Zemax

OPTI 517 Introduction to OpticStudio 16 SP2

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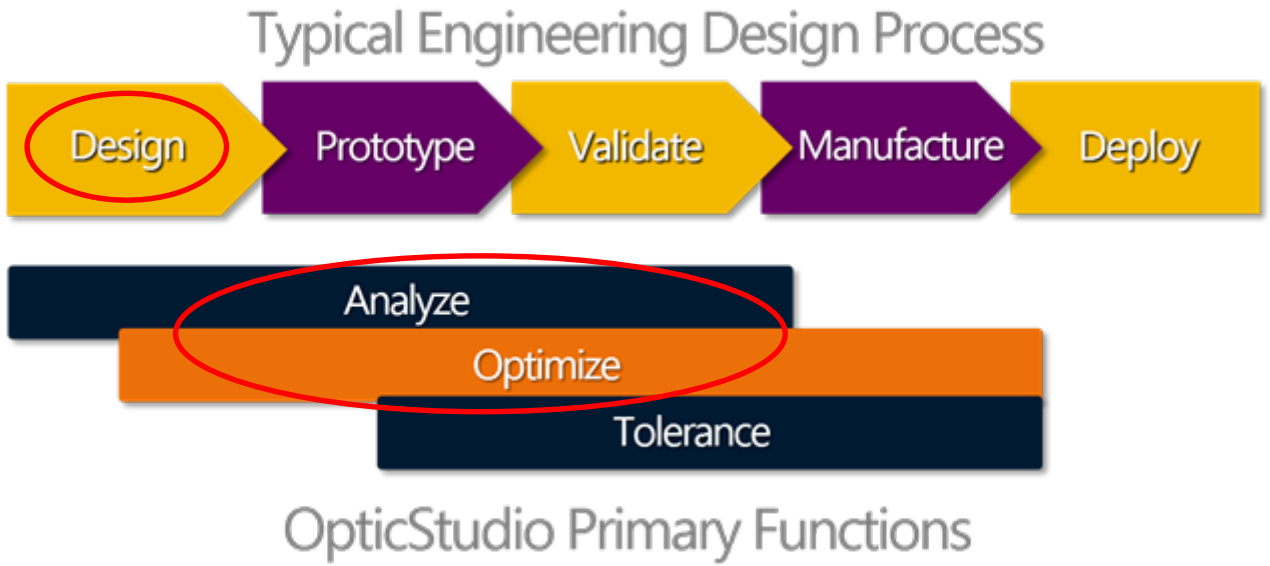
Why OpticStudio

- Combines intuitive user interface with complex physics engine
  - Customizable workspace
  - Dozens of sample files to start your design from
  - Robust documentation including a Getting Started Guide and In-Window Help Files
- 25+ years of proven technology
- New OpticStudio users come up to speed in 66% of the time
- Only software that has both sequential and non-sequential
  - Progress from first order design to toleranced imaging system to stray light analysis all from the same software

Workflow


Typical Engineering Design Process
Design
Prototype
Validate
Manufacture
Deploy
Analyze
Optimize
Tolerance
OpticStudio Primary Functions

Key Features

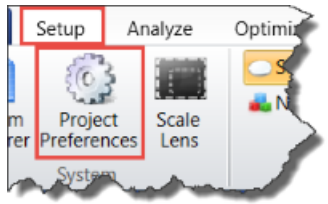
- Analysis
  - Ray, wave and diffraction calculations
  - Interactive charts to better visualize results
  - All data is available in both chart and text form
- Optimization
  - We have an optimization wizard that allows easy optimization of your design
  - User defined constraints
  - Built-in tools for stock lens and material matching
- Tolerancing
  - Help incorporate manufacturing/assembly limits in design
  - Scripts to automate process
  - Ability to run Monte Carlo, save files, and perform external analysis

