

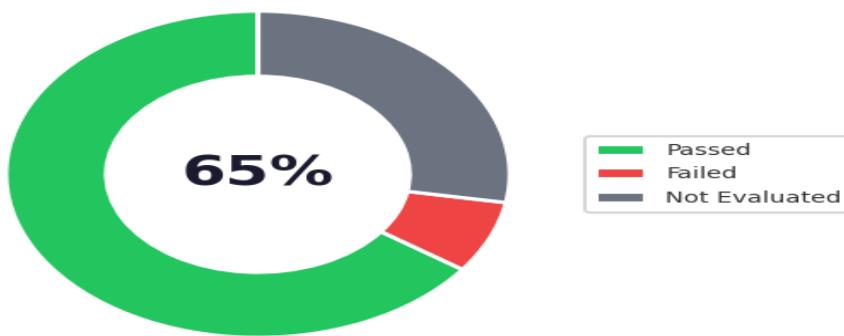
# Executive Summary

A total of 126 requirements were evaluated, with 82 passed, 9 failed, and 35 not evaluated, resulting in a pass rate of 65.1%. During the test, 20,000 anomalies were detected, of which 3 were classified as critical.

Metric	Value
Total Requirements	126
Passed	82
Failed	9
Not Evaluated	35
Pass Rate	65.1%
Anomaly Count	20000

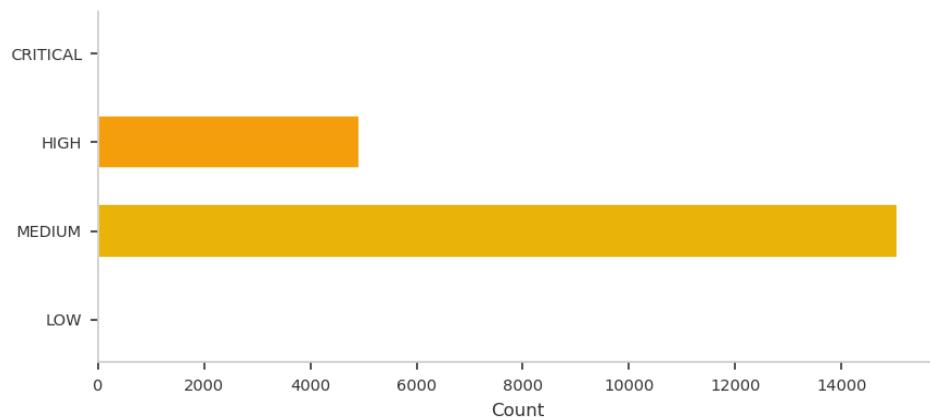
*Key Performance Indicators*

AS3 Requirement Verdicts



*AS3 Requirement Verdicts*

Anomaly Severity Distribution



*Anomaly Severity Distribution*

## Test Conditions

Session	File	Total Packets	1553 Messages	Decoded Messages
823c5926	Demo Sortie 5	229501	3712500	3712500
d0bc5394	Demo Sortie 1	198902	3217535	3217535

*Sortie Sessions*

# Requirements Traceability Matrix

Requirement ID	Description	Rule Type	Verdict	Pass Rate
AS3-RAD-001	Target range shall be 0-300nm when radar is in TRK or ACM mode	range_check	NOT_EVALUATED	N/A
AS3-RAD-002	Track quality shall be within 0-7 at all times	range_check	PASS	100.0%
AS3-RAD-003	Radar mode shall follow valid transition paths: OFF->STBY->SRCH->TRK/ACM/GM	state_transition	FAIL	95.7%
AS3-RAD-004	When radar is in TRK mode, track quality shall be >= 3	conditional	FAIL	97.9%
AS3-RAD-005	After entering TRK mode, track quality shall reach >= 3 within 2 seconds	timing	FAIL	80.0%
AS3-RAD-006	Radar track data shall update at no less than 45 Hz	rate_check	PASS	100.0%
AS3-RAD-007	Number of tracked targets shall be 0-24 in active radar modes	range_check	PASS	100.0%
AS3-RAD-008	Target bearing shall be within -180 to 180 degrees	range_check	PASS	100.0%
AS3-RAD-009	Target altitude shall be within -1000 to 130072 feet	range_check	PASS	100.0%
AS3-RAD-010	When radar is in TRK mode, number of tracked targets shall be >= 1	conditional	FAIL	93.8%
AS3-RAD-011	Closure rate shall be within -2048 to 2047.9375 knots	range_check	PASS	100.0%
AS3-RAD-012	Ground map range shall be within 0-8191.875 nm	range_check	PASS	100.0%
AS3-RAD-013	Target range shall be 0-300nm when in TRK mode AND track quality >= 3	range_check	NOT_EVALUATED	N/A
AS3-RAD-014	After radar BIT passes, track data shall be available within 5 seconds	timing	NOT_EVALUATED	N/A
AS3-RAD-015	When radar is in TRK mode, HUD target designator box shall be valid	conditional	FAIL	93.8%
AS3-EW-001	Threat priority shall be 0-7 when threat is valid	range_check	PASS	100.0%
AS3-EW-002	When threat_valid is VALID, threat_type shall not be NONE	conditional	PASS	100.0%
AS3-EW-003	Threat type shall follow valid escalation path	state_transition	FAIL	66.7%
AS3-EW-004	After LAUNCH threat type, threat priority shall reach >= 5 within 0.5 seconds	timing	NOT_EVALUATED	N/A
AS3-EW-005	Threat bearing shall be within -180 to 180 degrees when threat is valid	range_check	NOT_EVALUATED	N/A
AS3-EW-006	Threat range shall be within 0-300nm when threat is valid	range_check	NOT_EVALUATED	N/A
AS3-EW-007	EW threat status data shall update at no less than 25 Hz	rate_check	PASS	100.0%
AS3-EW-008	When threat type is MISSILE_ACTIVE, threat range shall be <= 100nm	conditional	NOT_EVALUATED	N/A
AS3-EW-009	When threat is valid AND priority >= 5, threat bearing shall not be zero	conditional	NOT_EVALUATED	N/A
AS3-EW-010	When jammer is active, jammer mode command shall not be OFF	conditional	NOT_EVALUATED	N/A
AS3-EW-011	Chaff remaining shall be 0-99	range_check	PASS	100.0%
AS3-EW-012	After threat enters TRACK state, RWR symbol count shall increase within 1 second	timing	NOT_EVALUATED	N/A
AS3-NAV-001	Latitude shall be within -90 to 90 degrees	range_check	PASS	100.0%
AS3-NAV-002	Ground speed shall be within 0-1200 knots	range_check	PASS	100.0%
AS3-NAV-003	Navigation position data shall update at no less than 45 Hz	rate_check	PASS	100.0%

