SH-60 Simulator Visual System Upgrade

Projector Raster Mapping

1.0 INTRODUCTION

The EIS projectors used in the SH-60 Visual System render imagery onto the dome surface with correct geometry for the center eyepoint (CEP) through the use of raster mapping. The projector electronics provide controllable distortion of the raster scanned onto the CRT faceplate so that the projected image, when viewed from the CEP, appears as the flat, rectangular window computed by the image generator (IG). A previous report, "Analysis of Dome Screen Geometry" (Rev 3 30May95), describes in detail the placement of windows and the procedures used for adjusting the raster mapping to produce the correct projection geometry. Although the required raster maps will be generated naturally by following the described procedure, and it is not necessary to compute what they will be in advance, it is nevertheless of interest to depict the shapes of the distorted rasters, primarily to insure that they will make efficient use of the active areas of the CRT faceplates. This report provides depictions of all the raster maps as seen from the front of the CRT faceplate for each projector.

2.0 COMPUTATION OF RASTER MAPS

The raster maps are computed by ray tracing from the geometrically correct window back through the optical path to the CRT faceplate. First, the window is divided into a rectangular grid of ten lines vertically and ten lines horizontally, all equally spaced. The horizontal grid lines are parallel to the raster lines; the vertical grid lines demark equal spacing along the raster. Seen from the CEP (the eyepoint for which geometry is correct), this grid would appear rectangular. Each grid intersection is then projected to the dome on a ray from the CEP. Each dome point, in turn is then projected onto the CRT faceplate on a ray passing through the nodal point of the projection lens. The distorted grid thus mapped onto the faceplate represents the raster shape required to render the window correctly on the dome.

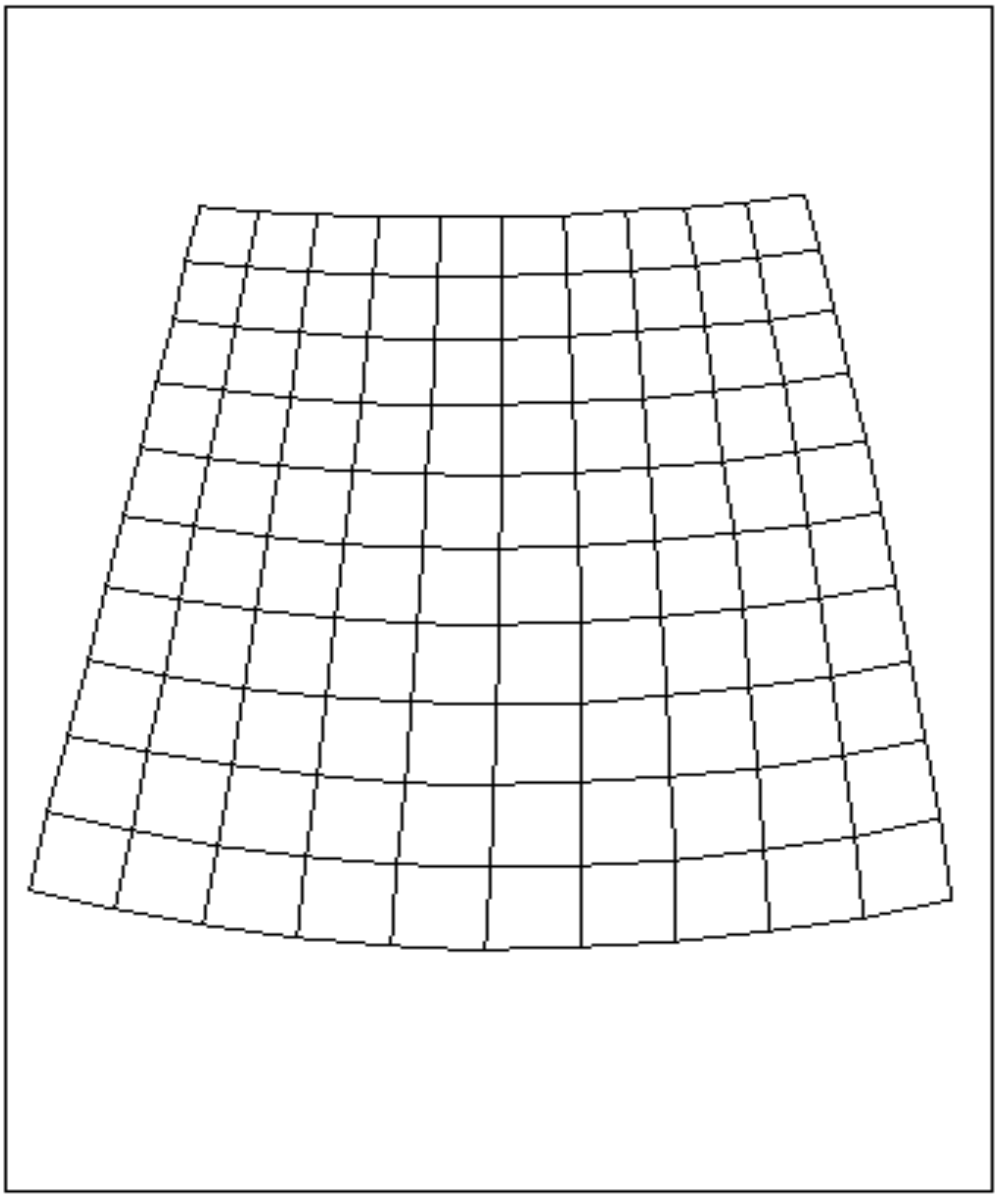
Window placement information is taken from "Analysis of Dome Screen Geometry" cited above. CRT faceplate geometry is computed from the design positions of known landmarks on the projector mounting plates. The view is from the dome looking toward the faceplate. Because the projection lens inverts the image, the top of the window is at the bottom of the raster as scanned on the CRT faceplate.

The raster map depictions are presented in Appendix A.

