

Esri Federal GIS Conference

February 22–24, 2012 | Washington, D.C.

esri.com/fedcon



Producing GEOINT with Esri Defense Mapping

Eric Ray and Brian Demers



Presentation Agenda

1. **Introduction**
2. **Design and implement standard workflows**
3. **Data loading and feature extraction**
4. **Maintain quality data**
5. **Cartographic production**

Introduction



Industry Challenges

- **Authoritative data**
 - Produce data you can trust
 - Share and exchange – regardless of its source
- **Good, fast, and cost-effective**
 - Improve the speed and accuracy of your data / maps
 - Streamline workflows for efficiency
- **Commercial-off-the-shelf solution:**
 - Configure to needs
 - Eliminate custom code or scripts

Esri Defense Mapping

- **Meet the standards set by defense community**
 - High quality databases and cartographic products
- **Platform for managing a production workflow**
 - Data management and editing tools
 - Quality control processes
 - Simplified cartographic tools
 - Defense specific database models
- **Evolved from defense community needs**
- **Previously named PLTS Defense Solution**

Esri Mapping and Charting Solutions

Esri Production Mapping

ArcGIS Workflow Manager

Task Assistant Manager

ArcGIS Data Reviewer

Data Loader

Enhanced
Editing
Tools

Resource Center
(ArcGIS Online)

Product
Library

Cartographic
Production
Tools

Defense Mapping

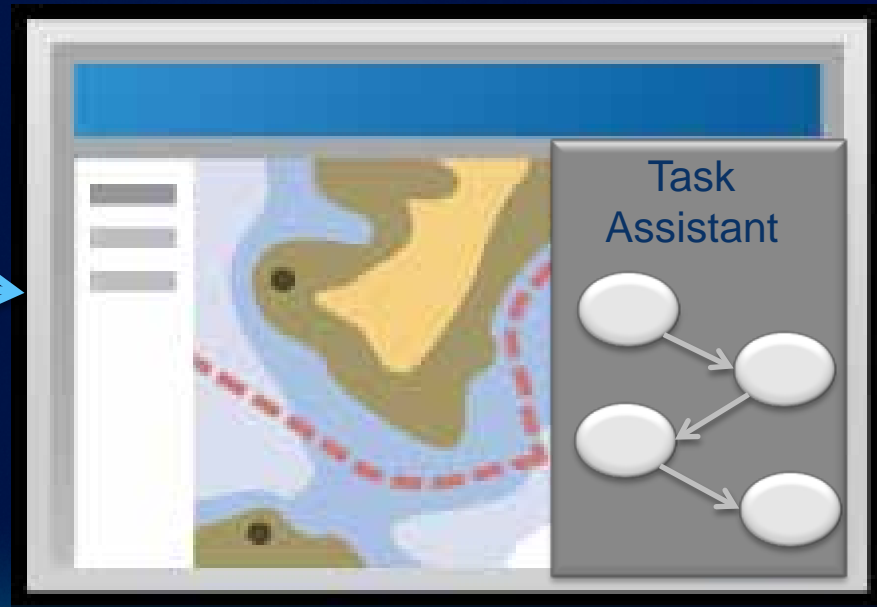
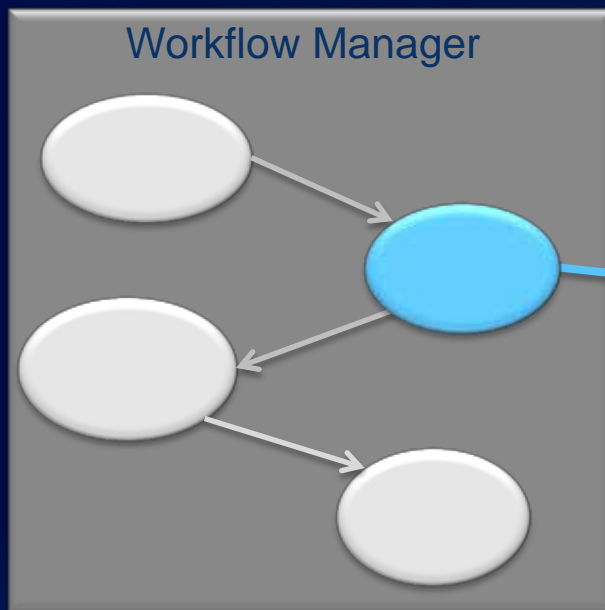
- Data Models
- Workflows\Database scripts
- Symbol Sets
- Map Templates
- Validation Rules
- MGCP, I&E editing

Design and implement standard workflows



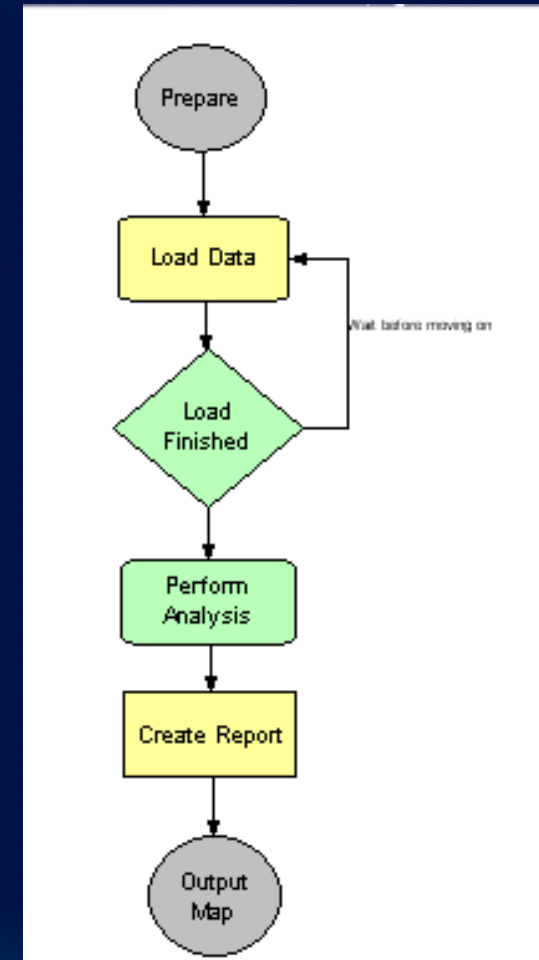
Manage workflows at multiple levels

- Define your workflows
- Macro – link to multiple systems at a high level
- Micro – tasks inside of ArcMap



