Terrain Manipulation in North America Ski Maps: A Preliminary Study of Four Artists

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Ellicott City, Maryland, United States

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Mountain Ski Maps
### Survey of North American Mountain Ski Maps

<table>
<thead>
<tr>
<th>View type</th>
<th>All Resorts</th>
<th>%</th>
<th>Major Resorts</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>panoramic</td>
<td>368</td>
<td>86%</td>
<td>100</td>
<td>100%</td>
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<tr>
<td>profile</td>
<td>36</td>
<td>8%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>planimetric</td>
<td>24</td>
<td>6%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Creation method</th>
<th>All Resorts</th>
<th>%</th>
<th>Major Resorts</th>
<th>%</th>
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</thead>
<tbody>
<tr>
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<td>307</td>
<td>72%</td>
<td>89</td>
<td>89%</td>
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<tr>
<td>illustrated</td>
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<td>20%</td>
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<td>7%</td>
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<tr>
<td>annotated photo</td>
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<td>6%</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>computer rendered</td>
<td>12</td>
<td>3%</td>
<td>3</td>
<td>3%</td>
</tr>
</tbody>
</table>

Total 428 100% 100 100%
Credited Artists in survey of current maps

James Niehues  
Peter Powers  
Gary Milliken  
Bill Brown  
Don Moss  
Murray Hay  
K.M. Mastin  
Hal Shelton  
A. Tait  
Ron Bomba  
Hans Schmidt  
Peter Kelley  
J.C. Hetz  
Unknown/unreadable  

112 maps (57 of top 100)  
25  
8  
4  
4  
3  
2  
2  
2  
1  
1  
1  
277
Compare Painting to DEM Generated Landscape

[From PATTERSON, 2000, ICA-Mountain Cartography Workshop]
Jay Peak, approximate camera location
Jay Peak, Vermont
Simple NSD render, 1.15x vertical, 35mm camera

Jay Peak, Vermont
Jay Peak, Vermont
Curved projection plane

Jay Peak, Vermont
Apex Mountain, British Columbia

Location
Apex Mountain, approximate camera location
Apex Mountain, British Columbia
Apex Mountain, British Columbia
Simple NSD render, 1.5x vertical, 55mm camera

Apex Mountain, British Columbia
Breckenridge, Colorado
Breckenridge, approximate camera location
Google Earth, 1.5x vertical, best fit

Breckenridge, Colorado
Simple NSD render, 1.4x vertical, 65mm camera

Breckenridge, Colorado
Breckenridge, Colorado
Mammoth Mountain, approximate camera location
Google Earth, 1x vertical, match horizon

Mammoth Mountain, California
Mammoth Mountain, California
1.3x vertical, 50mm camera, 90% x-compression, rotate 9°, angle “B”

Mammoth Mountain, California
Mammoth Mountain, California
Mammoth Mountain, two camera locations!
Angle “B”

Mammoth Mountain, California
Combined angle “A” and “B”

Mammoth Mountain, California
Mammoth Mountain, California
Manipulation techniques

Terrain

1. Exaggerate the vertical
2. Curve the projection plane (terrain bending)
3. Over emphasize distinctive features
4. Move mountains
5. Force break between mountain & background

Camera

1. Adjust camera field of View
2. Merge multiple view points
3. Compress the “x” dimension of the image
One more mountain ski mapmaker to look at...
Sierra-at-Tahoe, camera location
Sierra-at-Tahoe, NSD render, 1.5x, 65mm camera