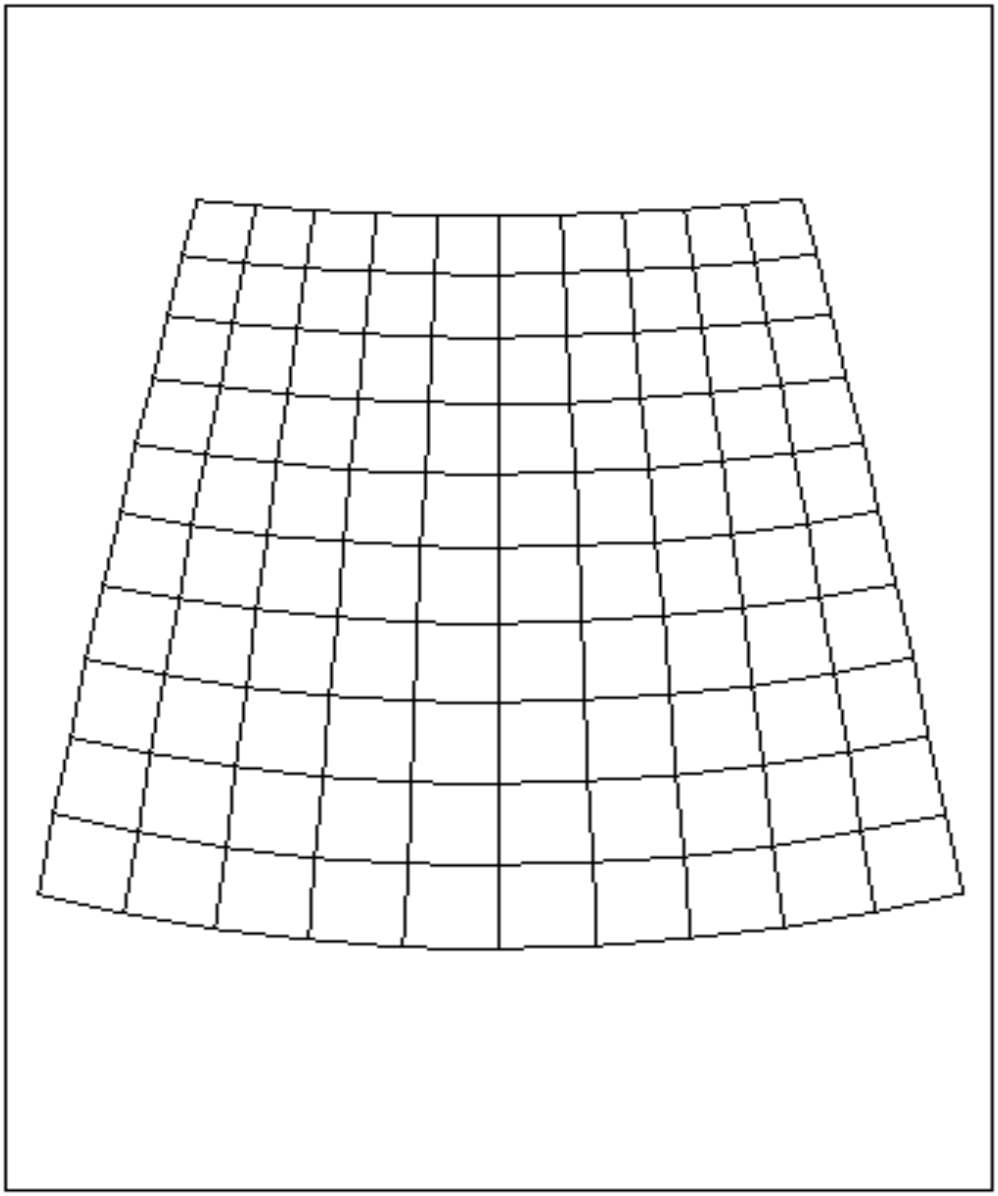
3.0 ANALYSIS

Since the final window placements (described in the report "Analysis of Dome Screen Geometry" cited above) are slightly different than the window placements contemplated when the projector truss was designed, the question naturally arises whether the required rasters actually fit onto the faceplates. Inspection of the raster maps shows that each fits onto the faceplate without difficulty. In addition, each map covers nearly the entire width of the phosphor area, thus utilizing the surface with maximum efficiency.

