



Leveraging the ArcGIS Platform for Data Integration

Discovering US Army Europe Training Resources



*US Army Europe
Joint Multinational Training Command
Training Support Activity Europe
Sustainable Range Program*





Sustainable Range Program



Responsible for management of **ranges** and **training areas** with the goal of maximizing the **capability, availability, and accessibility** of those assets to support doctrinal training, mobilization, and deployments, and ensure long term sustainability.

The USAREUR SRP GIS mission is to **create, analyze, manage, and distribute** authoritative standardized spatial information, products, and services for the execution of training strategies and missions on U.S. Army ranges and training lands.



Army Overview



7th Army JMTC: the U.S. Army's largest overseas training command.
Training Support Activity Europe (TSAE): A directorate of the JMTC.

- JMTC provides realistic, tailor-made training solutions to U.S., NATO and partner-nation units and leaders (*customers*).
- *Customers* becoming increasingly NATO / ISAF (International Security Assistance Force). TSAE needs tools for centralizing information and better service.



The TSAE Challenge

- Training resources (+800 facilities) geographically dispersed across Europe.
- Training related data is dispersed across IT systems.

TSAE needs solutions to make it as easy as possible to find training support information.

Goal

Identify, acquire, manage and sustain training planners to provide state-of-the-art training support

Make it as easy as possible to find the training support information training planners need.

Solution = TAP IN

GIS web application that provides a user-friendly means of locating and exploring training resources and facility scheduling data.



What is TAP IN?

A user-friendly map-driven application enabling location and exploration of training resources and facility scheduling data

- Web based map portal for discovering all TSAE training support resources (e.g. ranges, simulators, devices)
- *Locate* training resources and locations
- *Find* SOPs, handbooks, access maps, directions
- *Search* scheduling calendars for training facilities across USAREUR (Range Facility Management Support System – RFMSS)
- *Share* Lessons Learned, Tactics, Techniques & Procedures with training community





What is TAP IN?

Better way of interacting with Range Facility Management Support System (RFMSS) scheduling data

- Command (USAREUR)
- Sub-region (Training Support Centers)
- Facility (Ranges, Training Aids and Devices (TADS))



Architecture

Service Oriented Approach

- ArcGIS Server for map data and imagery services
- JSON and SOAP Web services for Oracle data and resource library

Interface combines the ESRI JS API with jQuery and ASP.NET

- Slideout panels
- Keyword search using jQuery smart search plugin
- Leveraged jQuery for enhanced user experience and efficient design

Application mobility: deployable to other .mil networks and groups within the JMTC.

Configurable via embedded database.



TAP IN – Under the hood

Oracle 11gR2, ArcGIS Server 10.1, ArcGIS JavaScript API
jQuery – customization for

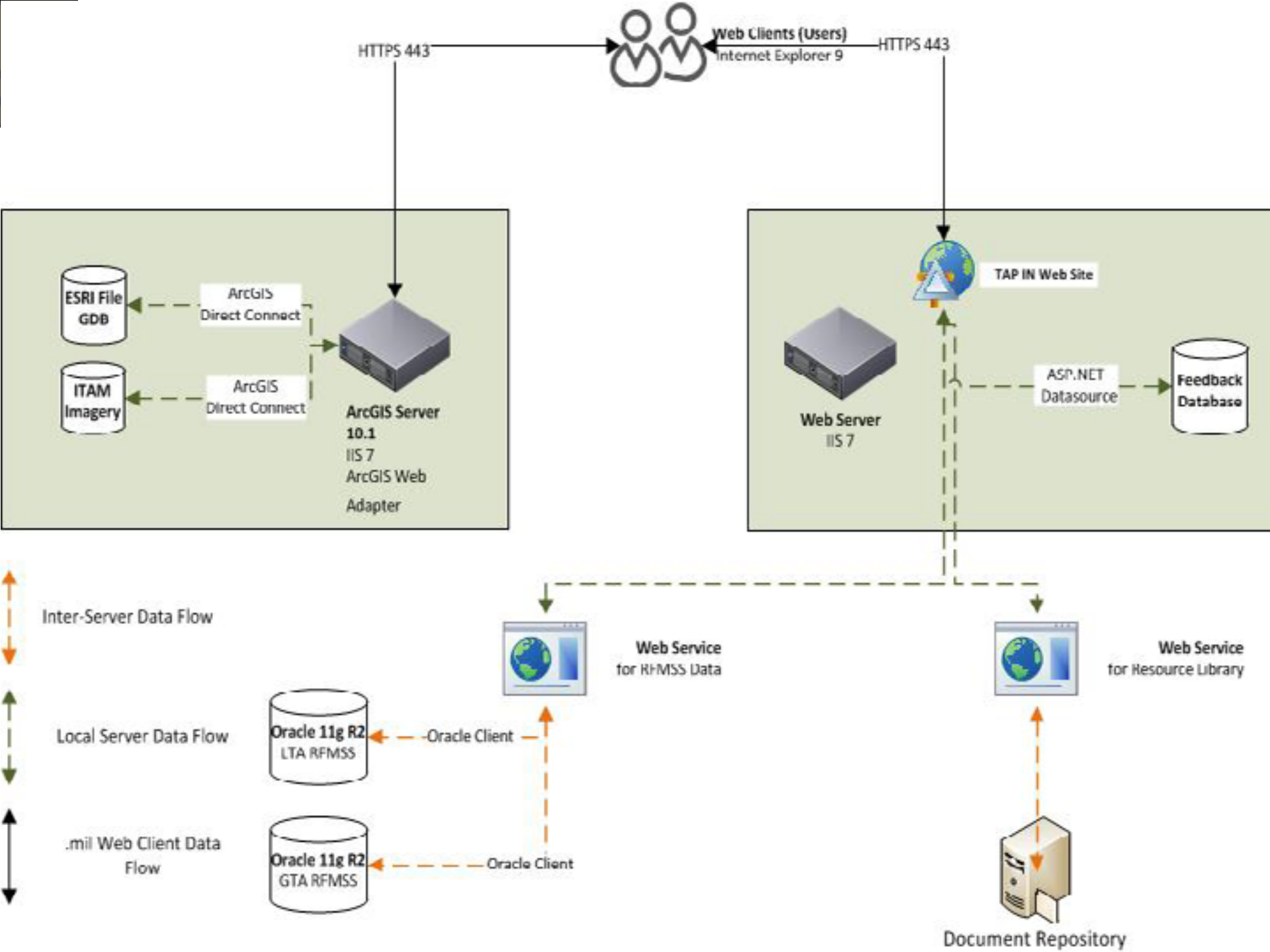
- Slideouts
- Information Window controls, accordions
- Keyword search

