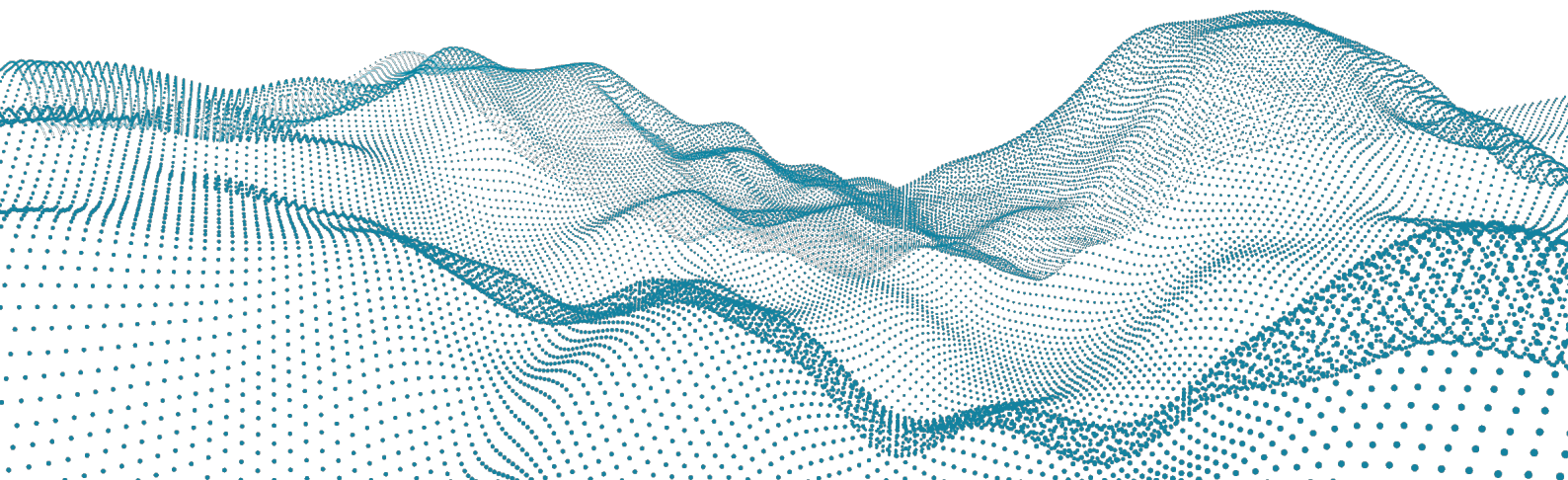




Roboception GmbH | October 2021

# rc\_visard 3D Stereo Sensor

FIRMWARE CHANGELOG



## Contents

<b>1</b>	<b>21.10.0 (2021-10-26)</b>	<b>3</b>
1.1	New Features . . . . .	3
1.2	Improvements and Fixes . . . . .	3
1.3	Other Changes . . . . .	3
1.4	Deprecations . . . . .	3
<b>2</b>	<b>21.07.0 (2021-07-21)</b>	<b>4</b>
2.1	New Components . . . . .	4
2.2	New Features . . . . .	4
2.3	Improvements and Fixes . . . . .	4
2.4	Other Changes . . . . .	4
2.5	Deprecations . . . . .	5
<b>3</b>	<b>21.04.1 (2021-04-20)</b>	<b>5</b>
3.1	Fixes . . . . .	5
<b>4</b>	<b>21.04.0 (2021-04-15)</b>	<b>5</b>
4.1	New Components . . . . .	5
4.2	New Features . . . . .	5
4.3	Improvements and Fixes . . . . .	5
<b>5</b>	<b>21.01.0 (2021-01-29)</b>	<b>6</b>
5.1	New Features . . . . .	6
5.2	Improvements and Fixes . . . . .	6
5.3	Other Changes . . . . .	7
<b>6</b>	<b>20.11.0 (2020-11-23)</b>	<b>7</b>
6.1	New Features . . . . .	7
6.2	Improvements and Fixes . . . . .	7
6.3	Other Changes . . . . .	7
<b>7</b>	<b>20.10.0 (2020-10-13)</b>	<b>7</b>
7.1	New Features . . . . .	8
7.2	Fixes . . . . .	8
7.3	Other Changes . . . . .	8
<b>8</b>	<b>20.04.1 (2020-05-07)</b>	<b>8</b>
8.1	Fixes . . . . .	8
<b>9</b>	<b>20.04.0 (2020-04-17)</b>	<b>9</b>
9.1	New Features . . . . .	9
9.2	Improvements and Fixes . . . . .	9
9.3	Other Changes . . . . .	9
9.4	New Components . . . . .	10
<b>10</b>	<b>1.8.4 (2020-01-24)</b>	<b>10</b>
10.1	Fixes . . . . .	10
<b>11</b>	<b>1.8.3 (2019-12-02)</b>	<b>10</b>
11.1	Fixes . . . . .	10
<b>12</b>	<b>1.8.2 (2019-11-19)</b>	<b>10</b>
12.1	Fixes . . . . .	10
<b>13</b>	<b>1.8.1 (2019-11-18)</b>	<b>10</b>
13.1	Fixes . . . . .	10

