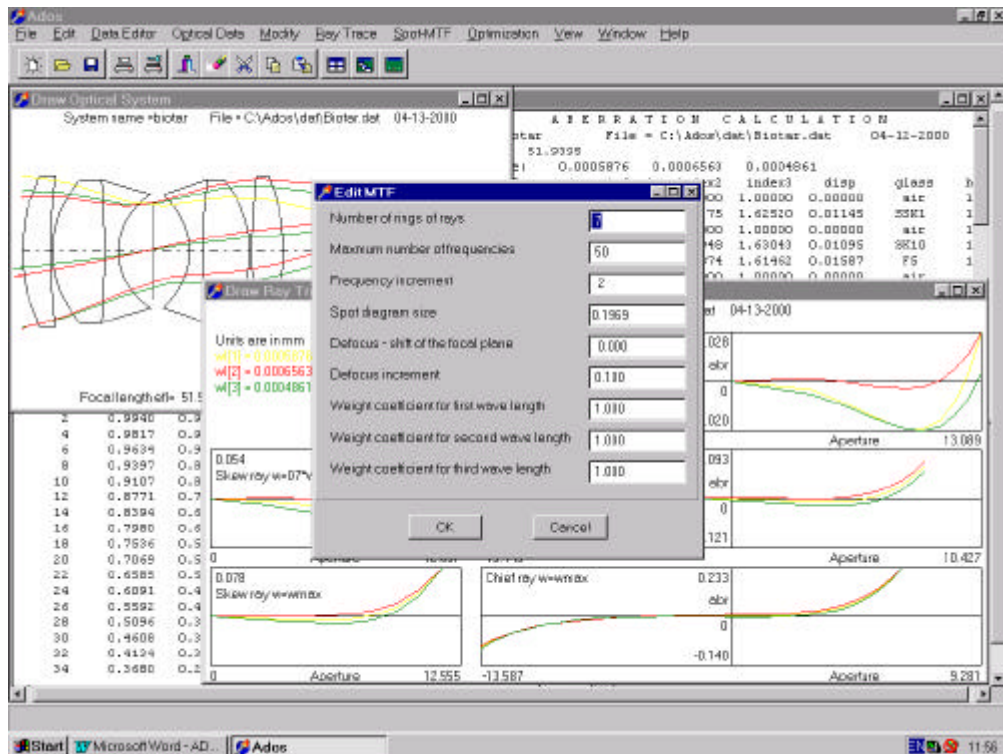


ADOS

Program for design, analysis and optimization of optical systems



Major features

<i>Excellent user interface</i>	<i>Optimizations:</i>
<i>32 bit optimized code for Windows</i>	<i>Damped least squares method</i>
<i>Multiple spreadsheet, graphic and text windows, dialog boxes</i>	<i>Adaptive steady state genetic algorithm</i>
<i>Complete aberrational analysis</i>	<i>Twomembered evolutionary strategy</i>
<i>Spot diagram and MTF analysis</i>	<i>Multimembered evolutionary strategy</i>

Basic properties of *ADOS*

- **Easy to use (user friendly)** - intuitive user interface with drop down menus, dialog boxes, check lists that is standard for Windows applications. All commands can be entered with mouse and/or keyboard. You can concentrate on the optical details of your problem, since user interface is easy and intuitive.
- **High Work Productivity** - saves your time and money.
- **Powerful** - all features you can need about designing, analysis and optimization of optical systems are displayed in easy managed text and graphical windows.
- **On-Line Help** - for quick and easy reference.
- **Free Technical Support** - call us, fax to us, email to us, write to us.
- **Fast** - uses fast and reliable mathematical algorithms for analysis and optimization.
- **Enhanced Optimization** - uses both classical damped least squares optimization and new global optimization based on genetic algorithms and evolution strategies. All this global optimization methods are based on imitation of principles of natural evolution, such as mutation, recombination and selection as a method to solve parameter optimization problems.
- **Connection with other programs:**
 - **AutoCAD** for mechanical construction.