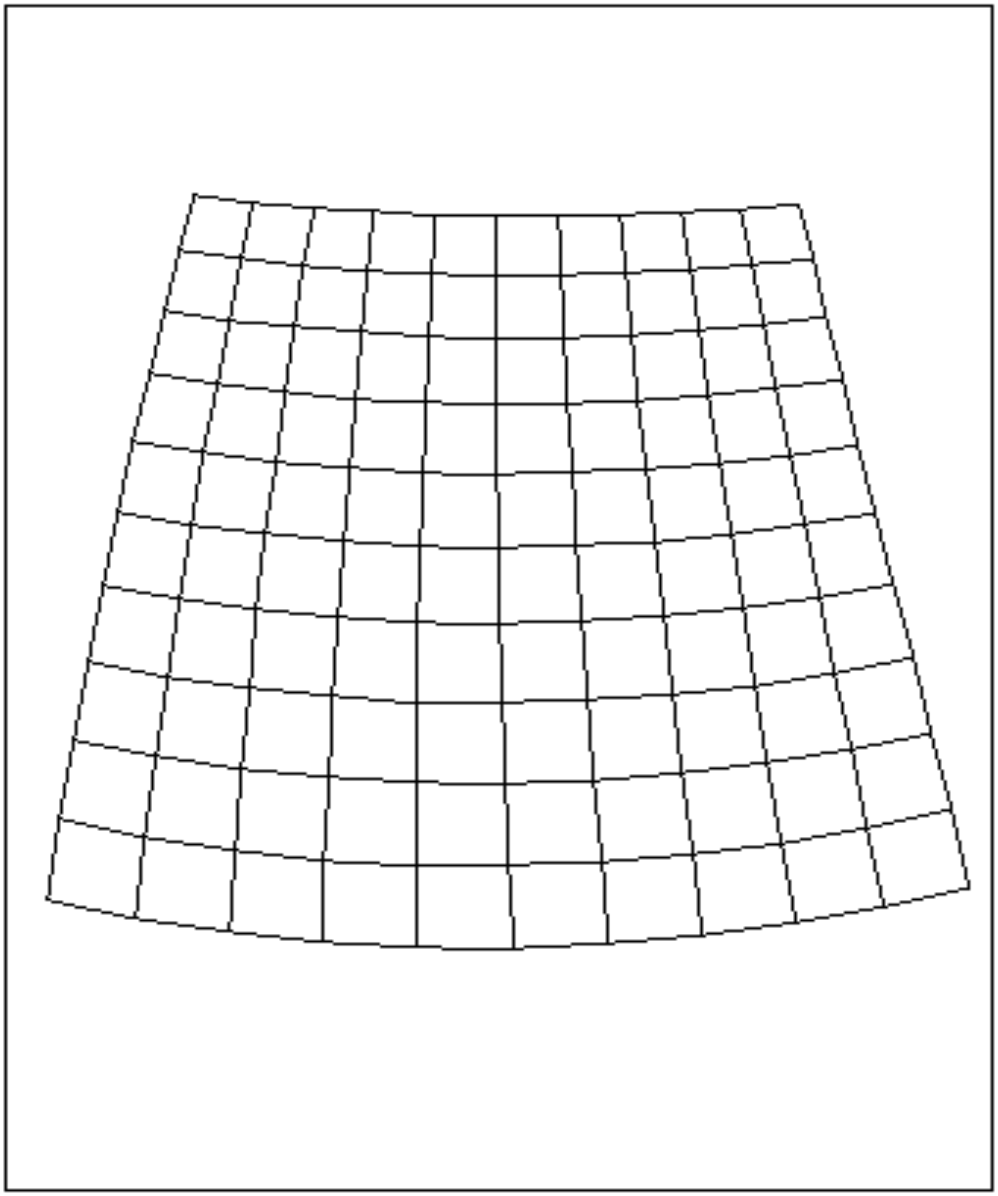
APPENDIX A. RASTER MAP DEPICTIONS



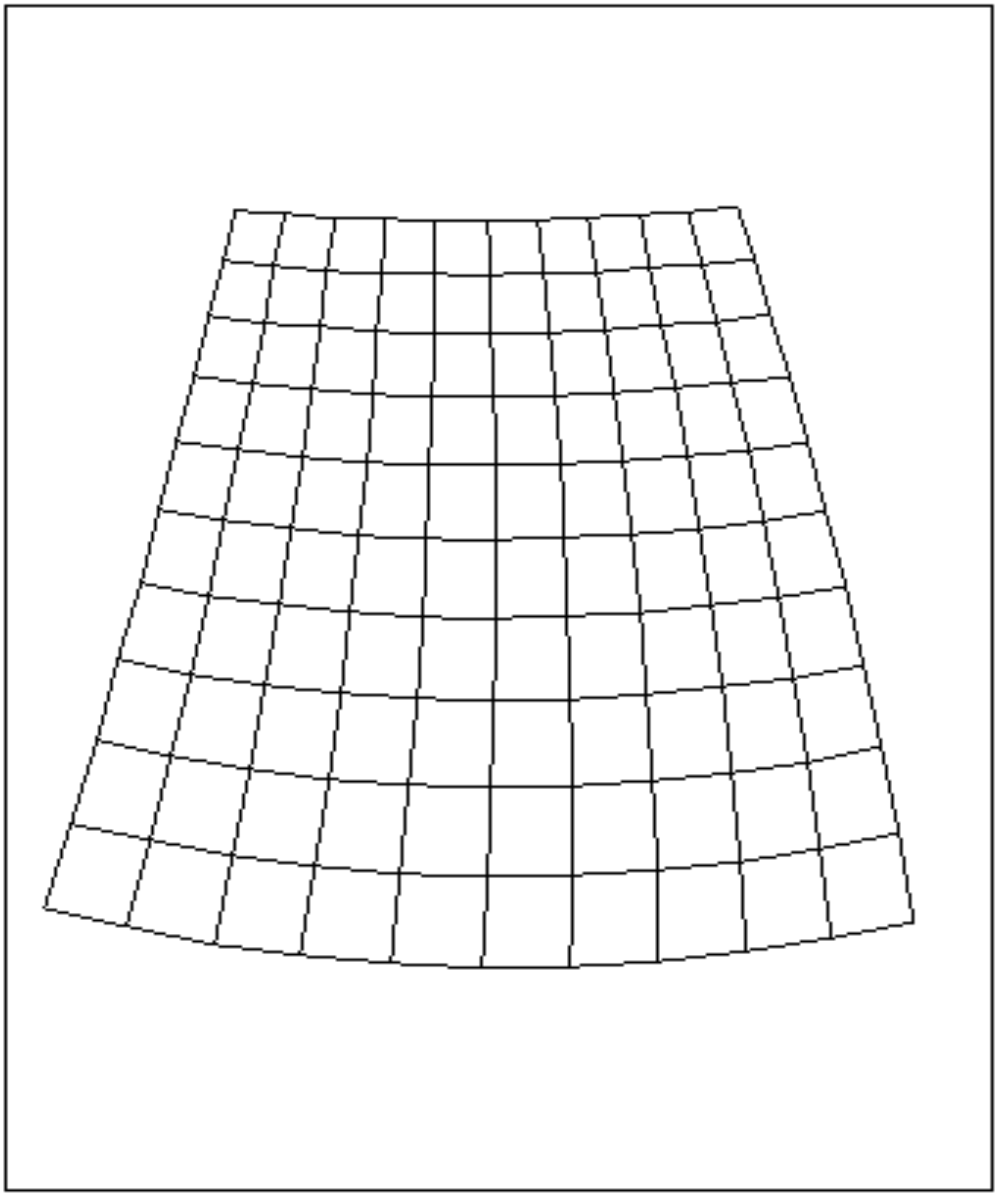
Zone 1 Red Raster Map



