	basic description	requirement_description	Requirement ID	GROUND Truth	CoCoSim Result	SLDV Result	Claude_sonnet	ChatGPT4o1
0	Verify triplex signal monitoring system for aircraft redundancy management	In the no-fail state, a mis-compare, which shall be characterized by one branch differing with the other two branches by a unique trip level that lasts for more than the persistence limit, shall be reported to failure management as a failure.	TSM-001	Valid	Valid	Valid	Falsifiable	Falsifiable
0	Verify triplex signal monitoring system for aircraft redundancy management	In the no-fail state, the mid-value shall be the selected value. Note: a first failure in progress will not affect the method for determining the selected value.	TSM-002	Falsifiable	Valid	Falsifiable	Falsifiable	Falsifiable
0	Verify triplex signal monitoring system for aircraft redundancy management	In the single fail state, a good channel average of the remaining two good branches shall be used to determine the selected value.	TSM-003	Valid	Valid	Valid	Valid	Falsifiable
0	Verify triplex signal monitoring system for aircraft redundancy management	If a second failure is in progress, the selected value shall remain unchanged from the previous selected value.	TSM-004	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Falsifiable
1	Safety-focused autopilot system reacting to hazard sensor inputs.	Exceeding sensor limits shall latch an autopilot pullup when the pilot is not in control (not standby) and the system is supported without failures (not apfail).	FSM-001	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Falsifiable
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The autopilot shall change states from TRANSITION to STANDBY when the pilot is in control (standby).	FSM-002	Valid	Valid	Valid	Valid	Valid
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The autopilot shall change states from TRANSITION to NOMINAL when the system is supported and sensor data is good.	FSM-003	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Falsifiable
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The autopilot shall change states from NOMINAL to MANEUVER when the sensor data is not good.	FSM-004	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Falsifiable
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The autopilot shall change states from NOMINAL to STANDBY when the pilot is in control (standby).	FSM-005	Valid	Valid	Valid	Valid	Valid
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The autopilot shall change states from MANEUVER to STANDBY when the pilot is in control (standby) and sensor data is good.	FSM-006	Valid	Valid	Valid	Valid	Valid
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The autopilot shall change states from PULLUP to TRANSITION when the system is supported and sensor data is good.	FSM-007	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Falsifiable
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The autopilot shall change states from STANDBY to TRANSITION when the pilot is not in control (not standby).	FSM-008v1	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Falsifiable
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The autopilot shall change states from STANDBY to MANEUVER when a failure occurs (apfail).	FSM-009	Valid	Valid	Valid	Valid	Valid
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The sensor shall change states from NOMINAL to FAULT when limits are exceeded.	FSM-010	Valid	Valid	Valid	Valid	Valid
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The sensor shall change states from NOMINAL to TRANSITION when the autopilot is not requesting support (not request).	FSM-011v1	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Falsifiable
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The sensor shall change states from FAULT to TRANSITION when the autopilot is not requesting support (not request) and limits are not exceeded (not limits).	FSM-012	Valid	Valid	Valid	Valid	Valid
1	Safety-focused autopilot system reacting to hazard sensor inputs.	The sensor shall change states from TRANSITION to NOMINAL when the autopilot is requesting support (request) and the autopilot reports the correct active mode (mode).	FSM-013	Valid	Valid	Valid	Valid	Valid
