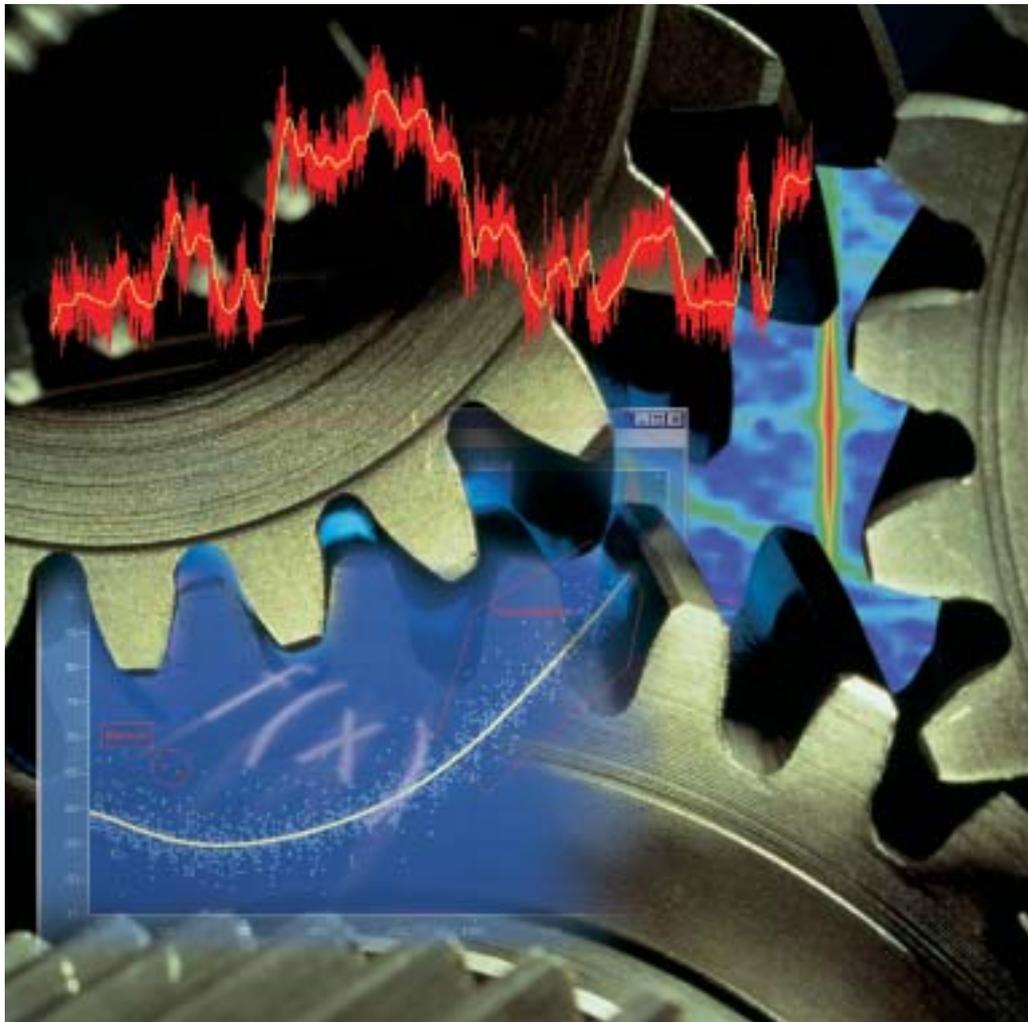


# FAMOS 4.0

FAMOS signal analysis software –  
The instrumentation pocket calculator



# FAMOS 4.0

## Measurement signal analysis FAMOS – The instrumentation pocket calculator

FAMOS 4.0 reflects the many advances we've achieved for the popular signal analysis software, FAMOS, since its introduction in 1988. Measurement engineers and technicians the world over already appreciate FAMOS as a practical tool for quickly and easily performing data analysis and documentation. Operation is simple and intuitive. Any kind of measurement data can be converted using the File Assistant, loaded and displayed in imc's curve window, which is unmatched in speed and versatility. Data can be displayed in a QuickView window without the trouble of scaling, or you can define color, size and scaling. A large array of mathematical functions serve as the basis for solving analysis tasks of any level of complexity. Routine tasks, such as repeated signal analysis processing, result evaluation as well as report composition, can all be automated.