SOA approach

- Esri Map, Image services
- Custom web services for RFMSS, Resource Library

Misc

- Clustering
- Custom graphic labeling, tooltips



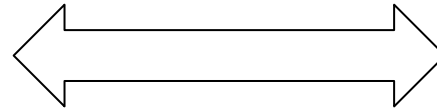


Data Integration

Enterprise GIS Data

- § ESRI ArcGIS Server
- § ArcGIS JavaScript API
- § ArcGIS Desktop
- § Enterprise geospatial databases

installation data
aerial imagery



Non-Spatial Enterprise Data

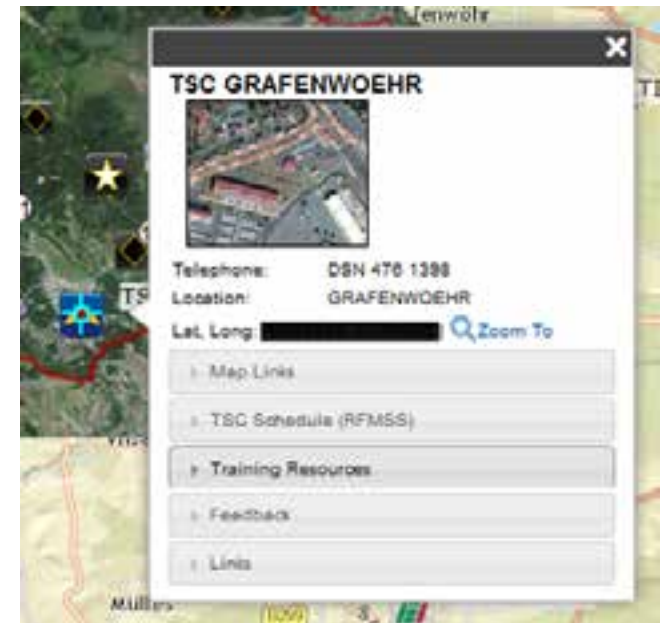
- § Oracle databases
- § Document repository (file databases)
- § Information Feedback



Data Integration

Spatial data

- Dynamic vector map services
- Feature layers
- Graphics layers
- Clustered graphic layers
- Image service layers



Non spatial data

- Oracle DB scheduling system (RFMSS)
- Document repositories (resource library, maps, SOPs, and more)

Today Schedule (RFMSS) as of Wednesday, June 19, 2013 9:51:09 PM

Installation:	Unit:	Facility:	Status:	Sch. End:
ANSBACH	412TH AVIATION SUPPORT BN	ENGAGEMENT SKILLS TRAINER 2000 - ANSBACH	OCCUPIED	13-DEC-12 15:30
ANSBACH	412TH AVIATION SUPPORT BN	HMMWV EGRESS ASSISTANCE TRAINER - ANSBACH	OCCUPIED	13-DEC-12 15:30
ANSBACH	5-158 AVIATION REGIMENT (GSAB)	RANGE CLASS ROOM	RESERVED	14-DEC-12 11:00