2	Signal integrator with bounded output and reset capability.	When Reset is Valid and the Initial Condition (ic) is bounded by the provided Top and Bottom Limits (BL <= ic <= TL), the Output (yout) shall equal the Initial Condition (ic).	TUI-001	Valid	Valid	Valid	Valid	Synax_error
2	Signal integrator with bounded output and reset capability.	The Output (yout) shall be bounded by the provided Top and Bottom limits (TL and BL)	TUI-002	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Synax_error
2	Signal integrator with bounded output and reset capability.	When in normal operation, the output shall be the result of the equation, yout = T*0.5*(xin + xinpv)+ ypv	TUI-003v1	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Synax_error
2	Signal integrator with bounded output and reset capability.	The Output of this function shall approximate the integration of the value of the input signal over time within a specified tolerance, defined in subtests below: a. After 10 seconds of Computation at an execution frequency of 10 hz, the Output should equal 10 within a +/- 0.1 tolerance, for a Constant Input (xin = 1.0), and the sample delta time T = 0.1 seconds when in normal mode of operation.	TUI-004a	UNKNOWN	Missing	Missing	UNKNOWN	Synax_error
2	Signal integrator with bounded output and reset capability.	The Output of this function shall approximate the integration of the value of the input signal over time within a specified tolerance, defined in subtests below: b. Over a 10 second computational duration at an execution frequency of 10 hz, the Output should equal the sine of time t, sin(t), where time is defined as a vector from 0 to 10 by increments of 0.1 seconds within a +/- 0.1 tolerance for an inpu	TUI-004b	UNKNOWN	Missing	Missing	UNKNOWN	Synax_error
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Roll Regulator Shall not command angular roll accelerations greater than the capability of the system (50 deg/sec2) for durations exceeding 100 frames (1 second @ 100 hz).	REG-001	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	Valid
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Pitch Regulator Shall not command angular pitch accelerations greater than the capability of the system (50 deg/sec2) for durations exceeding 100 frames (1 second @ 100 hz).	REG-002	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Yaw Regulator Shall not command angular yaw accelerations greater than the capability of the system (50 deg/sec2) for durations exceeding 100 frames (1 second @ 100 hz).	REG-003	UNKNOWN	Valid	UNKNOWN	UNKNOWN	Valid
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Airspeed Regulator Shall not command translational axial accelerations greater than the capability of the system (32 ft/sec2) for durations exceeding 100 frames (1 second @ 100 hz).	REG-004	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	Valid
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Height Regulator Shall not command translational height accelerations greater than the capability of the system (32 ft/sec2) for durations exceeding 100 frames (1 second @ 100 hz).	REG-005	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Roll Regulator Shall not command transient changes in angular roll acceleration greater than 50 deg/sec2/sec.	REG-006	Falsifiable	UNKNOWN	UNKNOWN	Falsifiable	Valid
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Pitch Regulator Shall not command transient changes in angular pitch acceleration greater than 50 deg/sec2/sec.	REG-007	Falsifiable	Falsifiable	UNKNOWN	Falsifiable	Valid
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Yaw Regulator Shall not command transient changes in angular yaw acceleration greater than 50 deg/sec2/sec.	REG-008	Falsifiable	Falsifiable	UNKNOWN	Falsifiable	Valid
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Airspeed Regulator Shall not command transient changes in translational axial acceleration greater than 32 ft/sec2/sec.	REG-009	Falsifiable	Falsifiable	UNKNOWN	Falsifiable	Valid
3	Five-channel feedback control system for vehicle dynamics regulation	The Inner Loop Height Regulator Shall not command transient changes in translational height acceleration greater than 32 ft/sec2/sec.	REG-010	Falsifiable	Falsifiable	UNKNOWN	Falsifiable	Valid
