

# RC Log Visualizer - User Manual and Online Help

Cross-system English help - Version 4.0 - 17 May 2026

## 1. Purpose and scope of this manual

This manual describes the **RC Log Visualizer** across all program variants. The description is intentionally general so it can be used for every edition of the visualizer. Instead of focusing on individual brand names, it uses neutral terms such as program variant, system-specific telemetry importer, and flight controller/blackbox import.

The RC Log Visualizer is no longer a pure CSV viewer. CSV is only one of several possible input paths. The program combines log import, data checking, charts, animated chart playback, table view, flight replay and aerobatics analysis.

- For new users: an overview of workflow and tabs.
- For testers: clear expectations for what should be visible after each step.
- For advanced users: explanations of project files, replay files, candidates, analysis markers and expert CSV.
- For online help: a basis for searchable and linked documentation.

**Note:** The actual buttons may differ slightly depending on program variant and development status. The logic and terms remain the same.

## 2. Basic principle of the program

The program imports telemetry or flight controller data, converts it into a uniform internal table structure and displays it in specialized tabs. Each tab answers a different question.

Tab	Main question	Typical result
Imports	How do data get into the program?	A log is detected, imported and prepared for the following tabs.
Chart	How did measured values change over time or over another X axis?	Curves with zoom, axes, value display and comparison of several measurements.
Chart Player	How do the curves change during playback?	Animated chart view with time cursor and value box.
Table	Which raw and calculated values are available row by row?	Table-based control view of the imported data.
Flight Replay	What did the flight look like spatially?	2D overview, replay data and optionally a 3D player.
Aerobatics Analysis	Which sections could be figures and where are they in the training box?	Overview, candidates, analysis markers and special views.

The tabs follow a practical workflow: import data, check values, play back time or space, then perform special analyses.

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### 3. Data flow and internal building blocks

The visualizer works with several data levels. This separation explains why a change in the aerobatics analysis does not modify the real flight and why an analysis project contains more information than a CSV file.

Level	Meaning	Modified?
Original log	The original file from transmitter, receiver, logger or flight controller.	No. This file remains unchanged.
Imported table	Data structure generated from the log with time, measured values, GPS, altitude and more.	Only internally in the program.
Chart data	Selected columns for curves and the Chart Player.	Selection and display can be changed.
Replay data	Spatial data for 2D/3D flight playback, typically as <code>flight_replay.json</code> .	Can be generated again, but is not a replacement for the original log.
Analysis markers	Manually or automatically accepted sections, such as possible roll, loop or turn.	Yes, but only as analysis information.
Candidates	Automatically found suggestions for noticeable sections.	Yes, but only as suggestions.
Analysis project	Stores flight path, markers and candidates together.	Yes, the working file of the aerobatics analysis.

**Rule of thumb:** The raw flight is the measurement. Charts, replay, candidates and analysis markers are interpretations of that measurement.

## 4. Important terms

Term	Explanation
Log file	Recording of a flight or telemetry session.
System importer	Importer of the current program variant for its telemetry format.
Generic import	Import of CSV or Excel files when no special system logic is required.
Flight controller/ blackbox import	Import of logs from flight controllers or raw blackbox files via a decoder.
Time axis	Preferred X axis for time-based analysis; it can come from log time, seconds or timestamps.
Own Y axes	Display of multiple measurements on separate scales when value ranges differ greatly.
Align zero axes	Option to visually align zero lines of different Y axes.
Replay flight	Spatial playback of a flight in 2D/3D.
Candidate	Automatic suggestion: this section could be a figure.
Analysis marker	A section confirmed or created manually by the user.
Aerobatics box	Training or competition area with ideal line, warning zones and limits.

## 5. Quick start: from log to analysis

For normal work, this sequence is usually sufficient:

- In the Imports tab, select the appropriate import function.
- Check whether the import was successful and whether the data are visible in Chart and Table.
- In the Chart tab, select the most important measured values and inspect the curve.
- If required, play back the curves in the Chart Player.
- In Flight Replay, check whether GPS, altitude and replay look plausible.
- For aerobatics or training logs, inspect the full flight in Aerobatics Analysis and search for candidates.
- Save important results as an analysis project.

**Note:** If a flight contains no aerobatics, it is normal for the aerobatics analysis to find few or no candidates.

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## 6. Program structure and importers

The RC Log Visualizer consists of a shared core and several import paths. Each program variant starts the same basic structure but uses a suitable system-specific importer and appropriate default labels.