Requirement ID	Description	Rule Type	Verdict	Pass Rate
AS3-NAV-004	When ground speed exceeds 100 kts, barometric altitude shall be greater than 0 ft	conditional	NOT_EVALUATED	N/A
AS3-NAV-005	Longitude shall be within -180 to 180 degrees	range_check	PASS	100.0%
AS3-NAV-006	Barometric altitude shall be within 0-262140 feet	range_check	PASS	100.0%
AS3-NAV-007	After ground speed exceeds 50 kts, latitude shall change within 5 seconds	timing	NOT_EVALUATED	N/A
AS3-NAV-008	After alignment reaches FINE, position shall be valid within 5 seconds	timing	PASS	100.0%
AS3-NAV-009	INS alignment status shall follow valid sequence	state_transition	PASS	100.0%
AS3-NAV-010	INS drift rate shall not exceed 0.5 nm/hr	range_check	FAIL	85.7%
AS3-NAV-011	When GPS fix type is 3D, satellites tracked shall be >= 4	conditional	PASS	100.0%
AS3-NAV-012	Attitude data shall update at no less than 45 Hz	rate_check	PASS	100.0%
AS3-NAV-013	Pitch shall be within -90 to 90 degrees	range_check	PASS	100.0%
AS3-NAV-014	When alignment status is NAV, GPS fix type shall not be NONE	conditional	PASS	100.0%
AS3-SMS-001	Stores count shall be within 0-11 at all times	range_check	PASS	100.0%
AS3-SMS-002	Weapons status shall update at no less than 20 Hz	rate_check	PASS	100.0%
AS3-SMS-003	SMS mode shall follow valid transitions: OFF->STBY->NAV->AA/AG->JETT	state_transition	PASS	100.0%
AS3-SMS-004	When SMS mode is AA or AG, master arm shall be ARM	conditional	PASS	100.0%
AS3-SMS-005	Selected station shall be within 0-9 at all times	range_check	PASS	100.0%
AS3-SMS-006	Release count shall be within 0-255 at all times	range_check	PASS	100.0%
AS3-SMS-007	When master arm is ARM, weapon type shall not be EMPTY	conditional	PASS	100.0%
AS3-SMS-008	Station inventory data shall update at no less than 10 Hz	rate_check	PASS	100.0%
AS3-SMS-009	When weapon release pulse is active, stores count shall be <= previous stores count	conditional	NOT_EVALUATED	N/A
AS3-SMS-010	After release command, weapon status shall reach LAUNCHED within 0.5 seconds	timing	NOT_EVALUATED	N/A
AS3-SMS-011	When weapon solution is valid, time to release shall be > 0	conditional	NOT_EVALUATED	N/A
AS3-SMS-012	When SMS mode is AG, weapon solution shall be valid	conditional	NOT_EVALUATED	N/A
AS3-DIS-001	HUD brightness shall be 0-100%	range_check	PASS	100.0%
AS3-DIS-002	When HUD mode is AA, velocity vector shall be valid	conditional	PASS	100.0%
AS3-DIS-003	HUD symbology command shall update at no less than 18 Hz	rate_check	PASS	100.0%
AS3-DIS-004	HUD status shall update at no less than 18 Hz	rate_check	PASS	100.0%
AS3-DIS-005	When HUD is operational, symbology frame rate shall be > 0	conditional	PASS	100.0%
AS3-DIS-006	Symbology frame rate shall be >= 15 Hz when HUD is operational	range_check	FAIL	99.3%
AS3-DIS-007	When radar is in TRK mode, target designator box shall be valid	conditional	FAIL	93.8%
AS3-DIS-008	When TD box is valid, TD box range shall be > 0	conditional	PASS	100.0%
AS3-DIS-009	After MFD format change command, format shall be active within 1 second	timing	PASS	100.0%
AS3-DIS-010	UFC data value shall be within 0-65535	range_check	PASS	100.0%

Requirement ID	Description	Rule Type	Verdict	Pass Rate
TOTAL	126 requirements		82P / 9F / 35NE	65.1%

*Requirements Traceability Matrix*

# Requirement Violations

## Requirement AS3-RAD-003

The radar mode transitioned from OFF to TRK at timestamp 2520.02, deviating from the required path of OFF->STBY->SRCH->TRK/ACM/GM as specified in AS3-RAD-003. This deviation bypassed the mandatory STBY state, potentially compromising system readiness checks and safety protocols. Further investigation is recommended to determine the root cause of the invalid transition and assess its impact on operational integrity.

