SERVIR

An Environmental Monitoring and Decision Support System for Mesoamerica
Border of Mexico and Guatemala 1986
Presidential Handshake: Mexico - Guatemala

President Cerezo (Guatemala) President Salinas (Mexico)
Land Cover and Land Use Change

- Conservation & Preservation
- Transportation Infrastructure
  - Urban Growth Planning
  - Human Impacts on the Land
  - Infrastructure and Utilities

Peten, Guatemala (1986-1995)
The MBC covers less than 1% of Earth’s landmass, but contains 7-8% of world’s plant and animal species.
## Population and Size

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (July 2001 est.)</th>
<th>Area (sq mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belize</td>
<td>256,062</td>
<td>8,865</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>3,773,057</td>
<td>19,730</td>
</tr>
<tr>
<td>El Salvador</td>
<td>6,237,662</td>
<td>8,124</td>
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<tr>
<td>Guatemala</td>
<td>12,974,361</td>
<td>42,043</td>
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<tr>
<td>Honduras</td>
<td>6,406,052</td>
<td>43,278</td>
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<tr>
<td>Nicaragua</td>
<td>4,918,393</td>
<td>49,998</td>
</tr>
<tr>
<td>Panama</td>
<td>2,845,647</td>
<td>30,193</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>37,384,234</strong></td>
<td><strong>202,231</strong></td>
</tr>
</tbody>
</table>
Model of Deforestation Following Road Building
Central America Volcano Activity
Primary SERVIR Team Institutions

- NASA/MSFC
- USAID
- World Bank
- Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC)
- Central American Commission for Environment and Development (CCAD)
- University of Alabama Huntsville
- University of Arkansas
- Science Systems and Applications Inc.
- Oak Ridge National Laboratory
The Mesoamerican Environmental Information System (SIAM)

**NASA/MSFC**
(Test bed)

**SERVIR**
CATHALAC/Panama
(Operational)

National Nodes Located At Environmental Ministries of Mesosamerican Countries

**National Node End-User Communities**

**PUBLIC INSTITUTIONS**
- Geography/Mapping
- Climate/Meteorology/Hydrology
- Biodiversity (Forest, Protected Areas)
- Agriculture
- Disaster Prevention
- Other

**UNIVERSITIES & NON-GOVERNMENTAL**
- Research/Educational
- Conservation
- Other

**PRIVATE SECTOR**
- Hydroelectric
- Aviation
- Other
- Fire Detection
- Land Cover/Land Use
- Forest Monitoring
- Red Tides
- Climate Change
- Short Term Weather
- Drought Monitoring
- Inter. Scientific Research
- Carbon Flux
- Hot Spot Monitoring
- Disaster Mitigation
- Urban Studies
SERVIR Lab - National Space Science and Technology Center Huntsville Alabama
SERVIR Lab in Panama
SERVIR Dedication – February 3, 2005
- Fully Operational by February 1, 2005
- Four Main Sections
  1. Mesoamerican Data
  2. Interactive Maps
  3. Decision Support
  4. Visualizations
1. MesoStor Regional Data System

- A one-stop geospatial data store
- Working in Beta as of October 2004
- A seamless database of vector and raster data covering all of Mesoamerica
- Web-based system for selection and delivery of geospatial data
2. Interactive On-Line Maps

- Mapping for the “Casual User”
- Web Map Server at regional node
- Multiviewer client
- Specialized clients (UAH-Space Time Toolkit)
- Thematic Areas – Biological, Protected Areas, etc.
- User Friendly Thematic Queries
3. Decision Support Tools

- **Fires**
  - MODIS Rapid Response
  - Web Fire Mapper (UMD)
  - Fire Alerts (Pilot)

- **Red Tides (Harmful Algae Blooms)**

- **Climate Change Scenarios**

- **Short Term Weather Prediction (SPORT)**

- **Land Cover and Land Use Change for Carbon Management**

- **Floods**

- **Other**
4. Visualization Tools for Decision Support

- NASA and COTS
  - World Wind - NASA
  - Terra Builder & Terra Explorer Pro – Skyline Software Corporation
  - ERDAS Imagine

- Users
  - Decision Makers
  - Media
  - Educators
  - Students
Terra Explorer Pro 4.6 User Interface
Panama Canal Flight
IKONOS Data Over Landsat 15 Meter Imagery
Vector Data Over Landsat and SRTM Elevation
3-D Flyover of Volcano Cosiguina - Guatemala
TEP Tools: Calculation of Best Path
TEP Tools: Viewshed Analysis

Volcano Cosiguina
Accomplishments to Date

- Development of NSSTC Test Bed Node Facility
- Interactive Web Page Online – One Stop Shop for Data, Interactive Maps, Decision Support, and Visualization (Fully Operational – February 2005)
- Fires Products Operational
- Red Tides Products Operational
- First Regional Climate Modeling Workshop Ever Held in Mesoamerica
- Response Mode Flood Analysis in Panama
- Visualization Products for Central America
- Visualization Workshops at NASA/MSFC
- Mesostor Data Distribution System for Panama Built and Operating in
- CATHALAC - Staff Hired
- Integration of Inter-American Biodiversity Network (IABIN)
- Regional Node Facility and Training Center Operating
- Integrating other Research at NSSTC
Dr. Tom Sever – NASA’s Archeologist
The Maya Biosphere Reserve

- Dos Lagunas El Mirador
- Rio Azul
- Tikal
- Sierra del Lacandón
- Laguna del Tigre
- El Zotz
- Cerro Cahui
- Parques Nacionales
- Biotopos
- Zona de Usos Múltiples
- Zona de Amortiguamiento
Ancient Maya Cities
Ikonos Data – Linear Features

[Image of linear features in grayscale with yellow arrows indicating specific areas of interest]
Capability of IKONOS Satellite Imagery to Detect Small Features Such as Maya Stelae at Tikal National Park, Guatemala
Mayan Architectures Detected via Remote Sensing
Mayan Ruins at San Bartolo
Isla Oásis and the Area Northwest of San Bartolo

1. San Bartolo
2. Chaj K’ek’ Cue
3. La Prueba
4. Las Minas

• Sites Identified on the Satellite Imagery, but Not Yet Verified on the Ground
Dr. Bill Saturno

Xultún - San Bartolo Transect
False Color Composition - RGB/4.3,1
Artist’s Sketch of Mural and Temple 200 BCE