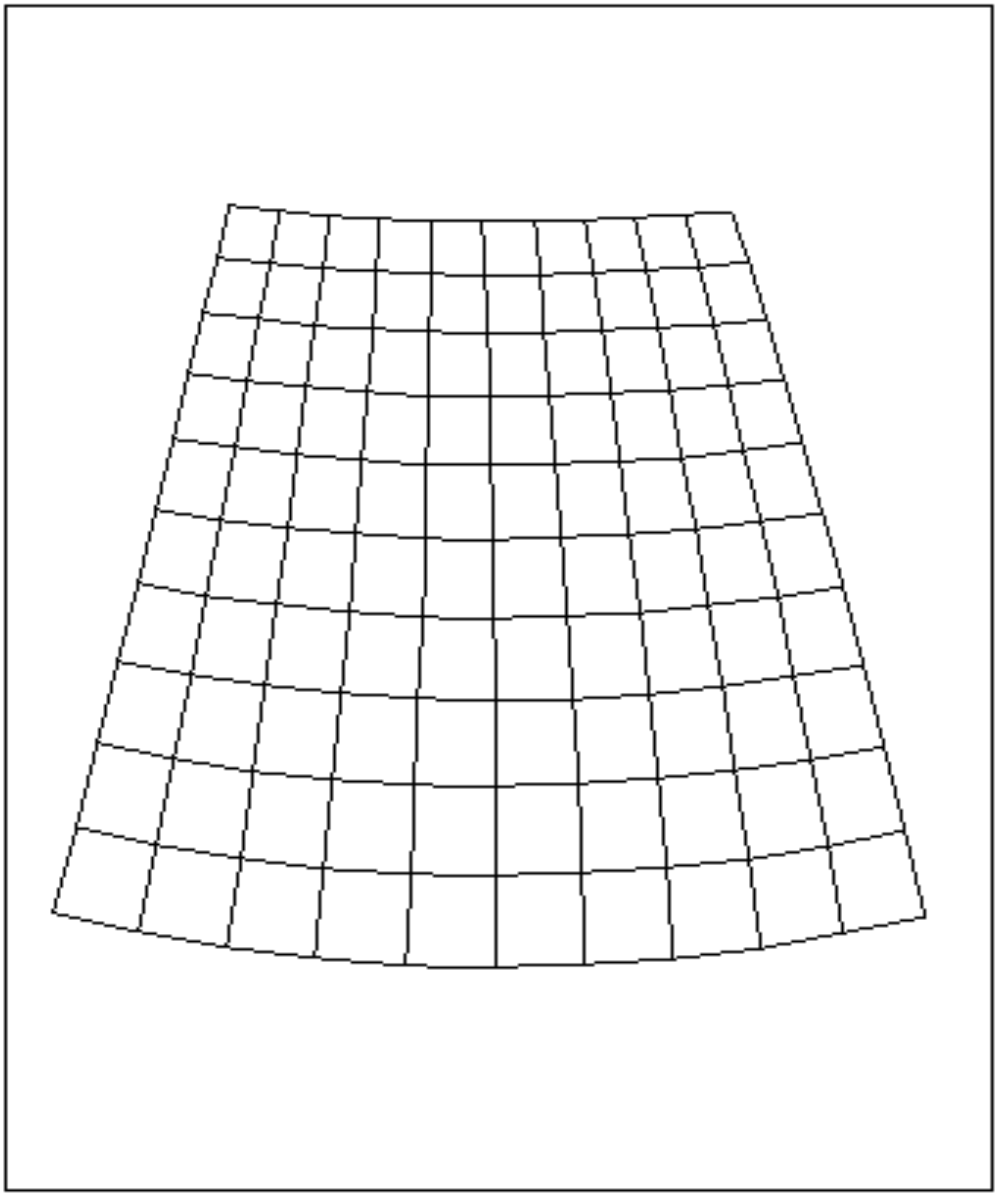
Zone 1 Green Raster Map



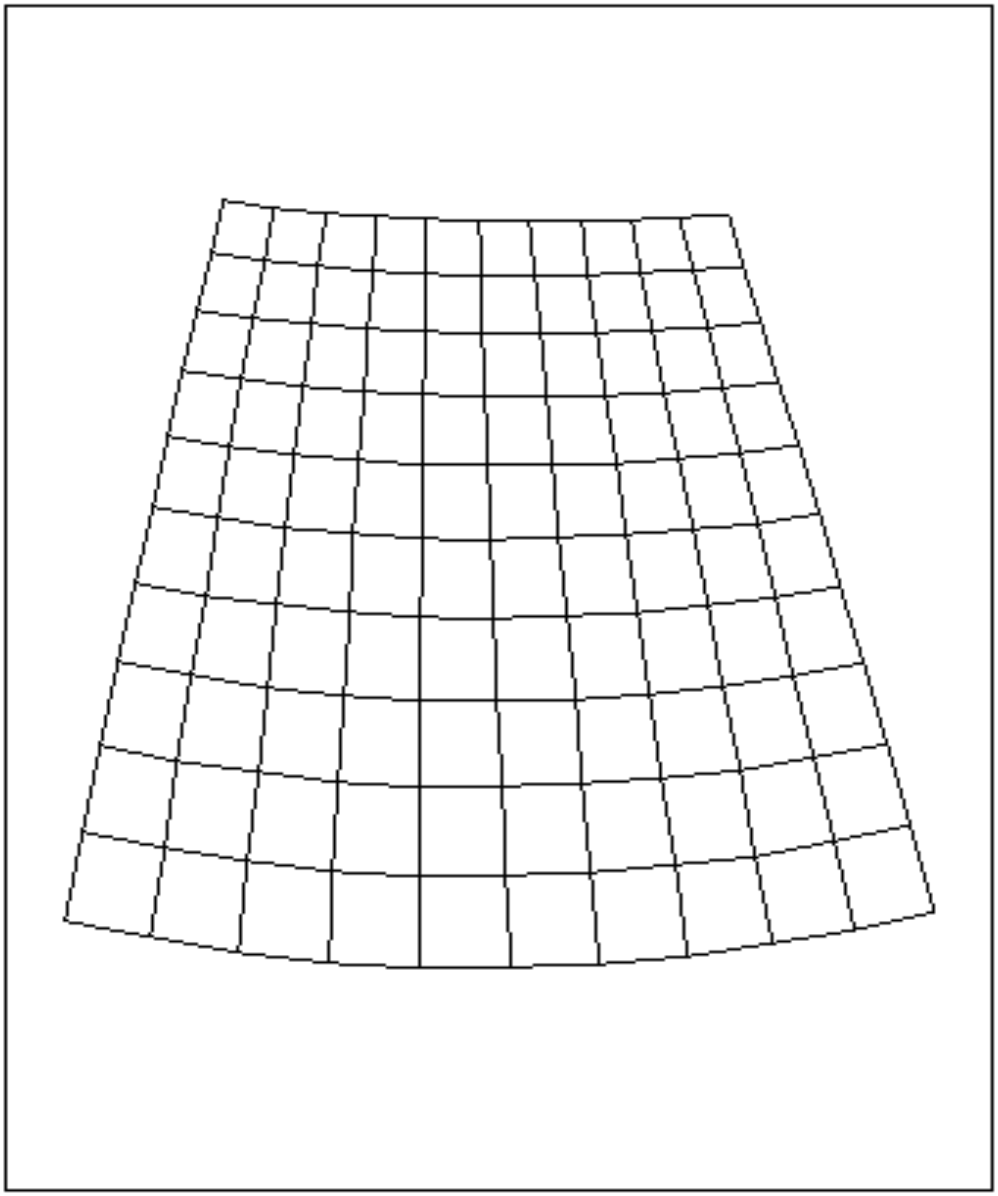
Zone 1 Blue Raster Map



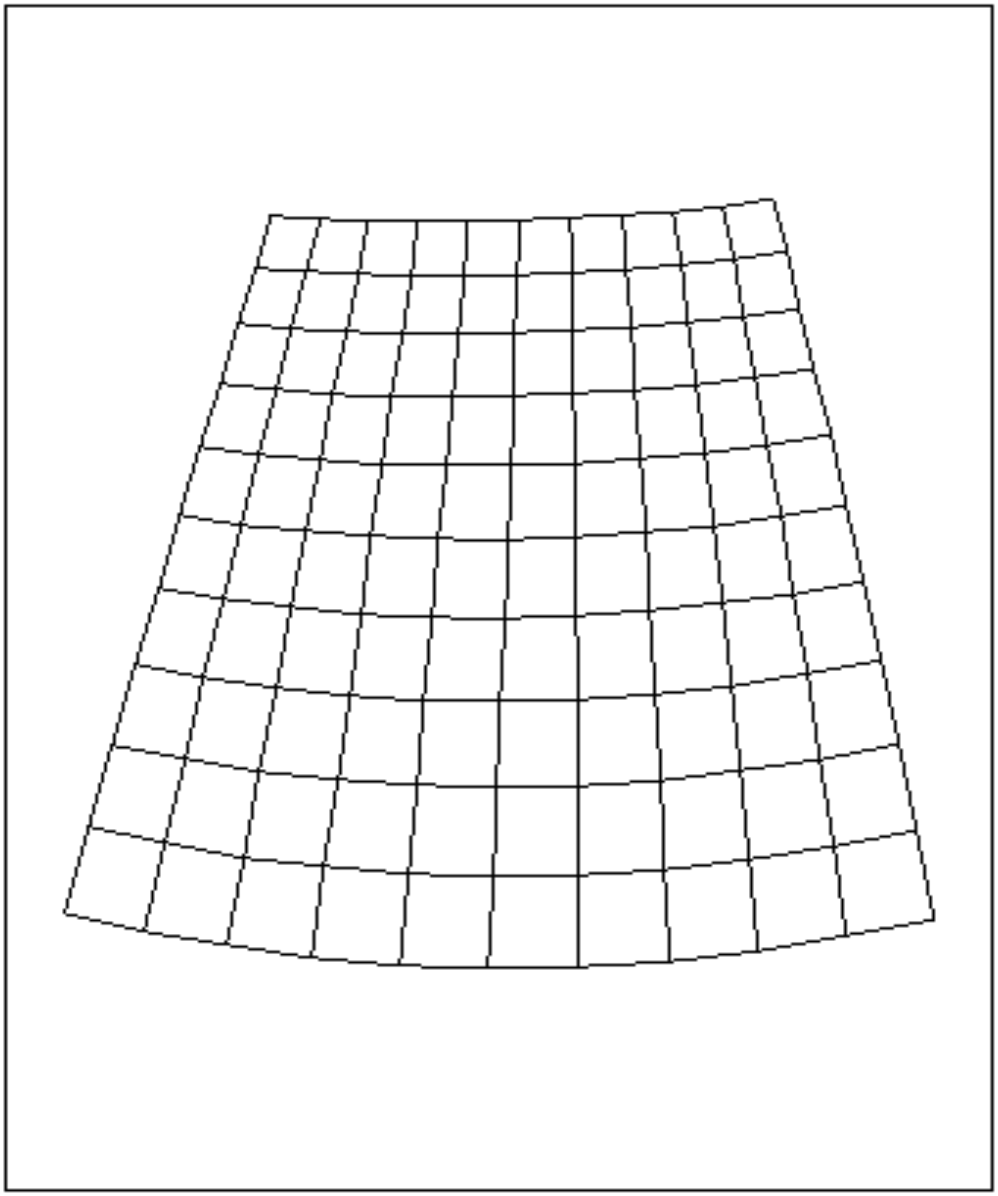