<b>14 1.8.0 (2019-10-07)</b>	<b>11</b>
14.1 New Components . . . . .	11
14.2 New Features . . . . .	11
14.3 Fixes . . . . .	11
14.4 Other Changes . . . . .	11
<b>15 1.7.0 (2019-07-22)</b>	<b>11</b>
15.1 New Features . . . . .	12
15.2 Fixes . . . . .	12
15.3 Other Changes . . . . .	12
<b>16 1.6.1 (2019-04-01)</b>	<b>12</b>
16.1 Fixes . . . . .	12
<b>17 1.6.0 (2019-03-28)</b>	<b>12</b>
17.1 New Components . . . . .	12
17.2 New Features . . . . .	13
17.3 Fixes . . . . .	13
17.4 Other Changes . . . . .	13
<b>18 1.5.0 (2019-01-31)</b>	<b>13</b>
18.1 New Features . . . . .	13
18.2 Fixes . . . . .	14
18.3 Other Changes . . . . .	14
<b>19 1.4.0 (2018-10-19)</b>	<b>14</b>
19.1 New Components . . . . .	14
19.2 New Features . . . . .	15
19.3 Fixes . . . . .	15
19.4 Other Changes . . . . .	15
<b>20 1.3.1 (2018-08-28)</b>	<b>15</b>
20.1 Fixes . . . . .	15
<b>21 1.3.0 (2018-07-25)</b>	<b>15</b>
21.1 New Components . . . . .	16
21.2 New Features . . . . .	16
21.3 Other Changes . . . . .	16
21.4 Fixes . . . . .	16
<b>22 1.2.1 (2018-05-04)</b>	<b>17</b>
22.1 Changes . . . . .	17
22.2 Fixes . . . . .	17
<b>23 1.2.0.1 (2018-04-05)</b>	<b>17</b>
23.1 Fixes . . . . .	17
<b>24 1.2.0 (2018-03-29)</b>	<b>17</b>
24.1 New components . . . . .	17
24.2 Changes . . . . .	17
24.3 Fixes . . . . .	17
<b>25 1.1.1 (2018-02-22)</b>	<b>18</b>
25.1 New Features . . . . .	18
25.2 Changes . . . . .	18
25.3 Fixes . . . . .	18
<b>26 1.1.0 (2018-01-19)</b>	<b>18</b>

# 1 21.10.0 (2021-10-26)

## 1.1 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`

## 1.2 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

## 1.3 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`.

## 1.4 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.

## 2 21.07.0 (2021-07-21)

### 2.1 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.

### 2.2 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

### 2.3 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

### 2.4 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

## 2.5 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.

## 3 21.04.1 (2021-04-20)

### 3.1 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

## 4 21.04.0 (2021-04-15)

### 4.1 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.

### 4.2 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

### 4.3 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

## 5 21.01.0 (2021-01-29)

### 5.1 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

### 5.2 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

## 5.3 Other Changes

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

# 6 20.11.0 (2020-11-23)

## 6.1 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

## 6.2 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

## 6.3 Other Changes

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

# 7 20.10.0 (2020-10-13)



## 7.1 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

## 7.2 Fixes

- ItemPick (rc\_itempick) and BoxPick (rc\_boxpick):
  - updated grasp quality computation by taking distance into account