4	Nonlinear air vehicle guidance calculating target intercept positions	NLGuidance shall always maintain the target on the port-side of the vehicle.	NLG-001	UNKNOWN	UNKNOWN	UNKNOWN	Falsifiable	Synax_error
4	Nonlinear air vehicle guidance calculating target intercept positions	NLGuidance shall compute the inertial position vector for aim point 1, defining the location at Standoff 1 with an offset from the target position, and oriented on a vector perpendicular to the tangent relative position vector from the vehicle to the cor	NLG-002	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	Synax_error
4	Nonlinear air vehicle guidance calculating target intercept positions	NLGuidance shall compute the inertial position vector for aim point 2, defining the location at Standoff 2 with an offset from the target position, and oriented on a vector perpendicular to the tangent relative position vector from the vehicle to the cor	NLG-003	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	Synax_error
4	Nonlinear air vehicle guidance calculating target intercept positions	NLGuidance shall always select an inertial position vector of aim point #1 or #2 which shall result in a counter clockwise loiter for the UAV. For example, the picture above with vehicle position, UAV, would return Tangent Aim Point #2.	NLG-004	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	Synax_error
4	Nonlinear air vehicle guidance calculating target intercept positions	When the UAV relative position to the target is less than the minimum standoff distance, NLGuidance shall command the nearest inertial position in order to reestablish the minimum standoff distance while maintaining the target on the port-side of	NLG-005	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	Synax_error
4	Nonlinear air vehicle guidance calculating target intercept positions	NLGuidance shall output consistent aim point with a static target without appreciable transient behavior in the command generation other than aim point switching where a transient is required to maintain a counter clockwise loiter (ref requirement	NLG-006	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	Synax_error
4	Nonlinear air vehicle guidance calculating target intercept positions	NLGuidance shall output the equivalent altitude of the vehicle for in-plane navigation. In-plane navigation is defined where the target and the vehicle altitude (3rd component in the input inertial position vectors) are equal.	NLG-007	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	Synax_error
5	Two-layer neural network computing output from two inputs	The maximum value of the NN output, z, shall always be less than or equal to 1.1, regardless of the input values.	NN-001	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
5	Two-layer neural network computing output from two inputs	The minimum value of the NN output, z, shall always be greater than or equal to -0.2, regardless of the input values.	NN-002	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
5	Two-layer neural network computing output from two inputs	Using a first order finite backward difference equation, the spatial derivatives of Δz/ Δxt = (z(n,1)-z(n-1))/(xt(n,1)-xt(n-1,1) and Δz/ Δyt = (z(n,1)-z(n-1))/(yt(n,1)-yt(n-1,1) shall never exceed a top bound of +10 or bottom bound of -35 (e.g. -35 <= Δz/	NN-003	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
5	Two-layer neural network computing output from two inputs	The absolute error between the zt truth data and the output z shall never exceed a tolerance of 0.01, for the equivalent input of (xt, yt).	NN-004	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
6	Control allocation algorithm optimizing vehicle surface configurations.	When the determinant of B(inv(Wp’)B’ is <= 1e-12 as indicated by ridge_on set to Valid, the inversion of the B(inv(Wp’)B’ matrix should be accurate to 6 digits precision in that each element in the check output matrix is within a 1e-6 tolerance with r	EB-001	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
6	Control allocation algorithm optimizing vehicle surface configurations.	When the determinant of B(inv(Wp’)B’ is > 1e-12 as indicated by ridge_on set to Falsifiable, the inversion of the B(inv(Wp’)B’ matrix should be accurate to 12 digits precision in that each element in the check output matrix is within a 1e-12 tolerance	EB-002	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