Features

Map-centric GUI with Smart Search

- Clean design, limited inputs
- Focus on map
- Enhanced user experience



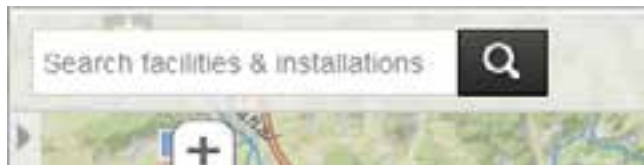
Map Centric Interface



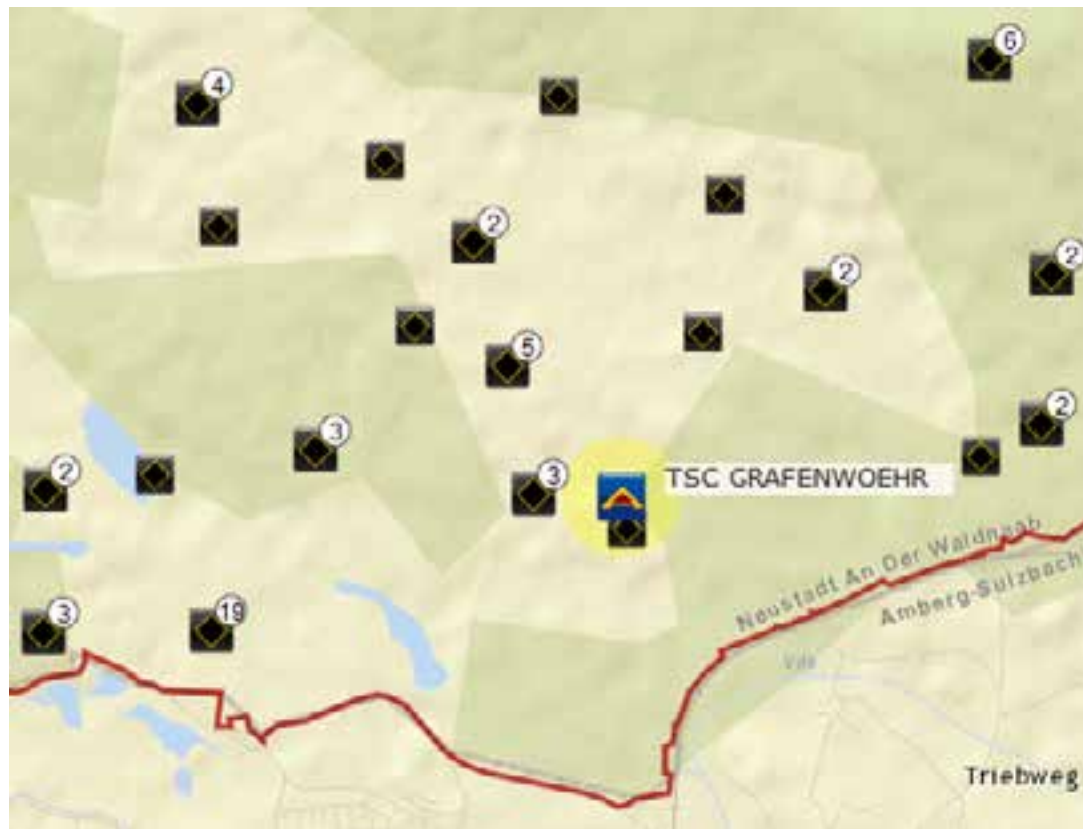


Search for Resources

Search is single text box...



...with auto-suggest



engagemt

Zoom All Clear

Matching Features

- ENGAGEMENT SKILLS TRAINER (EST) 2000 - ANSBACH Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - SAUMHOECH LTA Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - BELGIUM Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - GRAFENWOHR Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - HOHENFELS Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - HOLLAND Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - ITALY Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - KAFFERLAUTER Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - ROMANIA Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - STUTTGART Facility
- ENGAGEMENT SKILLS TRAINER (EST) 2000 - VLIRCK Facility

Click to zoom to the feature





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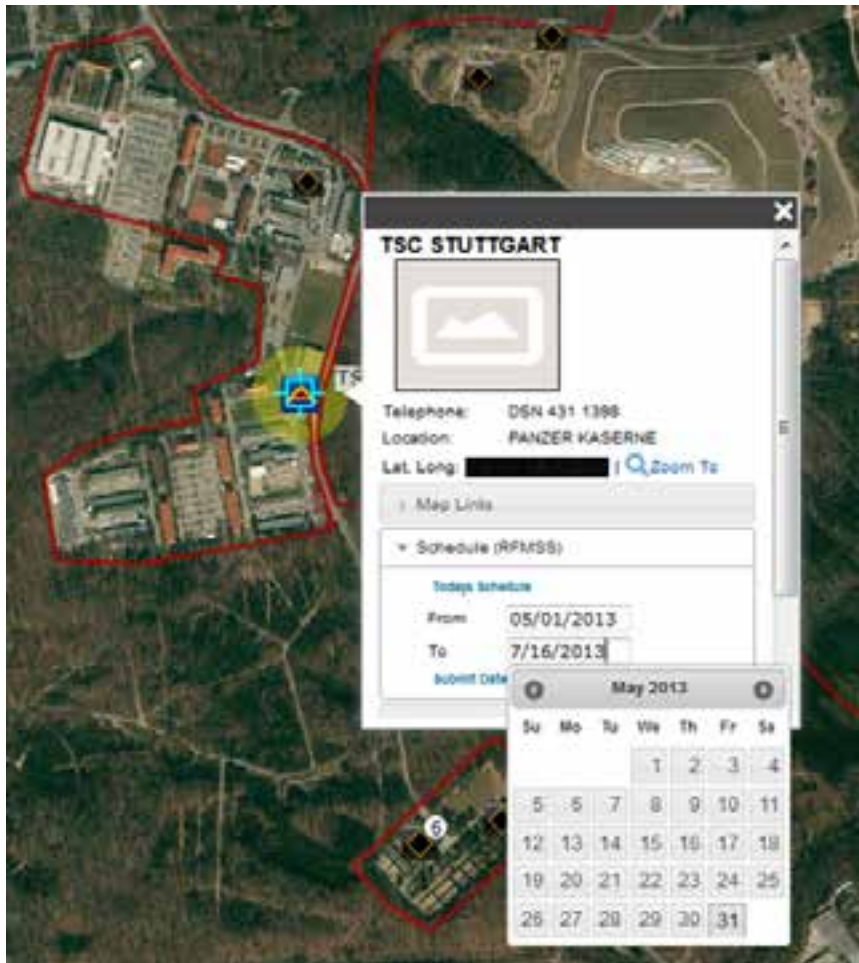
RFMSS - smart results grid, calendar control, output to file

Smart search, Map Active Facilities



Oracle Scheduling Reports (RFMSS)

