Esri Defense Mapping: Cartographic Map Production

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Agenda

• Cartographic Map Production
  - Overview
  - Multi-Scale Mapping using Generalization
  - Cartographic Automation
  - Defense Mapping Cartography and ArcGIS Pro
  - Product on Demand (CAPS)

• NGA
Overview
Esri Defense Mapping
Esri Defense Mapping
Produce, Manage, and Share Authoritative Content

• Defense Mapping as a Platform
  - Produce Authoritative Content
  - Manage Production Environment
  - Share and Collaborate
Esri Defense Mapping
Leveraging the ArcGIS Platform

System of Engagement

Apps

Systems of Record

Desktop

Server

Web GIS

Services
Esri Defense Mapping
An Extension to the ArcGIS Platform

- Specification Driven
- Geoprocessing Toolsets
- Predefined Edit Templates
- Quality Assurance / Control
- Cartographic Symbology
Multi-Scale Mapping using Generalization
Multi-Scale Mapping
One database, multiple products

Best Scale Data  Automation  Multi-Scale Product
Generalization Techniques

- Simplify
- Smooth
- Eliminate
- Amalgamate
- Exaggerate
- Collapse
- Thin
Generalization Tools in ArcGIS

- **Analysis**
  - Erase
  - Identity
  - Buffer
  - Graphic Buffer (10.5)
  - Near
  - Generate Near Table

- **Cartography**
  - Aggregate Points
  - Aggregate Polygons
  - Collapse Road Detail
  - Create Cartographic Partitions
  - Delineate Built-Up Areas
  - Merge Divided Roads
  - Simplify Building
  - Simplify Line
  - Simplify Polygon
  - Smooth Line
  - Smooth Polygon
  - Thin Road Network
  - Detect Graphic Conflict
  - Propagate Displacement
  - Resolve Building Conflicts
  - Resolve Road Conflicts
  - Feature Outline Masks
  - Update Override

- **Conversion**
  - Feature class to feature class
  - Table to Table

- **Data Management**
  - Integrate
  - Add Geometry Attributes
  - Copy Features
  - Delete Features
  - Feature To Line
  - Feature To Point
  - Feature To Polygon
  - Feature Vertices to Points
  - Minimum Bounding Geometry
  - Multipart To Singlepart
  - Repair Geometry
  - Split Line At Vertices
  - Unsplit Line
  - Add Field
  - Calculate Field
  - Append
  - Copy
  - Delete
  - Dissolve
  - Eliminate Polygon Part
  - Make Feature Layer
  - Select Layer By Attribute
  - Select Layer By Location
  - Get Count

- **Spatial Analyst**
  - Topo To Raster
  - Raster Calculator
  - Polygon To Raster
  - Point To Raster
  - Con
  - Contour
  - Raster to Point

- **Model Only Tools**
  - Select Data
  - Calculate Value
  - Iterators

- **Production Mapping**
  - Aggregate Polygons
  - Calculate Visual Specification
  - Convert Polygons
  - Delete Dangles
  - Delete Polygons and Extend Lines
  - Extend Polygon Sides
  - Fill Gaps
  - Generalized Shared Features
  - Increase Line Length
  - Increase Polygon Area
  - Production Centerline
  - Production Clip

- **Production Dissolve**
  - Prune Hydro
  - Remove Cutbacks
  - Remove Self Intersections
  - Repair Bad Geometry
  - Split Narrow Polygons
  - Thin Hydro Features
  - Thin Spot Heights

- **Defense Mapping**
  - Hydro Centerline
Leverage Tools Within Models...
...and Submodels
...and sometimes Python
Map Generalization in Esri Defense Mapping
Theme-Based Approach

- Best Scale Foundation Content (50K)
- Elimination / Thinning / Aggregation
- Simplify / Smooth Maintain Relationships
- Cartographic Automation

- Settlement
- Transportation
- Hydrography
- Landcover
- Infrastructure

Foundation Content (50K) → Map Sheet Content (50K) → Generalize Shared Features → Map Sheet Content (250K) → Map Product (250K)
TDS Generalization in Esri Defense Mapping

50K to 250K Generalization of TDS 6.1 Data Schema

• Output Intended for 250K Product Creation
• Stand-alone toolbox with models and scripts
• Esri Defense Mapping Releases:
  - 10.7
  - 10.6.1
  - 10.6 Patch 2
  - 10.5.1 Patch 7
  - 10.5 Patch 2
  - 10.4.1 Patch 7 Update 1
Cartographic Automation
Esri Defense Mapping for ArcMap
Cartographic Production
Expediting the Desktop Map Creation Process
Cartographic Automation
Expediting the Map Creation Process

