



Powerful Test Data Analysis using ASAM ODS[®]

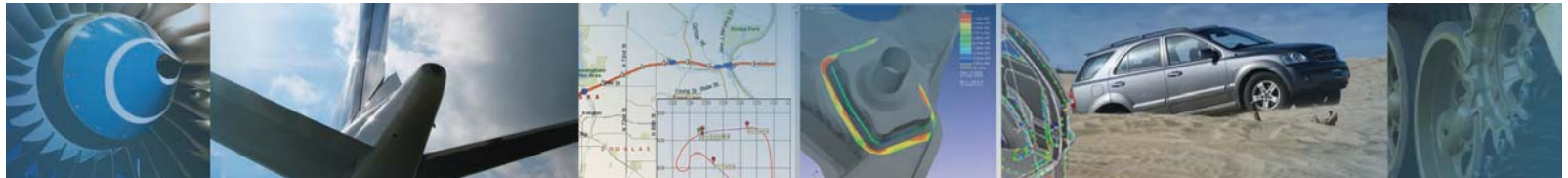
*Dr. Stephan Vervoort
Senior Application Engineer*



nCode International

25 years of helping customers:
*eliminate unexpected structural failures and
improve **product lifecycle performance***

*..... through a unique combination of
measurement instruments, software and services*

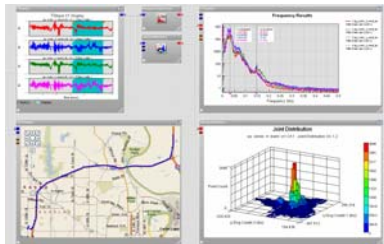


Product Range



Acquisition

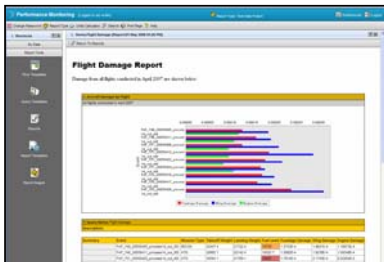
Rugged, mobile data acquisition
SoMat[®] eDAQ, eDAQ-Lite



Analysis

Desktop engineering software for
test and CAE analysis.

*ICE-flow[®] Analysis systems
(GlyphWorks[®], DesignLife[™])*



Automation

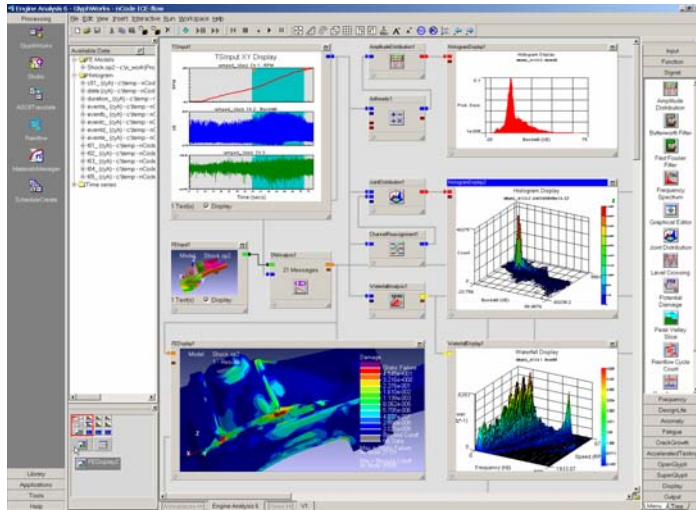
Web-based systems for automated
engineering data processing.

