PlanOpSim Meta-Component Ray tracing: OpticsStudio interface

06 June 2023
EPIC product release

PlanOpSim
Enlightened Planar Optics
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Lieven Penninck – CEO & Founder PlanOpSim

PlanOpSim

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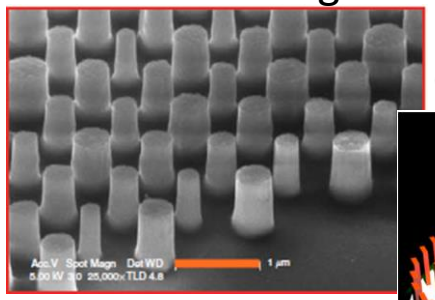
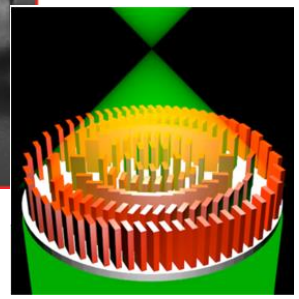
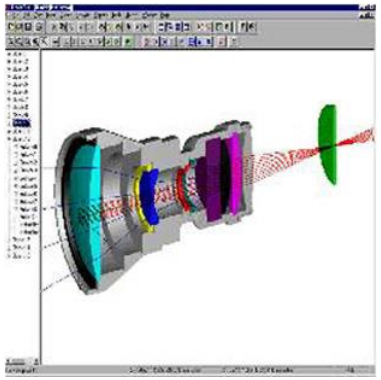
Nano-scale design



Component design



System Integration



Planopsim's mission

Planopsim supplies **R&D tools** to **engineers** & **scientists** that allow to unlock the maximum benefit of **flat optics** in a **user-friendly** way.

- Computer Aided Design software for Planar Optics & metasurfaces
  - All-in-one design workflow
- Design service for metasurfaces and photonics
  - In-house and 3^{d} party tools

Meta-optics project flow

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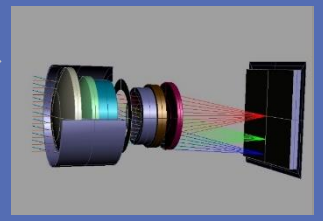
PlanOpSim Support solution

PlanOpSim Software solution

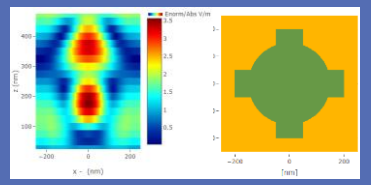
META CELL | META COMPONENT | LIBRARY | JOB OVERVIEW

Concept
- Feasibility
- Specs

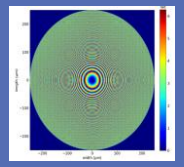
System model
- Ray tracing



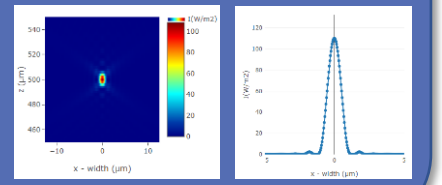
Nanostructure
- Full wave RCWA
- Structure library



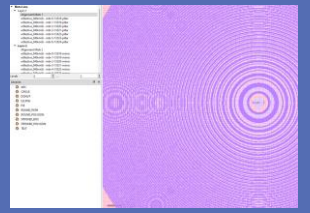
Component design
- Propagation
- Wavefront design



Validation
- Propagation
- Non-idealities



Fabrication
- gds export



REPORT

MASK

User Response

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Customers: software & design services

NIST National Institute of Standards and Technology U.S. Department of Commerce
20 YEARS TECH FOR IMPACT ASTRI
VIAVI Solutions
METRONOM HEALTH
ACTEGA
spectricity
BARCO
ibeo automotive
UNSW AUSTRALIA
Stanford University
HUAWEI
BARAJA
IPG PHOTONICS
MORROW
HELLA
JENOPTIK

User feedback

Thank you very much! I'm **really enjoying the application** already, the examples are great. The metacell portion is **very intuitive** for anyone familiar with modeling periodic structures.

