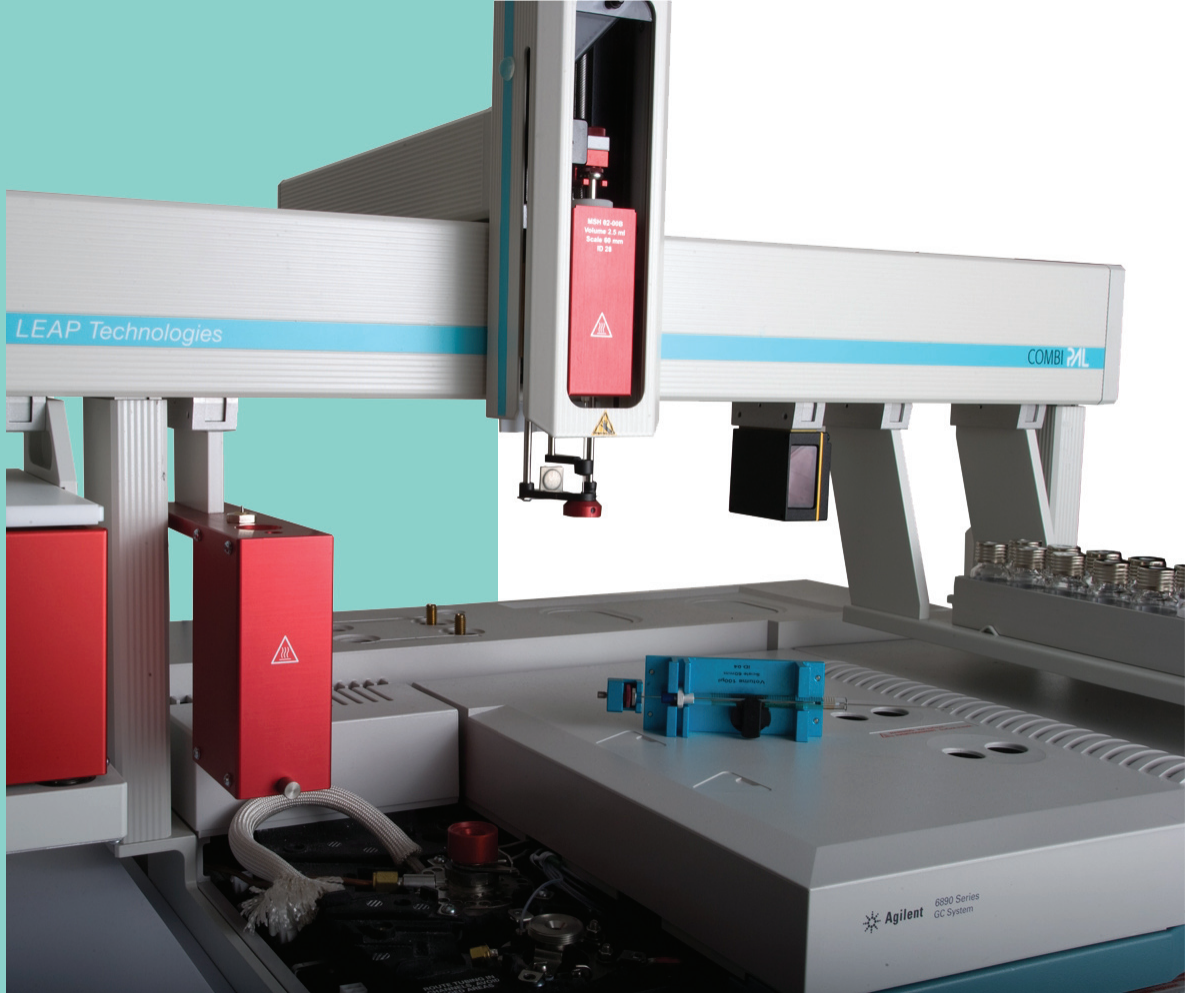


# SOFTWARE



## CHRONOS™ Mastersoftware for all CTC Sample Handlers

**Single Sample List Control - also for Twin Pal.** Chronos Mastersoftware is an ideal solution for automating complex Sample Preparation steps on the CTC PAL.