Range Facility Management Support System



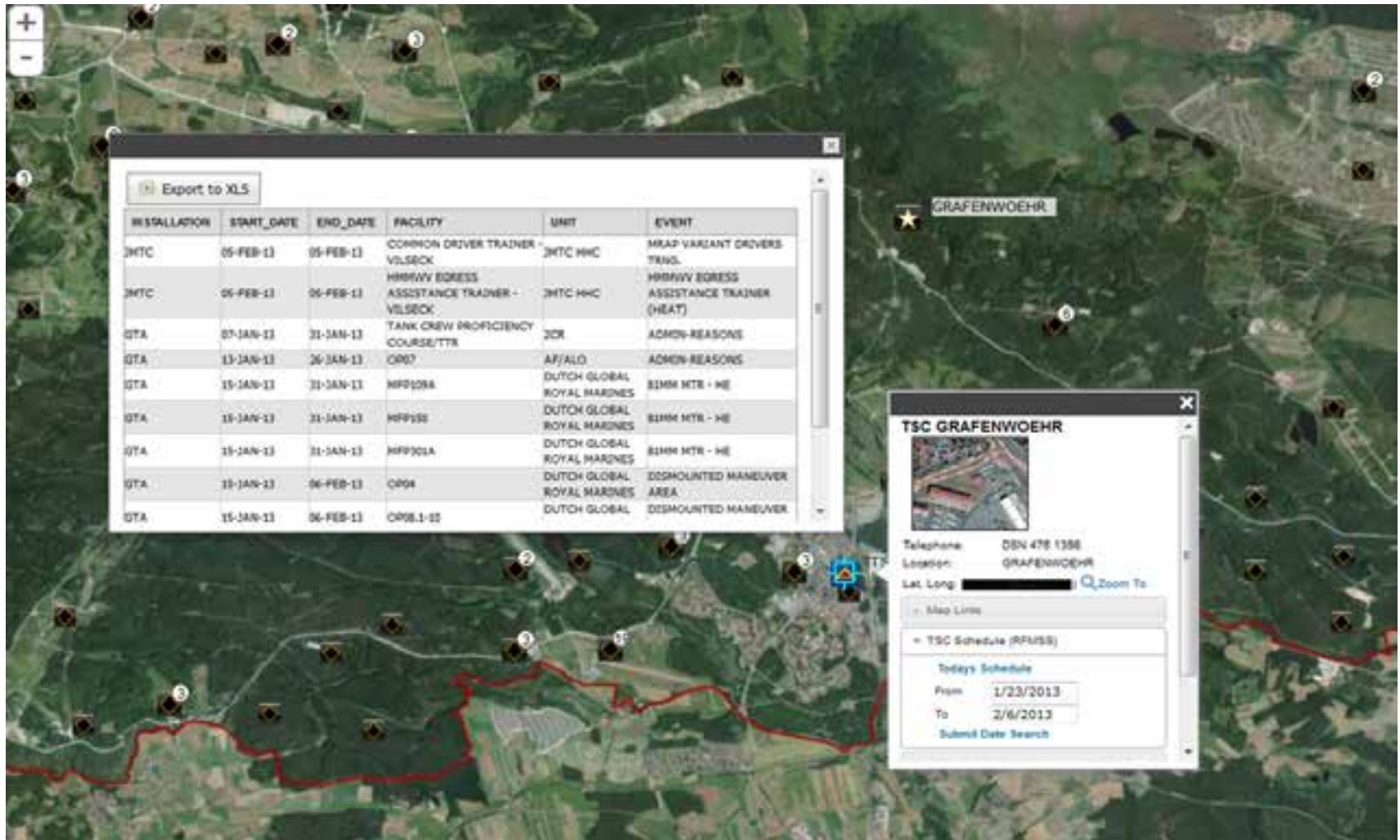
Export to XLS

INSTALLATION	START_DATE	END_DATE	FACILITY	UNIT	EVENT
JMTC	05-FEB-13	05-FEB-13	COMMON DRIVER TRAINER - VLSRICK	JMTC HHC	SMAP VACANT DRIVERS TRNG
JMTC	05-FEB-13	05-FEB-13	HMMVV BGRESS ASSISTANCE TRAINER - VLSRICK	JMTC HHC	HMMVV BGRESS ASSISTANCE TRAINER (HEAT)
GTA	07-JAN-13	31-JAN-13	TANK CREW PROFICIENCY COURSE/TTR	JCR	ADRON-REASONS
GTA	20-JAN-13	26-JAN-13	OPOT	AP/ALO	ADRON-REASONS
GTA	20-JAN-13	31-JAN-13	MFP08A	DUTCH GLOBAL ROYAL MARINES	810N MTR - HE
GTA	21-JAN-13	31-JAN-13	MFP10	DUTCH GLOBAL ROYAL MARINES	810N MTR - HE
GTA	21-JAN-13	31-JAN-13	MFP01A	DUTCH GLOBAL ROYAL MARINES	810N MTR - HE
GTA	21-JAN-13	06-FEB-13	OPH	DUTCH GLOBAL ROYAL MARINES	DISMOUNTED MANEUVER AREA
GTA	21-JAN-13	06-FEB-13	ORGL-10	DUTCH GLOBAL	DISMOUNTED MANEUVER

Information Windows with search tool and dynamic content



Oracle Scheduling Reports (RFMSS)



The screenshot displays a satellite map of Grafenwoehr, Germany, with several event markers. An 'Export to XLS' button is visible at the top left of the table. The table lists various training events with columns for installation, start/end dates, facility, unit, and event name. A popup window for 'TSC GRAFENWOEHR' provides contact information and a search interface for the TSC Schedule (RFMSS).

INSTALLATION	START_DATE	END_DATE	FACILITY	UNIT	EVENT
JMTC	05-FEB-13	05-FEB-13	COMMON DRIVER TRAINER - VLSBCK	JMTC HHC	MRAP VARIANT DRIVERS TRNG.
JMTC	05-FEB-13	05-FEB-13	HMMVV EGRESS ASSISTANCE TRADNER - VLSBCK	JMTC HHC	HMMVV EGRESS ASSISTANCE TRAINER (HEAT)
GTA	07-JAN-13	31-JAN-13	TANK CREW PROFICIENCY COURSE/TTR	JCR	ACMON-REASONS
GTA	13-JAN-13	26-JAN-13	OP07	AF/ALO	ACMON-REASONS
GTA	15-JAN-13	31-JAN-13	HFP108A	DUTCH GLOBAL ROYAL MARINES	81MM NTR - HE
GTA	15-JAN-13	31-JAN-13	HFP108	DUTCH GLOBAL ROYAL MARINES	81MM NTR - HE
GTA	15-JAN-13	31-JAN-13	HFP101A	DUTCH GLOBAL ROYAL MARINES	81MM NTR - HE
GTA	18-JAN-13	06-FEB-13	OP04	DUTCH GLOBAL ROYAL MARINES	DISMOUNTED MANEUVER AREA
GTA	15-JAN-13	06-FEB-13	OP05.1-10	DUTCH GLOBAL	DISMOUNTED MANEUVER

