

# ANSYS Speos 2022R2 新功能介绍

新科益系统与咨询（上海）有限公司

# Speos – What's New

## Speos 2022 R2

### Productivity Enhancement

- **Speos CAD Connection**
- **Locate Material**
- Light Field, simulation compatibility
- Speos enhancements
- Labs enhancements

### Optical Part Design

- Interactive Photometry
- MOS & Freeform lens enhancements
- Head Up Display
- Other OPD enhancements

### Speos GPU

- **Dynamic effects in Camera simulation**
- Live Preview Enhancements
- GPU Compute Enhancements
- HPC GPU

### Sensor / Autonomous Driving

- **Camera, asymmetric lens systems**
- LiDAR, multiple beams

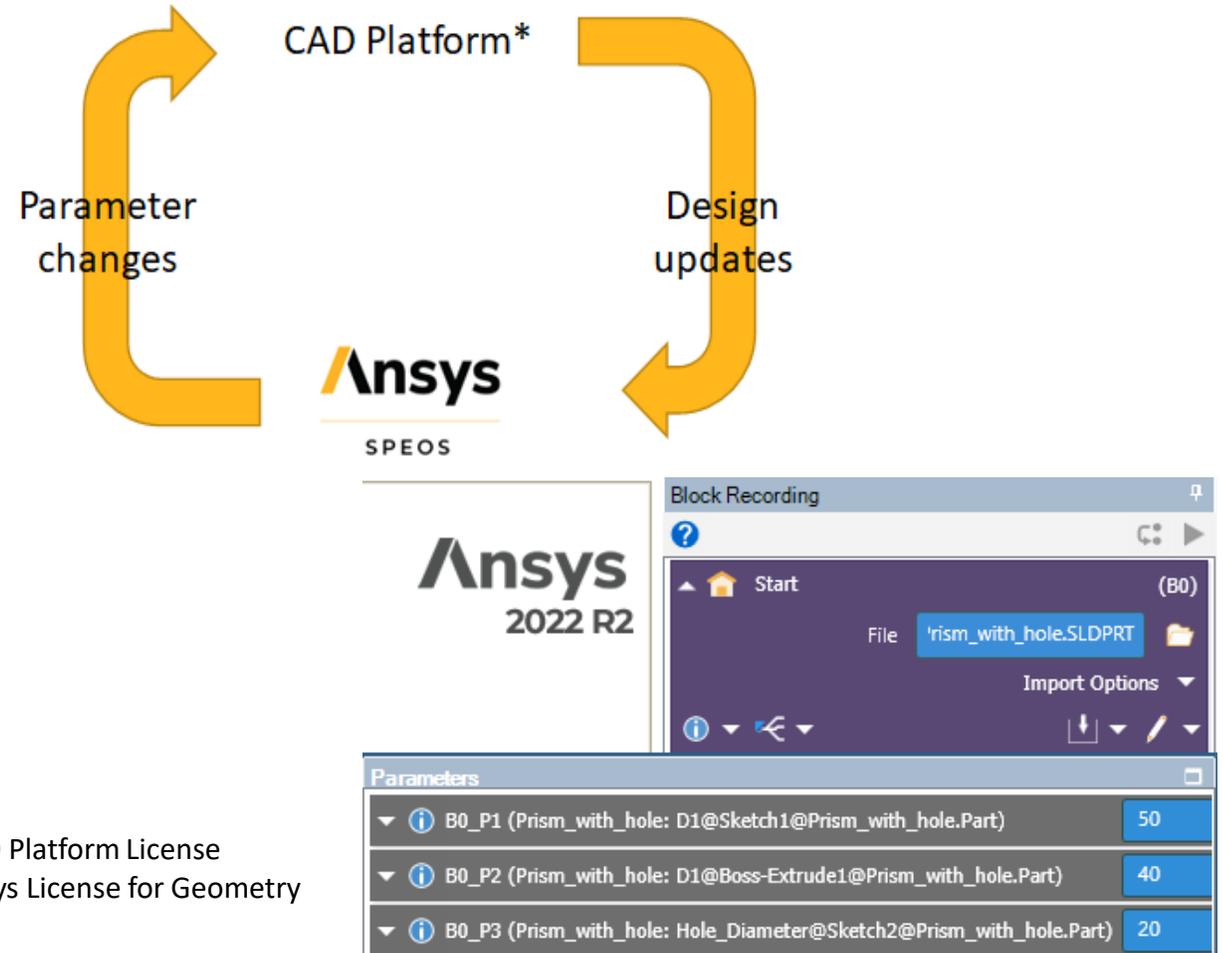
### Ansys Integration

- Better connection to Mechanical

# Productivity Enhancement

# CAD Connection enhancement

- Ease workflow with CAD update
- Enable CAD update (v2) using Parasolid Modeler (fast import)
- New bidirectional CAD Connection (v3) allows CAD parameters change from Speos using Spaceclaim block recording

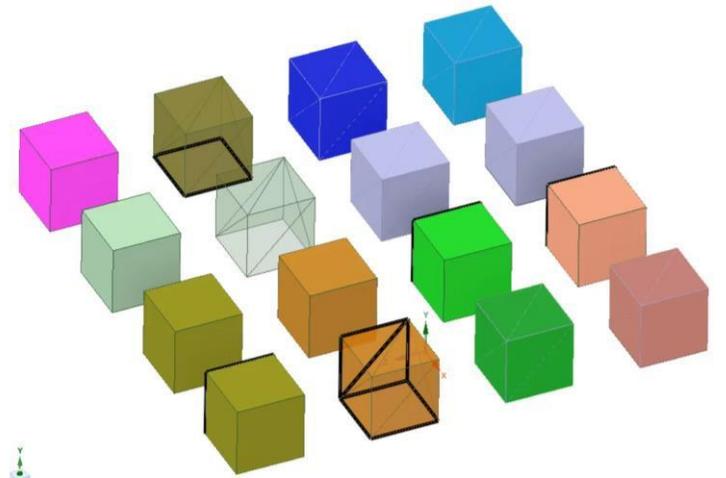
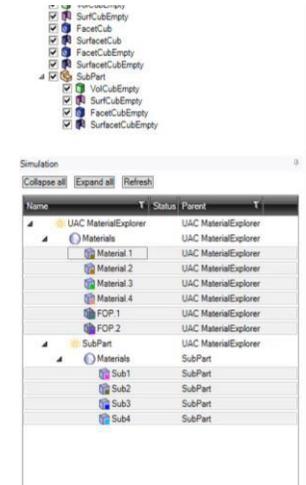
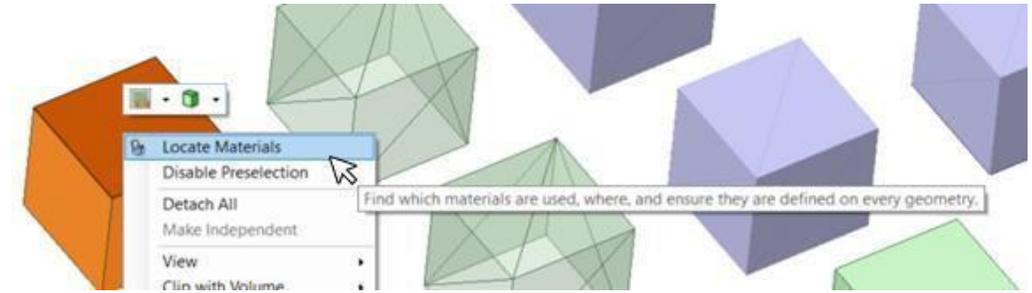
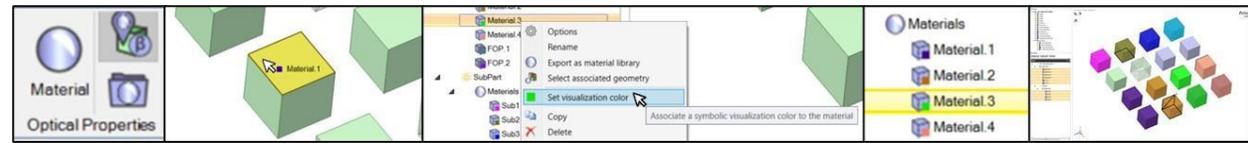


