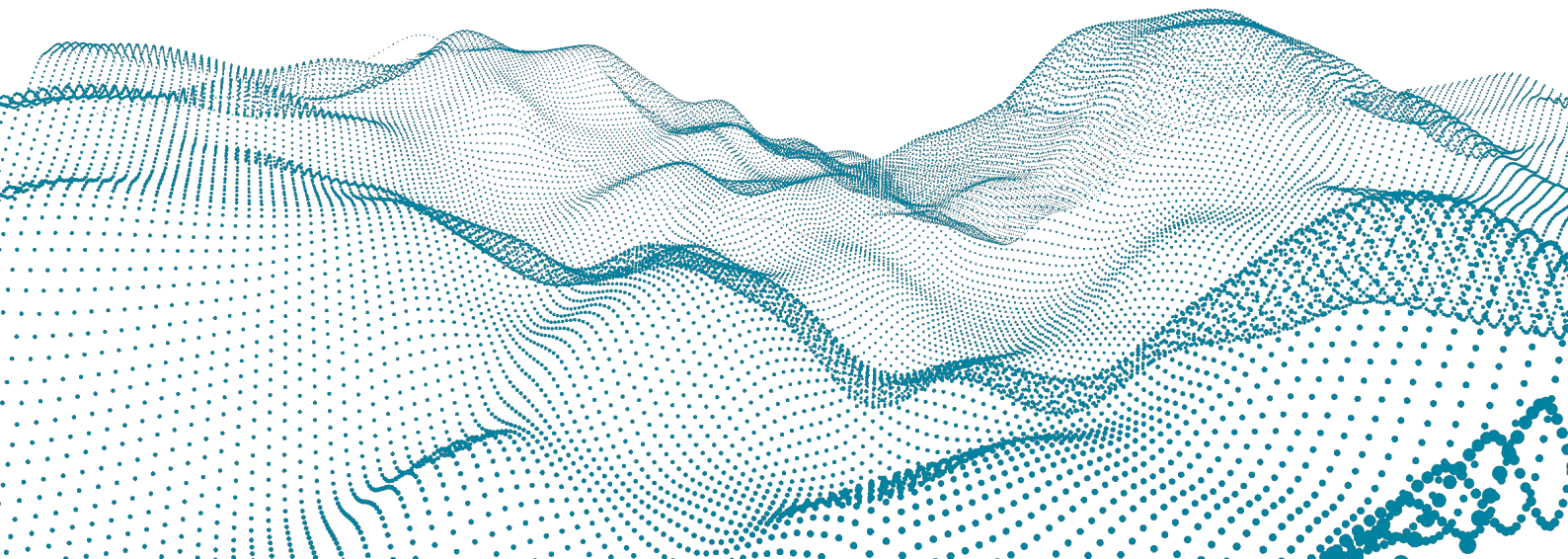
roboception

Roboception GmbH | October 2026

rc_visard 3D Stereo Sensor

FIRMWARE CHANGELOG



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1 26.10.0 (2026-10-26)

1.1 New Features

- Plane-based dimensioning in BoxPick (`rc_boxpick`): The new optional `dimensioning` argument of `compute_grasps` and `detect_items` measures a bounding box for each detected box that is aligned with a reference plane, e.g. a conveyor belt or a table. The box height is measured from that plane, so the full dimensions of the boxes are returned in addition to the grasps. The reference planes are taken from the new PrimitiveDB module (`rc_primitive_db`). This allows measuring the size of parcels and boxes in the same call that computes the grasps, e.g. for sorting items by size or choosing their place position.
- PrimitiveDB (`rc_primitive_db`): This new database module stores geometric primitives, currently planes, persistently on the device, so that they can be used by the detection modules, e.g. as reference planes for dimensioning. Planes are managed with the new services `set_plane`, `get_planes` and `delete_planes`, or on the Web GUI's new Planes database page, which also helps to estimate a plane from the current sensor data. Thus, a reference plane only has to be determined once during setup and can then be reused in every detection request.
- Measure (`rc_measure`): The new service `compute_plane` estimates a plane from the current sensor data, either from the point cloud (`DEPTH`) or from at least three AprilTags lying on a common plane (`APRILTAG`). The plane is returned without being stored and can be stored in PrimitiveDB with `set_plane`. The Web GUI's Measure page shows the estimated plane in a 3D visualization, and the plane can be adjusted interactively. This makes it easy to determine reference planes such as a conveyor belt or a table surface directly with the sensor instead of measuring them manually.
- Generic Robot Interface (GRI): The Web GUI's job editor now supports dynamic arguments, additional return values and mapping tables. Parameter jobs can be created, and jobs can be loaded and edited directly from the Try-Out sections of the modules. This makes setting up robot programs via GRI faster and less error-prone, as a configuration tested in the Try-Out section can be turned into a job directly.

1.2 Improvements and Fixes

- Pack (`rc_pack`):
  - Added argument `robot_pose` to `detect_place_pose` for robot-mounted sensors
  - Fixed load carriers with a pose in the external frame
  - Fixed load carrier detection not respecting `assume_gravity_aligned`
- SilhouetteMatch (`rc_silhouettematch`):
  - Fixed objects close to the border of a 2D region of interest not being detected
- GripperDB(`rc_gripper_db`):
  - Fixed uploading of CAD elements (OBJ files) with multiple connected components
- Generic Robot Interface (GRI):
  - Improved error handling with more specific return codes, e.g. for timeouts and misconfigured jobs
  - Poses and floating point values are now rounded instead of truncated
- REST-API:
  - Reduced memory usage
  - Added timeouts so that a hanging module can no longer block REST-API requests
- Web GUI:
  - Added a popup for previewing the request and response JSON of a result, with options to copy it to the clipboard or download it
  - Added 3d visualization for `measure_depth` result to Measure page
  - Reduced the CPU load of the 3D result visualizations
  - Minor improvements and fixes

2 26.07.0 (2026-07-28)

2.1 New Features

- Pack (`rc_pack`): This new module computes placement poses for objects inside a packing volume, such as a bin or a pallet. It takes the current filling state of the packing volume into account and selects the lowest position that provides stable support for the object, thereby maximizing the remaining space after placement and keeping as many packing options open as possible for the next object to be placed.
- BoxPick (`rc_boxpick`) now offers a new run-time parameter, `discard_cut_off_items`, which discards objects cut off by the image border, the stereo ROI, the 3D ROI, or the stereo overlap. This ensures that grasps are only computed for objects that are fully within the field of view.

2.2 Improvements and Fixes

- BoxPick (`rc_boxpick`):
  - Items returned by `detect_items` are now also sorted according to the user-defined sorting strategy
- LoadCarrier (`rc_load_carrier`):
  - Added new service `detect_filling_level_as_image`, which returns filling level values as compact, zlib-compressed, base64-encoded image strings for faster responses when the number of cells is large
- GripperDB (`rc_gripper_db`):
  - Increased maximum element dimensions and position bounds from 1.0 to 5.0 meters
- All detection modules:
  - The return code value and message of the last detection are now reported in the modules' status values
- Generic Robot Interface (GRI):
  - Support returning additional data in data_4 - data_10
  - Support passing dynamic arguments in data_1 - data_4
- Web GUI:
  - Added orthographic view mode to 3D viewers
  - Minor improvements and fixes

3 26.04.0 (2026-04-28)

3.1 New Features

- Stereo Matching (`rc_stereomatching`) can now be restricted to a user-defined 2D region of interest. This reduces latency when only a part of the image is relevant for the application.
- The gripper definition (`rc_gripper_db`) and CollisionCheck (`rc_collision_check`) support multiple TCPs: Each gripper can now have multiple TCPs with different poses in prioritized order. During collision checking, all defined TCPs are checked for collisions, and the ID of the first collision-free TCP will be returned for each grasp in all rc_reason software modules. By setting the minimum suction surface dimensions for each TCP, only grasps that fulfil these requirements are considered during collision checking. This is especially helpful in ItemPick and BoxPick for applications with multi-suction-cup grippers, where different combinations of suction cups can be activated depending on the size of the item to grasp.

