S1 ARCPAD DATA MANAGER USER GUIDE FOR V. 4.00

This document provides instructional guidance for the S1 ArcPad Data Manager Toolbar available through Desktop ArcGIS.

FIRST EDITION
UPDATED: 4/30/2014

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INTRODUCTION

WHAT'S THE S1 ARCPAD DATA MANAGER TOOLBAR?

The Service First ArcPad Data Manager (S1-APDM) Version 4.00 Toolbar is used with ArcGIS 10.1 or ArcGIS 10.2 Desktop and its ArcPad Data Manager Extension to automate the Check Out/In of field data between a mobile device and desktop ArcGIS.

The S1-APDM Toolbar leverages existing functionality of ESRI's[1] ArcPad Data Manager Extension while providing a simple-to-use graphic interface and customized tools for users to process their field data.

Features of the S1-APDM include:

- Downloading and uploading data to/from a geodatabase or an SDE Default database.
- Automated data Check Out/In process from a geodatabase to and from mobile devices.
- Managing and viewing geotagged photos.

WHAT'S NEW IN THIS VERSION OF THE S1 ARCPAD DATA MANAGER?

New Features

- Works with ArcGIS 10.1 and ArcGIS 10.2 (note: ArcGIS 10.0 is no longer supported).
- Compatible with Trimble Positions Extension and Add-In.
- Contextual menus (a la, right click) for all S1-APDM tools.
- Supports AREMP workflows.
- Supports Range/AIM Mobile workflows.
- Supports National Invasive Species Management System (NISIMS) 2.0 database and field tools.
  - PAR Summary Report Tool.
  - Changed how spot treatment acres are calculated to only use area based on amount of chemical sprayed, not total GIS area.
  - NISIMS Toolbar:
    - QA/QC Reporting.
    - Calculate GUID values.
    - Calculate Infestation Acreages.
    - Calculate Treatment Acreages.
    - Calculate Chemical Applied Values.
  - Bug Fixes:

[1] Environmental Systems Research Institute

        - NISIMS GP runs even if no infestations are present.
        - NISIMS GP checks for NULL species values before running.
        - SDE email alert is now initiated immediately after SDE upload completes.
    - Improved NISIMS GP tool's ability to clean up after itself.

Bug Fixes

- Check In data is copied to a temporary location and then checked instead of checking in directly from GPS Workspace. This resolves issue where AXF is locked after Check In, which prevents a user from being able to delete the file without first closing ArcMap.
- Resolved issues with Check Out to mobile devices when maps contained map services and grouped layers.
- Fixed issues associated with Check Outs to SDE failing to execute properly.
- Resolved issue where on slow network connections, not all layer were checking out to AXF file properly.
- NISIMS: changed calculation formula for herbicide usage when user specified a spot treatment using a rate/acre unit of measurement.

SYSTEM REQUIREMENTS

The S1-APDM Toolbar is designed to work within ESRI's Desktop ArcGIS 10.1 or ArcGIS 10.2 in conjunction with ESRI's Desktop ArcPad 10.0 Extension.

SOFTWARE/DESKTOP REQUIREMENTS

- ArcGIS 10.1 SP1 Desktop (either locally or via Citrix).
- If using Citrix ArcGIS, Citrix ICA Client 12.1 is needed.
- ArcPad 10.2 Desktop Extension.
- Service First (S1) ArcPad Data Manager 4.00 or above.
- Python 2.7 and Python Report Lab 2.6.
- Adobe Acrobat Reader.
- ActiveSync or Windows Mobile Device Center (for installation).
- Mobile Device set to USB Mass Storage Mode (for data Check Out/In).

HARDWARE AND OPERATIONAL CONFIGURATION REQUIREMENTS

Table 1: Manufacturers Stated Requirements – Desktop PC Running ArcGIS 10.1.

Processor	• Intel Pentium 4, Intel Core Duo, or Xeon Processors; SSE2 (or greater). • 2.2 GHz minimum or higher; Hyper-threading (HHT) or Multi-core recommended.
Operating System	Windows XP; Windows 7; Windows 2008 R2 Server with Citrix XenApp 6.
Memory	2 GB or higher.
Hard Disk	2.4 GB (for ArcGIS 10 install) + 200 MB for ArcPad.
Drive	N/A.
Display	24 bit color depth.
Other Devices	Mobile Device: Windows Mobile 5 and above .
Client Support	N/A.

Table 2: Operational Configuration – Citrix Environment

Make and Model		N/A.
Processor		4 Processors.
Operating System		Windows Server 2008 R2 Enterprise x64 Edition (Virtualized).
RAM (Type and Amount)		4 GB minimum.
Video Card		• 64 MB RAM minimum, 256 MB RAM or higher recommended. NVIDIA, ATI and INTEL chipsets supported. • 24 bit capable graphics accelerator. • OpenGL version 2.0 runtime or higher is required, and Shader Model 3.0 or higher is recommended. Be sure to use the latest available driver.
Hard Disk Size of Machine		C:\ Drive configured to 48 GB.
Hard Disk Storage Requirements:	**For the Application**	3 GB for ArcGIS-ArcPad-S1 ArcPad Data Manager.
	Anticipated for Data	45 GB for user data.
Other Required Software		• ArcGIS 10.1 SP1 Desktop. • ArcPad 10 SP1 Desktop Extension. • Python 2.7. • Python Report Lab 2.6 for Python 2.7. • Adobe Acrobat Reader. • ArcSDE 10.0. • Mobile Device Set to USB Mass Storage Mode.

INSTALLING THE S1 ARCPAD DATA MANAGER EXTENSION

PRE-INSTALL

Make sure that USB drive client support is enabled.

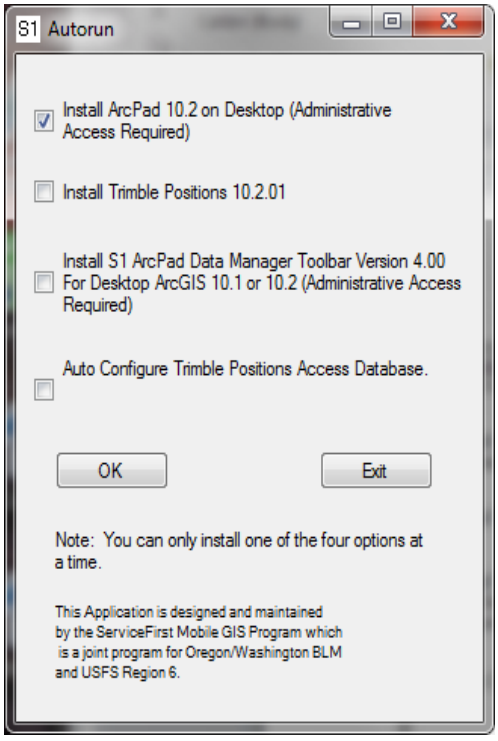
INSTALLATION INSTRUCTIONS

Begin by uninstalling previous versions of the S1-APDM.

1. Control Panel, Add/Remove Programs, Remove any existing version of S1-APDM.

Next, run the installer using the following steps:

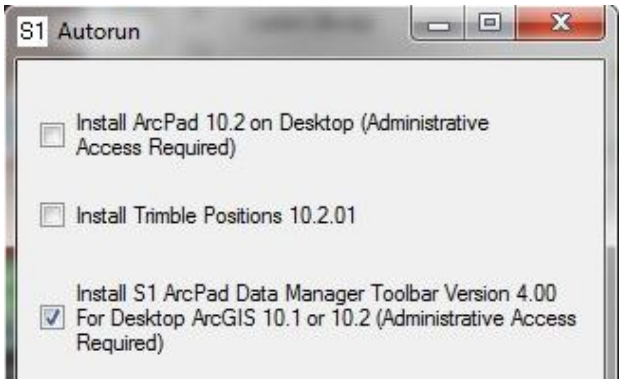
2. Download S1-APDM installer package and, if necessary, extract the zipped files to c:\tmp. Double click on the installer "setup.exe" to start the installer.
3. Check the box next to "Install ArcPad 10.2 on Desktop …," and click **OK**.