The integrated Sequence Editor offers the ability to write and save analysis routines quickly and easily. For special tasks, a series of optional FAMOS-Kits, such as Filter Design, Spectral Analysis, Class-Counting, Order Tracking and the FAMOS Video-Kit are available. Custom system expansions based on the Kits are possible, including full application development through COM Interfaces

Time [s]	Force [N]
0	18.1706
0.0001	18.809
0.0002	19.527
0.0003	19.8934
0.0004	20.142
0.0005	20.529
0.0006	20.877
0.0007	20.944
0.0008	18.579
0.0009	20.417
0.001	17.811
0.0011	17.217
0.0012	38.547
0.0013	12.646
0.0014	42.285
0.0015	20.646
0.0016	37.585
0.0017	20.173

Measurement data, e.g., Excel

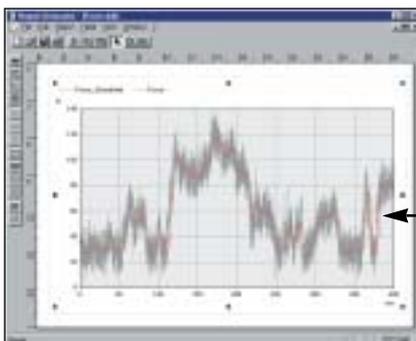
List of loaded or created data sets

Data Browser

Library of math functions

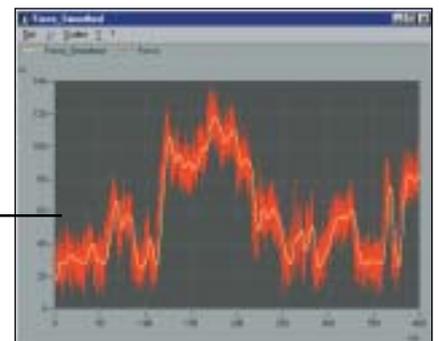
QuickView window displays data sets selected in Browser

Formula Editor, Sequence Editor



Report Generator

Easy transfer of curves using Drag and Drop



Automatically scaled curve window

# Data import made easy

Importing data is the first and often the most tedious task in data analysis. The multitude of existing import filters allow data to be selected in the File Browser, as you are accustomed to. The appropriate format or filter is simply selected in the loading dialog and the data read in. The length of the data set doesn't matter. If no suitable read-in filter is available, the File Assistant can be used to define one. All ASCII and binary formats can be interpreted.

## We support you

If your experience in interpreting data is limited, we're happy to help you out. Our applications group can create a data filter for you. Send a description of your format and sample data to: [www.imc-berlin.de](http://www.imc-berlin.de) – or contact your local distributor for pricing information.

## ASAM-ODS Browser

ODS stands for Open Data Services and is a data model as is required by the international automotive industry, and designed and defined by ASAM (Association for Standardization of Automation and Measuring Systems, [www.asam.de](http://www.asam.de)).

ODS was developed for storing test objects' measurement data and their description in databases or files. The contents include not only the measured data but descriptions of the test setup, procedure and conditions, as well as other organizational information. Data can be saved regardless of the recording equipment's manufacturer. The use of ODS is especially worthwhile in applications involving a large variety of units under test and measurement quantities. Here, FAMOS lets you browse through this mass of data, display, process and document test results in lab reports. For the current standard ODS 4.0, FAMOS is a client, which can write as well as read data.