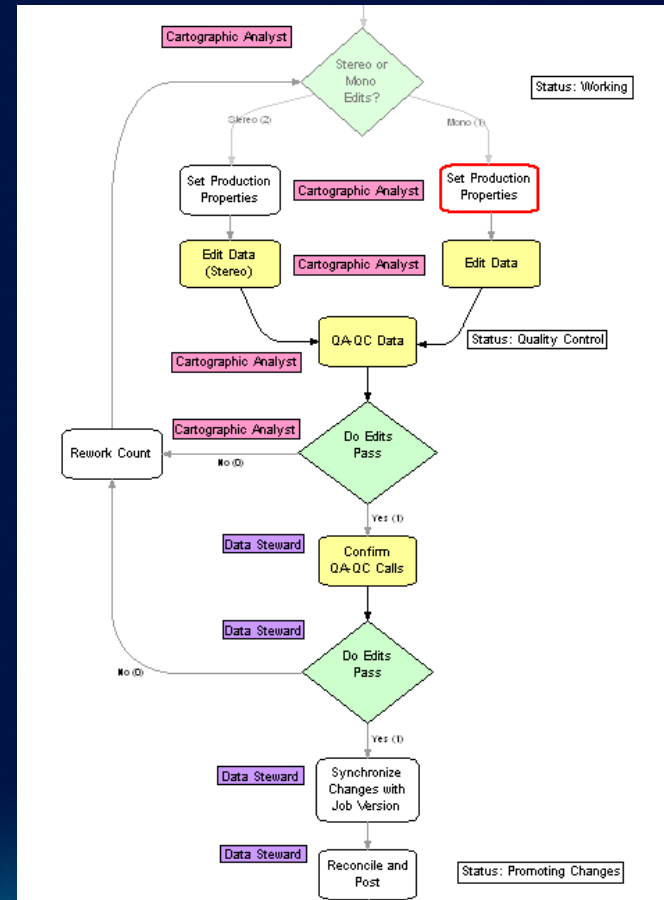
Workflow Manager

- **Develop and enforce standard workflows**
 - Enforce consistency across an organization
- **Create and assign units of work (jobs)**
 - Assign resource
 - Automate tasks
 - Notify users of pending work
- **Track assigned work**



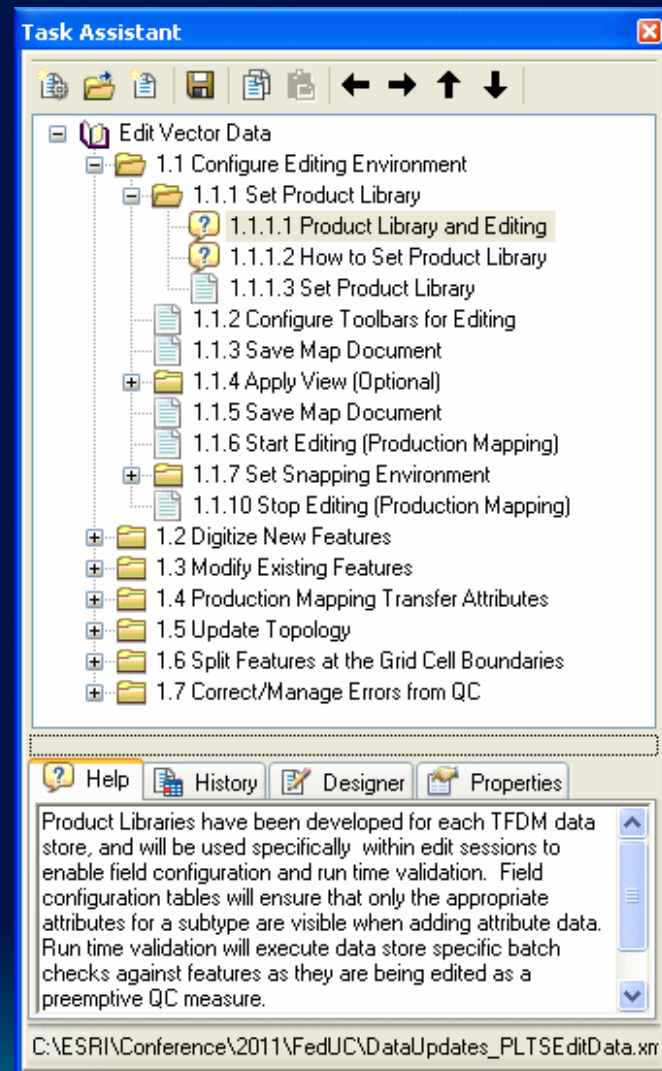
Defense Mapping Production Workflows

- Workflows available (.jxl file)
- Support TDS production for contractor/co-producer
 - Data exchange process
 - Data ingest
 - Data extraction and quality control



