Geospatial Support for UN Operations

UNRCC Asia & the Pacific

Cartographic Section
Department of Field Support
United Nations
Agenda

- UN Cartographic Section
  - Area of Responsibility
  - Field Mission Geo Operations
- Challenges & Limitations
  - UN Secretariat and its Missions
  - UN Peace Operations
  - Limitation & Constraint
- Strategy
  - Capacity Building
  - Partnership
- International Boundary Issues
- Questions & Answers
Objective:

Cartographic Section provides geographic support to the full range of United Nations Operations

Principal duties:

⇒ Provide accurate and timely geospatial information in support of the decision-making and operational needs of
  - the Security Council and the UN Management
  - the Secretariat
  - direct support to UN Peace Operations (DPKO, DPA & DFS)
⇒ Provide program management of Field Mission GIS operations
⇒ Provide technical assistance on International Boundary issues
Areas of Responsibilities

- HQ Geo Support
  - Country profile maps, Peacekeeping force deployment maps
  - Map production for SG report, briefing, publication, etc.
  - Map clearance for UN publication, including geographical names & boundary depiction
  - Maintain geo-database, including imagery & gazetteers
  - Timely exchange of geo-information between the field and UNHQ
  - Provide technical advice and solutions on geospatial matters
- Collaborate with UN agencies & strategic partners on data sharing

- International Boundary issues - research & technical support
  - Maintain International Boundaries Information System

- Mission Geo Support
  - Manage field mission GIS programme
  - Start-up mission GIS sections/units
  - Produce base maps, planning/operation maps & geo-databases
  - Perform geospatial/terrain analysis and other special analysis
  - Provide global backup of geo-databases and manage global GIS assets
  - Conduct geo training
GIS experts in UNHQ & Peace Operations
2009: 180~200 staff
2010: 200~220 staff

UN Cartographic Section
Field Mission Geo Operations

Typical UN Mission Structure

- SRSG
- Substantive
  - Force
  - UNPOL
  - Admin
    - UNMO
    - Troops
    - CAS
    - CISS

Joint GIS

- Chief GIS
  - Plans & Operations
  - Geographic Information Analysis
  - System Support & Admin

Section/Unit size varies according to mission mandate, strength, size of area of operation, etc.

- UNAMA (Afghanistan): 2 staff
- UNOCI (Ivory Coast): 8 staff
- UNMIS (Sudan): 24 staff
- UNAMID (Darfur): 42 staff

SRSG: Special Representative of the Secretary-General
Substantive: Political & Civil Affairs, Human Rights, etc.
UNPOL: UN Civilian Police
UNMO: UN Military Observer
CAS: Chief Administrative Services
CISS: Chief Integrated Support Services
Challenges & Limitations
Note: Department of Field Support (DFS) has established on 1 July 2007
UN Peace Operations statistics

Personnel

- Current Operations: 16
- Military (troops & observers): 98,413
- Police (individuals + formed): 17,287
- Troops & Police Contribute Nations: 120
- Civilian staff in missions: 27,147
- Civilian staff in HQ: 1,945
- Total: 144,792
- Budget: $8,6B

Approved resources (Jul 2009 – Jun 2010): $8.6 billions
Approved resources (Jul 2008 - Jun 2009): $7.0 billions
Approved resources (Jul 2007 - Jun 2008): $6.3 billions
Total cost of operations since 1948: $56.0 billions
UN Missions in Sudan

Map requirements

- 1:250,000: 170 sheets
- 1:100,000: 900 sheets
- 1:50,000: 3,600 sheets
- 1:10-20,000: 200 sheets
Total: 4,870 sheets
## Gap analysis (Operational implication):

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Map scale</th>
<th>Data Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Paper maps</td>
</tr>
<tr>
<td>Overview Strategic plan</td>
<td>1:1,000,000</td>
<td>ONC available, outdated</td>
</tr>
<tr>
<td>Strategic &amp; operational</td>
<td>1:500,000</td>
<td>TPC, Russian, Swiss - outdated</td>
</tr>
<tr>
<td>Operational</td>
<td>1:200,000 1:250,000</td>
<td>Sudan, Russian - outdated. JOG not completed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not existence.</td>
</tr>
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<td>MilObs/CivPol</td>
<td>1:50,000</td>
<td>Not existence.</td>
</tr>
<tr>
<td>City &amp; Street</td>
<td>1:20,000</td>
<td>Not existence. Khartoum, Port Sudan</td>
</tr>
</tbody>
</table>

As of April 2005

**UN Missions in Sudan**
“Geographic Information has been noted to be the soldier’s most important weapon - second only to his gun.