\* Require CAD Platform License  
+ Specific Ansys License for Geometry Interface

## Enhanced Productivity with Associative CAD Connection

# Locate Material

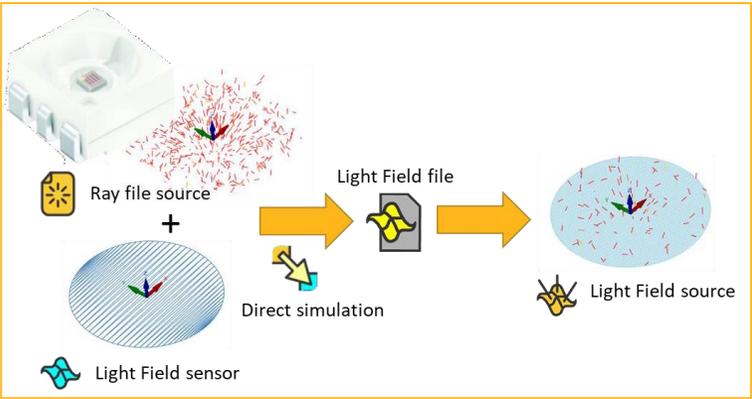
- Immediate access to material property from geometry
- Identify all materials in scene at a glance
- Locate geometries missing properties in 1 click
- A user discovering a project can learn its content in seconds!



1-Click to Know All Optical Properties

# Light Field, simulation compatibility

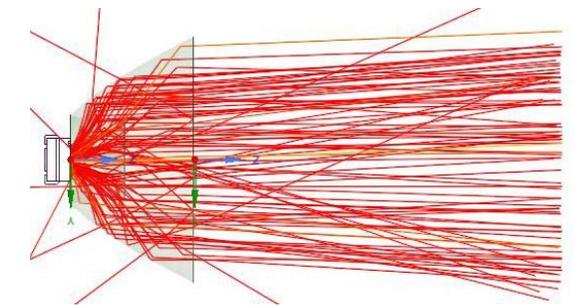
- Light Field sources can be used in conventional Speos simulations.



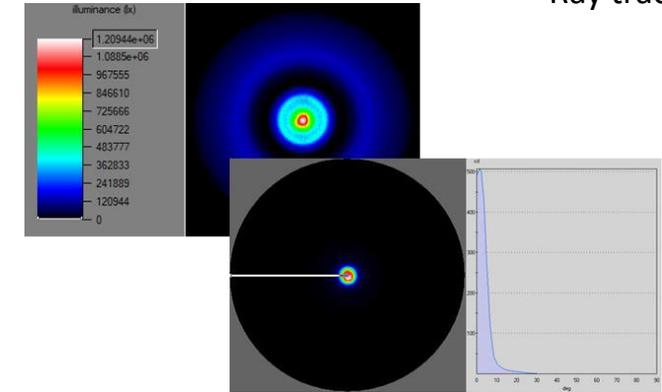
 Interactive simulation

 Direct simulation

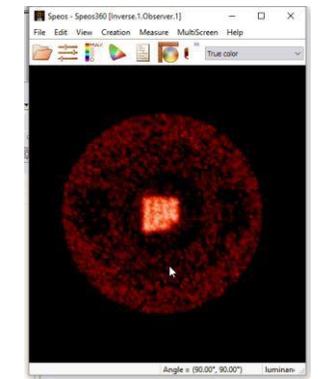
 Inverse simulation



Ray tracing using Light Field source



Illuminance and intensity distributions



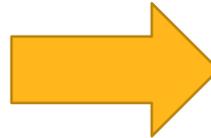
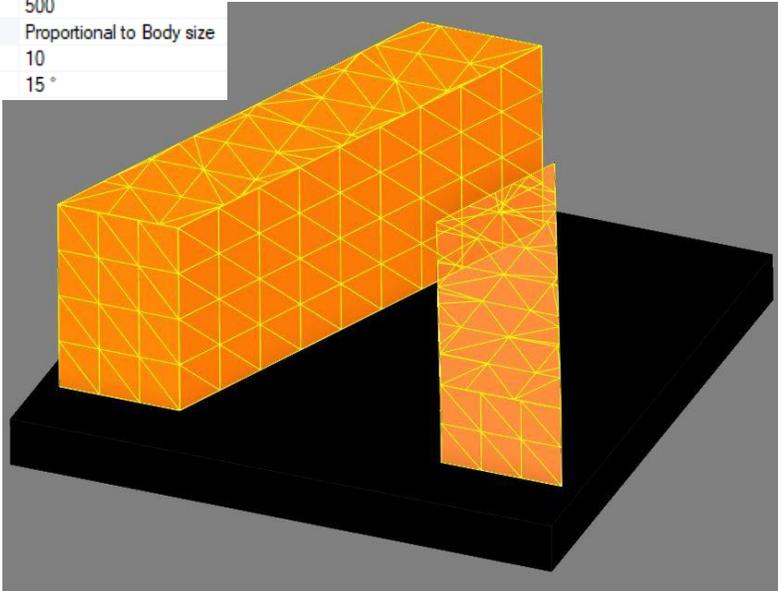
Luminance variation

## Innovative Model for Light Source

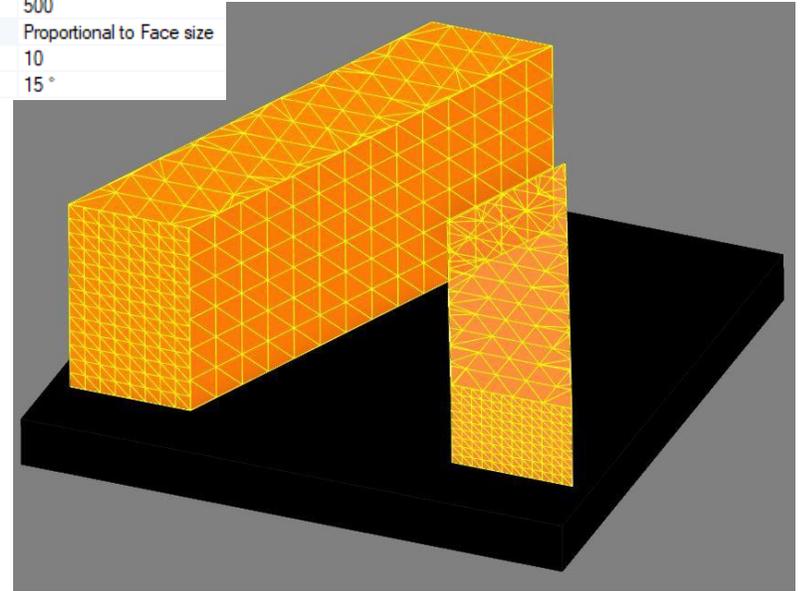
# Speos Enhancements

- Geometries can be meshed proportionally to each face's size (Proportional to face size), as opposed to each body's size (Proportional to body size) for a fine and adaptive meshing definition.