I found the PlanOpSim Software **most useful and appropriate for designing metalenses**. It really helped me to design the required lenses **with ease and instantaneous results**. We would like to continue using the software for our research. We are interested in both meta cell and meta component modules.

I think the software is a **real time saver**, I will be happy to use it in the future, thanks again!

Unique tool for meta-surface design

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	PlanOpSim Enlightened Planar Optics	Ansys Lumerical	LightTrans	Synopsys
CLOUD OR LOCAL	✓	✗	✗	✗
INTUITIVE LEARNING CURVE	✓	✗	✗	✗
LARGE AREA	✓	✗	✗	✗
INTEGRATION WITH **RAY TRACING**	✓	✓	✓	✓
SCRIPTING	✓	✓	✓	✓
EXPORT TO **MANUFCATURING**	✓	✗	✓	✓
FULL METASURFACE **WORKFLOW**	✓	✓	✗	✓
DEDICATED META-SURFACE **SUPPORT**	✓	✗	✗	✗

- Dedicated meta-surface UI and design workflow
- Multi-scale simulations from nano- to macroscale
  - Meta-atom -> full wave RCWA
  - Components -> Physical optics
  - Systems -> Integration to ray-tracing (new June 2023)
- High speed simulation

What's new?!

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- **New features**
- **Large area design**: Meta-components up to 169'000'000 meta-atoms (6,3x6,3mm^2)
- **Batch selection** of meta-atoms
- **Angular** analysis and optimization
- **Wave-to-ray interface**
  - Direct export to OpticStudio
  - Efficient DLL computation
  - Straightforward workflow
- Supported applications:
  - Hybrid meta-system design
  - Dispersion engineering
  - Angle dependence of meta-surfaces
  - Sequential and non-sequential mode