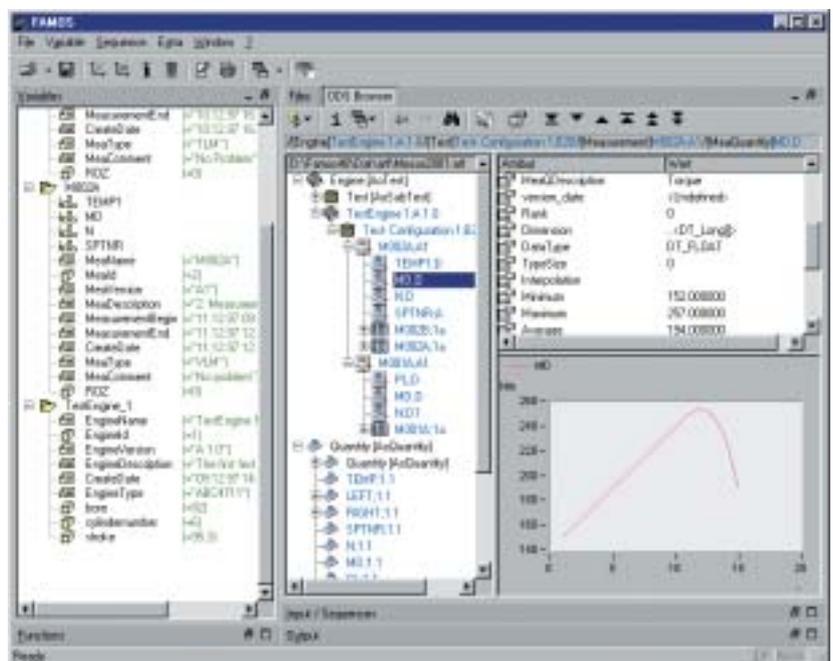
## Supported data formats

FAMOS, MUSYCS,  $\mu$ -MUSYCS, SPARTAN, CRONOS, BusDAQ  
Ascii, binary, Excel, Sound (\*.wav)

## Additional read-in filters include

**Alborn:** ALMEMO (\*.\*), AMR (\*.\*)  
**ASTROMED:** DASH 8 and ATRO-DAQ  
**Caesar:** REMUS (\*.dat, \*.RMS)  
**COMTRADE:** ASCII Format  
**Datalog:** DELTA Logger (\*.dat)  
**Gfs/DiaDEM:** DiaPC-Format Real48 (\*.dat, \*.R48)  
**GOULD-NICOLET:** \*.wft, \*.wff  
**Le Croy:** Oscilloscopes (\*.\*)  
**Haag:** EWS 92/94 (\*.asc)  
**Hioki:** 8807, 8825, 8826, 8835, 8840, 8841, 8842  
**NEC:** RT 3108N, RT 3208N, RT 3216N, RT 3608  
**OROS:** \*.ae2  
**Robert Bosch GmbH:** (\*.MBE, \*.MWE)  
**REX:** \*.rex  
**Siemens:** SIREC-Format (\*.rec)  
**SONY-DAT-Recorder:** PC 216 AX (\*.log, \*.bin)  
**TEAC:** Quickformat tape recorders (\*.DA)  
**Tektronix:** WFM-Format, (for TDS-700A/TDS-500B:4.1e; TDS-600B: 4.3e; TDS-640A:3.8.8e; TDS-400A:1.0.2e; TDS 5000/6000/7000), 222 and 224 DSO (TEK 222 and 224 hand-held oscilloscopes)  
**YOKOGAWA:** Universal format (HDR, WVf (for DL708, DL1540,LR DL2700 and DL 4080), OR 100 (\*.dat), LR 12000 (\*.prn)  
**Ziegler:** GDF (\*.GD\*)

The current import filters are available on the Internet:  
[www.imc-berlin.de](http://www.imc-berlin.de)



FAMOS ODS-Browser

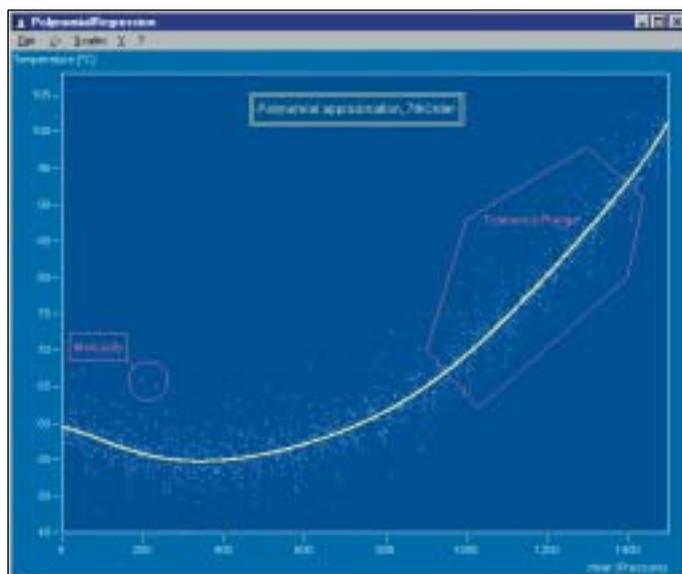
# FAMOS 4.0

## imc's Curve Window - From data source to graph in one mouse-click. Incomparable speed and flexibility!

All your data is only one click of the mouse away from colorful graphic displays.