Task Assistant Manager

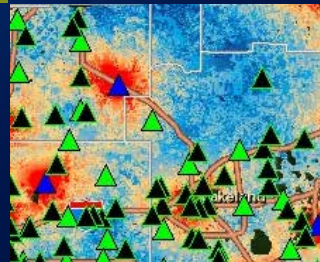
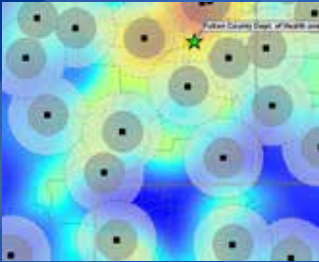
- **Create and Standardize workflows in ArcMap**
- **Promotes sharing of knowledge**
 - Experienced users create workflows
 - Less experienced users execute
 - Communicate best practices
- **Provides consistency and efficiency**



DeKalb County Board of Health

Fulton County Dept. of Health and Wellness/District 3, Unit 2: GIS

Demo: ArcGIS Workflow Manager



Data loading and feature extraction

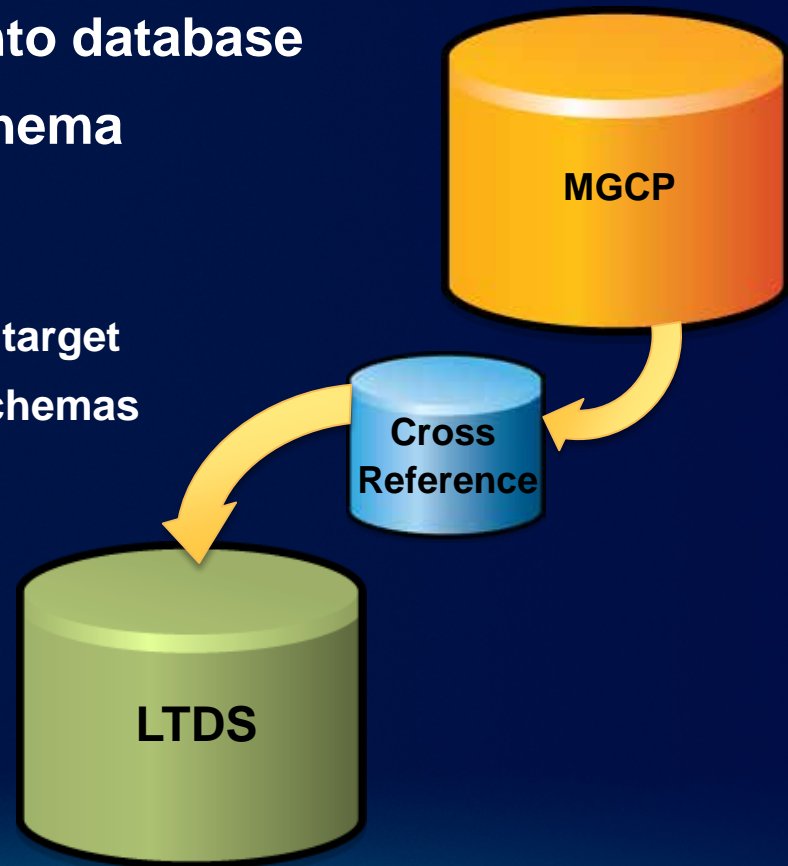


Database schemas supported

- **Designed to meet defense standards**
 - **Geobase**
 - **Geofidelis**
 - **GIFD**
 - **ICM**
 - **MGCP (TRD 3)**
 - **TDS (DCS 4.0) (Global, Regional, Local, Urban)**
 - **TGD (v 3.2) (Operational, Strategic, Tactical, Urban)**
 - **VMAP (0, 1, 2)**
 - **VITD**

Data loading

- Efficient loading of data into database
- Convert data from one schema to another
 - Cross reference database
 - Maps data from source to target
 - Available for supported schemas
 - Examples
 - MGCP to LTDS
 - GIFD to MGCP



Editing using Defense Mapping

- **Editing templates**
 - **Pre-defined attributions for supported data schemas**

Feature Manager

Manage Features

Template: Road (AWHS 1 lane - under cons Metadata: None

<Search>

RoadL

- Road (AWHS 1 lane - under construction) 1P030L023
- Road (AWHS 1 lane) 1P030L003
- == Road (AWHS 2+ lanes - median) 1P030L002
- Road (AWHS 2+ lanes - under construction) 1P030L048
- Road (AWLS 1 lane - candy stripe sym)
- Road (AWLS 1 lane - under construction) 1P030L049
- Road (AWLS 2+ lanes - under construction) 1P030L051

Selections: 0

Create Attributes

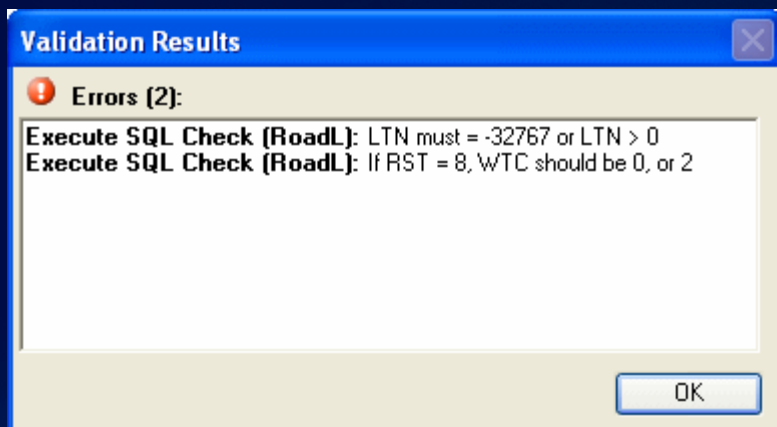
	Field Name	Field Value
<input checked="" type="checkbox"/>	F_CODE	AP030 - AP030
<input checked="" type="checkbox"/>	ACC	1 - Accurate
<input checked="" type="checkbox"/>	FUN	6 - Fully Functional
<input type="checkbox"/>	HCT	0 - Unknown
<input type="checkbox"/>	LOC	0 - Unknown
<input checked="" type="checkbox"/>	LTN	2
<input checked="" type="checkbox"/>	MES	1000 - Without Median
<input type="checkbox"/>	NAM	
<input type="checkbox"/>	NFI	