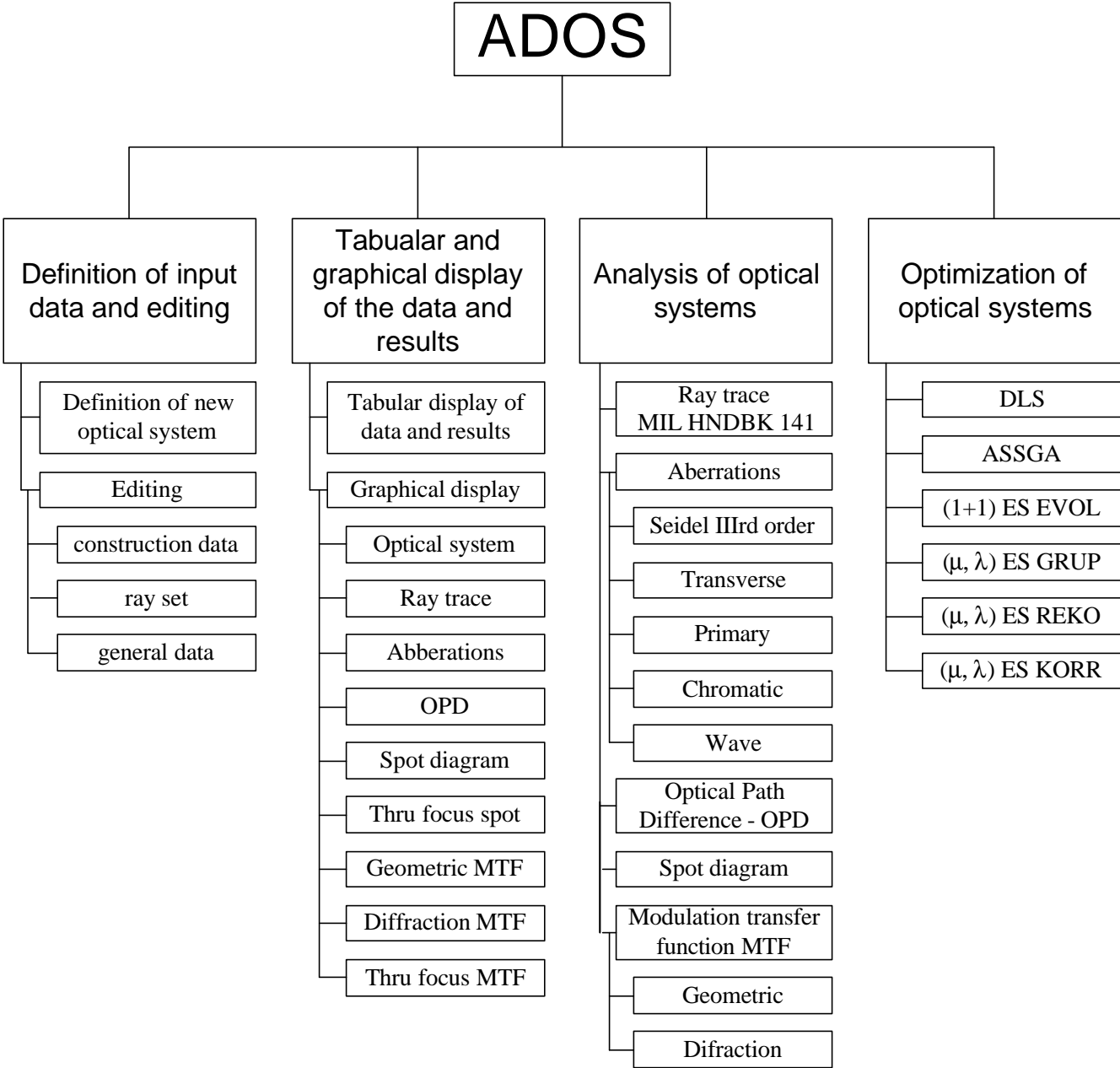
ADOS is powerful optical design program with scope needed to meet today's requirements of optical designers.

ADOS provides an integrated software environment that enables you complete almost any task in contemporary optical design.

ADOS is full-featured program that can help you design superior optical systems.

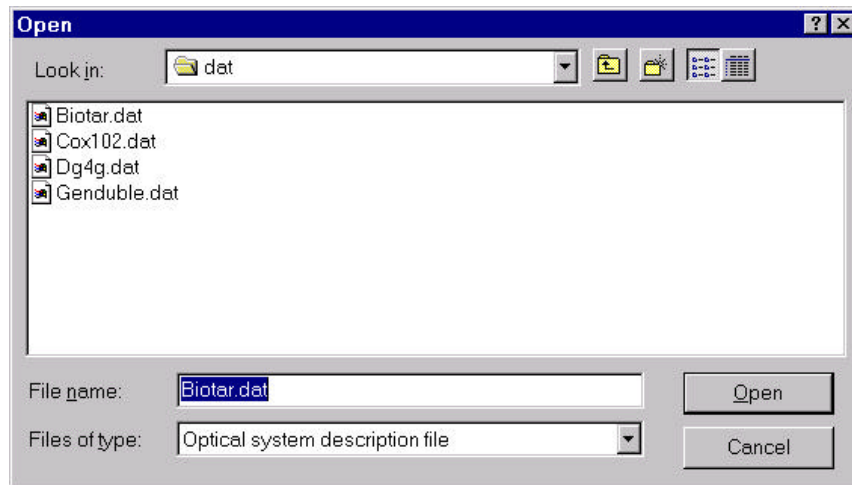
Best of all does all this without breaking your budget.