### 6.1 Import paths

Import path	When to use it	Result
System-specific telemetry import	When the log comes directly from the matching radio/telemetry environment.	Measured values, time axis, GPS and known columns are detected as automatically as possible.
Generic CSV/Excel import	When data are available as a table or exported from another program.	The user can check columns and, if required, select X/Y axes or assignments.
Flight controller/blackbox import	When raw data come from a flight controller, blackbox or compatible log format.	Decoder or bridge generates an internal table and supplies Chart, Replay and Aerobatics Analysis.
Replay/project files	When already generated analysis data should be loaded again.	Fast entry without importing the raw log again, depending on file type.

### 6.2 Background processing

- Column names are standardized where known.
  - Decimal separators and number formats are normalized.
  - Time values are converted into a usable time axis.
  - GPS columns are detected and converted into local meter coordinates where possible.
  - Altitude, speed, climb/sink and orientation are imported or estimated when enough data exist.
  - A flight\_replay structure is generated for the replay player.
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## 7. Imports tab

The Imports tab is the entry point. It loads new log files, opens existing entries from the history or uses special import functions. The goal is not only to read the file, but to prepare it for all following tabs.

### 7.1 Typical functions

Function	Meaning	Expected result
Import system log	Loads a log of the current program variant.	The file appears in the import history and the data are available for Chart and Table.
Import CSV/Excel	Loads a table file.	Columns are imported; depending on the file, assignments may need checking.
Import flight controller/blackbox log	Loads or decodes a flight controller log.	Large files can take longer; afterwards Chart and Replay are available.
History/database	List of already imported flights.	An existing flight can be opened again.
Message/status area	Shows import progress and warnings.	The user can see whether decoding, loading or processing is running.

### 7.2 Expected result after a successful import

- Selectable columns are available in Chart.
- Rows and values are visible in Table.
- For GPS flights, a track is visible in Flight Replay.
- For suitable data, a replay file can be generated or is already present.
- Flight controller data may additionally provide roll/pitch/yaw for aerobatics or 3D views.

## 7.3 Common import problems

Problem	Possible cause	Solution
No GPS display	GPS columns are missing, have unusual names or contain too few valid values.	Check the table; use another import path or column assignment if necessary.
Import takes very long	Very large log file or raw blackbox must be decoded.	Watch the status area and do not start the import repeatedly.
Measured values look wrongly scaled	Unit, decimal separator or column was detected incorrectly.	Check Table and Chart; use generic import with manual control if required.
Replay not available	GPS, altitude or time data are missing.	Check Chart/Table; replay requires spatial data.

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## 8. Chart tab

The Chart tab is the main technical measurement view. Values are displayed over an X axis. Usually this is time, but other columns can also be used as X axis if the program variant provides this option.

### 8.1 Basic operation

- Select Y values: choose the measurements that should be shown as curves.
- Check X axis: usually time; for special analyses other columns may be possible.
- Update chart: rebuild the curves with the current selection.
- Zoom: enlarge a section, for example with the mouse or toolbar.
- Read values: use the mouse position or value display for exact measurements.
- Legend/colors: distinguish curves by legend and colors.

### 8.2 Own Y axes

Many measurements have very different value ranges. Altitude, voltage, speed and climb rate are difficult to compare on one shared Y scale. Own Y axes create separate scales for individual curves or curve groups.

Option	Useful when	Note
Shared Y axis	Values have similar units or sizes.	Simple and clear.
Own Y axes	Value ranges differ greatly.	Do not overdo the number of axes; otherwise the display becomes busy.
Align zero axes	With own Y axes, zero lines should line up visually.	Can create empty space; enable deliberately.

### 8.3 Separate chart view

For detailed work, the chart can be opened in a separate window if the program variant provides this function. This is especially useful on small screens or with many curves.

## 8.4 Expected result

- Selected curves are visible and clearly distinguishable.
  - Axes match the displayed measurements.
  - When Y values change, old curves and old secondary axes disappear completely.
  - Zoom and value display allow detailed inspection of individual flight sections.
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## 9. Chart Player tab

The Chart Player is an animated chart view. It answers the question of how several measurements change over time. While the normal Chart tab is mostly static, the Chart Player focuses on playback, time cursor and current values.

### 9.1 Basic functions

Function	Description
Select Y values	Choose curves shown in the player.
Play/Pause	Start or stop the animation.
Step forward/back	Move through individual time points.
Time slider	Jump directly to a point in the flight.
Vertical time cursor	Marks the current time in the chart.
Value box	Shows values at the current time.
Open separately	Opens the player view in its own window if available.