The basic choices for the display are standard (Yt) or stacked Y-axes, Waterfall (3D), last value as number, bar meter or color map.

The curve window is automatically scaled when opened and reflects the maximum input range. Afterwards, you can set your own axis scaling and display styles. Display on the monitor and printer can be configured independently. For instance, a scaling of "units/cm" can be specified for the hardcopy report. All data is represented in terms of its physical units. When data sets are processed, the units and magnitudes are abbreviated according to the SI system, or using user defined settings.



### High performance for giant data sets



Overview window displaying entire data set



Communicator

Zoom into your data sets and results with the help of dual cursors crosshairs. FAMOS is well adapted for displaying extremely large data sets, at very high speed. It also offers the ability to display an overview window together with one or more close-up views. The same data can be displayed in various ways, such as curves, bar graphs, single values or in tabular form. All windows can be linked to each other; thus, scrolling through one window affects the display in other windows.

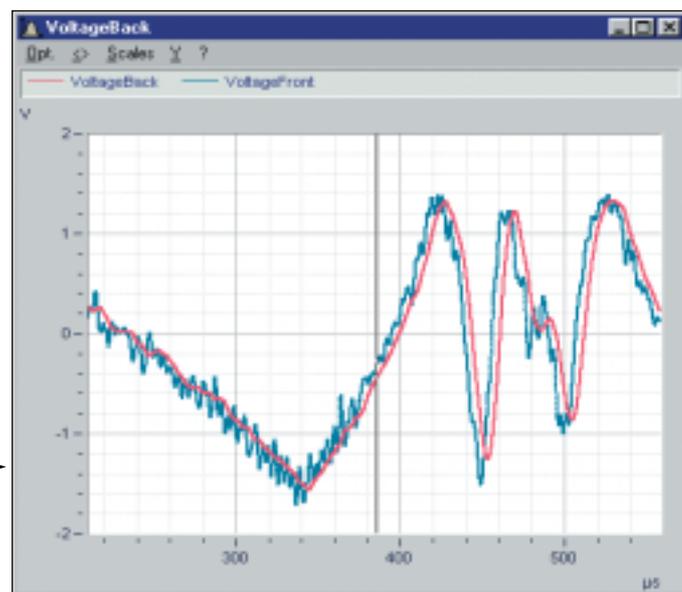


	VoltageBack	VoltageFront
0.0003848	-0.484	-0.484
0.0003849	-0.481	-0.482
0.000385	-0.478	-0.397
0.0003851	-0.476	-0.391
0.0003852	-0.473	-0.383
0.0003853	-0.47	-0.373
0.0003854	-0.468	-0.362
0.0003855	-0.465	-0.351
0.0003856	-0.463	-0.339
0.0003857	-0.46	-0.328
0.0003858	-0.457	-0.317
0.0003859	-0.455	-0.307
0.000386	-0.452	-0.299
0.0003861	-0.449	-0.292
0.0003862	-0.447	-0.286
0.0003863	-0.444	-0.282
0.0003864	-0.441	-0.279
0.0003865	-0.438	-0.277
0.0003866	-0.435	-0.276
0.0003867	-0.432	-0.274
0.0003868	-0.43	-0.273
0.0003869	-0.427	-0.271



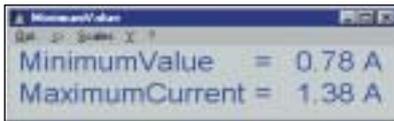
Navigator

Synchronously linked windows



Curve window with zoom on signal segment

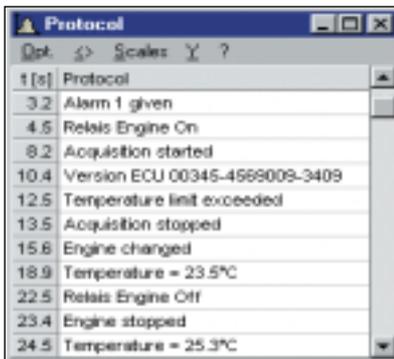
# FAMOS supports a wide variety of data types and display styles