6	Control allocation algorithm optimizing vehicle surface configurations.	The output u vector should be a 5x1 vector.	EB-003	UNKNOWN	Missing	Missing	UNKNOWN	UNKNOWN
6	Control allocation algorithm optimizing vehicle surface configurations.	The 2-norm of the output Buminusd should be less than 0.01.	EB-004	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
6	Control allocation algorithm optimizing vehicle surface configurations.	The output cost J shall be the minimum possible value given the set of input conditions.	EB-005	UNKNOWN	Missing	Missing	UNKNOWN	UNKNOWN
8	Aircraft speed safety monitor for collision avoidance maneuvers.	1. The SWIM Airspeed algorithm shall output the minimum AGCAS airspeed required to perform a 2g flyup as follows: Auto GCAS Minimum Vcas (knots) = SQRT{[2*Load Factor*Gross Weight]/[Air Density at sea level * Coefficient of Lift Max*Wing Area]} / 1.6891 (ft/s/knots) where Load Factor = 2 gs Gross weight of the aircraft Air Density at sea level = 0.0023769 slugs/ft^3 Coefficient of Lift Max = 1.24 (CAT I) and 1.10 (CAT III) Wing Area of the F-16 = 300 ft^2 Thus, IF CAT I, Auto GCAS Minimum Vcas (knots) = 1.25921 * SQRT(Gross Weight) + 10.0 IF CAT III, Auto GCAS Minimum Vcas (knots) = 1.33694 * SQRT(Gross Weight) + 10.0	SWIM-001a	Valid	Valid	UNKNOWN	Falsifiable	Falsifiable
8	Aircraft speed safety monitor for collision avoidance maneuvers.	2. When a low speed warning is allowed, as computed by the SWIM Airspeed algorithm, a low speed warning shall be Valid when the vehicle air data impact pressure is less than the warning trigger for minimum impact pressure in which a safe The warning trigger for minimum impact pressure in which a safe AGCAS evasive maneuver can be accomplished is computed as SWIM_Qcmin_lbspft2 = [(-2.0906 + 0.020306*Auto GCAS Minimum Vcas) + 0.1] * (70.7184 (lbspft2/in Hg))	SWIM-002	Falsifiable	Falsifiable	Falsifiable	Falsifiable	Synax_error
9	Euler-321 rotation matrix calculator for coordinate frame transformation.	The Rotation Matrix Output, DCM321, of this Function Shall Equal a 3x3 Matrix Product of a 3x3 Euler 3 (Roll) Rotation Matrix times a 3x3 Euler 2 (Pitch) Rotation Matrix times a 3x3 Euler 1 (Heading) Rotation Matrix.	EUL-001	UNKNOWN	Falsifiable	UNKNOWN	UNKNOWN	UNKNOWN
9	Euler-321 rotation matrix calculator for coordinate frame transformation.	The Body Vector Output, Vb, of this Function Shall Equal a 3x1 Vector Product of the 3x3 Rotation Matrix Output, DCM321, times the Input Inertial Vector, Vi.	EUL-002.1	Valid	Valid	UNKNOWN	UNKNOWN	UNKNOWN
9	Euler-321 rotation matrix calculator for coordinate frame transformation.	The magnitude of the Body Vector Output, Vb, shall equal the magnitude of the Input Inertial Vector, Vi.	EUL-003	UNKNOWN	Falsifiable	UNKNOWN	UNKNOWN	UNKNOWN
9	Euler-321 rotation matrix calculator for coordinate frame transformation.	The Rotation Matrix, DCM321, shall be invertible with the exception of the case where theta = +/- pi/2 radians.	EUL-004	UNKNOWN	Falsifiable	UNKNOWN	UNKNOWN	UNKNOWN
9	Euler-321 rotation matrix calculator for coordinate frame transformation.	The Rotation Matrix, DCM321, shall provide a distinct mapping from the input vector, Vi, to the output vector, Vb, for each pitch angle, theta. Note: the DCM321 is not distinct for all phi and psi inputs.	EUL-005	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
9	Euler-321 rotation matrix calculator for coordinate frame transformation.	The rows and columns of the Rotation Matrix, DCM321, shall be orthonormal. For instance, denoting r1 as row 1 and r2 as row 2 of DCM321, <r1, r2> = r1 r2T = 0 and <r1, r1> = r1 r1T = 1. Likewise, with c1 as column 1 and c2 as column 2 of DCM321, <c1, c2> = c1 c2T = 0 and <c1, c1> = c1 c1T = 1.	EUL-006	UNKNOWN	Falsifiable	UNKNOWN	UNKNOWN	UNKNOWN
9	Euler-321 rotation matrix calculator for coordinate frame transformation.	The Rotation Matrix, DCM321, multiplied by the transpose of the Rotation Matrix, DCM321T shall be the Identity (3x3) Matrix.	EUL-007	UNKNOWN	Falsifiable	UNKNOWN	UNKNOWN	UNKNOWN
9	Euler-321 rotation matrix calculator for coordinate frame transformation.	The determinant of the Rotation Matrix, |DCM321|, shall be equal to 1.0.	EUL-008	UNKNOWN	Falsifiable	UNKNOWN	UNKNOWN	UNKNOWN