### 9.2 Data transfer

The Chart Player uses the data already present in the chart or imported flight. Depending on program status, either only current chart columns or all available chart data can be transferred. The goal is that the player does not need its own import logic, but uses the same data base.

### 9.3 Expected result

- During playback, curves move relative to the time cursor or the cursor clearly indicates the current time.
  - The value box updates synchronously.
  - The time axis is displayed clearly, preferably in minutes or with clear seconds.
  - Own Y axes and zero-axis options behave consistently with the normal chart.
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## 10. Table tab

The table shows imported and calculated values row by row. It is the control view for all automatic detections. If Chart or Replay look unusual, the table should be checked.

### 10.1 Typical use

- Check whether time columns are filled correctly.
- Check whether GPS, altitude, speed and climb rate contain plausible values.
- Check column names when automatic assignment does not work.
- Detect suspicious values, gaps or wrong units.
- Understand which columns were imported during generic import.

### 10.2 Expected result

- The table contains at least time and one or more measurement columns.
  - For replay-capable flights, GPS or local coordinates exist.
  - For aerobatics/FC analyses, roll/pitch/yaw or derivable orientation values are ideally present.
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## 11. Flight Replay tab

The Flight Replay tab displays the flight spatially. It is the bridge between table/chart data and spatial flight analysis. Depending on the available data, the flight can be displayed in 2D, as exported replay file or in the 3D player.

### 11.1 2D overview

The 2D view shows the flight path from above or in a map/track view. It is the first plausibility check: start point, flight direction, size and GPS jumps can be spotted quickly.

### 11.2 3D player

The 3D player uses a replay file with local coordinates, altitude and orientation. It can provide different views such as ground view, follow mode or pilot view. Depending on program status, model selection, HUD, reception values, warnings and terrain/altitude logic may also be available.

Area	Meaning
Replay file	Contains the spatial flight points, for example time, X/Y/Z, GPS, altitude, roll/pitch/yaw.
Ground view	View relative to ground or start point.
Follow mode	Camera follows the model.
Pilot view	View from or near the model, possibly with horizon logic.
HUD/ warnings	Additional information such as altitude, distance, RSSI/TQL or status messages.
Terrain/ altitude	Corrections or protective logic so the flight is not displayed unnecessarily below terrain.

### 11.3 Expected result

- The flight appears at a plausible position and altitude.
- Start and landing are not shown below terrain without reason.
- If GPS data are missing, a clear warning is shown instead of a crash.

- The spatial display broadly matches Chart and Table.
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## 12. Aerobatics Analysis tab

Aerobatics Analysis is a special analysis for spatial flight assessment, training review and structured post-analysis of figure sections. It supplements Chart, Table and Flight Replay. It is especially useful when a pilot wants to understand a flight not only as measurement curves, but as a spatial sequence with possible figures, box position and correction hints.

**Important:** The aerobatics analysis never changes the original flight. It always works on the loaded raw flight and adds only analysis information such as candidates and markers.

### 12.1 Basic principle

- The raw flight always remains unchanged.
- Candidates are automatic suggestions for noticeable sections.
- Analysis markers are accepted or manually created sections.
- A section can be classified as a figure type without changing the flight path.
- The analysis project stores flight path, markers and candidates together.
- The expert CSV is only for data exchange and does not contain the full analysis.

### 12.2 Workflow in the tab

Step	Action	Expected result
1	View entire flight	Recognize size, position and rough flight structure.
2	Take over current replay flight	The replay flight generated by the main program is loaded into Aerobatics Analysis.
3	Optional: load demo aerobatics	Test data are loaded if no real aerobatics log is available.
4	Search candidates	The program suggests possible rolls, loops, humpties or turns.
5	Show/play candidate	The proposed section is focused and can be checked individually.
6	Accept or reject	A good candidate becomes an analysis marker; a wrong suggestion is removed.

Step	Action	Expected result
7	Mark manually	Start and end can be set from the current point.
8	Save analysis project	Flight path, markers and candidates are saved together.

### 12.3 Flight overview and loaded flight

The upper right area "How to use Aerobatics Analysis" and "Flight overview" is the entry point. It shows the loaded state and the next useful steps.

- Loaded: shows whether a real replay flight, demo aerobatics or analysis project is active.
- Next step: gives a rough action recommendation.
- Take over current replay flight: transfers the replay data currently available in the main program.
- Load demo aerobatics: loads a synthetic example flight if no real aerobatics log exists.
- Open analysis separately: opens the analysis in a movable and resizable window.