Create Attributes

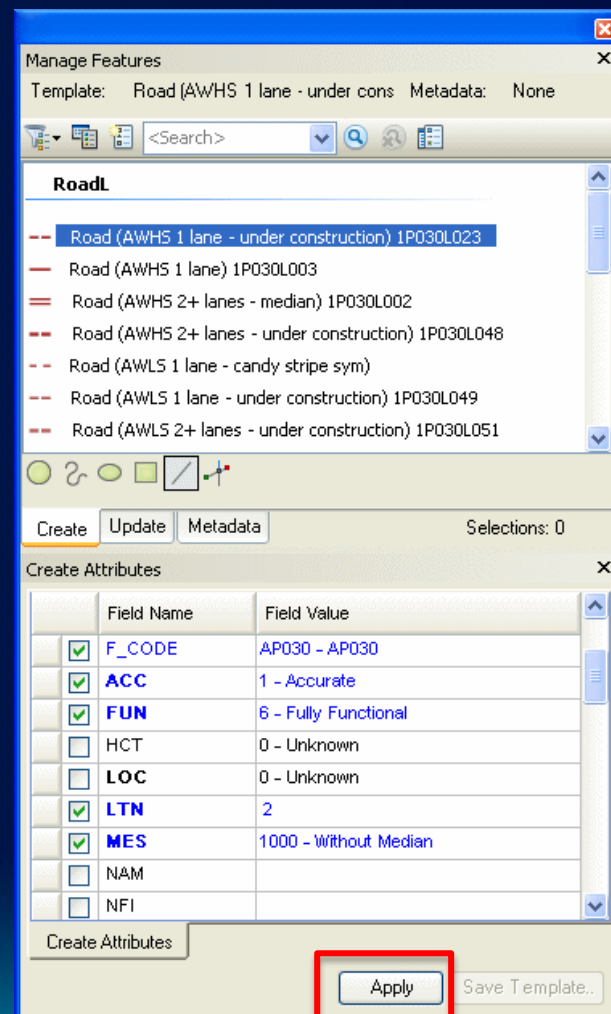
Apply Save Template..

Editing using Defense Mapping

- **Editing templates**
 - Pre-attribution for supported data schemas
- **On-the-fly validation**
 - Reject noncompliant data



Feature Manager



Editing using Defense Mapping

- **Editing templates**
 - Pre-attribution for supported data schemas
- **On-the-fly validation**
 - Reject noncompliant data
- **Attribute management**
 - Field configurations

Feature Manager

The screenshot shows the 'Feature Manager' window with the following details:

- Window Title: Manage Features
- Template: Road (AWHS 1 lane - under cc Metadata: None
- Search bar: <Search>
- Feature List (RoadL):
 - Road (AWHS 1 lane - under construction) 1P030L023 (highlighted)
 - Road (AWHS 1 lane) 1P030L003
 - Road (AWHS 2+ lanes - median) 1P030L002
 - Road (AWHS 2+ lanes - under construction) 1P030L048
 - Road (AWLS 1 lane - candy stripe sym)
 - Road (AWLS 1 lane - under construction) 1P030L049
 - Road (AWLS 2+ lanes - under construction) 1P030L051
- Buttons: Create, Update, Metadata, Selections: 0
- Table: Create Attributes

	Field Name	Field Value
<input type="checkbox"/>	GFID	
<input type="checkbox"/>	F_CODE	AP030 - AP030
<input type="checkbox"/>	ACC	1 - Accurate
<input type="checkbox"/>	FUN	6 - Fully Functional
<input type="checkbox"/>	HCT	0 - Unknown
<input type="checkbox"/>	LOC	0 - Unknown
<input type="checkbox"/>	LTN	2
<input type="checkbox"/>	MES	1000 - Without Median
<input type="checkbox"/>	NAM	McComas Rd

Buttons at the bottom: Create Attributes, Apply, Save Template..

Editing using Defense Mapping

- **Editing templates**
 - Pre-attribution for supported data schemas
- **On-the-fly validation**
 - Reject noncompliant data
- **Attribute management**
 - Field configurations
- **Feature level metadata**
 - Captures information when creating or modifying a feature

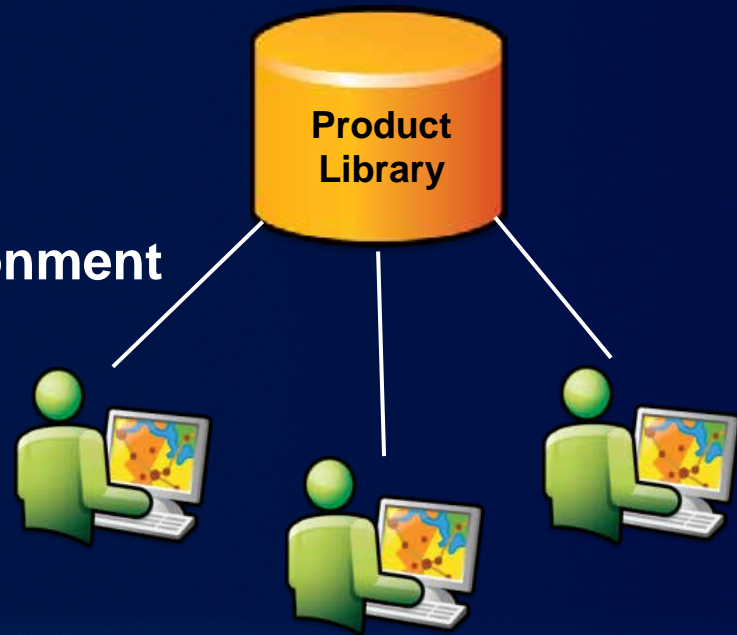
Feature Manager

The screenshot displays the 'Feature Manager' window with the 'Manage Features' tab active. The 'Metadata' button is highlighted with a red box. Below it, the 'Metadata Attributes' table is visible, listing various fields and their values.