Zone 2 Red Raster Map



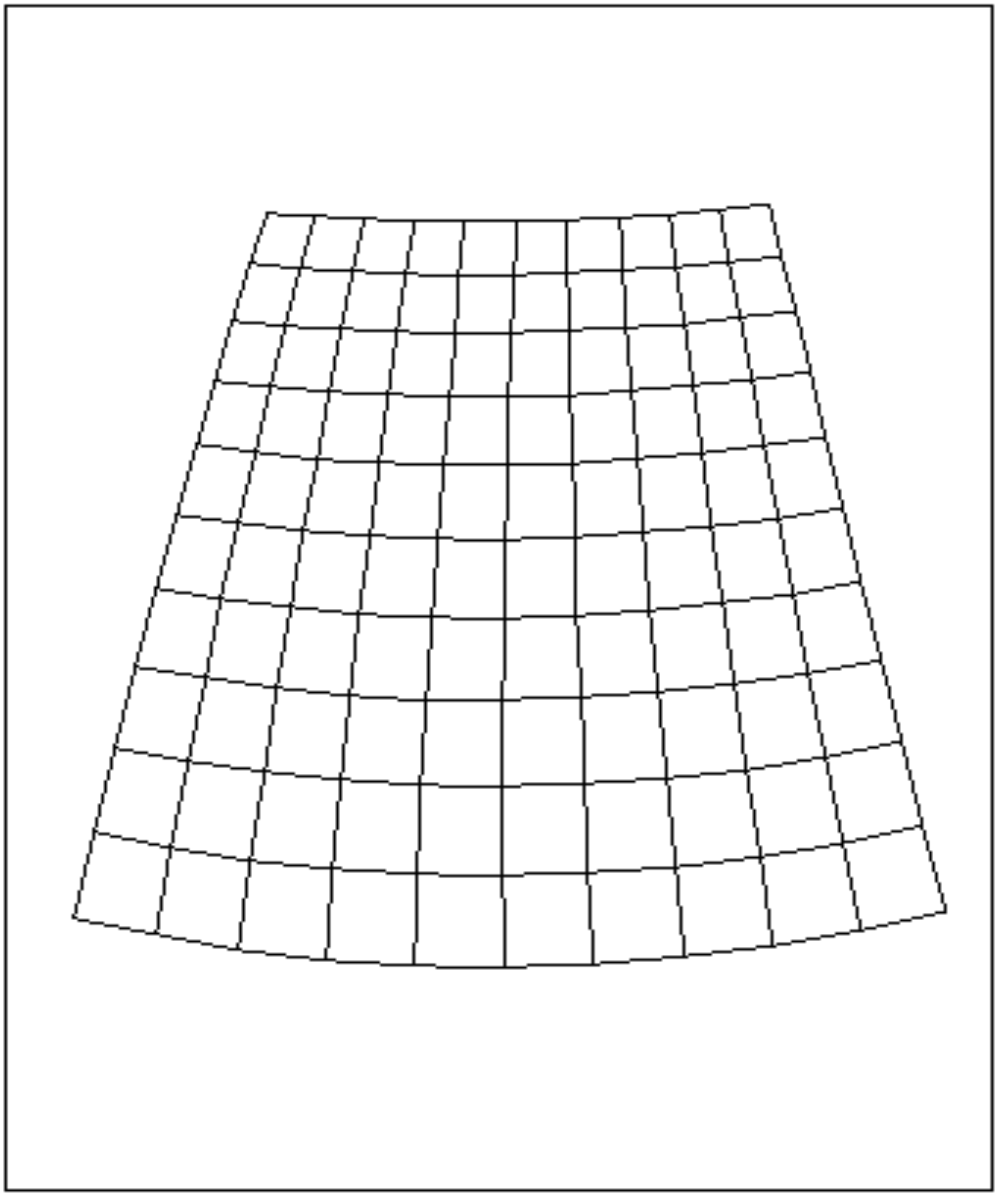
Zone 2 Green Raster Map



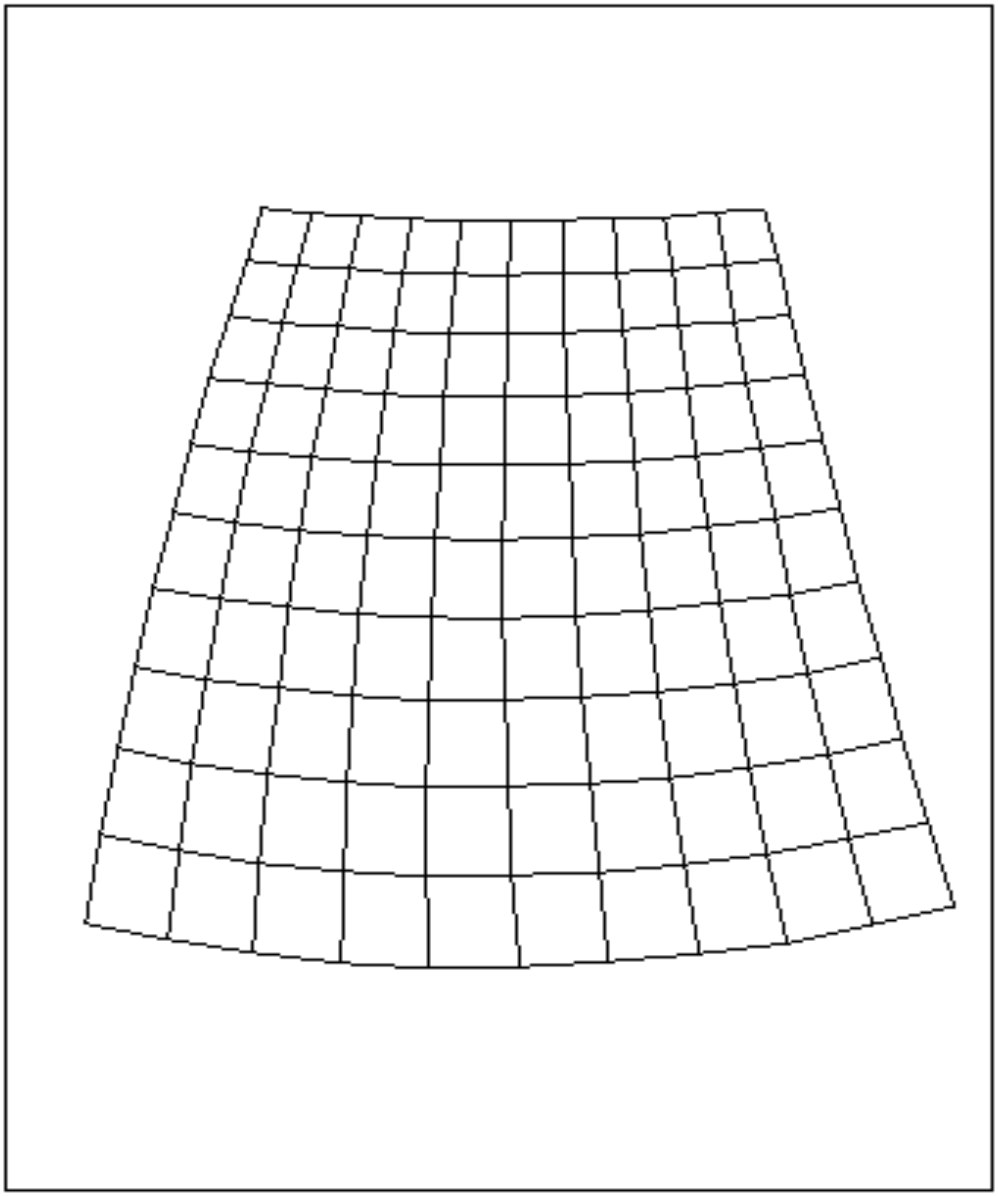
Zone 2 Blue Raster Map