3.2 Improvements and Fixes

- ItemPick (`rc_itempick`):
  - No longer return code 101 when no grasps are found, but valid clusters were detected
- CollisionCheck:

  - Fixed collision checking when FINGER elements have parent 'flange'
- SilhouetteMatch (`rc_silhouettematch`):
  - Added match numbers in result visualization
- EKI Bridge:
  - Updated the EKI XML config files in manual to utilize the maximum 64kB `BUFFSIZE`, allowing for more data per request
  - Added automatic payload pruning to prevent EKI connection crashes and transmission errors when responses would exceed the `BUFFSIZE` limit
- gRPC Interface:
  - Added gamma and auto_exposure_adapting to Image
- REST-API:
  - Added system messages to inform about the current system status
- LED control:
  - changed blink patterns for status notifications
- Web GUI:
  - Use Turbo color map in color-coded disparity image for better visibility of slight disparity changes
  - Fixed grasp duplication and downloading issues in SilhouetteMatch templates
  - Added warning bar when a license is about to expire
  - Minor improvements and fixes

4 26.01.0 (2026-01-28)

4.1 New Features

- Support of suction cups and movable fingers in gripper definition (`rc_gripper_db`) and CollisionCheck (`rc_collision_check`): When modelling a gripper, single gripper elements can be assigned a `function_type`, e.g. `SUCTION_CUP` or `FINGER`. Elements marked as suction cups will be ignored during collision checking, so that suction cups can now be modelled correctly for point cloud collision checking of suction grasps. Elements marked as fingers can have variable positions. By defining the zero position of the finger elements, variable strokes can be assigned to user-defined grasps in SilhouetteMatch. This makes the grasp definition with collision checking in complex applications more comfortable.
- New detection services for easier response parsing in BoxPick (`rc_boxpick`) and SilhouetteMatch (`rc_silhouettematch`): The new services `compute_grasps_extended` in BoxPick, and `detect_object_extended` in SilhouetteMatch perform the same detection tasks as their non-extended counterparts, but deliver the results in a different structure that is easier to parse. Instead of returning items or matches as a separate list next to the grasps, each grasp in the response now contains information about its corresponding object, e.g. the object's pose that is required for exact placement. Thus, retrieving the object information has become much easier.
- gRPC Interface: A new `ImageEventsInterface` service allows sending `depth_acquisition_done` events that signal when the image acquisition for depth computation is completed. This event can be used to determine when it is safe to move the robot or change the scene while a detection is still in progress. This helps for optimizing cycle times in robot applications.

4.2 Improvements and Fixes

- CollisionCheck (`rc_collision_check`):
  - Added new parameter `pointcloud_watertight` that allows to switch off filling holes in the depth image for point cloud collision checking
- Generic Robot Interface:
  - Support of fragmented TCP messages by TCP message buffering
- ItemPick (`rc_itempick`):
  - Fixed wrong number of items returned if `allow_any_grasp_pose` is active
  - Removed empty `template_id` and `view` fields from ItemPick responses

- Web GUI:
  - Minor layout improvements and fixes

5 25.10.1 (2025-11-11)

5.1 Improvements and Fixes

- Generic Robot Interface: fixed failing initialization
- SilhouetteMatch (`rc_silhouettematch`): fixed failing snapshot download when a base plane calibration was set manually

6 25.10.0 (2025-10-28)

6.1 New Features

- Generic Robot Interface: The Generic Robot Interface (https://doc.rc-visard.com/latest/en/gri.html) provides a standardized way to communicate with the rc_reason software modules using simple TCP socket communication, which is natively supported by all major robot platforms and PLCs. It allows creating pre-defined jobs for all services and parameters and triggering these jobs synchronously or asynchronously. Once a job has finished, the chosen return poses can be retrieved sequentially.

6.2 Improvements and Fixes

- LoadCarrier (`rc_load_carrier` and `rc_load_carrier_db`):
  - The maximum allowed dimensions for a load carrier have been increased to 5 meters to support very large load carriers.
- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - The maximum number of computed grasps has been increased to 100. This allows for computing all grasps of a layer packed with boxes in a depalletizing application with triggering a single detection.
- SilhouetteMatch (`rc_silhouettematch`):
  - Changed color of returned matches from red to green in result visualization
- Web GUI:
  - Added new page for Generic Robot Interface (GRI) functionality
  - Updated suggested hand-eye calibration pictograms for better image coverage
  - Added separate ABB robot pose format to have correct quaternion order
  - Show confirmation dialogue before deleting a hand-eye calibration
  - Fixed detection of connected rc_randomdot projector
  - Adjusted aspect ratio of result image streams to native image aspect ratio
  - Minor layout adaptions and fixes

7 25.07.0 (2025-07-29)

7.1 New Features

- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`): Grasps can optionally be checked for collisions between the gripper and the point cloud. This allows for collision-free grasp computation also for two-finger grippers.
- SilhouetteMatch (`rc_silhouettematch`): When sorting grasps according to the smallest angular deviation from the preferred TCP orientation, it is possible to select only a single axis that should be considered during sorting. This gives more appropriate grasps when picking continuously symmetric objects using this sorting strategy.

7.2 Improvements and Fixes

- Stereo camera calibration (`rc_stereocalib`):
  - The last pose can now also be 20% closer instead of only 20% further away to improve usability
  - Automatic self-calibration is now just reported, instead of applied to avoid decalibration in some critical scenes
- Hand-eye calibration (`rc_hand_eye_calibration`):
  - Improved robustness of grid detection. Up to four squares can now be occluded.
  - Rejecting grid detections with high errors
- GripperDB (`rc_gripper_db`) and CollisionCheck (`rc_collision_check`):
  - Fixed long conversion time for large CAD models leading to timeouts during gripper CAD element upload
- ItemPick (`rc_itempick`), BoxPick (`rc_boxpick`) and SilhouetteMatch (`rc_silhouettematch`):
  - Fixed using wrong load carrier detection parameters after startup
- WebGUI:
  - Show warning if camera calibration indicates a baseline change, which in almost all cases means wrong grid dimensions
  - Show suction surface size for ItemPick detection result
  - Improved 2D and 3D result visualization of ItemPick and BoxPick
  - Added counter and capacity text to all database lists
  - Minor fixes

8 25.04.0 (2025-04-25)

8.1 Improvements and Fixes

- Camera (`rc_camera`):
  - Improvements of HDR mode for more equally exposed images
  - In HDR mode the brightness of the image with middle exposure time is reported to ease selection of gain value
- WebGUI:
  - Fixed grasp and match info boxes sometimes not closing by clicking on X
  - Fixed 3D result visualization in SilhouetteMatch: Missing animation of object retraction
  - Fixed triggering stereo acquisition when opening 3D result visualization
  - Added special info box for gain in HDR mode
  - Minor fixes

9 25.01.0 (2025-01-28)

9.1 New Features

- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`): Increased flexibility of grasp computation by considering grasp symmetries. A new runtime parameter `allow_any_grasp_z_rotation` optionally enables the computation of completely rotationally symmetrical grasp points in order to obtain maximum grasping options. Additionally, the preferred TCP orientation of the robot can be defined for automatically selecting the most suitable collision-free grasp for each item and to filter unreachable grasps (see e.g. Setting the preferred orientation of the TCP in ItemPick).

9.2 Improvements and Fixes

- API:
  - Added sorting of keys in JSON and UBJSON responses for better use with some optimized parsers (e.g. on Rockwell PLCs)
  - Added `system/max_power_test` which fully loads GPU (and CPU) to consume max power for 10 seconds to test the power supply.

