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S P A T I A L

March 2007
Oracle Spatial User Conference



Oracle Spatial User Conference

March 8, 2007
Henry B. Gonzalez
Convention Center
San Antonio, Texas USA



March 2007
Oracle Spatial User Conference

Matthew Bafford

GIS Consultant / Software Developer

Designing GIS Applications for Mobile Web Devices

Presentation Outline

- Existing Web Application Overview
- Target Mobile Devices
- Mobile Design Considerations
- Detecting / Responding to Mobile Devices
- Finished Product
- Useful Links
- Q&A

MilitaryINSTALLATIONS

- Military Installations Search
 - Support for personnel relocating to new bases
 - Search based on location or services
 - Textual and graphical (map) results
 - Turn by turn driving directions
- eSpatial iSmart / Oracle Spatial
 - Oracle Route Server
- NAVTEQ data for US and other countries



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Search Page

MilitaryHOMEFRONT - Installations & Directories - U.S. Department of Defense - Search - Windows Internet Explorer

File Edit View Favorites Tools Help Links eSpatial iSMART 5.2 test.jsp

http://www.militaryinstallations.dod.mil/ismart/MHF-MI/ Google

MilitaryHOMEFRONT - Installations & Directories - U.S...

Home | Feedback | MilitaryHOMEFRONT

Military HOMEFRONT Supporting our Troops & their Families

Troops & Families Leadership Service Providers Search

MilitaryINSTALLATIONS About MilitaryINSTALLATIONS

Lookup Installations & Directories of Services

With information on over 250 military installations and communities worldwide, we have the information you're looking for. Make your selections from the following options:

Program or Service: All Branch of Service/Agency: All

Location: Enter an Installation, select a Country or State, click a state on the map, or simply enter your zip code below.

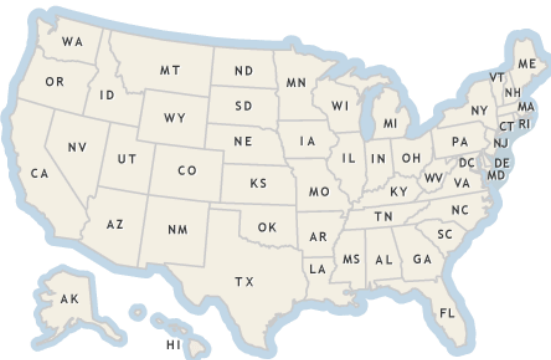
Installation: [Installation / Agency Lookup](#)

Country: United States

State/Provinces: All

Postal Code: Within 10 mi Search

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Done Trusted sites 100%

Installation Search

Location

Enter an Installation, select a Country or State, click a state on the map, or simply enter your zip code below.

Installation:

[Installation / Agency Lookup](#)

Country

United States

State/Provinces

All

Postal Code

Within

10 mi



Search

[Reset Form](#)

Installation/Agency Lookup

[Army](#) | [USMC](#) | [Navy](#) | [Air Force](#)
[USCG](#) | [Guard](#) | [DLA](#)

United States Army

[Aberdeen Proving Ground](#) (MD, US)
[Anniston Army Depot](#) (AL, US)
[Carlisle Barracks](#) (PA, US)
[Dugway Proving Ground](#) (UT, US)
[Fort Belvoir](#) (VA, US)
[Fort Benning](#) (GA, US)
[Fort Bliss](#) (TX, US)
[Fort Bragg](#) (NC, US)
[Fort Campbell](#) (KY, US)
[Fort Carson](#) (CO, US)
[Fort Detrick](#) (MD, US)
[Fort Dix](#) (NJ, US)
[Fort Drum](#) (NY, US)
[Fort Eustis](#) (VA, US)
[Fort George G. Meade](#) (MD, US)
[Fort Gordon](#) (GA, US)
[Fort Hamilton](#) (NY, US)
[Fort Hood](#) (TX, US)

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Search Results

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http://www.militaryinstallations.dod.mil/ismart/MHF-MI/search.do?programID=&branchID=ARMY&installationID=3040&countryID=

MilitaryHOMEFRONT - Installations & Directories - U.S...

