Release notes

# Open topics

|  |  |  |
| --- | --- | --- |
| Wheel load synchronization | Written into code but gain is zero. Must be tested |  |
| Robot fall warning by change of roll | Have to produce controlled fall situations and verify |  |
| Closed loop pole docking | Programmed to the level of coordinate systems and messages, but not beyond |  |
| Tape arm | With mechanism very much changed, entire code is irrelevant |  |
| Actuator torque limits may imply that the shoulder deviates a lot. Very awkward package positioning that may cause package fall |  |  |
| I2t limits | Must read GRT temperature |  |
| Mission pauses | Deliberately closed on the shelfs for fear that a pause will not allow enough speed over a junction, preventing it from properly rotating |  |

# Revision History

Version 14.5.1 19-1-2023

|  |  |  |
| --- | --- | --- |
| Issue | Made | Note |
| Need to reconfigure robot if calibrating neck with manipulator removed | Added an item in the “Cheats” dialog | Do NOT reconfigure robot.  After powering the robot, without the manipulator it will remain in pre-operational state.  Use the Cheats dialog “allow wakeup without manipulator”, check and proceed. |
| Rescue sometimes gave failure message on go down, that a distance was not enough | Bug fix | Issue is fixed |
| Potentiometer polarity mattered for wheel arm calibration, so different harnesses must be used for fore or aft potentiometer installations | Software allows both directions | Potentiometer polarity (which wire is return, and which is supply) does not matter anymore. Calibration finds the polarity. Same harness may be used for all configurations |
| Laser operation through host interface did not work | The manipulator is now prevented from overriding the host | Host may turn the laser on. If put off, the laser returns to automatic control |
| In some cases, the follower went over the terminal instead of entering it | Added “stoppy” action for the follower just before the terminal | Follower seems to climb smoothly |
| Failures in wheel arm latch release | Change algorithm to much faster action (current mode instead of neck difference mode) | Action completes before the follower enters peak current limiting, so it works |
| PATCH 2 | 21-1-2023 |  |
| Added “stoppy” action works too late | Added parameter  ControlPars.FollowerStoppyBeforeArcDistance | Action depends on floor friction.  Parameter increased in 3.5cm, but also now playable using SetFloatPar() |
| PATCH 3 |  |  |
|  | Added diagnostic capability, effective even while robot wakes up, useful before BIT effective info. will be broadened with time.  Can for now detect potentiometer reference voltage problem preventing robot wakeup | Use GetState(error\_code) in the Matlab command line, use 0 for error code if you have no specifics. |
|  | Manipulator motors always active in automatic modes |  |
| PATCH 4 | Bug fix |  |
| PATCH 5 |  |  |
|  | Added cheat to run old style programs with wheel arm  Added reports for diagnostics |  |
|  | Fix: shelf motion with fine motion for package – integration |  |
|  | Added current to make wheel-arm possible with bigger weight |  |
| PATCH 7 |  |  |
|  | Added current for 2.5Amp to make wheel-arm possible with bigger weight in the USA  Added trap for catching transitions to manual mode | See the expert.docx |
| PATCH 8 – ALSO CPU2 |  |  |
|  | Fixed bugs in cheats for steering potentiometer ignore, and in wheel arm ignore.  Encoder degrees display added to the CalibSteer dialog  Manipulator “Cant start motor” error extended to resolve which motor failed |  |
| PATCH 9 – ALSO CPU2 |  |  |
|  | Changed: Package doors closure angle to 1.2rad  Wheel arm latch currents to 1.65A | Because of door failure to arrive to previous 1.4rad reference, and because at 2.5A previous setting latch motor assemblies were damaged. |
| PATCH 10 | Added parameter  ControlPars.WheelArmPinReleaseCurrentTarget  Now set to -1Amp, determining the leader target current on wheel arm process  In wheel arm calibration latch current reduced to 0.9Amp | You may use  SetFloatPar(‘ControlPars.WheelArmPinReleaseCurrentTarget  ’,-3) to optimize the set point for easy latch release |
| PATCH 11 |  |  |
|  | Manipulator holds all the time in mission – manipulator only, doors are free.  Bug fix: Laser is not shut after mission |  |
| PATCH 12– ALSO CPU2 | Resolve which drive failed on boot  BIT colors SAFE\_FAILURE as red display  Bug fix: Problems to put into calibration flash of CPU2 | Also fixed IMU calibration:   * BIT dialog contains IMU on the button * Calibration does not depend on operational robot * Calibration does not require to be just after start |
|  |  |  |