  - Fixed bug where preferred orientations and sorting strategies were reset on firmware updates
- BoxPick+Match (`rc_boxpick`):
  - Fixed bug that led to creation of temporary phantom views

10 24.10.1 (2024-11-21)

10.1 Fixes

- GEV server (`rc_gev_server`):
  - mark FileSize register as NoCache to fix camera calibration via rc_cube after self calibration

11 24.10.0 (2024-10-24)

11.1 New Features

- ItemPick (`rc_itempick`), BoxPick (`rc_boxpick`) and SilhouetteMatch (`rc_silhouettematch`): New sorting strategy to sort grasps and matches according to their distances from a user-defined point (see e.g. SilhouetteMatch sorting strategies)
- GEV server (`rc_gev_server`):
  - Add RawCombined component and file interface for camera calibration via rc_cube
  - Add registers and chunk data with selfcalibration counter and offset

11.2 Improvements and Fixes

- Hand-Eye Calibration (`rc_hand_eye_calibration`):
  - Improved robustness of grid detection
- BoxPick+Match (`rc_boxpick`):
  - Fixed untextured rectangles not being returned when minimum coverage is given
- SilhouetteMatch (`rc_silhouettematch`):
  - Improved detection of objects when “Object Plane Detection” is used
- WebGUI:
  - Add button to download model or collision model ply from SilhouetteMatch template
  - Add option to filter database lists
  - Add option to toggle gripper element visibility
  - Rename R, P, Y to Rx, Rz, Rz and Roll/Pitch/Yaw to Rotation
  - Bring back logarithmic slider scaling for exposure times and min/max distances
  - Fixed SilhouetteMatch CAD objects not showing in 3D result visualization
  - Minor layout improvements and fixes

12 24.07.0 (2024-07-26)

12.1 New Features

- Manually configure additional NTP servers
- Measure node (`rc_measure`)
  - New Measure node
- BoxPick+Match (`rc_boxpick`)
  - Support detection of 3D boxes by setting z dimension of item model to detect rectangles corresponding to all sides of a box
  - Detection verification when 3D boxes are detected inside a load carrier
  - Visualization of 3D boxes in WebGUI
  - New allow_untextured_detections parameter to also return rectangles with matching dimensions but without matching view

  - Possibility to set user-defined names for views for easier reference
- SilhouetteMatch (`rc_silhouettematch`)
  - Add new check_collisions parameter and check_collisions_during_retraction parameter
- WebGUI:
  - Allow SilhouetteMatch base plane calibration in external pose frame
  - New interactive gripper creation by moving elements with the mouse
  - New System Time page for configuring synchronization including additional NTP servers
  - Option to duplicate and rename load carriers, grippers and regions of interest

12.2 Breaking Change

- Stereo Matching (`rc_stereomatching`)
  - Moved service call `measure_depth` to new node `rc_measure`

12.3 Improvements and Fixes

- BoxPick (`rc_boxpick`)
  - Return only items corresponding to the returned grasps
  - Higher matching performance on small or weakly-textured boxes
  - Improved grasp ellipse computation for partly occluded textured rectangles
- gRPC Interface:
  - Fix subscribing only to left image
- WebGUI:
  - Add filter possibility to dropdown fields and support arrow and tab keys
  - Remove HDR warning for tag detections
  - Make “Exact Pose” the default when setting a pose for a load carrier
  - Fix cut-off point cloud in 3D result visualization
  - Show hint in camera calibration and warning bar when self calibration counter gets greater than 0
  - Support arrow keys to navigate through matches and grasps in 3d result visualizations (ItemPick, BoxPick, SilhouetteMatch)
  - Delay hover popups for grasps, matches and load carriers in 3D result visualizations
  - Bring back progress bar on template and CAD element upload
  - Add option to duplicate a gripper element or a grasp
  - Minor layout improvements and fixes

13 24.04.2 (2024-05-15)

13.1 Fixes

- SilhouetteMatch (`rc_silhouettematch`):
  - Fix collision checking with point cloud for grippers with rotated elements.
- WebGUI:
  - Minor fixes.

14 24.04.1 (2024-05-08)

14.1 Improvements and Fixes

- BoxPick+Match (`rc_boxpick`)‘:
  - Fix crash in grasp computation in some corner cases when object is partly outside the image.
- WebGUI:
  - Minor fixes and improvements.
  - Disable exposureAdaptTimeout on DepthImage page when in Continuous mode.

  - Bring back progress bar on template and CAD element upload.

15 24.04.0 (2024-04-23)

15.1 New Features

- WebGUI:
  - New collision check visualization: Show contact point and provide collision category (in collision with LoadCarrier, Matches or PointCloud, etc.) in 3D visualisation for all rc_reason modules.

15.2 Improvements and Fixes

- TagDetect (`rc_april_tag_detect`, `rc_qr_code_detect`):
  - Allow setting size also when no ID or only family is given and allow size filtering also in these cases.
- LoadCarrier (`rc_load_carrier`):
  - Improve detection for some corner cases.
  - Add detection timeout of 25s
- BoxPick+Match (`rc_boxpick`)‘:
  - Allow grasps only on unoccluded item surface.
- WebGUI:
  - SilhouetteMatch: Draw unchecked grasps in yellow color.
  - Gripper: keep global element and TCP pose when changing the parent

16 24.01.1 (2024-03-11)

16.1 Improvements and Fixes

- Ensure gRPC server can always start by adding port to reserved ports.
- Hand-Eye Calibration (`rc_hand_eye_calibration`)‘:
  - Forcing detection of whole grid again as partial detection could result in degraded calibration in some corner cases. Instead exclude overexposed grid points from calculation.
  - Excluding grids if more than 16 calibration points (i.e. 4 squares) are over-exposed.
- EKI Bridge (`rceki_bridge`):
  - Log received and sent messages with info level so they show up in WebGUI log for ease of KRL program debugging.
- REST-API:
  - Prevent manually setting time to a date before firmware build time.
- WebGUI:
  - Minor improvements.

17 24.01.0 (2024-01-29)

17.1 New Features

- Stereo Matching (`rc_stereomatching`):
  - Add measure_depth service
- BoxPick (`rc_boxpick`)‘:
  - Add new PackedLayers mode
  - Add new min_cluster_coverage parameter
  - New BoxPick+Match extension to (re)detect boxes according to their texture with consistent orientation. Requires a separate license.

17.2 Improvements and Fixes

- Stereo Matching (`rc_stereomatching`):
  - Added Gaussian smoothing of input images for stereo when matching is done in full resolution to enhance matching quality
- Camera Calibration (`rc_stereocalib`):
  - Prevent detection of grid if overexposed and show overexposure in visualization image and WebGUI
- Hand-Eye Calibration (`rc_hand_eye_calibration`)':
  - Permit grid detection if up to 3 squares are missing
  - Visualize overexposed squares
- LoadCarrier (`rc_load_carrier`):
  - Add detection timeout
- ItemPick (`rc_itempick`):
  - Rename "Surfaces" and "Grasps" visualizations to "Intermediate Result" and "Result"
- BoxPick (`rc_boxpick`):
  - Publish clustering result as intermediate result image in WebGUI
  - Rename "Grasps" visualization to "Result" visualization
- SilhouetteMatch (`rc_silhouettematch`):
  - Add right intermediate result image to display match edges from right image
  - Restrict replacing bright pixels with base plane to ROI
- REST-API:
  - reset_defaults service also resets preferred orientation and sorting strategies to default
  - Add Deprecation response header for api/v1 routes
- WebGUI:
  - Separate Try-Out section and result section for rc_reason modules
  - Add 3D visualization for LoadCarrier detection
  - 3D result visualizations: keep camera settings when switching to full screen and back
  - LoadCarrier and TagDetect now also show last detection result if triggered from robot
  - Scroll to selected element when opening dropdown
  - BoxPick+Match support with 3D visualization of matched views
  - Live update of symmetric grasp poses in SilhouetteMatch templates
  - Add shortcut buttons to apply grasp pose as replication origin in SilhouetteMatch templates

18 23.10.0 (2023-10-30)

18.1 New Features

- SilhouetteMatch (`rc_silhouettematch`)':
  - Automatic object plane detection. This feature is intended for the detection of planar stacked objects, e.g. metal sheets, without base-plane calibration.
  - Added optional collision check with pointcloud.
- Add gRPC image streaming interface: This interface that can be used as an alternative to the GigE Vision / GenICam interface for getting camera images and synchronized sets of images (e.g. left camera image and corresponding disparity image).