**So nutzt man die Kunstflug-Analyse**

Die Ansicht verändert den Flug nicht. Sie zeigt den Rohflug, sucht mögliche Figuren und speichert nur Analysemarkierungen.

Arbeitsablauf:

1. Gesamtflug ansehen.
2. Kandidaten suchen.
3. Kandidat anzeigen/abspielen.
4. Übernehmen oder manuell markieren.
5. Analyse-Projekt speichern.

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**1. Flugüberblick**

Geladen: Demo-Kunstflug / Testdaten  
Demo-Kunstflug geladen – Testdaten

Nächster Schritt: Gesamtflug ansehen, dann Kandidaten suchen und Vorschläge prüfen.

Aktuellen Replay-Flug übernehmen

Demo-Kunstflug laden

Demo-Kunstflug ist nur ein Testflug, wenn noch kein echter Kunstfluglog vorhanden ist.

Figure 1: Entry into Aerobatics Analysis with instructions, flight overview and buttons for taking over replay data or loading the demo flight.

## 12.4 Detail for the current point

The "Detail for current point" area shows the data of the selected or played flight point. It is the most important control view for individual values.

- Time: current time and total duration.
- Maneuver/raw: current marker and associated raw section.
- Position, altitude, roll/pitch/yaw, speed and climb show the current flight state.
- Aerobatics box: assessment of position in the training/competition box including correction hint.

Detail zum aktuellen Punkt	
Zeit:	0.00 s / 47.52 s
Manöver:	Geradeaus (Gerade) Roh: Geradeaus
Position:	X 0.0 m   Y 0.0 m
Höhe:	50.0 m
Roll / Nick / Gier:	Roll 0.0° Nick 0.0° Gier 0.0°
Speed / Steigen:	1.5 m/s   0.0 m/s
GPS Demo:	Lat 47.780000 Lon 12.450000
Kunstflugfenster:	ROT - außerhalb / kritisch Abstand: auf Idealdistanz ( 150 m, + zur 150-m-Linie) Seite: 63.4° links (-63.4°) Höhe: Höhe ok (18.4°) Korrektur: Figur mehr nach rechts zur Mitte

Figure 2: Details of the currently selected flight point with time, position, orientation and box hints.

## 12.5 Views for the full overview

The view buttons define the perspective. For first analysis, "3D" or "Box top 2D" is usually recommended, then optionally "Judge view 2D".

- 3D, side, top and front: predefined camera views.
- Flight direction and reset view: quick orientation in confusing flights.
- Judge view 2D: reduces the spatial display to a judge/pilot view in 2D.
- Box top 2D: especially useful for position inside the aerobatics box from above.

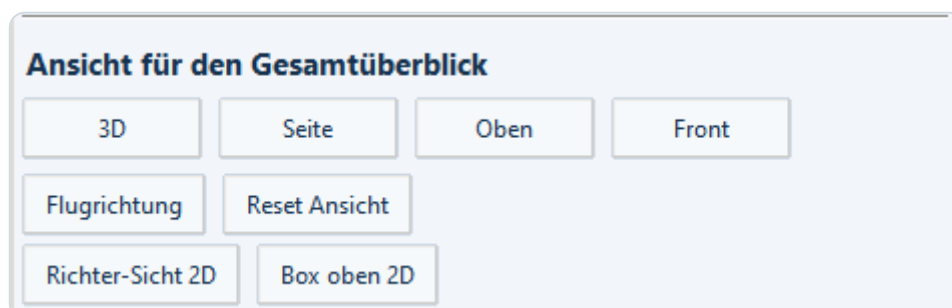


Figure 3: Switches for 3D, side, top and competition views.

## 12.6 Find and check candidates

The automatic candidate search suggests noticeable sections. It is intentionally cautious. In normal cross-country, thermal or training flights without aerobatics, few or no candidates are expected.

- Search candidates: starts automatic search.
- Delete all: removes all current suggestions.
- Table: shows suggestion, type, time range, quality and percentage.
- Show candidate: highlights the selected candidate.
- Play candidate: plays the selected section.
- Accept: converts the candidate into an analysis marker.
- Reject: removes an unsuitable candidate.
- Accept high-quality candidates: accepts all suggestions with high rating together.

A candidate does not automatically mean that a figure was reliably detected. It is always only a suggestion that should be checked in the plot and during playback.



Figure 4: Area for finding, displaying, playing and accepting automatic candidates.