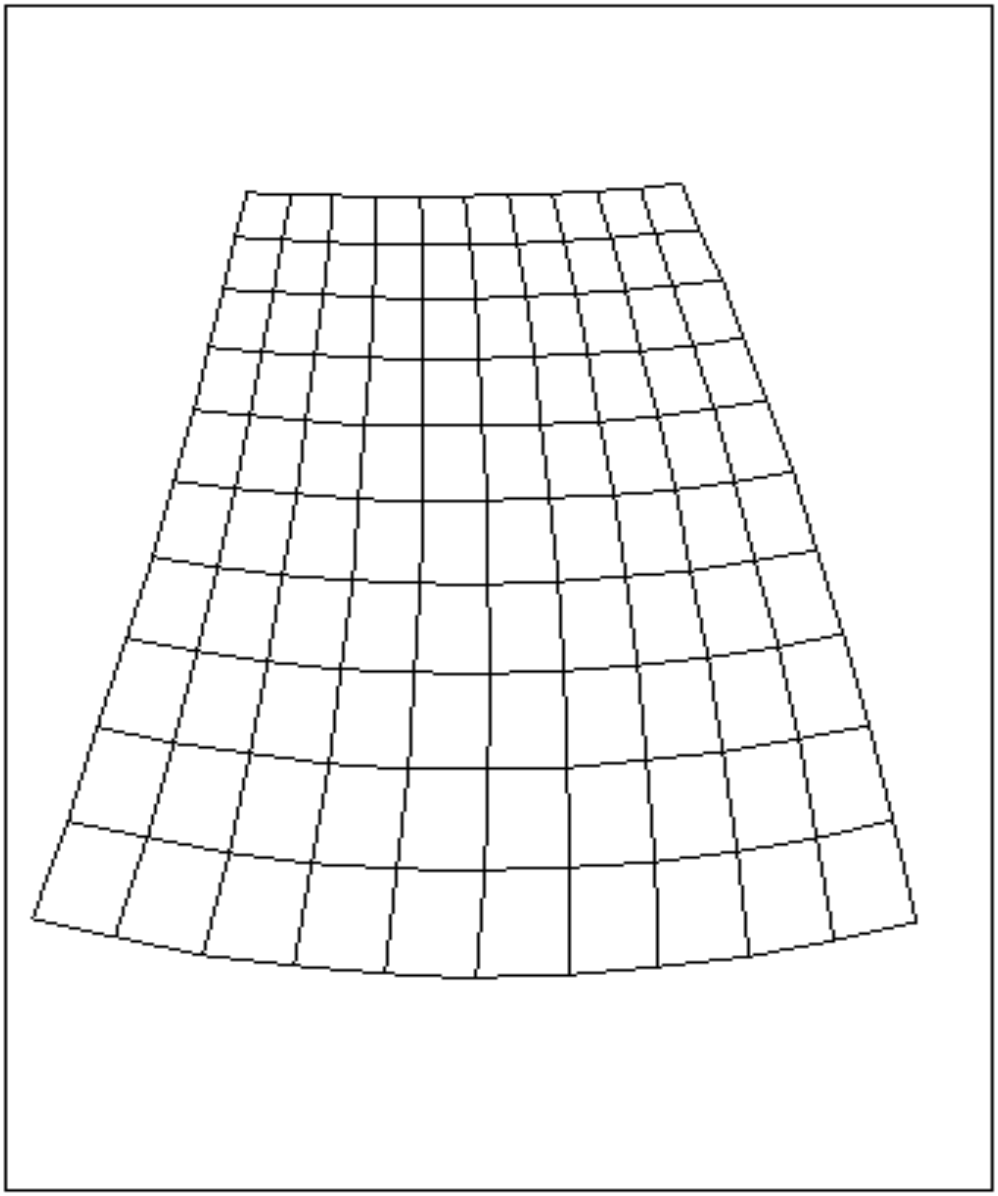
Zone 3 Red Raster Map



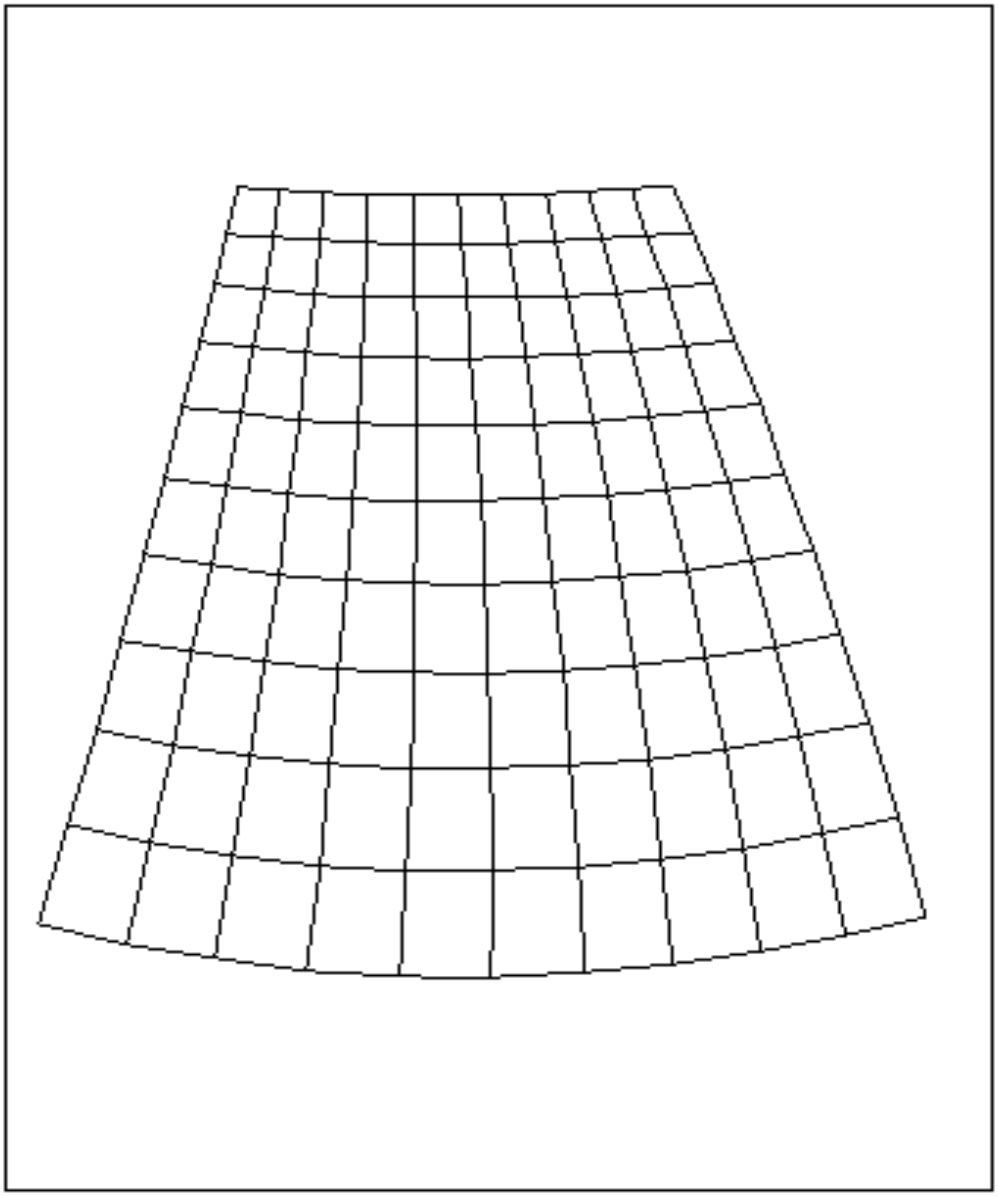
Zone 3 Green Raster Map



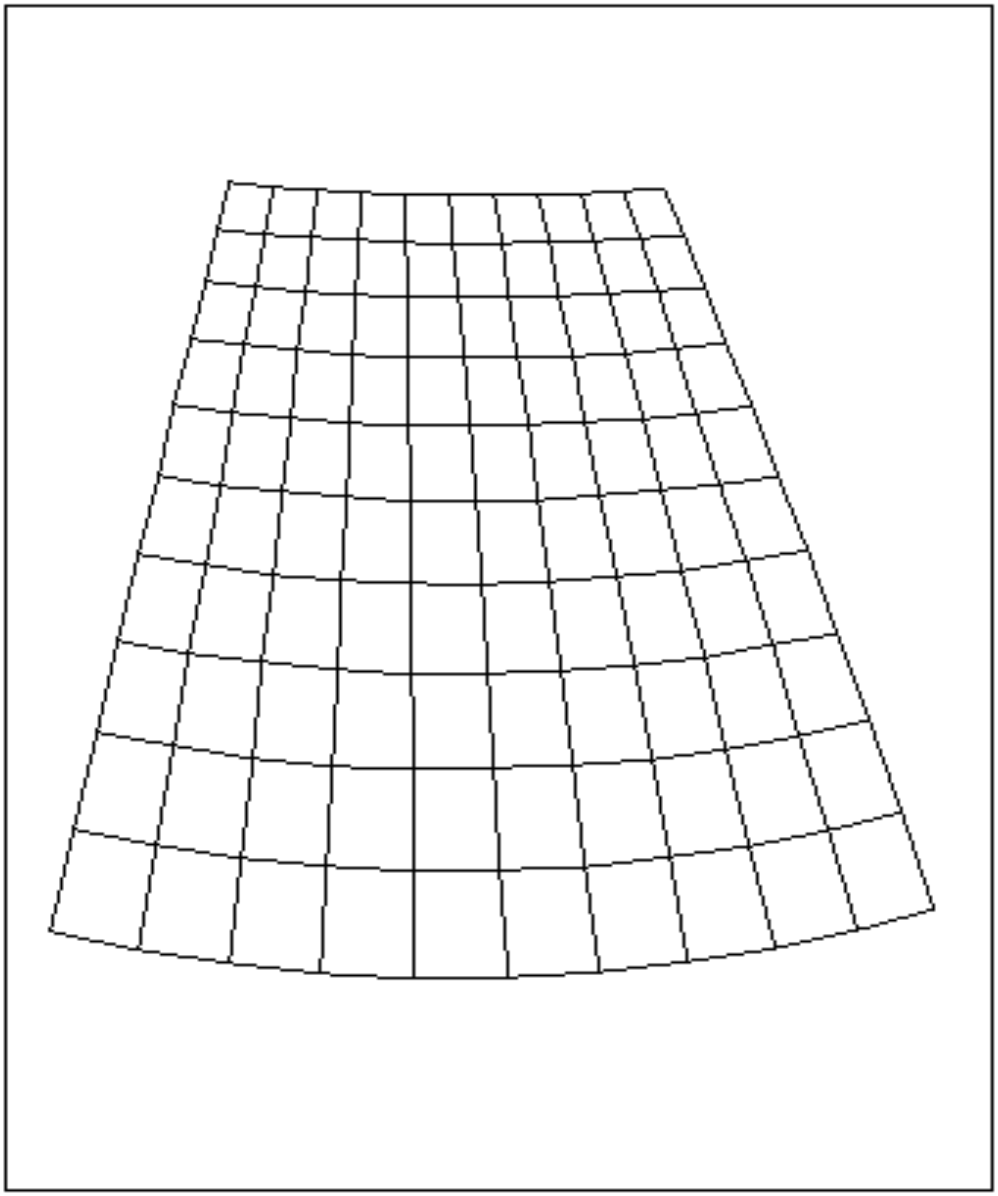