18.2 Improvements and Fixes

- Camera (`rc_camera`):
  - Much faster adaptation of auto exposure from overexposed images
- SilhouetteMatch (`rc_silhouettematch`)':
  - Runtime improvements, on average 20% faster
- GEV server (`rc_gev_server`):
  - fix LatchTimestamp bit according to GigE Vision spec
- REST-API:
  - add system/time endpoint to manually set time (if not synced via NTP)

- WebGUI:
  - show network page even when system is not ready
  - show model name and user-defined name in top bar
  - update grid pose suggestions for hand-eye calibration
  - do not disable DNS server configuration when GigEVision app is running
  - improve point cloud rendering performance
  - always show template and CAD model in template modal if available
  - show time zone for all time stamps (detection results and logs)
  - show system time in UTC and local time
  - new modal for setting the system time
  - support SilhouetteMatch stacked objects and layout for SilhouetteMatch streams to three images
  - fix symmetric grasps tooltip not shown when not symmetric

19 23.07.1 (2023-09-14)

19.1 Improvements and Fixes

- SilhouetteMatch (`rc_silhouettematch`):
  - Fix missed matches for tight ROIs
- WebGUI:
  - Move download all logs button and log level filter to top of log page

20 23.07.0 (2023-07-24)

20.1 New Features

- LoadCarrier (`rc_load_carrier`):
  - Added detection of multiple load carriers in `detect_load_carriers` and `compute_filling_level` services
- SilhouetteMatch (`rc_silhouettematch`):
  - Started pilot phase for SilhouetteMatch with automatic object plane detection. This feature is intended for the detection of planar stacked objects, e.g. metal sheets, without base-plane calibration and requires a separate license. Please reach out to info@roboception.de in case you are interested in participating in the pilot phase and obtaining the license.
  - Added creation of 3D collision model when creating templates from DXF files
- REST-API:
  - Support setting manual DNS servers

20.2 Improvements and Fixes

- LoadCarrier (`rc_load_carrier`):
  - draw three-sided rims for detected three-sided load carriers
  - add detected lines to the intermediate result image
  - fix error message when load carrier with exact pose is outside the image
- SilhouetteMatch (`rc_silhouettematch`)':
  - add intermediate result image
  - change default matching parameters
  - fix DXF import in case undefined units are specified
- Hand-Eye Calibration (`rc_hand_eye_calibration`)':
  - improve grid detection
- WebGUI:
  - improve filling level result in case of 0 coverage
  - fix layout for narrow pages, e.g. box headers, collision check status indicators
  - improve unsupported firmware/outdated license warning

  - Show warning when gripper TCP z axis is directed towards the flange
  - fix TCP frame not shown in gripper visualization when gripper is loaded
  - fix SilhouetteMatch base plane grid is not aligned with object origin
  - disable exposure radio buttons when GiGEVision application is running
  - fix error tooltip being shown in white balance radio buttons
- TagDetect (`rc_april_tag_detect`, `rc_qr_code_detect`):
  - fixed detection timeout
- GEV server (`rc_gev_server`):
  - fix xml: PrincipalPointV is also in middle of left image for IntensityCombined component

21 23.04.0 (2023-04-27)

21.1 Improvements and Fixes

- LoadCarrier (`rc_load_carrier`):
  - fix crash when load carrier with exact pose is outside the image, return error message instead
  - return measured load carrier dimensions for three-sided load carriers or load carrier detections without orientation prior or IMU
- WebGUI:
  - add shortcuts for template creation and LC/ROI/Gripper uploads in dropdowns
  - allow to choose units for SilhouetteMatch template creation from DXF
  - improve template upload bar hints by showing template/DXF verification step
  - show API parameter and node name in info box
  - disable dynamics settings and show warning when HDR is active
  - fix memory leak in useAccessControl, leading to increased memory and CPU usage on IOControl and Camera page
  - add warning for tag pose estimation and tag-based base-plane calibration in HDR mode
- REST-API:
  - swagger: add optional DXF units

22 23.01.1 (2023-02-22)

22.1 Improvements and Fixes

- Fix spurious timeouts when using HDR mode
- WebGUI:
  - show result of BoxPick detect_items call
  - fix no calibration shown for Yaskawa format

23 23.01.0 (2023-01-27)

23.1 New Features

- Added High Dynamic Range (HDR) mode
- Enhanced download of detection dumps for all reason modules:
  - TagDetect can also dump detections
  - include stereo input images with rc_randomdom pattern
- SilhouetteMatch (`rc_silhouettematch`):
  - added uploading DXF files as template
- WebGUI:
  - added access control to lock Web GUI access

23.2 Improvement and Fixes

- ItemPick (`rc_itempick`):
  - limit grasps to max_grasps after collision checking
  - fix grasp visualization in case of pruned grasps
- SilhouetteMatch (`rc_silhouettematch`):
  - do not show priority_filtered grasps in visualization
- LoadCarrier (`rc_load_carrier`):
  - added assume_gravity_aligned and min_plausibility params
  - improved 3d-lines based rim detection
- Rest-API:
  - always nest return_code under response for service calls, also for invalid arguments or other early aborts
- WebGUI:
  - Show robot TCP in result visualization if provided
  - select external pose frame by default when hand-eye calibration is available
  - Always show external frame and grid in result visualizations when hand-eye calibration is available
  - add Yaskawa pose format
  - combine results of load carrier and filling level detection in one common table
  - optionally show priority-filtered grasps in match detection result visualization
  - minor Web GUI improvements and fixes

23.3 Changes

- `rc_camera` parameter `exp_auto` is deprecated and will be removed in a future release. The new `exp_control` parameter should be used instead.

24 22.10.0 (2022-10-25)

24.1 New Features

- LoadCarrier (`rc_load_carrier`):
  - add support for three sided load carriers like pallet cages
- SilhouetteMatch (`rc_silhouettematch`):
  - extended grasp definitions with gripper_id, priority and replication
  - add only_highest_priority_grasps parameter

24.2 Improvements and Fixes

- GripperDB (`rc_gripper_db`) and CollisionCheck (`rc_collision_check`):
  - only require gripper CAD elements to exist when using the gripper but not on loading/setting
  - allow flange as tcp parent id
  - check max size of all gripper elements < 1m
- WebGUI:
  - new combined pivot control to move grasps, ROIs, LCs and pose priors
  - visualize grasp replications
  - visualize gripper for grasp symmetries
  - visualize load carrier compartment in result visualization of ItemPick and BoxPick
  - show ROI in result visualizations
  - many small usability fixes
  - show missing grippers in template modal and missing CAD elements in gripper modal
- GigE Vision:
  - fix packet size negotiation with some producers:
    - always write back valid/rounded packet size to SCPS according to GEV v2
    - use stream channel source port also for test packets

24.3 Breaking Changes

- EKI Bridge (`rceki_bridge`):
  - return -5 instead of -11 on REST errors

25 22.07.0 (2022-07-22)

25.1 New Features

- TagDetect - AprilTag (`rc_april_tag_detect`):
  - add support for 41h12 family, removed support for 25h7 family.
- GripperDB (`rc_gripper_db`) and CollisionCheck (`rc_collision_check`):
  - add support for gripper CAD elements.
- Camera (`rc_camera`):
  - add gamma parameter.
- GigE Vision/GenICam:
  - add RcParamLockDisable, Gamma, ChunkGamma and ChunkLineMode features.
- WebGUI:
  - add 3D result visualizations to ItemPick and BoxPick
  - add option to display SilhouetteMatch 3D result visualization fullscreen
  - pose formats
    * extend hand-eye calibration with more pose formats
    * choose robot pose formats in Try-Outs and modals

25.2 Improvements and Fixes

- add `processing_time` status to all rc_reason modules
- change format of regions of interest and load carriers in dumps to enable upload via WebGUI
- add configured sorting strategies to last detection dumps
- TagDetect (`rc_april_tag_detect` and `rc_qr_code_detect`):
  - rename `tag_detection_time` status to `processing_time`
- REST-API:
  - if uploaded file is too large, also return return_code with message about max size
  - prevent setting IP to 127.0.0.0/8
- EKI Bridge (`rceki_bridge`):
  - if return_code.value indicates error, log with warning level so it's shown in WebGUI under EKI logs
- WebGUI:
  - camera: only hide out1_reduction in Normal
  - show accuracy of stored hand-eye calibration on status page
  - show processing_time for all reason modules
  - allow SilhouetteMatch 3D result visualization to be shown during loop mode
  - poll hand-eye calibration result on status page
  - fix bugs in gripper creation modal
  - deselect file in case there was an upload error for template and cad element upload
  - allow rotation around z for gripper element attaching
  - do not allow out-of-range values in number inputs in visualization menus
  - fix detect filling level button not showing loader while detection is running
  - adapt default names for new grasps and pose priors to be alphabetical
  - lots of fixes for 3D visualizations
  - show ROI visualization by default on LoadCarrier module page
  - fix reset of preferred orientation not applied at first click on a fresh page

25.3 Breaking Changes

- TagDetect - AprilTag (`rc_april_tag_detect`):

  - removed support for 25h7 family.

