# IADS-RTSTATION

## Real-time and post-test data visualization and analysis software

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### Key Features

- Complete solution with real-time data processing, archiving, computation and display
- Full IADS client capability including real-time audio and video
- Interactive interface which allows custom data displays, parameter definitions, analysis options and test setup
- Connects to a wide range of data sources
- Start wizard automation that supports XML, XidML, TMATS and other metadata
- Client/Server mode

## Overview

IADS-RTSTATION is a complete real-time and post-test display and analysis software suite and is scalable from a laptop to a large workgroup through its client/server software architecture.

RTStation provides an interactive interface, which allows you to quickly customize displays, parameter definitions, analysis options and test setup in a matter of seconds. You can then send these customizations to multiple monitors via multi-port graphics processors and other networked clients. Every data point is cached, allowing real-time scrollback through the time history. Derived equations can be added or modified as required for use throughout the system. The same features are available for real-time and post-test processing. RTStation's ease of use, depth of display capability, and powerful analysis techniques can be used to save time and effort on any test program.

RTStation facilitates real-time mission analysis and monitoring as well as data playback. The same GUI is available for both real-time and post-test processing, supporting features such as ActiveX controls, derived parameters (formulas) and time/frequency-domain data analysis.

### Applications

- Telemetry ground stations
- On-board data display and analysis
- Post-test analysis and playback

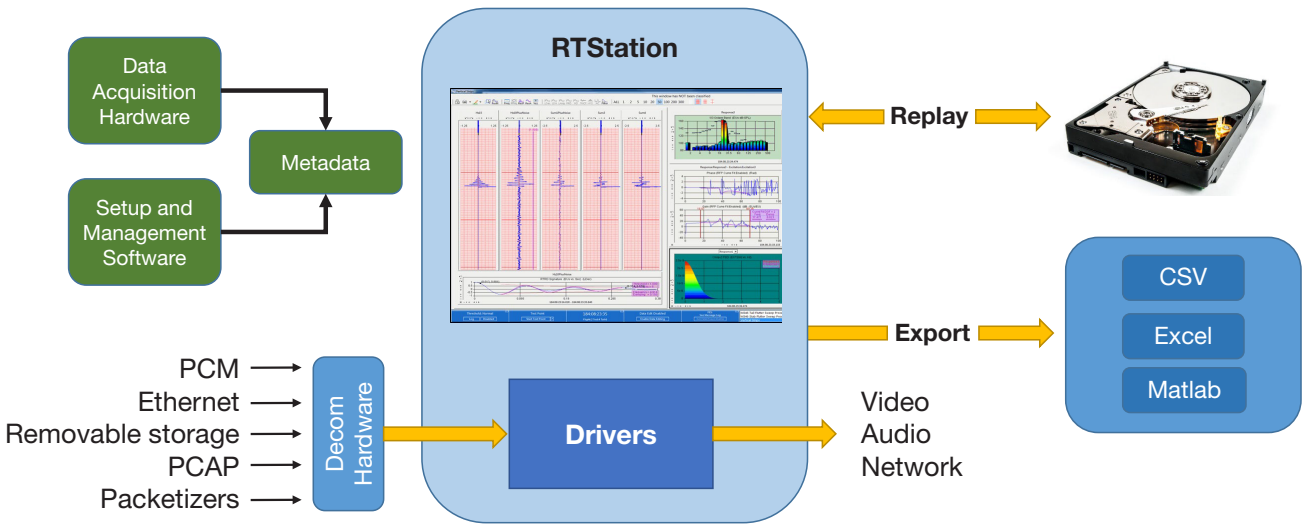


Figure 1: RTStation System Overview With KAM-500 Data Source

# Getting the most out of RTStation

## Client/server mode

When running in client/server mode, a RTStation server can have up to five clients. In this mode, data is saved only on the server. Connected clients can view live data and video, or can pause and replay saved data without affecting operation for other clients.

Any computer running RTStation can act as a data server, but only one data server can be present on the network. Any other computers (up to a maximum of five) on the dedicated network must run RTStation as real-time clients.

The same license is used to run RTStation as server or client.

## Licensing

RTStation is licensed software. For details on obtaining a license key, see the RTStation release notes.