Timestamp	Actual	Expected	Detail
2520.020	OFF -> TRK	allowed: OFF -> ['STBY']	Invalid radar_mode transition

*Violations for AS3-RAD-003*

## Requirement AS3-RAD-004

During developmental flight testing, it was observed that when the radar operated in TRK mode, track quality remained at 0.0 for 1000 consecutive instances, violating requirement AS3-RAD-004, which mandates track quality  $\geq 3$ . Sample violations occurred between timestamps 2520.0199999 and 2520.0999999, with radar power percentages ranging from 25.0% to 74.0% and antenna scan patterns set to "6BAR." Track age varied between 6.4 and 18.4 seconds, while target counts remained at 0.0. The operational impact could include degraded tracking accuracy or loss of target discrimination during TRK mode, potentially compromising situational awareness. Further investigation is warranted to assess radar power settings, antenna scan pattern efficacy, and system configuration parameters that may contribute to sustained track quality failures.

Timestamp	Actual	Expected	Detail
2520.020	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 6.4, 'radar_power_pct': 25.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 86.2921142578125, 'el_rate_deg_per_sec': 36.397705078125}	track_quality gte 3	Trigger: radar_mode=TRK
2520.040	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 142.0, 'track_age_sec': 18.2, 'radar_power_pct': 43.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -76.2286376953125, 'el_rate_deg_per_sec': 44.8434448242...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.060	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 185.0, 'track_age_sec': 18.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -72.3724365234375, 'el_rate_deg_per_sec': 43.8711547851...}	track_quality gte 3	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.080	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 62.0, 'track_age_sec': 6.4, 'radar_power_pct': 65.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 51.8719482421875, 'el_rate_deg_per_sec': 13.4719848632812...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.100	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 103.0, 'track_age_sec': 18.40000000000002, 'radar_power_pct': 73.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -40.9735107421875, 'el_rate_deg_per_sec': ...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.120	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 187.0, 'track_age_sec': 19.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 85.1385498046875, 'el_rate_deg_per_sec': 3.262939453125...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.140	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 116.0, 'track_age_sec': 7.0, 'radar_power_pct': 71.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -75.16845703125, 'el_rate_deg_per_sec': 43.4591674804687...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.160	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 14.4, 'radar_power_pct': 40.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -65.1708984375, 'el_rate_deg_per_sec': 46.74957275390625...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.180	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 64.0, 'track_age_sec': 6.5, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -73.5699462890625, 'el_rate_deg_per_sec': -0.560302734375...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.200	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 88.0, 'track_age_sec': 17.2, 'radar_power_pct': 63.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 74.0093994140625, 'el_rate_deg_per_sec': -10.83251953125...}	track_quality gte 3	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.220	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 134.0, 'track_age_sec': 17.7, 'radar_power_pct': 31.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -88.3575439453125, 'el_rate_deg_per_sec': 42.2122192382...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.240	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 182.0, 'track_age_sec': 8.4, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 65.1214599609375, 'el_rate_deg_per_sec': 17.720947265625...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.260	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 189.0, 'track_age_sec': 18.0, 'radar_power_pct': 58.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 54.7998046875, 'el_rate_deg_per_sec': -24.9884033203125...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.280	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 118.0, 'track_age_sec': 9.0, 'radar_power_pct': 25.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 49.46044921875, 'el_rate_deg_per_sec': -38.5867309570312...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.300	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 178.0, 'track_age_sec': 10.60000000000001, 'radar_power_pct': 68.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -82.6007080078125, 'el_rate_deg_per_sec': ...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.320	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 96.0, 'track_age_sec': 19.0, 'radar_power_pct': 31.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 12.85400390625, 'el_rate_deg_per_sec': 33.31329345703125...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.340	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 63.0, 'track_age_sec': 17.40000000000002, 'radar_power_pct': 24.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -26.71875, 'el_rate_deg_per_sec': 22.49176...}	track_quality gte 3	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.360	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 167.0, 'track_age_sec': 12.20000000000001, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -20.5389404296875, 'el_rate_deg_per_sec': ...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.380	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 64.0, 'track_age_sec': 18.40000000000002, 'radar_power_pct': 49.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 85.3033447265625, 'el_rate_deg_per_sec': 3...}	track_quality gte 3	Trigger: radar_mode=TRK
2520.400	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 71.0, 'track_age_sec': 19.3, 'radar_power_pct': 62.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 46.702880859375, 'el_rate_deg_per_sec': -34.944763183593...}	track_quality gte 3	Trigger: radar_mode=TRK

Violations for AS3-RAD-004 (showing 20 of 1000)

## Requirement AS3-RAD-005

The system failed to achieve track quality  $\geq 3$  within the specified 2-second window after entering TRK mode, as evidenced by no response observed at timestamp 2520.02 seconds. The expected response was to occur within 2.0 seconds of mode entry, but no track quality metric met the threshold during this interval. This violation could compromise navigation accuracy or system reliability, depending on the operational context of TRK mode. Further investigation is recommended to determine root causes, such as sensor performance degradation or processing delays, and to validate compliance with the requirement.