4. The ESRI install wizard starts. Accept all defaults. When the ArcPad Deployment Manager starts up, cancel the wizard. You won't be deploying anything to mobile devices.
5. Re-run the S1 Autorun installer by double clicking on setup.exe to start the installer.

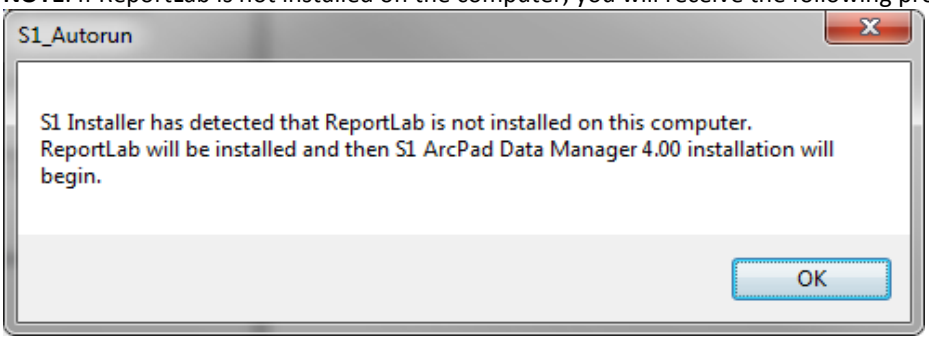
NOTE: Although optional, installation of Trimble Positions must occur before installing the S1-APDM. Follow the steps for "Installing Trimble Positions," then return to the remaining steps in this section for installing S1-APDM.

6. Place a check box next to "Install S1 ArcPad Data Manager Toolbar Version 4.00 For Desktop ArcGIS 10 …," and click **OK**.

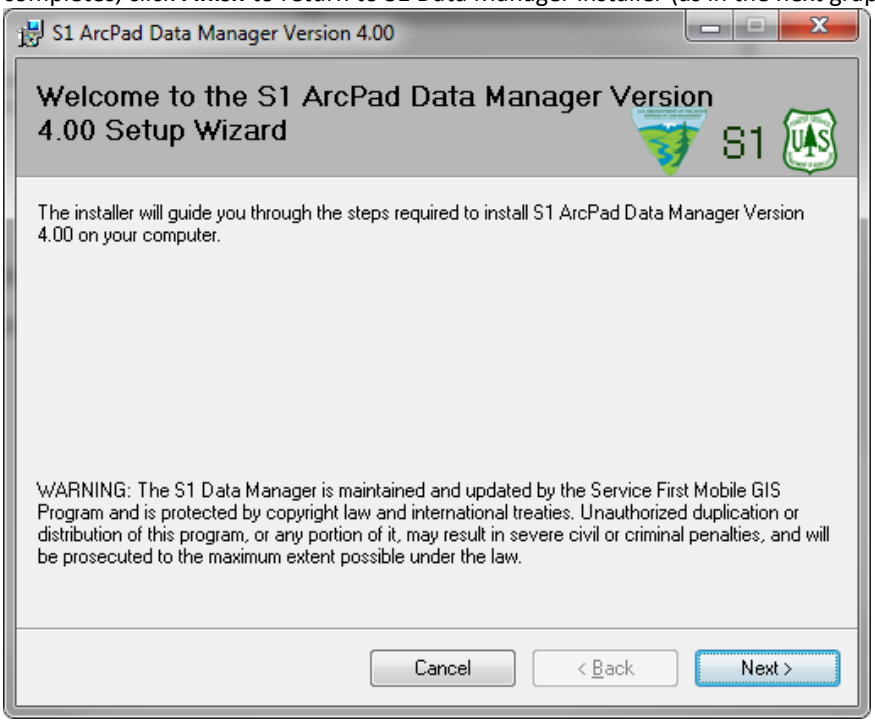


7. As in the next graphic, the S1-APDM Setup Wizard opens. Click Next.

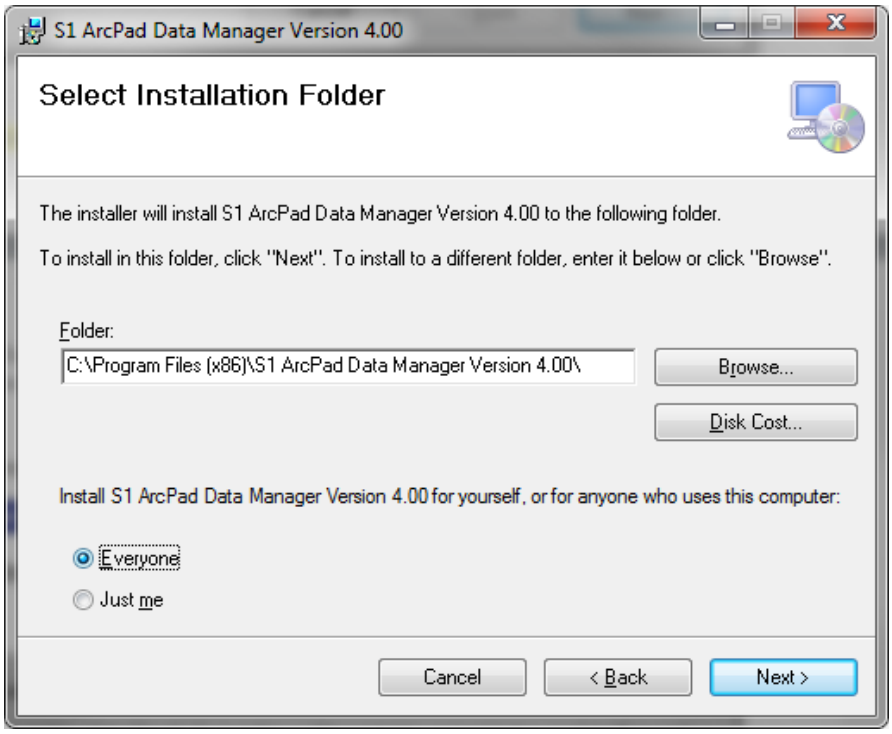
NOTE: If ReportLab is not installed on the computer, you will receive the following prompt:



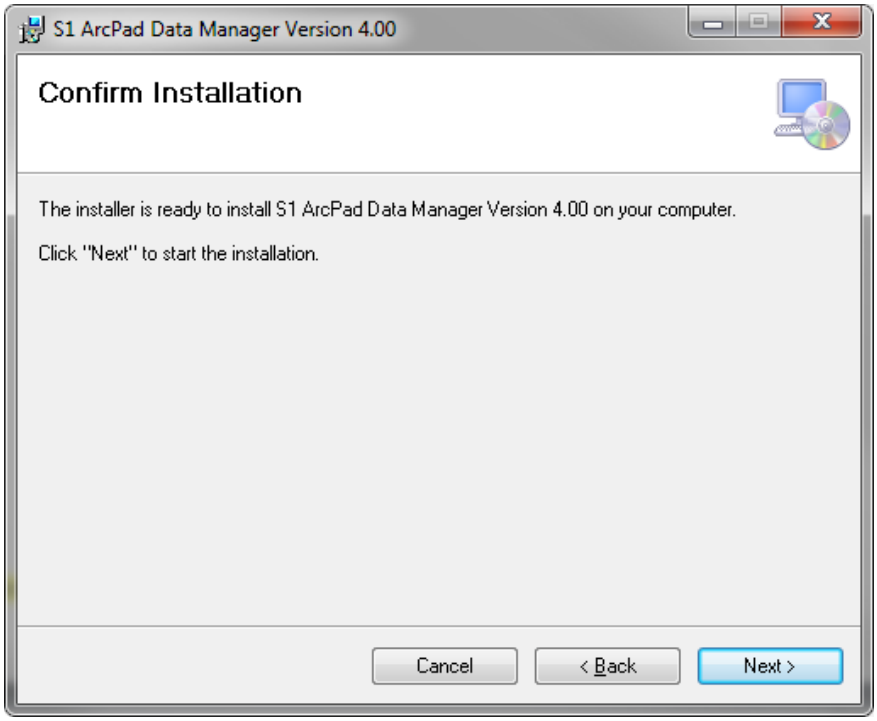
Click **OK** to initiate ReportLab install. Click the **Next** button until ReportLab installs. When the ReportLab installer completes, click **Finish** to return to S1 Data Manager installer (as in the next graphic).