## Latency

Although RTStation is a real-time system, it experiences latency when used with non (RT) real-time operating systems such as Microsoft Windows and also due to buffering time. Additionally, the latency varies between system configurations depending on the real-time data source (PCM frame or Ethernet transmission) scheduling, nature of the data (video or sampled parameters), specifications of the PC used and its available resources during RTStation execution. It is recommended to disable tasks on the PC that require a high amount of resources such as anti-virus software and system scanners. For additional information, RTStation has a performance window that summarizes the current state of the PC.

## Data sources

### Ethernet data from:

TTCWare XML Files

XidML 2.41 configuration files (KSM-500) IENA packets

XidML 3.0 configuration files (DAS Studio)

DARv3 Packets

IENA packets

iNET-X placed packets

iNET-X parser packets: ARINC-429 (KAD/ABM/102), MIL-STD-1553 (KAD/MBM/101 and KAD/MBM/102 packetizer mode), CAN (KAD/CBM/105 and KAD/CBM/105 packetizer mode), TTP (KAD/TBM/101), KAD/PBM/104, and KAD/UBM/103.

PCAP files[1]: from network recorder packets (NET/REC/xxx, SSR/CHS/xxx) and KAM/MEM/113

### PCM data from:

SAM/DEC/007 and SAM/DEC/008

PCI bit synchronizers and PCM decommutators

Supported Curtiss-Wright Ground Station boards[2] include: DBS-140U-1, GTS/DEC/003/C, GTS/DEC/004/C, GTS/DEC/005/C, GTS/DEC/006/C, GTS/BSC/003/C, GTS/BSC/004/C, GTS/BSC/005/C, GTS/BSC/006/C, GTS/FSC/003/C, GTS/FSC/004/C, GTS/FSC/005/C, and GTS/FSC/006/C.

CompactFlash® data from:

KAM/MEM/003[3]

KAM/MEM/004[4]

KAM/MEM/103

KAM/MEM/113[1]

NOTE: RTStation supports two ground station boards in the same PC.

## RTStation displays

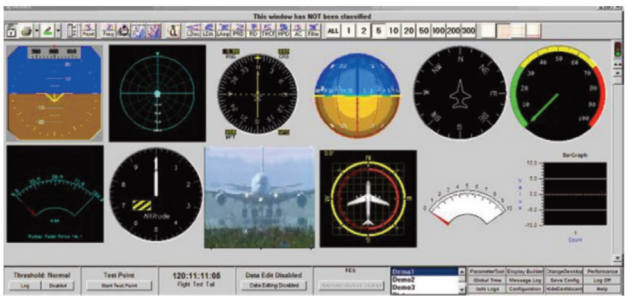

Figure 2: Standard RTStation display screens

### A set of ActiveX controls including:

- Altimeter
- Altitude indicator
- Audio player

1. PCAP files generated by Curtiss-Wright network recorders may contain IENA and iNET-X parameters. For details on packet structure, see TEC/NOT/067 - IENA and iNET-X packet pay- load formats.

2. GTS SDK must be installed when using ground station boards; these boards are only supported under Windows 7 32/64 bit. For more information, see RTStation release notes.

3. KAM/MEM/003 from revision /C onwards supported.

4. KAM/MEM/004 supported only when using raw data files extracted with the kFlashcardXID utility.

- Bar graphs
- Dial graphs
- Event monitor
- GPS clock
- HTML viewer
- LED display
- Stop watch
- Video player

Situational awareness

- Altitude direction indicator
- Horizontal indicator
- Heading indicator
- Stick force
- Force gauge
- Standard gauge

Input objects

- Action control
- Button
- Dial
- Drop down
- Slider
- Spin box
- Text
- Toggle switch

Drawing primitives

- Circle
- Mesh
- Polygon
- Rectangle
- Triangles
- Text
- Picture
- Line
- Overlays

Core analysis displays

- Digital strip chart
- Cross plot
- Frequency plot
- Nyquist
- Octave band
- Slider
- Alphanumeric
- Annunciator
- Frequency response

Auto scale, peak hold, envelopes, thresholds, 1D or 2D plotting apply to the above displays depending (on the type). Refer to GS Works 9 Help for details.