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MilitaryINSTALLATIONS MilitaryINSTALLATIONS Interactive Map Instructions

United States Army » United States » Maryland » Aberdeen Proving Ground [Print](#) | [Email](#) | [Link this page](#)

Installations & Directories of Services

37 Services found for 1 Installations | [Download Results](#)

[Conduct another search >](#)

United States Army

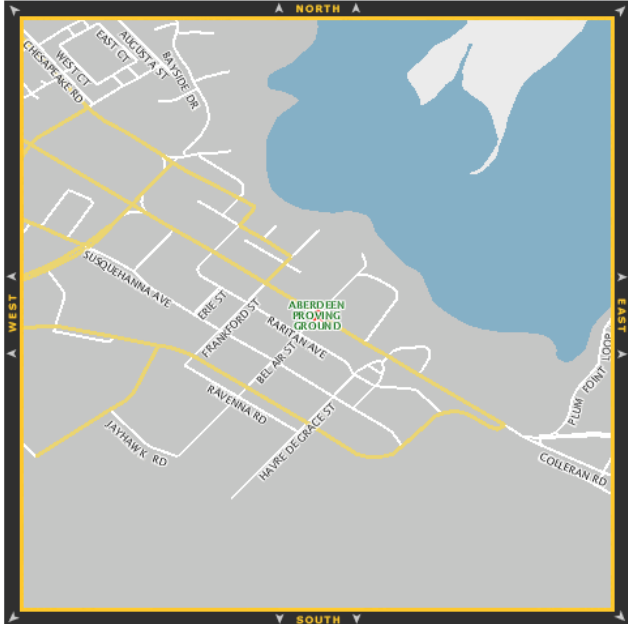
Maryland United States

▼ ★ [Aberdeen Proving Ground](#)

2201 Aberdeen Blvd. [Installation Overview](#)
Aberdeen Proving Ground, [Weather](#)
MD 21005 [Currently Mapped](#)
[Directions From / To](#)

- ▶ [Barracks/Single](#)
- ▶ [Service Member Housing](#)
- ▶ [Beauty/Barber Shops](#)
- ▶ [Chapels](#)
- ▶ [Child Development Centers](#)
- ▶ [Commissary/Shoppette](#)
- ▶ [Dental Clinics](#)
- ▶ [Emergency Relief Services](#)
- ▶ [Exceptional Family Member Program/Special Needs](#)
- ▶ [Exchange\(s\)](#)
- ▶ [Family Advocacy Program](#)
- ▶ [Family Center](#)
- ▶ [Federal Credit Unions](#)
- ▶ [Finance Office](#)
- ▶ [Golf Courses](#)
- ▶ [Gymnasiums/Fitness Centers](#)

[Conduct another search >](#)



Find on the map

Select a link to plot up to 5 points of interest that are within 10 miles of the mapped location.

- ▶ [Cultural](#)
- ▶ [Local Government](#)
- ▶ [Local Services](#)
- ▶ [Nearby Installations](#)
- ▶ [Recreation](#)
- ▶ [Travel](#)

zoom IN + zoom OUT -

Done Trusted sites 100%

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Routing Results

http://www.militaryinstallations.dod.mil/?inputFromTitle=Aberdeen+Proving+Ground&inputToTitle=H - Windows Internet Explorer

File Edit View Favorites Tools Help Links eSpatial iSMART 5.2 test.jsp

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MilitaryINSTALLATIONS


About MilitaryINSTALLATIONS

[Printable Version](#)

Start	End
Aberdeen Proving Ground 2201 Aberdeen Blvd. Aberdeen Proving Ground MD 21005	Home 6000 2nd Ave Silver Spring MD 20910

Estimated time is: 1 hours 8 minutes.
Distance is: 67.25 miles.

Seq	Instruction	Distance (miles)
1	Start out on ABERDEEN BLVD (Going Northwest)	0.67
2	Turn LEFT onto MARYLAND BLVD (Going Southwest)	2.07
3	Stay STRAIGHT to go onto MD-715/SHORT LN (Going West)	0.71
4	Stay STRAIGHT to go onto RAMP (Going Southwest)	0.14
5	Turn SLIGHT RIGHT onto S PHILADELPHIA BLVD/US-40 (Going West)	0.57
6	Turn SLIGHT RIGHT onto MD-7/OLD PHILADELPHIA RD (Going West)	1.11
7	Turn SLIGHT RIGHT onto RAMP (Going West)	0.06
8	Stay STRAIGHT to go onto MD-7/PHILADELPHIA RD (Going West)	1.89
9	Turn RIGHT onto CRESWELL RD/MD-543 (Going Northwest)	0.31
10	Take I-95 S RAMP I-95 S RAMP	0.32
11	Merge onto I-95/JOHN F KENNEDY MEMORIAL HWY (Going West)	18.89



