

**CANYONLANDS NATIONAL PARK  
NEW MEDIA MAPPING SERVICES**

1. **BACKGROUND**

Occupying a vast area of southeastern Utah, Canyonlands National Park preserves a colorful landscape eroded into countless canyons, mesas, and buttes by the Colorado River and its tributaries. The rivers divide the park into four districts: the Island in the Sky, the Needles, the Maze, and the rivers themselves. While these areas share a primitive desert atmosphere, each retains its own character and offers different opportunities for exploration. Much of the park is difficult to access.

The foundation of Canyonlands' ecology is its remarkable geology, which is visible everywhere in cliff profiles that reveal millions of years of deposition and erosion. These rock layers continue to shape life in Canyonlands today, as their erosion influences elemental features like soil chemistry and where water flows when it rains.

2. **PURPOSE**

The purpose of this contract is to produce a solid terrain model and table for the Island in the Sky Visitor Center in the northern part of Canyonlands National Park. The 3-Dimensional (3D) tactile model will orient visitors to the intricate terrain and other geographic features of the park.

3. **SCOPE OF WORK**

Independently, and not as an agent of the government, the contractor shall provide all labor, equipment, materials and services necessary to create a computer-generated solid terrain model and table for an exhibit at Canyonlands National Park, Utah.

A. Model preparation:

- (1) The government-furnished file "CANY\_area.jpg" shows the approximate geographic coverage and orientation of the model. The model shall be rectangular measuring 48 inches wide by 76 inches long. The model shall be north-oriented with the north-south axis aligned to the length of the rectangle.
- (2) The model coverage shall include the main section of the park, excluding the Horseshoe Canyon Unit, plus a narrow buffer of non-park land on all four sides, with more non-park land buffering the north. The northern edge of the model shall be high enough to include the intersection of Route 313 and the road going to Dead Horse Point State Park near a low summit called "The Knoll."

Determining the exact edge of the model shall take into account topography, rivers, and roads, to avoid small disconnected portions (orphans) of these features from appearing. The sharp river bend at the northeast corner of the model is one such problem area.

- (3) Terrain on the model shall derive from a United States Geographical Survey Digital Elevation Model (DEM). The resolution of the DEM shall be high enough to create a routed model with the maximum terrain detail possible.
- (4) The contractor shall propose an appropriate amount of vertical exaggeration to emphasize the plateaus, cliffs, entrenched meanders, and rock spires that characterize Canyonlands. Dramatic terrain is desirable, however, applying too much vertical exaggeration can result in problematic terrain that contains visual noise and unnatural spikes.
- (5) A natural-color satellite image shall be draped on the DEM to give the model realistic textures. The contractor shall be responsible for finding an appropriate satellite image. Possible sources for public domain imagery include:

<http://earth.gis.usu.edu/>

[http://agrc.utah.gov/agrc\\_sgid/naip.html](http://agrc.utah.gov/agrc_sgid/naip.html)

For additional information about available imagery, contact:

Doug Ramsey

Director, RS/GIS Laboratory

Utah State University

Tel: 435-797-3783, Email: [doug.ramsey@usu.edu](mailto:doug.ramsey@usu.edu)

- (6) The draped satellite image shall be in perfect registration with the DEM below and shall contain maximum possible detail for a solid terrain model. It is essential that the image represent the rocks and vegetation of Canyonlands in an appealing and plausible manner. The image shall appear with attractive natural colors that are not too drab, too gaudy, too light, or too dense. The contractor shall suggest to the Contracting Officer's Representative (COR) any changes needed on the draped image to improve the visual quality of the final model. Possible changes include color, image density, and contrast adjustments. The satellite image shall be free of clouds, smoke plumes, seam lines from mosaicked satellite images, and other detracting elements.

- (7) The satellite image shall depict the sediment-filled Colorado and Green rivers with impure blue highlighted with occasional sun glints. A thick, green ribbon of invasive tamarisk scrub follows the banks the Colorado and Green rivers in low-lying areas. The tailings ponds at the Potash (northeast corner of the model) shall be visible, but greatly subdued. The White Rim (a ledge) shall appear bleached compared to the terra cotta coloration of surrounding rocks. The highest plateau surfaces shall be vegetated with grass, shrubs, and pinyon-juniper woodland. The dense, dark color of pinyon-juniper shall appear lighter on the model than it does in nature. Rapids in the Colorado River shall appear as rough-textured white patches.
- (8) In addition to the information imbedded in the satellite image, the image applied to the model shall contain the following:
- a. The park boundary and boundary ribbon. The dark green boundary ribbon shall contain a soft edge that fades toward the interior of the park.
  - b. All two-wheel-drive roads that are identified on the park brochure map.
  - c. The following four-wheel-drive roads: White Rim Road and Potash Road.

