ARNOLD LIGHWEIGHT MIRROR MODELER

VERSION 2.0

WILLIAM R. ARNOLD, SR
DEFENSE ACQUISITION, INC
(SUBCONTRACT WITH JACOBS ESTS)
HUNSTVILLE, ALABAMA

H. PHILIP STAHL
NASA MSFC, HUNTSVILLE, AL.

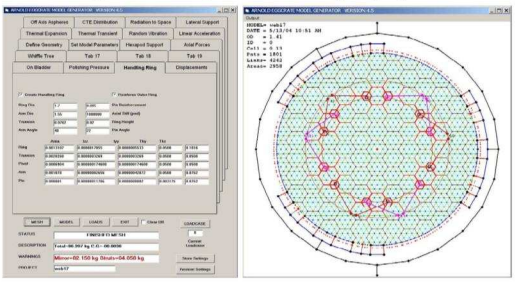
HERITAGE

- **SECOND GENERATION OF EGGCRATE MODELER DEVELOPED AT L3-COMM BRASHEAR, PITTSBURGH, PA. USED TO DESIGN PRIMARY MIRROR, SUPPORT SYSTEM AND MIRROR HANDLING EQUIPMENT FOR THE KEPLER PLANET FINDER.**
- **COMPLETE REWRITE FOR USE ON WINDOWS 7 AND ABOVE OPERATING SYSTEMS.**
- **EXPANDED TO MULTI-SEGMENT MIRROR AS WELL AS SINGLE MIRROR SYSTEMS.**

INTEGRATED PRODUCT DESIGN

L3 communications Brashear | CORNING | JDS Uniphase OCLI Products | Ball Aerospace & Technologies Corp.

Integrated Design of Handling Equipment



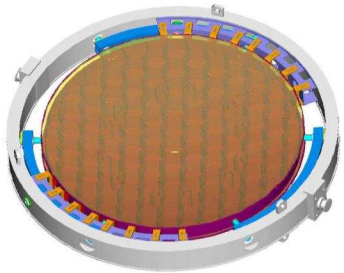
Design tool allows evaluation and design of handling fixtures during the preliminary design of the mirror blank. As mirrors become lighter, the difficulties of handling the glass during manufacturing requires careful attention to these operations. Special reinforced features were added to the blank specifically to aid the manufacturing process and reduce risk.

Kepler

CONVERT ANALYSIS TO DESIGN

L3 communications Brashear | CORNING | JDS Uniphase OCLI Products | Ball Aerospace & Technologies Corp.

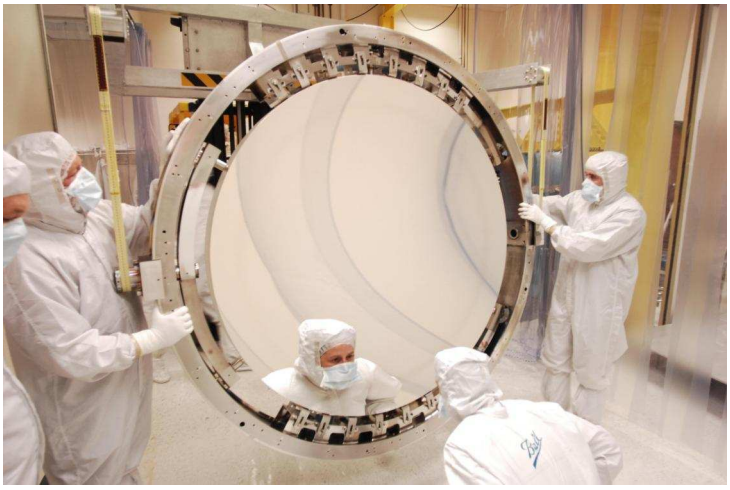
Primary Mirror in Flipping Ring



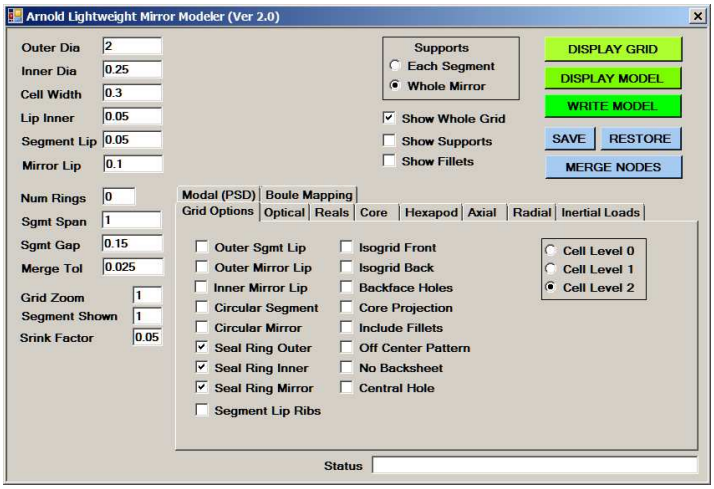
The handling ring interfaces with special reinforced slots in the mirror core. With the addition of storage shields, the unit can act as a temporary container. Does not touch optical surfaces or fragile edges.