26 22.04.0 (2022-04-29)

26.1 Improvements and Fixes

- Stereo Matching (`rc_stereomatching`)
  - when `double_shot` mode is used without the `ExposureAlternateActive` mode in IOControl, the same image is used to fill holes with disparity values from a lower resolution
  - suppress artifacts in the disparity image near the left image border
- Hand-Eye Calibration (`rc_hand_eye_calibration`)
  - improve visual feedback by drawing fat green boundary if grid is fully detected and annotating even if it is only partially detected
- Camera Calibration (`rc_stereocalib`)
  - improve visual feedback if grid is fully detected in left and right image by drawing a fat green boundary
  - reset current error when grid is not recognized during verification
  - show the minimum and maximum error during verification
- ItemPick/BoxPick (`rc_itempick`/`rc_boxpick`):
  - runtime optimization for Full resolution rc_visard depth images
  - add timeout after 25s for BoxPick's `compute_grasps` and `detect_items` services
- SilhouetteMatch (`rc_silhouettematch`)
  - speed-up collision checking for continuous symmetric templates
- CollisionCheck (`rc_collision_check`)
  - add validation of pre-grasp offset
- AprilTag/QR Code (`rc_april_tag_detect`/`rc_qr_code_detect`)
  - return error when no hand-eye calibration available and external pose frame requested
- EKI bridge:
  - fix parsing of empty list elements and catch all exceptions
- WebGUI:
  - camera page shows the IOControl parameters for easier projector setup
  - separate download buttons for depth snapshots with and without point cloud mesh
  - add buttons to download/upload single LCs, ROIs, grippers
  - add validation of pre-grasp offset in Try-Out sections
  - improve robot pose fields in Try-Outs and 3D visualizations for robot-mounted cameras
  - SilhouetteMatch result visualization:
    * improve visibility of grasps
    * allow to hover and click grasps inside matches and matches inside load carriers
    * add visualization of unreachable grasps that are filtered out due to the defined preferred TCP orientation
    * add close button to notes for matches and grasps
  - add warning when collision checking is used without grasps in SilhouetteMatch
  - made axes in 3D visualizations wider
  - improve hand-eye calibration to update when new poses are added via RestAPI
  - disable reboot when system is not ready

26.2 Changes

- CollisionCheck (`rc_collision_check`)
  - The `collision_dist` parameter is applied only to load carriers and the SilhouetteMatch base plane instead of the gripper. Thus, this parameter is not used anymore for checking collisions between the gripper and other detected objects.

27 22.01.0 (2022-01-31)

27.1 New Features

- REST API:
  - introduce API v2, see migration information
- BoxPick (`rc_boxpick`):
  - add mode parameter for unconstrained or packed grid layouts of boxes
  - add manual_line_sensitivity and line_sensitivity parameters to configure line detector
- WebGUI:
  - new layout with enhanced navigation side bar. This navigation side bar contains sub-menus to display the name of the current page and to make all pages reachable with one click. It also uses a responsive design with automatic collapsing on mobile devices
  - reorganize System page in multiple pages: Firmware & License, Network Settings, GigEVision Status, Logs

27.2 Improvements and Fixes

- Hand-Eye calibration (`rc_hand_eye_calibration`):
  - wait until grid is detect in `set_pose` service (up to 1.5s)
  - add services get_poses and delete_poses
  - limit slot numbers to 0-15
- SilhouetteMatch (`rc_silhouettematch`):
  - sort matches as well according to selected sorting strategy
  - include request and response in detection dumps
  - add check for empty load carrier and that the object plane inside the detected load carrier
  - retain existing grasps on template update if the new template does not contain any grasps
  - increase matching timeout to 10 seconds
- LoadCarrier (`rc_load_carrier`):
  - include right image in detection dumps
- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - include request, response and right image in detection dumps
  - draw load carrier rim in Surfaces and Grasps visualizations
- WebGUI:
  - allow creating and editing grippers with rotations and tree structure
  - new hand-eye calibration workflow showing stored poses and images
  - new annotations in camera calibration
  - added option to mirror images in camera calibration
  - automatic redirect when network settings have changed
  - higher resolutions of point cloud in 3D visualizations of ROIs, Load Carriers and SilhouetteMatch results
  - display resolution of current camera and depth image on the Camera and Depth Image pages
  - close fullscreen views by clicking anywhere or pressing ESC
  - make result tables automatically scroll to top when new results arrive
  - automatically update point cloud in SilhouetteMatch 3D result visualization when new result arrives
  - improved visibility of points inside a ROI or load carrier in 3D ROI or load carrier visualization
  - fixed SilhouetteMatch template aspect ratio for setting grasps
  - support setting of exposure regions or 2D ROIs by dragging rectangle in image on touch screens

27.3 Breaking Changes

- ItemPick (`rc_itempick`):
  - remove deprecated `item_model_tolerance` parameter
- The deprecated load_carrier services and parameters in the ItemPick, BoxPick, SilhouetteMatch and CADMatch nodes were removed. Please use the services and parameters provided by the `rc_load_carrier` module.
- EKI bridge:

  - The EKI bridge now reflects the API v2, please see the migration notes

28 21.10.0 (2021-10-26)

28.1 New Features

- StereoMatching (`rc_stereomatching`):
  - add exposure_adapt_timeout parameter
- REST API:
  - parameters are now always saved automatically so `save_parameters` is not necessary anymore and hence deprecated
- GigE Vision/GenICam:
  - add ChunkRcAutoExposureAdapting
  - add DepthExposureAdaptTimeout

28.2 Improvements and Fixes

- Hand-Eye calibration (`rc_hand_eye_calibration`):
  - fix corner case when entering wrong poses for 4DOF
- SilhouetteMatch (`rc_silhouettematch`):
  - improve grasp selection for continuous symmetric templates
  - sort matches as well according to the selected sorter
  - accept templates with zero height
  - improve match duplicate filter
  - limit minimum value of `match_max_distance` to 0.1
- WebGUI:
  - show placeholder when system is not connected or not ready
  - improve general warning and error messages
  - removed “save parameters” buttons from module pages as they are auto-saved now
  - improved marquee selection for 2D ROI and exposure region and added button to reset exposure region
  - improved template modal
    * add tab with more details of the template
    * show gripper in grasp visualization
    * made grasp list more compact
  - add hint in preferred orientation visualization when z axis points towards the camera

28.3 Other Changes

- REST API:
  - Renaming of `rc_stereocamera` to `rc_camera`. For backwards compatibility the now deprecated name `rc_stereocamera` will redirect to `rc_camera`.

28.4 Deprecations

- The load_carrier services and parameters in the ItemPick, BoxPick and SilhouetteMatch nodes are deprecated and **will be removed in January 2022 with version 22.01**. Please use the services and parameters provided by the `rc_load_carrier` module.
- The `item_model_tolerance` parameter in the ItemPick node is deprecated and **will be removed in January 2022 with version 22.01**.
- The node name `rc_stereocamera` is deprecated and will be removed in a future version. Please use `rc_camera`.
- The `save_parameters` service call is deprecated and will be removed in a future version.

29 21.07.0 (2021-07-21)

29.1 New Components

- OPC UA Server: New module that allows communicating with the rc_visard and the rc_visard via the OPC UA communication protocol.

  The OPC UA Server is available as an Early Access preview feature. Please contact us if you would be interested in testing the OPC UA interface.