Version 15.0.0

|  |  |  |
| --- | --- | --- |
| Issue | Made | Note |
| PATCH 0  CPU1, CPU2, PD,Calibrations,PI |  |  |
| Wheel arm failed large weights | Wheel arm works with split brake | MUST change robot wiring to SPLIT BRAKE ECR |
| WAIT for definite time – a bug | Bug fixed | Also time argument of WAIT instruction changed from microseconds to miliseconds |
| WIFI communication | BIT can now work with WIFI |  |
| PD calibration interface | Bug fix – was not possible to store calibration | The bug was in the Matlab interface, not the PD |
| Wheel direction in crabbing | Wheels both rotated back while crabbing, for improved weight delivery to motored wheels |  |
| Calibration storage | Now in the serial flash instead of in internal flash | Upload both the calibrations from CPU1 & CPU2 using the OLD environment, then reload them to the new environment. The calibrations will be lost on SW update! |
| Bug fix – neck returns to zero | Fix in the Matlab interface | In several occasions, after manual PACKAGE on the shelf, neck returned to zero |
| Bug fix – sometimes steering driver fails by over position error | Fixed – undetermined position command in Quickstop | Caused failure on entering steering calibration in the STAY IN PLACE mode |
| Bug fix – closing calibration window also closes BIT | Fixed – calibration graph was drawing over the BIT window |  |
| UDP communications share lines and thus may disturb PI-LP communication | Baud rate increased to 460800bps | Must be corrected also in PI |
| Prevent robot from falling completely if a junction is mis-rotated and a bogie exits the rail | Robot body tilt angle detected continuously and saved for depth of 262msec (32 samples),  Max(tilt) – min(tilt) >  (parameter= ControlPars.RollThereshold4FallDetection) issues an exception. | Experiment recordings in SigRecFallWArm.mat and in LeftFallOfBoogie.mat  Pending integration |
| Means to check wiring changes | Added BIT functions:   * Test split operation of brakes * Test lights: chakalaka, camera light, tail | See the “Additional Tests” button in BIT |
| Misses of terminal in climb attempts | Active pole homing, configurable  Robot retries on miss | Pending integration |
| Robot fatigued on climbs because of motor load imbalance | Neck joint tension dynamically adjusted for equalized motor load distribution | Pending integration |
| Malinki processor not available  TMS28f280023 put instead | SW works now with TMS28f280023 | No more need of boot and SW loaders |
| EEF (End effector) wiring problematic for tape arm | EEF card integrated SW and HW, including LP support. Use of EEF or vintage electronis instead is configurable | EEF card may be also installed on articulated (SCARA) manipulators |
| Increased shelf speed will cause too high accelerations as accelerations are now defined by time | New parameter defines the shelf acceleration explicitly ControlPars.ShelfAcceleration | Now set to 0.3m/sec2  Thus 30cm from motion end the speed is limited to 42cm/sec |
| Tape arm integration | Ready control of all motors, door calibration, plate calibration, tape homing |  |
| PATCH 1 Never released |  |  |
| PATCH 2 |  |  |
| Recorder had cut results if triggered on event | Bug fix |  |
| Wheel arm dialog did not show if potentiometer reading makes sense | Potentiometer result colored:   * Green for retracted range * Blue for extracted range. * Red for in-between |  |
| After resetting, with ground travel dialog open, the robot sometimes shot unintended reverse high-speed travel | Bug fix |  |
| Robot failed high weight climbs with the follower wheel missing the trail. | Caused by tail weight issuing side stress on the wheels. The follower tended towards robot head. Solved by correcting:   * Leader overturn for the rail to force the follower towards the tail. * Follower steering to push back its own side | Two new parameters:  {&ControlPars.PreArcFollowerYewOffset,247,-0.1f,0.1f,-0.025f }, // !< Angle offset to add to the steering for follower before it really meets the arc (rad)  {&ControlPars.PreArcLeaderYewOffset,248,-0.1f,0.1f,-0.030f }, // !< Angle offset to add to the steering for leader before follower meets the arc (rad)  Each line includes name, index, low limit, high limit, and default value.  Consider put these parameters into robot configuration |
| Saving manipulator configuration destroyed door calibration | BIT bug fix | Made after release, no change in robot FW |
| PATCH 3 |  |  |
| Shelf angle in correct on package handling | 1. Gyro angle correction taken just before package handling. 2. Position limit for neck is increased to compensate for increased correction. |  |
| PATCH 4 | 6-July-2023 |  |
|  | Fix: SetFloatPars is followed by geometry calculation |  |
|  | BIT: Shelf motion detects accidental crabbed conditions on start, when wheel direction might be opposing |  |
|  | Bug fix of two connected issues:   * Tray could operate unintentionally after vertical alignment. * Package actions were blocked after vertical alignment completion |  |
| PATCH 5  LP CORE1, CORE2 | 11-Jul-2023 |  |
|  | Possible, through the “Additional” dialog in BIT, calibrate the wheel diameter correction | For the correction e, the corrected wheel radi shall be Geom.rg \*(1+e), with Geom.rg=0.1003 |
|  | Motion compilation is done immediately on execute queue command | ACK is the proof that compilation has gone ok |
|  | Can record currents of manipulator |  |
|  | Removed problem of tail flipping after package handling failure |  |
|  | CommSetup shows own IP | Also analyzes a possible problem |
| PATCH 7 (6 was never a formal release) | Error 0x71a1 for exp\_switch\_absent\_pre\_wam  Is now FATAL, not ABORT |  |
|  | Bug fix – stray camera report during shelf session could cause confusion when back on ground |  |
|  | Bug fix – robot did not go full height towards limit switch |  |
|  | Rail radius corrected by 4 promil for the vertical only | Effective rail radius is a problem: vertical distances increase with weight! |
|  | Bug fix – rail steering correction was opposite for the two wheels |  |
|  | BIT fix – BIT crashed when robot is in pause |  |
| Patch 8 | Gyro yaw no more integrating while robot is in program and stopped | Due to Katia complaint |
| Patch 9 | Bug fix: Ground fine motions were to incorrect distance |  |