Miscellaneous

- Display panels
- Display folders
- Summary plots
- Labels

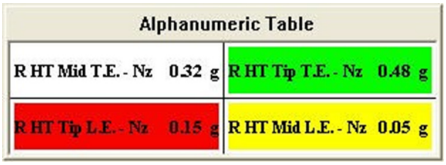


Figure 3: Sample RTStation information panels

Display building

- Display builder drag and drop user interface
- Easily add or modify displays at any time
- Save complex objects to the toolbox library
- Build complex screens with layers
- Generate visual signals via the dynamics wizard
- Use ActiveX properties as parameters
- Create text inputs that drive displays
- Dynamic display customization via the property sheet
- Zoom, translate, and point selection reset
- Alignment, Z order and grouping
- Global menu options

## Analysis

### Data reduction techniques

- Random decrement (real time and fixed block)
- Pseudo randomdec (auto and fixed block)
- Auto correlation (fixed block)
- Wavelet denoise (fixed block)

### Frequency plots

- Fast fourier and chirp-zoom transform
- Multiple block sizes 64 through 65,536
- Selective area sum algorithm
- Half-power damping with peak picking
- 2D, 3D or waterfall
- Peak hold can hold indefinitely or decay
- Rational fraction polynomial curve fit
- Phase and gain margin assessment
- Octave and 1/3 octave band displays
- Magnitudes scaled in RMS or SP-dBL
- Coherence for FRF data validity assessment
- Frequency plot options
- Power spectral density and auto spectrum scaling

### General features

- Data comparison
- Global cursor
- Matlab plug-ins
- Bus messages
- Load limits

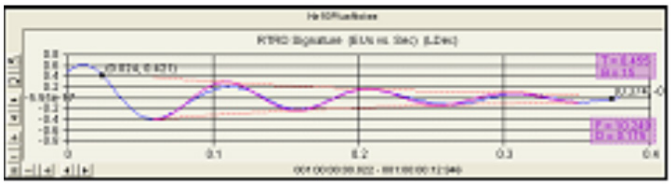

Figure 4: Sample RTStation frequency plot

### Feedback/stability analysis

- Nyquist plot unit circle
- Phase and gain margins
- Closed/open loop analysis

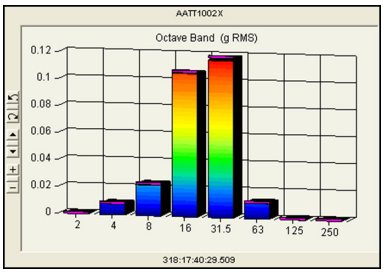


Figure 5: Sample graph for analysis of acquired data

### Windowing types

- Rectangular
- Hanning
- Hamming
- Blackman
- Flat top
- Kaiser-bessel

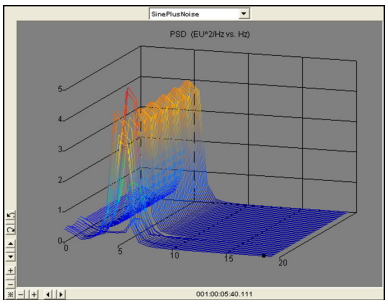


Figure 6: Sample graph for analysis of acquired data

## Derived equation engine


Figure 7: Sample derived parameter

- Arithmetic
- Conversions
- Boolean
- Byte swap
- Concatenation
- Bitwise
- Interpolation
- Signal generation
- Statistics
- Time functions
- Conditional
- Parameter default get/set
- Exponential/logarithmic
- Trigonometric
- Decimation
- Add-in functions

## Data editing

### Spike detection/correction

- Correct single spurious data points
- Slope detection
- Absolute value change detection

### Wild point editing

- Replaces bad data with user specified value

### Digital filtering

- Butterworth
- Elliptic
- Sign change
- Nulling
- Custom

In addition to units displayed, stripcharts are accompanied by a legend (displaying the legend displays the parameter unit beside the parameter name, along the top of the stripchart).

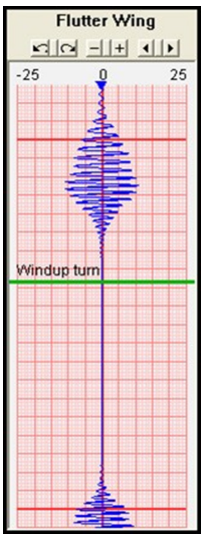


Figure 8: Sample horizontal stripchart

## Data marking

### Event marking

- Create visual markers dynamically
- Add dynamic event markers
- Add a pre-defined comment
- Go to time feature

### Test point/maneuver marking

- Mark by test point ID, maneuver, description or none
- Auto stop
- Log settings
- Drop down settings
- Actions on start
- Actions on stop
- Group settings

### Data export

- Define data groups in advance
- Export of Comma-Separated Values (CSV) files

### Export to Excel

- Specify number of rows; multiple worksheets

### Export to Matlab

- Export directly to Matlab or .mat file
- RTStation can produce Matlab EXecutable (MEX) files from RTStation data files. When compiled, MEX files can be run from within Matlab.

