NASA SBIR/STTR Technologies

High-Resolution, High-Efficiency Curved Diffraction Gratings Fabricated by Conformable, Maskless, 100-nm Lithography

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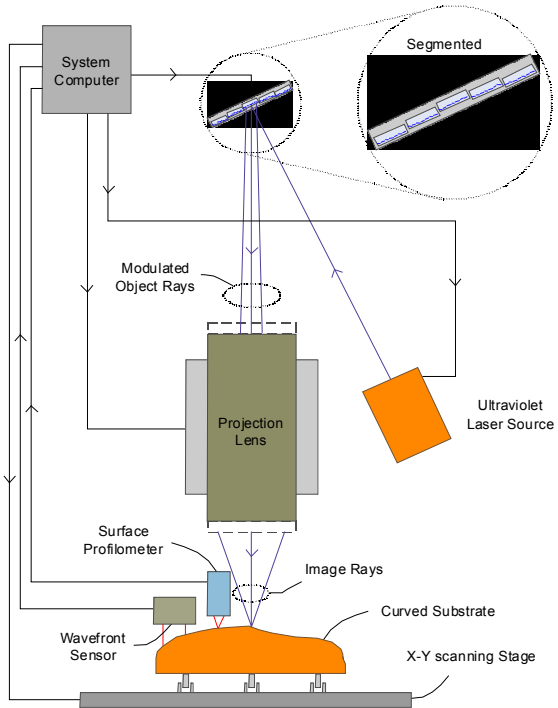
Topic No. S1.06 UV and EUV Optics and Detectors

Description and Objectives

Develop a conformable maskless lithography technology for fabricating curved ultraviolet diffraction gratings:

- Maskless lithography combined with Anvik's proprietary conformable lithography technique enables maskless patterning on curved substrates.
- Capability to achieve sub-micron resolution on highly curved substrates.
- High throughputs are achieved by means of seamless hexagonal scanning lithographic process.

Conformable Maskless Lithography System



Technical Approach

The technical effort will include five key areas of research: (i) Identification of requirements for curved gratings; (ii) Determination of mask design rules; (iii) Identification of spatial light modulators; (iv) Demonstration of the feasibility of conformable maskless lithography; and (v) Layout of a conformable maskless lithography system and throughput analysis.

NASA and Commercial Applications

Scientific Instrumentation • Curved Focal Plane Arrays • Medical Iimplants • Wide Field-of-View Remote Sensing and Surveillance Systems

Activity	Month 1	2	3	4	5	6	7 – 30
Phase I							
1. Identify requirements for curved ultraviolet dif fraction gratings.	▬	▬					
2. Determine 'mask' design rules , adjusting for substrate curvature .		▬	▬				
3. Identify spatial light modulators for integation into the conformable maskless lithography tool.			▬	▬	▬		
4. Demonstrate the feasibility of fabricating curved gratings by means of maskless lithography .				▬	▬	▬	
5. Layout a preliminary design of a conformable maskless lithography system.					▬	▬	
Phase II							
Develop a conformable maskless lithography tool, and fabricate curved ultraviolet dif fraction gratings.							▬