Candidate type	Rough detection logic	Typical false interpretation
Roll	Strong roll movement or clear change in roll angle.	Turns with strong bank can appear as weak rolls.

Candidate type	Rough detection logic	Typical false interpretation
Loop	Round altitude arc, clear pitch/altitude movement, little heading change.	Large arcs without aerobatics can look similar.
Humpty	Steep climb/descent, short horizontal path or direction change at the top.	Loop/humpty must be checked by shape.
Curve/turn	Strong heading change or noticeable yaw progression.	Normal traffic patterns can appear as curves/turns.

## 12.7 Accepted analysis markers

Analysis markers are the actual work results of the aerobatics analysis. Confirmed or manually created sections are managed here.

- Zoom section and play section: check the selected section.
- Start = current point / End = current point: set time limits from the current flight point.
- Name: freely selectable section name.
- Marked as: figure type or classification.
- Start s / End s: exact time limits of the marker.
- Save/update marker: creates a new section or updates the current one.
- Delete: removes the marker from the analysis.

Again: markers change only the analysis, never the flight itself.

### 3. Übernommene Analysemarkierungen

Für echte Flüge: Abschnitt markieren, Start/Ende setzen, benennen und als Figurtyp klassifizieren. Die Flugbahn/Messdaten bleiben unverändert.

Abschnitt	markiert als	Zeit
Geradeaus 2	Gerade	13.0-16.9s
Rolle	Rolle	17.0-22.9s
Geradeaus 3	Gerade	23.0-24.9s
Humpty	Humpty	25.0-33.3s
Geradeaus zurück	Gerade	33.4-36.5s
Kurve	Kurve	36.6-43.5s
Abschlussgerade	Gerade	43.6-47.5s

Name   
 markiert als   
 Start s   
 Ende s

Hinweis: Markierungen ändern nur die Analyse, nicht die Flugbahn.

Figure 5: Management of accepted analysis markers with time limits, names and figure type.

## 12.8 Focus, zoom and display

Display options switch between overview and detailed work. This area is especially useful if the flight path is long or individual figures need detailed inspection.

- Full flight / Current section / Current point / Zoom 1:1: quick focus changes.
- Zoom slider: enlarges or reduces the view.
- Current aircraft symbol, label and orientation marks control additional display elements.
- Competition box: controls box display, 150/175/200 m labels, warning points and pilot hints.
- Replay trace: determines whether only the current section or a preview of the full flight is visible.

- Ground helper line, ground trace/projection and 3D training background/ground help spatial orientation.

#### 4. Fokus / Zoom / Darstellung

Gesamtflug
Aktueller Abschnitt

Aktueller Punkt
Zoom 1:1

Fokus: Gesamtflug | Zoom 1.00x

Zoom

- Aktuelles Flugzeugsymbol anzeigen
- Beschriftung am aktuellen Punkt
- Orientierungsmarken Rolle/Humpty

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#### Wettbewerbsfenster

Box-Darstellung

Dezent
▼

- Kunstflugfenster anzeigen
- Beschriftung 150 / 175 / 200 m
- Box-Warnpunkte auf Flugspur
- Pilot-Hinweise im 2D-Plot
- Manöverlabels in 2D anzeigen
- Box-Timeline im 2D-Plot

Idealabstand / Demo-Box

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Replay-Spur

Nur aktueller Abschnitt: volles Band
▼

- Gesamtflug als dünne Vorschau
- Beim Abspielen weich folgen
- Breites Flugband für Rohflug
- Mittellinie zusätzlich anzeigen

Rohflug-Bandbreite

Gesamtübersicht-Spurbreite

Flugzeugsymbol-Größe

- Boden-Hilfslinie am Flugzeug
- Bodenspur / Projektion anzeigen
- 3D-Trainingshintergrund / Boden

Figure 6: Settings for focus, zoom, competition box and replay trace display.

## 12.9 Player and saving/loading

Under "Player", the playback step per tick is set. Below it is the "Save / Load" area. For normal users, the analysis project is almost always the relevant option.

- Save analysis project...: saves raw flight, analysis markers and candidates together.
- Load analysis project...: loads a previously saved analysis state.
- Show expert CSV: displays additional CSV functions. These are intended only for data exchange, checking or troubleshooting.

**Important note about expert CSV:** After clicking "Show expert CSV", additional buttons open below the hint text. They are not immediately visible if the user does not look or scroll down. When enabled, the buttons "Export CSV..." and "Import CSV..." appear. This CSV contains only the flight path table or point data, not the complete analysis with candidates and markers.

