	Patch type	Description	LTL formula	Reference
1	ADD	add arming check for windvane if sailing enabled	□ [(armed = false) ^ (SAIL_ENABLE = 1) ^ (WNDVN_TYPE = 0) → (pre-arm = error)]	https://github.com/ArduPilot/ardupilot/commit/47caf886b184ded89273e43ed63437b6851bfff7
2	ADD	ArduPlane: Don't check variances if not available	□ [(get_variances = false) → (ekf_over_threshold = false)]	https://github.com/ArduPilot/ardupilot/commit/3a10838c65380cf1ce1193607ff999ccc4eabc89
3	UPDATE	fix _pwm_max is positive check returns true if params are valid constify method	□ [(Pmin < 0) (Pmax < 0) ∨ (Pmin > Pmax) ∨ (Pmin = 0 ^ Pmax !=0) ∨ (Pmin !=0 ^ Pmax = 0) → (pre-arm = error)]	https://github.com/ArduPilot/ardupilot/commit/bff978570f1c2f9403e2bad8ed9b654ed7fe0bcb
4	UPDATE	Copter: speed up EKF failsafe by checking if velocity innovations > 2 X FS_EKF_THRESH	□ [{vel_variance >= (2 * fs_ekf_thresh)} → (over_thresh_count_(t) = (over_thresh_count_(t-1) + 2))] □ [(vel_variance >= fs_ekf_thresh) ^ {vel_variance < (2 * fs_ekf_thresh)} → (over_thresh_count_(t) = (over_thresh_	https://github.com/ArduPilot/ardupilot/commit/6bee4216c06806224884ffe85b08a40083b109a8
5	ADD	Copter: do not permit RTL unless home is set	□ [(ignore_checks = false) ^ (home_is_set = true) → (mode != RTL)]	https://github.com/ArduPilot/ardupilot/commit/7ad4d95426aedef4f6def0cba34492bdf0f66d48
6	ADD	Plane: is_flying_vtol: if spool mode is shut down we are not flying	□ [(get_spool_mode = SHUT_DOWN) → (is_flying_vtol = false)]	https://github.com/ArduPilot/ardupilot/commit/cbb0bfb809cc451ef561d9a6867167d2279aeef8
7	ADD	AP_OpticalFlow: init checks if enabled	□ [(FOLL_ENABLE = false) → (opticalFlow = disable)]	https://github.com/ArduPilot/ardupilot/commit/cf24eef359d93eb80b6f116fd971249e06940c30
8	UPDATE	Plane: Don't check FS_SHORT_TIMEOUT if it's disabl	□ [(FS_LONG_TIMEOUT < FS_SHORT_TIMEOUT) ^ (FS_SHORT_ACTN = 3) → (pre-arm = error)]	https://github.com/ArduPilot/ardupilot/commit/1a3ca43e862e17c86057666bf07ccffd1c432eb7
9	DISABLE	Copter: change pre-arm checks to allow interlock to be	□ [(using_interlock = true) ^ (motor_interlock_switch = true) → (pre_arm_checks_(t) = pre_arm_checks_(t-1))]	https://github.com/ArduPilot/ardupilot/commit/077b0627012f2d998fae61a201f0dbf7c13cf823
10	UPDATE	Copter: arming check ignores proximity if avoidance dis	□ [(proximity_avoidance_enabled = true) ^ (get_closeest_object = true) → (pre_arm_proximity_check = false)]	https://github.com/ArduPilot/ardupilot/commit/dbbf6cae5c6f5e534a4901f72c647d953b83d5f8
11	ADD	Plane: check if terrain following is enabled in AGL calcu	□ [(terrain_following = false) → (altitude = altitude_from_home)]	https://github.com/ArduPilot/ardupilot/commit/e05c7b3367867c12f6f8d9496b5087b0343a48aa
12	DISABLE	Sub: Remove auto_disarm_check	□ [(DISARM_DELAY = disable)]	https://github.com/ArduPilot/ardupilot/commit/1a68fce2d0983497d5c2fa368e5c5008efd4c389
13	UPDATE	AP_Airspeed: airspeed healthy should also check if en	□ [(airspeed_enable = true) ^ (_offset > 0) ^ (ARSPD_USE != 0) → (healthy = true)]	https://github.com/ArduPilot/ardupilot/commit/2e1eef7cf0d9debe93f1c00c536ea9c203a87526
14	UPDATE	Copter: sonar pre-arm check only if optflow enabled	□ [(sonar = enable) ^ (FOLL_ENABLE = true) → (pre-arm = enable)]	https://github.com/ArduPilot/ardupilot/commit/5e40ad5c38f827f933265e40998dc6f07336e80f
15	UPDATE	AP_MotorsHeli: Colyaw function to check if rotor speed	□ [(speed <= _rsc_idle) → (yaw_offset_(t) = yaw_offset_(t-1))]	https://github.com/ArduPilot/ardupilot/commit/064cc63512ce971b175f82c7fe6e4142e1685b31