Zone 3 Blue Raster Map



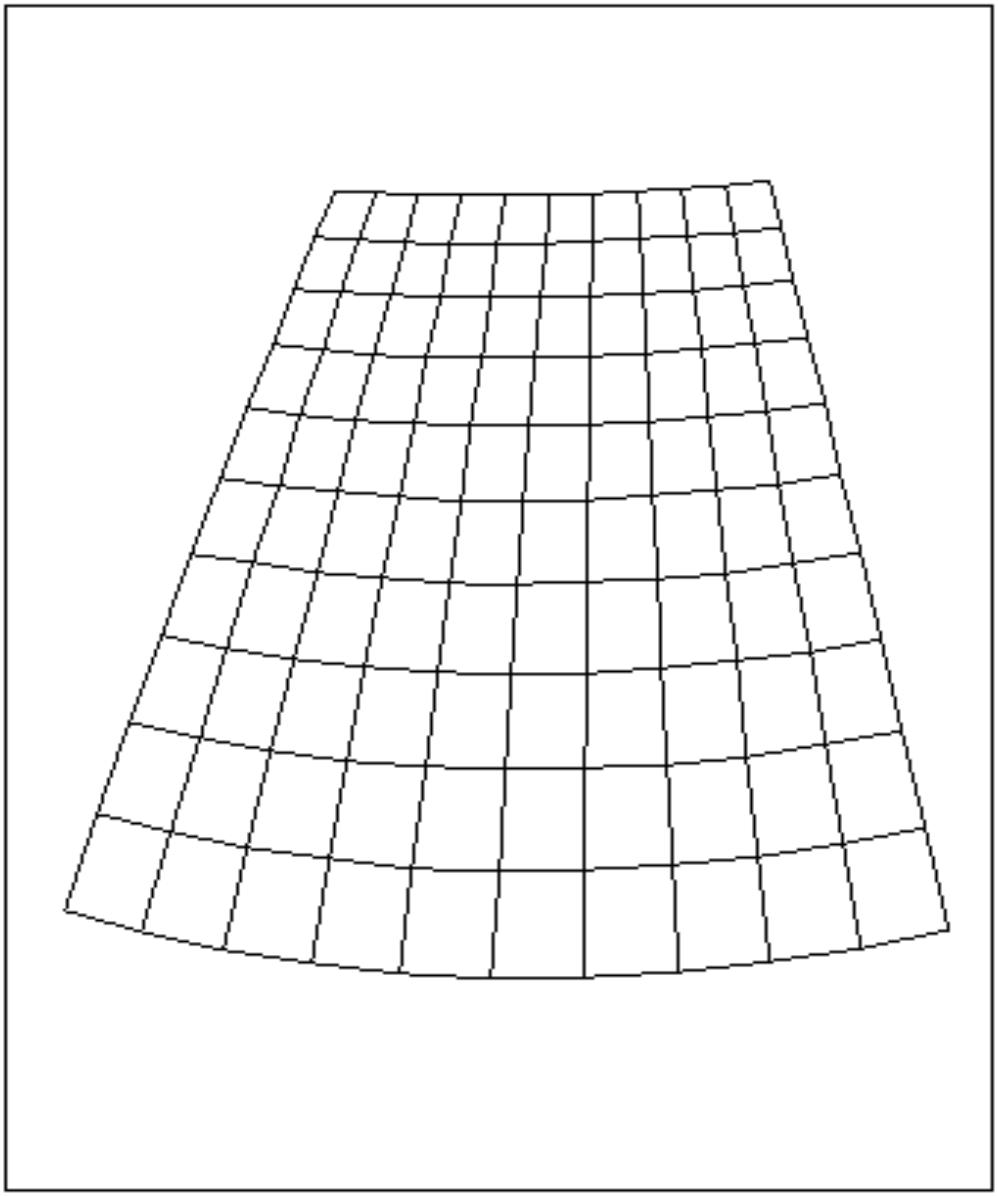
Zone 4 Red Raster Map



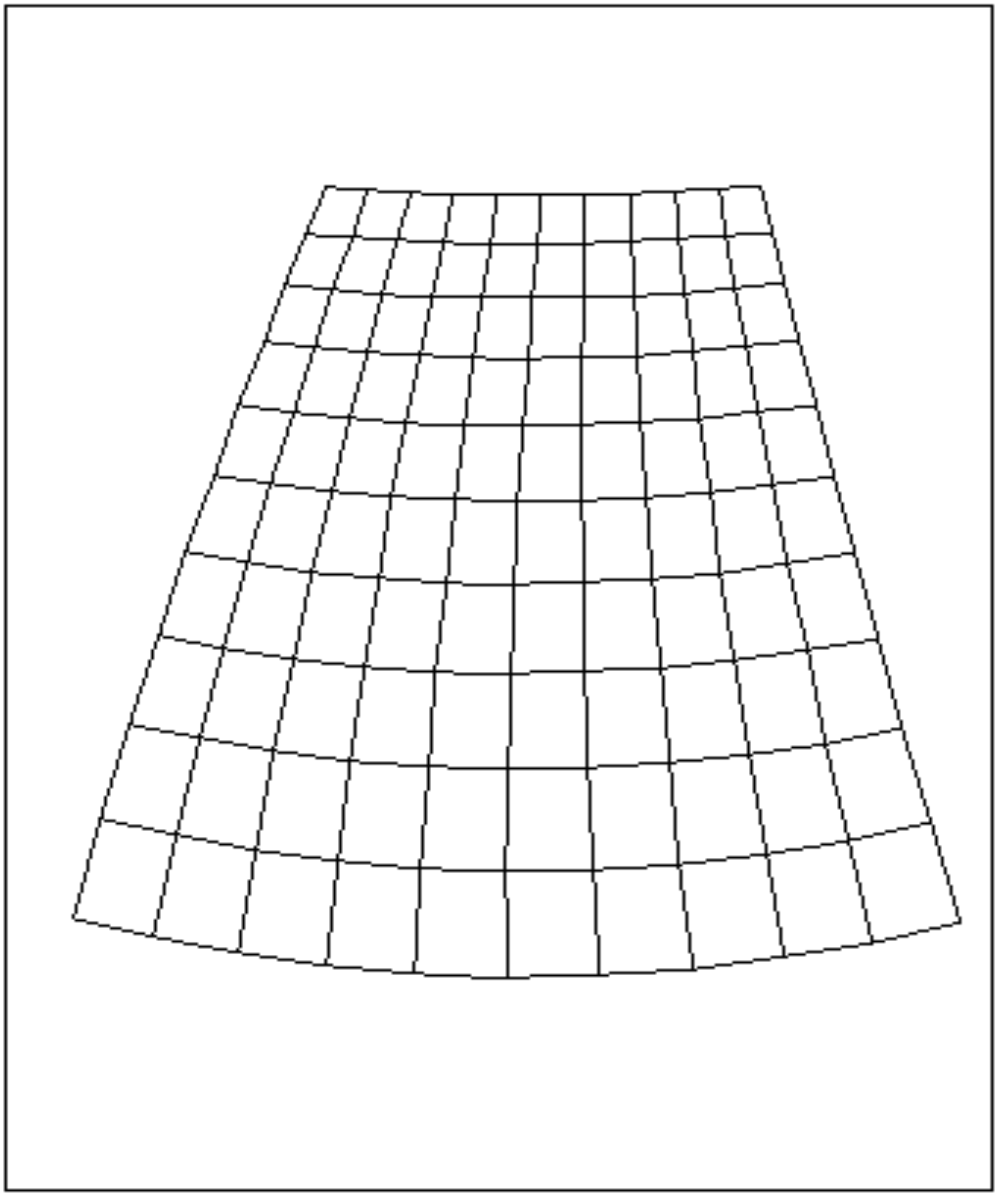