ICE-flow[®] Automation systems



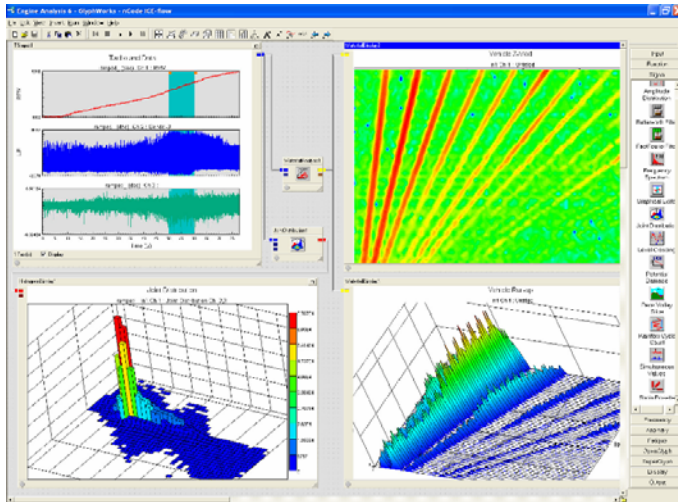
Graphical Process Driven Data Analysis

GlyphWorks : Power



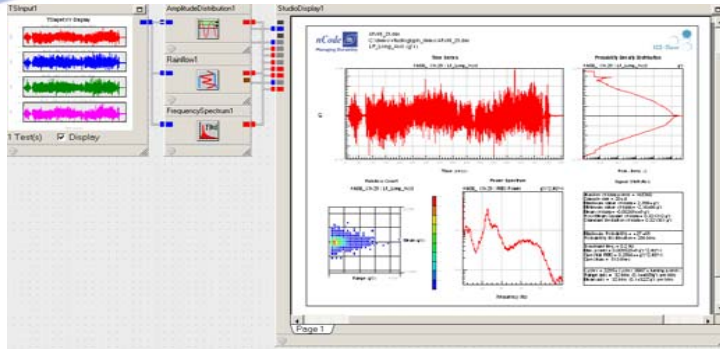
- Provides the ability to process **gigabytes of data** – many channels, millions of data points.
- Seamlessly work with a **wide range of data types** – no translation of formats needed.
- Wide range of **analysis tools** – from basic filtering and spectrum analysis to advanced fatigue prediction and accelerated testing.
- **Gain insight** from embedded GPS mapping and video.
- **Both Test and CAE data** in one environment for better, faster overall analysis.

GlyphWorks : Process

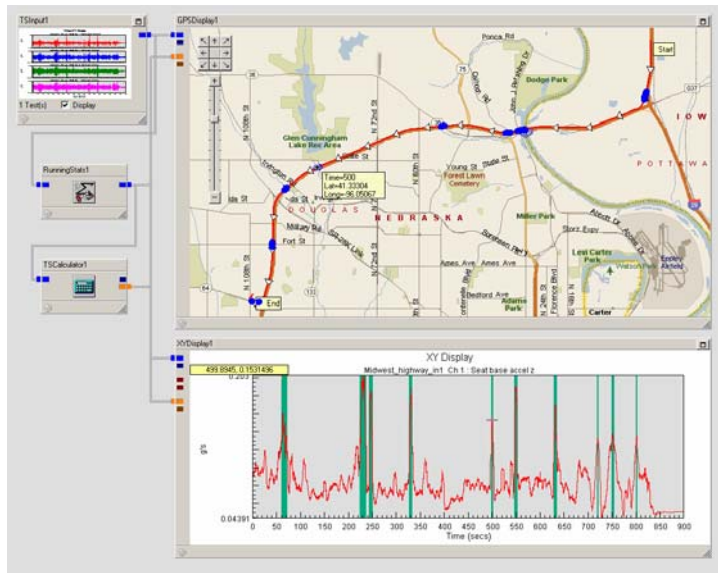


- **Drag and drop creation of multi-step analysis processes** with many steps and branches – no scripting required.
- Improve quality by using locked-down processes that **capture corporate knowledge**.
- Saved processes can be **password protected**.
- **Distribute processes** and deploy throughout organization.
- Incorporate links to **external codes** and even create glyphs using open-source Python.