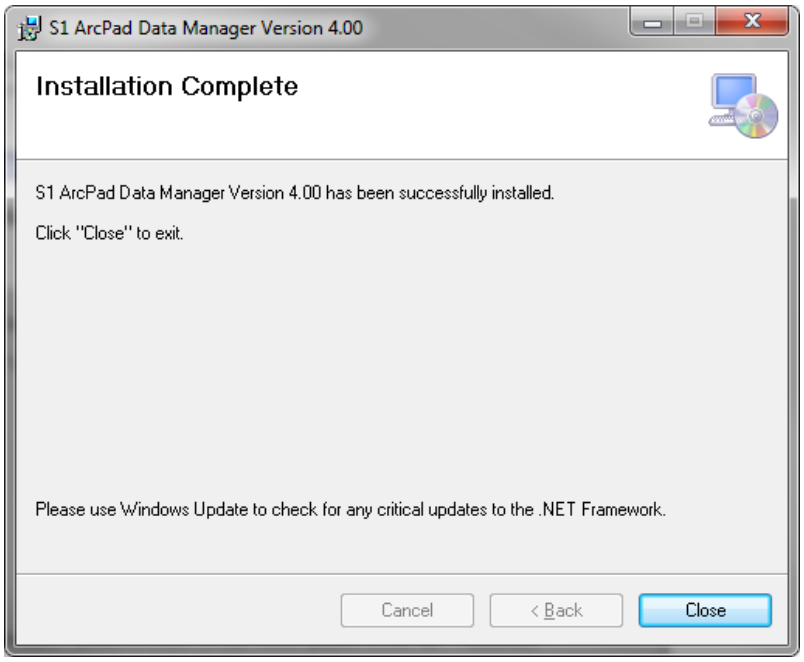
8. For Folder, use the default pathname, and choose the option **Everyone** (see next graphic).



9. Click **Next**.



10. Click **Next**. Software installation begins. When complete, your screen should match the next graphic.



11. Click **Close** to close the installer.

INSTALLING TRIMBLE POSITIONS ADD-IN (OPTIONAL)

The Trimble Positions Add-In is an optional extension for ArcGIS. The extension replaces GPS Analyst in the differential correction of collected data.

IMPORTANT: Install the Trimble Positions Add-In before installing the S1-APDM. Also, if you are installing Trimble Positions Add-In on a local computer, following the instructions for "Auto Configure Trimble Positions Access Database."

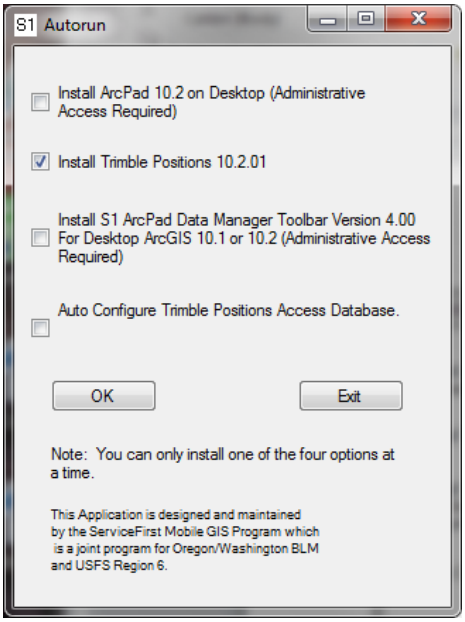
Begin by uninstalling previous versions of GPS Analyst and/or older versions of Trimble Positions.

1. **Control Panel, Add/Remove Programs**, Remove any existing version of GPS Analyst or Trimble Positions.

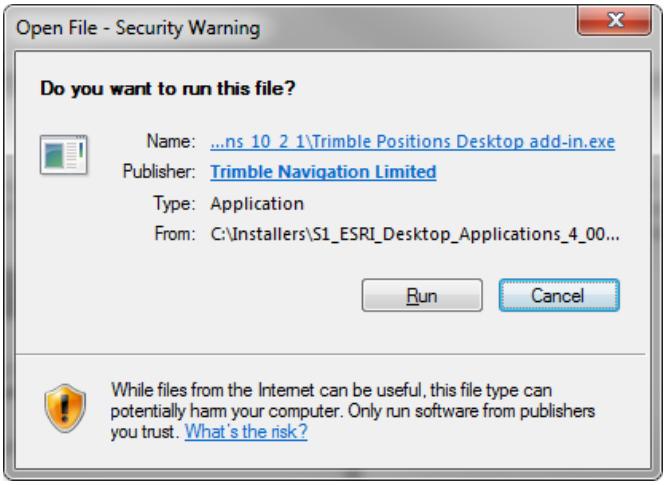
Next, run the installer using the following steps:

2. Download S1-APDM installer package and, if necessary, extract the zipped files to c:\tmp. Double click on the installer **"setup.exe"** to start the installer.

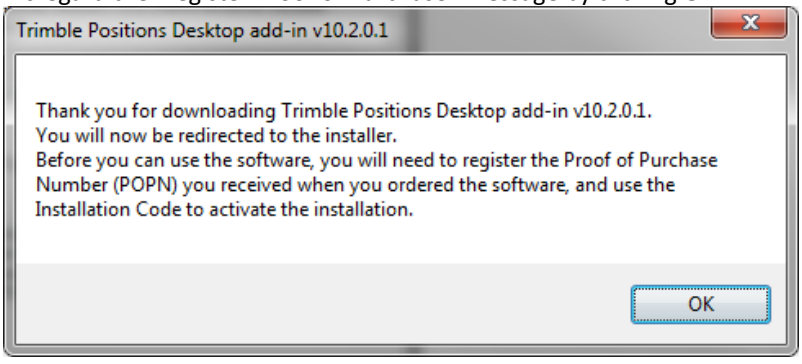
3. Check the box next to “Install Trimble Positions 10.2.01” and click **OK**.



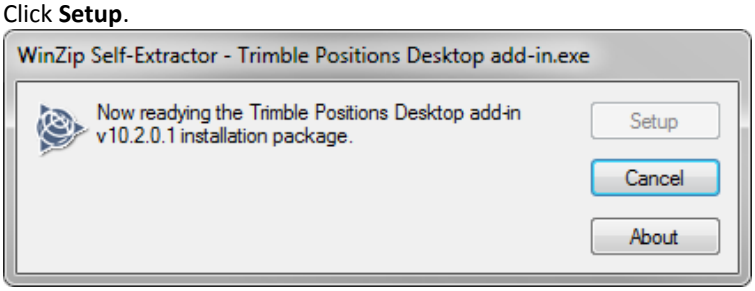
4. Click **Run**.



