Digital Map Update & Revision System

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Digital Map Status in KOREA

- **Scale & No. of Map Sheet**
  - 1/25K : 798 Sheets
  - 1/5K : 16,887 Sheets
  - 1/1K : 17,314 Sheets

- **Data Type**
  - Ver. 1.0(DWG/DXF)
  - Ver. 2.0(NGI)
  - Seamless Map Database
Map Production & Process

### [1: 1,000]
- Revision
- Partially Updated in Every Year
- Revision for Main City (2 Years)
- Revision for Unban Area (4 Years)

### [1: 5,000]
- Partially Updated in Every Year

### [1: 25,000]
- Map Generalization Using 1/5K

### Seamless DB
- Partially Updated in Every Year
# National Map Progression: Transitions

<table>
<thead>
<tr>
<th></th>
<th>Ver 1.0</th>
<th>Ver 2.0</th>
<th>Ver 3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
<td>Data</td>
<td>Information</td>
<td>Knowledge</td>
</tr>
<tr>
<td><strong>Data</strong></td>
<td>Layer based</td>
<td>Integrated layers</td>
<td>Feature based</td>
</tr>
<tr>
<td><strong>Data Model</strong></td>
<td>Theme based data models</td>
<td>Integrated data model</td>
<td>Intelligent spatial/temporal model</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>Map and data products</td>
<td>Service oriented delivery</td>
<td>Intelligent knowledge base</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Viewer</td>
<td>GeoServices</td>
<td>Future Technologies &amp; Services e.g. 3-D capabilities</td>
</tr>
</tbody>
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Issues in Digital Map

- **Requirements**
  - Product Life Cycle
  - Industrial Use

- **Technology**
  - Monitoring
  - Change Detection
  - Process Improvement

- **Policy & Surveying Law**
Renewing & Revision Sources

- Drawings & Reports
- Image Interpretation
- Public Sectors
- Local Governments
**Process for Map Revision**

1. Monitoring & Change Detection
2. Area Selection & Filtering
3. Field Surveying
4. Feature Editing
5. QC & Archive

- Extract Data
- Database
- Update

Data Editing

SHP File
NGI File
DXF File
Process for Map Update

Digital Map 2.0

Input Data

Main Algorithm

Data Clipping

Data Join

Management Backup Data

Apply Total Layer

Apply singular Layer

Apply Original Data
1. **The Sutherland-Hodgman Algorithm**
   ① Can’t Apply complicate Polygons Such as the Roads, the Rivers. Etc.
   ② Impossible to Divide Polygon Independently.
   ③ Can’t Apply Only Rectangle Types of Boundary

2. **Weiler-Atherton Algorithm**
   ① Only Possible to create Inside Polygon of Boundary
   ② Linked List Structure
   ③ Need Direction Property of Polygon
Suggestions & Improvements

Weiler-Atherton Algorithm & Vertex Cycle Algorithm

• Find direction property of Polygon
  ✓ Make boundary has difference direction property with Polygon.
  ✓ Add vertex boundary and Polygon at the intersection part.
  ✓ Remove overlap Polygon
  ✓ Apply data structure of arrangement type.
  ✓ When it move to outside into inside of vertex direction, add vertex after moving opposite Boundary index.
Test & Results

Digital Map 2.0 (Exist)

Input File (New Features)

Digital Map Clipping Using MBR

Digital Map Join Using Input File
Test & Results (Cont.)

Digital Map 2.0 (Exist)

Apply singular Layer (New Features)

Join Digital Map Using Singular Layer
Conclusions

• **Provide Definition & Guidance.**

• **Provide Incentives to real-time map updating solutions as a cost effective, fast and intuitive**

• **Support Problem-Solving.**