The mission experienced a lot of operational setbacks initially, because there were no topographical maps for accurate operational planning or orders and hence, it was easy for the Rebels who were more familiar with the country’s topography to ambush foreign Peacekeepers who knew little about their Area of Operational Responsibilities and had no Maps.”

UNAMSIL Press release, 22 Oct 2002
Limitation & Constraint

• Limited Support & Resources
  - Lack of Governance (structural & information flow)
  - Lack of Staff: 180-200 (HQ: 20-30, Missions: 160-170)
  - Lack of Geo infrastructure & capacity

• Critical shortfalls on Mission Start-up
  - Global coverage, mostly underdeveloped areas
  - Long lead-time for resource generation
  - Surge GIS/Mapping demands to start-up a mission

• No Magic for Instant Mapping
  - Lack of base maps (particularly Vector maps)
  - Outdated maps, limited coverage
  - Minimal verified data
Strategy
**Strategic Preparedness**

- Capacity building
- Planning & Preparing in advance
- Strategic partnership & alliances
- Pre-training
- Team spirit

![Graph showing strategic preparedness over time](image)
4 Tiers: UNHQ-UNLB-RSC-Missions

1. Geo-database
2. UN Earth (Google-Earth)
3. Image library

UNLB GIS Centre: UN Geo-Database repository & Bridge
Capacity Building

- Established GIS Centre (Oct 2007)
- Mapping (Vmap2) projects (UNDOF, UNIFIL, Darfur, DRC, Somalia)
- Terrain Analysis and Groundwater Assessment
- UN-EC Gazetteer system
- UN Geo-database
- UNMap (1:1, 5, 10 millions)
- UN Earth (Google Earth enterprise system)
- UN Image Library
- Map portal (UN Internet & Intranet)
- UN World Map
- SOPs & Guidelines, Community of Practice
- Established Systems Contracts – ESRI, MDA Geo, SPOT
- Operation & System architecture
- GIS start-up: Strategic deployment stocks (SDS) & GIS Rapid Deployable Module (containerized)
- Application developments: Field Reporting Tool, Security warden system, Election, Tracking & Monitoring, etc.
Partnership & Alliances

- **Strategic Partners**
  - UN Geographic Information Working Group (UNGIWG)
  - Geographic Information Support Team (GIST)
  - Interagency collaboration on the field
  - EU Satellite Centre (EUSC)
  - EC Joint Research Centre (JRC)
  - NATO Geo Section
  - France (BGHMO), EUFOR–Chad/CAR
  - US State Dept (Office of Geographer & Global Issue)
  - Italy (DGS), US NGA, Netherlands, Belgium, …
  - G-MOSAIC (EU funded GMES initiative)
  - Multinational Geospatial Co-production Program (**MGCP**)

- **Other partners (revitalizing)**
  - ISO/TC211 Geographic Information/Geomatics
  - Open GIS Consortium (OGC)
  - Global Spatial Data Infrastructure (GSDI)
  - International Steering Committee for Global Mapping (ISCGM)
  - Committee on Earth Observation Satellite (CEOS)
  - National Mapping Agencies
Furthering Partnership

To meet the Operational needs effectively & timely fashion within the given resource/capacity.

“Avoid duplications, enhance synergy by cooperation”

• Sharing geo-data, knowledge & experience
• Geo-data co-production (Darfur, Somalia, etc)
• Joint Task Force
• Joint Projects (e.g., evacuation, water source)
• Cross-training & education
• Technology exchange
• Staff exchange
• Other areas
UN Geographic Information Working Group: 28 March 2000

2000-2002: UN Cartographic Section
2003-2004: UNEP + WHO
2005-2006: WFP + FAO
2007-2008: UN OCHA + UNHCR
2009-2010: UN OOSA + UN ECA

Objective:
“to promote the use of geographic information for better Decision-making.” a network of professionals working in the fields of cartography and geospatial information management science to address common geospatial issues - maps, boundaries, data exchange, standards, naming conventions, and location.