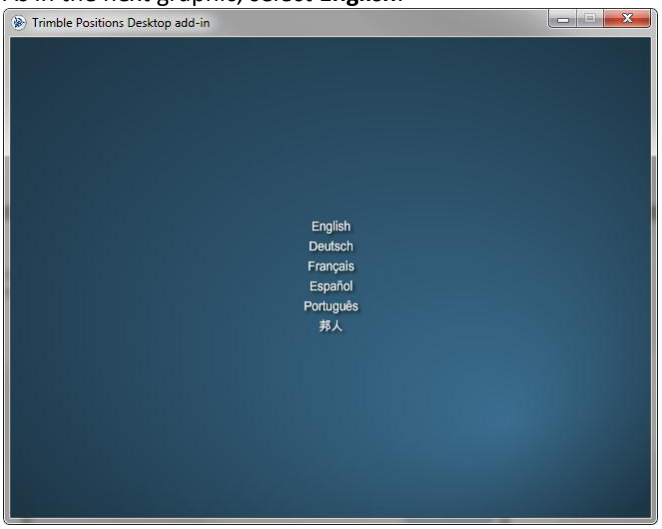
5. Disregard the “register Proof of Purchase” message by clicking **OK**.



6. Click **Setup**.

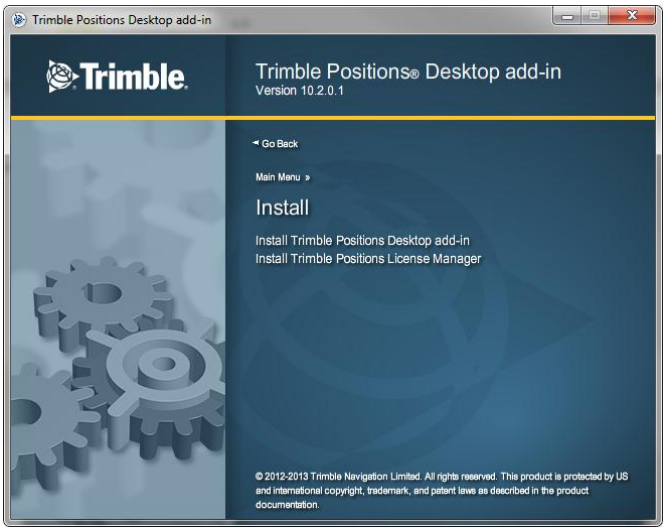


7. As in the next graphic, select **English**.

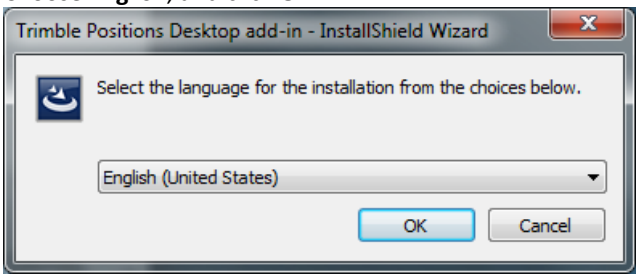


8. Click **Install**.

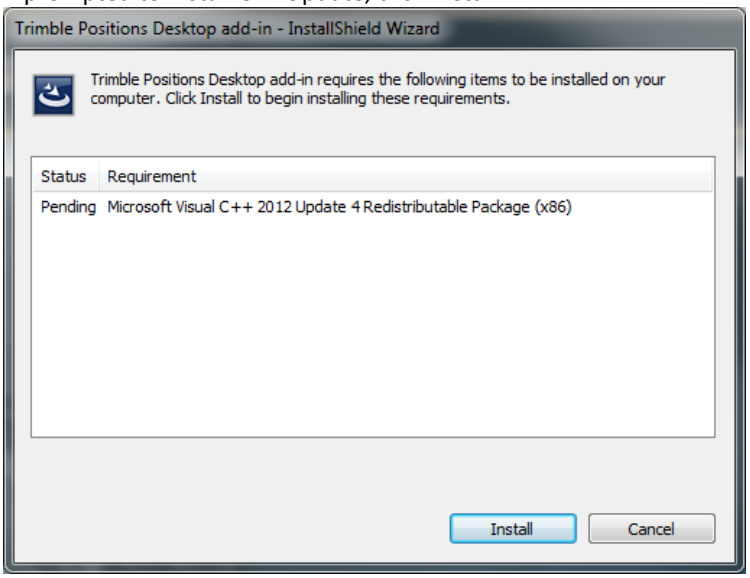
9. Click **Install Trimble Positions Desktop add-in**.



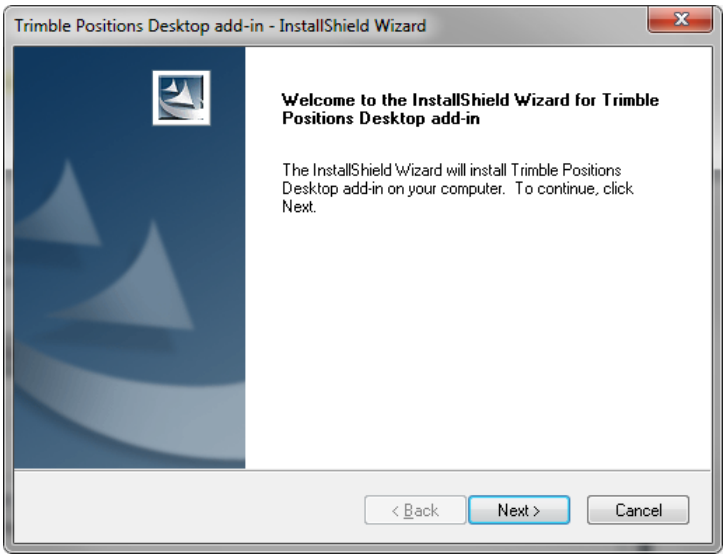
10. Choose **English**, and click **OK**.



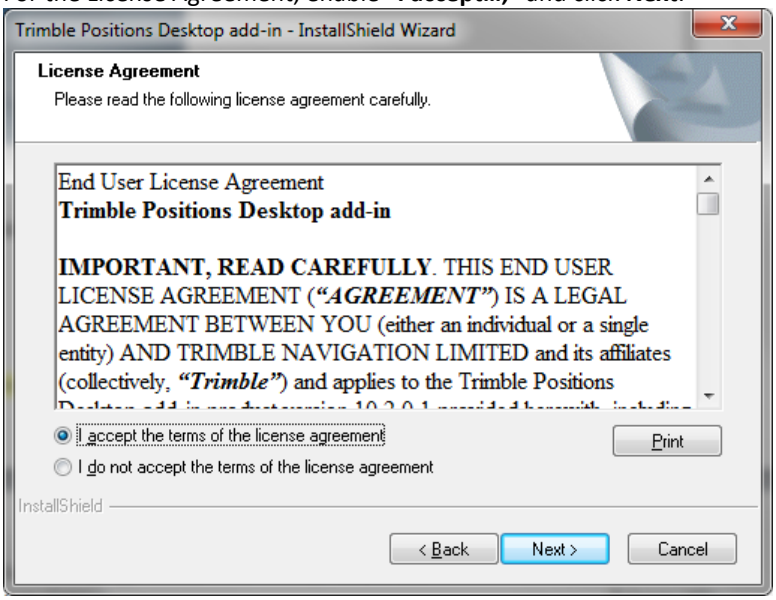
11. If prompted to install C++ Update, click **Install**.



