



3D PRINTING FOR ASTRONOMICAL MIRRORS

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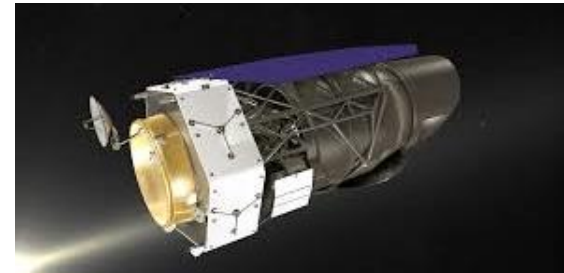


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3D printing for astronomical mirrors

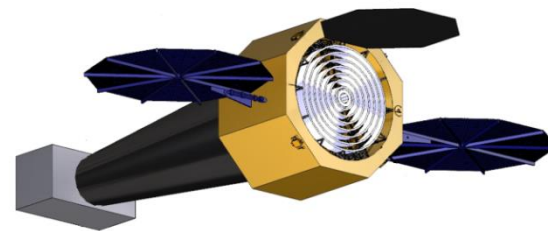
Project I: Off axis parabolas

WFIRST
2024
Infrared telescope



Project II: Lightweight mirrors

LYNX
2040?
X-Ray telescope



Context

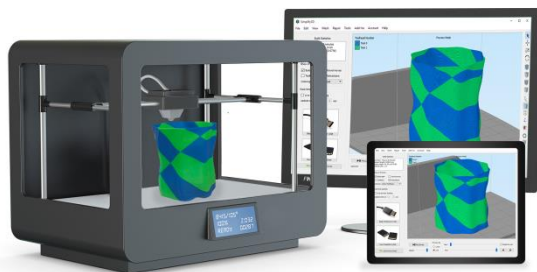
- **Requirements**

- Large collecting area
- High resolution
- Low weight

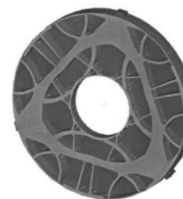


- **Tools**

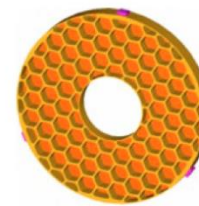
- Active optics
- 3D printing
- Topological optimisation
- Polishing process



a) Optimized topology



b) Verification model



a) Lightweight hexagonal cell pattern



[Unit: mm]

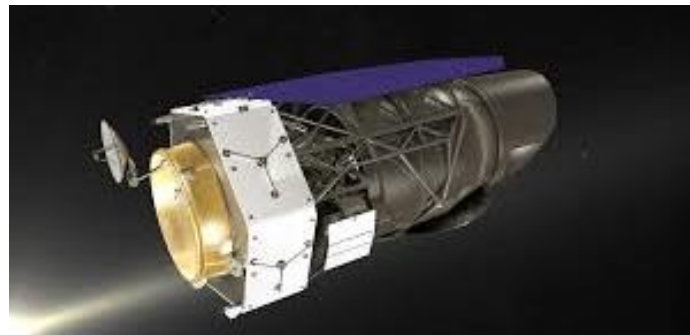
b) Dimension of the unit hexagonal cell

Objectives

WFIRST telescope (LAM):

Stress polishing of mirrors for exoplanet imaging

- Warping harness FEA Simulation & optimization
- 3D printing ultra-lightweight warping harness
- Development of a new fabrication process



Objectives

LYNX x-ray surveyor (UK ATC):

3D printing and lightweight / high precision structures

- Comparison of the 3D printing process and material
- Properties of lightweight structure in 3D printing
- Study the feasibility of substrates polishing