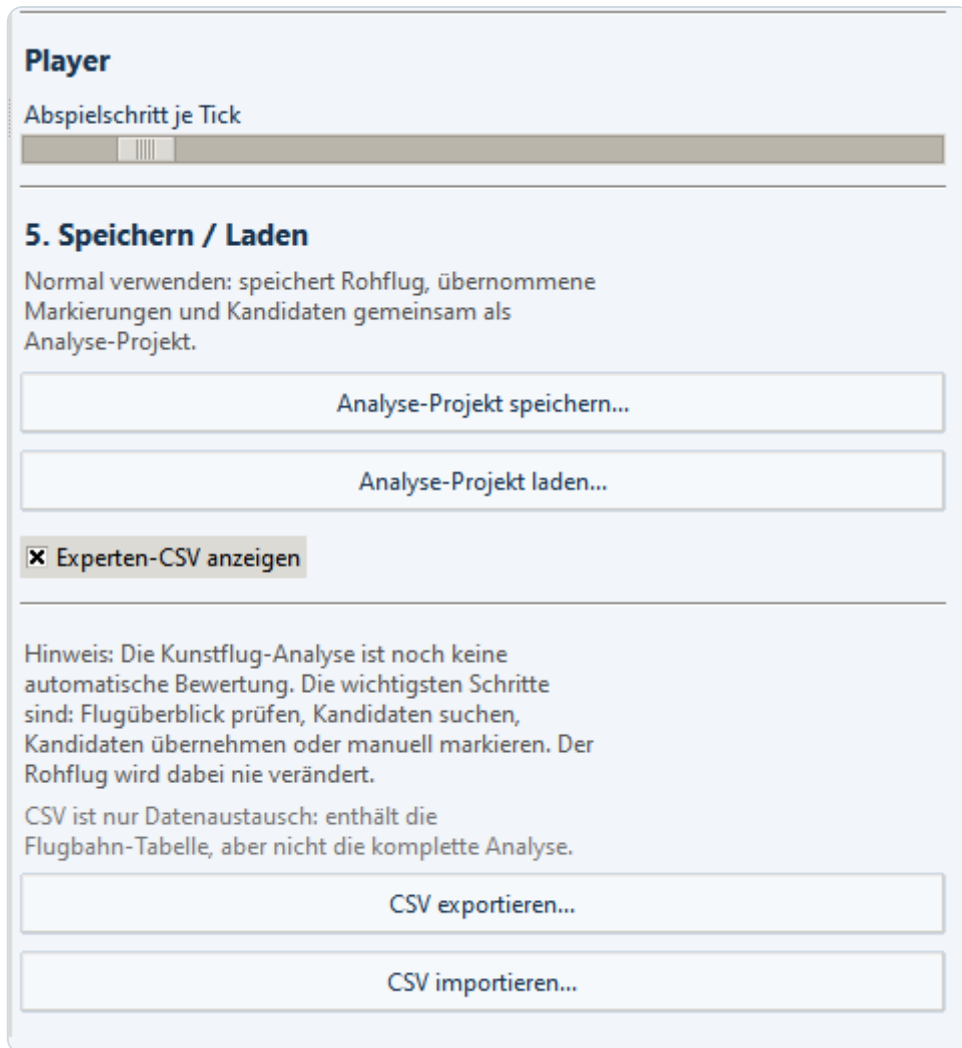


Figure 7: Save/Load area with analysis project and checkbox for displaying expert CSV functions.