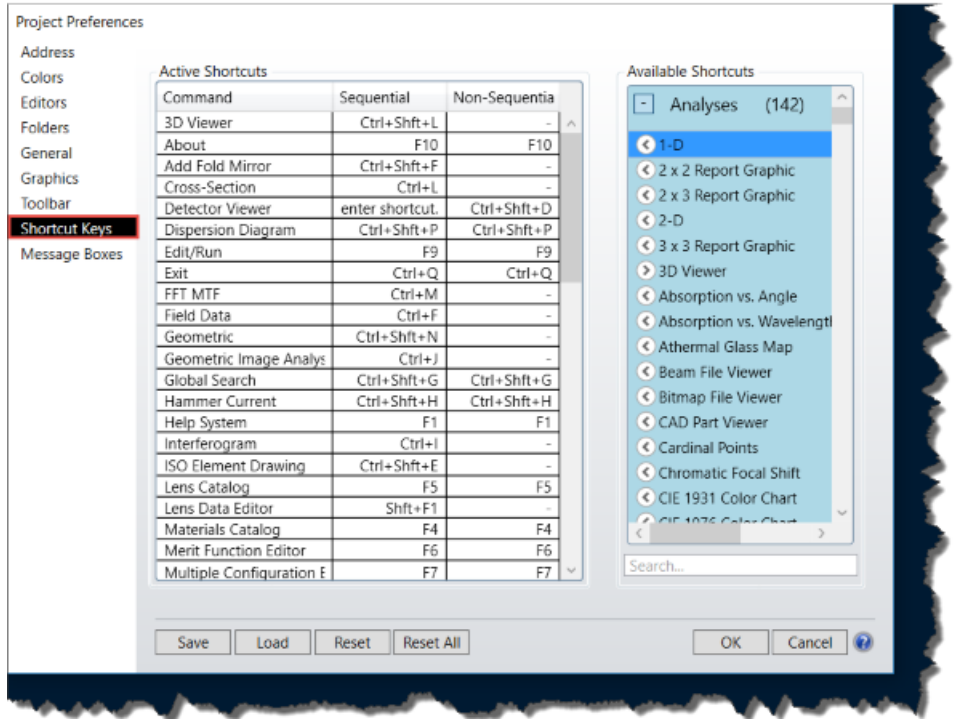
Key Features (cont)

- Manufacturability
  - Design lockdown: automates final steps for production
  - ISO Element Drawing and export XML data
  - Automatic conversion to non-sequential mode including CAD Integration
- Extensibility
  - Robust programming language that is extremely easy to learn (ZPL)
  - API that allows for 2-way external communication with .NET and COM languages (C++, C#, Matlab, Python, and more)

Keyboard Shortcuts

- All keyboard shortcuts are customizable
- Favorites
  - Ctrl+Z: toggle variable
  - F6: Merit Function Editor
  - Ctrl+Shift+Q: Quick Focus
  - Ctrl+Shift+O: Optimization
  - Insert: new editor (above)
  - Ctrl+Insert: new line (below)





Live Demo

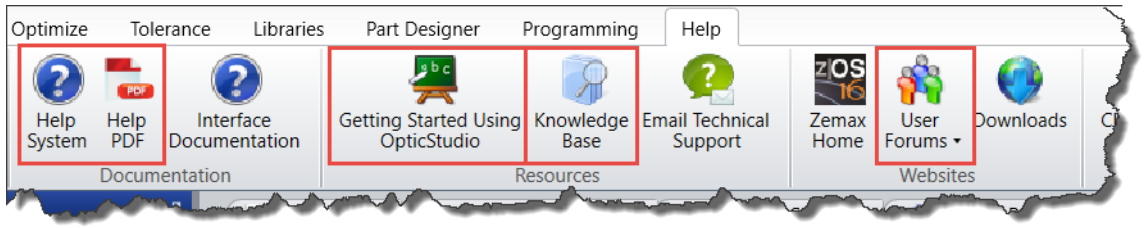
- Optimize a singlet including Default Merit Function
  - Show analysis features including spot diagram, wave/ray fans, wavefront map, and MTF curve
- Show mirrors (negative thickness) and decenter/tilt components (coordinate breaks)
- Look at catalogs including materials and lens catalogs
- Open up first order prescription data and system check
- User Interface Wrap-Up

Top 10 Tips/Tricks (in no particular order)

1. Search Bar: allows you to quickly find any feature in OpticStudio.
2. You can automatically shift to paraxial focus by using a *Marginal Ray Height* solve of 0, 0
3. Increment/Decrement values in a cell by using "+1" or "+-1"
4. Remove pickups by toggle variable twice (Crtl+Z)
5. Add data markers to XY Plots to better analyze data
6. Set "*Update: None*" to speed up UI (does not update all windows on each keystroke)
7. Customize Quick Access Toolbar
8. Analyze -> Rays & Spots -> Single Ray Trace using [Hx, Hy, Px, Py] to see ray segments at each surface
9. Universal Plots allow for easy visualization of changing variables on Merit Function Operand Values (thickness vs RSRE)
10. ISO Element Drawing gives one-click ability to produce drawing

Where to Find More Help

- Look at example files located in *Zemax/Samples*
- Help Tab in the Ribbon Toolbar



- Knowledgebase with over 400 articles and examples
  - http://www.zemax.com/os/resources/learn/knowledgebase/
- Zemax Webinars on YouTube
  - https://www.youtube.com/user/RadiantZemaxLLC

Conclusion

- Are there any questions?
- If you have issues or trouble throughout the semester, please contact Professor Sasian: jose@optics.arizona.edu