Program structure



Input – output data

All needed data necessary for complete definition of the optical system are written in the ASCII data file.



Analysis of optical systems

The analysis of optical systems gives possibility for a complete performance analysis of a given optical system. The analysis of optical systems can be divided into:

- Aberrational analysis;
- Spot diagram and modular transfer function (MTF) analysis.

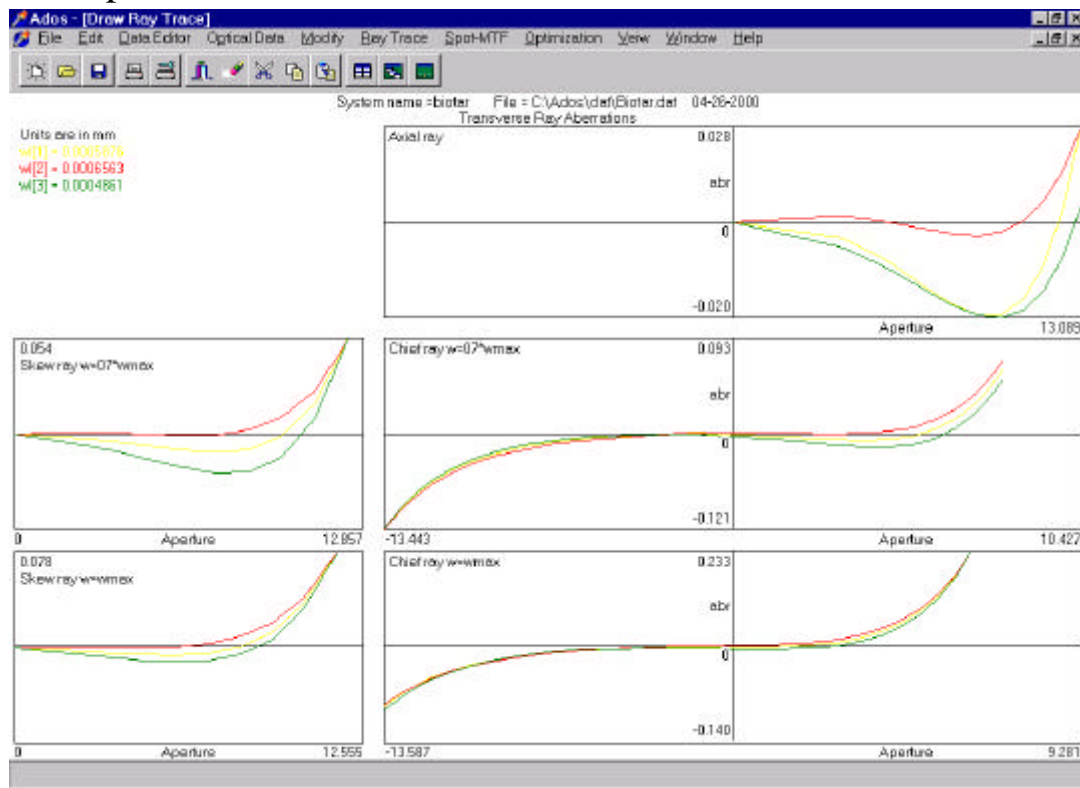
Aberrational analysis

- Calculation of the ray trace according to MIL HDBK 1241
- Calculation of the transverse aberrations

- Calculation of the primary monochromatic aberrations (longitudinal and transverse spherical aberration, coma, astigmatism, field curvature and distortion)
- Calculation of the chromatic aberrations
- Calculation of the wave aberrations
- Calculation of the optical path difference

The results of all those calculations can be shown in the following formats:

- ASCII text;
- Graphics.