Kepler

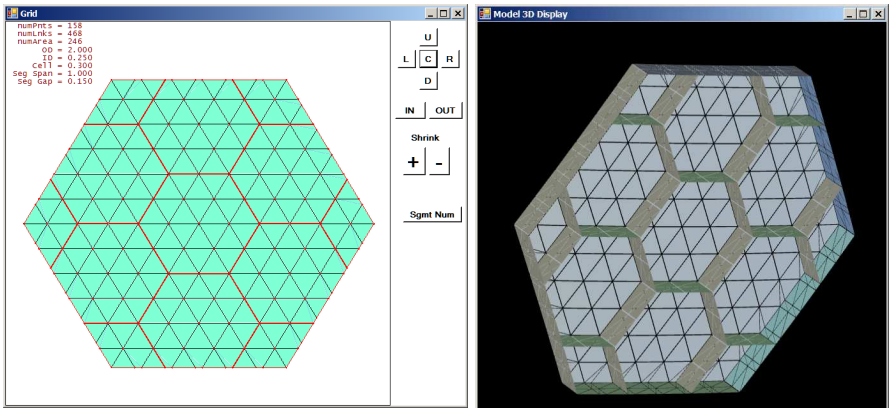
THE FINAL PRODUCT



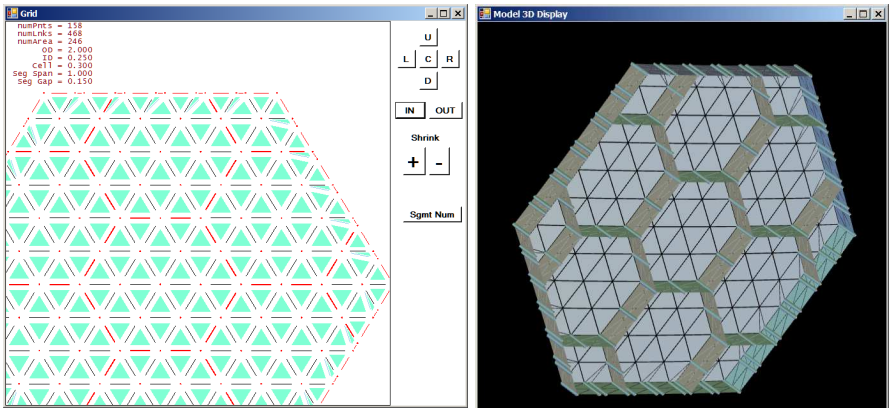
PROGRAM CONTROL WINDOW



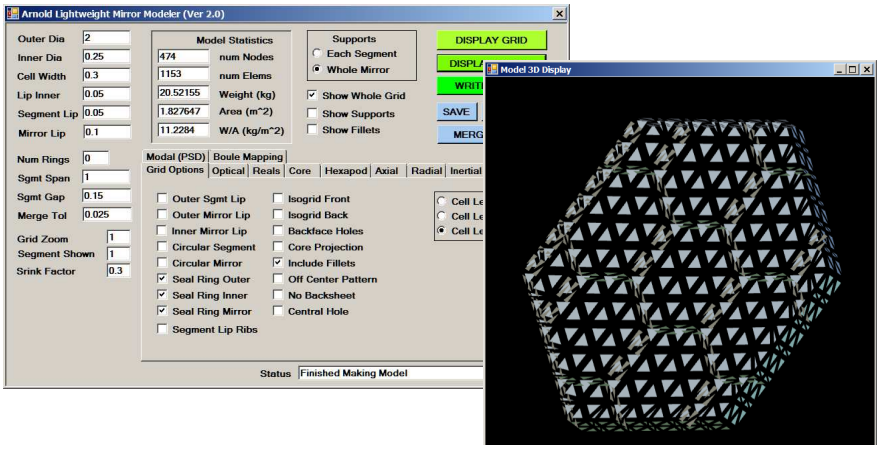
BOTH 2D AND 3D DISPLAYS



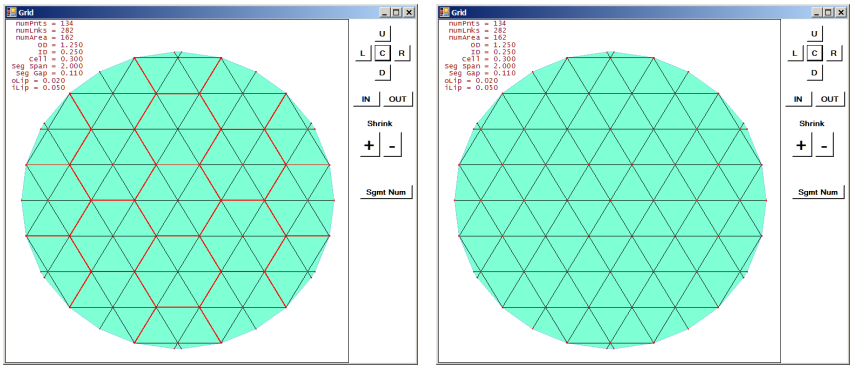
GUI ALLOWS PAN AND ZOOM



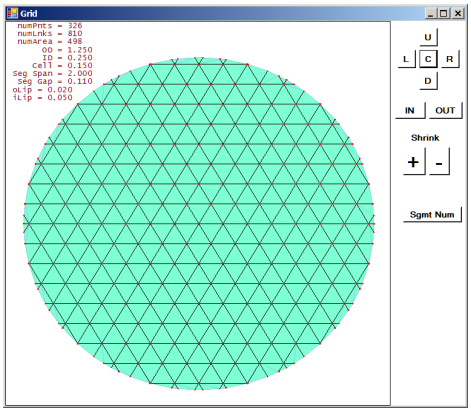
ELEMENT SHRINK HELPS UNDERSTAND MESH