	Field Name	Field Value
<input type="checkbox"/>	ACE	124
<input type="checkbox"/>	UPD_DATE	01/04/2011
<input type="checkbox"/>	ZVAL_TYPE	3 - Feature is 2D only
<input type="checkbox"/>	ALE	108
<input type="checkbox"/>	UPD_INFO	N_A
<input type="checkbox"/>	ACE_EVAL	21 - FZD:Evaluation deferred (no me...
<input type="checkbox"/>	ALE_EVAL	21 - FZD:Evaluation deferred
<input type="checkbox"/>	UPD_NAME	4 - NGA City Graphic.
<input type="checkbox"/>	SRC_INFO	

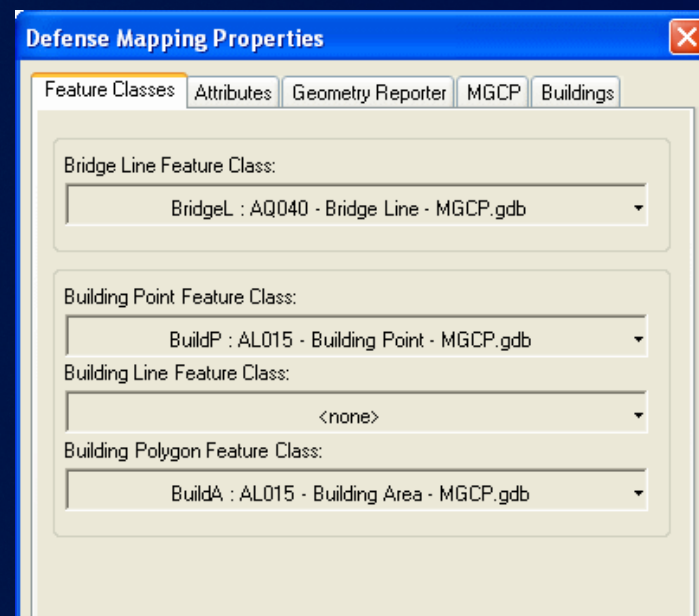
Product Library

- **Stores editing business rules**
 - Editing templates
 - Database validation
 - Attribute management
 - Feature level metadata
- **Controls the editing environment**
- **Provided for supported data schemas**
- **Connect to production database when editing**



Defense Mapping editing tools

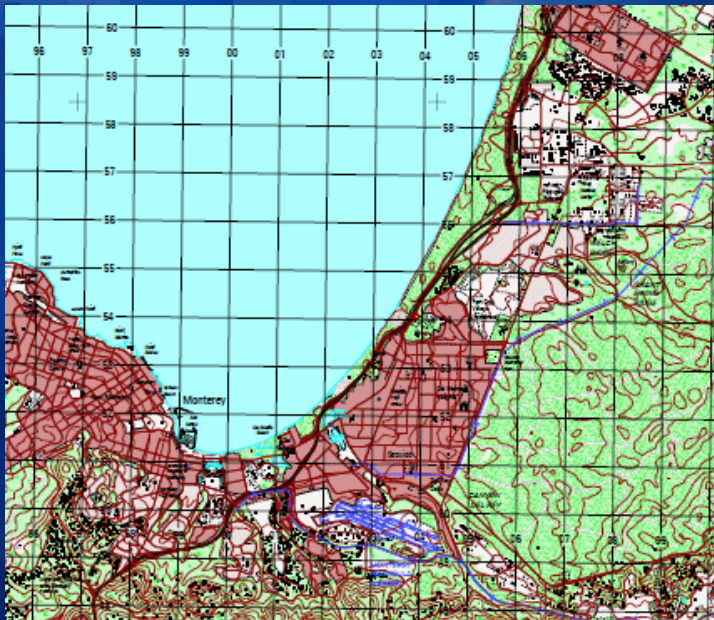
- **Designed to meet data requirements**
 - **Creating features**
 - **Batch update attributes**
- **MGCP production tools**
 - **Ensure 100% landcover**
 - **Show extraction guide when creating features**
 - **Create compliant MGCP shapefiles**



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Fulton County Dept. of Health and Wellness/District 3, Unit 2, G

Demo: Feature extraction and modification



Quality Control



When to perform quality control

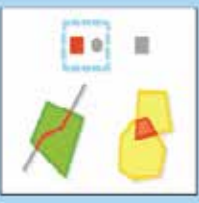

- **Before data loading**
 - QC the data in the source prior to loading
- **Receiving data from contractor/co-producer**
 - QC the data upon arrival and notify sender of errors
- **Extracting or editing data**
 - QC edits for accuracy



ArcGIS Data Reviewer

- **Automated quality control**
 - **Geometry checks**
 - **Attribute checks**
- **Visual quality control**
- **Errors centrally managed and tracked**
 - **Reviewer workspace**
 - **Reviewer table**
- **Run GAIT from ArcMap**
 - **Store errors in Reviewer table**

Feature on Feature Checks

Geometry on Geometry	Searches for features from two different feature classes or within the same feature class that spatially interact (e.g., intersect) or are within a tolerance of each other Comparison to Topology: Line—Must not overlap, intersect, or overlap with Polygon—Must not overlap, contain point, or overlap with	
Intersection on Geometry	Returns geometries for features in feature class 3 that intersect with the intersections of features from feature classes 1 and 2	

