3D Mapping of Mount Rushmore
Virtual Views, Air Photos, and LIDAR Data

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Mount Rushmore South Dakota
Mount Rushmore South Dakota
Fort Laramie Bird’s Eye View

Richard Schlect

Weir Farm Bird’s Eye View International Mapping
Why use rendered virtual views when they are costly to make compared to an annotated air photo?
Fort Stanwix Bird’s Eye View [Annotated photo] NPS Staff

Exploring the Fort

1. Willett Center
   Start here for an orientation to Fort Stanwix and the American Revolution in the Mohawk Valley. Explore interactive displays and visit the Eastern National Bookstore and gift shop.

2. Drawbridge
   While it is not known what type of drawbridge was originally at Fort Stanwix, this type was commonly used at the time. It operated on a counterweight system, with soldiers pulling the weights in the hinge house down a track to bring the bridge up.

3. Southeast Casemate
   This structure was used as a common soldiers’ barracks. The name above the door denotes the company command center. The long straw-filled bed, called a crib, slept 18 to 15 men side by side.

4. Southeast Bastion
   The bastion was built by the British in 1756. This corner was the first to be constructed. The secure bombproof below was used as the garrison’s powder magazine. During the American occupation of the fort in the 1770s, the bombproof was used as a lake house. The orientation of this bastion toward Onondaga may have been important for communication during the siege. It is believed that the signal guns requested by Gen. Herkimer were fired from this corner on August 6, 1777.

5. Storehouse (Public Rooms)
   This building was originally used as a storage area for supplies and may have contained the Quartermaster’s room as well.

6. Barton
   Along with the West Bastion, this structure was built by the British around 1764. Together, the end of their occupation of the fort. Unburnt and unusable by the time of the siege, it was later repaired for use as enlisted and officers’ barracks.

7. Satelyport
   The satelyport (not fully reconstructed), common to forts like Stanwix, was used to allow small parties of soldiers out of the fort to obtain fresh water from the nearby stream. During the 1777 siege, Lt. Col. Walkin used the satelyport to sneak through the British lines to get help. The casemates on either side of the satelyport served as barracks for soldiers.

8. North Casemate
   (includes acquiring spaces 5-14)
   During the British occupation of the fort, this space was divided into three barracks rooms for common soldiers. The Americans used this area for officers’ living spaces. Today the North Casemate houses the park’s largest artifact—the remains of a 1756 fireplace.

9. Northwest Bastion
   During the siege of the fort, the powder magazine located in the bombproof beneath this bastion made it a target in the British attempt to destroy the American powder supply.

10. West Casemate
    During the British and American occupations of the fort, this entire structure served as soldiers’ barracks with double fireplaces for cooking and crib for sleeping.

11. West Barracks (Visitor Contact Station)
    Built by the British to ward the end of their occupation of the fort, this structure was largely unusable at the time of the siege. Eventually it was repaired and used by the Americans as barracks for common soldiers and officers. Today it serves as a visitor contact area with exhibits and a short film.

12. Southwest Casemate
    This area served as living quarters for the fort’s civilian workers. It would have been furnished in the same manner as the common soldiers’ barracks.
Harpers Ferry Oblique Air Photo
Virtual Views Advantages

- Control of content and features
- Clear presentation of complex geographic information
- Control of design style for look and feel of image
- Flexible means to integrate cartographic elements
- Added drama and aesthetic appeal to encourage visitation or exploration
Techniques

1. Control Camera
2. Control Atmosphere
3. Modify Terrain
4. Gardening
5. Select Features
Techniques Control the Camera

- Focal length of lens
- Camera position
- Shift of focal plane
- View from great distance
- Adjustments without cost of flying again!
Techniques: Control the Atmosphere

- Time of year (pick or mix!)
- Time of day
- Haze and smoke
- Snow and water
- Light source or sources
Techniques Modify the Terrain

- Eliminate terrain features
- Bend, warp or tweak elevation
- Recreate historical terrains
Techniques Gardening

- Trim, reduce, or remove unwanted trees and plants
- Add or enlarge desired trees and plants
- Show historical vegetation
Techniques Feature Selection

- Use for buildings, roads, trails, other structures
- Remove or hide unwanted features
- Add planned or future features
- Show historical features
- Move features for better presentation
Mount Rushmore Can we do better than an oblique photo?
Mount Rushmore Apple Maps
Step 1: THE VIEW
Step 2: THE TERRAIN
Step 3: THE FEATURES
Step 4: THE VEGETATION
Step 5: TWEAKING and ENHANCEMENTS
How does it compare to the air photo?
Final ready for use by Park Services
Your Guide to Mount Rushmore

Plan Your Visit
Parking: The park has a limited number of parking spaces, and during peak times, cars may be turned away. Please plan accordingly.

Things to See and Do
- **Black Hills**: The Black Hills are a beautiful and diverse landscape, offering a range of activities like hiking, cycling, and wildlife viewing.
- **Mount Rushmore National Memorial**: The memorial is a striking feat of engineering, with four presidents carved into granite.
- **Visit the Visitor Center**: The visitor center provides information about the park and its facilities.
- **Guided Tours**: Guided tours are available, offering insights into the history and geology of the area.

Accessibility: The park is accessible to visitors with disabilities. Please contact the park for more information.

At Home in the Black Hills
Ponderosa pine don’t do well here. The climate is too dry and the soil is too poor. The Black Hills are home to a variety of wildlife, including pronghorn antelope, bison, and black bears. The area is also home to a variety of birds and insects.

Inside the Park
- **Yahne Peak**: This peak offers a stunning view of the surrounding landscape.
- **Informative Trails**: There are several informative trails that provide insights into the park’s history and geology.

More Information
Mount Rushmore National Memorial
3201 Murdock Ave.
Keystone, SD 57751
Phone: 605-578-2420

Explore Further
- **Presidential Trail**: This trail offers a close-up view of the monuments.
- **Birding**: The area is known for its diverse bird population.

Fun Fact:
Bisons and bison-like animals are not native to South Dakota. Today’s bison are descended from a group that was reintroduced to the United States in the 1800s. They are now an integral part of the black hills ecosystem.
Mount Rushmore LIDAR DATA, part 1

- Airborne LIDAR scanning
- Performed by Cyark (www.cyark.org)
- Point cloud converted to 2.5D elevation data
Mount Rushmore 2.5D render
Mount Rushmore LIDAR DATA
Mount Rushmore 2.5D render
Mount Rushmore with basic rock
Mount Rushmore LIDAR DATA, part 2

- Terrestrial and Airborne LIDAR scanning
- Performed by Cyark (www.cyark.org)
- Point cloud converted to mesh (OBJ format) for integration into landscape scene in Vue Infinite
Mount Rushmore LIDAR faces
Mount Rushmore LIDAR faces added to scene
Mount Rushmore faces fully integrated