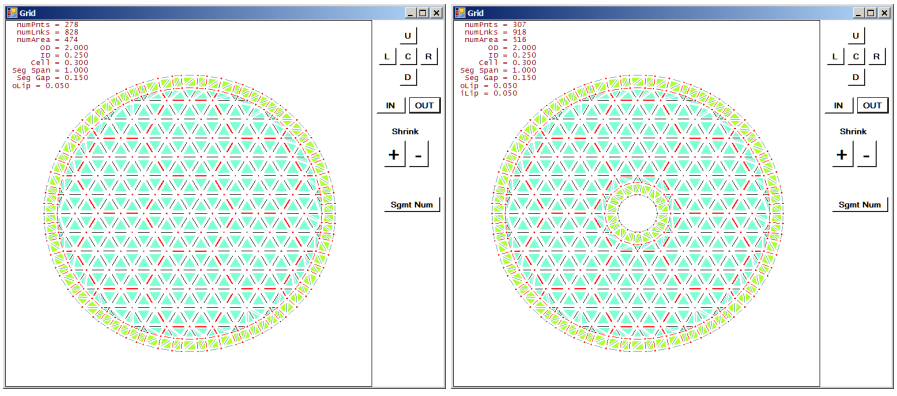
ALSO ISOGRID AND SIMPLIFIED MESHES



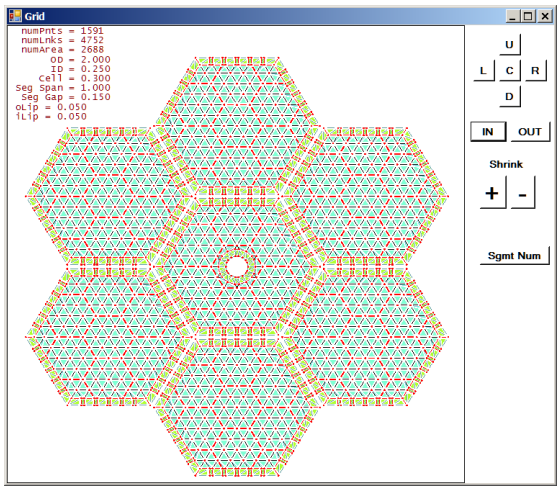
QUICKLY REMESH



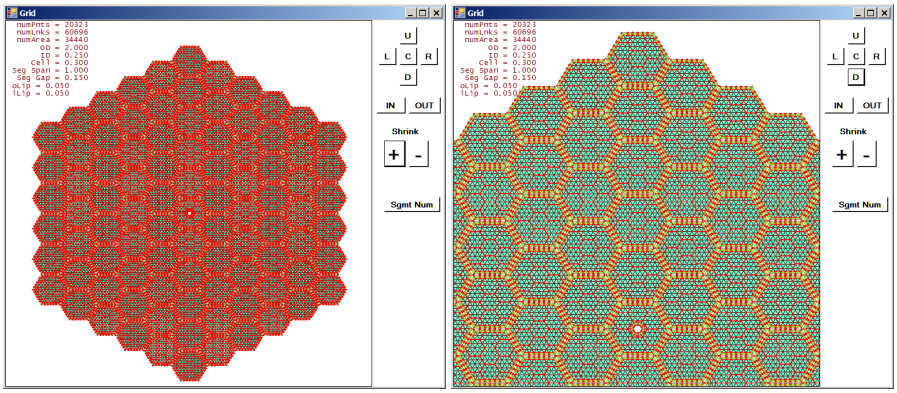
ADD CENTRAL HOLE EASILY



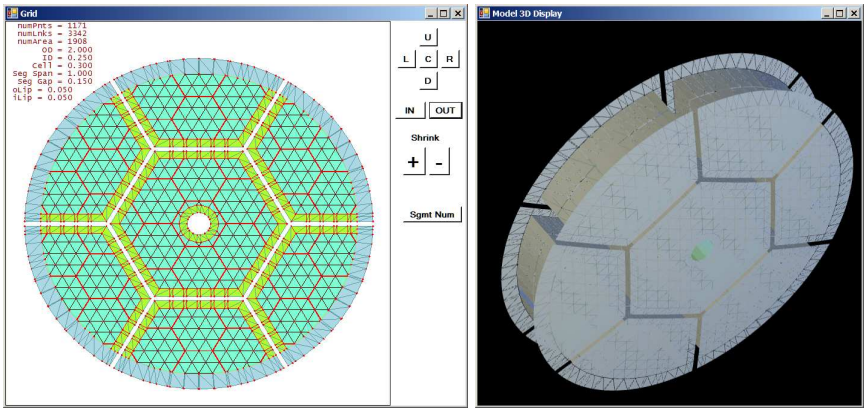
MODEL SEGMENTED MIRRORS



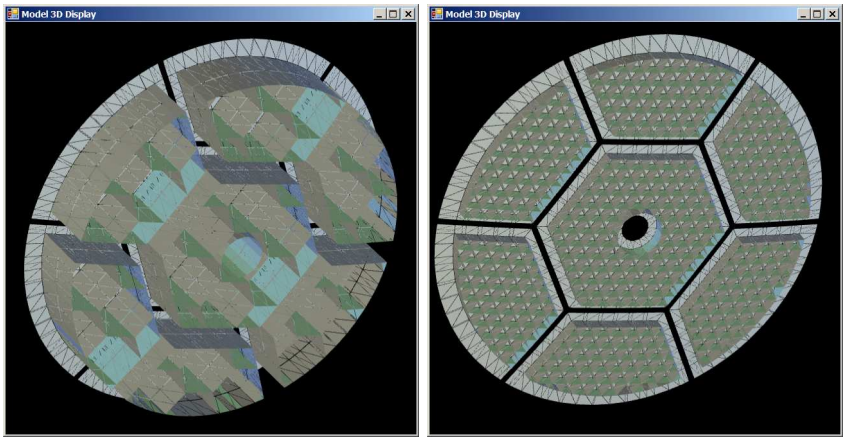
ALMOST UNLIMITED SIZE