TSC GRAFENWOEHR

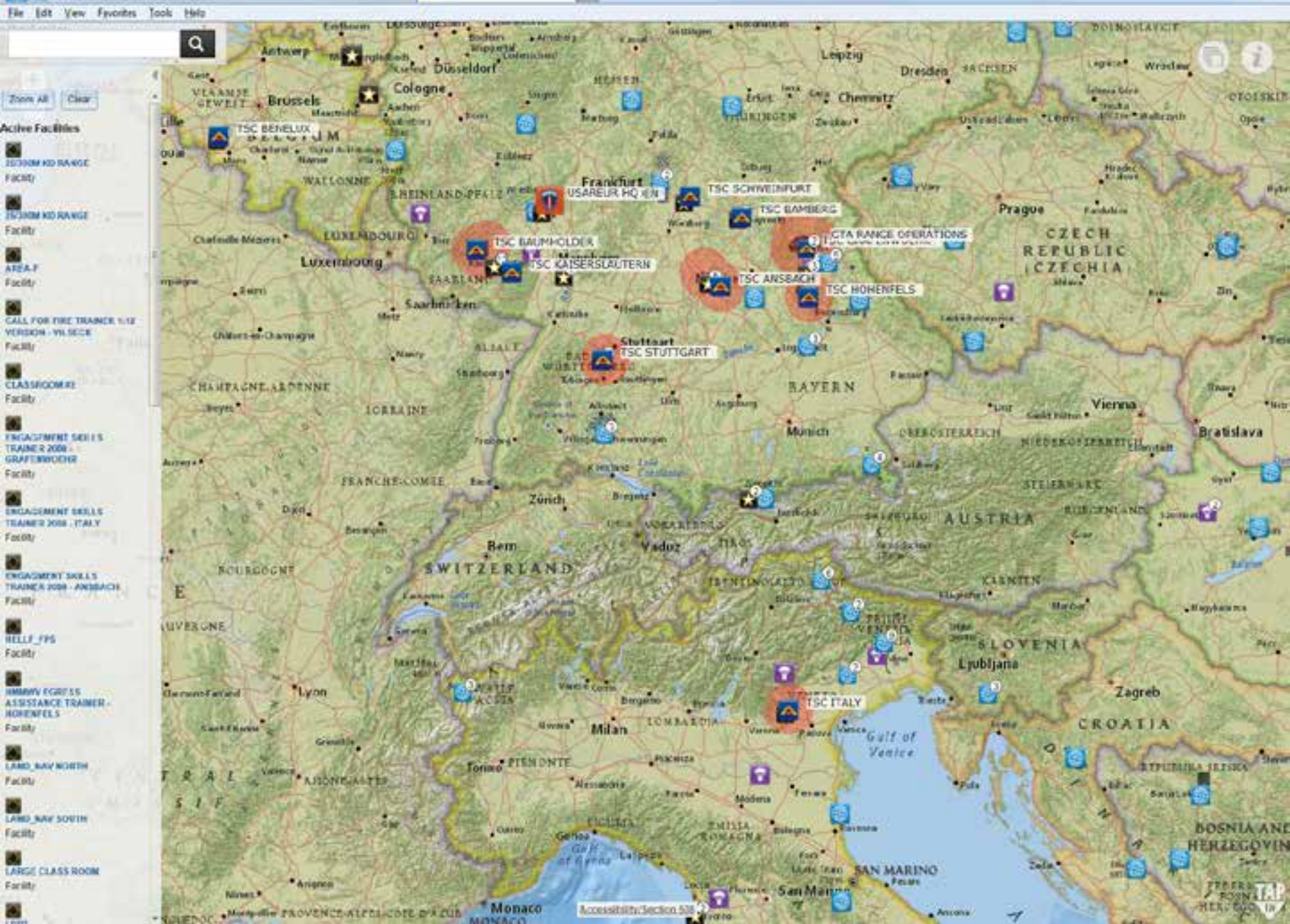
Telephone: DSN 478 1358
 Location: GRAFENWOEHR
 Lat Long: [REDACTED] [Zoom To](#)

Map Links

TSC Schedule (RFMSS)

Today's Schedule

From: 1/23/2013
 To: 2/6/2013
[Submit Date Search](#)



- Active Facilities
- 2030M KD RANGE Facility
- 2530M KD RANGE Facility
- AREA-F Facility
- CALL FOR FIRE TRAINER 1/2 VERSION - WILSECE Facility
- CLASSROOM#2 Facility
- ENGAGEMENT SKILLS TRAINER 2008 - GRAFENWOEDER Facility
- ENGAGEMENT SKILLS TRAINER 2008 - ITALY Facility
- ENGAGEMENT SKILLS TRAINER 2008 - ANSBACH Facility
- HELIF TPS Facility
- HMMWV EGRESS ASSISTANCE TRAINER - HOHENFELS Facility
- LAND NAV NORTH Facility
- LAND NAV SOUTH Facility
- LARGE CLASS ROOM Facility