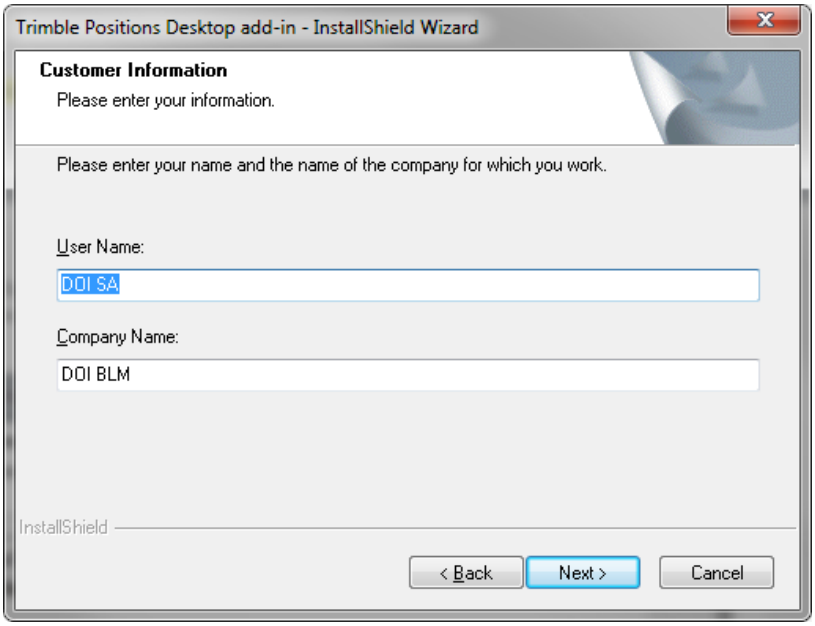
12. Click **Next**.



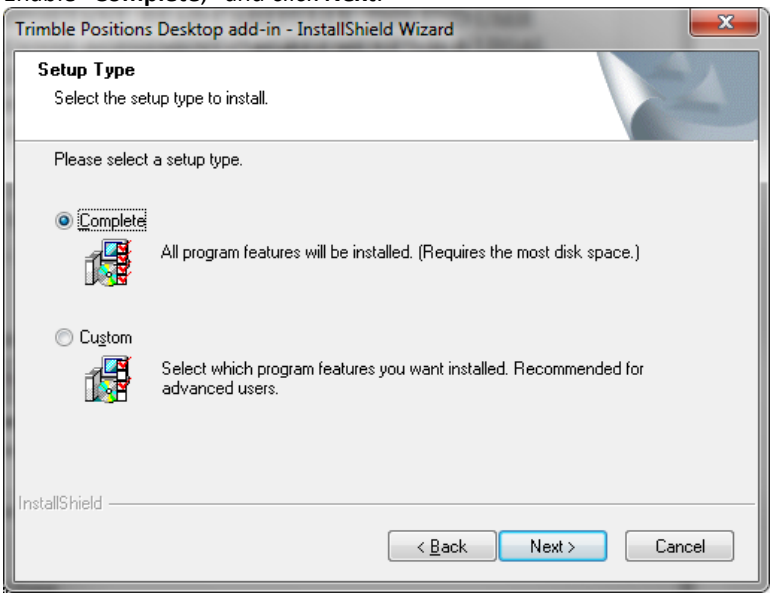
13. For the License Agreement, enable "**I accept…,**" and click **Next**.



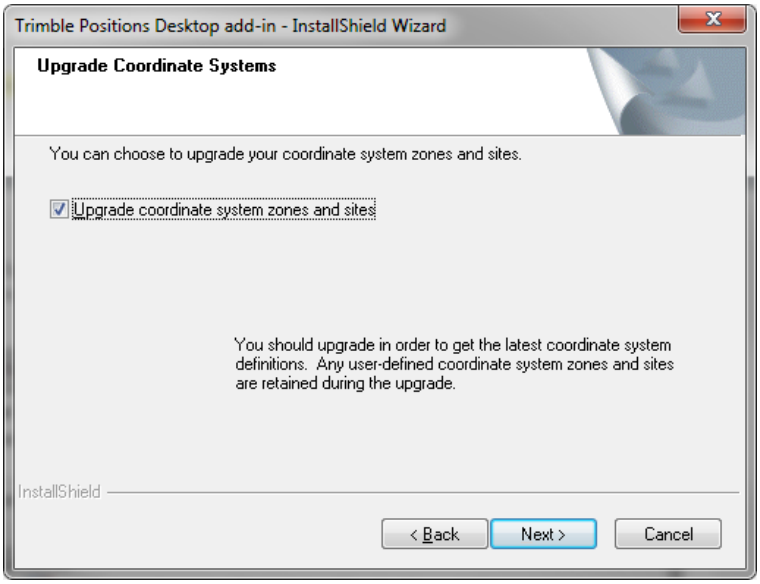
14. Accept the default values, and click **Next**.



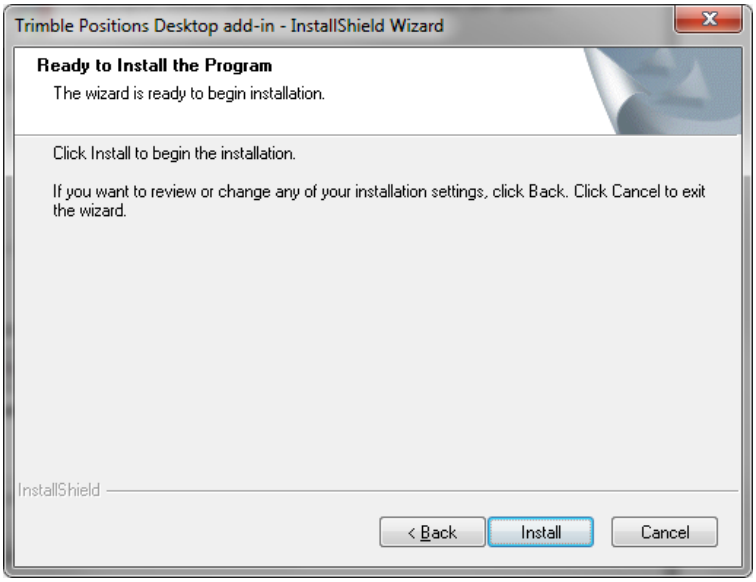
15. Enable "**Complete**," and click **Next**.



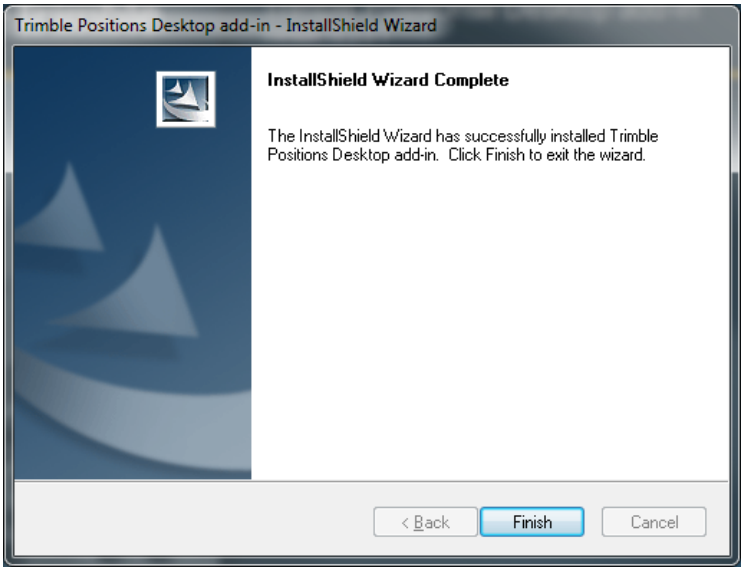
16. Accept the default values, and click **Next**.