Version 16.0.0

|  |  |  |
| --- | --- | --- |
| PATCH 0  CPU1, CPU2 | Major revision, all CAN#2 communications transferred to CAN2.  It is no more possible to address the LP slave via CAN#2 |  |
|  | Gyro offset | Automatic gyro offset correction |
|  | Allowed pauses on the shelf | No yet allowed in vertical positions |
|  | Pre-operational state is limited in time, diagnostic message on failure |  |
|  | Specific warning issued to BIT is motion program compilation failed |  |
| Patch 1 | Enabled pauses on the shelf |  |
|  | Enables navigation restart on the shelf |  |
|  | Bug fix : GetSignal() for short unaligned variables |  |
| Patch 2 | Added in the “additional” menu of BIT:  Observe the actual current limit of the GRT drivers in comparison to the “good” values |  |
|  | In the rescue process, overload protection is disabled | Must tell technicians that if the robot remains too much time on the pole with active motors, it should be set to motor OFF |
|  | Bug fix: overload was FAILURE, now SAFE\_FAIL. This means that the robot will not significantly fall |  |
| Patch3 | Corrected junction stabilization | Now robot arrives exactly to commanded place |
|  | Corrected distance between junction switch and junction rotation center |  |

Version 16.1.0

|  |  |  |
| --- | --- | --- |
| PATCH 0  CPU1, CPU2 | Many code additions for GEN#3 compatibility |  |
|  | Bug fix: Protocol subversion was reported as “1” instead of “3” |  |
| Patch 1  CPU1 | On LP Reset, brake are safely engaged first, reducing the chance of robot slip-down  More time allowed for wheelarm convergence on extension, as extensions failed by lack of time |  |