Finding The Road To Bree:
Initial perspectives on the use of remote sensing for the study of the medieval Khmer road network

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the Khmer world - transportation
Why roads?
Goods, people and ideas

• Economics
  – trade networks

• Politics
  – transportation of troops, movement of royal processions, communication, propaganda

• Religion
  – pilgrimage routes, causeways

• Social
  – kin ties
Why Khmer Roads?
The bigger picture...

- Define the limits of the Khmer empire
- Examine oscillations in size of the Khmer empire over time
- Model transportation times across the empire in GIS
The Issues

• Can we locate Khmer roads using remotely sensed data?
  – Introduction of ASTER

• How can the location of cultural features aid us in determining the path of old roads?

• Scale and road systems
  – Local
  – Regional
  – Supraregional
supra regional

regional
The Remains of a Road

Roman roads

Khmer roads
• Communication between Sites
• Roads/Paths
• Bridges
• New Sites
• Water
• Shade
• Shelter
# Roads and remote sensing

## Test #1 - linear features “roads”

## Test #2 - rectangular features “reservoirs”

<table>
<thead>
<tr>
<th></th>
<th>Method</th>
<th>Description</th>
<th>Cost</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Air photos</td>
<td>Most common for roads</td>
<td>$3/ sheet - 5x5km</td>
<td></td>
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<tr>
<td></td>
<td>AIRSAR</td>
<td>Paths in Panama</td>
<td>$10,000 - 10x60km* (varies)</td>
<td>5m horizontal</td>
</tr>
<tr>
<td></td>
<td>ASTER</td>
<td>Nazca lines, Great Wall</td>
<td>$100 - 60x60km</td>
<td>VNIR - 15m</td>
</tr>
</tbody>
</table>
Test #1 - linear features

- ASTER
- AIRSAR
- Test areas
- B-W Air Photos
Test areas in relation to Angkor

Area #4
Modern Roads, Hydrology, and Cultural Features
(Pottier 1999; Evans 2002; JICA; ZEMP)
Test #2 - Rectangular “water” features
Results - AIRSAR vs. ASTER
Will the real ASTER image please stand up...
The road to the future...?
Initial perceptions:
Roads and remote sensing

Can we find “roads” with remote sensing?
Problem – modern roads, canals, etc.

Can we find other cultural features?
Problem – resolution

How can we find the road to bree?
Combine remote sensing with cultural data for multiple scale analysis
(Node-Line-Network)
Nodes

Bridges
Resthouses
Chapels
Settlements

Bruguier 2000
...Lines...

Royal Roads of the Khmer
A final word

- Remote Sensing and Roads
- The ASTER advantage
  - Multiscale
  - Coverage area
  - Digital Format
  - Georegistered
  - VNIR
  - Cost
- Will we recover the Khmer roads?
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