Meshing	
Sag Mode	Proportional to Body size
Sag Value	500
Step Mode	Proportional to Body size
Step Value	10
Angle	15 °



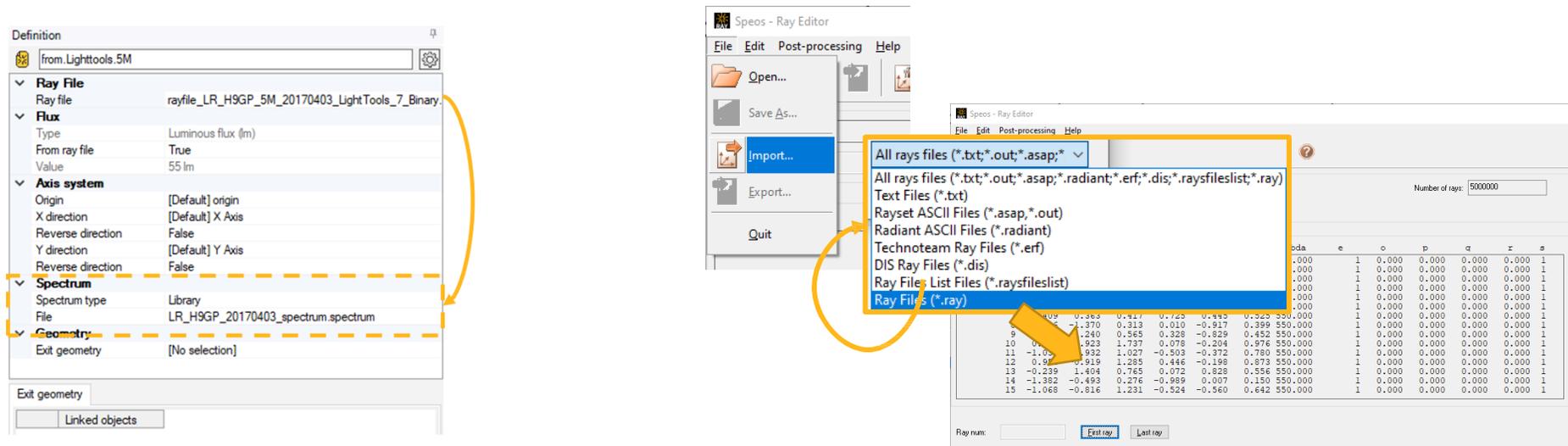
Meshing	
Sag Mode	Proportional to Face size
Sag Value	500
Step Mode	Proportional to Face size
Step Value	10
Angle	15 °



Better Meshing Control

# Speos Enhancements

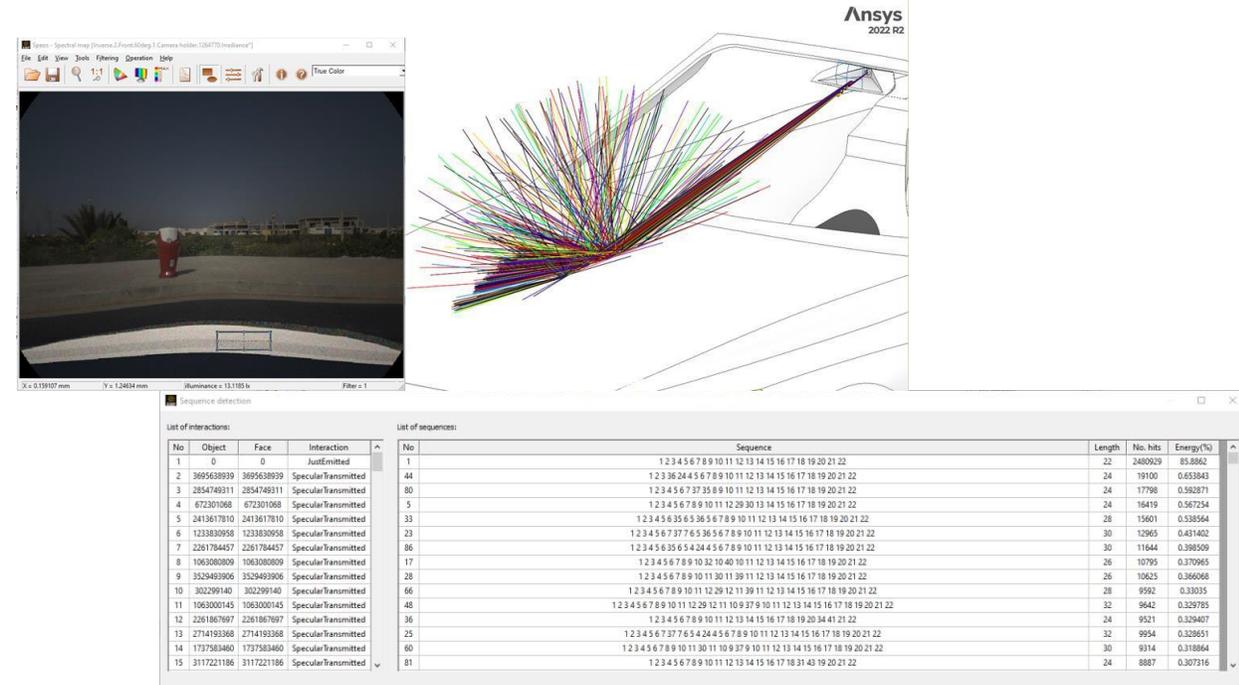
- Other ray file formats (TracePro® and LightTools®) can be:
  - Directly used to define ray file sources.
  - Converted to ANSYS' one from Ray File editor.



Ease Data Transfer from Other Solutions to Speos

# Speos Enhancements

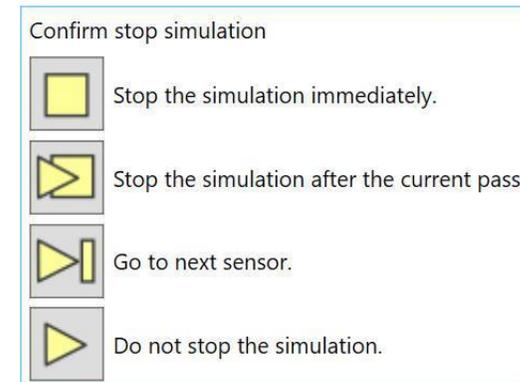
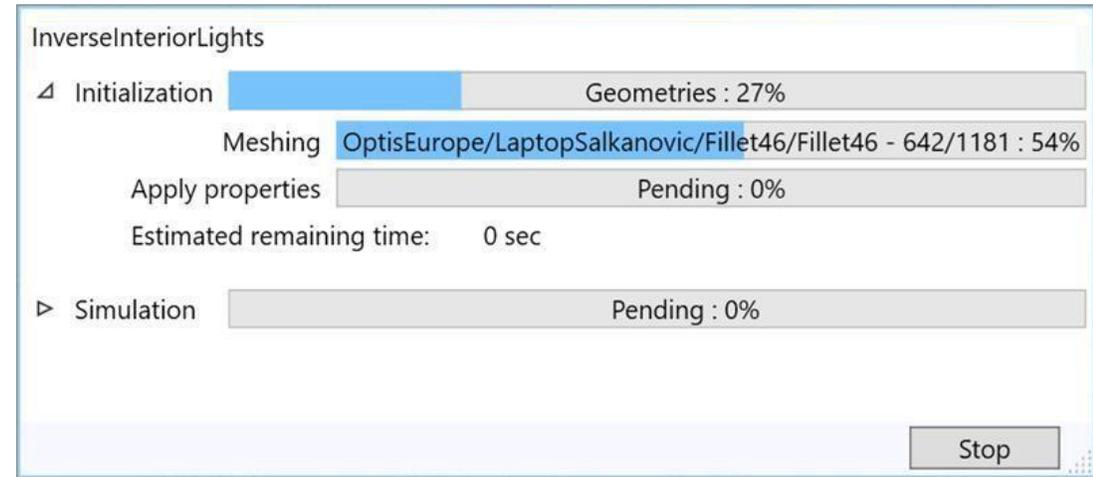
- Camera sensor compatibility with Light Expert permits to easily analyze and find origins of hotspots on simulation results.
- User experience has been improved in the Sequence detection panel for Straylight Analysis, by allowing the different columns of the list of sequences to be sorted.