Features

Updated GUI with Smart Search

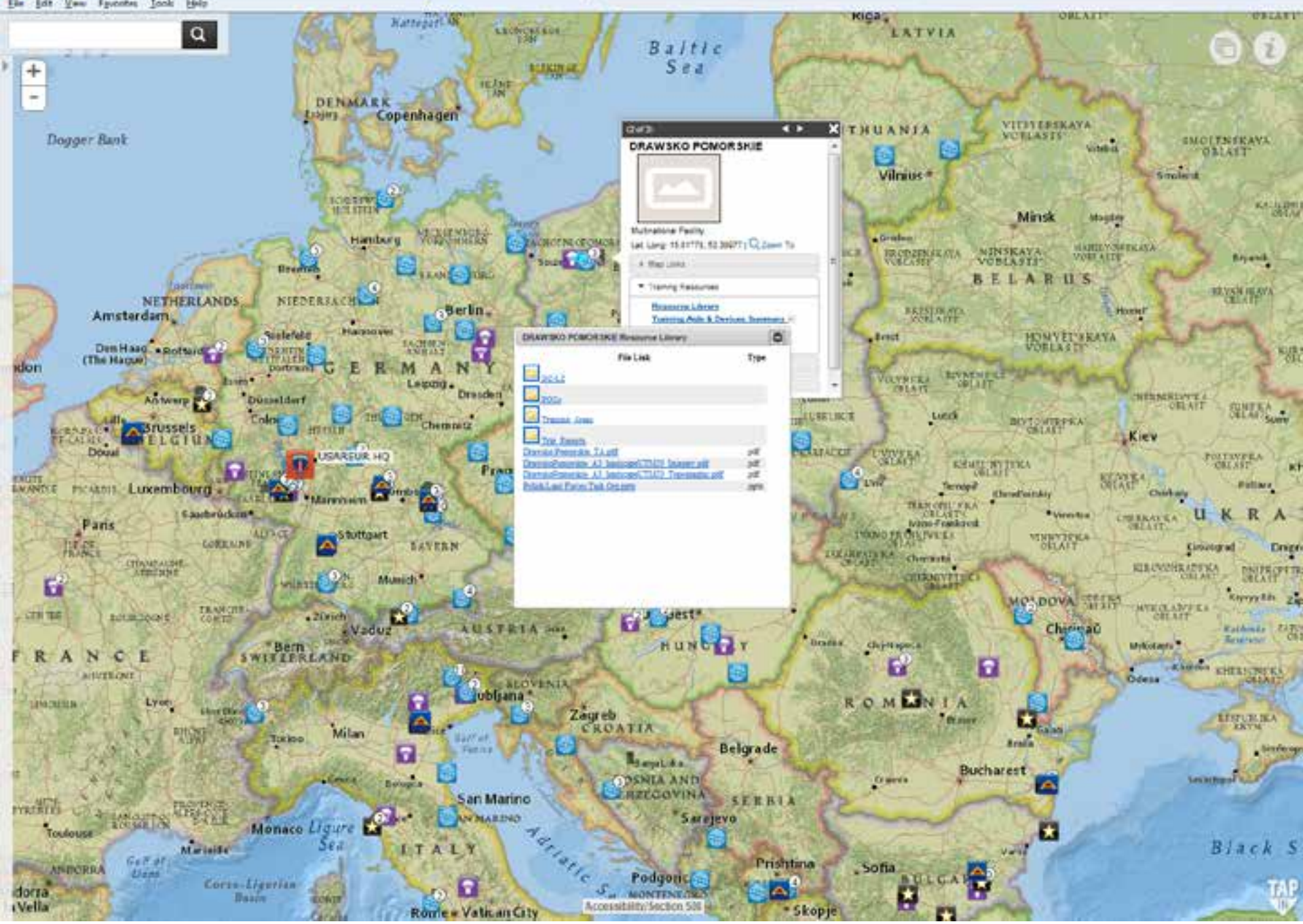
- Clean design, limited inputs
- Focus on map
- Enhance user experience

RFMSS - smart results grid, calendar control, output to file

Smart search, Map Active Facilities

Resource Library file browser, AF Survey Sheets

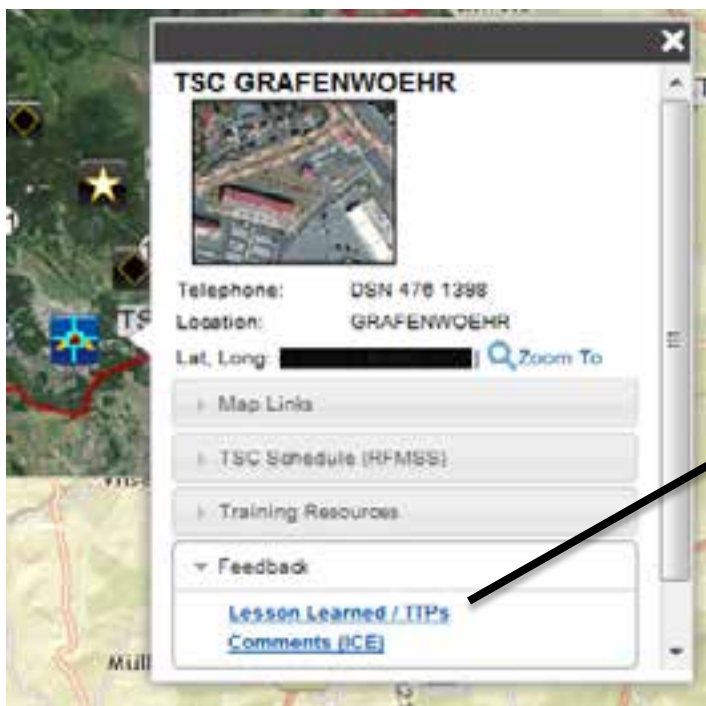
Feedback – Tactics, Techniques & Procedures





User Feedback

Submit Feedback to TSAE

tap@us.army.mil'. Below the introduction, the form is divided into five sections, each with a question and a text input area: 1. 'TSC GRAFENWOEHR' (header), 2. 'What training was conducted?', 3. 'What was good about the training facility?', 4. 'What about the Training Facility could improve?', and 5. 'Any additional comments?'." data-bbox="507 162 929 786"/>



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Feedback – Tactics, Techniques & Procedures

Unit SharePoint adoption



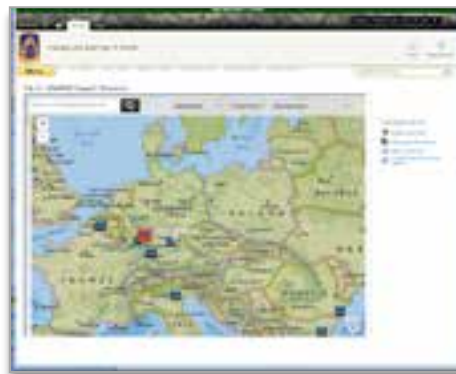
TAP IN & SharePoint

TAP IN can be readily embedded in unit SharePoint sites



Full Screen TAP IN: <https://armyrangemapper.eur.army.mil/tapin>

↓ **Deploy to unit SharePoints** ↓



12th CAB

<https://intranet.eur.army.mil/12cab/hq/s3/training>



21st TSC

<https://intranet.eur.army.mil/21tsc/hq/G3/Training>



TAP IN – What went into it

Content

- RTSD data call & content scrub
- GIS RSC data development
- Land Forces Assurance event (Pabrade, Lithuania; Adazi, Latvia; Tapa, Estonia)
- 173rd ABCT AF Survey Sheet data