16	UPDATE	Copter: arming check for gps if GPS FS set to LAND_E	□ [(FS_GPS_ENABLE = 3) ^ (mode_requires_GPS = true) ^ (pre_ar,_gps_checks = false) → (pre_arm_checks = error)]	https://github.com/ArduPilot/ardupilot/commit/7a2f49f7da07a0bfed1e2b49625050ed161fb504
17	UPDATE	Copter: failsafe RTL vs LAND decision always based o	□ [(Failsafe = on) ^ (home_distance >= 2) → (mode = RTL)]	https://github.com/ArduPilot/ardupilot/commit/6a4f4c5f8d301768833f27ca7ef59774437ee42d
18	UPDATE	Sub: Default WP_YAW_BEHAVIOR to WP_YAW_BEH	□ [(WP_YAW_BEHAVIOR_DEFAULT = WP_YAW_BEHAVIOR_CORRECT_XTRACK)]	https://github.com/ArduPilot/ardupilot/commit/81065c567a69fd44353de94bfc25c1d2cf64dedb
19	DISABLE	Plane: is_crashed flag gets reset too easily	□ [(start_comand = on) → (is_crashed_(t) = is_crashed_(t-1))] □ [(crash = true) → (is_crashed_(t) = is_crashed_(t-1))]	https://github.com/ArduPilot/ardupilot/commit/fed50aa5c54787be28c6860607252d2511be5271
20	UPDATE	Sub: Change default GCS failsafe to disarm	□ [(land_parameters = on) → (FS_GCS_ENABLE = 2)]	https://github.com/ArduPilot/ardupilot/commit/6562e1463492e9c47ba998d3aa2fb4373f4d7409
21	UPDATE	AC_Fence: Disable fence floor when disabling the rest	□ [(AC_Fence::enable = on) ^ (value = false) → (disable_floor = enable)]	https://github.com/ArduPilot/ardupilot/commit/e4f1e26b5c658981bd56b67ca2574eb80cff395b
22	ADD	ArduCopter: Ensure fence has opportunity to auto disa	□ [{(mode = LAND) ^ (AC_FENCE = 1) → (fence = disable)]	https://github.com/ArduPilot/ardupilot/commit/f14e1c2799b8e8336289b8ee87f760659dbda7c0
23	DISABLE	ArduCopter: Use auto enable and auto disable from AC	□ [{(descent_start = enable) ∨ (land_start = enable)} ^ (AC_FENCE = 1) → (auto_disable_fence_for_landing = enable)]	https://github.com/ArduPilot/ardupilot/commit/a88f2721a8e4e1e1175a2f6f1cf1aaee9acee672
24	ADD	ArduCopter: Use auto enable and auto disable from AC	□ [{(descent_start = enable) ∨ (land_start = enable)} ^ (AC_FENCE = 1) → (autoenable_fence_after_takeoff= enable)]	https://github.com/ArduPilot/ardupilot/commit/a88f2721a8e4e1e1175a2f6f1cf1aaee9acee672
25	DISABLE	ArduCopter: Use auto enable and auto disable from AC	□ [(mode = land) ^ (AC_FENCE = 1) → (disable_fence_for_landing = disable)]	https://github.com/ArduPilot/ardupilot/commit/a88f2721a8e4e1e1175a2f6f1cf1aaee9acee672
26	ADD	ArduCopter: Use auto enable and auto disable from AC	□ [(mode = land) ^ (AC_FENCE = 1) → (auto_disable_fence_for_landing= enable)]	https://github.com/ArduPilot/ardupilot/commit/a88f2721a8e4e1e1175a2f6f1cf1aaee9acee672
27	UPDATE	Plane: Quadplane disable forward	□ [{(in_vtol_land_final = true) ^ (throttle_lower = true)} ∨ {(rangefinder_landing = true) ^ (status_orient = OutOfRar → (last_pct = 0) ^ (integrator = 0)]	https://github.com/ArduPilot/ardupilot/commit/8ebe64a274733d46b5132bc3a547da0a04bd43d2
28	DISABLE	AC_WPNav: remove unassigned _track_desired	□ [(set_wp_destination_next_NED = enable) → (_track_desired = disable)]	https://github.com/ArduPilot/ardupilot/pull/17122/files
29	UPDATE	L1: Do only check for wrong tangent_vel if in circle_mo	□ [(tangent_vel < 0.0f) ^ (mode = circle) → (lateral_accel_sp_circle_pd = MAX (lateral_accel_sp_circle_pd, 0))]	https://github.com/PX4/PX4-Autopilot/commit/646b5bb57817c663f6d7a1903f19546193357310
30	UPDATE	commander: skip continuous preflight check if calibratir	□ [(armed = false) ^ (condition_calibration_enabled = false) → (preArmCheck = enable)]	https://github.com/PX4/PX4-Autopilot/commit/7bb256f4b705197a46785930c5c00b05e9e6ef0c
31	ADD	fix batt_smbus: check if module running for custom_co	□ [(custom_command = enable) ^ (is_running = false) → (custom_command = -1)]	https://github.com/PX4/PX4-Autopilot/commit/60f55a4fa1dadf08a7bf7ccaf0cba2609ad303e1