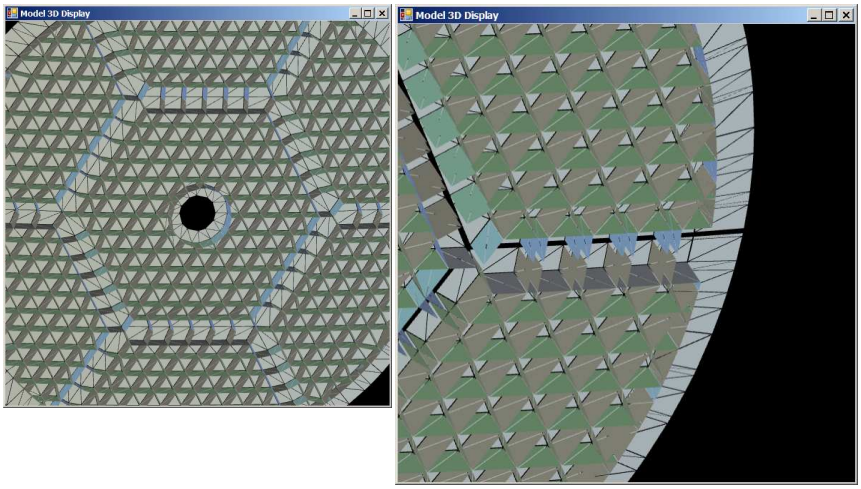
MODEL CIRCULAR SEGMENTED MIRRORS



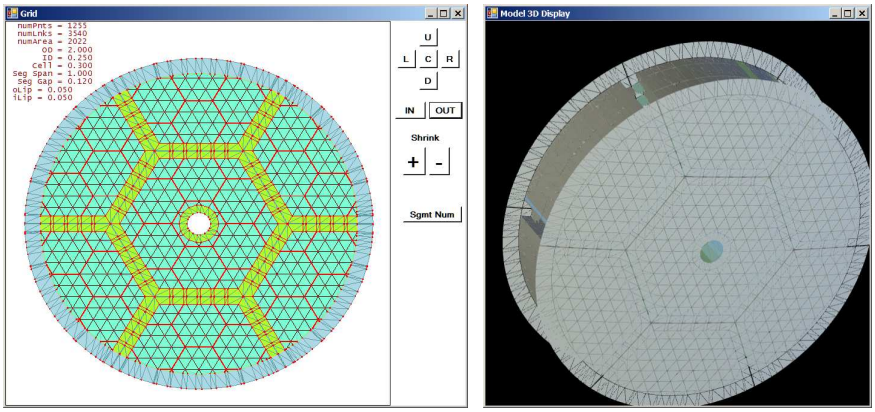
SUPPORTS ISOGRID FACESHEETS



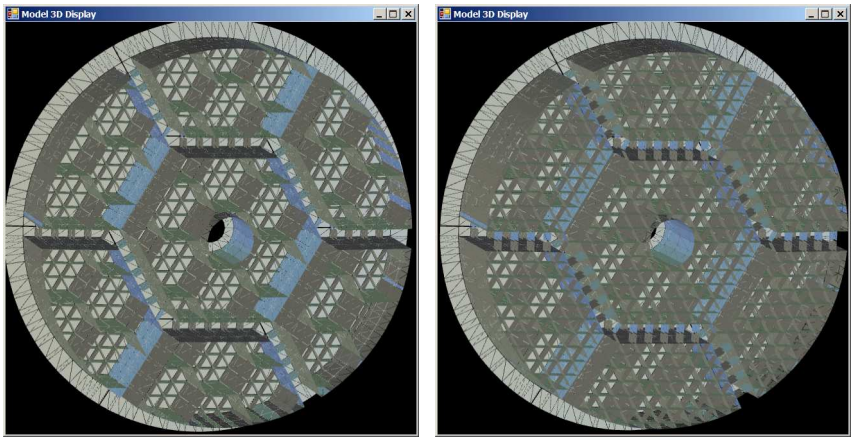
EDGES CAN HAVE RIBS



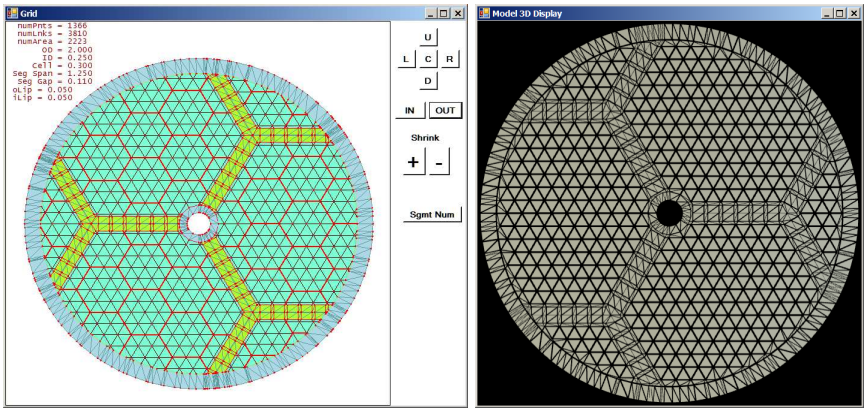
MODEL CAN BE MERGED IN ONE MIRROR



FRONT AND BACK ISOGRIDS SUPPORTED

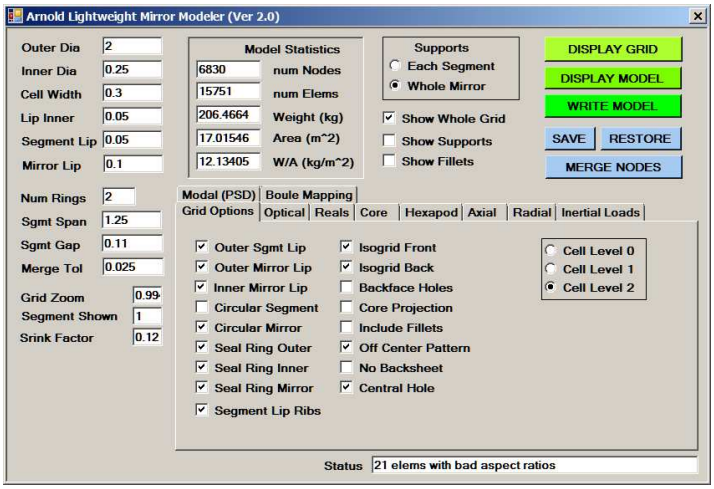