Meta-lens in ray-tracing

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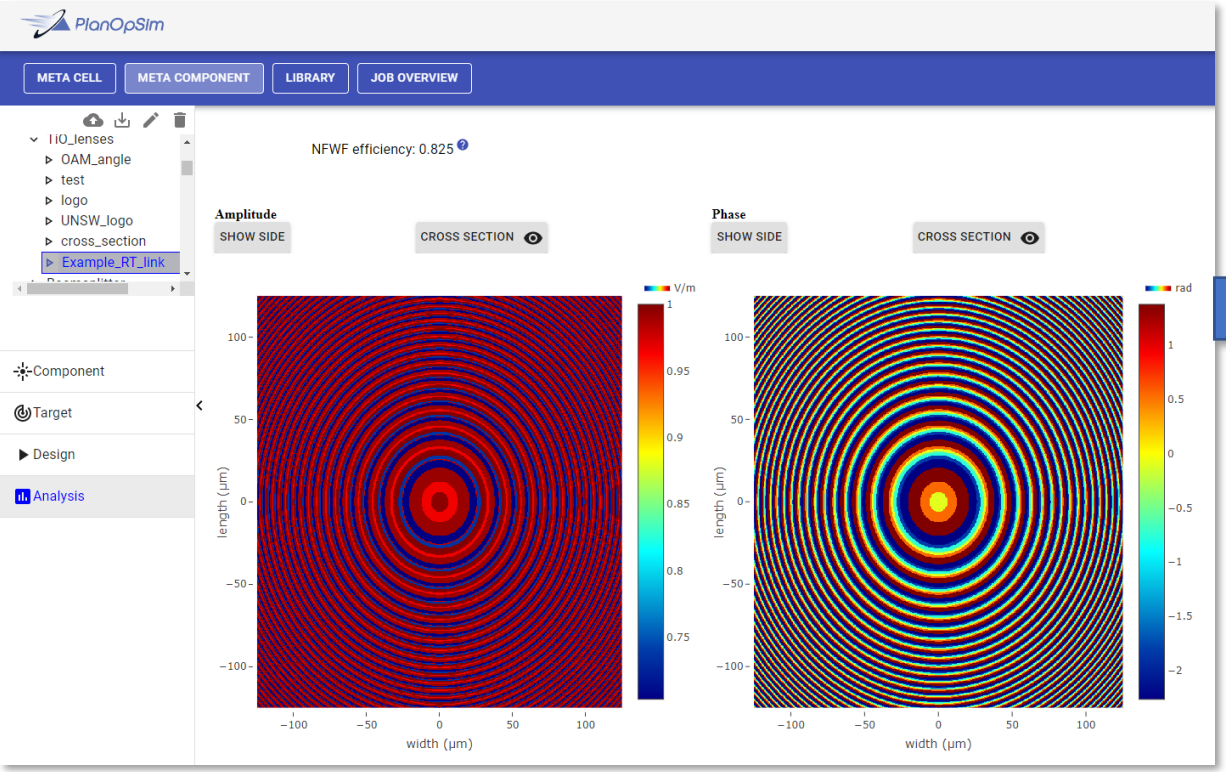
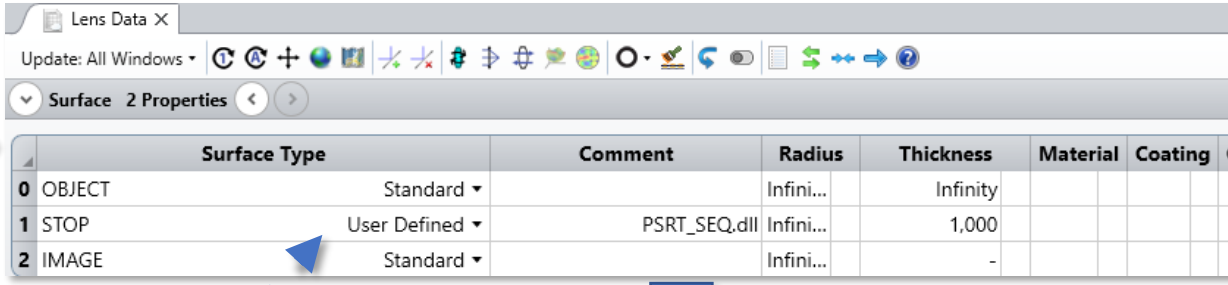
PlanOpSim: metasurface design & wavefront analysis

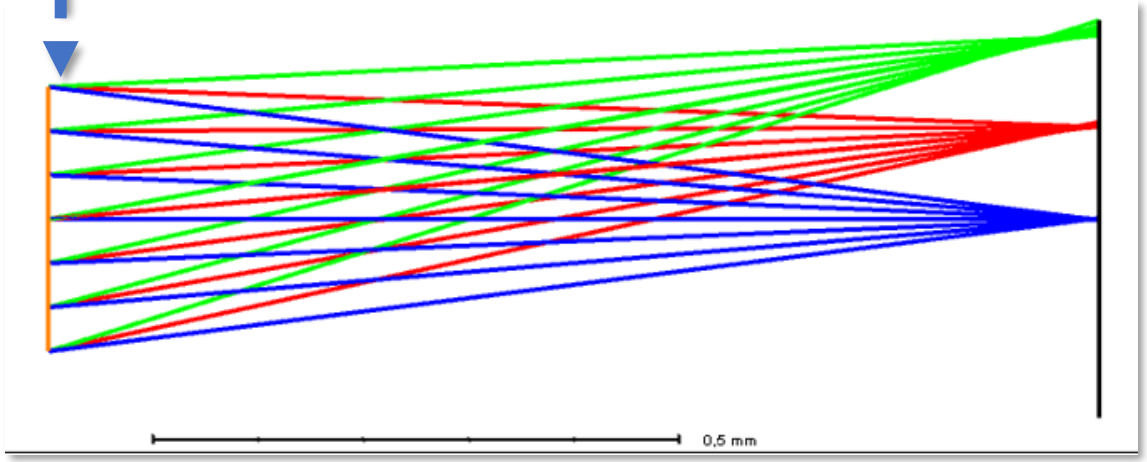




Imported meta-surface

- Meta-surface design in PlanOpSim:
  1. Design
  2. Decompose
  3. Export PSRT & DLL
- Meta-lens import to OpticsStudio