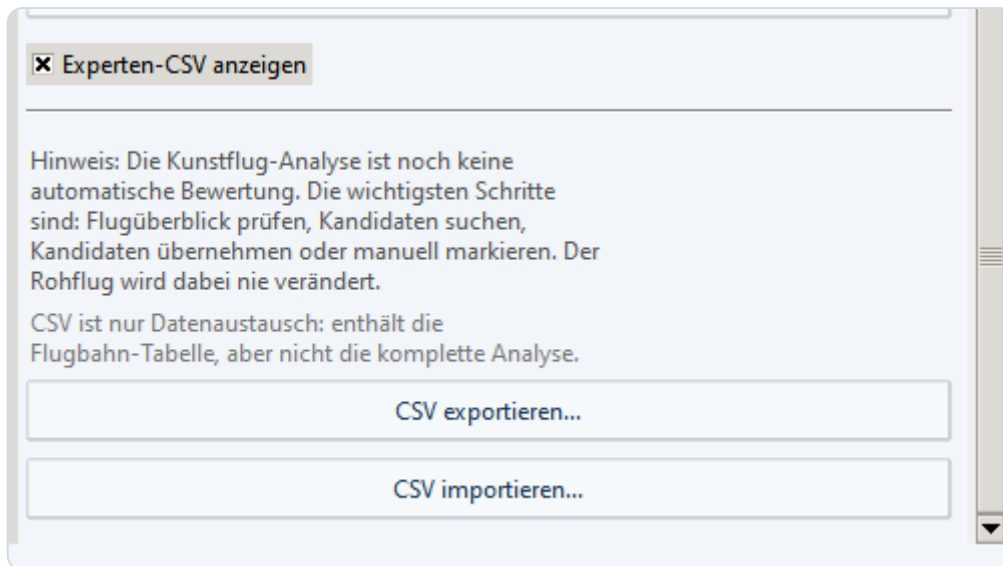


Figure 8: After activating "Show expert CSV", additional CSV buttons appear below the hint text.

## 12.10 Separate analysis window

Aerobatics Analysis can be opened in a separate window. This window has normal window controls, can be moved and resized and is useful on large monitors or for parallel work with Chart, Table or Flight Replay.

Changes from the separate window can be transferred back into the main window. This allows detailed analysis in a large window and then writing the result back to the main tab.

## 12.11 Summary for normal users

- Always view the full flight first.
  - Then search for candidates.
  - Check good candidates individually before accepting them.
  - Correct markers manually when needed.
  - Save the analysis project at the end.
  - Use expert CSV only deliberately for data exchange or troubleshooting.
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## 13. Supported file formats, file types, saving and loading

The RC Log Visualizer uses several file types. Understanding them is important for the workflow. The old name "CSV Visualizer" was historically understandable, but too narrow: CSV is only one possible input format.

### 13.1 Supported input and working formats

File group	Typical extensions / examples	Purpose / note
System-specific telemetry logs	Depending on program variant and transmitter/ logger system	Raw source from radio, receiver, telemetry logger or sensor environment.
CSV / text tables	.csv, delimited text exports	Generic table import and data exchange with Excel, LibreOffice, Python/Pandas and other tools.
Excel files	.xlsx and compatible table files	Convenient import path when data are already available in spreadsheet form.
Flight controller / blackbox logs	.bin, .log, .csv or decoded blackbox files depending on source	Import path for ArduPilot, iNAV, Betaflight/Blackbox or compatible recordings. Some raw formats require a decoder.
Replay file	flight_replay.json	Prepared spatial data for 2D/3D replay with time, coordinates, altitude and orientation.
Aerobatics analysis project	Program-specific project file	Stores flight path, accepted markers, candidates and analysis state together.
Expert CSV in Aerobatics Analysis	.csv	Only point/flight-path data for exchange and troubleshooting; not a full analysis project.
	e.g. IGC, if implemented in the program variant	Additional importers can be added without changing the basic workflow.

File group	Typical extensions / examples	Purpose / note
Optional future/ import extensions		

## 13.2 Original log file

The original log file comes from the respective telemetry or flight controller system. It is the raw source and should be kept unchanged.

## 13.3 flight\_replay.json

The replay file is a prepared structure for spatial views and the 3D player. It usually contains time, local coordinates, altitude and orientation.

## 13.4 Analysis project

The analysis project is the most important working file for Aerobatics Analysis. It stores together:

- the loaded flight path or points used in the tab,
- accepted analysis markers,
- the current candidate list and analysis state.

## 13.5 General CSV export

General CSV exports are mainly used for exchange with spreadsheet programs or external analysis. They are useful for further processing in Excel, LibreOffice Calc, Python/Pandas or other tools.

## 13.6 Expert CSV in Aerobatics Analysis

The expert CSV is deliberately not a complete project format. It contains only the flight path table or point data. Candidates, markers and other analysis states are missing. It should therefore not be used as a replacement for the analysis project.

## 13.7 Recommended practice

- Keep the original log file separately.
  - Use `flight_replay.json` for spatial work where required.
  - For aerobatics work, always save/load the analysis project.
  - Use CSV only when data should deliberately be exported or imported.
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## 14. Typical workflows

### 14.1 Normal telemetry flight

- Import log.
- Open Chart and select important values: altitude, speed, voltage, reception, variometer and similar.
- Zoom suspicious areas in the chart.
- Check Table if values are not plausible.
- Open Flight Replay if GPS exists.
- Use Aerobatics Analysis only when figures or spatial training assessment are relevant.

