ground Speed, FE (flat earth or local) frame or GE frame, whichever applies. For GE frame, groundspeed is relative to the gound location directly under the aircraft. | NSC | | | | | |
| 55 | $V_{rw}$ | VRW | trueAirspeed_fs-1<br>trueAirspeed_ms-1<br>(true_airspeed_fs-1) | Vehicle Velocity relative to the wind (true airspeed) | NSC | | | | | |
| 56 | $M_N$ | XMACH | mach<br>(mach) | Mach Number of the aircraft | NSC | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 57 | $V_{NRW}$ | VNRW | velocityXRelativeToWind_fs-1<br>velocityXRelativeToWind_ms-1<br>(velocity_x_Relative_To_Wind_fs-1) | North Relative Velocity Vn-vnw<br>FE (flat earth or local) frame or GE frame, whichever applies. For GE frame, groundspeed is relative to the gound location directly under the aircraft. | NORTH | | | | | |
| 58 | $V_{ERW}$ | VERW | velocityYRelativeToWind_fs-1<br>velocityYRelativeToWind_ms-1<br>(velocity_y_Relative_To_Wind_fs-1) | East Relative Velocity Ve-vew<br>FE (flat earth or local) frame or GE frame, whichever applies. For GE frame, groundspeed is relative to the gound location directly under the aircraft. | EAST | | | | | |
| 59 | $V_{DRW}$ | VDRW | velocityZRelativeToWind_fs-1<br>velocityZRelativeToWind_ms-1<br>(velocity_z_Relative_To_Wind_fs-1) | Down Relative Velocity Vd-vdw<br>FE (flat earth or local) frame or GE frame, whichever applies. For GE frame, groundspeed is relative to the gound location directly under the aircraft. | DOWN | | | | | |
| 60 | $V_{EQ}$ | VEQ | equivalentAirspeed_nmih-1<br>(equivalent_airspeed_nmih-1 | Equivalent Airspeed, nautical miles per hour | NSC | | | | | |
| | | | | Vector of Geocentric Earth (GE) or Flat Earth (FE) translational velocities comprised of the three components as | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | defined below. | | | | | | |
| 61 | $W_N$ | VNW | windXVelocity_fs-1<br>windXVelocity_ms-1<br>(wind_x_velocity_fs-1) | North component of wind velocity<br>FE (flat earth or local) frame or GE frame, whichever applies. | TO | | | | | |
| 62 | $W_E$ | VEW | windYVelocity_fs-1<br>windYVelocity_ms-1<br>(wind_y_velocity_fs-1) | East component Of Wind Velocity<br>FE (flat earth or local) frame or GE frame, whichever applies. | TO | | | | | |
| 63 | $W_D$ | VDW | WindZVelocity_fs-1<br>WindZVelocity_ms-1<br>(wind_z_velocity_fs-1) | Down Component Of Wind Velocity<br>FE (flat earth or local) frame or GE frame, whichever applies. | TO | | | | | |
| 64 | $W_T$ | VTW | windVelocity_fs-1<br>windVelocity_fs-1<br>(wind_velocity_fs-1) | Total Wind Velocity,<br>FE (flat earth or local) frame or GE frame, whichever applies. | NSC | | | | | |
| 65 | h | ALTD | altitudeRate_fs-1<br>altitudeRate_ms-1<br>(altitude_rate_fs-1) | Altitude Rate Of Change<br>FE (flat earth or local) frame or GE frame, whichever applies. | DOWN | | | | | |
| 66 | | XLOND | longitudeRate_rs-1<br>longitudeRate_ds-1<br>(longitude_rate_rs-1) | Longitude Rate Of Change<br>FE (flat earth or local) frame or GE frame, whichever applies. | WEST | | | | | |
| 67 | | XLATD | latitudeRate_rs-1 | Latitude Rate Of Change | NORTH | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | latitudeRate_ds-1<br>(latitude_rate_rs-1) | FE (flat earth or local) frame or GE frame, whichever applies. | | | | | | |
| 68 | h | ALT | altitudeMSL_f<br>altitudeMSL_m<br>(altitude_MSL_f) | Altitude Of Aircraft Above Sea Lvl<br>FE (flat earth or local) frame | UP | | | | | |
| 69 | | XLON | GELongitude_r<br>GELongitude_d<br>FELongitude_r<br>FELongitude_d<br>(ge_longitude_r) | Longitude Of Aircraft<br>FE (flat earth or local) frame or GE frame, whichever applies. | WEST | | | | | |
| 70 | | XLAT | GELatitude_r<br>GELatitude_d<br>FELatitude_r<br>FELatitude_d<br>(ge_latitude_r) | Latitude Of Aircraft<br>FE (flat earth or local) frame or GE frame, whichever applies. | NORTH | | | | | |
| 71 | | SLAT | sineLatitude<br>(sine_latitude) | Sine Of Aircraft Latitude<br>FE (flat earth or local) frame or GE frame, whichever applies. | NORTH | | | | | |
| 72 | | CLAT | CosineLatitude<br>(Cosine_Latitude) | Cosine Of Aircraft Latitude<br>FE (flat earth or local) frame or GE frame, whichever applies. | NORTH | | | | | |
| | | | | Vector of Geocentric Earth (GE) or Flat Earth (FE) translational acclerations | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | comprised of the three components as defined below. | | | | | | |
| 73 | $V_N$ | VND | FEaxisXAccel_fs-2<br>FEaxisXAccel_ms-2<br>(FEaxis_x_accel_fs-2)<br>or<br>GEaxisXAccel_fs-2<br>GEaxisXAccel_ms-2<br>(GEaxis_x_accel_fs-2) | North Acceleration Over Earth<br><br>FE (flat earth or local) frame or GE frame, whichever applies. | NORTH | | | | | |
| 74 | $V_E$ | VED | FEaxisYAccel_fs-2<br>FEaxisYAccel_ms-2<br>(FEaxis_y_accel_fs-2)<br>or<br>GEaxisYAccel_fs-2<br>GEaxisYAccel_ms-2<br>(GEaxis_y_accel_fs-2) | East Acceleration Over Earth<br><br>FE (flat earth or local) frame or GE frame, whichever applies. | EAST | | | | | |
| 75 | $V_D$ | VDD | FEaxisZAccel_fs-2<br>FEaxisZAccel_ms-2<br>(FEaxis_z_accel_fs-2)<br>or<br>GEaxisZAccel_fs-2<br>GEaxisZAccel_ms-2<br>(GEaxis_z_accel_fs-2) | Down Acceleration Toward Earth surface or center<br><br>FE (flat earth or local) frame or GE frame, whichever applies. | DOWN | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 76 | | AX | bodyXCgAccel_fs-2<br>bodyXCgAccel_ms-2<br>(body_x_cg_accel_fs-2) | X Acceleration Of A/c C.g. (body axis)<br>Includes the gravity vector.<br>Is this actually body? | FWD | | | | | |
| 77 | | AY | bodyYCgAccel_fs-2<br>bodyYCgAccel_ms-2<br>(body_y_cg_accel_fs-2) | Y Acceleration Of A/c C.g. (body axis)<br>Includes the gravity vector. | RT | | | | | |
| 78 | | AZ | bodyZCgAccel_fs-2<br>bodyZCgAccel_ms-2<br>(body_z_cg_accel_fs-2) | Z Acceleration Of A/c C.g. (body axis)<br>Includes the gravity vector. | DOWN | | | | | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 79 | | AXP | bodyXPilotAccel_fs-2<br>bodyXPilotAccel_ms-2<br>(body_x_pilot_accel_fs-2) | X Acceleration Of Pilot reference point (body axis) | FWD | | | | | |
| 80 | | AYP | bodyYPilotAccel_fs-2<br>bodyYPilotAccel_ms-2<br>(body_y_pilot_accel_fs-2) | Y Acceleration Of Pilot reference point(body axis) | RT | | | | | |
| 81 | | AZP | bodyZPilotAccel_fs-2<br>bodyZPilotAccel_ms-2 | Z Acceleration Of Pilot reference point(body axis) | DOWN | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | (body_z_pilot_accel_fs-2) | | | | | | | |
| 82 | | G | localGravity_fs-2<br>localGravity_fs-2<br>(local_gravity_fs-2) | Acceleration Due To Gravity (at the vehicle altitude) | DOWN | | | | | |
| 83 | $V_{CAL}$ | VCAL | calibratedAirspeed_nmih-1<br>(calibrated_airspeed_nmih-1) | Calibrated Air Speed, knots | FWD | | | | | |
| 95 | $I_{xx}$ | XIXX | bodyXXMomentOfInertia_slugf2<br>bodyXXMomentOfInertia_kgm2<br>(body_xx_moment_of_inertia_slugf2) | Vehicle X - Moment Of Inertia about Cg<br>body frame | NSC | | | 10)<br>1.5.2 | | |
| 96 | $I_{yy}$ | XIYY | bodyYYMomentOfInertia_slugf2<br>bodyYYMomentOfInertia_kgm2<br>(body_yy_moment_of_inertia_slugf2) | Vehicle Y - Moment Of Inertia about Cg<br>body frame | NSC | | | 10)<br>1.5.2 | | |
| 97 | $I_{zz}$ | XIZZ | bodyZZMomentOfInertia_slugf2<br>bodyZZMomentOfInertia_kgm2<br>(body_zz_moment_of_inertia_slugf2) | Vehicle Z - Moment Of Inertia about Cg<br>body frame | NSC | | | 10)<br>1.5.2 | | |
| 98 | $I_{xz}$ | XIXZ | bodyXZProductOfInertia_slugf2<br>bodyXZProductOfInertia_kgm2<br>(body_xz_product_of_inertia_slugf2) | Vehicle Xz Prod Of Inertia about Cg<br>body frame | NSC | | | 10)<br>1.5.3 | | |
| 99 | $I_{xy}$ | XIXY | bodyXYProductOfInertia_slugf2<br>bodyXYProductOfInertia_kgm2<br>(body_xy_product_of_inertia_slugf2) | Vehicle Xy Prod Of Inertia about Cg<br>body frame | NSC | | | 10)<br>1.5.3 | | |
| 100 | $I_{yz}$ | XIYZ | bodyYZProductOfInertia_slugf2<br>bodyYZProductOfInertia_kgm2 | Vehicle Yz Prod Of Inertia about Cg | NSC | | | 10)<br>1.5.3 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (body_yz_product_of_inertia_slugf2) | body frame | | | | | | | |
| 101 | M | XMASS | totalMass_slug<br>totalMass_kg<br>(total_mass_slug) | Total Mass Of Vehicle (including Fuel, crew, cargo, stores, passengers, etc.) | NSC | | | | | | |
| 102 | $C_L$ | CL | coefficientOfLift (coefficient_of_lift) | Coefficient Of Lift, Total, includes effects of stores | UP | | | | | 3 | |
| 103 | $C_D$ | CD | coefficientOfDrag (coefficient_of_drag) | Coefficient Of Drag, Total, includes effects of stores | AFT | | | | | 3 | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | | |
| 104 | $C_X$ | CX | aeroBodyXForceCoefficient (aero_body_x_force_coefficient) | X-body Force Coefficient due to aerodynamic loads, includes stores (Body axis) | FWD | | | | 10) 1.6.3 | 3 | |
| 105 | $C_Y$ | CY | aeroBodyYForceCoefficient (aero_body_y_force_coefficient) | Y-body Force Coefficient due to aerodynamic loads, includes stores (Body axis) | RT | | | | 10) 1.6.3 | 3 | |
| 106 | $C_Z$ | CZ | aeroBodyZForceCoefficient (aero_body_z_force_coefficient) | Z-body Force Coefficient due to aerodynamic loads, includes stores (Body axis) | DOWN | | | | 10) 1.6.3 | 3 | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of | | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | the three components as defined below. | | | | | | |
| 107 | $F_{AX}$ | FAX | aeroBodyXForce_lbf<br>aeroBodyXForce_N<br>(aero_body_x_force_lbf) | Total X-body Force due to aerodynamic loads, includes stores (Body axis) | FWD | | | | 3 | |
| 108 | $F_{AY}$ | FAY | aeroBodyYForce_lbf<br>aeroBodyYForce_N<br>(aero_body_y_force_N) | Total Y-body Force due to aerodynamic loads, includes stores (Body axis) | RT | | | | 3 | |
| 109 | $F_{AZ}$ | FAZ | aeroBodyZForce_lbf<br>aeroBodyZForce_N<br>(aero_body_z_force_lbf) | Total Z-body Force due to aerodynamic loads, includes stores (Body axis) | DOWN | | | | 3 | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 110 | $F_{TX}$ | FEX<br>FTX | thrustBodyXForce_lbf<br>thrustBodyXForce_N<br>(thrust_body_x_force_lbf) | Total engine thrust Force, X-body axis | FWD | | | | 3 | |
| 111 | $F_{TY}$ | FEY<br>FTY | thrustBodyYForce_lbf<br>thrustBodyYForce_N<br>(thrust_body_y_force_lbf) | Total engine thrust Force, Y-body axis | RT | | | | 3 | |
| 112 | $F_{TZ}$ | FEZ<br>FTZ | thrustBodyZForce_lbf<br>thrustBodyZForce_N<br>(thrust_body_z_force_lbf) | Total engine thrust Force, Z-body axis | DOWN | | | | 3 | |
| | | | | Vector of Geocentric Earth (GE) Fixed | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | axis translational velocities comprised of the three components as defined below. | | | | | | |
| 113 | $F_{GX}$ | FGX | gearBodyXForce_lbf<br>gearBodyXForce_N<br>(gear_body_x_force_lbf) | Total landing gear Force, X-body axis | FWD | | | | 3 | |
| 114 | $F_{GY}$ | FGY | gearBodyYForce_lbf<br>gearBodyYForce_N<br>(gear_body_y_force_lbf) | Total landing gear Force, Y-body axis | RT | | | | 3 | |
| 115 | $F_{GZ}$ | FGZ | gearBodyZForce_lbf<br>gearBodyZForce_N<br>(gear_body_z_force) | Total landing gear Force, Z-body axis | DOWN | | | | 3 | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 116 | $F_x$ | FTX<br>FX | totalBodyXForce_lbf<br>totalBodyXForce_N<br>(total_body_x_force_lbf) | Total Forces On A/c, X-body axis | FWD | | | | 3 | |
| 117 | $F_y$ | FTY<br>FY | totalBodyYForce_lbf<br>totalBodyYForce_N<br>(total_body_y_force_lbf) | Total Forces On A/c, Y-body axis | RT | | | | 3 | |
| 118 | $F_z$ | FTZ<br>FZ | totalBodyZForce_lbf<br>totalBodyZForce_N<br>(total_body_z_force_lbf) | Total Forces On A/c, Z-body axis | DOWN | | | | 3 | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 123 | $C_l$ | CLL | aeroBodyRollMomentCoefficient (aero_body_roll_moment_coefficient) | Total Aerodynamic Rolling Moment Coeffocoent, Moment about the X-body axis | RWD | | | | 3 | |
| 124 | $C_m$ | CLM | aeroBodyPitchMomentCoefficient (aero_body_pitch_moment_coefficient) | Total Aerodynamic Pitching Moment Coeffocoent, Moment about the Y-body axis | ANU | | | | 3 | |
| 125 | $C_n$ | CLN | aeroBodyYawMomentCoefficient (aero_body_yaw_moment_coefficient) | Total Aerodynamic yawing Moment Coeffocoent, Moment about the Z-body axis | ANR | | | | 3 | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 126 | $L_A$ | TAL | aeroBodyRollMoment_flbf aeroBodyRollMoment_Nm (aero_body_roll_moment_flbf) | Total Aerodynamic Rolling moment (including attached stores), about the X-body axis | RWD | | | | | |
| 127 | $M_A$ | TAM | aeroBodyPitchMoment_flbf | Total Aerodynamic pitching moment | ANU | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | aeroBodyPitchMoment_Nm (aero_body_pitch_moment_flbf) | (including attached stores), about the Y-body axis | | | | | | |
| 128 | $N_A$ | TAN | aeroBodyYawMoment_flbf aeroBodyYawMoment_Nm (aero_body_yaw_moment_flbf) | Total Aerodynamic yawing moment (including attached stores), about the Z-body axis | ANR | | | | | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 129 | $L_T$ | TEL | thrustBodyRollMoment_flbf thrustBodyRollMoment_Nm (thrust_body_roll_moment_flbf) | Total Engine Rolling Moment, about the X-body axis | RWD | | | | | |
| 130 | $L_M$ | TEM | thrustBodyPitchMoment_flbf thrustBodyPitchMoment_Nm (thrust_body_pitch_moment_flbf) | Total Engine pitching Moment, about the Y-body axis | ANU | | | | | |
| 131 | $L_N$ | TEN | thrustBodyYawMoment_flbf thrustBodyYawMoment_Nm (thrust_body_yaw_moment_flbf) | Total Engine yawing Moment, about the X-body axis | ANR | | | | | |
| | | | | Vector of Geocentric Earth (GE) Fixed | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | axis translational velocities comprised of the three components as defined below. | | | | | | |
| 132 | $M_{gx}$ | TGL | landingGearBodyRollMoment_flbf<br>landingGearBodyRollMoment_Nm<br>(landing_gear_body_roll_moment_flbf) | Total Landing Gear Rolling Moment, about the X-body axis | RWD | | | | | |
| 133 | $M_{gy}$ | TGM | landingGearBodyPitchMoment_flbf<br>landingGearBodyPitchMoment_Nm<br>(landing_gear_body_pitch_moment_flbf) | Total Landing gear Pitch Moment, about the Y-body axis | ANU | | | | | |
| 134 | $M_{gz}$ | TGN | landingGearBodyYawMoment_flbf<br>landingGearBodyYawMoment_Nm<br>(landing_gear_body_yaw_moment_flbf) | Total Landing Gear Yawing Moment, about the Z-body axis | ANR | | | | | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 135 | Mtotx | TTL | totalBodyRollMoment_flbf<br>totalBodyRollMoment_Nm<br>(total_body_roll_moment_flbf) | Total Rolling Moment, about the X-body axis | RWD | | | | | |
| 136 | Mtoty | TTM | totalBodyPitchMoment_flbf<br>totalBodyPitchMoment_Nm | Total Pitching Moment, about the Y-body axis | ANU | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | (total_body_pitching_moment_flbf) | | | | | | | |
| 137 | Mtotz | TTN | totalBodyYawMoment_flbf<br>totalBodyYawMoment_Nm<br>(total_body_yaw_moment_flbf) | Total Yawing Moment, about the Z-body axis | ANR | | | | | |
| 138 | | HGT_RWY | runwayHeightAboveSL_ft<br>runwayHeightAboveSL_m<br>(runway_height_above_SL_ft) | Height Of Runway W/r/t Sea Level | Above | | | | | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of the three components as defined below. | | | | | | |