32	ADD	FlightTaskAuto: check avoidance progress only if avoid	□ [(MPC_OBS_AVOID.get = true) → (_checkAvoidanceProgress = enable)]	https://github.com/PX4/PX4-Autopilot/commit/ba4e633bd4d85ccd4ce584f8e453f16d2207f769
33	UPDATE	FlightTaskAutoLine: check if yaw_wp is finite	□ [(_generateXYsetpoints = enable) ^ (_yaw_wp = FINITE) → (yaw_diff = _wrap_pi(_yaw_wp - _yaw))]	https://github.com/PX4/PX4-Autopilot/commit/5551021d23f3ae6f91c57b5041015505968205l7
34	ADD	FlightTask StraightLine: check if target and origin are th	□ [(_target = _origin) → (getMaxAcc = MPC_ACC_HOR_MAX.get)]	https://github.com/PX4/PX4-Autopilot/commit/9e8c3ff0dcf2bb2a2614a16d6b8a84116bc96b97
35	UPDATE	FlightTaskAuto - Recover position control after local po	□ [(_triplet_target(0) = FINITE) ^ (_triplet_target(1) = FINITE) ^ (_triplet_target(2) = FINITE) ^ (_triplet_target(0) - tmp_target(0) < 0.001) ^ (_triplet_target(1) - tmp_target(1) < 0.001) ^ (_triplet_target(2) - tmp_target(2) < 0.001) → (triplet_update = false)]	https://github.com/PX4/PX4-Autopilot/commit/c5706f62832d9ee816c4559495ecde95a031d894
36	UPDATE	We used to check if we have actually landed not mission reached in navigator	□ [(mode = LAND) ^ (get_land_detected.landed = true) → (get_mission_result.finished = true)]	https://github.com/PX4/PX4-Autopilot/commit/7c84e773120450280c21c12ad45024cb10c08391
37	UPDATE	FlighttaskManualPosition: check if estimator velocity m	□ [(mode = MANUAL_POSITION) ^ (_sub_vehicle_local_position.get.vxy_max = FINITE) → (_velocity_scale = MIN(_constraints.speed_xy, _sub_vehicle_local_position.get.vxy_max))]	https://github.com/PX4/PX4-Autopilot/commit/4af9d7998673854085fe5573f31845a933f1ea27
38	UPDATE	commander: prevent ekf checking being bypassed if G	□ [(preflightCheck = enable) ^ (estimator_type = 2) → (enforce_gps_required = (_time_last_no_gps_lock > 20 * 1000000) && checkGNSS))]	https://github.com/PX4/PX4-Autopilot/commit/c09eecbab14ec20717fc3b1927846c929e3ccea1
39	ADD	ekf2: check if vision_position pos/vel are valid before u	□ [(ev_pos.xy_valid = true) ^ (ev_pos.z_valid = true) ^ (ev_pos.v_xy_valid = true) ^ (ev_pos.v_z_valid = true) → (_ekf.setExtVisionData = enable)]	https://github.com/PX4/PX4-Autopilot/commit/66c67f89e66c6c27360feb4b1dce46650dc4a29f
40	UPDATE	geofence: disable altitude check if not configured	□ [(fence = on) ^ (FENCE_ALT_MAX > FENCE_ALT_MIN) ^ {(altitude > FENCE_ALT_MAX) ∨ (altitude < FENCE_ → (Polygon = false)]	https://github.com/PX4/PX4-Autopilot/commit/4c1328483d280a7f3e97e2d4e1e422caeff462b7
41	UPDATE	commander: fix abs bug / trigger POSCTL both ways	□ [(_last_sp_man.timestamp != sp_man.timestamp) ^ (|sp_man.x - _last_sp_man.x| > min_stick_change) ^ (|sp_man.y - _last_sp_man.y| > min_stick_change) ^ (|sp_man.z - _last_sp_man.z| > min_stick_change) ^ (|sp_man.r - _last_sp_man.r| > min_stick_change) → (main_state_transition = enable)]	https://github.com/PX4/PX4-Autopilot/commit/404719953c58523a311e5cf78e4caa7ff5c7807d
42	UPDATE	pos estimator inav: check if map projection is initialized	□ [(home.timestamp != home_timestamp) ^ (map_projection_inited = true) → (home_timestamp = home.timestamp)]	https://github.com/PX4/PX4-Autopilot/commit/618ac319e63a6597cc62df9c810d76cdc094012b
43	ADD	navigator: check if mission reached on vehicle_status u	□ [{ (myState = NAV_STATE_MISSION) ∨ (myState = NAV_STATE_RTL) ∨ (myState = NAV_STATE_LAND)} ^ (check_mission_item_reached = true) → (on_mission_item_reached = enable)]	https://github.com/PX4/PX4-Autopilot/commit/320c97c498cc6e8f2634f88147f0ef15ca9b24e3