### 14.2 Flight controller/blackbox log

- Import or decode the raw log.
- For large files, wait for progress to finish.
- Check in Chart whether time, altitude, speed, roll/pitch/yaw are plausible.
- Check Flight Replay.
- Open Aerobatics Analysis and search candidates.
- Accept candidates only when they look plausible in plot and playback.

### 14.3 Aerobatics training

- Take over replay flight or load demo aerobatics.
- View full flight in 3D and Box top 2D.
- Search candidates.
- Show and play every candidate.
- Accept good candidates; correct start/end if needed.
- Name markers and classify them as figure types.
- Save the analysis project.

### 14.4 Test without a real aerobatics log

- Load demo aerobatics.
- Search for candidates.
- Check loop, roll, humpty and turn.
- Test views and competition box.

- Do not confuse the demo with a real evaluation; it is only for function checking.

## 15. Important settings and displays

Area	Setting	Effect
Chart	Y values	Determines which measurements are shown as curves.
Chart	Own Y axes	Separates scales for different value ranges.
Chart	Align zero axes	Visually aligns zero lines when axes are separated.
Chart Player	Play step / time cursor	Controls playback speed and current time.
Flight Replay	View / camera	Switches between spatial perspectives.
Flight Replay	Model / HUD / warnings	Affects 3D display and additional information.
Aerobatics	Search candidates	Creates automatic suggestions.
Aerobatics	Show aerobatics box	Displays training/box elements.
Aerobatics	Replay trace	Controls whether raw flight, future band or current section is visible.
Aerobatics	Open analysis separately	Opens the tab in its own window.
Aerobatics	Save/load analysis project	Saves or loads flight path, markers and candidates.

## 16. Plausibility checks

Before deeper analysis, check whether the data are plausible. Many apparent program errors are caused by missing or incorrectly detected input data.

Check	How problems appear	Reaction
Time axis	Curves jump, run too fast/slow or only use row numbers.	Check time column in Table.
GPS	Replay is missing or track jumps far away.	Check GPS columns and valid values.
Altitude	Flight starts below ground or altitude is extremely wrong.	Check altitude column, start offset and replay altitude.
Speed/ variometer	Unplausible peaks or wrong sign.	Check unit and derived values.
Roll/pitch/yaw	Aircraft rotates incorrectly or figures are not detected.	Check data source and model orientation.
Candidates	Too many or wrong suggestions.	Observe quality, reject candidates manually or correct limits.

## 17. Troubleshooting and typical questions

Question / problem	Answer / solution
Why are no aerobatics candidates found?	The flight may contain no noticeable aerobatics sections or the required orientation data may be missing. For normal flights this is expected.
Why does the flight not change when I mark a section as loop?	The marker changes only the analysis. The real raw flight remains unchanged.
Why is CSV not the same as an analysis project?	CSV contains table/flight-path data. The analysis project additionally contains markers and candidates.
Why does a curve look wrongly scaled?	Old secondary axes, wrong units or shared Y axes may be involved. Check own Y axes and rebuild the chart.
Why does an FC/blackbox import take long?	Raw data must be decoded and converted into internal tables. Large logs can contain many rows.
Why is the 3D player or replay missing?	GPS, altitude or time are missing, or the replay file could not be generated.
Why is another flight shown in the separate window?	After a demo test, take over the current replay flight again; changes can be transferred into the main window.
Why is a candidate wrong?	Candidates are suggestions. Show, play and reject them if necessary.

## 18. Notes for testers

Testers should not only check whether the program starts, but whether the expected logic of each tab is followed.

- Import: Is the file loaded and is there a status? Are error messages understandable?
  - Chart: Are curves, axes and zoom plausible?
  - Chart Player: Does the time cursor run synchronously with the values?
  - Table: Do columns and values match the log?
  - Flight Replay: Are position, altitude and start point roughly correct?
  - Aerobatics Analysis: Does the raw flight remain unchanged? Are candidates treated only as suggestions?
  - Separate windows: Can they be moved and resized and do they have normal window controls?
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## 19. Online help, search and linking

For an online version, this manual should be divided into sections with unique anchors. A search field can search headings, body text and keywords. The keyword index should link to the appropriate sections.

- Search field at the top of the page.
  - Table of contents with jump links.
  - Keyword index with links to relevant sections.
  - Keep sections short enough for search results to stay readable.
  - Check screenshots and captions after larger interface changes and update them if necessary.
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## 20. Keyword index

This index is intended for the online version as a linked keyword search. In the PDF version it serves as a reference aid.

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