Mobile Devices

- “Smart Phone” Devices
 - Windows Mobile, BlackBerry, PalmOS
 - Support HTML, CSS, JavaScript
 - Bigger Screens
- Other Mobile Devices
 - Cell Phones
 - Poor HTML support
 - Very small screens (96x96)



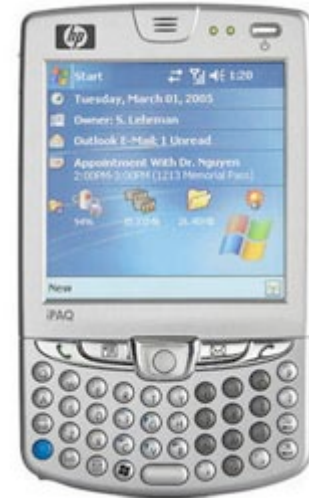
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Target Mobile Devices



Navigation

- Input methods
 - Touch screen and stylus
 - Often easier to use joystick
 - Four-way pad or joystick
 - Scroll wheel
- No concept of cursor
 - No “hand” for links

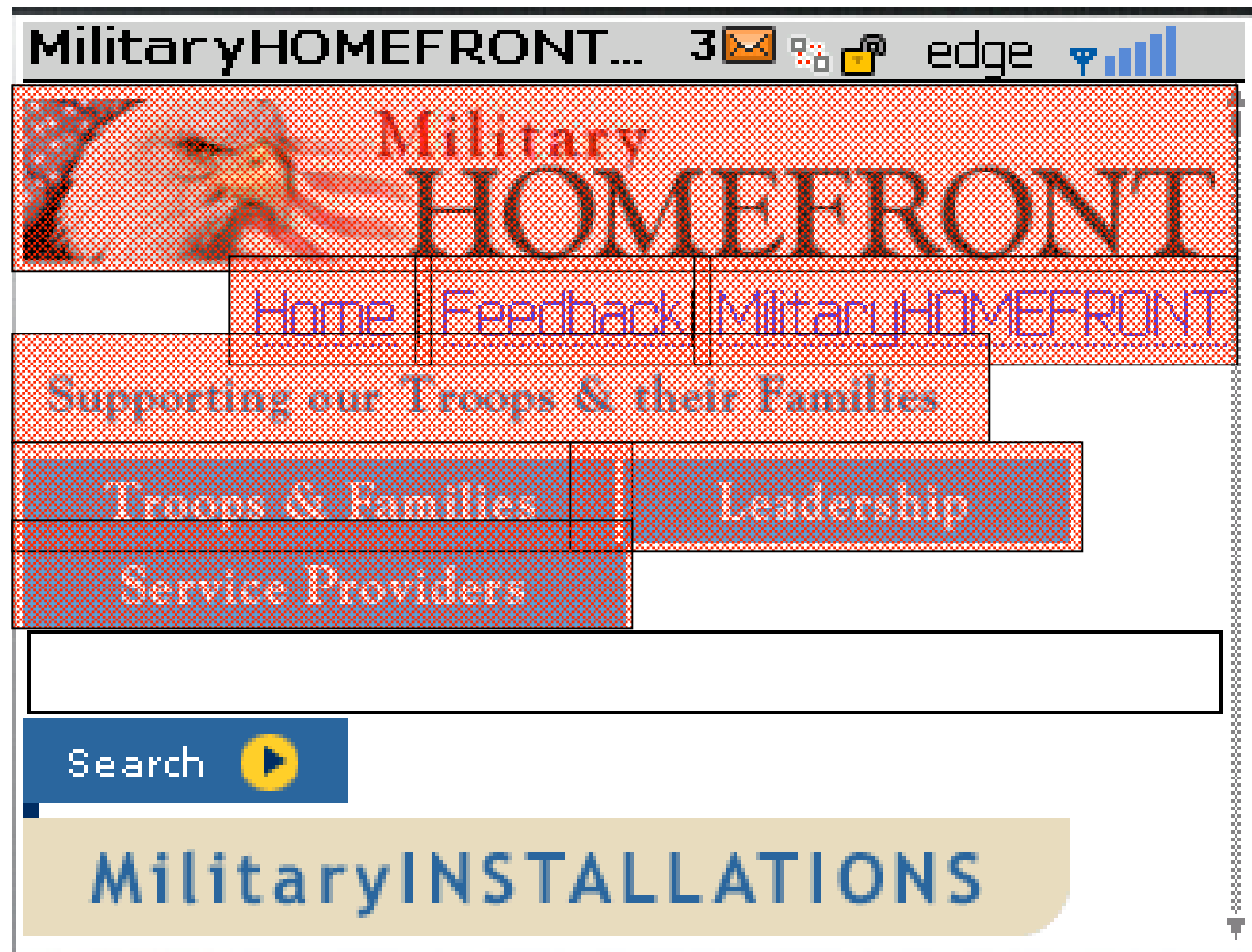
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Navigation