GlyphWorks : Productivity

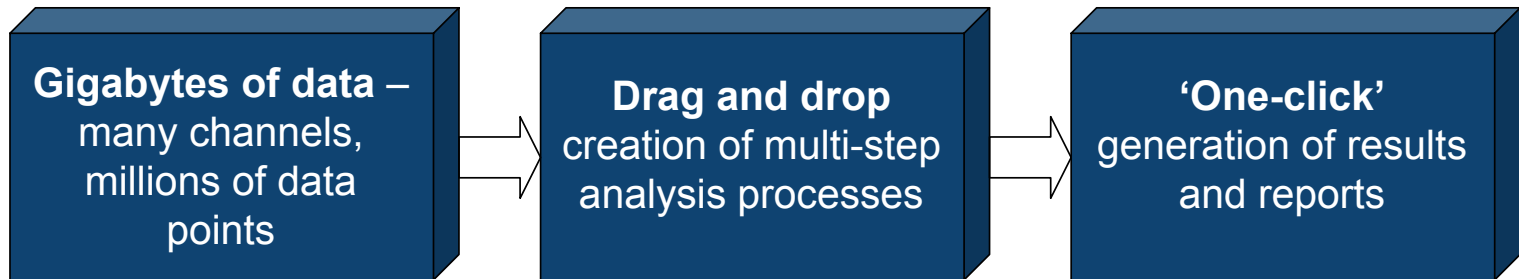


- **‘One-click’ generation of results and reports.** Go straight from raw data to finished document.
- Intuitive flow-chart interface is **easy to learn.**
- Build a **complete process in minutes** that would have taken days to code.
- Spend engineering time **understanding the data** not supporting scripts.



GlyphWorks – Summary

GlyphWorks delivers **Power, Process, Productivity...**



...to more quickly gain understanding and make decisions.

Common Data Problems

- Increasing volumes of data.
- Spending too much time looking for the correct data or manually distributing data.
- Repeating tests because data cannot be found or re-used with confidence.
- Limited or inconsistent electronic description of the data.
- Many different proprietary data formats causing inefficiencies in software and data usage.