All vector roads shall show completely their corresponding lines on the satellite image.

- (9) The contractor shall place the following labels and symbols on the model:
- a. “You are here” callout box, locator dot, and label for “Island in the Sky Visitor Center”.
  - b. Label and dot for “Needles Visitor Center”, “Grand View PointOverlook”, and “Green River Overlook”.
  - c. Label and campground pictograph for “Willow Flat” and “Squaw Flat”.
  - d. Label for “Deadhorse Point State Park.” Do not show the park boundary or area color.

- e. Large labels for the three districts of Canyonlands National Park: “Island in the Sky,” “The Maze,” and “The Needles.”
  - f. “Colorado River,” “Green River,” and “White Rim.”
  - g. A North arrow and scale. If a flat, light place on the model (outside the park boundary) is not available for the north arrow and scale, then the contractor shall flatten the terrain under these elements and lighten the satellite image with a ghosted beige box with a feathered edge. The contractor shall propose other labels to place on the model identifying major physical features and points of interest in the park.
  - h. All labels shall use the Frutiger font in the same style and approximate color as those used on the government-furnished park brochure map.
  - i. Labels on the model shall be right reading when the model is viewed from the south looking north, except for labels aligned to the physical features, such as the Colorado River.
  - j. The contractor shall adjust the position of text labels so that they print on flat terrain surfaces wherever possible and avoid dark areas of high contrast on the satellite image. The label for “Grand View Point Overlook” will be especially tricky. If necessary, leader lines can connect labels placed on nearby flat terrain to the steep features that they identify.
- (10) The model shall have a clear protective coating (more durable than the standard single Touch Coat applied to Solid terrain Models) to protect it from touching.
- (11) The contractor shall provide a standard wooden table fitted to the 48 x 76” base dimensions of the model. The table shall be designed to accommodate viewing of the model by people in wheelchairs.

4. **DELIVERABLES**

The contractor shall submit the work in stages for COR review and approval before proceeding to the next phase. Those review stages are specific to presentation and content as follows:

- A. **Preliminary visualization:** Color jpeg images rendered with 3D software made with the same data that shall be used to produce the final physical models. The images shall be rendered 3,000 pixels wide. The images shall show views of the model from the south, southwest, and southeast. The COR will use the visualizations to evaluate label placement, coloration of the satellite image, vertical exaggeration, geographic coverage, and topographic detail. FTP or optical media shall be used for delivery of the jpeg visualizations.
- B. **Sample model:** 1' x 1' sample that shows the model with final vertical exaggeration, draped satellite image with text and carved from high-density foam. The sample model shall include an area in the northeast section of the park with the Island in the Sky Visitor Center east to the Colorado River and Deadhorse Point.
- C. **Final model and table:** The contractor shall crate and ship the final model and table to:

Canyonlands National Park  
2282 South West Resource Boulevard.  
Moab, Utah 84532

5. **TIME FOR COMPLETION**

All work, including review and approval, shall be completed on or before November 21, 2007 in accordance with the following schedule:

	<b><u>NOT LATER THAN</u></b>
A. Submission of Preliminary Visualization	September 7, 2007
B. Submission of Sample Model	October 8, 2007
C. Submission of Final Model and Table	November 9, 2007

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6. **REVIEW AND APPROVAL**

The COR will notify the contractor, in writing, of approval or rejection citing any additions, corrections, or suggestions to the work within 12 calendar days. Any additions or corrections shall be completed and returned to the Government within 12 calendar days.

In the event the government delays comments beyond the period specified, the contractor shall be entitled to a day-to-day extension in the completion date.

7. **CONTRACTING OFFICER'S REPRESENTATIVE** for the purpose of this contract is:

Tom Patterson  
Cartographer

8. **GOVERNMENT-FURNISHED PROPERTY**

The government will furnish the contractor with digital data on CD-ROM and a park brochure map. Upon completion and acceptance of all work the contractor shall return all materials to the COR.

9. **ATTACHMENTS**

The following items are attached and are incorporated into this order:

A. CD-ROM:

- (1) CANY\_Park Map.ai
- (2) CANY\_area.jpg

B. Hard copy:

Canyonlands NPS brochure map.