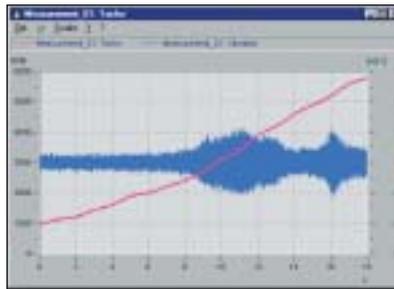
Single values



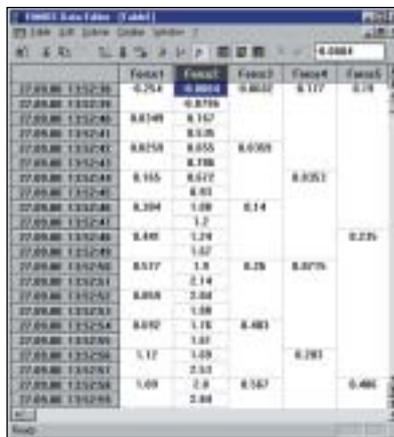
Measurement curve with event markers



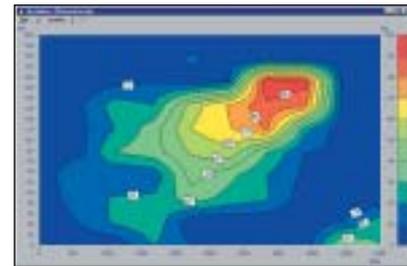
List with event markers



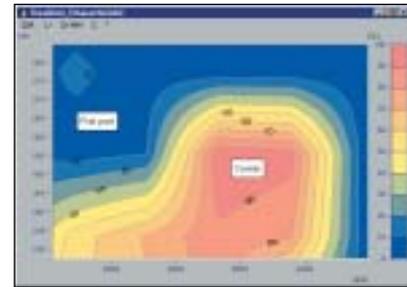
Measurement curves with different y-axes



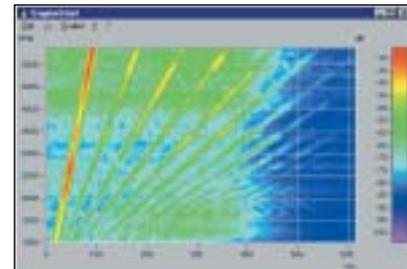
Display of data with different sampling rates



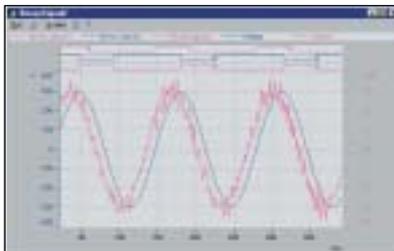
ISO-Line color map display



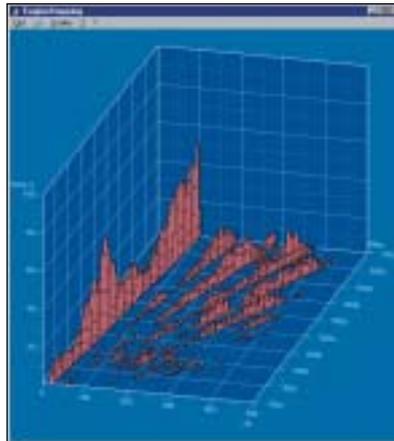
ISO-Line color map zoomed



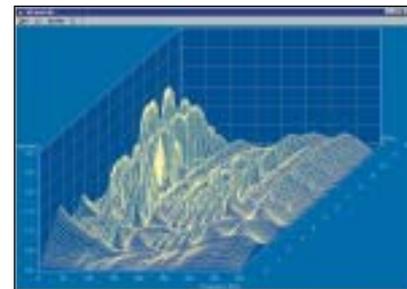
Color map



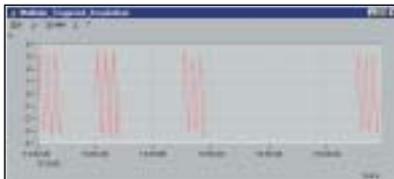
Joint display of analog & digital data



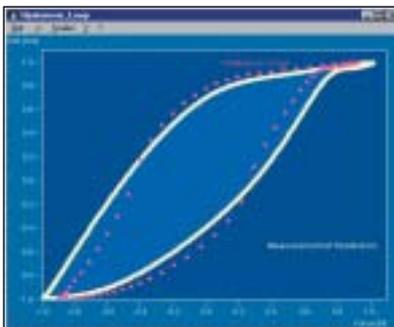
3D Histogram



Waterfall



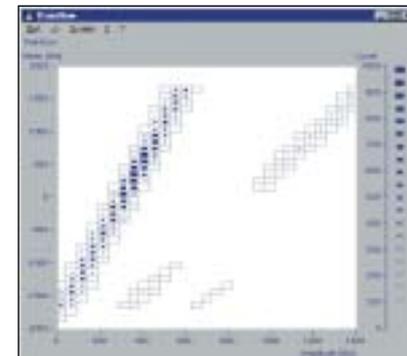
Repeatedly triggered measurement



XY-representation with comments



Bar meter with slave pointers



Matrix display of data (Campbell)