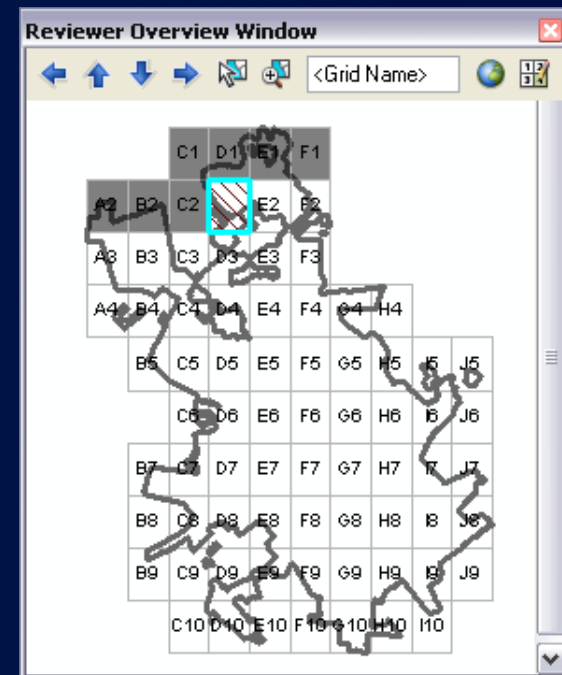
Automated checks

- **42 automated checks**
 - Configure to ensure specification
- **Batch Jobs**
 - Automated running of multiple checks
 - **Quality control model**
 - Available for supported data models
 - Established to ensure data standards
 - Easily distributed
 - **Provided with Defense Mapping**
 - Validate supported schemas



Visual QC

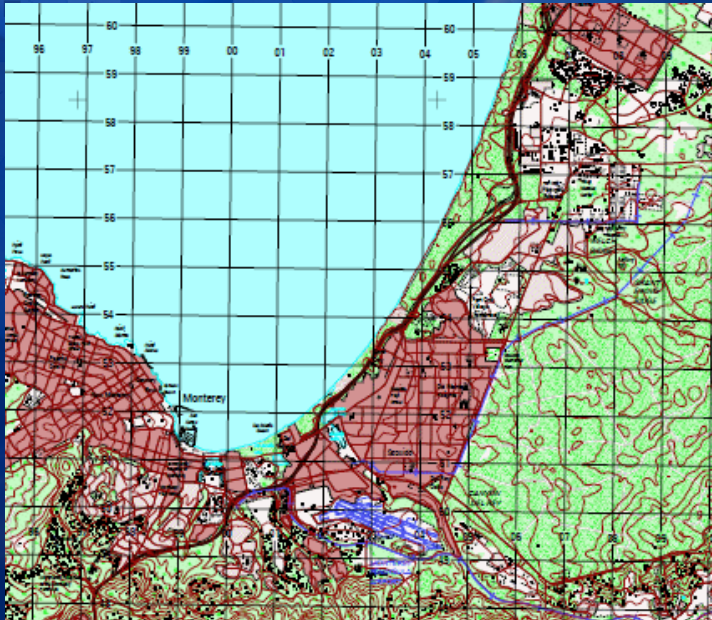
- **Select, browse, and flag tools**
- **Reviewer Overview Window**
 - Systematically review a given area
- **Sampling check**
 - Statistical sample



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Demo: Quality Control

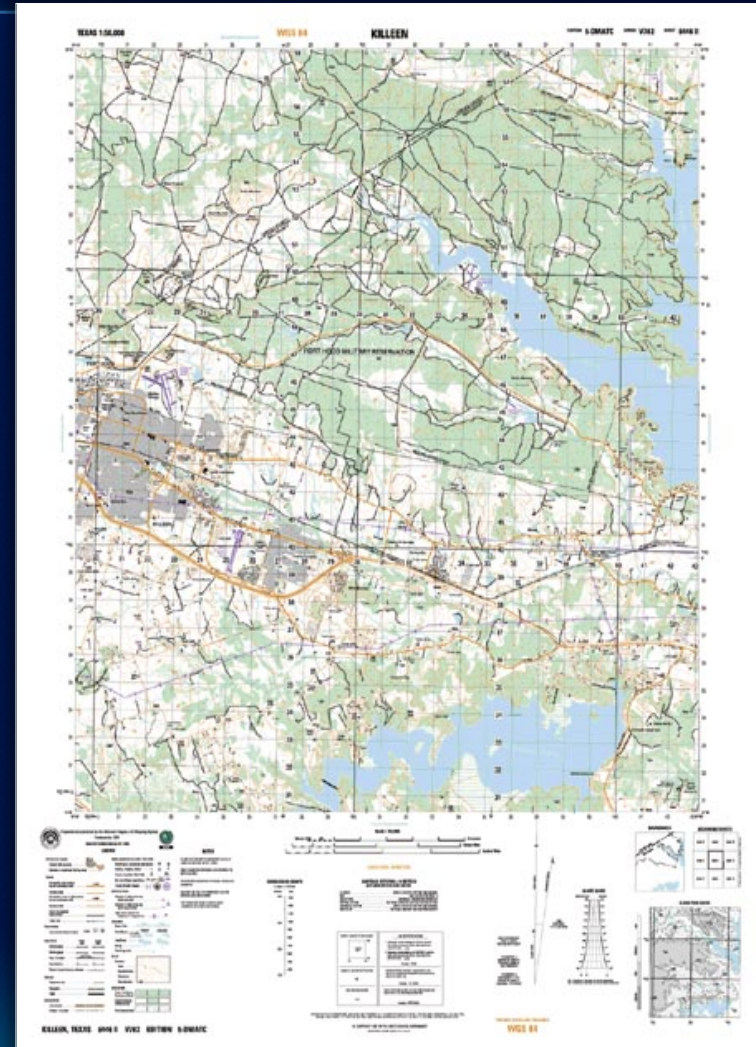


Cartographic production



Defense Mapping map templates

- **Built to specification**
 - JOG
 - MDG50 and 100
 - ICM
 - TLM50 and TLM100
 - LDG50 and LDG100
- **Populate map sheet info**
 - Update surround text
 - Sheet name, country, series, edition, etc.