| 139 | | XPLT2CG | pilotEyeBodyXCGReference_ft<br>pilotEyeBodyXCGReference_m<br>(pilot_eye_body_X_CG_reference_ft) | X Position Of Pilot eye point W/r/t C.g., in the body axis system | Eye FWD of CG | | | | | |
| 140 | | YPLT2CG | pilotEyeBodyYCGReference_ft<br>pilotEyeBodyYCGReference_m<br>(pilot_eye_body_Y_CG_reference_ft) | Y Position Of Pilot eye point W/r/t C.g. , in the body axis system | EyeRT of the CG | | | | | |
| 141 | | ZPLT2CG | pilotEyeBodyZCGReference_ft<br>pilotEyeBodyZCGReference_m<br>(pilot_eye_body_Z_CG_reference_ft) | Z Position Of Pilot eye point W/r/t C.g. , in the body axis system | Eye below CG | | | | | |
| | | | | Vector of Geocentric Earth (GE) Fixed axis translational velocities comprised of | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | the three components as defined below. | | | | | | |
| 142 | | XCG | GEaxisXTouchdownPoint_ft<br>GEaxisXTouchdownPoint_m<br>(GEaxis_X_touchdown_point_ft)<br>or<br>FEaxisXTouchdownPoint_ft<br>FEaxisXTouchdownPoint_m<br>(FEaxis_X_touchdown_point_ft) | C.g. X-position W/r/t Runway touchdown point<br><br>FE (flat earth or local) frame or GE frame, whichever applies. | CG NORTH of TD point | | | | | |
| 143 | | YCG | GEaxisYTouchdownPoint_ft<br>GEaxisYTouchdownPoint_m<br>(GEaxis_Y_touchdown_point_ft)<br>or<br>FEaxisYTouchdownPoint_ft<br>FEaxisYTouchdownPoint_m<br>(FEaxis_Y_touchdown_point_ft) | C.g. Y-position W/r/t Runway<br><br>FE (flat earth or local) frame or GE frame, whichever applies. | CG East of TD point | | | | | |
| 144 | | HCG | GEaxisZTouchdownPoint_ft<br>GEaxisZTouchdownPoint_m<br>(GEaxis_Z_touchdown_point_ft)<br>or<br>FEaxisZTouchdownPoint_ft<br>FEaxisZTouchdownPoint_m<br>(FEaxis_Z_touchdown_point_ft) | C.g. Z-position W/r/t Runway<br><br>FE (flat earth or local) frame or GE frame, whichever applies.<br><br>(this variable is normally negative) | CG below the TD point | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| 145 | | WEIGHT | grossWeight_lbm<br>grossWeight_kg<br>(gross_weight_lbm) | Aircraft Gross Weight | NSC | | | | | |
| 146 | $\bar{q}$ | QBAR | dynamicPressure_lbff-2<br>dynamicPressure_Nm-2<br>(dynamic_pressure_lbff-2 ) | Dynamic Pressure | NSC | | | | | |
| 147 | $\overline{q}_c$ | QBARC | impactPressure_lbff-2<br>impactPressure_Nm-2<br>(impact_pressure_lbff-2 ) | Inpact Pressure | NSC | | | | | |
| 148 | A | AREA | referenceWingArea_f2<br>referenceWingArea_m2<br>(reference_wing_area_f2) | Reference Wing Area | NSC | | | | | |
| 149 | b | SPAN | referenceWingSpan_f<br>referenceWingSpan_m<br>(reference_wing_span_f) | Reference Wing Span | NSC | | | | | |
| 150 | c | CHORD | referenceWingChord_f<br>referenceWingChord_m<br>(reference_wing_chord_f) | Mean Aerodynamic Chord (reference wing chord) | NSC | | | | | |
| 151 | ρ | RHO | airDensity_lbmf-3<br>airDensity_kgpm-3<br>(air_density_lbmf-3 ) | Air Density, At Altitude | NSC | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| 152 | a | SOUND | speedOfSound_fs-2<br>speedOfSound_ms-2<br>(speed_of_sound_fs-2) | Velocity Of Sound At Altitude | NSC | | | | | |
| | | | eulerAngleInitialCondition_d(3)<br>eulerAngleInitialCondition_r(3)<br>(euler_angle_initial_condition_d(3)) | Vector of initial Euler angles comprised of the three components as defined below. | | | | | | |
| 153 | | PHIIC | rollEulerAngleInitialCondition_d<br>rollEulerAngleInitialCondition_r<br>(roll_euler_angle_initial_condition_d) | Initial Roll Angle | RWD | | | | | |
| 154 | | THETIC | pitchEulerAngleInitialCondition_d<br>pitchEulerAngleInitialCondition_r<br>(pitch_euler_angle_initial_condition_d) | Initial Pitch Angle | ANU | | | | | |
| 155 | | PSIIC | yawEulerAngleInitialCondition_d<br>yawEulerAngleInitialCondition_r<br>(yaw_euler_angle_initial_condition_d) | Initial Yaw Angle | ANR | | | | | |
| 156 | $\gamma_{VIC}$ | GAMVIC | flightPathAngleInitialCondition_r<br>flightPathAngleInitialCondition_d<br>(flight_path_angle_ | Initial Vertical Flt Path Angle | AH | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | initial_condition_r) | | | | | | | |
| 157 | $\Gamma_{HIC}$ | GAMHIC | flightPathAzimuthInitialCondition_r<br>flightPathAzimuthInitialCondition_d<br>(flight_path_azimuth_<br>initial_condition_r)<br>(Ground_Track_Velocity_Angle) | Initial Horizontal Flt Path Angle | CWFN | | | | | |
| | | | s_bodyAngulerRateInitialCondition_r<br>s-1(3)<br>s_bodyAngularRateInitialCondition_d<br>s-1(3) (s_body_anguler_rate_<br>initial_condition_rs-1(3)) | Vector of initial body axis anguler rates comprised of the three components as defined below. | | | | | | |
| 158 | | PBIC | s_bodyRollRateInitialCondition_rs-1<br>s_bodyRollRateInitialCondition_ds-1<br>(s_body_roll_rate_<br>initial_condition_rs-1) | Initial Roll Angular Rate | RWD | | | | | |
| 159 | | QBIC | s_bodyPitchRateInitialCondition_rs-1<br>s_bodyPitchRateInitialCondition_ds-1<br>(s_body_pitch_rate_<br>initial_condition_rs-1) | Initial Pitch Angular Rate | ANU | | | | | |
| 160 | | RBIC | s_bodyYawRateInitialCondition_rs-1<br>s_bodyYawRateInitialCondition_ds-1<br>(s_body_yaw_rate_<br>initial_condition_rs-1) | Initial Yaw Angular Rate | ANR | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| 161 | | VEQIC | equivalentAirspeedInitialCondition_nmih-1 | Initial Equiv Air Speed | NSC | | | | | |
| 162 | | XCG | GEaxisXTouchdownPointInitialCondition_ft GEaxisXTouchdownPointInitialCondition_m (GEaxis_X_touchdown_point_initial condition_ft) or FEaxisXTouchdownPointInitialCondition_ft FEaxisXTouchdownPointInitialCondition_m (FEaxis_X_touchdown_point_initial condition_ft) | Initial Distance From Runway | NORTH | | | | |
| 163 | | YCG | GEaxisYTouchdownPointInitialCondition_ft GEaxisYTouchdownPointInitialCondition_m (GEaxis_Y_touchdown_point_initial condition_ft) or FEaxisYTouchdownPointInitialCondit | Initial Distance From Runway | EAST | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ion_ft<br>FEaxisYTouchdownPointInitialCondition_m<br>(FEaxis_Y_touchdown_point_initial_condition_ft) | | | | | | | |
| 164 | | HCG | GEaxisZTouchdownPointInitialCondition_ft<br>GEaxisZTouchdownPointInitialCondition_m<br>(GEaxis_Z_touchdown_point_initial_condition_ft)<br>or<br>FEaxisZTouchdownPointInitialCondition_ft<br>FEaxisZTouchdownPointInitialCondition_m<br>(FEaxis_Z_touchdown_point_initial_condition_ft) | Initial Height Above Sea Level | UP | | | | | |
| 165 | | WEIGHTIC | grossWeightInitialCondition_lbm<br>grossWeightInitialCondition_kg<br>(gross_weight_initial_condition_lbm) | Initial Gross Weight | NSC | | | | | |
| 166 | | CG | XBodyCGReference_f | C.g. Position W/r/t L.e. Of the mean | AFT | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | XBodyCGReference_m<br>(X_body_CG_reference_f) | aerodynamic chord | | | | | | |
| 167 | $a_{SL}$ | SOUND_SL | seaLevelSpeedOfSound_fs-2<br>seaLevelSpeedOfSound_ms-2<br>(sea_level_speed_of_sound_fs-2) | Standard day speed of sound @ sea level | | | | | | |
| 168 | | TIME | simTime_s<br>simTime_s<br>(sim_time_s) | Time Since Start Of Operate Mode | NSC | | | | | |
| 169 | | TR | totalTempRatio_C<br>totalTempRatio_K<br>(total_temp_ratio_C) | Total Temperature Ratio | NSC | | | | | |
| 170 | | PR | totalPressureRatio_C<br>totalPressureRatio_K<br>(total_pressure_ratio_C) | Total Pressure Ratio | NSC | | | | | |
| 171 | | D2R | degToRad<br>degToRad<br>(deg_to_rad) | 0.01745329 Deg To Rad Conversion Factor | NSC | | | | | |
| 172 | | R2D | radToDeg<br>radToDeg<br>(rad_to_d) | 57.2957795 Rad To Deg Conversion Factor | NSC | | | | | |
| 173 | $T_{AMB}$ | TAMB | ambientTemperature_C<br>ambientTemperature_K | Ambient Temperature at altitude | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | (ambient_temperature_C) | | | | | | | |
| 174 | $P_{AMB}$ | PAMB | ambientPressure_lbff-2<br>ambientPressure_Nm-2<br>(ambient_pressure_lbff-2) | Ambient Pressure at altitude | NSC | | | | | |
| 175 | $T_{TOT}$ | TTOT | totalTemp_C<br>totalTemp_K<br>(total_temp_C) | Total Temperature at altitude | NSC | | | | | |
| 176 | $P_{TOT}$ | PTOT | totalPressure_lbff-2<br>totalPressure_Nm-2<br>(total_pressure_lbff-2) | Total Pressure at altitude | NSC | | | | | |
| 177 | $I_{EXX}$ | IEXX | engineXXMomentOfInertia_slugf2<br>engineXXMomentOfInertia_kgm2<br>(engine_xx_moment_of_inertia_slugf2) | Moment of inertia about the X-axis Of Rotating Eng, for an engine with the propeller, includes the propeller This is wrt the axis of the engine | | | | | | |
| 178 | $I_{EYY}$ | IEYY | engineYYMomentOfInertia_slugf2<br>engineYYMomentOfInertia_kgm2<br>(engine_yy_moment_of_inertia_slugf2) | Moment of inertia about the Y-axis Of Rotating Eng, for an engine with the propeller, includes the propeller This is wrt the axis of the engine | | | | | | |
| 179 | $I_{EZZ}$ | IEZZ | engineZZMomentOfInertia_slugf2<br>engineZZMomentOfInertia_kgm2<br>(engine_zz_moment_of_inertia_slugf2) | Moment of inertia about the Z-axis Of Rotating Eng, for an engine with the propeller, includes the propeller This is wrt the axis of the engine | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | $I_{EXZ}$ | IEXZ | engineXZProductOfInertia_slugf2<br>engineXZProductOfInertia_kgm2<br>(engine_xz_product_of_inertia_slugf2<br>) | Product of inertia about the XZ-axis Of Rotating Eng, for an engine with the propeller, includes the propeller<br>This is wrt the axis of the engine | | | | | | |
| | $I_{EXY}$ | IEXY | engineXYProductOfInertia_slugf2<br>engineXYProductOfInertia_kgm2<br>(engine_xy_product_of_inertia_slugf2<br>) | Product of inertia about the XY-axis Of Rotating Eng, for an engine with the propeller, includes the propeller<br>This is wrt the axis of the engine | | | | | | |
| | $I_{EYZ}$ | IEYZ | engineYZProductOfInertia_slugf2<br>engineYZProductOfInertia_kgm2<br>(engine_yz_product_of_inertia_slugf2<br>) | Product of inertia about the YZ-axis Of Rotating Eng, for an engine with the propeller, includes the propeller<br>This is wrt the axis of the engine | | | | | | |
| | | | | Vector _____ comprised of the three components as defined below. | | | | | | |
| 180 | $u_B$ | UBD or sd_UBD | sd_bodyXacceleration_fs-2<br>sd_bodyXacceleration_ms-2<br>(sd_body_X_acceleration_fs-2) | Lnongitudinal acceleration (along the X-body axis)<br>EOM can be formulated such that UBD is not a state derivative, correct? | FWD | | | | | |
| 181 | $v_B$ | VBD or sd_VBD | sd_bodyYacceleration_fs-2<br>sd_bodyYacceleration_ms-2<br>(sd_body_Y_acceleration_fs-2) | Right Sideward Acceleration, B-axis | RT | | | | | |
| 182 | $w_B$ | WBD or | sd_bodyZacceleration_fs-2 | Downward Acceleration, B-axis | DOWN | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | sd_WBD | sd_bodyZacceleration_ms-2<br>(sd_body_Z_acceleration_fs-2) | | | | | | | |
| | | | | Vector _____ comprised of the three components as defined below. | | | | | | |
| 183 | | VTWN | netWindVelFromNorth_fs-1<br>netWindVelFromNorth_ms-1<br>(net_wind_vel_from_north_fs-1) | Net wind velocity from north (plus means wind is coming from the North)<br>Net wind is the steady state winds plus any turbulences and shears. | NORTH (plus means wind | | | | | |
| 184 | | VTWE | netWindVelFromEast_fs-1<br>netWindVelFromEast_ms-1<br>(net_wind_vel_from_east_fs-1) | Net wind velocity from East (plus means wind is coming from the East)<br>Net wind is the steady state winds plus any turbulences and shears. | EAST | | | | | |
| 185 | | VTWD | netWindVelFromBelow_fs-1<br>netWindVelFromBelow_ms-1<br>(net_wind_vel_from_below_fs-1) | Net wind velocity from below (plus means wind is coming from below)<br>Net wind is the steady state winds plus any turbulences and shears. | DOWN | | | | | |
| | | | | Vector _____ comprised of the three components as defined below. | | | | | | |
| 186 | | VNTURB | turbulenceFromNorth_fs-1<br>turbulenceFromNorth_ms-1<br>(turbulence_from_north_fs-1) | North component of turbulence (plus means turbulence is coming from the North) | NORTH | | | | | |
| 187 | | VETURB | turbulenceFromEast_fs-1 | East component of turbulence (plus means | EAST | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | turbulenceFromEast_ms-1<br>(turbulence_from_east_fs-1) | turbulence is coming from the East) | | | | | | |
| 188 | | VDTURB | turbulenceFromBelow_fs-1<br>turbulenceFromBelow_ms-1<br>(turbulence_from_below_fs-1) | Down component of turbulence (plus means turbulence is coming from below) | DOWN | | | | | |
| 189 | | PAMBR | ambientPressureRatio<br>(Ambient_Pressure_Ratio) | Ratio Of ambient pressure at altitude to sea level ambient ressure | NSC | | | | | |
| 190 | | TAMBR | ambientTemperatureRatio<br>(ambient_temperature_ratio) | Ratio Of ambient temperature at altitude to sea level ambient temp. | NSC | | | | | |
| | | | | Vector _____ comprised of the three components as defined below. | | | | | | |
| 191 | $\Delta X_{cg}$ | DXCG | aircraftBodyXCGPosition_ft<br>aircraftBodyXCGPosition_m<br>(aircraft_body_X_CG_position_ft) | Cg Displacement From the aerodynamic force and moment reference center, + is CG fwd of the Aerodynamcic Reference Center (ARC). The ARC is the reference point that the aero model forces and moments act upon the aircraft. | FWD | | | | | |
| 192 | $\Delta Y_{cg}$ | DYCG | aircraftBodyYCGPosition_ft<br>aircraftBodyYXCGPosition_m<br>(aircraft_body_Y_CG_position_ft) | Cg Displacement From the aerodynamic force and moment reference center, + is CG to the right of the ARC | RT | | | | | |
| 193 | $\Delta Z_{cg}$ | DZCG | aircraftBodyZCGPosition_ft<br>aircraftBodyZCGPosition_m<br>(aircraft_body_Z_CG_position_ft) | Cg Displacement From the aerodynamic force and moment reference center, + is CG below the the ARC | DWN | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| 194 | $p_s$ | PS | stabilityaxisRollRate_rs-1<br>stabilityaxisRollRate_ds-1<br>(stabilityaxis_roll_rate_rs-1) | Stability Axis roll rate<br>Haven't defined stability axis | RWD | | | | | |
| 195 | $r_s$ | RS | stabilityaxisYawRate_rs-1<br>stabilityaxisYawRate_ds-1<br>(stabilityaxis_yaw_rate_rs-1) | Stability Axis yaw rate | ANR | | | | | |
| 196 | | PBDEG | Body_Roll_Acceleration_ds-2 | Roll rate, body axis | RWD | | | | | |
| 197 | | QBDEG | Body_Pitch_Acceleration_ds-2 | Pitch rate, body axis | ANU | | | | | |
| 198 | | RBDEG | Body_Yaw_Acceleration_ds-2 | Yaw rate, body axis | ANR | | | | | |
| 199 | | | | | | | | | | |
| 200 | | IWEEL | | Landing Gear Down | NSC | | | | | |
| 201 | | IWEELC | | Command Landing Gear Down | NSC | | | | | |
| 202 | | ILGTRN | | Landing Gear In Transit | NSC | | | | | |
| 203 | | IPARAC | | Activate Parachute | NSC | | | | | |
| 204 | | IATCG | | Cg Reference Point Moment Transfer FlagND | | | | | | |
| 205 | | | | | | | | | | |
| 206 | | | | | | | | | | |
| 207 | | | | | | | | | | |
| 208 | | | | | | | | | | |
| 209 | | NX | | X Body acceleration at CG, includes the | FWD | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | gravity vector | | | | | | |
| 210 | | NY | | Y Body acceleration at CG, includes the gravity vector | RT | | | | | |
| 211 | | NZ | | Z Body acceleration at CG, includes the gravity vector | DOWN | | | | | |
| 212 | | | | | | | | | | |
| 213 | | | | | | | | | | |
| 228 | | DTAMB_R | | Delta to ambient temperature, deg Rankin | | | | | | |
| | | | | Vector comprised of the three | | | | | | |

| Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|
| | | | components as defined below. | | | | | | |
| 229 | XCGLOC | | X-location in inertial space of CG | | | | | | |
| 230 | YCGLOC | | Y-location in inertial space of CG | | | | | | |
| 231 | ZCGLOC | | Z-location in inertial space of CG | | | | | | |
| | | | Vector comprised of the three components as defined below. | | | | | | |
| 232 | XPLOC | | X-location in inertial space of pilot | | | | | | |
| 233 | YPLOC | | Y-location in inertial space of pilot | | | | | | |
| 234 | ZPLOC | | Z-location in inertial space of pilot | | | | | | |
| 235 | RR | | Radius of Earth + height of rwy above SL | | | | | | |
| 236 | UUU | | Inertial velocity trans to body x-axis | +FWD | | | | | |
| 237 | VVV | | Inertial velocity trans to body y-axis | +RT | | | | | |
| 238 | WWW | | Inertial velocity trans to body z-axis | +DWN | | | | | |
| | | | Vector _____ comprised of the three components as defined below. | | | | | | |
| 239 | PTURB | | Body axis roll turbulence | RT | | | | | |
| 240 | QTURB | | Body axis pitch turbulence | ANU | | | | | |
| 241 | RTURB | | Body axis yaw turbulence | RT | | | | | |
| | | | Vector _____ comprised of the three components as defined below. | | | | | | |
| 242 | PBWN | | Roll rate wrt roll turbulence | RT | | | | | |
| 243 | QBWN | | Pitch rate wrt pitch turbulence | UP | | | | | |
| 244 | RBWN | | Yaw rate wrt yaw turbulence | RT | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| 245 | | PSWN | | Stability axis roll rate w/turb | RT | | | | | |
| 246 | | RSWN | | Stability axis yaw rate w/turb | RT | | | | | |
| 247 | | RALT | heightAboveTerrain_f<br>heightAboveTerrain_m | height above the terrain | | | | | | |
| 248 | | RE | Radius_of_Smooth_Earth_f | Radius of Earth (center to smooth surface which is mean sea level), round earth model | | | | | | |
| | | H_O_T | heightOfTerrain_f<br>heightOfTerrain_m<br>(Height_of_Terrain_f) | Height of the terrain under the a/c cg. It is the terrain height above the smooth surface of of the earth, regardless whether a flat, round or oblate spheroid model is used. | | | | | | |
| | | RE_OS | Radius_Of_Oblate_Spheroid_Earth_f | Radius of Earth, center to smooth surface, oblate spheroid earth model. | | | | | | |
| 249 | | DTINV | | Inverse of simulation time step | | | | | | |
| 250 | | G_INV | | Inverse of acceleration due to gravity | | | | | | |
| 251 | | FPS2KTS | | Conversion from feet/sec to knots | | | | | | |
| 252 | | KTS2FPS | | Conversion from knots to feet/sec | | | | | | |
| 253 | | TAMB_R | | Ambient temperature, degrees Rankin | | | | | | |
| 254 | | TTOT_R | | Total temperature, degrees Rankin | | | | | | |
| 255 | | ALT_SET | | Altimeter setting (Kohlsman window) | | | | | | |
| 256 | | ALT_PRESSURE | Pressure_Altitude_f | Pressure altitude | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| 257 | | ALT_TAMB_REF | | Altitude at reference temperature | | | | | | |
| 258 | | TAMB_R_REF | | Ref. ambient temperature (non-standard) | | | | | | |
| 259 | | RHO_SL | seaLevelAirDensity_lbfpf3 | Air density at sea level | | | | | | |
| 260 | | TAMB_R_SL | seaLevelAmbientTemp_ | Standard day ambient temperature | | | | | | |
| 261 | | PAMB_SL | | Standard day ambient pressure | | | | | | |
| 262 | | CGXREF | (X_CG_Reference_Inches_Constant) | X-location of reference CG (fuselage sta | AFT | | | | | |
| 263 | | CGYREF | (Y_CG_Reference_Inches_Constant) | Y-location of reference CG (buttline) | LEFT | | | | | |
| 264 | | CGZREF | (Z_CG_Reference_Inches_Constant) | Z-location of reference CG (waterline) | UP | | | | | |
| 265 | | PI | pi | Constant = pi = 3.14159 | | | | | | |
| 267 | | RALT_TERRAIN | | Radar alt perpendicular to terrain slope | | | | | | |
| 268 | | VNGUST | | North wind gust component | North | | | | | |
| 269 | | VEGUST | | East wind gust component | East | | | | | |
| 270 | | VDGUST | | Down wind gust component | Down | | | | | |
| 271 | | WIND_SPEED | | Total velocity of steady wind | | | | | | |
| 272 | | WIND_DIRECTION | | Steady wind heading (blowing FROM) | | | | | | |
| 273 | | UBURB | | Body x-axis component of carrier | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | burbleFT/S | | | | | | |
| 274 | | VBURB | | Body y-axis component of carrier burbleFT/S | | | | | | |
| 275 | | WBURB | | Body z-axis component of carrier burbleFT/S | | | | | | |
| 276 | | PBURB | | Roll component of carrier burble | RT | | | | | |
| 277 | | QBURB | | Pitch component of carrier burb | ANU | | | | | |
| 278 | | TURB_LEVEL | | Level of severity of turbulence | | | | | | |
| 279 | | TURB_MODEL | | DRYDEN = 1, Von Karman = 2 | | | | | | |
| 280 | | TURB_TYPE | | Random = 1, Repeatable = 2 | | | | | | |
| 281 | | GUST_LEVEL | | Step gust level - magnitude,frequency | | | | | | |
| 282 | | BURB_TYPE | | Ship burble type 0-off,1-random,2:11 rpt | | | | | | |
| 283 | | FDX | | Delta to x-axis body force | +FWD | | | | | |
| 284 | | FDY | | Delta to y-axis body force | +RT | | | | | |
| 285 | | FDZ | | Delta to z-axis body force | +DOWN | | | | | |
| 286 | | TDL | | Delta to roll moment | +RWD | | | | | |
| 287 | | TDM | | Delta to pitch moment | +ANU | | | | | |
| 288 | | TDN | | Delta to yaw moment | +ANR | | | | | |
| 289 | | IFLAPC | | Flap command (0:retract, 1..n:extend) | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| 290 | | IFLAP | | Flap status (-1:trans,0:up,1..n out) | | | | | | |
| 291 | | IWOW | (Weight_On_Wheels) | Weight-on-wheels flag (0:none,1:on) | | | | | | |
| 292 | | SLOPE_RWY | | Slope (ie "pitch") of runway | | | | | | |
| 293 | | BANK_RWY | | Bank (ie "roll") of runway | RT | | | | | |
| 294 | | CBNKRWY | | Cosine of runway Euler bank angle | | | | | | |
| 295 | | SBNKRWY | | Sine of runway Euler bank angle | | | | | | |
| 296 | | CSLPRWY | | Cosine of runway Euler pitch angle | | | | | | |
| 297 | | SSLPRWY | | Sine of runway Euler pitch angle | | | | | | |
| 298 | | PBGUST | | Body axis roll gust | RT | | | | | |
| 299 | | QBGUST | | Body axis pitch gust | RT | | | | | |
| 300 | | TAMB_C | | Ambient temp.- used for non-standard day | | | | | | |
| 301 | | ALT_DENSITY | | Density altitude | | | | | | |
| 302 | | PAMB_ST | | Ambient pressure, standard day | | | | | | |
| 303 | | TAMB_R_ST | | Ambient temperature, standard day | | | | | | |
| 304 | | RHO_ST | | Ambient density, standard day | | | | | | |
| 305 | | DELTA_PAMB | | Ambient pressure delta from standard day | | | | | | |
| 306 | | DELTA_TAMB | | Ambient temp. delta from standard day | | | | | | |
| 307 | | DELTA_RH | | Ambient density delta from standard | | | | | | |

| | Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|---|
| | | O | | daySLUG/FT3 | | | | | | |
| 308 | | NS_PAMB | | Non-standard ambient pressure flag | | | | | | |
| 309 | | NS_ALTP | | Non-standard pressure altitude flag | | | | | | |
| 310 | | NS_TAMB | | Non-standard ambient temperature flag | | | | | | |
| 311 | | NS_DENS | | Non-standard ambient density flag | | | | | | |
| 312 | | ALFA_TRIM | | Target angle of attack for trim | ANU | | | | | |
| 313 | | BETA_TRIM | | Target angle of sideslip for trim | ANL | | | | | |
| | | | Trailing_Edge_Flap_Deflection | Trailing edge flap deflection | | | | | | |
| | | | Leading_Edge_Flap_Deflection | Leading edge flap deflection | | | | | | |
| | | | Spoiler_Deflection | Spoiler deflection | | | | | | |
| | | | Aileron_Deflection | Aileron deflection | | | | | | |
| | | | Rudder_Deflection | Rudder deflection | | | | | | |
| | | | Stabilizer_Deflection | Stabilizer deflection | | | | | | |
| | | | Speedbrake_Deflection | Speedbrake deflection | | | | | | |
| | | | Canard_Deflection | Canard Deflection | | | | | | |
| | | | Elevator_Deflection | Elevator deflection | | | | | | |
| | | | Aircraft_Landing_Gear_Status_Positi on | array of gear positions (array) | | | | | | |
| | | | Ownship_Linear_Velocity | Ownship linear velocity VECTOR | | | | | | |
| | | | Ownship_Linear_Acceleration | Ownship linear acceleration VECTOR | | | | | | |
| | | | Ownship_Angular_Position | Ownship angular position VECTOR | | | | | | |
| | | | Ownship_Angular_Velocity | Ownship angular velocity VECTOR | | | | | | |
| | | | Ownship_Angular_Acceleration | Ownship angular acceleration VECTOR | | | | | | |

| Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|
| | | Ownship_Earth_Axis_Velocity | Ownship earth axis velocity VECTOR | | | | | | |
| | | Ownship_Earth_Axis_Acceleration | ownship earth axis acceleration VECTOR | | | | | | |
| | | Ownship_Attitude_Relative_To_Deck | Ownship attitude relative to deck VECTOR | | | | | | |
| | | Quaternion_E1 | Quaternion E1 | | | | | | |
| | | Quaternion_E2 | Quaternion E2 | | | | | | |
| | | Quaternion_E3 | Quaternion E3 | | | | | | |
| | | Quaternion_E4 | Quaternion E4 | | | | | | |
| | | Last_Times_Quaternion_E1_Rate | previous Quaternion E1 dot | | | | | | |
| | | Last_Times_Quaternion_E2_Rate | previous Quaternion E2 dot | | | | | | |
| | | Last_Times_Quaternion_E3_Rate | previous Quaternion E3 dot | | | | | | |
| | | Last_Times_Quaternion_E4_Rate | previous Quaternion E4 dot | | | | | | |
| | | Delta_Time | Time step | | | | | | |
| | | Body_To_Earth_Transformation_Matrix | Transformation matrix from body axis to earth axis | | | | | | |
| | | Direction_Cosine_Matrix | matrix of direction cosines | | | | | | |
| | | Angle_Of_Attack_At_Stall_Onset | Angle of attack at stall onset | | | | | | |
| | | Body_Air_Velocity | Body air velocity VECTOR | | | | | | |
| | | Body_Air_Acceleration | Body air acceleration VECTOR | | | | | | |
| | | Normal_Load_Factor | (Fxb*Sin(alpha)-Fzb*Cos(alphs))/Wgross | | | | | | |
| | | Platform_Velocity | platform velocity VECTOR (see CRAFT_RA.A) | | | | | | |
| | | Air_Density_Ratio | Air density ratio (Rho_amb/Rho_std_SL) | | | | | | |

| Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|
| | | Meridional_Earth_Radius | (see EAR_RAD.A) | | | | | | |
| | | Normal_Earth_Radius | round or oblate spheroid earth model? (see EAR_RAD.A) | | | | | | |
| | | Geodetic_Altitude | (see CRAFT_RA.A) | | | | | | |
| | | Wander_Angle | (see CRAFT_RA.A) | | | | | | |
| | | Earth_Rotation_X_Rate | Earth rotation x rate (see EAR_RO_R.A) | | | | | | |
| | | Earth_Rotation_Y_Rate | Earth rotation y rate (see EAR_RO_R.A) | | | | | | |
| | | Earth_Rotation_Z_Rate | Earth rotation z rate (see EAR_RO_R.A) | | | | | | |
| | | Coriolis_Acceleration | Coriolis acceleration VECTOR | | | | | | |
| | | Craft_X_Velocity | Craft x velocity (see CRAFT_RA.A) | | | | | | |
| | | Craft_Y_Velocity | Craft y velocity (see CRAFT_RA.A) | | | | | | |
| | | Fuel_Tank_Quantities | Array of fuel weights of each tank | | | | | | |
| | | Drift_Angle | = (true heading) - (ground track) | | | | | | |
| | | X_CG_Location | | | | | | | |
| | | Lift_Due_Do_Angle_Of_Attack | lift due to angle of attack | | | | | | |
| | | Lift_Due_To_Angle_Of_Attack_Rate | Lift due to angle of attack rate | | | | | | |
| | | Pitching_Moment_Due_To_Elevator | Pitching moment due to elevator | | | | | | |
| | | Yawing_Moment_Due_To_Rudder | yawing moment due to rudder | | | | | | |
| | | Oscillatory_Roll_Rate | Oscillatory roll rate | | | | | | |
| | | Oscillatory_Pitch_Rate | Oscillatory pitch rate | | | | | | |
| | | Oscillatory_Yaw_Rate | Oscillatory yaw rate | | | | | | |
| | | Oscillatory_Roll_Rate_Stability_Derivative | Oscillatory roll rate stab. deriv. | | | | | | |

| Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|
| | | Oscillatory_Yaw_Rate_Stability_Derivative | Oscillatory yaw rate stab. deriv. | | | | | | |
| | | Last_Times_Linear_Velocity | linear velocities from N-1 (array) | | | | | | |
| | | Last_Times_Angular_Position | previous angular position VECTOR | | | | | | |
| | | Last_Times_Angular_Velocity | angular velocity VECTOR (N-1) | | | | | | |
| | | Last_Times_Angular_Acceleration | angular accelration VECTOR (N-1) | | | | | | |
| | | Fuel_X_Moment | array of x-momt for each tank (array) | | | | | | |
| | | Fuel_Y_Moment | array of y-momt for each tank (array) | | | | | | |
| | | Fuel_Z_Moment | array of z-momt for each tank (array) | | | | | | |
| | | Total_X_Moments | total x moments | | | | | | |
| | | Total_Y_Moments | total y moments | | | | | | |
| | | Total_Z_Moments | total z moments | | | | | | |
| | | Cargo_X_Position | cargo x position | | | | | | |
| | | Cargo_Y_Position | cargo y position | | | | | | |
| | | Cargo_Z_Position | cargo z position | | | | | | |
| | | Cargo_X_Moment | cargo x moment | | | | | | |
| | | Cargo_Y_Moment | cargo y moment | | | | | | |
| | | Cargo_Z_Moment | cargo z moment | | | | | | |
| | | Aircraft_Empty_Weight_X_Moment | A/C empty weight x moment | | | | | | |
| | | Aircraft_Empty_Weight_Y_Moment | A/C empty weight y moment | | | | | | |
| | | Aircraft_Empty_Weight_Z_Moment | A/C empty weight z moment | | | | | | |
| | | Total_Ground_Reaction_Body_Axis_X_Force | Total ground reaction x force (body axis) | | | | | | |