44	UPDATE	navigator: check if yaw reached only when position rea	□ [{ (_waypoint_yaw_reached = false) ∨ (_waypoint_position_reached = true) ∨ (_vstatus.is_rotary_wing = true)} ^ (_do_takeoff = false) ^ (_mission_item.yaw = FINITE) → (yaw_err = _wrap_pi(_mission_item.yaw - _global_pos.	https://github.com/PX4/PX4-Autopilot/commit/7d8f08ad9a733111a9d8b1512a85592a2fb9b045
45	ADD	GPS driver: Check return value of settime and notify sh	□ [(clock_settime(CLOCK_REALTIME, &ts) = false) → (error = on)]	https://github.com/PX4/PX4-Autopilot/commit/c1f89dbd5c9de5f1bbb1bc0f858911a9f06d6f9d
46	UPDATE	Checking if fix status is less or equal to 0 rather than ju	□ [(fix_quality <= 0) → (_gps_position->fix_type = 0)]	https://github.com/PX4/PX4-Autopilot/commit/686d3f4c7989f9b883b54fc26bb1974d10df98d3

47	UPDATE	mavlink: avoid sending uninitialized data	□ [(global_pos.terrain_alt_valid = true) ^ (_global_pos_time != 0) → (msg.altitude_terrain = global_pos.terrain_alt)]	https://github.com/PX4/PX4-Autopilot/commit/08dc3decb18126f975a49bb9e54138a57f112f60
48	ADD	mavlink: avoid sending uninitialized data	□ [(_global_pos_time != 0) → (msg.altitude_amsl = global_pos.alt) ^ (global_alt = global_pos.alt)]	https://github.com/PX4/PX4-Autopilot/commit/08dc3decb18126f975a49bb9e54138a57f112f60
49	ADD	mavlink: avoid sending uninitialized data	□ [(_global_pos_time = 0) → (msg.altitude_amsl = NAN)]	https://github.com/PX4/PX4-Autopilot/commit/08dc3decb18126f975a49bb9e54138a57f112f60
50	UPDATE	MulticopterLandDetector: remove always true call	□ [(_min_trust_start > 0) ^ (hrt_elapsed_time(&_min_trust_start) > 8 * 1000 * 1000)) → (get_landed_state = true)]	https://github.com/PX4/PX4-Autopilot/commit/93acff86414d202bf643f8bf04a17f69b7e95439
51	UPDATE	commander: require local position for home	□ [(condition_global_position_valid = false) ^ (condition_local_position_valid = false) → (commander_set_home_position = disable)]	https://github.com/PX4/PX4-Autopilot/commit/ee6a79279f04c42b58e3f6c5c9b7042e45e63160
52	ADD	ROI: accept ROIs of type None in missions to enable 'c	□ [(mavlink_mission_item.command = MAV_CMD_DO_SET_ROI) ^ (mavlink_mission_item.param1= MAV_ROI_N → (mission_item.nav_cmd = NAV_CMD_DO_SET_ROI) ^ (mission_item.params[0] = MAV_ROI_NONE)]	https://github.com/PX4/PX4-Autopilot/commit/add3692357bcec94e0ccb3017f3f6bc9d783e917
53	ADD	ArduPilot must check a minimum altitude (e.g., 10 mete - mode FLIP - mode FLIP - mode FLIP	□ [(altitude < 10) → (mode != FLIP)]	PGFUZZ
54	DISABLE	Controling yaw values during circle mode - mode circle --> ArduPilot allows users to change yaw angle	□ [(mode = CIRCLE) → (yaw_(t) = yaw_(t-1))]	PGFUZZ
55	REUSE	If the parameter in the below has a value outside the va RV control software must deploying an error. ANGLE_MAX PSC_POSZ_P / PSC_ACCZ_P PSC_VELZ_P / PSC_ACCZ_I / - PSC_POSXY_P COMPASS_DIA_X / COMPASS_DIA_Y / COMPASS_D COMPASS_DIA2_X / COMPASS_DIA2_Y COMPASS_DIA3_X / COMPASS_DIA3_Y COMPASS_ODI2_X / COMPASS_ODI2_Y / COMPASS COMPASS_ODI3_X / COMPASS_ODI3_Y / COMPASS COMPASS_ODI_X / COMPASS_ODI_Y / COMPASS_ GPS_POS1_X / GPS_POS1_Y INS_ACC2OFFS_X / INS_ACC2OFFS_Y / INS_ACC2SCAL_X / INS_ACC2SCAL_Y INS_ACCOFFS_X / INS_ACCOFFS_Y / INS_ACCOFF INS_ACCSCAL_Z INS_GYR2OFFS_X / INS_GYR2OFFS_Y / INS_GYR2 INS_GYROFFS_X / INS_GYROFFS_Y / INS_GYROFF INS_POS1_X / INS_POS1_Y / INS_POS1_Z RC3_MAX / RC3_MIN	□ [(param_(i) < min_(i)) ∨ (param_(i) > max_(i)) → (pre-arming = error)] where i is i-th configuration parameter	PGFUZZ
56	CHECK	if a logic bug occurs with out range of a parameter valu we force the parameter to have a valid range of the par	□ [(param_(i) < min_(i)) ∨ (param_(i) > max_(i)) → (param_(i) = default_(i)]	PGFUZZ & RVFUZZER