### Export default options

- Decimation factor
- Time format
- Time precision
- Disable filters
- Name modification
- Set sample rate
- Parameter naming
- Export directory
- Data precision

- Header type
- Separator character

## Information logging

- Information from analyses automatically recorded
- Recall and display logged data
- Record data values of pre-selected parameters
- Save logged data to a file, window or clipboard

### RTStation logs

- Event markers
- Test points
- Thresholds
- Data edit
- Selections
- Analysis
- Loads summary
- Flutter summary

## The Configuration Tool

- Single database system
- File can be accessed by multiple users simultaneously
- Organized by tables
- Import/export table information
- Editing capabilities similar to Excel

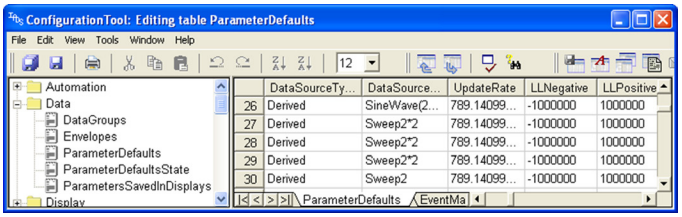


Figure 9: Sample setup in Configuration Tool window

### Tools

- Create mission attribute parameters
- Global parameter search and replace
- Automate parameter selection for data groups
- Validate equations, data to parameters, and displays
- Test point import wizard
- Create desktop summary reports
- Create dynamic envelopes

### The parameter defaults table

- Stores all default parameter attribute information
- Apply equation changes to all applicable displays

## Organization

### The desktop

- Create multiple analysis windows on a desktop
- Create multiple desktops in the same config file
- Import/export

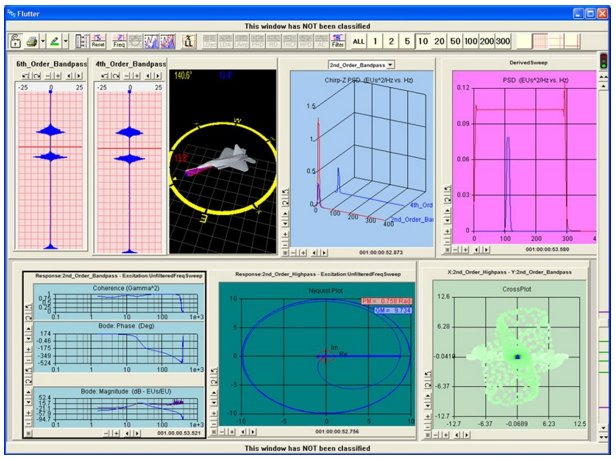


Figure 10: Sample customization of the RTStation desktop

### Analysis windows

- Create multiple displays
- Assign classifications
- Print display or window
- Add-in tools
- Freeze/unfreeze
- Toolbar buttons
- Play speed
- Import/export

### Analysis window scroll bar

- Go to time
- Global scroll bar
- Data search tool
- Play from here

### Dashboard

- Access tools quickly
- Enable thresholds
- Start/stop test points
- Monitor performance
- View IRIG time
- Enable data editing
- Change windows
- Save config file

### The parameter tool

- Add parameters to displays and controls easily
- Identify displays with a selected parameter
- View parameter defaults for a selected parameter
- Quick find feature

## System extensibility

### Automation interface[5]

- Build scripts using VB, C++ or C#
- Create analysis plug-ins
- Add derived parameter functions
- Matlab interface