OFFSET SUPER-CELLS SUPPORTED

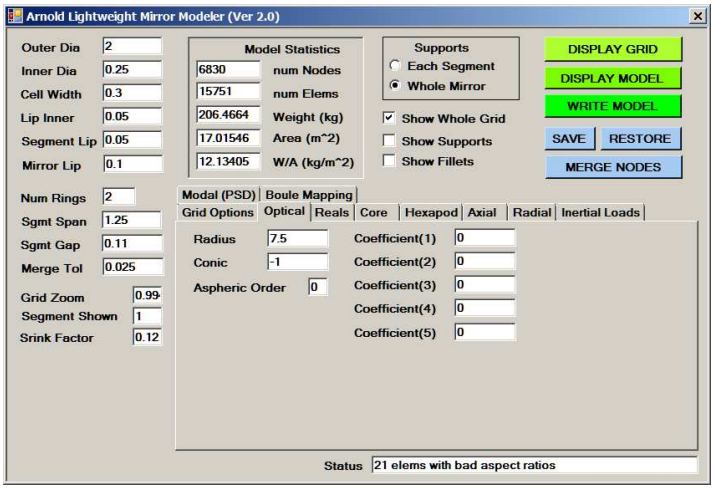


WITH OR WITHOUT SEAL RINGS

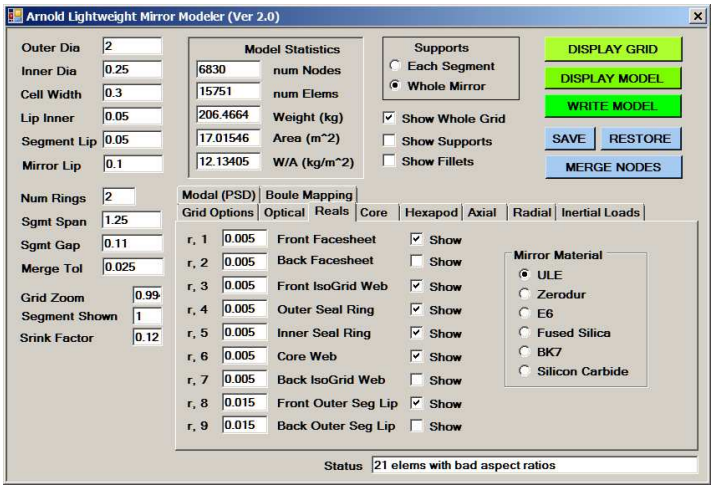
MODEL STATISTICS ON THE FLY



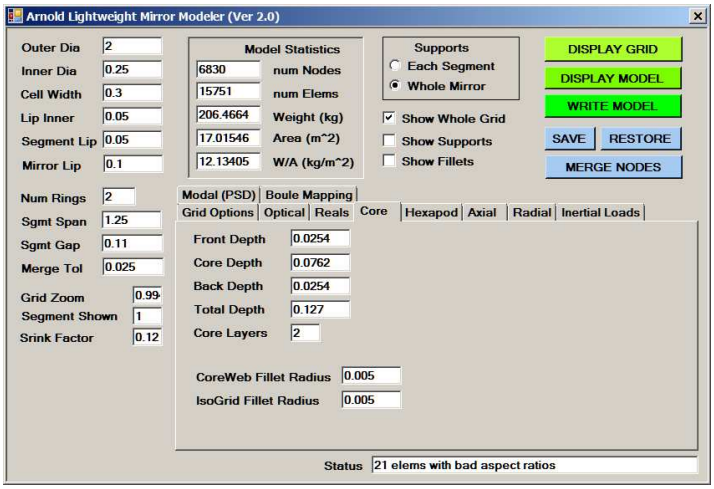
ANY OPTIC SUBSCRIPTION SUPPORTED



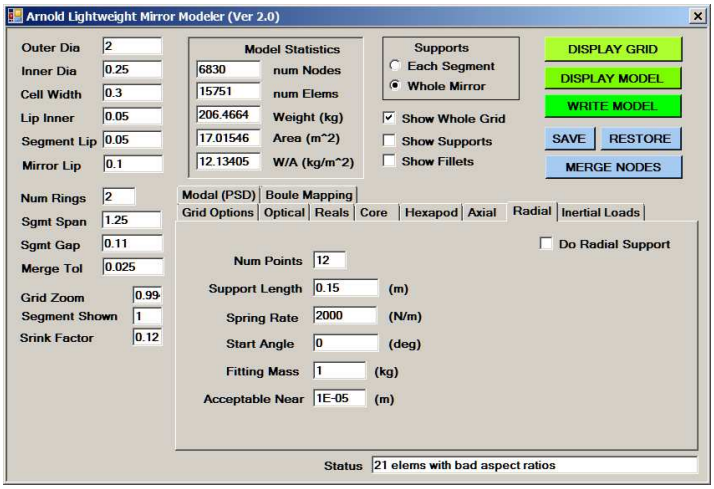
CONTROL OVER MOST VARIABLES



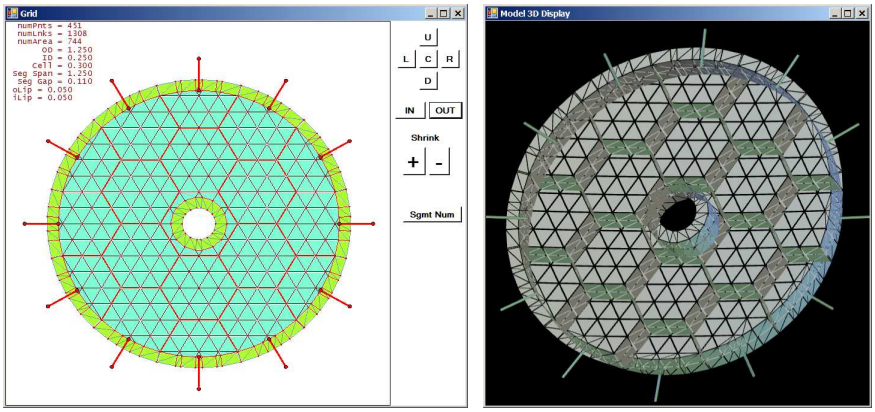