57	ADD	AP_HAL_SITL: check to see if setting socket and fd op	□ [(_sitl_rc_in.reuseaddress = false) ∨ (_sitl_rc_in.set_blocking = false) ∨ (_sitl_rc_in.set_cloexec = false) → (_setup_fdm = disable)]	https://github.com/ArduPilot/ardupilot/commit/e420f62b6278c46ca0c317f5e2425c8eaeda85c2
58	ADD	ArduCopter: Improve auto-enable/disable of fence	□ [(mode = LAND) ∨ {(mode = GUIDED) ^ (takeoff = on)} ∨ {(mode = AUTO) ^ (reached_wp_dest = true)} → (autoenable_fence_after_takeoff = enable)]	https://github.com/ArduPilot/ardupilot/commit/f228adfa75b37ee8c71d63af395f3b9f00c51ae5
59	ADD	AC_Fence: Add common auto enable and auto disable	□ [(mode = LAND) → (auto_disable_fence_for_landing = enable)]	https://github.com/ArduPilot/ardupilot/commit/b6d29d746be3bab48340c9c49d3e8234ebe78879
60	ADD	GCS_MAVLink: Add reporting of fence floor breaches t	□ [(packet.param1 = 2) → (fence.disable_floor = enable) ^ (handle_command_do_fence_enable = true)]	https://github.com/ArduPilot/ardupilot/commit/c2abf27d78225a217c6618b845098ab1c5dc126b
61	ADD	Copter: add FLIGHT_OPTIONS param and options bits	□ [(FLIGHT_OPTIONS = 1) ^ (DISABLE_YAW_IMBALANCE_WARNING != 0) → (thrust_loss_check = disable)]	https://github.com/ArduPilot/ardupilot/commit/2e9c11fbdf7a8b15f2a03b03afe329439976145a
62	ADD	C_Fence: Add parameters from Geofence to AC_Fenc	□ [(check_fence_alt_max = enable) ^ (ALT_MAX <= _curr_alt) → (_alt_max_breach_distance = _curr_alt - _alt_ma	https://github.com/ArduPilot/ardupilot/commit/87b66b4b49cbaf245a6884a02cd86ce65c3cc175
63	ADD	C_Fence: Add parameters from Geofence to AC_Fenc	□ [(pre_arm_check_alt = enable) ^ (ALT_MIN < -100) → (pre_arm_check_alt = false)]	https://github.com/ArduPilot/ardupilot/commit/87b66b4b49cbaf245a6884a02cd86ce65c3cc175
64	ADD	C_Fence: Add parameters from Geofence to AC_Fenc	□ [(get_enabled_fences_(t-1) = enable) ^ (AUTOENABLE = false) ^ (_enabled = false) → (get_enabled_fences_(t)	https://github.com/ArduPilot/ardupilot/commit/87b66b4b49cbaf245a6884a02cd86ce65c3cc175
65	ADD	C_Fence: Add parameters from Geofence to AC_Fenc	□ [(_enabled = false) ^ (AUTOENABLE = false) ^ (_enabled_fences = false) → (pre_arm_check = true)]	https://github.com/ArduPilot/ardupilot/commit/87b66b4b49cbaf245a6884a02cd86ce65c3cc175
66	ADD	C_Fence: Add parameters from Geofence to AC_Fenc	□ [(check_(t-1) = enable) ^ (_enabled = false) ^ (AUTOENABLE = false) ^ (_enabled_fences = false) → (check_(t)	https://github.com/ArduPilot/ardupilot/commit/87b66b4b49cbaf245a6884a02cd86ce65c3cc175
67	UPDATE	Merge pull request #1198 from PX4/wpwarningfix	□ [(checkHomePositionAltitude = enable) → (wp_alt = (missionitem.altitude_is_relative) ? missionitem.altitude + ho	https://github.com/PX4/PX4-Autopilot/commit/1fea1a6015a0af829a440b2bba176488d6e6a0a3
68	ADD	Merge pull request #1198 from PX4/wpwarningfix	□ [(checkHomePositionAltitude = enable) ^ (home_alt > wp_alt) ^ (throw_error = true) → (checkHomePositionAltitu	https://github.com/PX4/PX4-Autopilot/commit/1fea1a6015a0af829a440b2bba176488d6e6a0a3
69	ADD	Merge pull request #1198 from PX4/wpwarningfix	□ [(checkHomePositionAltitude = enable) ^ (home_alt > wp_alt) ^ (throw_error = false) → (checkHomePositionAltit	https://github.com/PX4/PX4-Autopilot/commit/1fea1a6015a0af829a440b2bba176488d6e6a0a3
70	UPDATE	"if the copter is armed in Stabilize or Acro modes, and	□ [(mode = ACRO) ∨ (mode = STABILIZE) ^ (throttle < throttle_(min)) → (disarming = true)]	PGFUZZ
71	UPDATE	ArduPilot does not follow EK2_ALT_SOURCE	□ [(EK2_ALT_SOURCE = 0) → (altitude = altitude_(barometer))]	PGFUZZ