Easier Stray Light Analysis and Hot Spot Detection

# Speos Enhancements

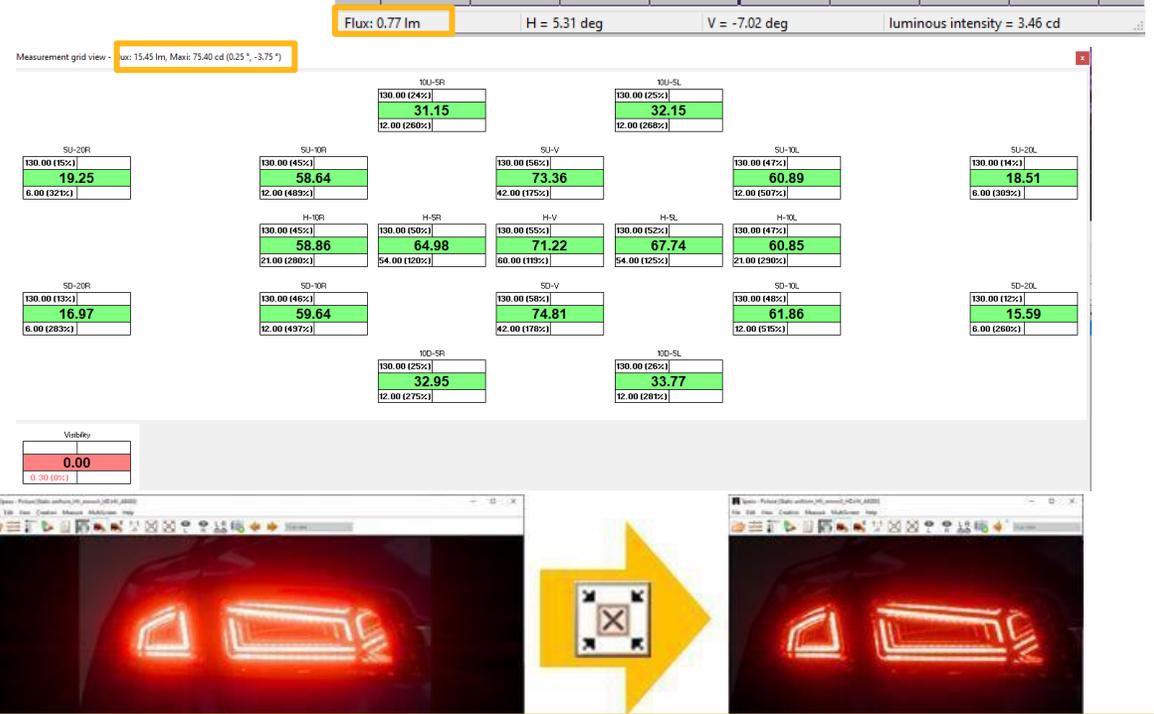
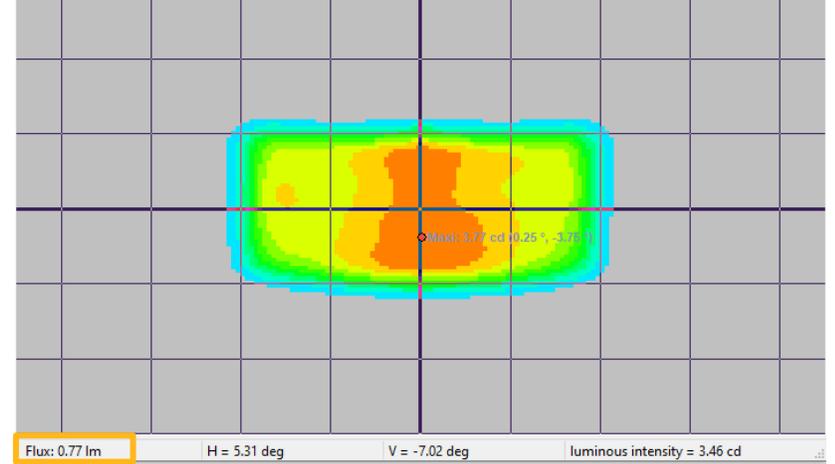
- New Progress Bar
  - Easier to read progress
  - More details in progress
  - Always-on-top window
  - Improved reactivity
  - Fewer user interaction to stop operation



Simulation Status at Every Step

# Labs enhancement

- Ease analysis for lighting engineers
- Improve result visualization
  - New Margin formula : Value/Target
  - Add information in reports : Flux, Maxi & Mini
  - Main axis highlighted
- All information in a single view
- VR-Lab – Fit window to content