17. Click **Install**.



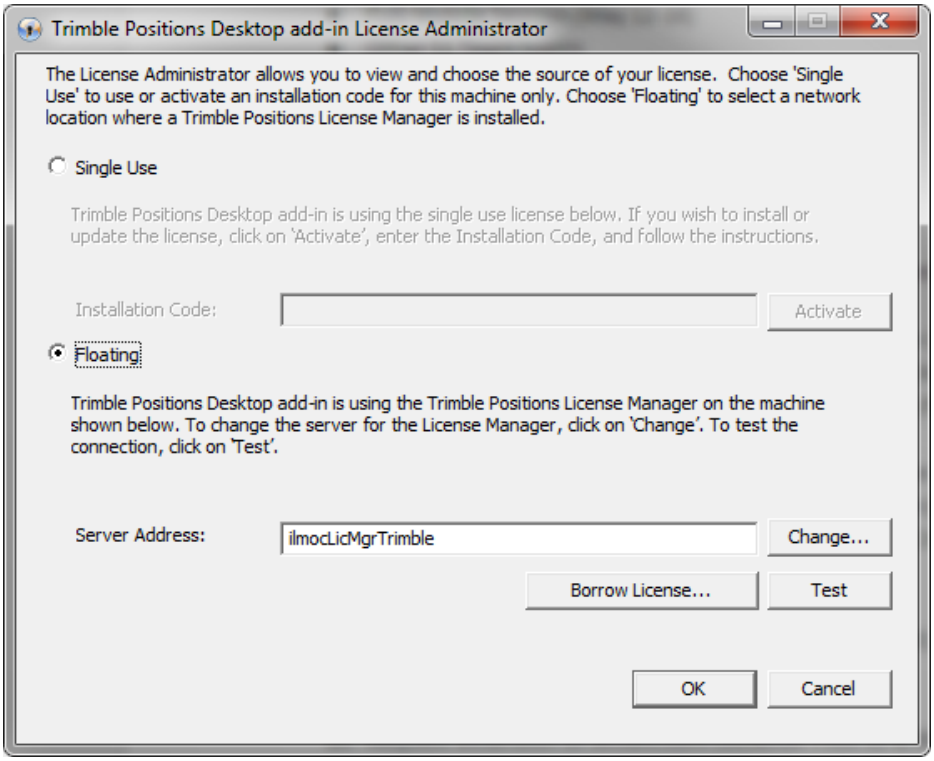
18. Click **Finish** to complete installation.



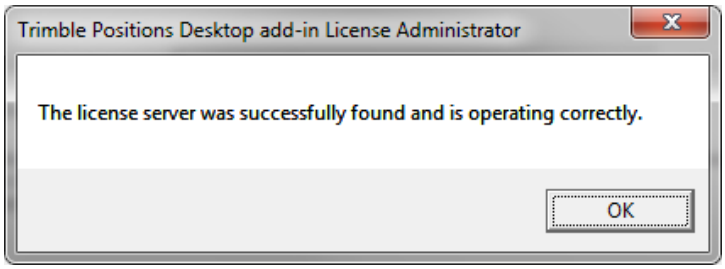
CONNECTING TO THE BLM, TRIMBLE LICENSE MANAGER

1. Start Menu/All Programs/Trimble/Trimble Positions Desktop Add-in/Trimble Positions License Administrator

2. Choose **Floating** and then type **"ilmocLicMgrTrimble"** into Server address



3. Click **Test** to verify server is working, if you receive message below, then the license administrator is properly configured.

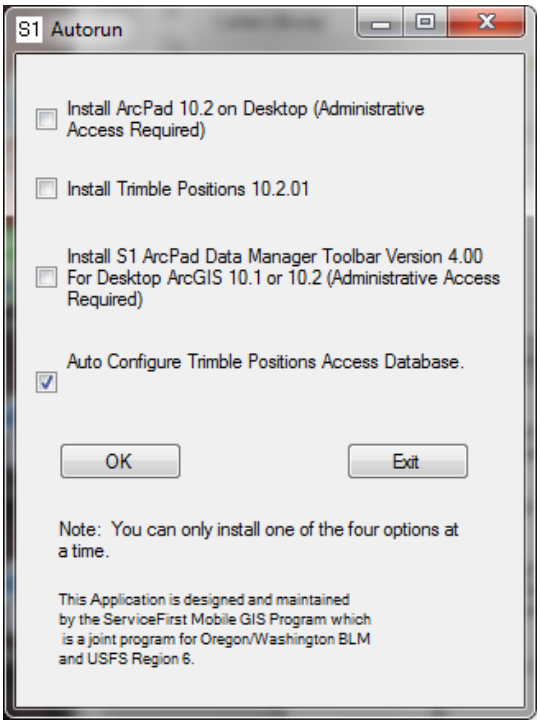


4. Click **OK** to exit out of the License Administrator

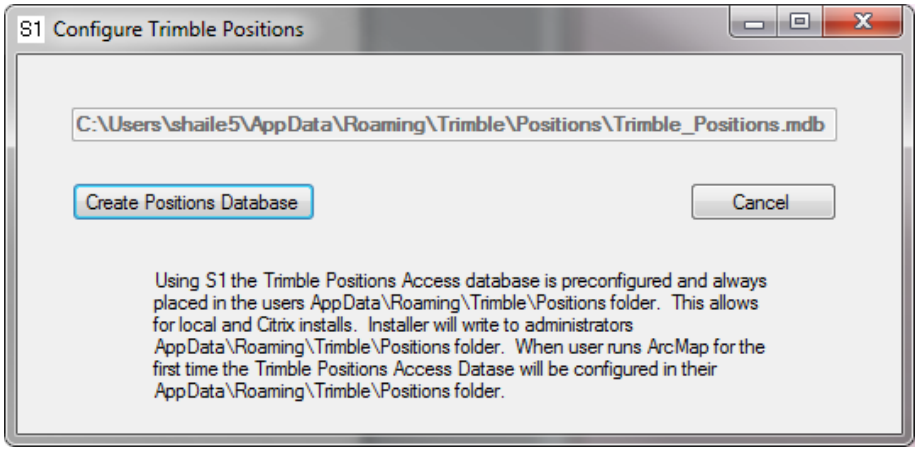
AUTO CONFIGURE TRIMBLE POSITIONS ACCESS DATABASE

If Trimble Positions is installed on a local computer, this step is required in order to create the database needed by Trimble Positions to post-process collected data.

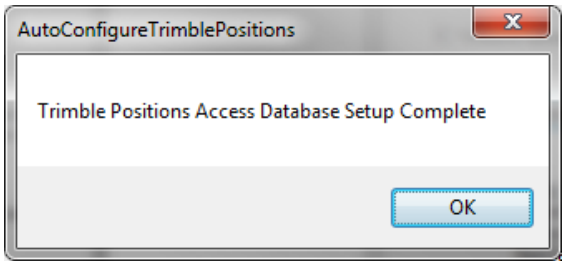
1. Return to the S1 Autorun installer. Double click on **S1_Autorun.exe** to start the installer.
2. As in the next graphic, place a check box next to "**Auto Configure Trimble Positions Access Database**," and click **OK**.



3. Click **Create Positions Database**.



4. Click **OK**.



CREATE GPS WORSKSPACE FOLDER

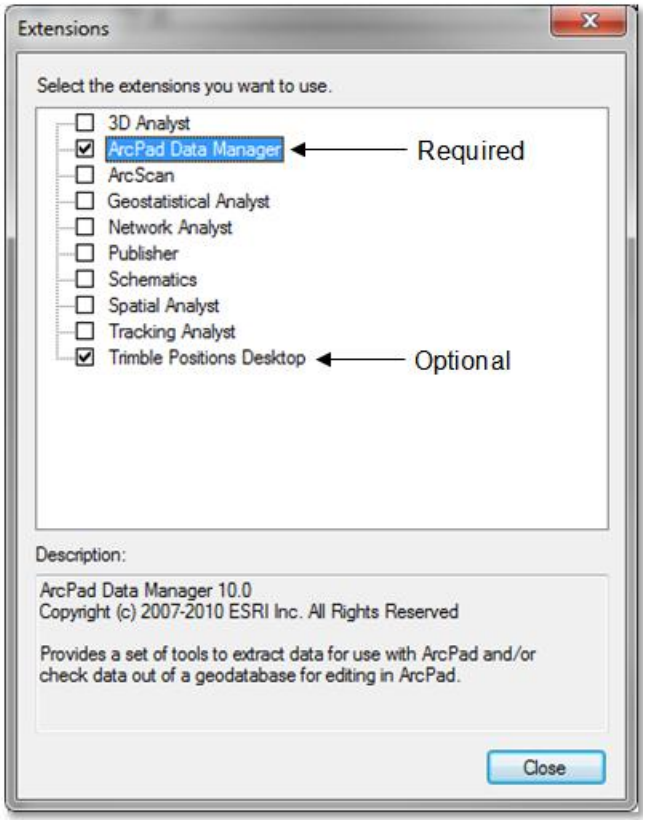
There needs to be a network location accessible to users from within the same environment as the ArcGIS Desktop installation, where files can be created, modified and deleted by the user. If this is in Citrix, the path should be to a network drive accessible within Citrix. If ArcGIS is run from a local computer, then the network location should be somewhere accessible on the Local Area Network (LAN).