Rapid Mapping
Cartographic Product

Authoritative Data -> Data Preparation -> Create Rapid Graphic -> Export Map -> Evaluate Map -> Enhance Cartography -> Publish Map
Data Preparation
Creating and Preparing Cartographic Data

Create Data
- Extract Area of Interest (GP)
- Create Contours (GP)
- Create Spot Heights (GP)
- Add Boundary Data
- Add Map Sheet Information

Prepare Data
- Calculate Visual Specifications (GP)
- Building Offsets (GP)
- Calculate Bridge Overrides (GP)
- Suppress Spot Heights (GP)
Create Rapid Graphic
Automated Map Creation

Centerline Data → Data Preparation → Create Rapid Graphic

Geoprocessing
Rapid Graphic Map Template
Defining the Map Sheet Layout

Map Template

- Centerline Data
- Data Preparation
- Create Rapid Graphic
- Map Template (MXD)

Custom Template
- Layers
- Logo
- Legend
- Notes
- Graphics
Rapid Graphic Output
Geoprocessing Options

- Centerline Data
- Data Preparation
- Create Rapid Graphic
- Output Options

Rapid Graphic Output
- Map Document
- Production PDF
- Map Package
Create Rapid Graphic Functions
Automated Updates to the Map Sheet

Map Template
- Dynamic Elements
- Map Sheet Information

Data Frames
- Projected Extents
- Grids & Graticules
- Sourced Data Layers
- Export Layer Order
- Spot & Contour Labels
- Feature Annotation
- Adjoining Sheet Labels
- Elevation Band Data
- Elevation Band Symbols
Cartographic Product
Evaluating the Map Sheet
Cartographic Updates
Meeting Cartographic Requirements

- Map Information
- Element Placement
- Feature Offsets
- Symbol Levels for Roads
- Thin or Hide Annotation
- Annotation Masks
Map Publishing
Delivering the Cartographic Product

Centerline Data → Data Preparation → Create Rapid Graphic → Export PDF → Evaluate Map → Enhance Cartography → Publish Map

Cartographic Product
Defense Mapping

ArcGIS Pro
ArcGIS Pro
Esri Defense Mapping for ArcGIS Pro 2.3

• Defense Mapping Extension
  - Edit Tools
    - Modify Features
    - Create Features

• Topographic Production Toolbox
  - Cartography
  - Data Management
  - Workflows
Edit Tools
Esri Defense Mapping for ArcGIS Pro 2.2

- Populate Angle
- Geoname to Feature
- Create Structures
- Difference Polygon
Geoprocessing Tools
Esri Defense Mapping for ArcGIS Pro 2.3

- **Cartography**
  - Banding
  - Features
  - Layout

- **Data Management**
  - Features
  - Generalization
  - Geodatabase
  - Topology
  - Validation

- **Workflow**
  - Properties
  - Tasks
Support Files
Esri Defense Mapping for ArcGIS Pro 2.2

- Independent Install
  - Default Location
    - C:\ProgramData\Esri\Defense Mapping\Product Files\2.3
  - Custom Location

- GeoNames
- Grid Templates
- Masking Rules
- MGCP
- Reference Data
- TDS
- Workflows
Cartographic Support
Esri Defense Mapping for ArcGIS Pro 2.2

- MGCP Topographic Map
  - Map Templates
    - TM50, MTM50 & MTM100
  - Dynamic Elements
    - Meter Reference Guide
    - TM North Arrow
    - Elevation Guide Bar
  - Symbol Expressions (Arcade)
  - Label Expressions (Python)

```python
Expression

```}

```python
if ($feature.F_CODE == "AMB20" && $feature.HGT < 46) {
    return "Grain Elevator / non-obstruction (point) PS-04105"
}
else if ($feature.F_CODE == "AMB20" && $feature.HGT < 46) {
    return "Grain Storage Structure / non-obstruction (point) PS-04102"
}
```
Product on Demand (CAPS)
Cartographic Automation Production Solution
Product On Demand (POD)
Esri Defense Mapping Web Application

- Installed with Esri Defense Mapping for Server
- Cartographic Production App
- Self-service
  - Defense Products
  - Custom Products
  - Both Maps and Data
Product on Demand (CAPS)
Questions?
Print Your Certificate of Attendance
Print Stations Located at L Street Bridge

**Tuesday**
12:30 pm – 6:30 pm  
GIS Solutions Expo  
Hall D

5:15 pm – 6:30 pm  
GIS Solutions Expo Social  
Hall D

**Wednesday**
10:45 am – 5:15 pm  
GIS Solutions Expo  
Hall D

6:30 pm – 9:00 pm  
Networking Reception  
National Museum of Natural History
Please Take Our Survey on the App

Download the Esri Events app and find your event

Select the session you attended

Scroll down to find the feedback section

Complete answers and select “Submit”