# FAMOS 4.0

## Industrial-grade lab reports – in the blink of an eye

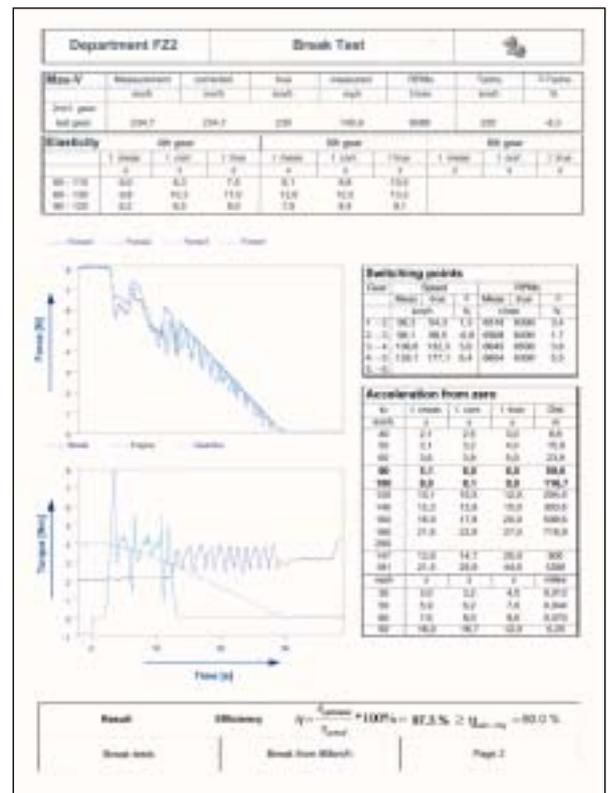
### Manual documentation

As measurement technicians know, although performing a measurement properly is the most difficult part of the job, composing the documentation takes the most time. FAMOS comes with the powerful report composition tool Report Generator.

Any graphical displays of the measurement signals can be inserted into the layout with the click of the mouse. The size of the vector graphics can be adjusted and graphics can be moved and positioned with the accuracy provided by an alignment grid. The insertion of text and graphic objects such as lines, arrows, company logos and other external bitmap graphics, in a variety of colors, sizes and angles is supported.

The FAMOS Report Generator can also be defined as a "style-sheet" or template in order to save time and effort in composing similar reports. The editing and transfer of lab reports, whether single or multiple paged, to other programs (i.e. MS Word, MS PowerPoint or the like) are also possible.

Measurement reports are composed quickly and easily, and are printed out directly or transferred to other programs to be converted to hard copy.



### Automatic documentation

For repetitive measurement, evaluation and documentation tasks, it makes sense to automate the documentation process.

The FAMOS Report Generator is an OLE-Container. So the entire documentation process can be automated. A sequence is used to load automatically all the report's variable elements, such as the graphs of measurement results or tabulated values, into a "stylesheet" report template.



# Increase efficiency

## – automate routine tasks

For measurement procedures which are frequently repeated and which require the same visualization, data analysis and documentation each time, automation by means of FAMOS-sequences is the right approach.

This very powerful macro language is easy to learn and doesn't require specialized programming skills, plain language equations give you full access to FAMOS' library of functions. Clear commands enable, for instance, the loading of completely pre-defined curve window configurations and lab reports. The commands are expressed in a way which is explicit and readable. An integrated debugger indicates faulty command lines and marks the location of the problem.

Some experienced FAMOS users consider the Sequence Editor to be FAMOS' most essential, efficiency-providing feature. Even the most complex processes can be defined quickly and executed accurately.

Sequences allow FAMOS to be enhanced according to the particular requirements of the user or the application. They can be integrated into FAMOS' selection of functions and even introduced into the group of favorites or standard function.

