Speeding Designs to Market with Zemax Virtual Prototyping

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Agenda

- What is Zemax Virtual Prototyping?
- The relationship between optical and mechanical engineers in the design process
- The value Zemax Virtual Prototyping can bring to your business
Our History

1990
- Developed Windows Version of Zemax
- First 32-bit version of Zemax

1990
- Multi-threaded optical design software

1990
- Thin film modeling and polarization ray tracing

2011
- Physical optics propagation
- Increased speed with new ray splitting and sampling technology
- Introduced first 64-bit versions supporting up to 16-core computers
- Added network support

2011
- Hybrid sequential/non-sequential ray tracing

2015
- Zemax 13 with Lightning Trace
- Zemax China
- Zemax Taiwan and Zemax Japan

2016
- Zemax 13 R2 – Stock Lens Matching Tool
- OpticStudio 15
- LensMechanix Gold Certified SOLIDWORKS
- OpticStudio 14
- OpticStudio 16

2015
- Zemax 12 with Integrated Radiant Source Library

2015
- Opened Radiant Zemax China and Zemax Europe

2016
- Began addressing specific vertical markets (e.g. aerospace, commercial lighting, medical)

2016
- OpticStudio 16
- Zemax China
- Zemax Taiwan and Zemax Japan
Vision and Expertise

Industry leading optical and illumination design software for over 25 years
Our Solution: Zemax Virtual Prototyping

• Performance Improvement
• Time to Market
• Cost Reduction and Customer Success
Zemax
Zemax Virtual Prototyping - Tools
Zemax Virtual Prototyping in Action
Engineering Workflow

- Specification
- Optical Design
- Optimization
- Mechanical Packaging
- System Validation
- Prototype
- Manufacture

OpticStudio
- Analyze
- Optimize
- Tolerance

LensMechanix
- Package
- Analyze
- Validate
OpticStudio: Design

• Ray-tracing software suitable for modeling:
  • Imaging & afocal systems
  • Illumination systems
  • Stray light & ghosting
  • Lasers & fibers

• Hundreds of sample files and knowledgebase articles as starting points
OpticStudio: Analyze

• Evaluate performance based on optical specifications
  • Wavefront
  • Spot size or PSF
  • MTF
  • Beam size
  • Illumination uniformity
  • Color

• Evaluate qualitative performance as well
  • Image Simulation
  • Footprint Diagram
OpticStudio: Optimize

• Tell OpticStudio what aspects of the system are allowed to vary
  • Surface radius of curvature
  • Lens thickness
  • Position/tilt of elements in space
  • Materials
  • Detector position

• Specify how you will validate the system’s performance in the lab or in production
  • Criteria, input as a Merit Function

• Algorithms help find improvements to the system based on your criteria
OpticStudio: Tolerance

• Predict system performance degradation due to:
  • Optical element fabrication
  • Shifts in material index or dispersion
  • Assembly errors
  • Environmental changes

• OpticStudio introduces small perturbations to the system
  • Re-optimizes any compensators
    • Like a technician adjusting the back focal length in assembly
  • Evaluates performance criteria
    • Like measuring spot size after assembly

• Can report yield expectations and provide insights into where the system is most sensitive
LensMechanix: Package

• Open OpticStudio files in SOLIDWORKS
  • All lenses, sources, and detectors loaded as native SOLIDWORKS parts
  • No STEP, IGES, STL files needed
  • No file format conversion required
  • No loss of information

• Add mechanical housings, mounts, and surface finishes
LensMechanix: Analyze & Validate

• Critical ray bundles created by optical engineer can be re-traced with packaging
  • Identify and correct clipping/vignetting
  • Identify and correct sources of stray light
• Measure performance changes as compared with the OpticStudio output in the Optical Performance Summary
Zemax

Zemax Virtual Prototyping - Services
Life with Zemax Virtual Prototyping

• Tailored solutions to help you get the most out of your new tools and workflow from day one

• Key considerations in how we build these solutions:
  • Existing workflow
  • Team size
  • Your project timeline
  • Sensitivity of your work

• Broadly split into two categories
  • Zemax Virtual Prototyping Onboarding
  • Zemax Process Optimization
Zemax Virtual Prototyping Onboarding

• Our number one goal as a solution provider is success for you, our customers

• Desire to provide users with step-by-step assistance getting up to speed with the Zemax Virtual Prototyping workflow
Zemax Process Optimization

• Comprehensive solution for large organisations where core business is founded on optical component design

• Multi-user OpticStudio and LensMechanix network licenses
  • Seamless access to all of the necessary tools, by all users

• Tailored, dedicated engineering services access
  • We can help ensure the success of your project in many ways
    • Converting customer requirements into technical specifications
    • Ensuring production process is adequately modelled
    • Helping non-optical engineers ensure the design intent of the optical system is maintained
  • Doubled engineering time as a bonus for first-year customers
Zemax

Zemax Virtual Prototyping - Benefits
Benefits of Zemax Virtual Prototyping

Projected vs. Actual timeline of A-Series Project

1-Oct  1-Nov 2-Dec 2-Jan 2-Feb 5-Mar 5-Apr

Projected candidate design
Projected marketing prototype
Projected design completion

Candidate design
Marketing prototype
Design completion

Time savings

106 days cut from project

Projected schedule
Actual schedule
Time saved
Benefits of Zemax Virtual Prototyping

• Our customers design and make products where optics is a significant part of the value of the product
• Portfolio of products and services to cover different stages in the design process
• Zemax Virtual Prototyping brings with it three key benefits
“In time savings, we knocked this project out of the park. A seamless optomechanical exchange cut two months out of the project in the back and forth in the modeling piece.”

Robert Mentzer, Optical Engineer
Global Surgical