29.2 New Features

- add grasp sorting strategy selection to ItemPick, BoxPick and SilhouetteMatch
- include grasps when downloading SilhouetteMatch templates
- LoadCarrier (`rc_load_carrier`):
  - add detection of gitter boxes/pallet cages by extending load carrier definition. This is available as an Early Access preview feature. Please contact us if you would be interested in testing this feature.
  - add pose_type to load carrier model to support Exact Poses and Orientation Priors
- WebGUI:
  - add 3D result visualization to SilhouetteMatch
  - add interactive Menus to all 3D visualizations with Controls and View Options

29.3 Improvements and Fixes

- persist parameters across firmware updates
- improve system ready notification at boot
- LoadCarrier (`rc_load_carrier`):
  - add snapshot dumps for last detection
- SilhouetteMatch (`rc_silhouettematch`):
  - fix bug that caused less object to be detected in some scenes
  - extend data included in snapshot dumps for last detection
- BoxPick (`rc_boxpick`):
  - improve detection with small dimension ranges
- ItemPick (`rc_itempick`):
  - fix segmentation for small clusters far away from camera
- WebGUI:
  - allow download of templates in SilhouetteMatch
  - new 3D orbiting control for unconstrained rotations
  - only show min distance warning if depth range is actually reduced
  - show hint if new rc_randomdot projector is connected
  - allow editing and deleting elements in Try-Out dropdowns
  - show if system requires a reboot when dongle is reconnected
- GEV server:
  - add ChunkLineStatus

29.4 Other Changes

- Grasps and load carriers are internally migrated to new storage format and not available any more if a rollback to a previous firmware version is performed. It is advised to create a backup before upgrading if a rollback might be desired.
- REST API:
  - node status: rename `stale` to `idle` and add `initializing`
- IOControl get_io_values service changed to support varying number of IOs

29.5 Deprecations

- The load_carrier services and parameters in the ItemPick, BoxPick and SilhouetteMatch nodes are deprecated and will be removed in a future version. Please use the services and parameters provided by the `rc_load_carrier` module.

30 21.04.1 (2021-04-20)

30.1 Fixes

- network settings: fix check if IP is already in use when no route to given IP is available
- WebGUI:
  - fixed rotation of grid for SilhouetteMatch template visualization
  - only show full screen icons for depth images in continuous acquisition mode

31 21.04.0 (2021-04-15)

31.1 New Components

- LoadCarrier (`rc_load_carrier`): New module that allows setting and retrieving load carriers, as well as detecting load carriers and their filling levels.

  The LoadCarrier module is an optional on-board module of the rc_visard and is licensed with any of the modules ItemPick, BoxPick, or SilhouetteMatch. Otherwise it requires a separate LoadCarrier license to be purchased.

31.2 New Features

- SilhouetteMatch (`rc_silhouettematch`):
  - add check_collisions_with_matches and check_collisions_with_base_plane parameters
- REST API:
  - add backup/restore functionality to download and upload the complete configuration of an rc_visard
- WebGUI:
  - organize modules into detection modules and configuration modules
  - add import/export of grasps for SilhouetteMatch templates
  - new LoadCarrier detection module
  - new Regions of Interest page for configuring regions of interest for all detection modules
  - add optional item maximum dimensions to ItemPick Try-Out section
  - add fullscreen control to images in stream view

31.3 Improvements and Fixes

- LoadCarrier (`rc_load_carrier`)
  - return estimated dimensions of detected load carriers
  - improve load carrier detection in low contrast scenes
- SilhouetteMatch (`rc_silhouettematch`):
  - grasp sorting combines orientation and distance to preferred orientation
  - allow collision check with all detectable objects
  - disambiguate equally good grasps for symmetric templates
  - enforce detection timeout of 5 seconds
- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - improve detection of small rectangles at large camera distances
  - added compartment to load carrier visualization
- REST API:

  - return object_uuid for SilhouetteMatch templates
- WebGUI:
  - allow up to 8 poses during Hand-Eye Calibration
  - moved Try-Out sections below image streams in all detection modules
  - add shortcuts to create Load Carriers, Regions of Interest and Grippers from the Try-Out section of all detection modules
  - show positions with four digit precision in detection result tables
  - show SilhouetteMatch 3D collision model when configuring grasps
  - show default values for all parameters in info boxes
  - ask if firmware update should be applied if filename indicates wrong image
  - show message if websocket connection is not available
  - also use port 80 for websocket
  - enforce max length of 60 characters for all IDs
  - show logs for EKI bridge
  - show why network setting could not be applied

32 21.01.0 (2021-01-29)

32.1 New Features

- BoxPick (`rc_boxpick`):
  - add `prefer_splits` parameter
- SilhouetteMatch (`rc_silhouettematch`):
  - collision check with other detected objects
- REST API:
  - UBJSON support, via `application/ubjson` mime type in `Content-Type` and/or `Accept` headers
- WebGUI:
  - Download last detection of ItemPick, BoxPick, SilhouetteMatch as tarball with visualization images

32.2 Improvements and Fixes

- ItemPick (`rc_itempick`):
  - improve segmentation of objects with dimensions and few 3D edges
- BoxPick (`rc_boxpick`):
  - improve box detection using confidence image for 2D edges as well
- Hand-Eye calibration (`rc_hand_eye_calibration`):
  - minimize geometric loop closure error instead of reprojection error and return more error values
- WebGUI:
  - downloadable JSON response of try-outs now matches full REST-API response
  - visualization image selection via dropdown

32.3 Other Changes

- REST-API:
  - return image version without device and 'v' prefix

33 20.11.0 (2020-11-23)

33.1 New Features

- SilhouetteMatch (`rc_silhouettematch`):
  - Add collision detection with base plane

- StereoMatching (`rc_stereomatching`):
  - New `double_shot` mode: Combine images from two subsequent stereo image pairs. This is meant for the use with a random-dot projector in `ExposureAlternateActive` or `SingleFrameOut1` acquisition mode.
- Camera (`rc_stereocamera`):
  - New `Out1High` auto exposure mode: Adapt exposure time using only images with GPIO Out1 high. This is meant for the use with a random-dot projector in `SingleFrameOut1` acquisition mode.
- WebGUI:
  - Japanese translation
  - Add snapshot download on depth image page (with disparity and pointcloud as ply)
  - Optionally show image that is actually used by stereo matching on depth image page
  - Download try-out requests as JSON

33.2 Improvements and Fixes

- BoxPick (`rc_boxpick`):
  - Fix missing detections in packed scenes
  - Also draw detected box in grasp visualization
- SilhouetteMatch (`rc_silhouettematch`):
  - Improve refinement
- Hand-Eye calibration (`rc_hand_eye_calibration`):
  - Service `get_calibration` strictly returns only saved result. Before it returned values of calibrate call, even if `save_calibration` was not called
  - Service `set_calibration` implicitly calls `save_calibration`
  - Extended collinearity check to ensure that positions are at least 3 mm apart from each other

33.3 Other Changes

- GigE Vision/GenICam:
  - add `DepthDoubleShot` feature
  - add `Out1High` to `ExposureAuto` enum
  - rename `RcAdaptiveOut1Reduction` to `RcOut1Reduction`

34 20.10.0 (2020-10-13)

34.1 New Features

- WebGUI:
  - 3D ROI visualization
  - simplified specification of grid size for calibration
- SilhouetteMatch (`rc_silhouettematch`):
  - added load carrier detection
  - added grasp point specification
  - integrated CollisionCheck module
- StereoMatching (`rc_stereomatching`):
  - smooth disparity interpolation
  - disparity border smoothing
- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - common loadcarrier and ROI dbs
- GigE Vision/GenICam:
  - add support for GevSCSP (stream channel source port) with fixed port 50010

34.2 Fixes

- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):

  - updated grasp quality computation by taking distance into account

34.3 Other Changes

- Camera (`rc_stereocamera`):
  - set default for maximum exposure time to 18 ms
  - add parameters `exp_auto_average_min` and `exp_auto_average_max` for fine tuning of auto exposure
- StereoMatching (`rc_stereomatching`):
  - remove parameter `disprange`
  - remove parameter `median`
- IOControl (`rc_iocontrol`):
  - Set default of out1_mode to low
- GigE Vision/GenICam:
  - removed `DepthMedian`, `DepthDispRange`
  - add `RcExposureAutoAverageMax` and `RcExposureAutoAverageMin`
  - add `DeviceLinkSpeed`
  - minor updates and generic SFNC features

35 20.04.1 (2020-05-07)

35.1 Fixes

- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - fix ROI pose if external frame is used
  - fix rejection un-normalized input quaterions
  - set timestamp in response even if request is invalid
- TagDetect (`rc_april_tag_detect` and `rc_qr_code_detect`):
  - set timestamp in response even if request is invalid
  - always use full name for quality parameter (`High`, `Medium`, `Low`)
- SilhouetteMatch (`rc_silhouettematch`):
  - always use full name for quality parameter (`High`, `Medium`, `Low`)
  - `detect` service: return -1 (invalid argument) if ROI offset is larger than image
- Hand-Eye calibration (`rc_hand_eye_calibration`):
  - re-compute calibration on `calibrate` service call if `robot_mounted` parameter changed
- REST API and Web GUI:
  - correctly report MAC and link speed even if no default gateway is set
  - show 'AdaptiveOut1 Reduction' value on camera page if this exposure mode is chosen
  - fix issues with floating image streams on Chrome