Even inexperienced users can use a sequence by simply loading and executing it at the click of a button. Within seconds, a complex, specialized signal analysis procedure is performed. The result shows up on the printer and screen – it's that easy!

### We support you

If your experience in writing macros is limited, we're happy to help you out. We offer application programming services including sequence preparation. Send a description of your analysis, display and documentation procedure to:

[hotline@imc-berlin.de](mailto:hotline@imc-berlin.de)

– or contact your local distributor for pricing information.

### Example

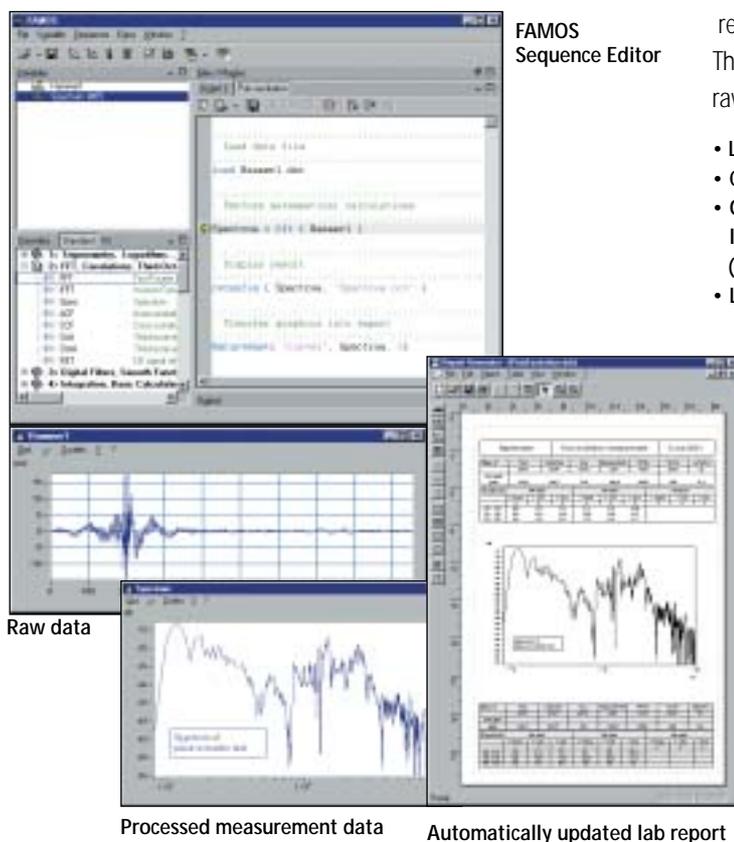
As a demonstration of how easy it is to write a sequence, have a look at the following.

An experiment with a impact hammer is conducted, the data are acquired using a measurement system of the user's choice and are recorded on the PC's hard drive.

The FAMOS-sequence is used to compute the FFT-spectrum from the raw data and plot the graph of the results in the lab report.

- Loading of data `load PulsHammer1.dat`
- Computation of FFT spectrum `Spectrum= fft (ImpactHammer1)`
- Graphing the result,  
loading curve window configuration  
(\* .ccv) `CvConfig (Spectrum "Spectrum.ccv")`
- Layouting of result in lab report `RgCurveSet ("Curve", Spectrum, 0)`

FAMOS sequence commands appear in blue print, placeholders or configuration files in red, and raw or processed data in black.



Raw data

Processed measurement data

Automatically updated lab report

# Overview of FAMOS 4.0 functions

## General

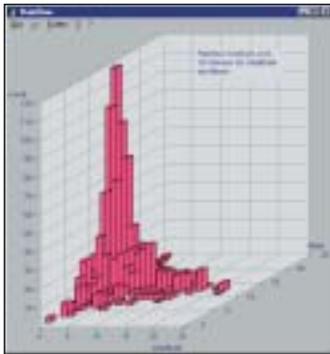
File management – imc Data Browser  
Data display – imc curve window  
Calculations with data sets of any format or length  
Library of mathematics functions  
Macro language – FAMOS sequences  
Waveform Editor  
Documentation – imc Report Generator  
Interface to imc function libraries (COM)  
Interface to imc File Assistant  
DLL-interface  
DDE-interface

## FAMOS function expansion modules

To use FAMOS for solving special tasks, optional FAMOS-Kits are available. If you have a special application never yet solved with FAMOS, we can modify these Kits to suit your specific requirements. Experienced programmers can also make and integrate their own enhancements to the Kits via Windows standard DLL and DDE interfaces, and COM.