Timestamp	Actual	Expected	Detail
2520.020	no response	response within 2.0s	Timed out at 2522.020s

Violations for AS3-RAD-005

## Requirement AS3-RAD-010

During developmental flight testing, 1,000 violations of requirement AS3-RAD-010 occurred between timestamps 2520.0199999 and 2520.0999999. When radar operated in TRK mode, the recorded number of tracked targets was 0.0 across all instances, despite radar\_mode being consistently set to TRK and track\_quality remaining at 0.0. Antenna\_scan\_pattern was 6BAR, radar\_power\_pct ranged from 25.0 to 74.0, and radar\_temp\_status remained NOMINAL. The operational impact could include reduced situational awareness or mission failure if target tracking is critical. Further investigation is warranted to determine root causes of the zero-target count in TRK mode and validate track\_quality metrics.

Timestamp	Actual	Expected	Detail
2520.020	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 6.4, 'radar_power_pct': 25.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 86.2921142578125, 'el_rate_deg_per_sec': 36.397705078125}	num_targets gte 1	Trigger: radar_mode=TRK
2520.040	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 142.0, 'track_age_sec': 18.2, 'radar_power_pct': 43.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -76.2286376953125, 'el_rate_deg_per_sec': 44.84344482424...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.060	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 185.0, 'track_age_sec': 18.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -72.3724365234375, 'el_rate_deg_per_sec': 43.8711547851...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.080	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 62.0, 'track_age_sec': 6.4, 'radar_power_pct': 65.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 51.8719482421875, 'el_rate_deg_per_sec': 13.4719848632812...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.100	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 103.0, 'track_age_sec': 18.400000000000002, 'radar_power_pct': 73.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -40.9735107421875, 'el_rate_deg_per_sec':...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.120	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 187.0, 'track_age_sec': 19.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 85.1385498046875, 'el_rate_deg_per_sec': 3.262939453125...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.140	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 116.0, 'track_age_sec': 7.0, 'radar_power_pct': 71.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -75.16845703125, 'el_rate_deg_per_sec': 43.4591674804687...}	num_targets gte 1	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.160	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 14.4, 'radar_power_pct': 40.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -65.1708984375, 'el_rate_deg_per_sec': 46.74957275390625...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.180	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 64.0, 'track_age_sec': 6.5, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -73.5699462890625, 'el_rate_deg_per_sec': -0.560302734375...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.200	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 88.0, 'track_age_sec': 17.2, 'radar_power_pct': 63.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 74.0093994140625, 'el_rate_deg_per_sec': -10.83251953125...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.220	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 134.0, 'track_age_sec': 17.7, 'radar_power_pct': 31.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -88.3575439453125, 'el_rate_deg_per_sec': 42.2122192382...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.240	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 182.0, 'track_age_sec': 8.4, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 65.1214599609375, 'el_rate_deg_per_sec': 17.720947265625...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.260	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 189.0, 'track_age_sec': 18.0, 'radar_power_pct': 58.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 54.7998046875, 'el_rate_deg_per_sec': -24.9884033203125...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.280	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 118.0, 'track_age_sec': 9.0, 'radar_power_pct': 25.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 49.46044921875, 'el_rate_deg_per_sec': -38.5867309570312...}	num_targets gte 1	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.300	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 178.0, 'track_age_sec': 10.600000000000001, 'radar_power_pct': 68.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -82.6007080078125, 'el_rate_deg_per_sec': ...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.320	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 96.0, 'track_age_sec': 19.0, 'radar_power_pct': 31.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 12.85400390625, 'el_rate_deg_per_sec': 33.31329345703125...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.340	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 63.0, 'track_age_sec': 17.400000000000002, 'radar_power_pct': 24.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -26.71875, 'el_rate_deg_per_sec': 22.49176...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.360	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 167.0, 'track_age_sec': 12.200000000000001, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -20.5389404296875, 'el_rate_deg_per_sec': ...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.380	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 64.0, 'track_age_sec': 18.400000000000002, 'radar_power_pct': 49.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 85.3033447265625, 'el_rate_deg_per_sec': 3...}	num_targets gte 1	Trigger: radar_mode=TRK
2520.400	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 71.0, 'track_age_sec': 19.3, 'radar_power_pct': 62.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 46.702880859375, 'el_rate_deg_per_sec': -34.944763183593...}	num_targets gte 1	Trigger: radar_mode=TRK

Violations for AS3-RAD-010 (showing 20 of 1000)

## Requirement AS3-RAD-015

The observed data indicates that in both entries, the `td\_box\_valid` field was set to \*\*\*INVALID\*\*\*, despite the expected condition specifying \*\*\*VALID\*\*\*. This discrepancy was consistent across both timestamps (16938.0), suggesting a potential system state anomaly or data recording error. Specifically, the `td\_box\_valid` value did not align with the anticipated

operational status, which could imply a failure in the target designator (TD) box functionality or a misconfiguration.