ASAM ODS

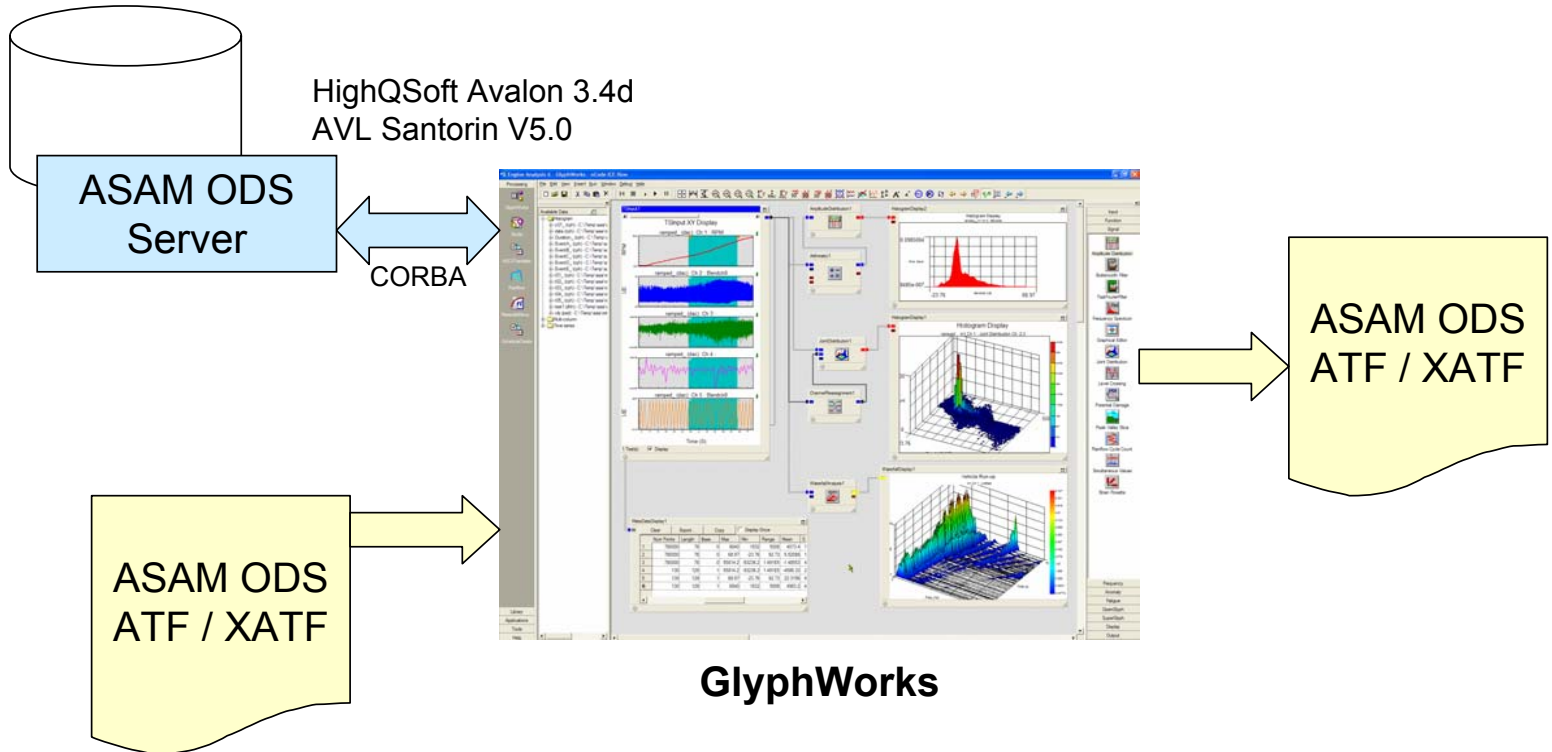


- ASAM (Association for Standardization of Automation and Measuring System) family of standards originated in the European automobile industry in the early 1990's as a method to increase standardization in the field of automated testing.
- ASAM ODS (Open Data Structures) is a part of the ASAM family of standards responsible for storing and maintaining persistent testing data. Reduces reliance upon proprietary data formats.

ASAM ODS Components

- ASAM Base Model
 - This is essentially a standard schema which defines the basic object types and attributes. Customers add their own Application Model to include additional elements to describe the data (such as “VehicleWeight”, “DriverName” etc.)
- ASAM API
 - This allows applications to find and access data via an ‘ASAM Server’ by executing standard calls.
- ASAM ATF and XATF
 - ATF is an import / export format of data and associated schema to move between applications. XATF is a newer XML-based version.

GlyphWorks and ASAM ODS



ASAM ODS Version Support

- GlyphWorks uses functionality available in ASAM ODS V4.1 and above.
- GlyphWorks uses CORBA to connect to the ASAM ODS server and has been tested with
 - HighQSoft Avalon 3.4d
 - AVL Santorin V5.0

Data Support

- Based upon established mime types in ODS standard, GlyphWorks supports
 - Time series data
 - Rainflow histograms
 - Time at level histograms
 - Multi-dimensional time at level histograms
- GlyphWorks data is “test” oriented, where a test is a single multi-channel data set. The corresponding base element type in ASAM ODS is AoMeasurement.
- The “channels” of the time series test are the AoMeasurementQuantity children of the AoMeasurement.
- Information from the ASAM Application Model can also be accessed within GlyphWorks using its powerful metadata system that passes additional information along with the test data.

Example Usage

The screenshot displays the 'Open ASAM Data' dialog box. On the left, a menu bar includes 'File', 'Edit', 'View', 'Insert', and 'In'. Below the menu bar, a list of options is shown, with 'Open ASAM Data...' highlighted. The main dialog area is divided into several sections:

- Available ASAM Data:** A tree view showing the hierarchy of data. The selected path is: Whole Database > Santorin Project > Related Instances > Testseries 1 > Related Instances > Test1,1 > Related Instances > Measurement1.1.
- Object Details:** A table showing properties of the selected object.
- Object Attributes:** A table showing a list of attributes and their values.

At the bottom of the dialog, there are buttons for 'Disconnect', 'Add to File List', 'Cancel', and 'Help'. The 'No. of selected instances : 1' is displayed next to an 'Add to Selected' button.