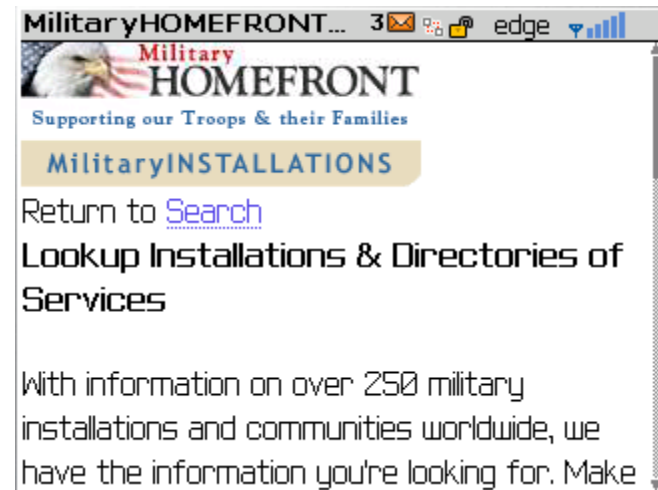


Navigation

- Links take time to navigate through
 - One motion or “click” per link
- Solutions
 - Remove unnecessary links
 - Add “Jump to Content” link
 - Simplify!

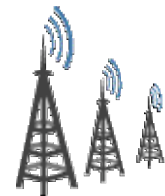
Screen Size

- Extremely Small
 - 240x320 or 240x240 standard
- Large images scaled or dropped altogether
- Browsers prefer linear display



Network Speed

- Remember dialup?
 - The Bad GPRS/CSD 2-3 kB/s
 - The Good EDGE 20-30 kB/s
 - The Awesome EvDO 60-70 kB/s
- High Latency
- Devices are slow
 - Large pages render slowly



Browser Quirks

- Everything can be turned off
- CSS support is limited
- Browser knows best (it thinks)
- Font sizes might be ignored
- Colors might be ignored
- Images turned off?
- Only one window

HTML Layout

- Use the proper tags
 - UL/OL for lists (nested for hierarchy)
 - DIV for formatting
 - Tables for tabular data
 - H1-H6 for headings
 - P for paragraphs
 - HR to separate content
 - etc...
- ``

Dynamic Content (AJAX)

- XmlHttpRequest is supported on Mobile IE
- Poor DOM support
 - No getElementById()
 - No changing CSS styles on the fly
 - innerHTML is supported on DIVs
- BlackBerry/Treo?

User Goals

- In and out – quickly!
- Specific information
- Not browsing – on a mission



Device Recognition

- User-Agent
- Device specific headers
- X-WAP-Profile
- Specific path / domain

User-Agent

- Mozilla/4.0 (compatible; MSIE 4.01; Windows CE; PPC; 240x320)
- Mozilla/4.0 (compatible; MSIE 4.01; Windows CE; PPC; 240x240)
- Mozilla/4.0 (compatible; MSIE 4.01; Windows CE; Smartphone; 176x220)
- BlackBerry8100/4.2.0 Profile/MIDP-2.0 Configuration/CLDC-1.1 VendorID/-1

User-Agent

- No standard format
- Easily faked
 - BlackBerry and Mobile IE allow you to change
- Always present
 - “PPC” on Mobile IE
 - “BlackBerry” on BlackBerry
- WURFL Project

WURFL (User-Agent)

- **Wireless Universal Resource File**
- User-Agent / Device database
 - Screen size and other capabilities
- Open Source
- Java API
- VERY Ambitious
- Thousands of devices
- Incorrect / missing listings