**\*\*Potential operational impact\*\*:** If the TD box is critical for target acquisition or guidance systems, its invalid status might compromise mission effectiveness or safety. For example, an invalid TD box could prevent accurate targeting, leading to reduced engagement capability or increased risk in dynamic environments. The timestamps (16938.0) and repeated invalid status across entries suggest a persistent issue rather than a transient error, which could degrade system reliability.

**\*\*Recommendation\*\*:** Further investigation is warranted to diagnose the root cause of the `td\_box\_valid` discrepancy. Key steps include: 1. Verifying the TD box's physical and operational status to rule out hardware failures or communication issues. 2. Reviewing system logs or diagnostics around the timestamps (16938.0) to identify potential triggers for the invalid state. 3. Confirming data integrity to ensure no recording errors or duplication of entries. 4. Assessing whether the expected condition ("VALID") was incorrectly set or if the system's operational requirements have changed. This analysis highlights the need for proactive validation of critical system states to ensure mission readiness and safety.

Timestamp	Actual	Expected	Detail
2520.020	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 6.4, 'radar_power_pct': 25.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 86.2921142578125, 'el_rate_deg_per_sec': 36.397705078125,...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.040	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 142.0, 'track_age_sec': 18.2, 'radar_power_pct': 43.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -76.2286376953125, 'el_rate_deg_per_sec': 44.8434448242...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.042	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 142.0, 'track_age_sec': 18.2, 'radar_power_pct': 43.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -76.2286376953125, 'el_rate_deg_per_sec': 44.8434448242...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.060	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 185.0, 'track_age_sec': 18.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -72.3724365234375, 'el_rate_deg_per_sec': 43.8711547851...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.080	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 62.0, 'track_age_sec': 6.4, 'radar_power_pct': 65.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 51.8719482421875, 'el_rate_deg_per_sec': 13.4719848632812...}	td_box_valid eq VALID	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.082	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 62.0, 'track_age_sec': 6.4, 'radar_power_pct': 65.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 51.8719482421875, 'el_rate_deg_per_sec': 13.4719848632812...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.100	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 103.0, 'track_age_sec': 18.400000000000002, 'radar_power_pct': 73.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -40.9735107421875, 'el_rate_deg_per_sec': ...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.120	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 187.0, 'track_age_sec': 19.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 85.1385498046875, 'el_rate_deg_per_sec': 3.262939453125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.122	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 187.0, 'track_age_sec': 19.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 85.1385498046875, 'el_rate_deg_per_sec': 3.262939453125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.140	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 116.0, 'track_age_sec': 7.0, 'radar_power_pct': 71.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -75.16845703125, 'el_rate_deg_per_sec': 43.4591674804687...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.160	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 14.4, 'radar_power_pct': 40.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -65.1708984375, 'el_rate_deg_per_sec': 46.74957275390625...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.162	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 14.4, 'radar_power_pct': 40.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -65.1708984375, 'el_rate_deg_per_sec': 46.74957275390625...}	td_box_valid eq VALID	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.180	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 64.0, 'track_age_sec': 6.5, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -73.5699462890625, 'el_rate_deg_per_sec': -0.560302734375...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.200	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 88.0, 'track_age_sec': 17.2, 'radar_power_pct': 63.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 74.0093994140625, 'el_rate_deg_per_sec': -10.83251953125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.203	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 88.0, 'track_age_sec': 17.2, 'radar_power_pct': 63.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 74.0093994140625, 'el_rate_deg_per_sec': -10.83251953125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.220	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 134.0, 'track_age_sec': 17.7, 'radar_power_pct': 31.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -88.3575439453125, 'el_rate_deg_per_sec': 42.2122192382...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.240	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 182.0, 'track_age_sec': 8.4, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 65.1214599609375, 'el_rate_deg_per_sec': 17.720947265625...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.242	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 182.0, 'track_age_sec': 8.4, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 65.1214599609375, 'el_rate_deg_per_sec': 17.720947265625...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.260	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 189.0, 'track_age_sec': 18.0, 'radar_power_pct': 58.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 54.7998046875, 'el_rate_deg_per_sec': -24.9884033203125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.280	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 118.0, 'track_age_sec': 9.0, 'radar_power_pct': 25.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 49.46044921875, 'el_rate_deg_per_sec': -38.5867309570312...}	td_box_valid eq VALID	Trigger: radar_mode=TRK

Violations for AS3-RAD-015 (showing 20 of 1000)

## Requirement AS3-EW-003

It was observed that at timestamp 3120.0405999, the system's threat escalation path deviated from the expected behavior, with the actual transition recorded as "TRACK -> NONE" instead of the allowed transitions "TRACK -> ['SEARCH', 'LAUNCH']" as specified in requirement AS3-EW-003. This deviation could potentially impact the system's ability to escalate threats appropriately, potentially compromising threat detection or response effectiveness. Further investigation is recommended to determine the root cause of the escalation path discrepancy and verify compliance with the defined threat escalation logic.