Workflow

- Reduction data redundancy
- Data Contribution, SharePoint deployment SOPs

Functionality

- Internal Alpha testing
- Limited Beta test sessions (12th CAB, 173rd ABCT)

Design



- Clean design
- Limited inputs
- Focus on map
- Enhances user experience
- Simplicity = more dev work
but better for user
- Design Elements
- Simple search
- Slide-outs
- Transparency
- Clean map graphics





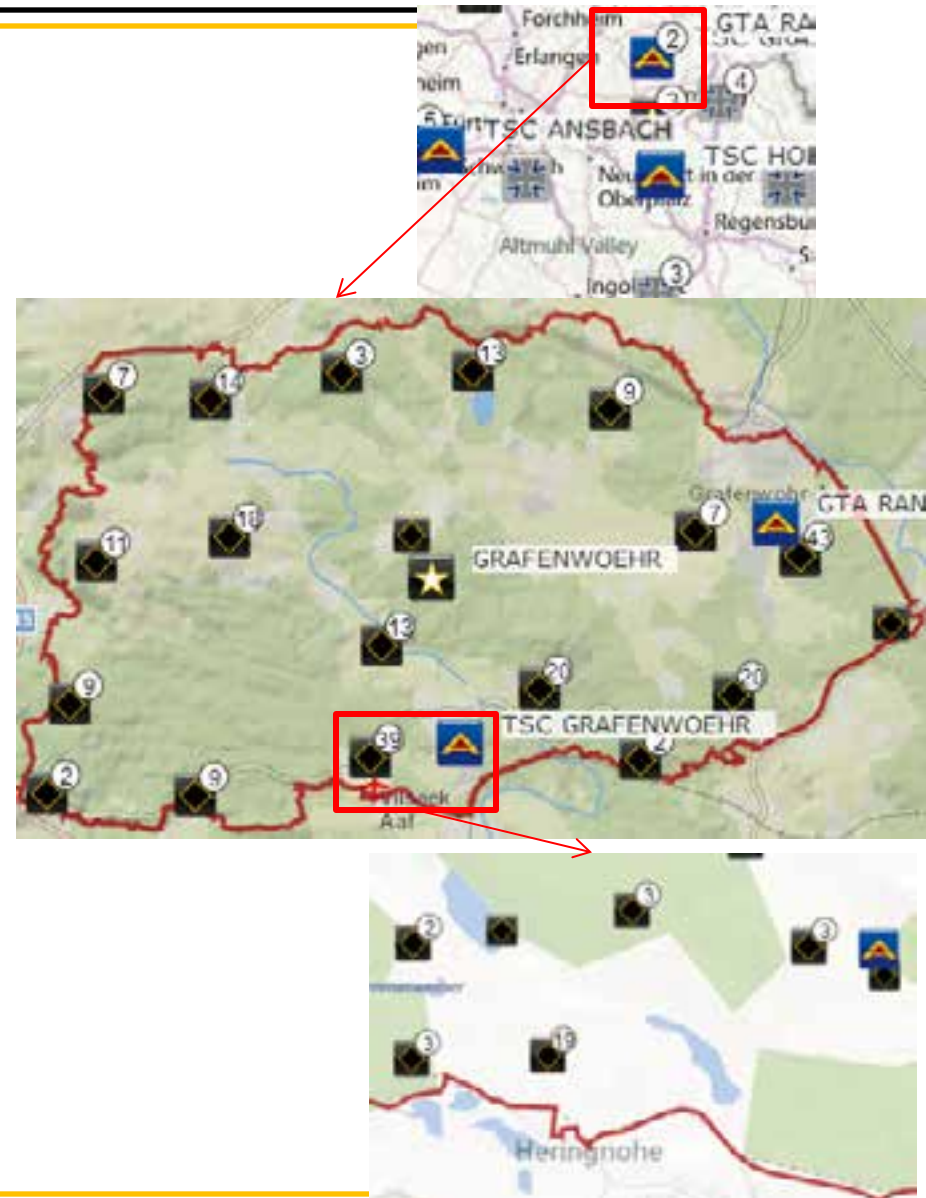
Key Features

- jQuery Integration
- Keyword Search
- Point Clustering
- Graphic Labeling
- Extending the Popup
- Custom Tooltips
- Image Services
- Security/Encryption

Point Clustering



- Eliminates clutter, avoids overlapping features
- Multiple layers are clustered
- Hierarchical Layers
- Cluster features + clustered info window
- Dynamic cluster "count"
- Behind the scenes
- Extend JS API GraphicsLayer
- Mouse over shows singles and tooltips
- Offset cluster count in graphic
- Separate graphics layer for singles



Graphic Labeling



Challenge to put labels on cluster (graphics) layers

No native support

Created extra graphics layer

- Copy of graphics geometry
- Added white backing
- Added text
- Scale dependency
- Labels are clickable