If this folder does not already exist, create one called *gps_workspace*, and grant read/write/modify privileges to those users accessing the folder via the S1-APDM Toolbar. You should also confirm that said users have the appropriate permissions to read, write, and modify the folder's contents.

POST-INSTALLATION VALIDATION AND EXTENSION ACTIVATION

1. Start ArcMap, and open a blank map
2. Go to Customize menu/Extensions…, and add a check mark next to **ArcPad Data Manager**.
3. Optionally, if you want to post-process collected data, add a check mark next to **Trimble Positions Destktop**.

4. Click **Close**.



5. Again, from the Customize menu/Toolbars, check the **S1 ArcPad Data Manager Version 4.00 Toolbar** to turn it on. *Note: Do NOT enable ESRI's out-of-the-box ArcPad Data Manager Toolbar.*

6. Optionally, check the Trimble Positions Toolbar to turn it on. Like the graphic below, the Trimble Positions Toolbar only has two icons on it.

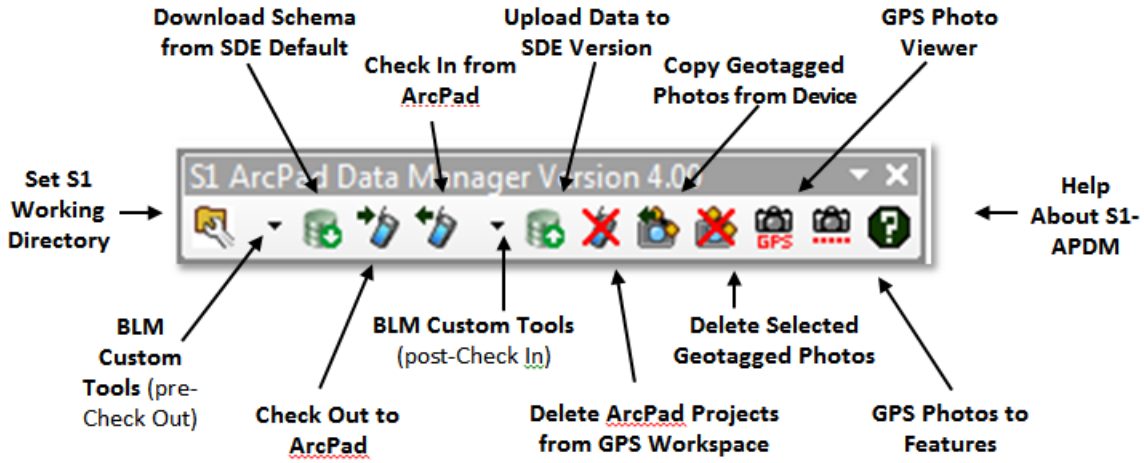
NOTE: Using Trimble Positions with the S1-APDM is explained in a separate section titled "Check Out Options with Trimble Positions."

As in the graphic at the bottom of this page, the S1-APDM Toolbar opens in ArcMap.

If this is the first time using the S1-APDM Toolbar, it opens undocked in ArcMap's Data View.

S1 ARCPAD DATA MANAGER TOOLBAR – BUTTONS AND TOOLS

The next graphic labels the names of buttons and tools found on the S1-APDM (ver. 4.00) Toolbar. Starting from left to right on the toolbar, this section describes the functionality of each button and tool.



Note: The remainder of this user guide assumes you have ArcMap open; have turned on both the APDM Extension and S1-APDM Toolbar; and have GIS layers and geotagged photos available that you will transfer to and from a connected mobile device.

SETTING YOUR S1 WORKING DIRECTORY

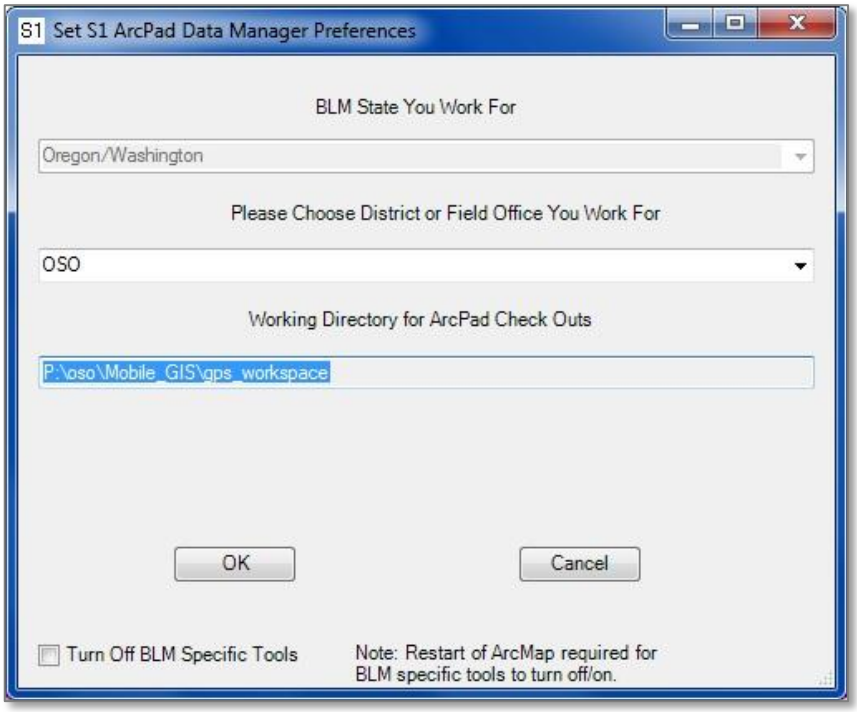
Set once per user, the S1 Working Directory (a.k.a., GPS workspace) is used by the S1-APDM tools (e.g., Check Out) to transfer data to and from a mobile unit. For networked BLM users, the GPS workspace is state and district/field office specific. For non-networked or non-BLM agencies, the GPS workspace is specified manually. For Citrix users, set the GPS workspace to a directory accessible within Citrix.