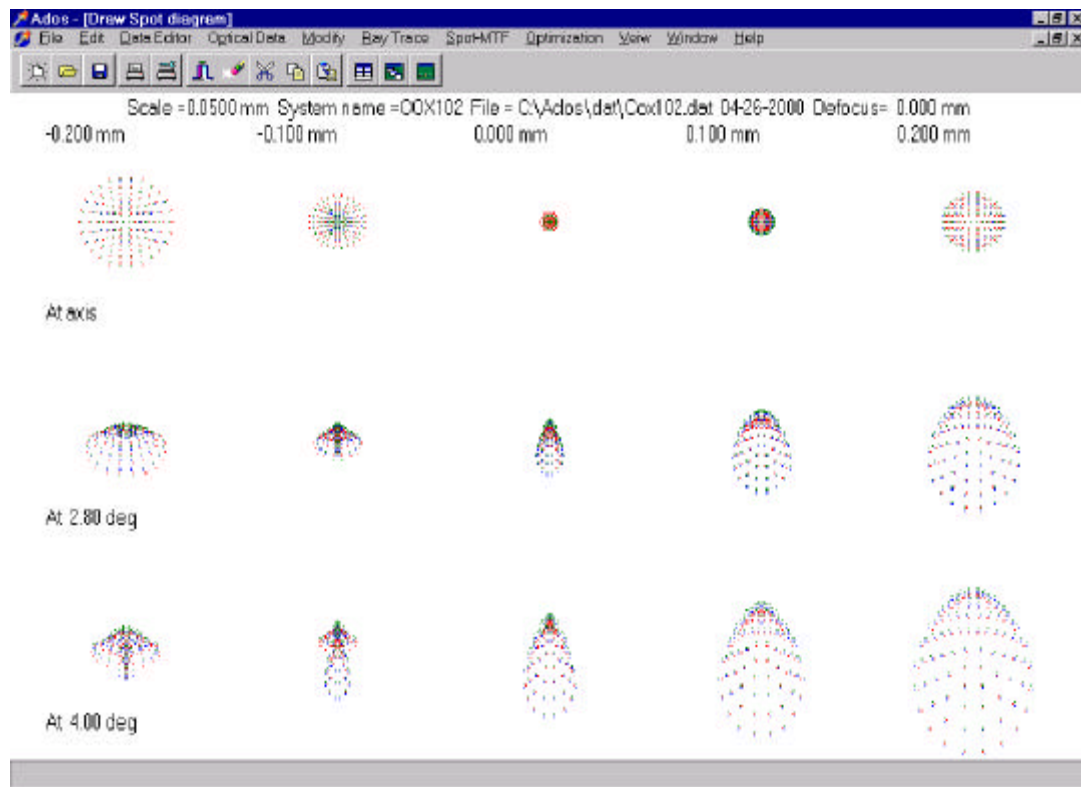
Spot diagram and modulation transfer function (MTF) analysis

- Spot diagram for the every wave length separately and for all wave lengths together;
- Finding plane of the best image position by the through focus spot diagram;

- Geometrical approximation of the modulation transfer function (MTF);
- Calculation of the diffraction modulation transfer function (MTF);
- Finding plane of the best image position by the through focus modulation transfer function (MTF).

The results of all those calculations can be shown in the following formats:

- ASCII text;
- Graphics.



Optimization of optical systems

A large number of available optimization methods distinguishes the program ADOS among other commercial programs for design analysis and optimization of optical systems. The program ADOS has the following methods of local and global optimization:

- Damped least squares method with two variants additive damping and multiplicative damping;

- Genetic algorithms –three optimization methods are implemented:
 - Simple genetic algorithm;
 - Elitist genetic algorithm;
 - Adaptive steady state genetic algorithm without duplicates;
- Evolutionary strategies – four optimization methods are implemented:
 - Twomembered evolutionary strategy (1+1) ES EVOL;
 - Multimembered evolutionary strategies (μ , λ) ES methods GRUP, REKO and KORR.

The program ADOS is one of rare programs that offer methods of global optimization of optical systems. It is unique in the usage of the various genetic algorithms and evolutionary strategies in the optimization of optical systems. The application of these methods of global optimization is a result of author's research in the field of modern optimization methods which, are based on the analogies in nature and their application in optimization of complex technical systems. All the author's research results are verified with three papers published at important international conferences.

Connection of the ADOS with the AutoCAD

The program ADOS has a possibility for creating script files which can be executed in AutoCAD. The user can optically design system in the program ADOS and only when the optical system fulfills all given criteria (correction of the aberrations, size of the aberrations spot, resolving power) the mechanical design of the optical system in AutoCAD can start. The starting point for the mechanical design is the optical system designed in the program ADOS and imported in AutoCAD by the script file.

Necessary hardware requirements

Minimal Hardware	Recommended Hardware
Processor Intel Pentium	Processor Intel Pentium III
Memory 32 Mb RAM	Memory 128 Mb RAM
Remaining hardware is standard	Remaining hardware is standard
Remark: Program uses numerical calculations very much particularly in the part for global optimizations. Fastest possible processors with minimum 512 Kb of internal cache memory are expected. For example the processor Intel Pentium II at 350 MHz with 512 Kb internal cache memory is 10 to 12 times faster than the processor Intel Pentium 133 MHz with 32 KB internal cache memory.	

Operating systems

Program ADOS works with the following operating systems:

- MS DOS ver. 6;
- MS Windows 95/98;
- MS Windows NT ver. 4;
- MS Windows 2000.

Necessary condition for using ADOS is that user has installed the Borland Database Engine (BDE) ver. 5 or higher. If user does not have required version of the BDE one will be installed together with the program ADOS.

Very important is to have basic working knowledge in the geometric optics and the optical design.

Without this knowledge this program is too complicated to use. It is recommended to find and study appropriate book about optical design.