Cartographic reference grids

- Existing grid definition files
 - ICM
 - JOGA
 - TLM 50 and TLM 100
- Apply grid to different AOIs
 - Consistent and repeatable
- Converging UTM zones
 - Zippers
- Definition files can be modified













Symbolize data

- **Visual specifications**
 - Created for specific map products
 - Standardize and reuse
 - MDG, TLM, LDG, JOG
 - Batch symbolize data
 - Uses predefined representation rules



Defense surround elements

- **Product specific map elements**
 - **Dynamically update**
 - **North Arrows**
 - **Meter Reference Guides**

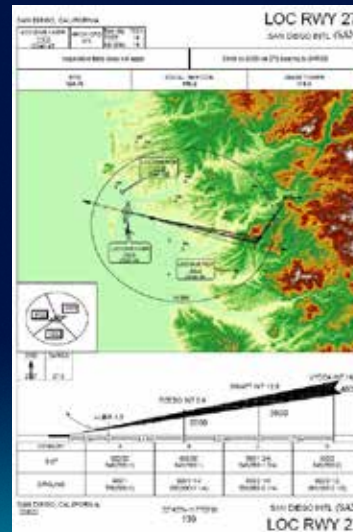
	TLM North Arrow
	TLM Meter Reference Guide
	TLM Conversion Graph
	TLM Elevation Guide Bar
	TLM Slope Guide
<hr/>	
	JOG Elevation Tints
	JOG Meter Reference Guide
	JOG GeoRef Diagram
<hr/>	
	ICM North Arrow
	ICM Meter Reference Guide

Defense surround elements

- Product specific map elements
 - Dynamically update
 - North Arrows
 - Meter Reference Guides
- Dynamic table generation

Category	Reference Number	Feature Name
1	4	Industrial plant with warehouse
1	12	Warehouse and storage facility
1	10	Underground POL storage
1	5	Market
1	9	Truck depot
4	26	Al Kut Military Hospital
5	40	Military facility
5	34	Helipad
5	06	Helipad
8	81	Transformer station
8	66	Water treatment plant
8	51	Bus depot
8	62	Transformer station
8	57	Diesel power plant
8	53	Dam
8	54	Dam
8	65	Water treatment plant
8	56	Helipad
8	60	Bus depot
9	74	From Muhammad Abu Al Hasan Mosque

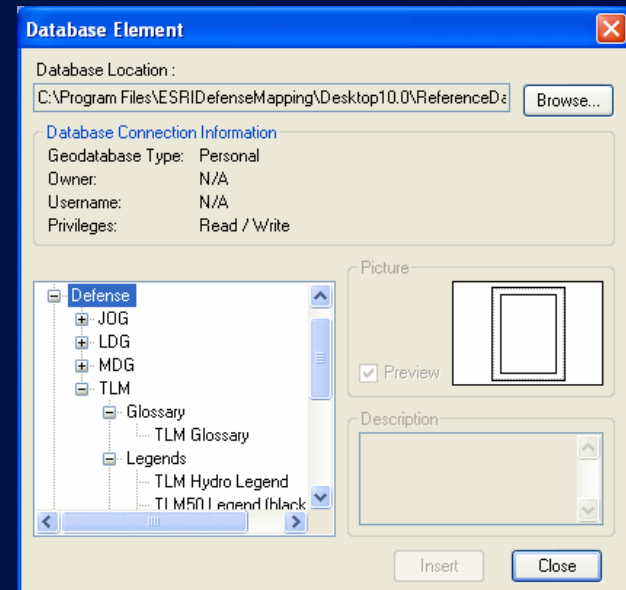
Generated from 2005 Sample Data



INDUSTRIAL AND COMMERCIAL		
Number	Grid Reference	Name
1	9999	Ad Dawan Petroleum Refinery
1	9999	Ad Dawan Petroleum Refinery
1	9999	Dairy products plant
2	9999	Al Hamea Industrial Complex
2	9999	Gas products storage facility
2	9999	Al Hamea Industrial Complex
3	9999	Gas storage facility
3	9999	Al Zafaraniyah Industrial Strip
3	9999	Al Zafaraniyah Industrial Strip
4	9999	Industrial plant with warehouses
4	9999	Bank of Baghdad
4	9999	Bank of Baghdad
5	9999	Brick factory
5	9999	Brick factory
6	9999	Market
6	9999	Market
6	9999	Brick factory
6	9999	Brick factory
7	9999	POL storage
7	9999	Bus repair facility
7	9999	Bus repair facility
8	9999	POL storage facility
8	9999	Bustruck repair facility
8	9999	Bustruck repair facility
8	9999	Bustruck repair facility
9	9999	Truck depot
9	9999	Cement plant
9	9999	Cement plant
10	9999	Underground POL storage
10	9999	Central bank of Iraq
11	9999	Warehouse and distribution facility
11	9999	Chamber of Commerce
12	9999	Warehouse and storage facility
12	9999	Cement plant
12	9999	Cement plant
13	9999	Fuel tank depot
13	9999	Fuel tank depot
14	9999	Gas and oil separation plant
15	9999	Crash storage
16	9999	Crash storage
17	9999	Overhaul shop
18	9999	Iraq Cement Factory
18	9999	Kharranah Cotton Textile Plant