CONTROL OVER CORE DESIGN



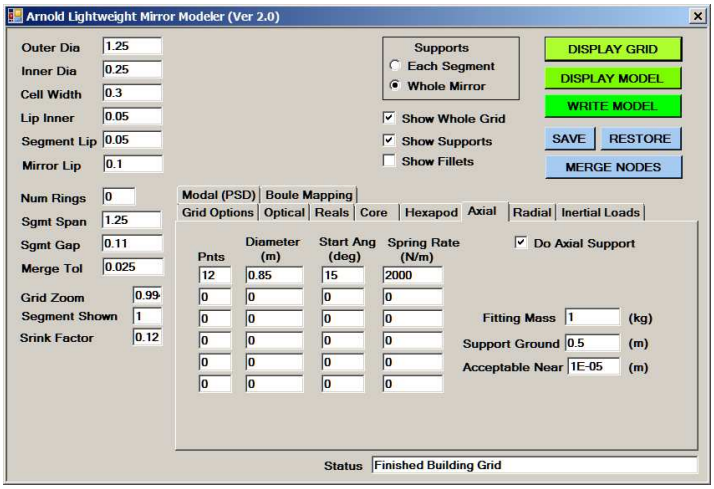
WHOLE MIRROR OR SEGMENT SUPPORTS



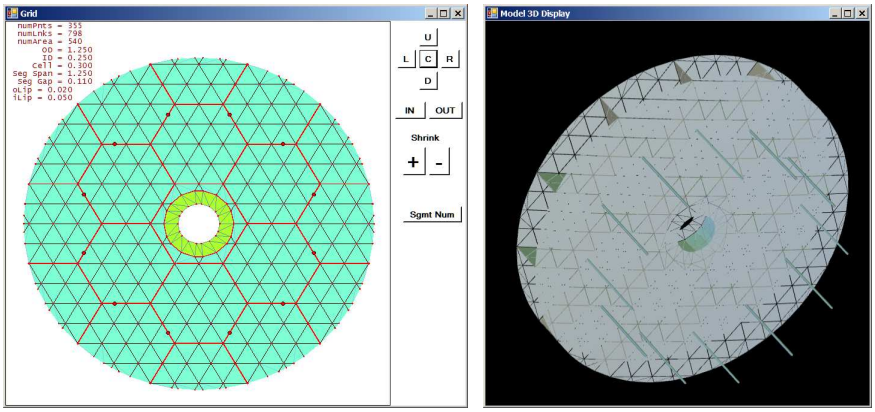
USER CAN ADJUST AND OPTIMIZE



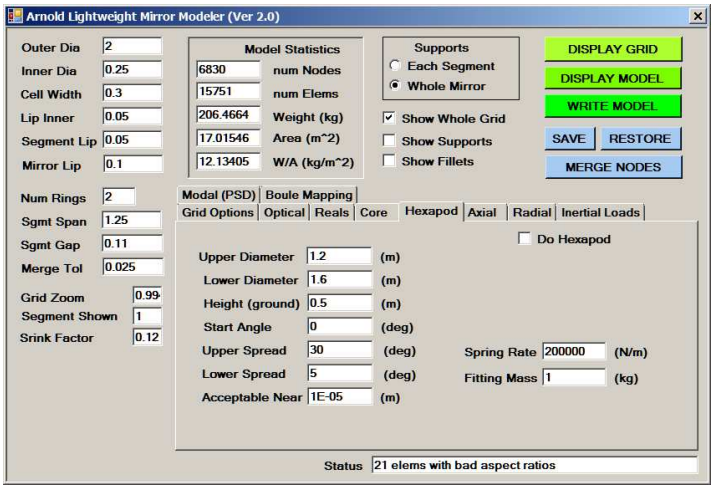
AXIAL AS WELL AS RADIAL STYLES



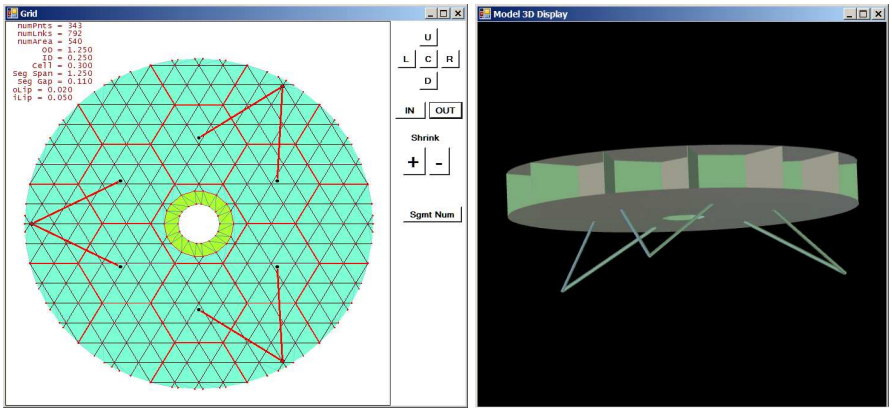
MODEL TEST MOUNTS, ETC



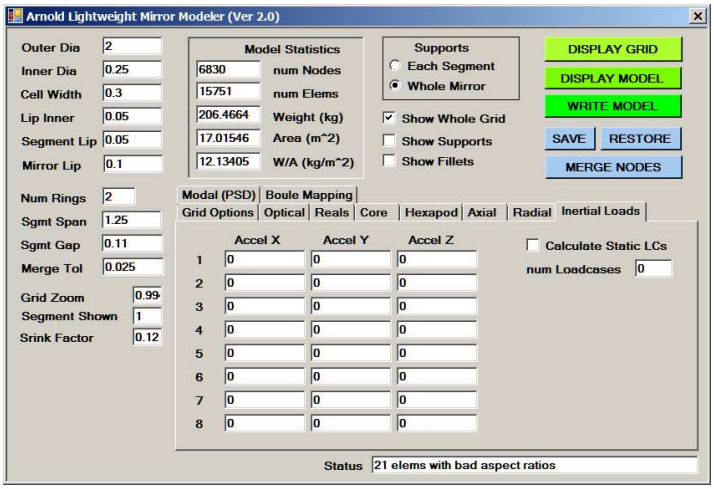