| Symbol | Short Name | Full Variable Name | Description | Sign Convention | Intial Value | Min Value | Max Value | Note | Date Changed |
|---|---|---|---|---|---|---|---|---|---|
| | | Total_Ground_Reaction_Body_Axis_Y_Force | Total ground reaction y force (body axis) | | | | | | |
| | | Total_Ground_Reaction_Body_Axis_Z_Force | Total ground reaction z force (body axis) | | | | | | |
| | | Total_Ground_Reaction_Body_Axis_Rolling_Moment | Total ground reaction pitch momt (body axis) | | | | | | |
| | | Total_Ground_Reaction_Body_Axis_Pitching_Moment | Total ground reaction roll momt (body axis) | | | | | | |
| | | Total_Ground_Reaction_Body_Axis_Yawing_Moment | Total ground reaction yaw momt (body axis) | | | | | | |
| | | Engine_Thrust | array of engine thrusts (array) | | | | | | |
| | | Thrust_Coefficient | Thrust coefficient | | | | | | |

KEY TO LISTING ABBREVIATIONS

Notes: (1)Axis Systems Used:

GE = Geo-centric earth fixed axis sytem which is the

ANSI/AIAA 1.1.3 Geocentric Earth-fixed axis system [Ref 10]

DIS Geocentric Cartesian Coordinate System (also referred to as World Coordinate System) [Ref. 38]

The DIS and AIAA axis systems are identical.

Rotating Earth with axis system origin at Earth's center, $X_{(GE)}$ axis intersects the surface at Greenwich Meridian and the Equator, $Z_{(GE)}$ axis is cooincindent with the Earth's spin axis North, and $Y_{(GE)}$axis completing the right handed triad.

When referred to in a variable name it is ..._GE_... and in a symbol it is $_{(GE)}$. The parenthesis indicating the letters GE refer to an axis system.

(2) NASA Ames[Ref 39] , DIS [Ref 38], ANSI/AIAA [ref 10], and NAWC-TSD agree on this definition,

This is a generally accepted definition.

(3) NASA Ames[Ref 39] , ANSI/AIAA [ref 10], and NAWC-TSD agree on this definition. Not defined by DIS.

This is a generally accepted definition.

(4) Axis Systems Used:

FE (flat earth or local) frame is defined by NASA Ames [Ref. 10] as:

The Local (L) frame is situatied on the earth's surface, directly under the vehicle. Its $X_L$ axis points Northward and its $Y_{(L)}$ axis points Eastward: both are paralel to the Earths's surface.

The $Z_{(L)}$ axis pointstowards the Earth's center. It moves with the aircraft, the $-Z_{(L)}$ axis passes through the aircraft cg.

Since it move with the aircraft it is not an inertiaFE (flat earth or local) frame. The LocaFE (flat earth or local) frame's origin is always a constant distance from the Earth's center.

(5) Axis Systems Used:

B = Body Axis

which both ANSI/AIAA [Ref 10, 1.1.7] and NASA Ames [Ref 39] call "Body Axis" and DIS calls "Entity Coordinate System' [Ref 38]. All definitions are identical and normally accepted throughout industry.

The origin of the Body axis system is at the CG of the vehicle.

The $X_{(B)}$ axis passes is parallel to the horizontal (XY) reference plane of the vehicle and is positive forward,

The $Y_{(B)}$ axis is parallel to the horizontal (XY) reference plane and is positive to the right.

The $Z_{(B)}$ axis is positive down, completing the right handed triad.

When referred to in a variable name it is ..._B_... and in a symbol it is $_{(B)}$. The parenthesis indicating the letter B refers to an axis system.

| | | | | | | |
|---|---|---|---|---|---|---|
| 84 | FLOAT 32 BITS | | XPR | | Distance Of Pilot Down Runway | DOWN |
| 85 | FLOAT 32 BITS | | YPR | | Distance Of Pilot To Right Of Rwy | RIGHT |
| 86 | FLOAT 32 BITS | | HPR | | Height Of Pilot Above Runway | UP |
| 87 | FLOAT 32 BITS | | DNR | | Aircraft Distance North Of Runway | NORTH |
| 88 | FLOAT 32 BITS | | DER | | Aircraft Distance East Of Runway | EAST |
| 89 | FLOAT 32 BITS | | HDG_RWY | Active_Runway_Heading_d | Compass heading of current runway | |
| 90 | FLOAT 32 BITS | | XRUNWAY | | X-position in NED of runway (latitude) | NORTH |
| 91 | FLOAT 32 BITS | | YRUNWAY | | Y-location in NED of runway (longitude) | EAST |
| 92 | FLOAT 32 BITS | | CLATR | | Cosine Of Runway Latitude | NORTH |
| 93 | FLOAT 32 BITS | | SHDGRWY | | Sine of runway compass heading | |
| 94 | FLOAT 32 BITS | | CHDGRWY | | Cosine of runway compass heading | |
| 119 | FLOAT 32 BITS | | FN | | Total Force, North Axis | NORTH |

| | | | | | | |
|---|---|---|---|---|---|---|
| 120 | FLOAT 32 BITS | | FE | | Total Force, East Axis | EAST |
| 121 | FLOAT 32 BITS | | FD | | Total Force, Down Axis | DOWN |
| 122 | FLOAT 32 BITS | FG | FG | Gravitational_Force_lbf | Total Force Due To Gravity (at Alt.) | n |