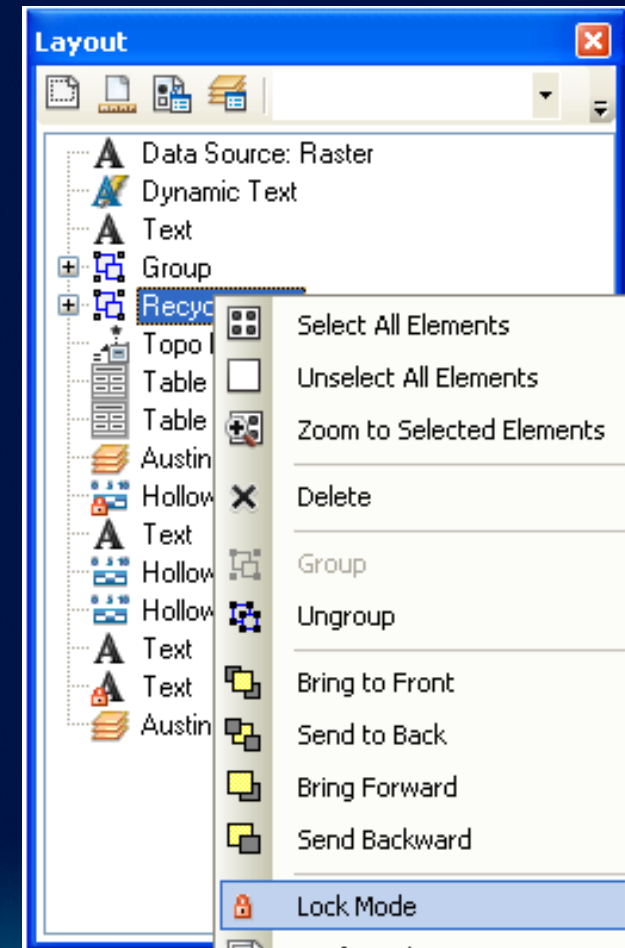
Defense surround elements

- **Product specific map elements**
 - **Dynamically update**
 - **North Arrows**
 - **Meter Reference Guides**
- **Dynamic table generation**
- **Database element library**
 - **JOG, LDG, MDG, TLM elements**



Defense surround elements

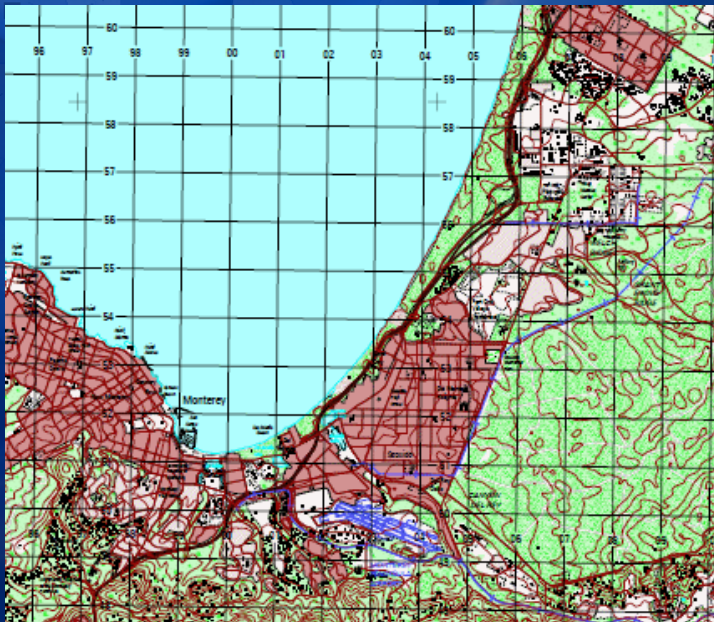
- **Product specific map elements**
 - Dynamically update
 - North Arrows
 - Meter Reference Guides
- **Dynamic table generation**
- **Database element library**
 - Store and share layout elements
- **Manage elements in the Layout window**
 - Centralized layout management



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Demo: Cartographic Production



Summary

- **Extension to ArcGIS Desktop**
- **Tools and support files for GEOINT production**
 - **Plan and streamline workflows**
 - **Defense databases**
 - **Enhanced editing tools including templates**
 - **Validation checks to maintain standards**
 - **Cartographic production tools**
 - **Automate repeatable cartography tasks**

Upcoming Events (www.esri.com/events)

March 8 - MeetUp at Esri (Vienna, VA)

April 12 - MeetUp in DC area (location TBD)

Mar 24-27 – Esri Partner Conference (Palm Springs, CA)

Mar 26-29 – Esri Developer Summit (Palm Springs, CA)

July 21-24 – Esri Homeland Security Summit (San Diego, CA)

July 23-27 – Esri International User Conference (San Diego, CA)



Thursday Evening Reception

- 6:30 – 9:30 pm
- **Smithsonian Air and Space Museum**
- **Logistics:**
 - 6:15 – 10:00 pm Buses transport between convention center and reception
 - Conference Badge needed for reception
 - Coat check – available at entrance
 - Serving hot hors d'oeuvres and beverages



Additional Resources and Questions

- **Esri Defense Mapping Resource Center**
 - <http://www.esri.com/software/arcgis/extensions/defense-mapping/index.html>
 - **Sample data**
 - **White papers**
 - **System requirements**
 - **Success stories**
 - **Free 60-day trial**
- **Brian Demers – bdemers@esri.com**
- **Eric Ray – eray@esri.com**

Thank You

Please complete session evaluation form





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