36 20.04.0 (2020-04-17)

36.1 New Features

- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - integrate new CollisionCheck module
  - add load carrier filling level detection
  - add load carrier `overfilled` flag
- SilhouetteMatch (`rc_silhouette`):
  - support calibration to closest base plane via new `plane_preference` parameter
- TagDetect (`rc_april_tag_detect` and `rc_qr_code_detect`):
  - add support for `external` pose frame
- Hand-Eye calibration (`rc_hand_eye_calibration`):
  - support calibration for robots with constrained motion, e.g. 4 DOF
  - add `set_calibration` service to re-upload calibration previously retrieved via `get_calibration`

- Camera:
  - add new auto exposure mode `AdaptiveOut1` that optimizes exposure for use with a projector
- Web GUI:
  - add network configuration
  - add download snapshot button on camera page
  - Try-out results can be downloaded as JSON file
  - show if device is not yet ready
- REST API:
  - add endpoints to change network configuration

36.2 Improvements and Fixes

- Stereo Matching (`rc_stereomatching`):
  - improvement of sub-pixel interpolation which reduces disparity steps
- Camera:
  - fixed auto-exposure flicker in full sunlight
- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - improve segmentation and box detection
  - increase maximum number of ROIs and load carriers to 50
  - increase maximum allowed load carrier dimensions to 2m

36.3 Other Changes

- rc_dynamics:
  - add `return_code` to `get_cam2imu_transform` service
- REST API:
  - improve error messages for invalid requests
  - new `return_code` values for adding elements, e.g. ROIs or load carriers:
    * `10`: element was added but max capacity is now reached
    * `-10`: new element could not be added because the capacity was exceeded

36.4 New Components

- CollisionCheck (`rc_collision_check`): This module provides an easy way to check if a gripper is in collision with a load carrier. It is integrated with the ItemPick and BoxPick modules, but can be used as standalone product. This feature is currently only available as part of the 3D-R Vision & Handling Set from our partner J. Schmalz GmbH.
  - documentation: https://doc.rc-visard.com/latest/en/collisioncheck.html
  - access via REST-API and EKI interface
  - configurable via Web GUI

37 1.8.4 (2020-01-24)

37.1 Fixes

- EKI bridge: on error return more useful return_code from corresponding module
- `rc_stereomatching`:
  - Reset image buffer for static mode on trigger or switching to single shot
- `rc_stereocamera`:
  - Fixed reporting 0 baseline in diagnostic messages

38 1.8.3 (2019-12-02)

38.1 Fixes

- SilhouetteMatch (`rc_silhouettematch`): increase data acquisition timeout to 5s
- `rc_stereomatching`: make `aquisition_trigger` service available again
- REST-API:
  - improve serialization error messages
  - return http code 400 if service call failed with invalid argument

39 1.8.2 (2019-11-19)

39.1 Fixes

- fix model name for color sensors

40 1.8.1 (2019-11-18)

40.1 Fixes

- EKI bridge: fix handling of empty lists
- SilhouetteMatch (`rc_silhouettematch`): performance improvements
- `rc_stereocamera`:
  - Fixed error when choosing very small exposure region
  - Only apply new signal masks for GPIO outputs if they differ from the previous ones, so that the alternate pattern in not interrupted
- Web GUI: fix flipped grid visualization thumbnails on hand-eye-calibration page

41 1.8.0 (2019-10-07)

41.1 New Components

- SilhouetteMatch (`rc_silhouettematch`): This module detects position and orientation of comparatively flat objects that are positioned on a plane, by matching the scene at hand to a previously taught template.
  - documentation: https://doc.rc-visard.com/latest/en/silhouettematch.html
  - shop: https://roboception.com/product/silhouettematch/
  - access via REST-API
  - configurable via Web GUI
- EKI bridge: The Ethernet KRL Interface (EKI Bridge) allows communicating with the rc_visard from KUKA KRL via `KUKA.EthernetKRL XML`.
  - Use rc_reason onboard software with KUKA robots without any external PC
  - documentation: https://doc.rc-visard.com/latest/en/eki.html
  - shop: https://roboception.com/product/ekibridge/

41.2 New Features

- Web GUI:
  - Hand-eye calibration: allow redoing poses
- `rc_stereomatching`:
  - Add new acquisition mode `SingleFrameOut1`. This mode can be used to control an external projector. It sets the line source of `Out1` to `ExposureAlternateActive` upon each trigger and resets it to `Low` as soon as the images for stereo matching are grabbed. (Requires IOControl license)

41.3 Fixes

- ItemPick (`rc_itempick`):
  - bugfix for grasp computation on surfaces with holes
- GigE Vision/GenICam:
  - fix max PayloadSize

41.4 Other Changes

- REST-API:
  - `save_parameters` and `reset_defaults` return `return_code` instead of just message string

42 1.7.0 (2019-07-22)

42.1 New Features

- GigE Vision/GenICam:
  - add ChunkComponentIDValue according to SFNC 2.5
  - add ChunkDecimationHorizontal ChunkDecimationVertical
  - add ChunkLineSource and ChunkLineSelector
- ItemPick (`rc_itempick`):
  - sorting of grasps using gravity and size
  - accept lc and roi in `camera pose_frame` even if request is for `external`
  - compute grasp quality from surface rmse
  - performance improvements

42.2 Fixes

- fix log rotation for nginx to prevent disk running full
- GigE Vision/GenICam:
  - fix Decimation and Width for depth images in Low res
  - also apply `AcquisitionAlternateFilter` for `SynchronizedComponents` except if it would result in no images being sent
- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - various small fixes/improvements

42.3 Other Changes

- `rc_dynamics`:
  - added state-machine state “STOPPING”
- REST-API:
  - possibility to add/delete multiple datastream destinations at once
- ItemPick (`rc_itempick`) and BoxPick (`rc_boxpick`):
  - made `pose_frame` argument always required

43 1.6.1 (2019-04-01)

43.1 Fixes

- Web GUI:
  - fix for new BoxPick page

44 1.6.0 (2019-03-28)

44.1 New Components

- BoxPick (`rc_boxpick`): The optional on-board component of the rc_visard, which provides a perception solution for robotic pick-and-place applications such as de-/palletizing and sorting of packets. It allows the detection of stationary items with rectangular surfaces and the determination of their position, orientation and size for picking.
  - documentation: https://doc.rc-visard.com/latest/en/boxpick.html
  - shop: https://roboception.com/product/boxpick/
  - access via REST-API
  - configurable via Web GUI

44.2 New Features

- Web GUI:
  - depth image: add single frame aquisition mode
  - page for new BoxPick component
- GigE Vision/GenICam:
  - add DecimationHorizontal and DecimationVertical as readonly features
  - report if system is ready (fully booted) via custom RcSystemReady feature

44.3 Fixes

- Web GUI:
  - Imporove translation of labels and info boxes
  - Various fixes in region of interest modal
  - Fix race condition in hand-eye-calibration
- ItemPick (`rc_itempick`):
  - scale all pixel parameters with resolution
  - various fixes/improvements for corner cases

44.4 Other Changes

- Web GUI:
  - Add acquisition mode parameter to depth image page
  - ItemPick, BoxPick, TagDetect, QRDetect: Request new detection only, if last response has arrived.
  - Hand-Eye-Calibration replace error modal popup with error message under each pose
- REST-API:
  - warn if service request contains unused args
  - itempick RegionOfInterest: only return actually used type (box or sphere)
  - also lock service calls of rc_stereocamera, rc_stereomatching and rc_iocontrol if a GEV application is connected
- StereoPlus (`rc_stereomatching`):
  - enable smoothing by default
- ItemPick (`rc_itempick`):
  - deprecate `item_model_tolerance` parameter (now read-only)
- TagDetect (`rc_april_tag_detect`):
  - performance improvements
- SLAM (`rc_slam`):
  - improve map loading and resets/restarts

45 1.5.0 (2019-01-31)

45.1 New Features

- New Module: StereoPlus (`rc_stereomatching`):