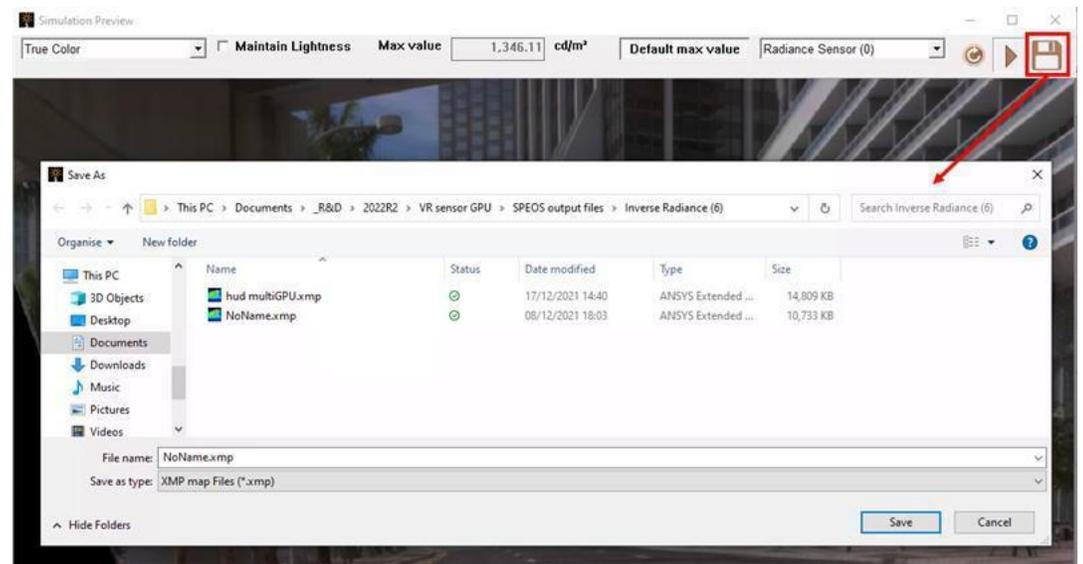


Immediate Access to Key Optical Metrics

# Speos GPU

# Live Preview Improvement

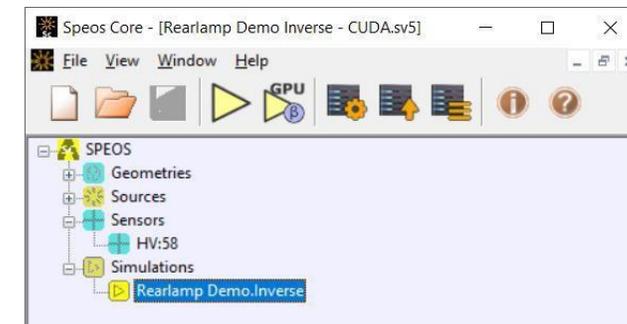
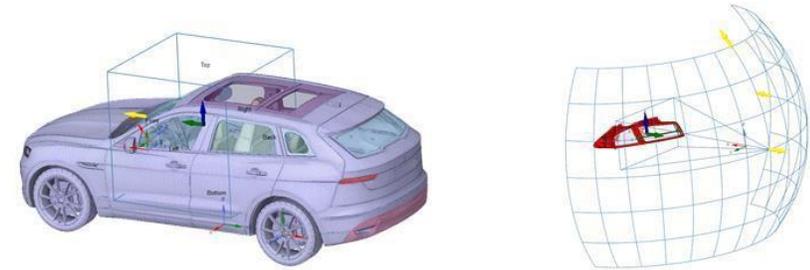
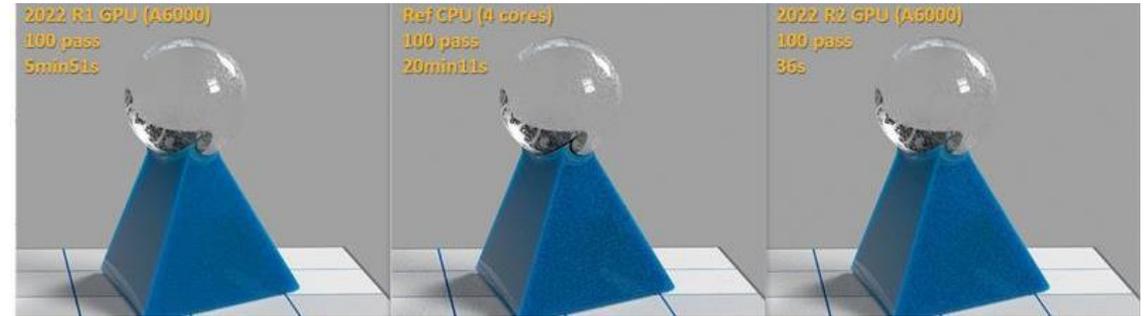
- Live Preview Export Results
  - Export the result of an ongoing Live Preview simulation in xmp or picture format
  - Explore your simulation and take snapshots to analyze
  - Requires to use 32 cores to enable the feature (same as GPU Compute)



Explore and Save the Best View

# GPU Compute Improvement

- Improved progress correlation
  - GPU converge closer to CPU reference
  - Faster simulation in some cases
  - Easier to benchmark GPU
- VR-Sensors compatibility
  - Immersive and Observer sensor compatible
- GPU Compute in Speos Core
  - Run an exported simulation on GPU
  - Keep working on Speos while GPU simulation is running
  - Run export from Speos CREO on GPU!

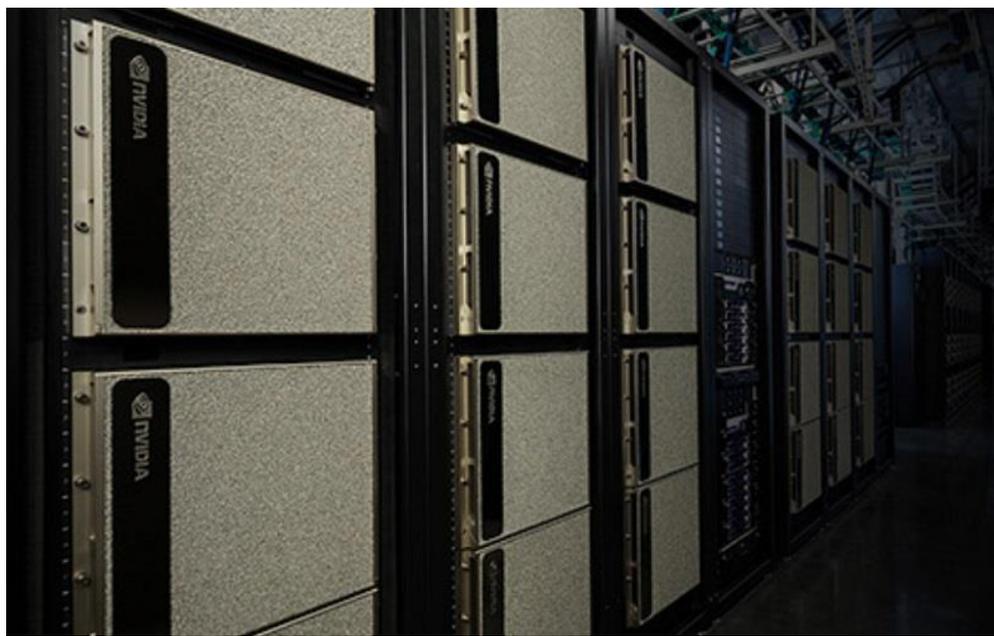


Speos GPU is Closer to Speos Reference, and Still Even Faster!

# / HPC GPU

- GPU Speed beyond any limits!
- Use Windows or Linux GPU nodes
- Multiple GPU per node are possible
- Expect linear performance increase per nb of GPU
- 32 Ansys OPTIS HPC per GPU used

```
only for INVERSE finite element multi sensor simulations  
-gpu:  
  Run simulation on GPU with CUDA (BETA)
```



Unlimited GPU Acceleration

# Dynamic effects in Camera simulation

- Camera simulation full compatibility with GPU Compute
  - v2.0 distortion files support
  - Dynamic parameters (integration, lag time) support

## Performance comparison



CPU i7-11850H on 12 threads: **5min**



GPU RTX A4000: **5s**  
GPU is 60x faster !!!

Faster Camera Acquisition Thanks to GPU

# Dynamic effects in Camera simulation

- Camera simulations inherit from GPU's better convergence when propagating light in diffuse ambient materials.



Evaluate Weather Effect on Camera Performance

# Sensor / Autonomous Driving

## Camera improvements

# Camera, asymmetric lens systems

- Speos Lens System reduced model manages asymmetric lens systems, introducing the brand-new version 2.1.
- Anamorphic lens series used in CinemaScope is a good candidate to highlight the new capabilities of the Camera sensor.

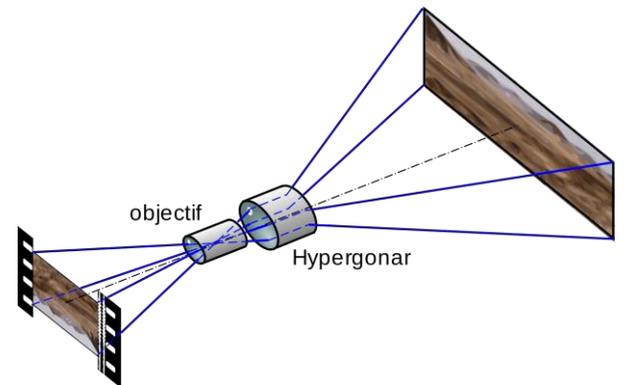
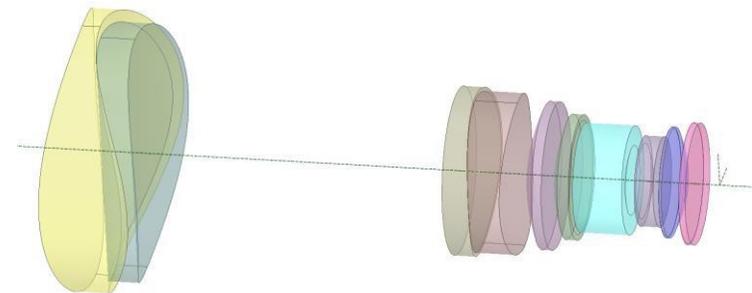