Device Specific Headers

- Mobile IE
 - UA-OS Windows CE (Pocket PC) - Version 4.21
 - UA-COLOR color16
 - UA-PIXELS 320x240
 - UA-CPU Intel(R) PXA272
- UA-Pixels screen size accurate
 - Mozilla/4.0 (compatible;
MSIE 4.01;
Windows CE;
PPC; 240x320)



UAProf (X-WAP-Profile)

- **User Agent Profile**
- X-WAP-Profile header
- Provided by device manufacturer
- Header not guaranteed
- URL not guaranteed valid
- Slow
 - Network speeds
 - Large files
- Complicated to parse

Path or Domain

- **Easy to guess user's intentions**
- **Most users won't realize it exists**
- **Link to mobile page on desktop page**
- **Still need to detect screen size**

Our Approach

- **Mobile Specific Path**
- **WURFL – Exact match / Loose match**
 - Only trust exact match
 - Screen size
- **Windows Headers**
 - Screen size
- **BlackBerry User Agent**
- **Automatic redirect if sure**

Our Approach

- **SiteMesh**
 - Page headers and overall layout differences
- **Struts**
 - Model View Controller
 - Same code for different presentation
- **JSP Includes**
 - Majority of HTML same for mobile/desktop
- **CSS / HTML**
 - HTML tags indicate content type
 - CSS indicates content style

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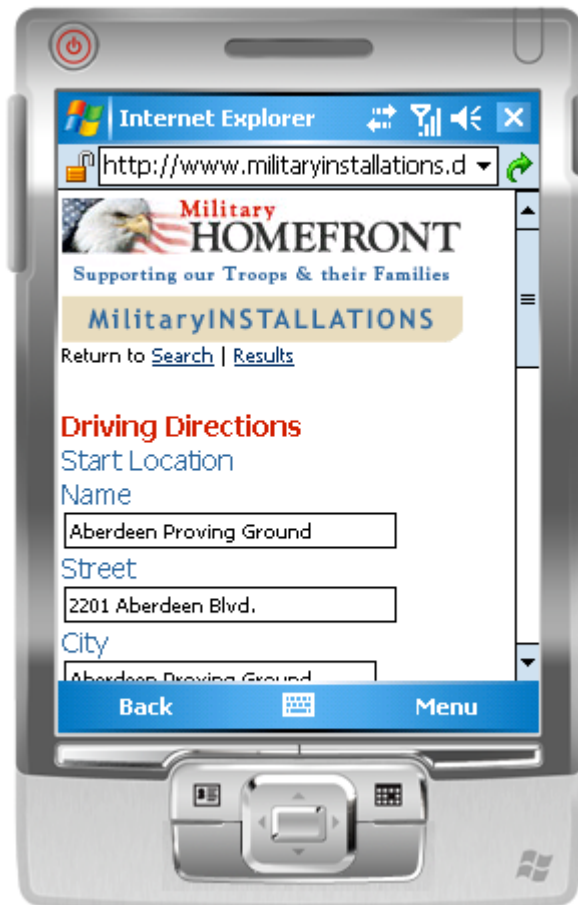
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Emulators

- Standalone Device Emulator 1.0
and Windows Mobile 5.0 Images
<http://www.microsoft.com/downloads/details.aspx?familyid=C62D54A5-183A-4A1E-A7E2-CC500ED1F19A&displaylang=en>
- BlackBerry Emulator
Need MDS (Mobile Data Service) and Device Emulator
<http://www.blackberry.com/developers/downloads/index.shtml>
- PalmOS Simulators
<http://www.palmos.com/dev/tools/simulator/>

Useful Links

- WURFL Project
<http://wurfl.sourceforge.net/>
- Delicon (UAProf)
<http://delicon.sourceforge.net/>
- Mobile Device User-Agents
http://www.zytrax.com/tech/web/mobile_ids.html
- Small Screen Tips
<http://webmonkey.com/webmonkey/04/12/index4a.html>
- CSS Support on Mobile IE
<http://blogs.msdn.com/windowsmobile/articles/213771.aspx>
- AJAX on Mobile IE
<http://blogs.msdn.com/iemobile/archive/2005/11/15/493200.aspx>
- UAProf
<http://en.wikipedia.org/wiki/UAProf>

Useful Links

- **eSpatial**
<http://www.espatial.com>
- **MilitaryINSTALLATIONS**
<http://www.militaryinstallations.dod.mil/>
- **MilitaryINSTALLATIONS Mobile**
<http://www.militaryinstallations.dod.mil/mobile/>

- **Contact Information**

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Q&A

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