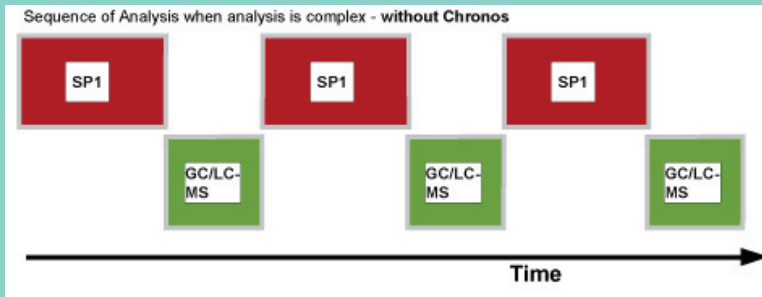
Software Integration with data systems such as ChemStation™ or Xcalibur™ assures seamless functionality with existing systems. Chronos not only exchanges information with other systems, but also controls complete processes and optimizes intelligent time-management resulting in significant improvement in system throughput.



Axel Semrau®



# Chronos for Sampler and Analytical System

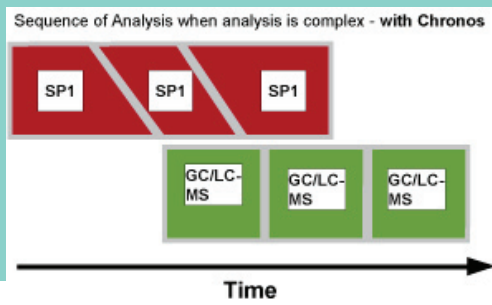


## Time is Money!

In most analytical labs expensive detectors and analyzers wait for elaborate sample preparations. The consequence is long waiting periods between samples.

Chronos provides optimization work that pays off. The software package is compatible with practically all systems using CTC PALs and controls sampler and detector devices.

Timing optimization with staggering by Chronos

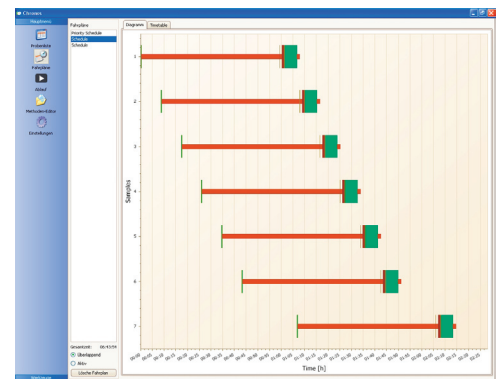


## Automation

New trends in chromatography such as Fast-GC and UHPLC lead to shorter and shorter run times. Simultaneously, sample preparation tasks are migrating to the sample handlers. Today simple liquid sample injections or headspace analysis are complemented more often with dilutions, standard additions, derivatizations, SPE process and others. For this reason many GC, GC/MS and LC/MS systems are inefficient because of incubation and waiting periods. The analytical process traditionally works serially where the run time has to be complete before the next sample can be prepared. The detector system has to wait for the sample prep steps to be completed. Exactly in those instances Chronos goes to work. Chronos optimizes the interaction of the sampler and detector system by staggering events (see graph above). The result is a maximal load factor for each component in the system and significant time savings or throughput increase.

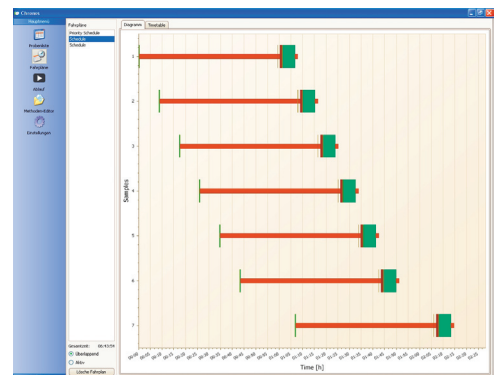
## Chronos – Open Software

Chronos controls the sampler and the MS-Data system as with ChemStation and Xcalibur from one sample list. The sample list is freely configurable and it can be saved as csv-database. The sample list can be imported from any LIMS system and can be exported to a sample list for post processing of analytical data. Chronos Methods provide maximal flexibility. All features of the CTC PAL can be implemented. Complex sample prep steps can be programmed with ease in a simple series of sub-steps. Standardization of all Sample Lists makes operation simpler for the end-users.