Detail	Value
Instance Element	Measurement1
Version	1
Application Element	Measurement
Base Element	AoMeasurement
ASAM Path	[Environment]AVL Santorin/[Project]Santorin Project/[Testseries]Testseries 1/[Test]Test1.1

Attribute	Data Type	Value
ArchiveDate	DT_DATE	
ArchiveFile	DT_STRING	
ArchiveFlag	DT_STRING	
ArchiveOption	DT_BYTE	0
Description	DT_STRING	Demo Data
Endtime	DT_DATE	
Id	DT_LONGLONG	1
Name	DT_STRING	Measurement1
Starttime	DT_DATE	12-Oct-2007 15:48:09
Version	DT_STRING	1

Example Usage

The screenshot shows the 'Open ASAM Data' application window. The left pane displays a tree view of the ASAM data structure, with 'Measurement1.1' selected. The right pane shows the 'Object Details' for the selected object, including a table of object attributes and values.

Available ASAM Data

Name	App Ele
Whole Database	Project
Santorin Project	Project
Related Instances	
Testseries 1	Testseries
Related Instances	
Test1,1	Test
Related Instances	
Measurement1.1	Measurement
Channel_1	MeasurementQuantity
Channel_2	MeasurementQuantity
Channel_3	MeasurementQuantity
Channel_4	MeasurementQuantity
Channel_5	MeasurementQuantity
Channel_6	MeasurementQuantity
Channel_7	MeasurementQuantity
Channel_8	MeasurementQuantity
Channel_9	MeasurementQuantity
Channel_10	MeasurementQuantity
Channel_11	MeasurementQuantity
Channel_12	MeasurementQuantity

Object Details

Detail	Value
Instance Element	Measurement1
Version	1
Application Element	Measurement
Base Element	AoMeasurement
ASAM Path	[Environment]AVL Santorin/[Project]Santorin Project/[Testseries]1 estseries 1/[Test]1 est1,1

Object Attributes

Attribute	Data Type	Value
ArchiveDate	DT_DATE	
ArchiveFile	DT_STRING	
ArchiveFlag	DT_STRING	
ArchiveOption	DT_BYTE	0
Description	DT_STRING	Demo Data
Endtime	DT_DATE	
Id	DT_LONGLONG	1
Name	DT_STRING	Measurement1
Starttime	DT_DATE	12-Oct-2007 15:48:09
Version	DT_STRING	1

No. of selected instances : 1 Add to Selected

Selected ASAM Data

Name	ASAM Path
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Disconnect Add to File List Cancel Help

Object level details and values

Object attributes and values

Tree view to explore ASAM ODS data structure e.g. to view the tests and channels

Example Usage

The screenshot displays two overlapping dialog boxes from the nCode software. The background dialog is 'Open ASAM Data', which has tabs for 'Whole database' and 'Search results'. It includes a search field and a table for 'Object Details' with columns 'Detail' and 'Value'. The foreground dialog is 'Edit Attributes', titled 'Editing instances of type: MeasurementQuantity'. It features a table with the following data:

Instance	Name	Description	Type_Size	Interpolation	Rank
Channel_1	Channel_1	Channel_1	-1	0	0
Channel_2	Channel_2	Channel_2	-1	0	0
Channel_3	Channel_3	Channel_3	-1	0	0
Channel_4	Channel_4	Channel_4	-1	0	0

Below the table are 'Ok' and 'Cancel' buttons. A yellow callout box with a black border contains the text: 'Directly edit attributes with required security'. The 'Open ASAM Data' dialog also shows a 'Selected ASAM Data' section with columns for 'Name' and 'ASAM Path', and buttons for 'Disconnect', 'Add to File List', 'Cancel', and 'Help'.

Example Usage

The screenshot shows the 'Open ASAM Data' dialog box. The 'Available ASAM Data' section contains a tree view with the following structure:

- Whole Database
 - Santorin Project
 - Related Instances
 - Testseries 1
 - Related Instances
 - Test1,1
 - Related Instances
 - Measurement1,1 (Selected)
 - Channel_1 (MeasurementQuantity)
 - Channel_2 (MeasurementQuantity)
 - Channel_3 (MeasurementQuantity)
 - Channel_4 (MeasurementQuantity)
 - Channel_5 (MeasurementQuantity)
 - Channel_6 (MeasurementQuantity)
 - Channel_7 (MeasurementQuantity)
 - Channel_8 (MeasurementQuantity)
 - Channel_9 (MeasurementQuantity)
 - Channel_10 (MeasurementQuantity)
 - Channel_11 (MeasurementQuantity)
 - Channel_12 (MeasurementQuantity)