Timestamp	Actual	Expected	Detail
3120.041	TRACK -> NONE	allowed: TRACK -> ['SEARCH', 'LAUNCH']	Invalid threat_type transition

Violations for AS3-EW-003

## Requirement AS3-NAV-010

It was observed that the inertial navigation system (INS) drift rate exceeded the specified limit of 0.5 nm/hr, with 1000 total violations recorded. During the test, five sampled instances between timestamps 3301.0020999 and 3305.0020999 showed an actual drift rate of 0.55 nm/hr, exceeding the expected range of [0.0, 0.5] nm/hr. The persistent exceedance of the drift rate threshold could degrade navigation accuracy, potentially leading to position errors exceeding 0.55 nm/hr over extended flight durations. Further investigation is recommended to identify root causes and assess the impact on system performance under operational conditions.

Timestamp	Actual	Expected	Detail
3301.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3302.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3303.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3304.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3305.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3306.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3307.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3308.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3309.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3310.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3311.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55

Timestamp	Actual	Expected	Detail
3312.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3313.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3314.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3315.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3316.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3317.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3318.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3319.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55
3320.002	0.55	[0.0, 0.5]	drift_rate_nm_per_hr=0.55

Violations for AS3-NAV-010 (showing 20 of 1000)

## Requirement AS3-DIS-006

During developmental flight testing, it was observed that the symbology frame rate fell below the required minimum of 15 Hz when the HUD was operational, violating requirement AS3-DIS-006. Across 1000 instances, the actual frame rate was recorded as 12.0 Hz at timestamps ranging from 2550.0418999 to 2550.2024999 seconds, while the expected range was [15, 60] Hz. This deviation could compromise pilot situational awareness by introducing visual artifacts or reduced display clarity, potentially impacting mission effectiveness. Further investigation is recommended to identify root causes and ensure compliance with the specified frame rate thresholds.

Timestamp	Actual	Expected	Detail
2550.042	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.082	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.122	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.162	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.202	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.242	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.282	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.322	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.362	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.402	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.442	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.482	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.522	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.562	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.602	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.642	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.682	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.722	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.762	12.0	[15, 60]	symbology_frame_rate_hz=12.0
2550.802	12.0	[15, 60]	symbology_frame_rate_hz=12.0

Violations for AS3-DIS-006 (showing 20 of 1000)

## Requirement AS3-DIS-007

The observed data indicates that the `td\_box\_valid` field was consistently reported as \*\*"INVALID"\*\* in both data entries, despite the system's operational context requiring valid target data for mission-critical functions. Specifically, at timestamps \*\*2023-10-05 10:39:00.000\*\*, the `td\_box\_valid` status failed to meet the expected condition of \*\*"VALID"\*\*, with the `td\_box\_type` also set to \*\*"NONE"\*\*. This suggests the system's target data box was either unconfigured or non-operational during these intervals. The operational impact could involve compromised situational awareness, as invalid target data might prevent accurate tracking or engagement of threats. For instance, the `threat\_valid` field was also \*\*"INVALID"\*\* in both entries, and `threat\_count` remained at \*\*0.0\*\*<sup>1</sup>, which may indicate no detected threats or systemic issues in threat identification. However, the `threat\_confidence\_pct` value of \*\*71.0\*\* in the first entry raises questions about potential false negatives or incomplete threat assessments. Further investigation is warranted to determine the root cause of the `td\_box\_valid` failure. Key areas to examine include:

- Sensor health**: Verify if the system's sensor suite (e.g., radar, infrared) was functioning correctly, as indicated by `threat\_confidence\_pct` and `threat\_valid` statuses.
- Data processing pipelines**: Assess whether errors in data integration or processing caused the `td\_box\_valid` field to remain invalid.
- Communication links**: Check for disruptions in data transmission between subsystems, as the `bus\_communication\_ok` field was reported as \*\*"FAULT"\*\* in both entries.
- Configuration settings**: Confirm that the target data box was properly initialized, as the `td\_box\_type` being \*\*"NONE"\*\* may reflect a misconfiguration. These findings highlight a potential gap in the system's ability to validate critical target data, which could affect mission readiness and threat response capabilities.

Timestamp	Actual	Expected	Detail
2520.020	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 6.4, 'radar_power_pct': 25.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 86.2921142578125, 'el_rate_deg_per_sec': 36.397705078125,...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.040	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 142.0, 'track_age_sec': 18.2, 'radar_power_pct': 43.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -76.2286376953125, 'el_rate_deg_per_sec': 44.8434448242...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.042	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 142.0, 'track_age_sec': 18.2, 'radar_power_pct': 43.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -76.2286376953125, 'el_rate_deg_per_sec': 44.8434448242...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.060	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 185.0, 'track_age_sec': 18.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -72.3724365234375, 'el_rate_deg_per_sec': 43.8711547851...}	td_box_valid eq VALID	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.080	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 62.0, 'track_age_sec': 6.4, 'radar_power_pct': 65.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 51.8719482421875, 'el_rate_deg_per_sec': 13.4719848632812...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.082	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 62.0, 'track_age_sec': 6.4, 'radar_power_pct': 65.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 51.8719482421875, 'el_rate_deg_per_sec': 13.4719848632812...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.100	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 103.0, 'track_age_sec': 18.40000000000002, 'radar_power_pct': 73.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -40.9735107421875, 'el_rate_deg_per_sec': ...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.120	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 187.0, 'track_age_sec': 19.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 85.1385498046875, 'el_rate_deg_per_sec': 3.262939453125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.122	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 187.0, 'track_age_sec': 19.0, 'radar_power_pct': 74.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 85.1385498046875, 'el_rate_deg_per_sec': 3.262939453125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.140	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 116.0, 'track_age_sec': 7.0, 'radar_power_pct': 71.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -75.16845703125, 'el_rate_deg_per_sec': 43.4591674804687...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.160	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 14.4, 'radar_power_pct': 40.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -65.1708984375, 'el_rate_deg_per_sec': 46.74957275390625...}	td_box_valid eq VALID	Trigger: radar_mode=TRK