ANY VARIETY OF HEXAPOD SUPPORT



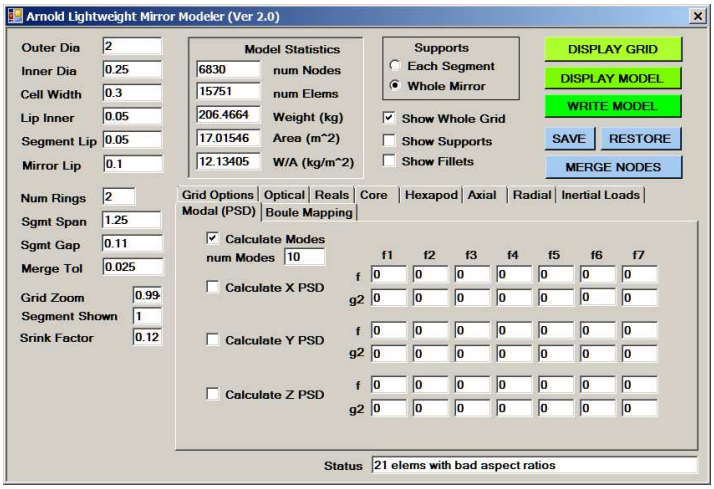
WHOLE MIRROR OR EACH SEGMENT



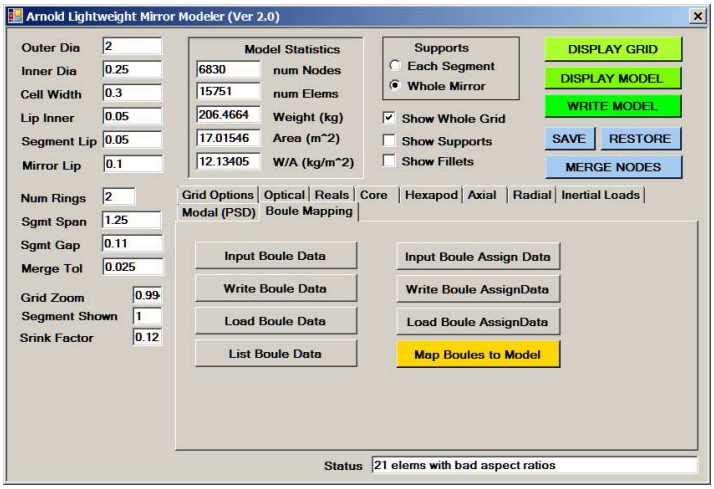
GENERATE STATIC LOADING CONDITIONS



GENERATE DYNAMIC LOADING SETS



(IN WORK) ULE CTE MAPPING



FUTURE ENHANCEMENTS

- FINISH CTE MAPPING
- LOCALIZED MESH REFINEMENT AT ATTACHMENT POINTS
- REAL CONSTANT BASED COLOR 3D DISPLAY OF MODEL
- AUTOMATIC BAD ASPECT RATIO ELEMENT FLAGGING/PLOTTING
- HEXAPOD GEOMETRY OPTIMIZATION
- EXPAND ANSYS GENERATED DATA SUMMARIES
- ABACUS OUTPUT FORMAT (LOW PRIORITY FOR NOW)
- NASTRAN OUTPUT FORMAT (NEEDS SPONSOR)

- USER MANUAL
- TUTORIAL(S) ON HOW TO USE MODELER
- SHORT COARSE IN ADVANCED MIRROR DESIGN METHODS