### Application Programming Interface (API)

- ActiveX displays
- Sample projects

5. IADS features compatible with RTStation

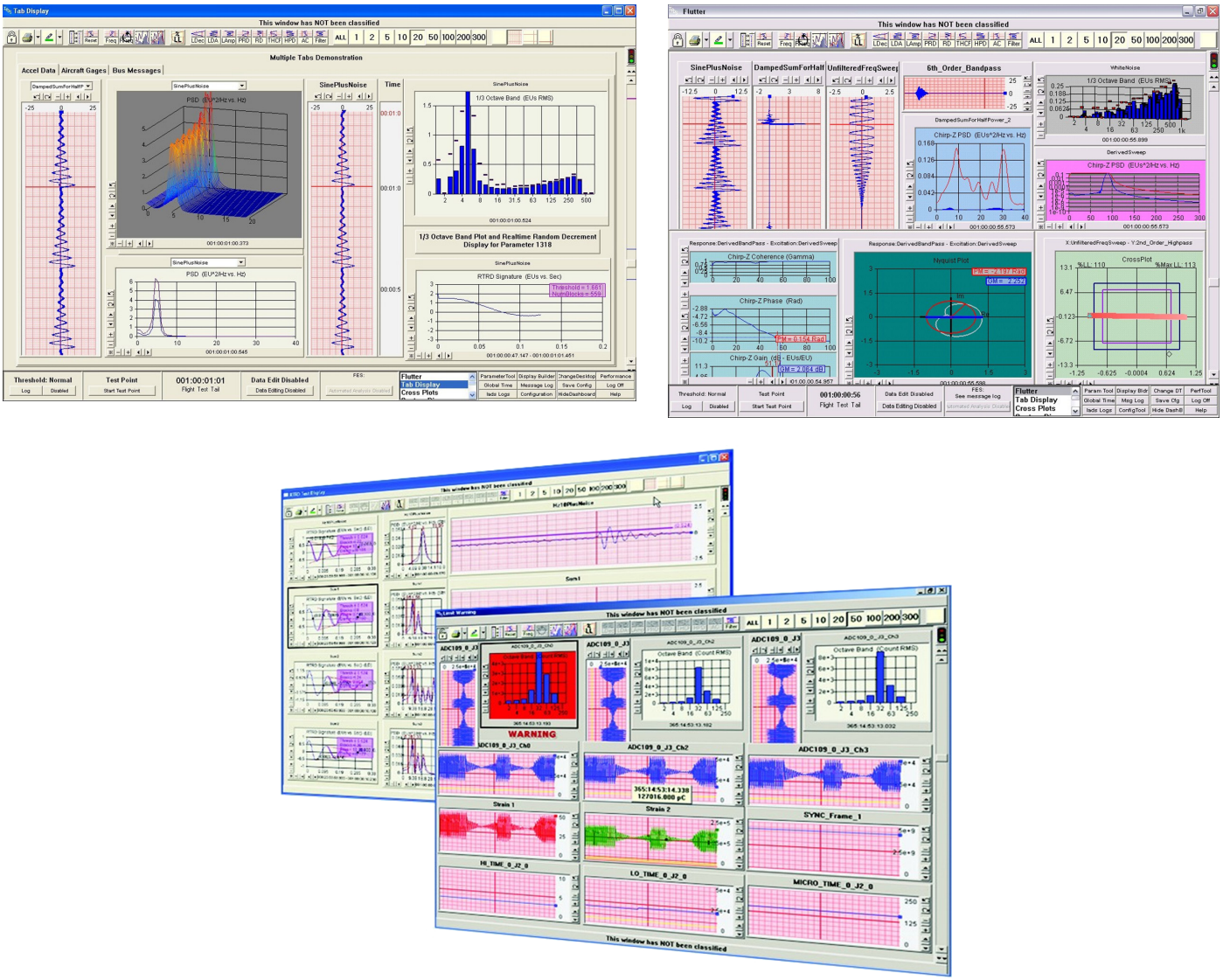

Figure 11: Typical user-defined displays

# Minimum recommended system requirements*

TABLE 1

| | |
|---|---|
| Operating system | Windows 7 32/64 bit or Windows 10 32/64 bit. Note: Ground station boards (GTS/DEC/xxx) are only supported by Windows 7 32/64 bit and require GTS/SDK. |
| Processor | 2.4 GHz Dual Core |
| Hard-disk | 500 GB |
| RAM | 4 GB |
| Input device | Keyboard; mouse (if using GUIs) |
| Screen | 1024 x 768 (if using GUIs) |
| FSB speed | 1333 MHz/1066 MHz/800 MHz |
| Graphics card | nVidia GeForce 6xxx+ or nVidia Quadro 3xxx Video (PCI Express x16) |

* More powerful PC configurations will lead to improved software performance