Zone 4 Green Raster Map



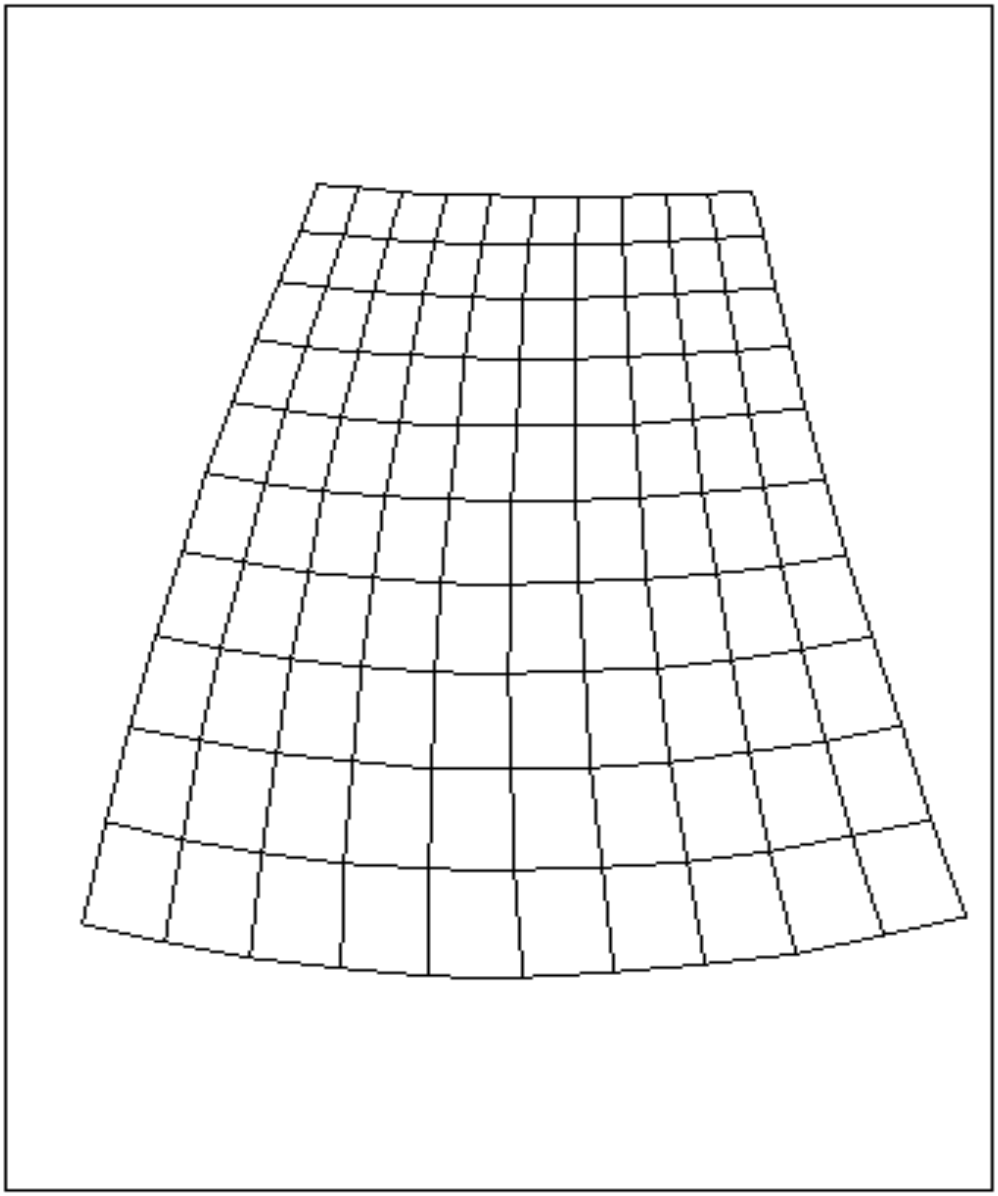
Zone 4 Blue Raster Map



Zone 5 Red Raster Map



Zone 5 Green Raster Map



Zone 5 Blue Raster Map