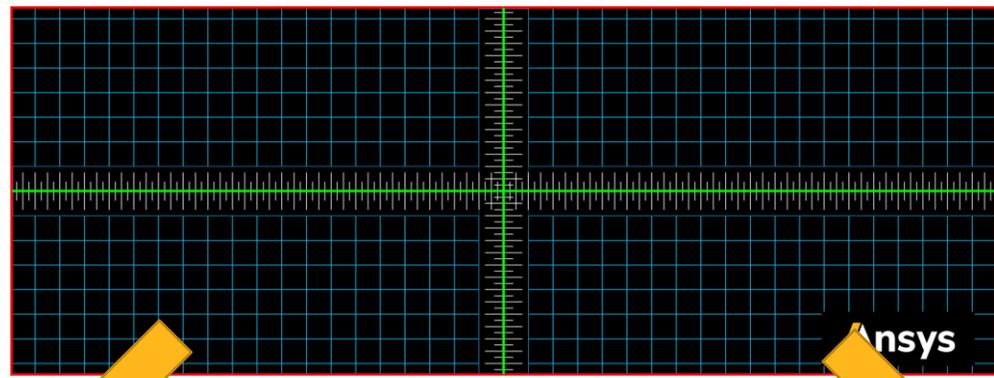
Image expansion when screening the film  
(from Wikipedia)



lens series including cylindrical components

Improved reduced order model for camera's objective

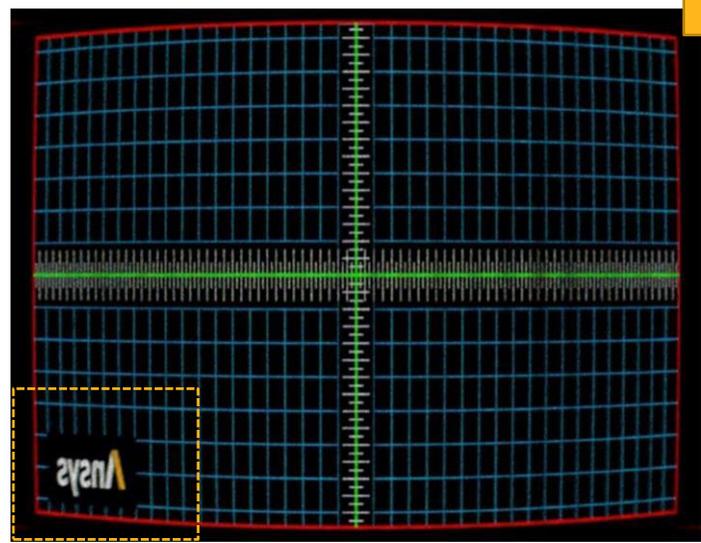
# Camera, asymmetric lens systems



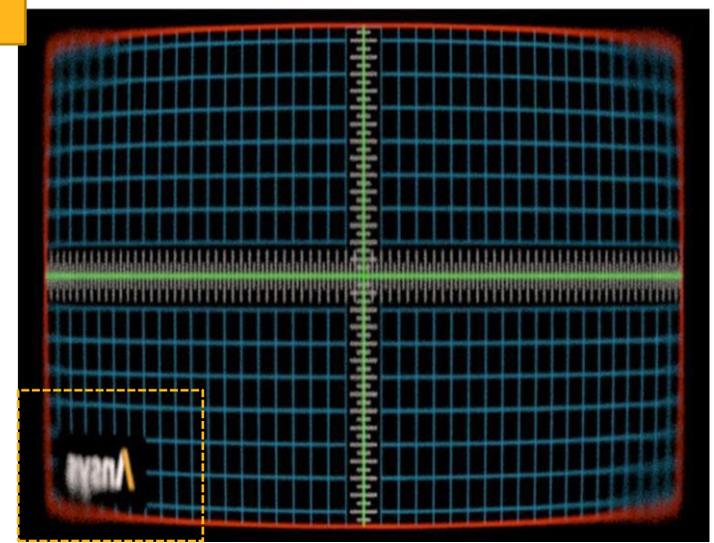
Sight image on the object plan

CPU i7-9850H on 12 threads: **60min**

CPU i7-9850H on 12 threads: **8min**



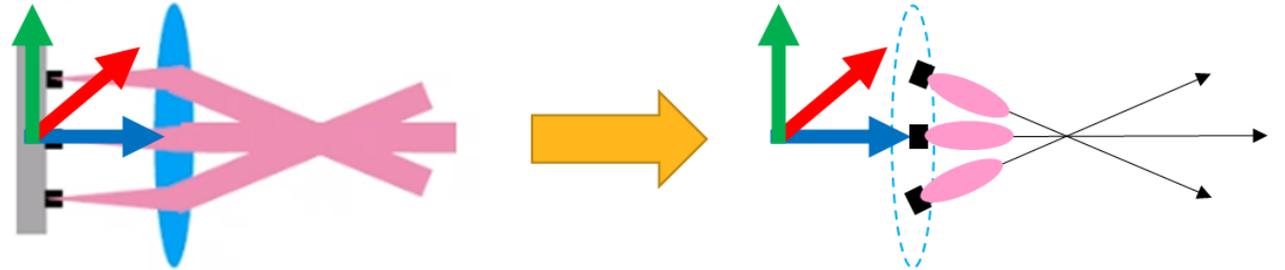
Speos simulation result of the complete system



Speos simulation result using distortion file

# LiDAR, multiple beams

- Scanning sequence file description includes additional parameters to model the output of a complex light source system.
- Example of parameters that can be defined per light beam:
  - Aperture and position
  - Intensity distribution
  - Spectrum



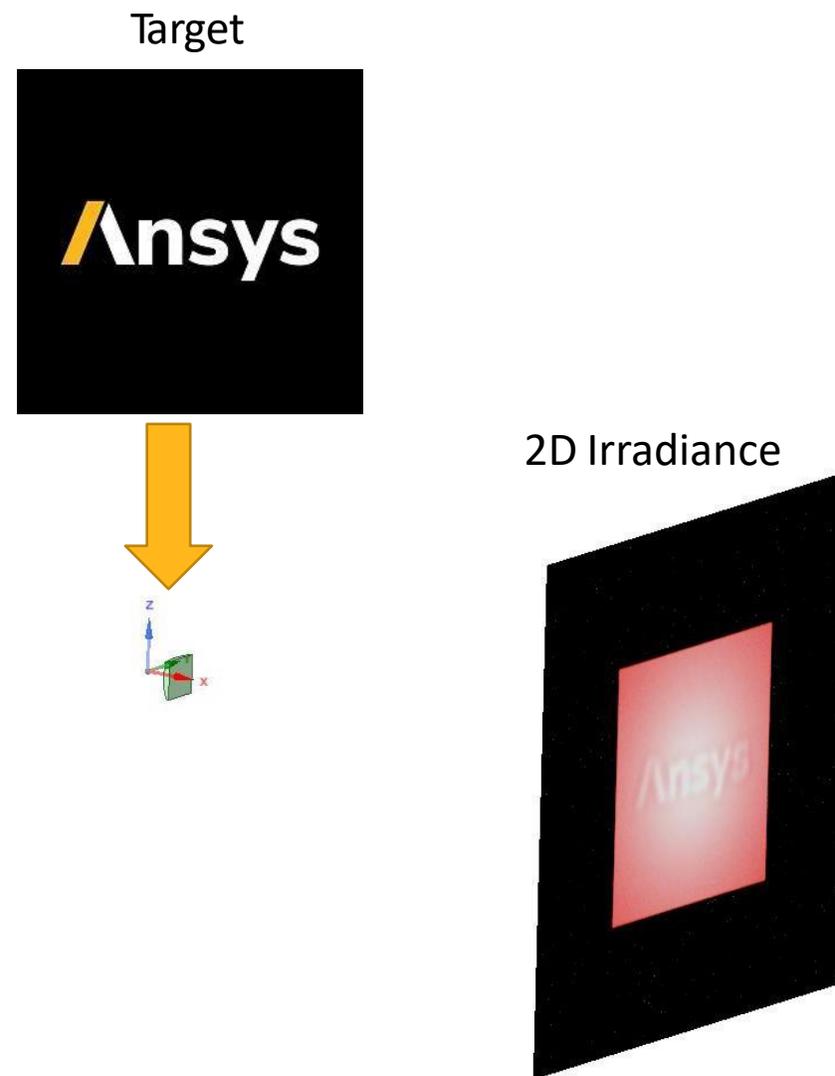
All these parameters help the definition of a reduced model that represents the source of a LiDAR system.

