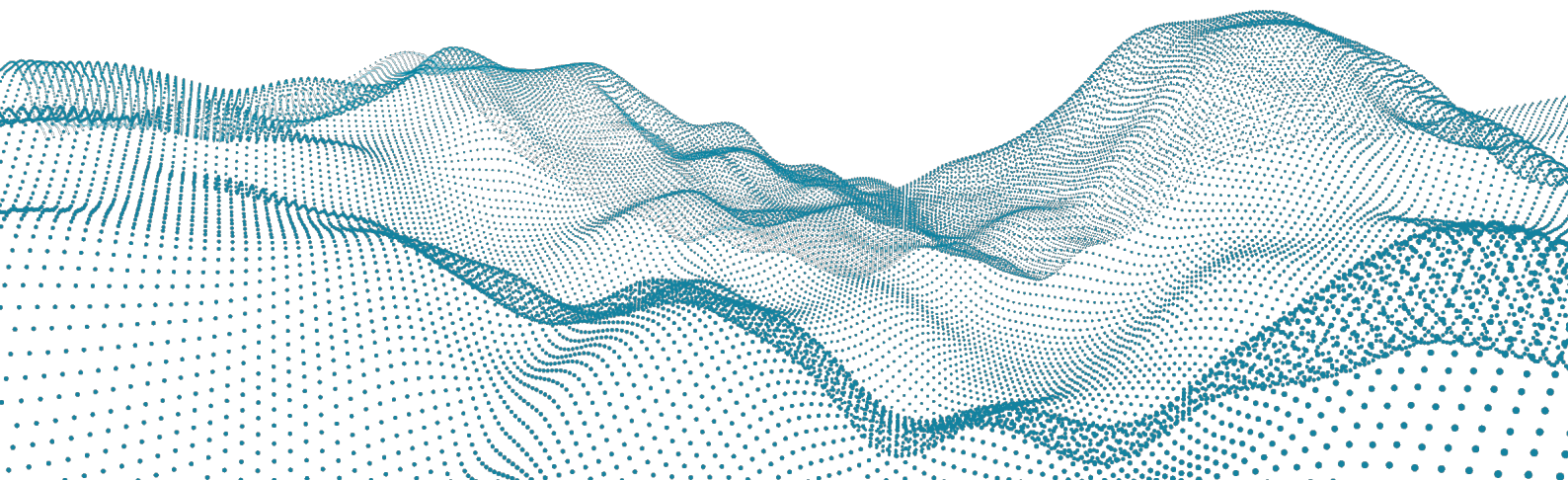




Roboception GmbH | April 2021

# **rc\_cube** Accelerator for rc\_visard

FIRMWARE CHANGELOG



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## 1 21.04.1 (2021-04-20)

### 1.1 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

## 2 21.04.0 (2021-04-15)

### 2.1 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_cube` and is licensed with any of the modules ItemPick, BoxPick, SilhouetteMatch or CADMatch. Otherwise it requires a separate LoadCarrier license to be purchased.

- **gRPC image streaming interface**: New `rc_cube` 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).

### 2.2 New Features

- CADMatch (`rc_cadmatch`):
  - add `check_collisions_with_matches` parameter
- 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_cube`
- WebGUI:
  - organize modules into detection modules and configuration modules
  - add import/export of grasps for CADMatch and SilhouetteMatch templates
  - new LoadCarrier detection module
  - new Regions of Interest page for configuring regions of interest for all detection modules
  - possibility to directly update the firmware of the connected `rc_visard`
  - add optional item maximum dimensions to ItemPick Try-Out section
  - add fullscreen control to images in stream view

### 2.3 Improvements and Fixes

- LoadCarrier (`rc_load_carrier`)
  - return estimated dimensions of detected load carriers
  - improve load carrier detection in low contrast scenes
- CADMatch (`rc_cadmatch`):
  - performance improvements
  - allow collision check with all detectable objects
  - disambiguate equally good grasps for symmetric templates
  - fix parsing of symmetries during refinement

- 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 CADMatch and 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

## 2.4 Other Changes

- support NTFS and exFAT formatted USB flash drives
- GigE Vision/GenICam:
  - set model\_name to rc\_cube\_S or rc\_cube\_X
- REST API:
  - report if userspace is available in system

## 3 21.01.0 (2021-01-29)

### 3.1 New Features

- BoxPick (rc\_boxpick):
  - add prefer\_splits parameter
- CADMatch (rc\_cadmatch):
  - collision check with other detected objects
  - add grasp\_filter\_orientation\_threshold 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 and CADMatch as tarball with visualization images

## 3.2 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
- CADMatch (rc\_cadmatch):
  - improve refinement for flat objects
- 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
  - show version of connected rc\_visard and warn if rc\_visard firmware is not supported
  - improve grasp teaching and visualization of large CAD models

## 3.3 Other Changes

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

# 4 20.11.0 (2020-11-23)

## 4.1 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

## 4.2 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
- CADMatch (`rc_cadmatch`):
  - Updated grasp sorting to also consider the matching score of the object the grasp is located on

### 4.3 Other Changes

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

## 5 20.10.0 (2020-10-13)

First release



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