The 'Object Details' section shows the following information:

Detail	Value
Instance Element	Measurement1
Version	1
Application Element	Measurement
Base Element	AsMeasurement
ASAM Path	[Environment]JAVL Santorin/[Project]Santorin Project/[Testseries]Testseries 1/[Test]Test1,1

The 'Object Attributes' section shows the following information:

Name	DT_STRING	measurement
Starttime	DT_DATE	12-Oct-2007 15:48:09
Version	DT_STRING	1

The 'Selected ASAM Data' section shows the following information:

Name	ASAM Path
Measurement1,1	[Environment]JAVL Santorin/[Project]Santorin Project/[Testseries]Testseries 1/[Test]Test1,1/[Measurement]Measurement1,1

A green arrow points from the 'Measurement1,1' item in the tree view to the 'Selected ASAM Data' section. A yellow callout box contains the text: 'Required data is moved to Selected list for use in GlyphWorks'.

Buttons at the bottom include: Disconnect, Add to File List, Cancel, Help.

Searching

- An important requirement is to find the right data using search.
- Context sensitive pull downs show available options such as the attributes on each element.

The screenshot shows a 'Search Definition' dialog box with the following fields and controls:

- Search From: Whole Database
- Search For: Measurement
- Condition section:
 - Element: Measurement
 - Attribute: Version
 - Comparison: Less Than
 - Value: 2
 - Buttons: Insert Condition, Append Condition, Replace Condition
- Operator section:
 - Radio buttons: AND (selected), OR, NOT, Open (), Close ()
 - Buttons: Insert Operator, Append Operator, Replace Operator
- Search Definition list:
 - Measurement.Description = "Demo Data"
 - AND
 - Measurement.Version < "2"
 - Buttons: Clear, Edit, Remove

- Multiple conditions can be combined using operators to build up sophisticated searches.
- Searches can be saved and restored for rapid future use.

Advanced Searching

- Additional filtering can be added to searches.
- This enables numerical calculations to be used such as where the range of a channel:
 $(Max - Min) > 10$ AND
 $Name == "Oil Temperature"$
- This reduces the search results to only include tests (measurements) where this is true.

The screenshot shows the 'Search Definition' dialog box with the following configuration:

- Search From: Whole Database
- Search For: Measurement
- Condition: Element: Measurement, Attribute: Version, Comparison: Less Than, Value: 2
- Operator: AND (selected), Open (), Close (), OR (), NOT ()
- Search Definition: Measurement.Description = "Demo Data" AND Measurement.Version < "2"
- Filter Definition: Element: MeasurementQuantity, Filter Statement: [#Max# - #Min#] > 10 and #Name#=="Oil Temperature"
- Full Search and Filter Statement: Measurement.Description = "Demo Data" AND Measurement.Version < "2" AND FILTER(MeasurementQuantity, [#Max# - #Min#] > 10 and #Name#=="Oil Temperature")

Buttons at the bottom: Save..., Load..., Search, Cancel, Help.

Example: PSA Peugeot Citroën

Business: Automotive OEM

Challenge: Process and manage over 800 gigabytes of data from different sources such as proving grounds, customer monitoring sites, and laboratory test rigs

Solution: GlyphWorks used corporately, interfacing with ASAM ODS database

Value: Productivity gains from accelerated testing and faster processing speed

- **“nCode’s software provides PSA Peugeot Citroën with an easy-to-use, standard solution powerful enough to process and manage over 800 gigabytes of data.”**

Jacques Mercier, Manager, Customer Usage Synthesis Department.