## Reduced Order Model for LiDAR Light Sources

# Optical Part Design

# Freeform Lens enhancement

- Speos 2022 R2 adds 2D illuminance target to freeform lens :
  - From a given surface (used in front face)
  - Define optical beam target : any target from image input
- Speos automatically computes back face of lens to achieve an optical target

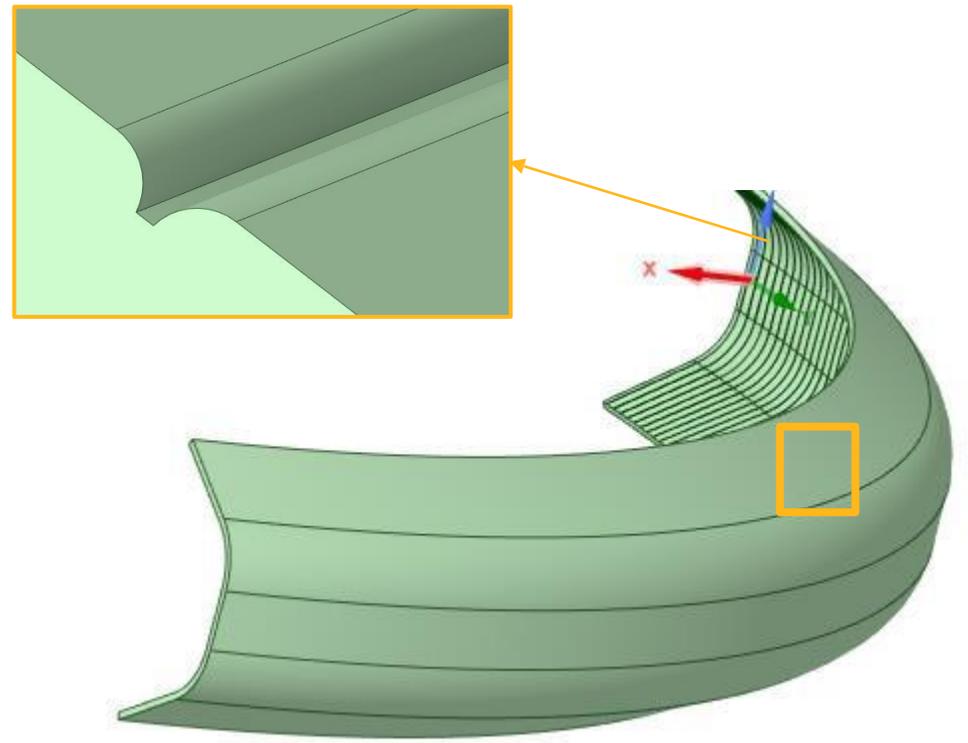
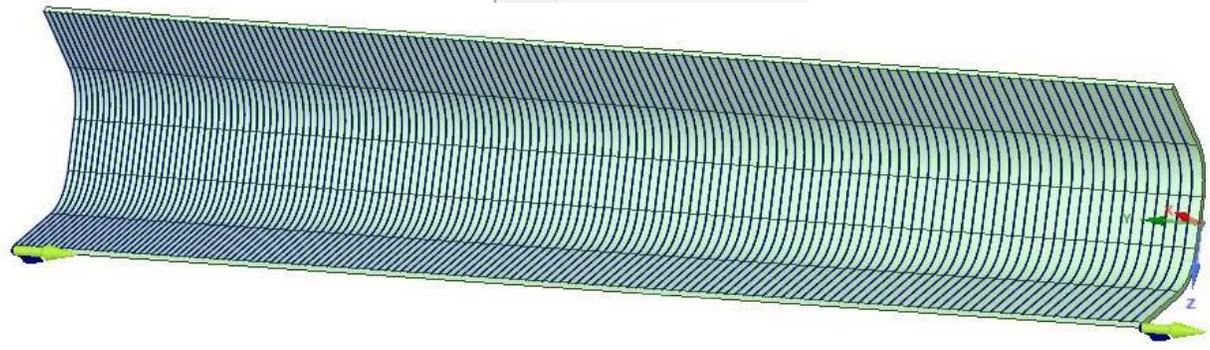


Save Engineering Time with Automatic Optimization of Your Optical Design

# Micro Optical Stripes enhancements

- MOS is more robust and faster to compute
- New advanced tools ease preview of prism and extract information for manufacturing

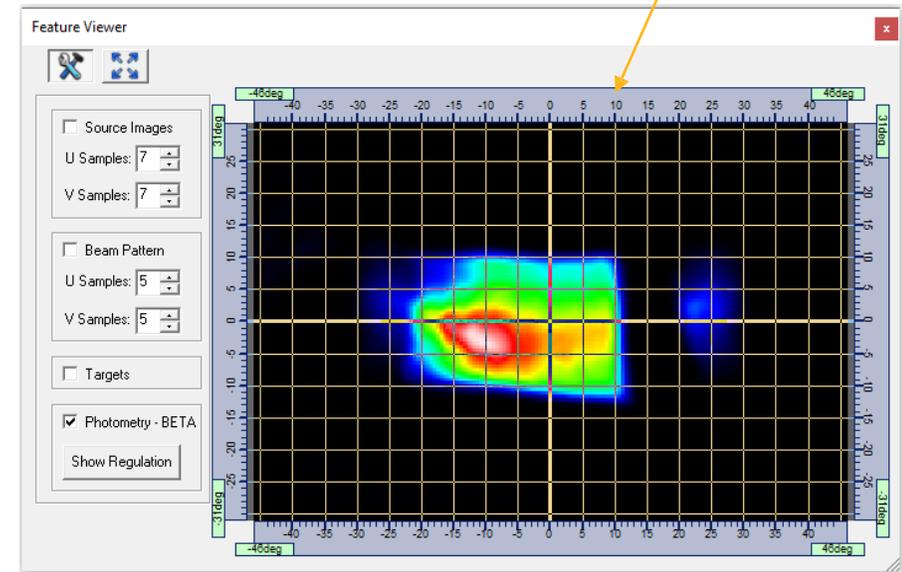
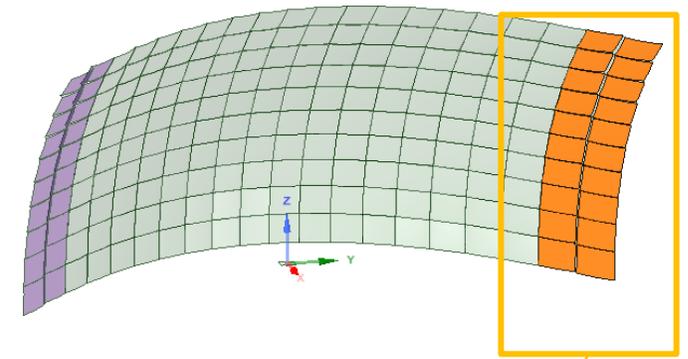
- Extract Tooling Path
- Export as CSV file
- PreviewStripes



Innovative Design for Thick Appearance

# Interactive Photometry

- Improve design iteration with embedded photometry in Optical Surface and Optical Lens definition
- Using Speos GPU compute, simulate photometry and regulation contribution from light passing through optical elements
- Accurate and instantaneous analysis