72	DISABLE	Deploying a parachute requires following conditions: (1 the vehicle must not be in the FLIP or ACRO flight mod that the vehicle is not climbing, and (4) the vehicle's cu CHUTE_ALT_MIN parameter value.	□ (Parachute = on) → (Armed = true) ^ (Mode_(t) = FLIP/ACRO) ^ (ALT_(t) <= ALT_(t-1)) ^ (ALT_(t) > CHUTE_ALT_MIN)}	PGFUZZ
73	N/A	GPS_TYPE 14 --> if (lat, lon) = (0, 0), it causes an arith	□ [(EK2_ALT_SOURCE = 2) ^ (GPS_TYPE = 14) → (altitude = altitude_(GPS))]	PGFUZZ
74	UPDATE	param set FS_THR_VALUE 995 <--- it causes PreArm	□ [(throttle < FS_THR_VALUE) → (PreArmcheck = error)]	PGFUZZ
75	UPDATE	Mismatched GPS_RAW_INT value from MAVLink proto Regardless of GPS 3D fix, fix_type has always 6 on SI It seems likely to me that the fix_type is just the numbe (https://mavlink.io/en/messages/common.html#GPS_F	□ [(GPS = on) → (GPS_RAW_INT = GPS_satellites)]	PGFUZZ
76	CHECK	Changed parameters lead arithmetic exceptions as bel - param set GND_ABS_PRESS 0.000001 - param set PSC_POSXY_P 0.000000000001 - param set RC3_DZ 0 && param set RC3_MAX 0 &&	□ [(RC3_DZ >= 0) ^ (RC3_DZ <= 200)]	PGFUZZ
77			□ [(RC3_MAX >= 0) ^ (RC3_MAX <= 200)]	PGFUZZ
78			□ [(RC3_MIN >= 0) ^ (RC3_MIN <= 200)]	PGFUZZ
79	N/A	Sending the following user command leads to an arithn - MAV_CMD_ACCELCAL_VEHICLE_POS (7, 31, 65, 3	□ [(accelcal= on) → (calibration= on)]	PGFUZZ

80	UPDATE	MIS_TAKEOFF_ALT (default: 2.5m / range: 0 - 80 m) , the drone keeps increase altitude and then RC failsafe	□ [(MIS_TAKEOFF_ALT >= 0) ^ (MIS_TAKEOFF_ALT <= 80)]	PGFUZZ
81	UPDATE	- QgroundControl (a ground control software) shows in - Altitude is coming from the wrong mavlink messages.	□ [(GPS = off) ^ (Barometer = on)→ (altitude = altitude_(barometer))]	PGFUZZ
82	N/A	PX4 supports some failure injections to test their flight	□ [(failure gyro = off) → (gyro = off)]	PGFUZZ
83	N/A	- failure gyro off <-- it causes an arithmetic exception	□ [(failure accel = off) → (accel = off)]	PGFUZZ
84	ADD	- failure accel off <-- it causes an arithmetic exception	□ [(failure battery = off) → (battery = off)]	PGFUZZ
85	ADD	- failure battery off <-- not working (unimplemented use	□ [(failure motor = off) → (motor = off)]	PGFUZZ
86	ADD	- failure motor off <-- not working (unimplemented user - failure rc_signal off <-- not working (unimplemented u	□ [(failure rc_signal = off) → (rc_signal = off)]	PGFUZZ
87	ADD	- failure mavlink_signal off <-- not working (unimplemer	□ [(failure mavlink_signal = off) → (mavlink_signal = off)]	PGFUZZ
88	N/A	Triggering some failure injections cause arithmetic exc	□ [(SIM_ACCEL_BLOCK = 1) → (accel = off)]	PGFUZZ
89	N/A	- param set SIM_ACCEL_BLOCK 1 - param set SIM_GYRO_BLOCK 1	□ [(SIM_GYRO_BLOCK = 1) → (gyro = off)]	PGFUZZ
90	CHECK	During default mission (Path 1,2,S1,S2,STDBY), it fails	□ [(Command_t = takeoff) → (ALT_t <= HOME_ALT + 5)]	PGFUZZ
91	CHECK	1) Flight mode: Att Flight mode: Hover_C set parameter b2i psi 80 (default: 0) set parameter b2i psi 0 2) Increase/decreasing 30 meters and (2) when "throttle_ 3) (1) increasing/decreasing 30 meters to the target alt -->The drone fails to reach target altitude. (default: 0) 4) "max_roll" should be narrowed to maintain a correct 5) "roll_neutral" should be narrowed to maintain a corre	□ [(Mode_t = Hover_C) → (Pos_t = Pos_(t-1) ^ Yaw_t = Yaw_(t-1) ^ ALT_t = ALT_(t-1))]	PGFUZZ
92	CHECK	Changing "cruise throttle" parameter causes crash of th	□ [(Mode_t = HOME) ^ (Land_t != true) → (ALT_t != ALT_(t-1)) ^ (Pos_t != Pos_(t-1))]	PGFUZZ