Meta-surface response in ray tracing



Meta-surface in system

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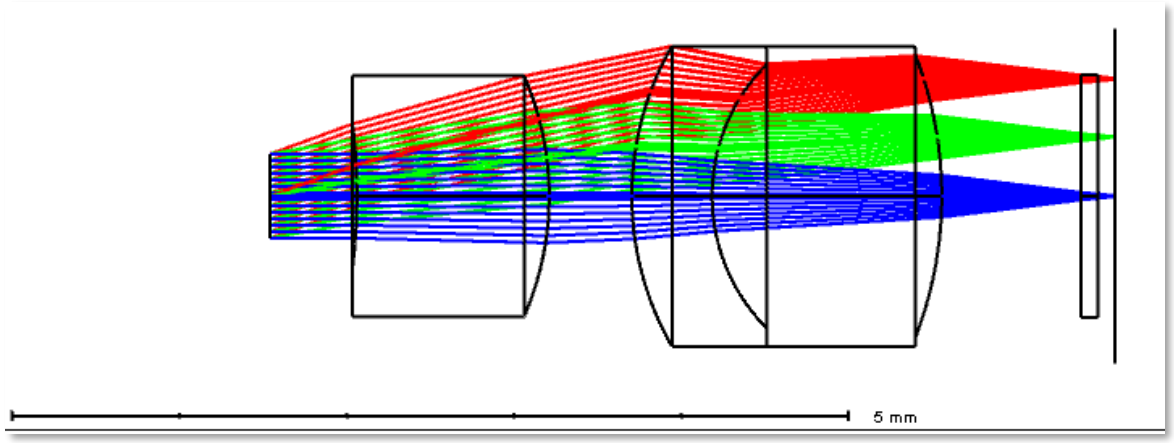
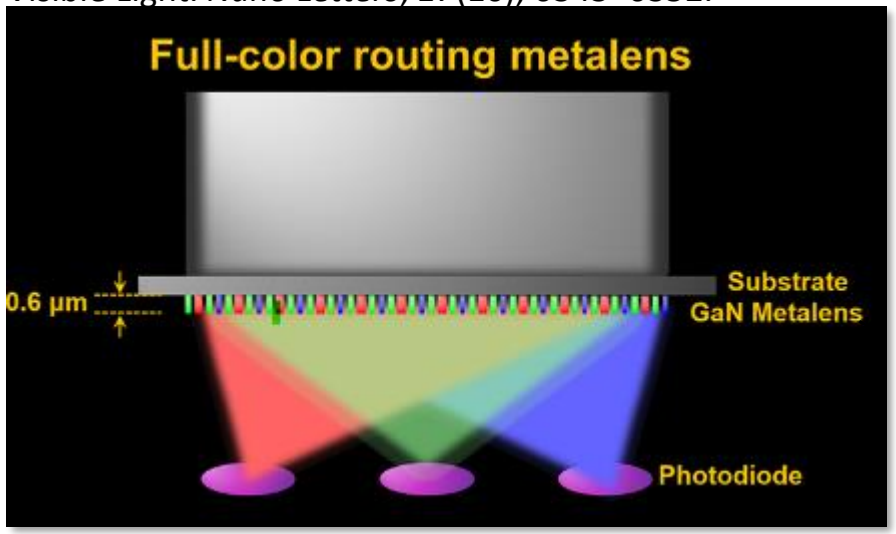
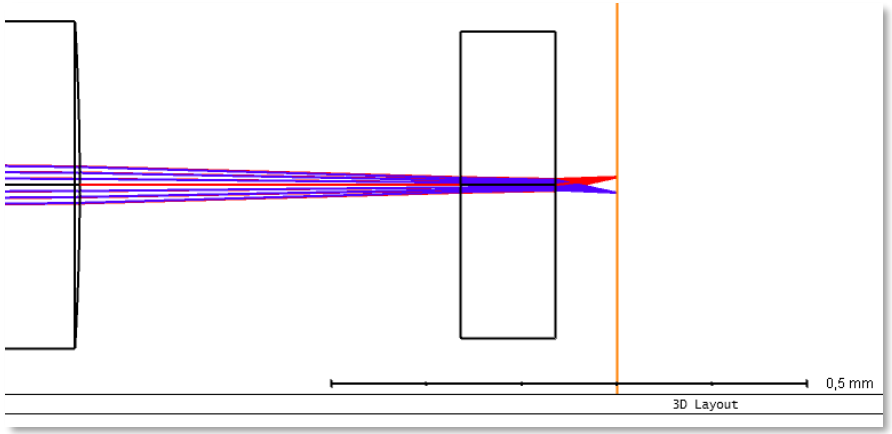
- Example: **Pixel level colour routing in system**
  Classical design: telecentric imaging system