PSA PEUGEOT CITROËN 

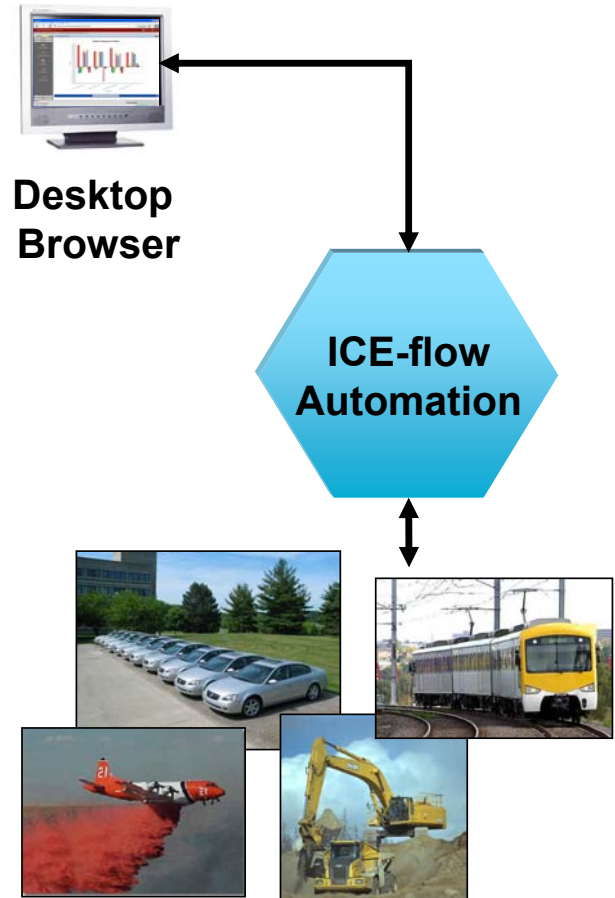


GlyphWorks & ASAM ODS

- Together, GlyphWorks and ASAM ODS provide
 - Ability to process large amounts of data.
 - Graphical, easy to use analysis environment.
 - Controlled analysis processes.
 - Access to the right data through interactive browsing and advanced searches.
 - Ability to share data with other applications through ATF / XATF.
- Thus providing the means to save time, improve quality and reduce costs in the testing process.

ICE-flow Automation *NEW!*

- ICE-flow Automation takes test data management to the next level through:
- Web-based system for engineering data processing.
- Catalogue, process, analyse and distribute data and reports.
- Used by leading engineering organizations to:
 - Automatically processing test data
 - Monitoring and analysing vehicle fleets



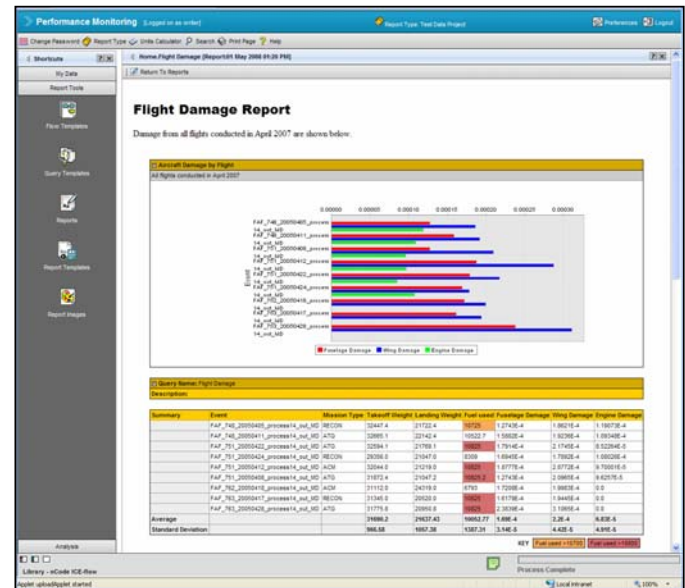
ICE-flow Automation applications

- Ground Vehicle OEMs and suppliers
 - Proving grounds
 - Test rigs
 - Multibody dynamic analysis
 - Customer correlation.
- Aerospace OEMs
 - Life cycle test rig programs
 - Engine test cell data
 - Flight loads
- Monitoring
 - Optimize maintenance.
 - Health usage monitoring



ICE-flow Automation Benefits

- Simplifies data and report distribution.
- Encourages corporate and global design collaboration.
- Automates the data processing.
- Enables detailed trend analysis.
- Streamlines remote monitoring exercises.
- Promotes data quality and analytical consistency.



Visit us at Booth #1042

Thanks for Your Attention!

Any questions?

Visit us at Booth #1042

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