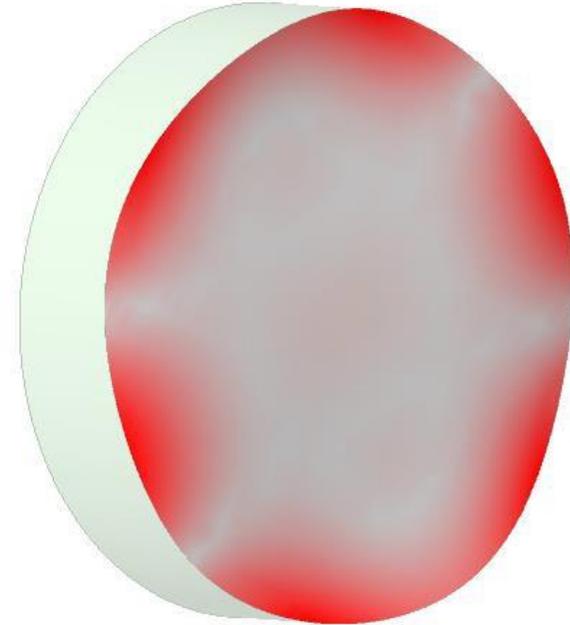


Interactive and Accurate Design Iteration

# Zernike Lens

- Enable projection lens design using Zernike coefficient (up to 28)
- Get optimize lens definition from Zemax and design accurately Zernike lens without any conversion to STEP
- Ease Stray Light Analysis using Speos while keeping accuracy of native CAD design

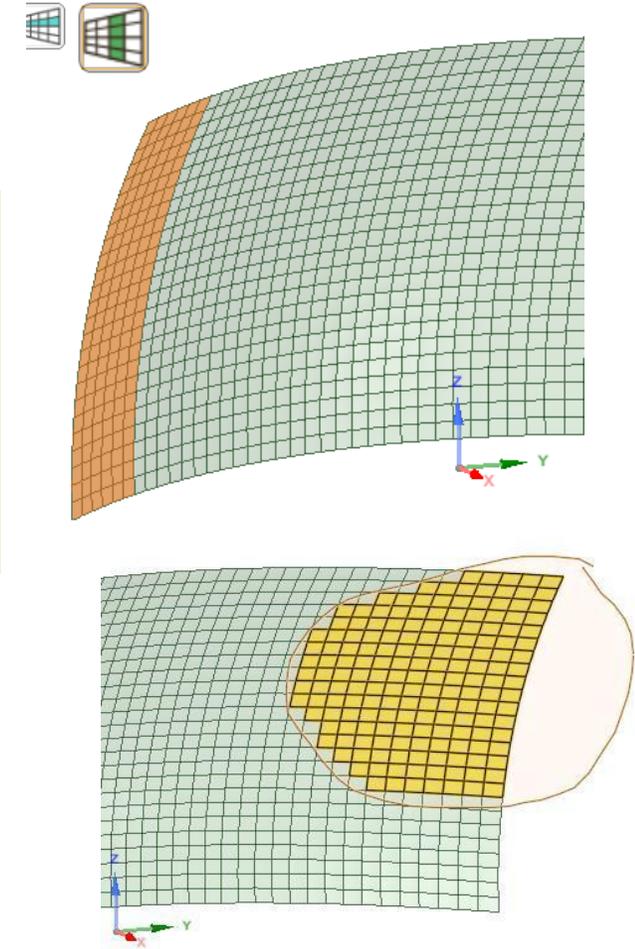
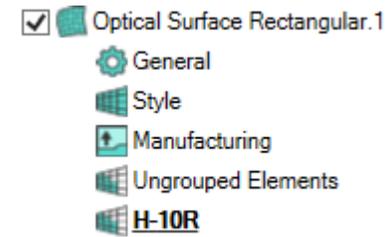
Back face type Zernike



Ease Import of OpticStudio Lens System

# OPD enhancements

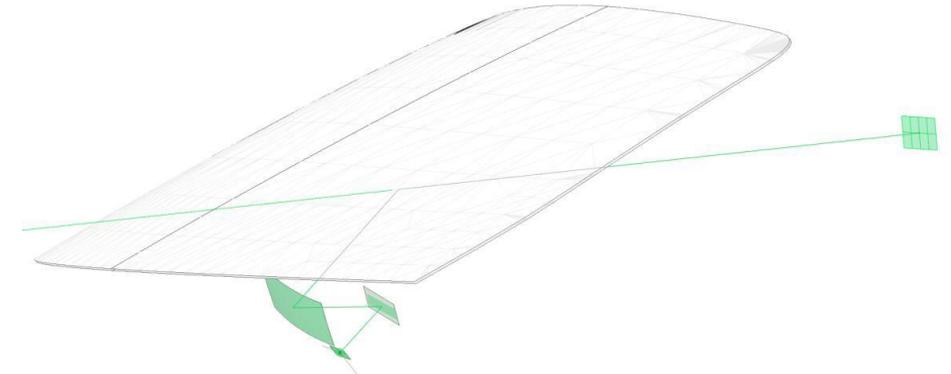
- OS & OL :
  - Smart Group definition : Select row and lines, lasso, box, paint
  - Rename Groups to ease organization
  - Better OPD integration in Speos for NX : Design iteration is better supported with higher integration in user workflow.
- LightGuide :
  - Milling defined by control point in Add/remove mode
- Faster construction
  - Lightguide : 2x faster compared to 2022 R1
  - Optical Lens : 5x faster than 2022 R1



Faster Optical Design Creation

# Head up Display enhancements

- Ease design and validation of Head Up Display
- Review your Head Up display in real-time immersive environment
- Analyze Optical performance of measured surface thanks to support of faceted data in HOA
- Optimize advanced parameter in HOD (Speos for NX, already available in Ansys Speos)



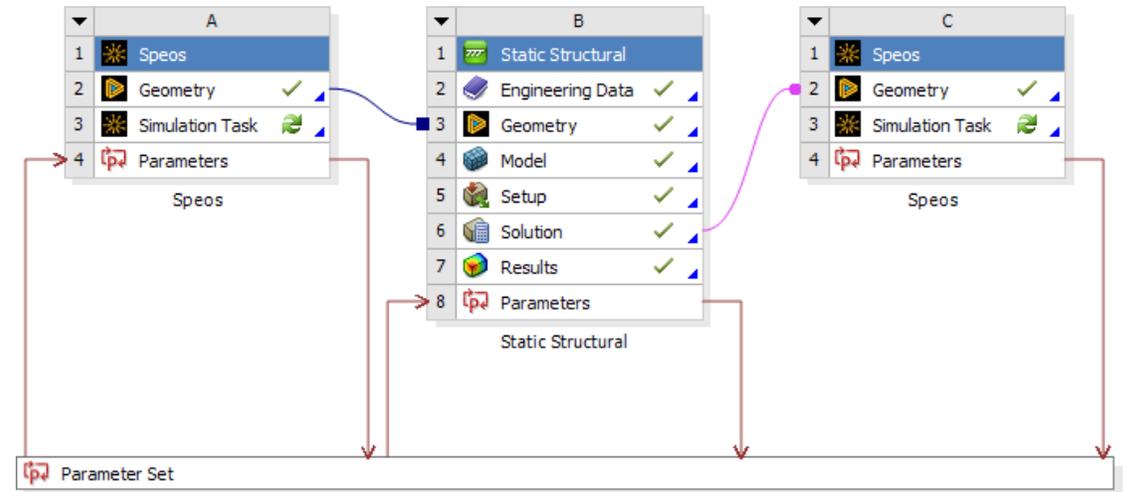
Advanced	
Mirror Size Ratio	1.1000
PGU Usage	0.0001
Stopping Criterion	0.1000
Curvature Balance	0.0000

Uniformed HUD Design Solution

# Ansys Integration

# Better connection with Mechanical

- Ease Multiphysics workflow with faster and reliable connection through workbench
- Enable **multiple Speos instances** to ease design optimization (1 for nominal design, 1 for deformed simulation)
- Unique Ansys capability to automatically perform optical simulation from mechanical deformation



Analyze Mechanical Deformation Impact on Optical Performance



## 新科益工程仿真中心



咨询邮箱 : [ansyssupport@cadit.com.cn](mailto:ansyssupport@cadit.com.cn)

公司网址 : <http://www.cadit.com.cn>