  - disparity image smoothing (enabled via `smooth` parameter)
  - full resolution disparity image
- Web GUI:
  - add exposure region selection via mouse
  - floating video streams
  - new parameters for StereoPlus (full resolution and smoothing)
  - allow deletion of hand-eye-calibration
  - hand-eye-calibration page shows current sensor mounting

45.2 Fixes

- Web GUI:
  - several layout/UI improvements and fixes
  - Hide white balance settings on calibration page
  - ItemPick update streams shown only after detection
  - fix kuka pose format calculations
- `rc_hand_eye_calibration`:
  - If calibration error is NaN or Inf, return failure with status code 2 and a message
  - fix concurrency bug
- ItemPick (`rc_itempick`):
  - surface segmentation: fix return code when roi is empty
- GigE Vision/GenICam:
  - return correct baseline and focal_length_factor even before fully booted up
- IOControl
  - fix GPIO output when switching from active to low

45.3 Other Changes

- add baseline and color/monochrome version to model name, e.g. “rc_visard 160m”
- GigE Vision/GenICam:
  - add GenICam parameters for StereoPlus:
    * add `DepthSmooth` (requires `stereo_plus` license)
    * add `Full` quality (requires `stereo_plus` license)
    * remove `StaticHigh` quality
    * add `DepthStaticScene` parameter (replacing `StaticHigh`, but also works in `Full`)
  - remove GevTimestampControlReset
  - add and fix TimestampLatch and TimestampLatchValue (GEV counterparts are deprecated)
  - add DeviceFirmwareVersion (same as DeviceVersion for now)
  - add `sent_frames`, `dropped_frames` and `packet_resends` in REST-API status values
- SLAM (`rc_slam`):
  - add `return_code` in `get_trajetory` response
  - add number of `map_frames` in status values

46 1.4.0 (2018-10-19)

46.1 New Components

- ItemPick (`rc_itempick`): The optionally available software component provides an out-of-the-box and model-free perception solution for robotic pick-and-place applications with suction grippers.
  - documentation: https://doc.rc-visard.com/latest/en/itempick.html
  - access via REST-API
  - configurable via Web GUI

46.2 New Features

- Web GUI redesign:

  - additional modules pages:
    * ItemPick
    * AprilTag and QRCode Detect
    * IOControl
  - camera page:
    * set gain manually
    * set white balance manually for color cameras
- GigE Vision/GenICam:
  - support for GigE Vision 2.1 MultiPart
  - add `DepthAcquisitionMode` and `DepthAcquisitionTrigger`
  - add SFNC 2.4 category `PtpControl` with
    * `PtpEnable`
    * `PtpDataSetLatch`
    * `PtpStatus`
    * `PtpOffsetFromMaster`
  - add `AcquisitionMultiPartMode` enum with
    * `SingleComponent`: Immediately send one single component per frame/buffer when it becomes available.
    * `SynchronizedComponents`: Only send a multipart frame/buffer iff all enabled components are available for that time.
- Improved auto exposure for reducing overexposure

46.3 Fixes

- REST-API:
  - return 400 error if parameter is out of min/max range
  - update Swagger UI to get correct cURL examples for Windows

46.4 Other Changes

- Web GUI:
  - removed French and Chinese translations

47 1.3.1 (2018-08-28)

47.1 Fixes

- REST-API:
  - fix error messages on service call failures (when some messages fields are of wrong type)
- GigE Vision/GenICam:
  - only reset block id when a new stream channel is opened
  - reduce latency on changing enabled components
- Web-GUI:
  - make doc links work in proxied environment

48 1.3.0 (2018-07-25)

48.1 New Components

- IO and projector control (`rc_iocontrol`): The optionally available software component allows read and write access to the rc_visard's GPIOs, e.g. to synchronize with external pattern projectors.
  - documentation: https://doc.rc-visard.com/latest/en/iocontrol.html
  - access via REST-API
  - access via GigE Vision/GenICam interface:

    * category: DigitalIOControl, features: LineStatus, LineSource, etc.
    * custom AcquisitionAlternateFilter which makes it possible to receive only images with/without projector(gpio) on

48.2 New Features

- TagDetect (`rc_april_tag_detect` and `rc_qr_code_detect`):
  - add `detect_inverted_tags` parameter that allows detection of negative, i.e. black/white inverted QRCodes and AprilTags in front of black background.
  - possiblity to specify approximate tag size to resolve ambiguous stereo tag matching
- GigE Vision/GenICam:
  - add support for setting exposure region:
    * ExposureRegionWidth, ExposureRegionHeight, ExposureRegionOffsetX, ExposureRegionOffsetY
  - support extended chunk mode
  - new SFNC 2.4 features:
    * Scan3dFocalLegth, Scan3dBaseline, Scan3dPrincipalPointU, Scan3dPrincipalPointV
- SLAM (`rc_slam`):
  - add services to persist and load onboard created maps (`save_map`, `load_map`, `remove_map`)

48.3 Other Changes

- `rc_stereomatching`:
  - remove `force_on` parameter from public interface
- `rc_itempick`:
  - add `clustering_max_surface_rmse` parameter
  - performance improvements

48.4 Fixes

- `rc_stereo_ins`:
  - fixed correction offsets in case of long vision outages
- `rc_april_tag_detect` and `rc_qr_code_detect`:
  - fix memory leak
  - improved matching between left and right image
- REST-API:
  - fix locking of service calls if module is not licensed
  - make log download work in tunneled/proxied environment
  - fix persistant storage of boolean parameters
- GigE Vision/GenICam:
  - fixes for better compatibilty with some clients
  - some nodes like PixelFormat, Width, Height now correctly depend on ComponentSelector
  - DeviceVersion: report image version instead of rc_gev_server version

49 1.2.1 (2018-05-04)

49.1 Changes

- `rc_gev_server`:
  - add `packet_size` to status values in REST-API

49.2 Fixes

- `rc_slam`:
  - fixed map localization
  - fixed various internal issues

  - do “restart” when “start”ed in HALTED, so the internal state is cleared.
- `rc_stereo_ins` and `rc_dynamics`
  - fixes for communication timeouts
  - Use start on SLAM, not always restart (which drops the map)
- GigE Vision/GenICam:
  - fix race on (un)subscribing to images on heartbeat timeout
- REST-API:
  - fix loading of saved boolean parameters at startup

50 1.2.0.1 (2018-04-05)

50.1 Fixes

- `rc_itempick`:
  - Make sure that the grasp z-axis points into item (according to the camera z-axis)

51 1.2.0 (2018-03-29)

51.1 New components

- `rc_itempick`
- `rc_april_tag_detection`
- `rc_qr_code_detection`

51.2 Changes

- `rc_hand_eye_calibration`
  - add `remove_calibration` service

51.3 Fixes

- request NTP servers from DHCP
- `rc_stereocalib`
  - Force syncing of calibration files and images to disc
- Web GUI:
  - show hand-eye calibration images again
  - update chinese translation

52 1.1.1 (2018-02-22)

52.1 New Features

- `rc_stereocamera`:
  - added parameters to select a rectangular region used for calculating auto exposure:
    * `exp_offset_x`, `exp_offset_y`, `exp_width` and `exp_height`

52.2 Changes

- `rc_hand_eye_calibration`:
  - provide `robot_mounted` bool with get_calibration service
- REST API:
  - include detailed info for all nodes (status, parameters, services) in log tarball
  - limit to 10 destinations per datastream

52.3 Fixes

- GigE Vision/GenICam:
  - immediately sync network settings to disk after changes
- Web GUI:
  - minor update to chinese translations
- fix switching of partitions via magic packet (via rcdiscover)
- improve system robustness under high load
- REST API:
  - fixes for ros service call response to API mappings
  - fix: correctly boot into new image if sensor is power-cycled immediately after update
- `rc_stereo_ins`:
  - fix initialization when camera doesn't see anything
  - improve robustness
- `rc_slam`:
  - autorecovery now also recovers the map
- `rc_dynamics`:
  - improve performance and robustness

53 1.1.0 (2018-01-19)

- Web GUI now also in French and Chinese
- new "producer" field in rc_dynamics_msgs Frame and Dynamics
- REST API:
  - fix bool parameters, actually return true/false and validate input correctly
- first release of SLAM
- `rc_dynamics`:
  - add `start_slam`, `stop_slam`, `restart_slam` services

roboception

rc_visard 3D Stereo Sensor

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