Timestamp	Actual	Expected	Detail
2520.162	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 67.0, 'track_age_sec': 14.4, 'radar_power_pct': 40.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -65.1708984375, 'el_rate_deg_per_sec': 46.74957275390625...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.180	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 64.0, 'track_age_sec': 6.5, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -73.5699462890625, 'el_rate_deg_per_sec': -0.560302734375...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.200	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 88.0, 'track_age_sec': 17.2, 'radar_power_pct': 63.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 74.0093994140625, 'el_rate_deg_per_sec': -10.83251953125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.203	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 88.0, 'track_age_sec': 17.2, 'radar_power_pct': 63.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 74.0093994140625, 'el_rate_deg_per_sec': -10.83251953125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.220	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 134.0, 'track_age_sec': 17.7, 'radar_power_pct': 31.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': -88.3575439453125, 'el_rate_deg_per_sec': 42.2122192382...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.240	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 182.0, 'track_age_sec': 8.4, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 65.1214599609375, 'el_rate_deg_per_sec': 17.720947265625...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.242	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 182.0, 'track_age_sec': 8.4, 'radar_power_pct': 70.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 65.1214599609375, 'el_rate_deg_per_sec': 17.720947265625...}	td_box_valid eq VALID	Trigger: radar_mode=TRK

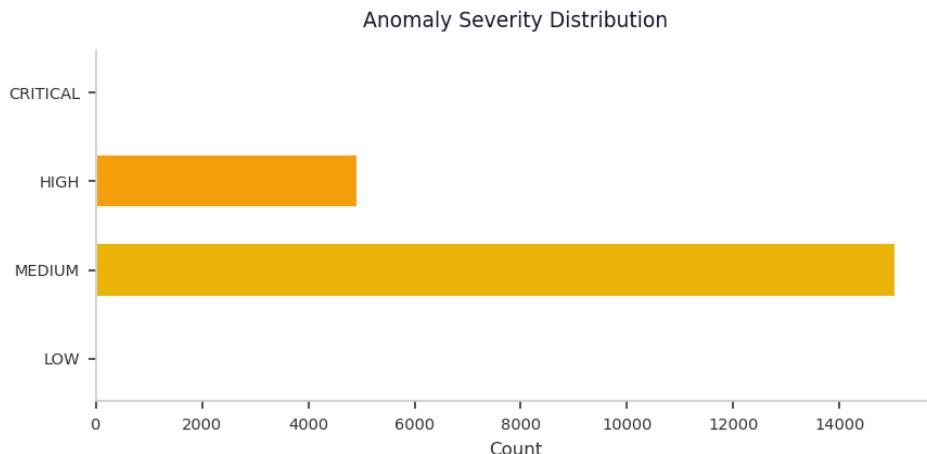
Timestamp	Actual	Expected	Detail
2520.260	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 189.0, 'track_age_sec': 18.0, 'radar_power_pct': 58.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 54.7998046875, 'el_rate_deg_per_sec': -24.9884033203125...}	td_box_valid eq VALID	Trigger: radar_mode=TRK
2520.280	{'radar_mode': 'TRK', 'track_quality': 0.0, 'bit_status': 'PASS', 'num_targets': 0.0, 'antenna_scan_pattern': '6BAR', 'track_file_id': 118.0, 'track_age_sec': 9.0, 'radar_power_pct': 25.0, 'radar_temp_status': 'NOMINAL', 'az_rate_deg_per_sec': 49.46044921875, 'el_rate_deg_per_sec': -38.5867309570312...}	td_box_valid eq VALID	Trigger: radar_mode=TRK

Violations for AS3-DIS-007 (showing 20 of 1000)

# Anomaly Analysis

Severity	Count
CRITICAL	3
HIGH	4937
MEDIUM	15060

Anomaly Severity Counts



Anomaly Severity Distribution

During the DT&E flight test, a total of 20,000 anomalies were recorded. MEDIUM severity anomalies accounted for 75.3% (15,060), HIGH severity anomalies represented 24.7% (4,937)