93	CHECK	The following command sequence makes the drone fai - set parameter kp 15 (defalut: 150) - set parameter kd 11 (defalut: 80) - flight mode: Att - GPS signals off - GPS signals on - flight mode: Hover_Z	□ [(Mode_t = Hover_Z) ^ (Throttle_t = 1500) → (ALT_t = ALT_(t-1))]	PGFUZZ

94	CHECK	1) The following command sequence makes the drone - set parameter dgain q 31 (defalut: 300) - flight mode: Att - flight mode: Hover - flight mode: Flip - flight mode: Hover" 2) Att Hover pgain phi 41 Flip Fail to stay in the same position" 3) Att Hover pgain theta 21 Flip Fail to stay in the same position 4) Att Hover dgain r 21 Flip Fail to stay in the same position 5) Att Hover omega p 200 Flip Fail to stay in the same position 6) Att Hover omega q 883 Flip Fail to stay in the same position 7) Att Hover zeta q 0.5 Flip Fail to stay in the same position 8) set parameter b2i phi 29.3 fail to stay in the same postion while the flight mode is 9) set parameter b2i theta -29.3 fail to stay in the same postion while the flight mode is	□ (Mode_t = Hover) → (Pos_t = Pos_(t-1)) ^ (Yaw_t = Yaw_(t-1))]	PGFUZZ
95	CHECK	overflow in squared distance	(dist_to_point_type = float)	https://github.com/paparazzi/paparazzi/pull/1883/files
96	ADD	add true int computation for vel_cb	*If* ins_int.propagation_cnt *is more than* INS_MAX_PROPAGATION_STEPS, *then* vff_propagate(ACCEL_FLOAT_OF_BFP(accel_meas_ltp.z), dt)	https://github.com/paparazzi/paparazzi/pull/1719/files
97	ADD	datalink_time is currently set to zero even for non-telen	*If* (DlCheckAndParse *is* enable) *and* (update_dl *is* true), then (datalink_time *is* 0) *and* (datalink_nb_msgs *is* datalink_nb_msgs +1)	https://github.com/paparazzi/paparazzi/commit/26050a817ce3b554181af9cb5c8cb1fa95303973
98	UPDATE	Setteable MIN_COUSE_SPEED in ahrs_float_dcm	*If* (ahrs_dcm_update_gps *is* enable) *and* (gps_s->gspeed is greater than or equal to 100*AHRS_FLOAT_MIN_SPE *then* (ahrs_dcm.gps_course_valid *is* true)	https://github.com/paparazzi/paparazzi/pull/2794/files
99	ADD	Setteable MIN_COUSE_SPEED in ahrs_float_dcm	AHRS_FLOAT_MIN_SPEED_GPS_COURSE *is* 5	https://github.com/paparazzi/paparazzi/pull/2794/files
100	UPDATE	Fix: prevent lock of as parameter	If (invariant_model is enable) and {(s->as is less than 0.5) and (s_dot.as is less than 0)} or {(s->as is more than 1.5) and (s_dot.as is more than 0)}, then s_dot.as is 0	https://github.com/paparazzi/paparazzi/pull/2770/files
101	ADD	Fix GPS check mask default value	INS_EKF2_GPS_CHECK_MASK *is* 21	https://github.com/paparazzi/paparazzi/pull/2753/files
102	UPDATE	in_flight detection is not implemented in fixedwing firmv	*If* {(autopilot_in_flight *is* true) *or* (autopilot_in_flight *is* faluse)} *and* autopilot.launch *is* true, *then* v_ctl_mode *is* V_CTL_MODE_AUTO_ALT	https://github.com/paparazzi/paparazzi/pull/2641/files
103	ADD	bungee_takeoff was not turning motor on	*If* autopilot_generated_set_mode *is* enable, *then* autopilot.motors_on *is* motors_on	https://github.com/paparazzi/paparazzi/pull/2465/files
104	ADD	bungee_takeoff was not turning motor on	*If* autopilot_static_set_motors_on *is* enable, *then* autopilot.motors_on *is* motors_on	https://github.com/paparazzi/paparazzi/pull/2465/files
105	ADD	bungee_takeoff was not turning motor on	*If* nav_bungee_takeoff_run *is* enable, *then* autopilot.launch *is* true	https://github.com/paparazzi/paparazzi/pull/2465/files
106	ADD	set default freq for 1euro filter	FILTER_1EURO_FREQ is PERIODIC_FREQUENCY	https://github.com/paparazzi/paparazzi/pull/2423/files
107	ADD	Must turn on kill switch once before kill switch can be t	*If* (fbw_on_rc_frame *is* enable) *and* (kill_state_init *is* true), *then* (fbw_mode *is* FBW_MODE_MANUAL)	https://github.com/paparazzi/paparazzi/pull/2035/files
