Weapon Danger Zone Tool

Daniel A. Levine
Geographic Information Services, Inc.
Topics

• Background
• WDZ Definitions
• General Concepts
• Applications
• Deployment Strategy
• Road Ahead
What is the WDZ Tool

- Desktop and Web Application that produces and manages safety footprints for air to ground weapons training.
- ArcGIS 9.2 - desktop
- ArcGIS Server 9.2 - web
- Utilizes and produces SDSFIE standard data
- Integrates with the Range Managers Toolkit (RMTK) for ground based weapons
- GOTS
What is the WDZ Tool

- Initial Tool will use the legacy footprints from previous application (SafeRange)
- Ultimate Tool will interactively create footprints for each request.
WDZ Background

- OSD Sub Groups on GIS and Aviation Safety
- Services teamed up to develop common requirements and define differences
- Collaborative effort – All Services
  - Contribute funding
  - Participate in Configuration Management Working Group
  - Contractually led by the Air Force
WDZ Background

- Development Contract Awarded to CSR and GISi
- CSR providing the aircraft weapons domain expertise
- GISi providing the GIS development and Range Managers Toolkit expertise
WDZ Definition

• The Weapons Danger Zone (WDZ) encompasses the ground and airspace for lateral and vertical containment of projectiles, fragments, debris, and components resulting from the firing, launching, and/or detonation of aviation delivered ordnance.

• This three-dimensional zone accounts for weapon accuracy, failures, ricochets, and broaches/porpoising of a specific weapon/munition type delivered by a specific aircraft type.

• WDZs represent the minimum safety requirements designed for aviation weapons training on DOD ranges.
Weapon Danger Zone

- Weapon Delivery Envelope (including errors)
- Nominal Flight Track
- Greatest Case Short
- Nominal Weapon Trajectory
- Worst Case Long
- Target
- Weapon Impact Zone
- 99.99% Containment
- 95% Confidence Level
- Weapon Safety Footprint
- Weapon Ricochet Zone

Geographic Information Services, inc.
Innovative Solutions...Proven Results
Weapon Danger Zone Area

Containment

A specific area drawn about a target based on weapon containment within that area:
- Containment is selectable:
  - 99.99% (1 in 1:10,000 probability)
  - 99.999% (1 in 1:100,000 probability)
  - 99.9999% (1 in 1:1,000,000 probability)
WDZ Selectable Containment

99.99%

99.999%

99.9999%
Risk Determination

- Areas of Critical Concern (ACC)
- Risk – exposure to the chance of injury or loss
- “Mission Essential Personnel” may be authorized inside a WDZ
- To determine risk, you must know:
  - **Location** – where within the WDZ?
  - **Size** – how large is the risk area?
    - JTAC / TACP / OP
  - **Vulnerability** – how is the risk area protected?
    - Open / Tank / Bunker
Desktop WDZ Toolbar

Setup – Configure tool for specific installation and data set
WDZ Generator, wizard for creating single WDZ’s
Batch WDZ Generator, Create multiple WDZ’s at one time
WDZ Manager – Control Viewing, Delete, Combine WDZ’s
Select WDZ – Selects specific WDZ’s to start other operations (Print)
Move / Rotate WDZ – Slide side to side or rotate around target to reposition WDZ
Target Manager – Create, Edit, Delete targets and attributes about targets
Create Target – Create targets on map or enter coordinates
Select Target – Select existing Target, tool used by other components
ACC Manager – Create, Edit, Delete ACC’s and attributes for ACC’s
Create ACC From Feature – Creates ACC from existing Map feature
Create ACC From Graphic – Create ACC by map click
Risk Analysis – Wizard for performing Risk Analysis
WDZ Print – Creates map output of WDZ with parameters
WDZ Help – WDZ Help System
WDZ Generator Workflow

Service: United States Navy
Aircraft: F/A-18
Weapon: 2.75in MK61
Event: High Altitude Rocket
WDZ Generator Workflow
WDZ Generator Workflow
Enter WDZ Criteria via GUI

Does a WDZ Cube Exist?
  Yes → Plot WDZ
  No →

Is There a Legacy Footprint that Meets the Criteria?
  Yes → Plot WDZ
  No → Display Legacy Choices

User Selects Footprint to Use → Plot WDZ
WDZ Generator Workflow
WDZ Generator Workflow
WDZ Deployment Strategies

- Both desktop and web systems to be completed June 30th
- Working the CTO processes for each Service
- Each Service will be deploying Desktop and Web versions
  - Some users will use it everyday some occasionally
- CSR and GISi will train the trainers for each Service
- Each Service with have Tech POC with reachback
- Contracted to provide ongoing sustainment and engineering support
WDZ Road Ahead – Ultimate Tool

- Build the data bases to be able to interactively produce footprints for any real release condition
- Adding GPS Guided weaponry
- Close the gap between the Desktop and Web tools functional components.
- Improve 3D Functionality
Questions

Contact Info

Dan Levine 205.941.0442
dlevine@gis-services.com

Don Garrison 850.678.7015
don.garrison@csr-fl.com