UNSDI:
The agencies of the UN system deliver more services in more places than ever before. In order to do so, the UN agencies produce data and information which they need to share among themselves, with member states, non-governmental organizations, as well as other institutions. From peace-keeping to humanitarian relief and pandemics, from environment to economic development, the ready availability and cost-effective management of dependable geospatial information is central to raising the operational efficiency of the United Nations.
GI Support Team (GIST)

Foundation: July 1998 (UN OCHA)
UN/OCHA, UN/DPKO, UNHCR, WB, UNICEF, WFP, FAO, USAID, EU/ECHO, WHO, ITOS (U. of Georgia), DEPHA, VVAF

Objective:
“rapidly strengthening humanitarian information coordination
preparedness and response efforts around the world.”
a group of technical and operational experts from humanitarian agencies with
disaster management, humanitarian assistance and coordination mandates – and an
interest and capacity in information management. The group seeks to enhance the
use of geographic information, data standards and information sharing to improve
emergency preparedness and response.

Activities: disaster recovery & humanitarian relief operations
- Tsunami
- Earthquake, Eruption, flooding, etc.
- Humanitarian activities
**Global Impact & Vulnerability Alert System (GIVAS)**

**Background:**
- G20 Summit in London: called UN to establish an effective mechanism to monitor the impact of the crisis on the poorest and most vulnerable.

**Objective:**
- To provide early indications of how an exogenous shock, like the financial crisis, is affecting the economic, social and political welfare of the most marginalized populations and countries.

**Geo Support:**
- Global geo-data
- Global interoperable geo-infrastructure
- Spatial analysis, and interface with the existing systems

**Major Geo Participants:**
- UNCS (focal point), UNEP, FAO, UNHCR, etc.
UNCS Satellite Imagery

Medium Resolution (NaturalVue)
Country Profile Maps
Situation Analysis
Mapping & GeoDB (Vmap2) - Golan Heights
Mapping & GeoDB (Vmap2) - Darfur

Duration: 3 years (2008-10)
Scope: 11~16 cells
Source: SPOT-5 & Reference 3D
Image map → TLM → GeoDB

TLM production status
TLM completed with Q/C: 63 maps
TLM completed without Q/C: 47 maps
Mapping & GeoDB (Vmap2) - Darfur
Ground Water Analysis

GROUNDCOATER EY SUD: SELECTION OF LOI's FOR SURVEYS & DRILLING

AL - GENEINA, Darfur (SUDAN): AREA OVERVIEW

GIS and SATELLITE DATA: Data Sources and Processing Workflows

Map Result: Potential Drilling Location

Hydrogeological Analysis Integrated into the GIS (notional representation only)
Map Portal

The image shows a webpage from the United Nations Peace Operations site, featuring a map portal with various map options available. The portal includes sections for general maps, political operations, peacekeeping operations deployment, troop contributing countries, and asset contributing countries. The map in the center displays troop contributors to UN missions with a world map in the background.
UNmap (1:10, 5 & 1 millions)
Security Warden Information System
Bird Flu Analysis
International Boundaries

- Boundary delimitation & demarcation
  - EEBE (Eritrea-Ethiopia)
  - CNMC (Cameroon-Nigeria)
  - IKBDC/IKBMP (Iraq-Kuwait)
  - Blue Line (Lebanon-Israel)

- Technical assistance
  - AU Border Program
  - North-South Sudan
  - Iraq disputed internal boundaries
  - Green Line (Cyprus)

- Capacity building
  - Boundary Information System
  - Cooperation with major players
International Boundaries
Boundary Information System

Collection of evidence …

International Court of Justice
Benin Niger boundary decision

League of Nations
Togoland Boundary Commission

UN Treaty Section
Tunisia Algeria boundary treaty

UN Treaty Section – Malawi Mozambique boundary treaty

UN Cartographic Section
UNRCC-AP, Bangkok 2009

Other source: Chad - Sudan boundary

League of Nations
Libya and Egypt boundary treaty
Boundary Information System

Interpretation & digitization ...

- Treaty maps
- Treaty coordinates
- Supporting evidence
- Treaty text
- Digitization
- Input and convert
- Interpretation & Digitization

Final boundary
All elements are included
Problem of accuracy between map and image

LANDSAT IMAGE (WGS 84):
Accuracy ≈ 100 meters

MAP (CLARKE 1880):
Accuracy to WGS84
ΔX ≈ -180 meters
ΔY ≈ -45 meters

Extracted boundary

Treaty map
(Clarke 1880)

Geo-referenced maps
Thank you

Kyoung-Soo Eom
Chief Cartographic Section
United Nations
eom@un.org
+1 (212) 963-0221