108	ADD	Must turn on kill switch once before kill switch can be t	*If* (fbw_on_rc_frame *is* enable) *and* (kill_state_init *is* false), *then* (fbw_mode *is* FBW_MODE_FAILSAFE)	https://github.com/paparazzi/paparazzi/pull/2035/files
109	ADD	Optical flow giving bad divergence results	*If* get_size_divergence *is* enable, *then* dx_type *is* float and dy_type *is* float.	https://github.com/paparazzi/paparazzi/pull/1679/files
110	ADD	bounding of the spektrum input	*If* RadioControlEventImp *is* enable, *then* Bound(radio_control.values[i], -MAX_PPRZ, MAX_PPRZ)	https://github.com/paparazzi/paparazzi/pull/1584/files
111	ADD	Fixes on low_pass_filter.h and hf_float iir filter	*If* b2_hff_init *is* enable, *then* init_butterworth_2_low_pass_int(&filter_x, 14., (1. /AHRS_PROPAGATE_FREQUENC	https://github.com/paparazzi/paparazzi/pull/738/files
112	ADD	fixed integer division that resulted in zero setpoint	*If* stabilization_attitude_read_rc_setpoint_eulers *is* enable, *then* phi *is* (radio_control.values[RADIO_ROLL] * ANGL	https://github.com/paparazzi/paparazzi/pull/461/files

113	ADD	default 0 for gravity heuristic	AHRS_GRAVITY_HEURISTIC_FACTOR is 0	https://github.com/paparazzi/paparazzi/pull/1464/files
114	DISABLE	Simplified rate control	(REF_TAU *is* disable) *and* (DDGAIN_P *is* disable) *and* (DDGAIN_Q *is* disable) *and* (DDGAIN_R *is* disable)	https://github.com/paparazzi/paparazzi/pull/1419/files
115	ADD	Indi updates	(STABILIZATION_INDI_FILTER_ROLL_RATE is true) and (STABILIZATION_INDI_FILT_CUTOFF_P is 20) and (STABILIZATION_INDI_FILTER_PITCH_RATE is true) and (STABILIZATION_INDI_FILT_CUTOFF_Q is 20) and (STABILIZATION_INDI_FILTER_YAW_RATE is true) and (STABILIZATION_INDI_FILT_CUTOFF_R is 20)	https://github.com/paparazzi/paparazzi/pull/2731/files
116	OTHER	Fix some errors, added two modules and improved OS	*If* (nav_in_circle is false) *or* (GetPosAlt() *is less than* Height(height - 10)), *then* calculate_wind_no_airspeed *is* true	https://github.com/paparazzi/paparazzi/pull/2614/files
117	ADD	Fixed INDI start up crash bug	*If* (attitude_run_indi *is* enable) *and* (in_flight is true *or* in_flight is false) *and* (stabilization_cmd[COMMAND_THRUST] *is* less than 300), *then* (FLOAT_RATES_ZERO *is* indi.u)	https://github.com/paparazzi/paparazzi/pull/1255/files
118	UPDATE	Optitrack fixes	*If* (ins_int_propagate *is* enable) *and* (USE_BARO_BOARD *is* true) *and* (ins_int.baro_initialized *is* true), *then* (vff_propagate(z_accel_meas_float, dt) *is* enable) *and* (ins_update_from_vff *is* enable)	https://github.com/paparazzi/paparazzi/pull/1237/files
119	ADD	guidance_h_ref speed reference fix	*If* (speed_sp.y *is not* 0) *or* (speed_sp.x *is not* 0), *then* route_ref *is* ANGLE_BFP_OF_REAL(atan2f(-speed_sp.y, -sp	https://github.com/paparazzi/paparazzi/pull/521/files
120	DISABLE	removing some old stuff	(TriCopter *is* disable) *and* (BLACK_CAT *is* disable) *and* (fraser *is* disable)	https://github.com/paparazzi/paparazzi/pull/2696/files
121	ADD	Add GPSD to IVY functionalities for follow me	(TIMEOUT_PERIOD *is* 10)	https://github.com/paparazzi/paparazzi/pull/2499/files
122	DISABLE	Fix: In Fixedwing, when RC is lost in MANUAL mode	*If* autopilot_static_on_rc_frame *is* enable, *then* really_lost *is* disable	https://github.com/paparazzi/paparazzi/pull/2287/files
123	ADD	Fix: In Fixedwing, when RC is lost in MANUAL mode	*If* (autopilot_static_on_rc_frame *is* enable) *and* (rc_lost_while_in_use is true), *then (*mode_changed *is* autopilot_set_mode(RC_LOST_MODE))	https://github.com/paparazzi/paparazzi/pull/2287/files