## Class-Counting Kit

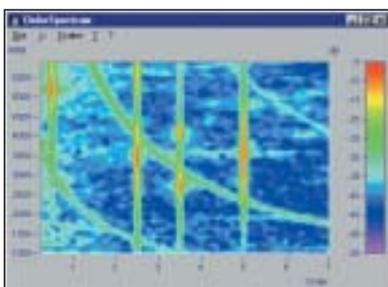
In life-expectancy tests, class-counting of the time behavior of vibration, rpm, torque, pressure, force, mechanical stress and temperature are performed. The results are represented as a histogram or matrix which reflect the stresses and strains suffered by a mechanical part.



A variety of established methods are supported by this Kit. These include the Standard-method as per DIN 45667, the Rainflow-method with a host of options, the production of 1- and 2-dimensional histograms and revolution class-counts. One special feature is imc's TrueMax procedure, which enables precise determination of signal minima and maxima, vital for class-counts, to be located even when sampling at a low rate.

## Order Tracking Kit

This Kit contains a comprehensive set of mathematical functions and examples for analyzing rotating machines. The order spectrum of a machine's run-up or ramp-down, the frequency spectrum as a function of rpm, or the third-octave spectrum can be computed from raw data. The behavior of measurement signals can be recorded not only in reference to the time domain, but also referenced to the rotation angle or the rpm. All functions operate according to demanding and



precise algorithms with tracking-filters (which track the rpm). These tracking-filters are available as tools, in order, for instance to restore the audibility of a sound from which an order was filtered out by using a tracking band-rejection filter.

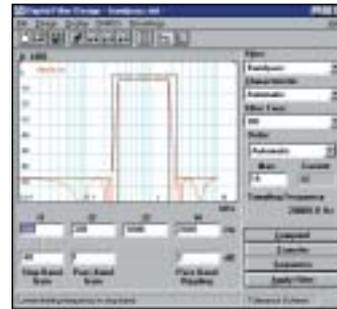
## Data types

Equidistant waveforms  
XY-data sets – characteristic curves  
Segmented, Multi-Event Data  
Complex data sets  
Video files, WAV, Audio Files  
Text with up to 255 characters and protocol entries  
Data groups (Structured organization)  
ASAM-ODS data model

## Features

Processing of data sets of any size  
Processing of data in any format (File Assistant)  
Calculations with data groups (channel groups)  
Drag and Drop (display, reports, calculations)  
Cutting and splicing of data set segments  
Resampling of data sets (prototype sampling)  
Synchronized scrolling through associated windows  
Expansion of functionality using sequences  
Complete automation of whole analysis routines, including display and documentation  
Personally adapted user's interface

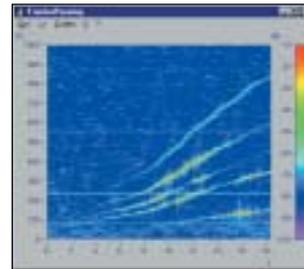
## Filter Design Kit



This interactive software allows you to define IIR and FIR digital filters by simply specifying the frequency response. The definitions are used to compute the filter order and filter coefficient automatically. The user defines the frequency response graphically by setting the tolerance levels. Amplitude and phase can be displayed directly.

## Spectrum Kit

The Spectrum Kit offers comprehensive spectrum analysis capabilities. The time behavior of a spectrum can be computed using your choice of window width, various window functions, averaging type and overlapping. Along with the effective (RMS) spectrum, the power density spectrum, power spectrum, cross-power, coherence, transfer function and cepstrum can all be determined. Loudness analysis, shock-response spectrum (SRS) and vibration filters conforming to various standards round out the palette of functions.



## FAMOS-Video

Video-data in common formats such as AVI, MPG and MOV can be opened. Measurement curves and video data can be synchronized: the corresponding video image is displayed while scrolling through the measurement curve. Similarly, the measurement curves can follow the video player.



## COM-Interface

Provides all mathematics and graphics functions for professional software developers as a COM-library. The functions can be embedded into one's own programs in languages such as in Visual Basic, C++ or Delphi.

Errors and changes excepted

imc  
Meßsysteme GmbH  
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email: [hotline@imc-berlin.de](mailto:hotline@imc-berlin.de)  
<http://www.imc-berlin.de>

  
imc  
integrated measurement & control