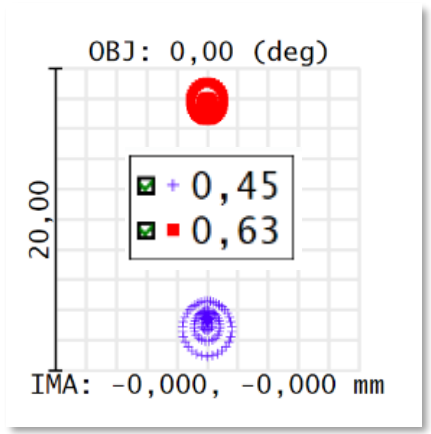


*Based on: GaN Metalens for Pixel-Level Full-Color Routing at Visible Light. *Nano Letters*, *17*(10), 6345–6352.

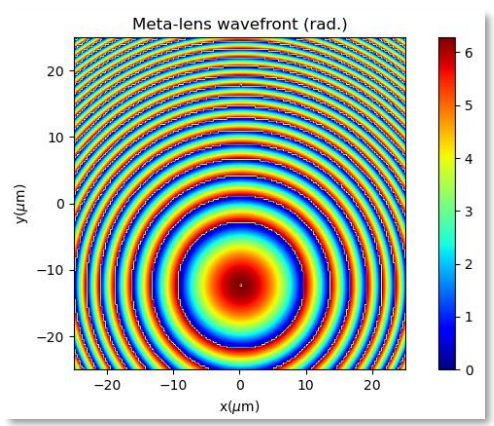


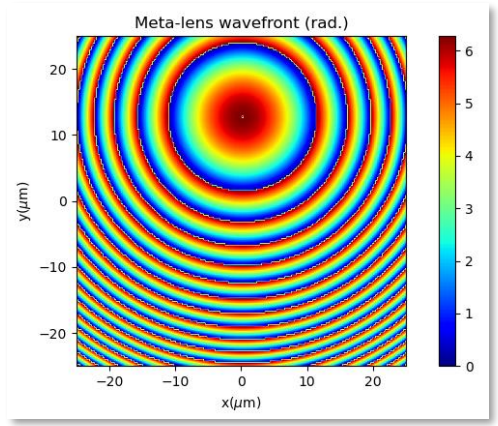
- Colour multiplexing meta-lens **designed and exported from PlanOpSim**





Wavelength multiplexed meta-lens





OPTICA
Formerly OSA

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European Photonics Industry Consortium

Contact us to participate in Beta test!

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