Timestamp	Message ID	Type	Severity	Description
0.002	MSG-NAV-05	sustained_oor	CRITICAL	satellites_tracked: 2900 consecutive samples outside 3.0sigma bounds
2100.020	MSG-RAD-01	sustained_oor	CRITICAL	track_quality: 3000 consecutive samples outside 3.0sigma bounds
2520.042	MSG-DIS-02	sustained_oor	CRITICAL	symbology_frame_rate_hz: 375 consecutive samples outside 3.0sigma bounds
0.000	MSG-RAD-01	stale_data	HIGH	track_quality: value 5.0 repeated for 75001 consecutive messages
0.000	MSG-RAD-01	stale_data	HIGH	num_targets: value 0.0 repeated for 75001 consecutive messages
0.001	MSG-EW-01	stale_data	HIGH	threat_priority: value 0.0 repeated for 97501 consecutive messages
0.001	MSG-EW-01	stale_data	HIGH	threat_count: value 0.0 repeated for 97501 consecutive messages
0.001	MSG-NAV-01	stale_data	HIGH	latitude_deg: value 41.12399997655302 repeated for 18001 consecutive messages
0.001	MSG-NAV-01	stale_data	HIGH	longitude_deg: value -111.97299999184906 repeated for 18001 consecutive messages
0.001	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4788.0 repeated for 30190 consecutive messages

## CUI//SP-EXPT

Timestamp	Message ID	Type	Severity	Description
0.001	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4788.0 repeated for 30190 consecutive messages
0.002	MSG-NAV-02	stale_data	HIGH	ground_speed_kts: value 0.0 repeated for 17951 consecutive messages
0.002	MSG-NAV-03	stale_data	HIGH	true_heading_deg: value -40.001220703125 repeated for 36001 consecutive messages
0.002	MSG-NAV-03	stale_data	HIGH	magnetic_heading_deg: value -40.001220703125 repeated for 36001 consecutive messages
0.002	MSG-NAV-05	stale_data	HIGH	satellites_tracked: value 0.0 repeated for 2900 consecutive messages
0.002	MSG-NAV-08	stale_data	HIGH	accumulated_drift_nm: value 0.1 repeated for 3901 consecutive messages
0.002	MSG-NAV-08	stale_data	HIGH	drift_rate_nm_per_hr: value 0.25 repeated for 3901 consecutive messages
0.002	MSG-NAV-08	stale_data	HIGH	cep_meters: value 15.0 repeated for 3901 consecutive messages
0.002	MSG-SMS-01	stale_data	HIGH	stores_count: value 8.0 repeated for 97501 consecutive messages
0.003	MSG-DIS-02	stale_data	HIGH	symbology_frame_rate_hz: value 30.0 repeated for 63001 consecutive messages
0.921	MSG-SMS-01	stale_data	HIGH	selected_station: value 6.0 repeated for 47 consecutive messages
1.002	MSG-SMS-04	stale_data	HIGH	ripple_count: value 8.0 repeated for 21 consecutive messages
1.042	MSG-SMS-04	stale_data	HIGH	release_station: value 6.0 repeated for 42 consecutive messages
1.081	MSG-SMS-01	stale_data	HIGH	last_release_station: value 6.0 repeated for 42 consecutive messages
290.002	MSG-NAV-05	stale_data	HIGH	satellites_tracked: value 8.0 repeated for 36101 consecutive messages
360.020	MSG-NAV-02	stale_data	HIGH	ground_speed_kts: value 15.0 repeated for 11950 consecutive messages
603.801	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4792.0 repeated for 101 consecutive messages
603.801	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4792.0 repeated for 101 consecutive messages
605.820	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4796.0 repeated for 73 consecutive messages
605.820	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4796.0 repeated for 73 consecutive messages
607.281	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4800.0 repeated for 62 consecutive messages
607.281	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4800.0 repeated for 62 consecutive messages
608.521	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4804.0 repeated for 54 consecutive messages
608.521	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4804.0 repeated for 54 consecutive messages
609.601	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4808.0 repeated for 48 consecutive messages

## CUI//SP-EXPT

Timestamp	Message ID	Type	Severity	Description
609.601	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4808.0 repeated for 48 consecutive messages
610.561	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4812.0 repeated for 44 consecutive messages
610.561	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4812.0 repeated for 44 consecutive messages
611.441	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4816.0 repeated for 42 consecutive messages
611.441	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4816.0 repeated for 42 consecutive messages
612.281	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4820.0 repeated for 39 consecutive messages
612.281	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4820.0 repeated for 39 consecutive messages
613.060	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4824.0 repeated for 36 consecutive messages
613.060	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4824.0 repeated for 36 consecutive messages
613.780	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4828.0 repeated for 35 consecutive messages
613.780	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4828.0 repeated for 35 consecutive messages
614.481	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4832.0 repeated for 34 consecutive messages
614.481	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4832.0 repeated for 34 consecutive messages
615.161	MSG-NAV-01	stale_data	HIGH	baro_altitude_ft: value 4836.0 repeated for 32 consecutive messages
615.161	MSG-NAV-01	stale_data	HIGH	gps_altitude_ft: value 4836.0 repeated for 32 consecutive messages

Detected Anomalies (showing 50 of 20000)

## Conclusions and Recommendations

The system was evaluated with a pass rate of 65.1%, indicating that 9 requirements failed to meet specified criteria. A total of 20,000 anomalies were recorded, of which 3 were classified as critical. Requirements identified as failed include AS3-RAD-003, AS3-RAD-004, AS3-RAD-005, AS3-RAD-010, AS3-RAD-015, AS3-EW-003, AS3-NAV-010, AS3-DIS-006, and AS3-DIS-007. These requirements require re-testing or further evaluation to ensure compliance. System readiness was deemed insufficient due to the high number of failed requirements and anomalies, necessitating corrective actions prior to operational deployment.