## 7.3 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

# 8 20.04.1 (2020-05-07)

## 8.1 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

## 9 20.04.0 (2020-04-17)

### 9.1 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](#)

### 9.2 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

### 9.3 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

## 9.4 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

## 10 1.8.4 (2020-01-24)

### 10.1 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

## 11 1.8.3 (2019-12-02)

### 11.1 Fixes

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

## 12 1.8.2 (2019-11-19)

### 12.1 Fixes

- fix model name for color sensors

## 13 1.8.1 (2019-11-18)

### 13.1 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 is not interrupted
- Web GUI: fix flipped grid visualization thumbnails on hand-eye-calibration page

## 14 1.8.0 (2019-10-07)

### 14.1 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/>

### 14.2 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)

### 14.3 Fixes

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

### 14.4 Other Changes

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

## 15 1.7.0 (2019-07-22)

## 15.1 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\_ f frame even if request is for external
  - compute grasp quality from surface rmse
  - performance improvements

## 15.2 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

## 15.3 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\_ f frame argument always required

## 16 1.6.1 (2019-04-01)

### 16.1 Fixes

- Web GUI:
  - fix for new BoxPick page

## 17 1.6.0 (2019-03-28)

### 17.1 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

## 17.2 New Features

- Web GUI:
  - depth image: add single frame acquisition 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

## 17.3 Fixes

- Web GUI:
  - Improve 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

## 17.4 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

# 18 1.5.0 (2019-01-31)

## 18.1 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

## 18.2 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

## 18.3 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\_trajectory response
  - add number of map\_frames in status values

# 19 1.4.0 (2018-10-19)

## 19.1 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

## 19.2 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

## 19.3 Fixes

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

## 19.4 Other Changes

- Web GUI:
  - removed French and Chinese translations

## 20 1.3.1 (2018-08-28)

### 20.1 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

## 21 1.3.0 (2018-07-25)



## 21.1 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

## 21.2 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.
  - possibility 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`)

## 21.3 Other Changes

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

## 21.4 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 persistent storage of boolean parameters
- GigE Vision/GenICam:
  - fixes for better compatibility with some clients
  - some nodes like `PixelFormat`, `Width`, `Height` now correctly depend on `ComponentSelector`
  - `DeviceVersion`: report image version instead of `rc_gev_server` version

## 22 1.2.1 (2018-05-04)

### 22.1 Changes

- rc\_gev\_server:
  - add packet\_size to status values in REST-API

### 22.2 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

## 23 1.2.0.1 (2018-04-05)

### 23.1 Fixes

- rc\_itempick:
  - Make sure that the grasp z-axis points into item (according to the camera z-axis)

## 24 1.2.0 (2018-03-29)

### 24.1 New components

- rc\_itempick
- rc\_april\_tag\_detection
- rc\_qr\_code\_detection

### 24.2 Changes

- rc\_hand\_eye\_calibration
  - add remove\_calibration service

### 24.3 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

## 25 1.1.1 (2018-02-22)

### 25.1 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

### 25.2 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

### 25.3 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

## 26 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



## rc\_visard 3D Stereo Sensor

FIRMWARE CHANGELOG

### Roboception GmbH

Kaflerstrasse 2  
81241 Munich  
Germany

info@roboception.de  
www.roboception.de

**Tutorials:**

<https://tutorials.roboception.de>

**GitHub:**

<https://github.com/roboception>

**Documentation:**

<https://doc.rc-visard.com>

**Shop:**

<https://roboception.com/shop>

### For customer support, contact

+49 89 889 50 790  
(09:00-17:00 CET)

support@roboception.de