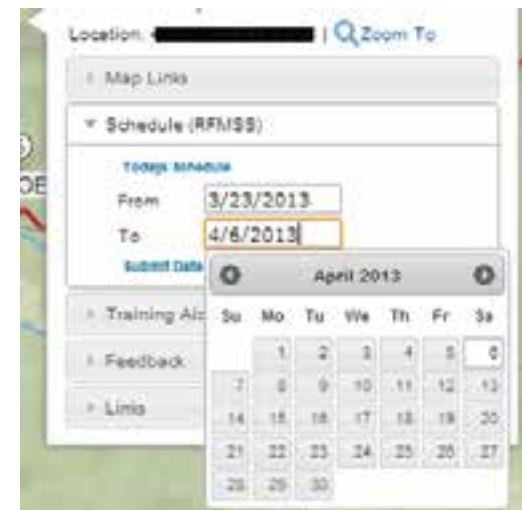
Extending the Pop Up

Custom popup style templates and
sprite

jQuery integration – accordions,
calendar date picker

Integration with the clustered points

Popup content is configurable and
dynamic





Custom Tooltips

Mouse over shows a small
“maptip” (not the same as
popup window)

Used custom element for tooltips
(maptips)

Roll over a cluster and see names
of all facilities in cluster

Used onmouseover event

- Set content
- Set position
 - Avoid edges



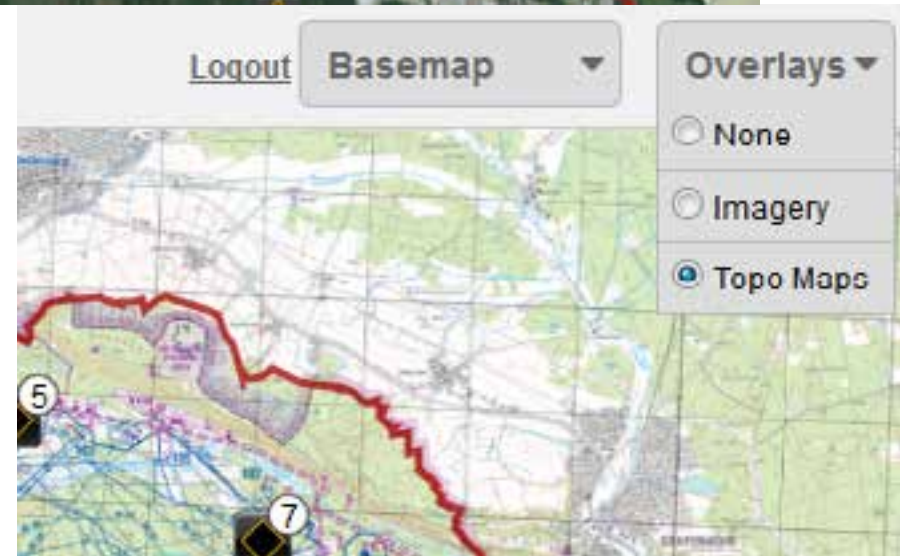
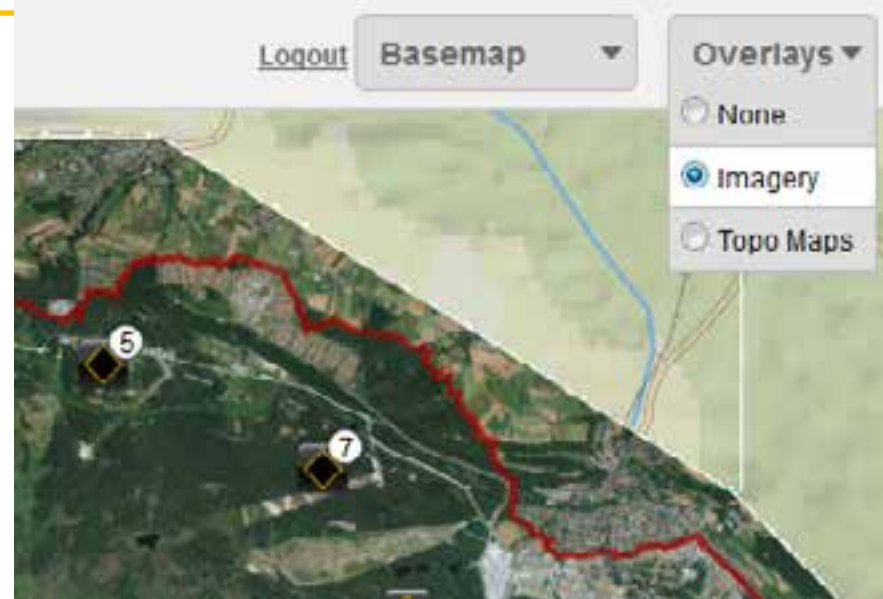


Image Services

TSAE has historical aerial imagery and topo maps.

ArcGIS Image Server: mosaic dataset overviews.

- **Overlays tool - toggle imagery layers.**
- **Image layers between base map and vector layers.**





Challenges

Design

STIG Compliance

Encryption - SSL (https)

SiteMinder SSO Integration

Implementation on Army network

Foreign Disclosure, Copyright / Distribution

Operational Security

Network Access



Design (again)

Intuitive design is difficult...
...because it's a deal breaker for user adoption

Limited inputs

Map Centric

Simplicity = more dev work but better for user

Simple search

Slide-outs

Transparency

Clean map graphics



Security/Encryption...

STIG Compliance

- Coding standards
- .NET and system configuration
- Server hardening and group policies
- Software Assurance
- Internet Explorer only (yuk)

Everything must run over SSL (https)

- ArcGIS and Web Adapter SSL
- All API references SSL
- Web services over SSL
- Basemap toolbar thumbnails... yep SSL





...Security/Encryption

ESRI widgets cause mixed content error in IE

- Custom controls to avoid http requests content from ArcGIS online.

ESRI JS API, jQuery all hosted in-house to avoid cross-site scripting issues.

ArcGIS Server configuration lessons learned for STIG and CoN



TAP IN – Where next?

More content, more coverage

Continue unit SharePoint outreach

ArcGIS Online Portal

CAC Enabled mobile version

Multiple JMTC deployments

NATO engagement

- BICES (LANDCOM, ACT)

DAMO-TRS – umbrella portal for DA training support systems

Future Challenges

- Whitelist
- OS Security
- Balance lightweight vs functionality
- ARM – TAP IN convergence



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