## Visualization of sample sequence

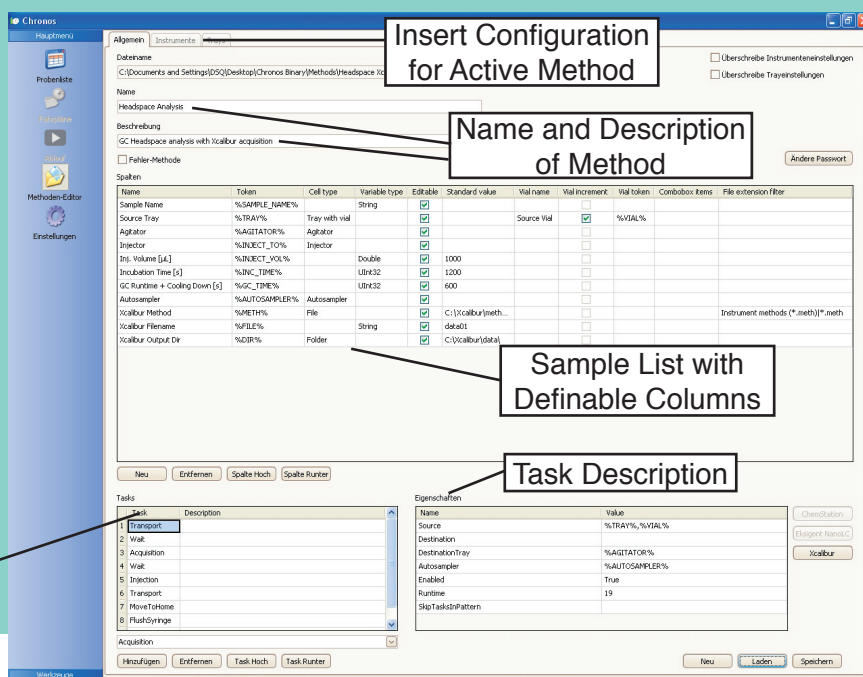
After submitting the sample list Chronos will automatically calculate the optimized schedule for the run times. The result of this calculation will be displayed graphically (see Fig. below). The actual status will always be displayed either in form of the graph or in a table. During the run time a log file will be created and saved for later review.



# Maximum Flexibility

## Chronos Method Editor

With Chronos, methods can be prepared in a straightforward simple way by using prepared "Tasks". The sample list can be created with the method editor in a flexible but still simple way. Subsequently it can be passed on to the analytical system.



## All Encompassing Functionality Examples of Applications

- Import and export of sequences in ChemStation and Xcalibur or CVS format
- Control of multiple PALs
- Support for liner exchange in a ATAS Linex system
- Programmability of Valco valves over a serial interface
- Management of multiple sample lists
- Management of priority samples
- Call up external programs for data interpretation from within the method
- Reading of gravimetric data from a Mettler balance
- Support for Gilson dilutors for sample dilutions
- Support for SPME fiber changer
- Support for ITEX functions

### GC and GC/MS

- Headspace
- SPME
- ITEX-2
- Derivatization
- automatic H53-extraction
- on-line SPE

### HPLC, UHPLC and LC/MS

- multi-dimensional chromatography
- derivatizing with fluorescence tags
- fast separation of active ingredient in pharma research

### Summary Conclusions:

Chronos optimizes the complex work flows of the sample handler (CTC PAL) and reduces waiting times of all components in GC(-MS) or LC(-MS) systems. This is possible because Chronos through its intelligent algorithms allows parallel handling of multiple samples without compromising precision and accuracy of the final results. This replaces the usual concept of serially processing samples. Chronos introduces an innovative way to enter the world of parallel, staggered sample centric work flow that raises efficiencies significantly.

## Specifications

Applicable Chromatography and MS Data Systems

- Xcalibur 1.4, 2.0, LC, GC
- GC/LC/MSD ChemStation
- ChromPerfect 5.5.6

CTC PAL Samplers  
HTS, HTC, Twin  
PAL, CombiPAL, GC PAL

The simultaneous control of multiple PALs or of a Twin PAL can be realized with Chronos.

System requirements:  
Minimum Pentium III, 1.3 GHz, Windows XP, Windows Vista; for each PAL 1 serial port (RS 232) or over network

# SOFTWARE



**Axel Semrau®**

Axel Semrau is one of the largest Trade and Service Organization in Germany engaged in analytical instrumentation.

For 30 Years Axel Semrau has sold and supported specialized solutions for chromatography and mass spectrometry with a steadily growing staff. Besides analytical systems for LC and GC Axel Semrau has an expanding line of its own products in lab information management systems and odor applicator control for the natural gas industry.

A competent team of analytical chemists, informatics specialist and software engineers develops in close cooperation with end-users new products such as Chronos to improve efficient processes in the laboratory.

LEAP Technologies has had collaborations with Axel Semrau over its life of 20 years in bringing automation solutions to a sophisticated market in Europe and in North America. The two companies have signed a VAR agreement where LEAP will start selling and supporting Chronos in the U.S. and Canada.



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