1. Click the Set Working Directory button.

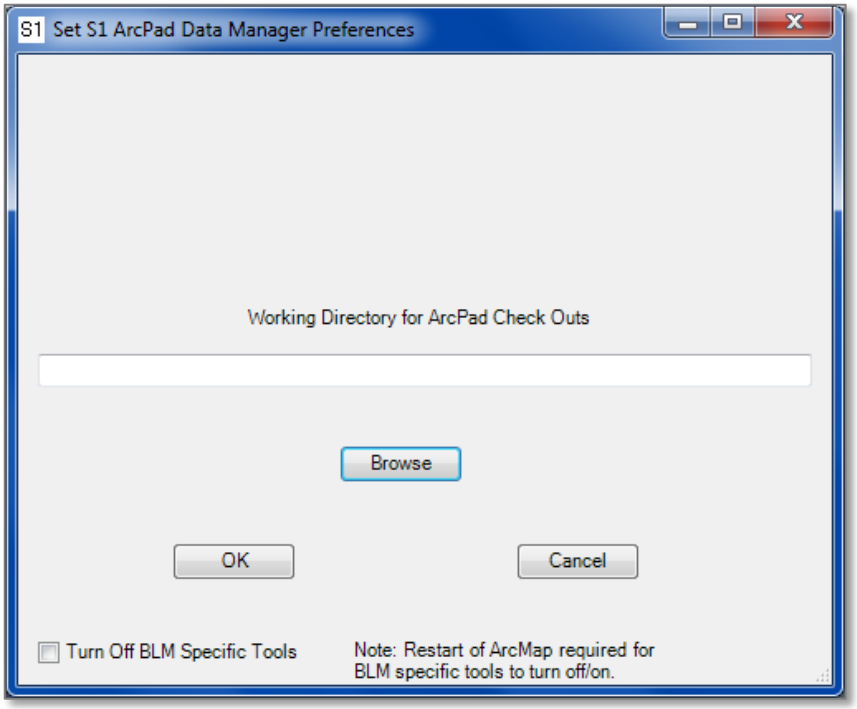
As in the next two graphics, the S1 ArcPad Data Manager Preferences window opens. The graphics illustrate how the Preferences window varies depending upon the user's agency and/or network configuration. For example, the first graphic is the window BLM employees at the Oregon State Office would see.

Depending upon your agency and district location, certain fields are auto-populated and grayed out. Regardless, any blank fields must be completed. If you are unsure of field value, consult with your local Mobile GIS coordinator *(for a link to a list of contacts, refer to last page of this user guide).*

Tip: If you work for a non-BLM agency (e.g., USFS), you can disable customized BLM tools in the S1-APDM Preferences window, which will streamline the look of the S1-APDM Toolbar without eliminating its core functions.



OR

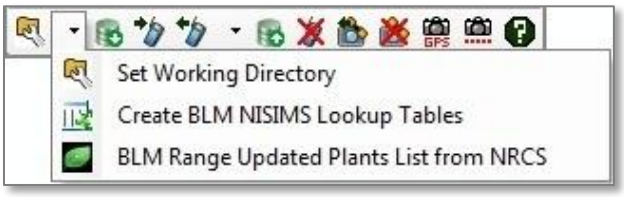


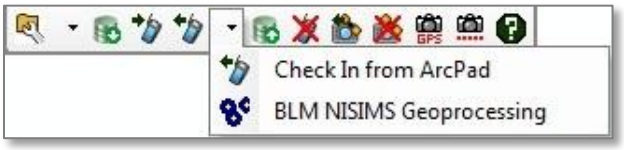
2. As needed, manually populate blank fields in S1-APDM Preferences window, and click **OK**.

Note: If you disable BLM specific tools, you'll need to restart ArcMap.

BLM SPECIFIC TOOLS

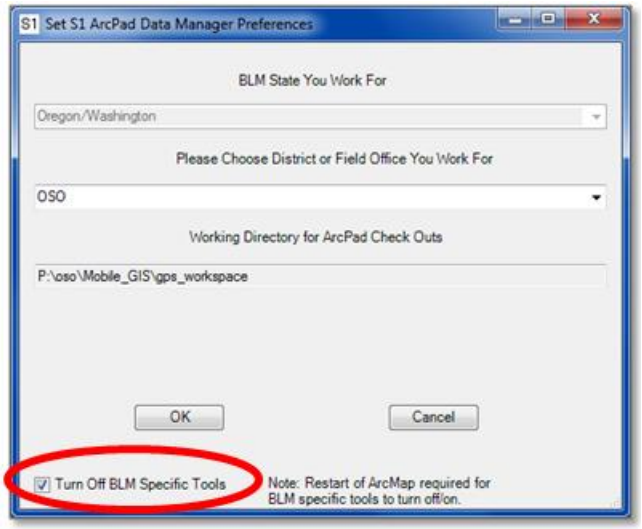
The BLM Specific Tools are found under the down pointing triangles (▾) on the S1-APDM Toolbar. As their name implies, the tools are customized for BLM-specific projects such as the National Invasive Species Information Management System (NISIMS) and the Range Assessment, Inventory, and Monitoring (Range AIM).





SET S1 WORKING DIRECTORY AND DISABLING BLM SPECIFIC TOOLS

If you belong to a non-BLM agency or your work does not involve NISMIS or Range AIM, you can turn off BLM Specific Tools by using the Set Working Directory tool (for further details, see previous section). Whether you have BLM Specific Tools checked on or off, the setting remains enabled/disabled until you manually change it. *Note: If you disable/enable BLM Specific Tools, restart ArcMap.*



CREATE BLM NISIMS LOOKUP TABLES

Prior to checking out NISIMS data to a mobile device, a NISIMS field user can create customized Lookup Tables, which are lists of attribute values expected to be encountered in the field. The Lookup Tables

are shortened versions of the NISIMS master tables for chemicals, adjuvants, project, species, and people.

Note: Even if you by-pass using this tool, the NISIMS data check out process still prompts you to create Lookup Tables.

For further details on BLM custom tools designed for NISIMS, refer to the NISIMS User Guide found on the BLM NISIMS website at http://www.blm.gov/wo/st/en/prog/more/weeds/nisims/NISIMS_Help_Documents_and_Training_Materials.html

BLM RANGE UPDATED PLANTS LIST FROM NRCS

Prior to checking out Range AIM data to a mobile device, the Range field user can create a customized plant species list from the NRCS database of flora species. The customize plant list includes Species Code, Historical Species Code, Scientific Name, and Common Name.

Note: Even if you by-pass use of this tool, the Range data check out process still prompts you to create a customized plant list.

Stay tuned: At the time of this writing, mobile tools, user documentation, and training materials for Range AIM are being developed. Periodically refer to the Mobile GIS SharePoint web site for any new Range-related materials (the SharePoint link is provided at the end of this user guide).

CHECK IN FROM ARCPAD (BLM SPECIFIC TOOL)

This tool is the same as the standard Check In tool () found on the S1-APDM Toolbar. For further details, refer to the section titled “Check In from ArcPad.”

BLM NISIMS GEOPROCESSING

You can manually use the BLM NISIMS Geoprocessing tool () after the check in of NISIMS data collected in the field. A requirement of the NISIMS GDB is that new and/or modified features collected be geoprocessed before the final appending of features to the master NISIMS GDB. An example of geoprocessing common to NISIMS is the buffering of lines into polygons.

Tip: If you have several mobile devices with data to check in, you can cancel the geoprocessing step during the data check in. After you have checked in data from all mobile devices, manually run the BLM NISIMS Geoprocessing tool on the newly collected/modified NISIMS data.

DOWNLOAD SCHEMA FROM SDE DEFAULT

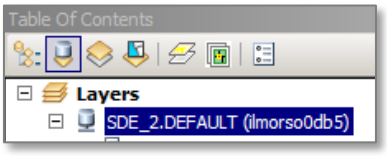
The Download Schema from SDE tool ( ) creates a schema-only (i.e., empty), local geodatabase (GDB) from SDE.DEFAULT. The tool is intended for mobile devices that will be disconnected from the network for extended periods of time (e.g., the mobile device is out the entire field season).

For example, if the mobile device will be out during the summer field season, the device could potentially be disconnected from the network for several months. Therefore, the field user should work off a local, disconnected GDB derived from SDE.DEFAULT.

Notes on use:

- The new GDB created by the tool is unregistered with no links to your SDE version.
- You'll still need to run the Check Out tool ( ) to load the extracted schema onto the mobile device.

1. Launch ArcMap, and open the map document representing your project. If you are creating a new map document, add the layers from the SDE.DEFAULT. *Notice in the first graphic, the name of the SDE layers contains the word "DEFAULT."*

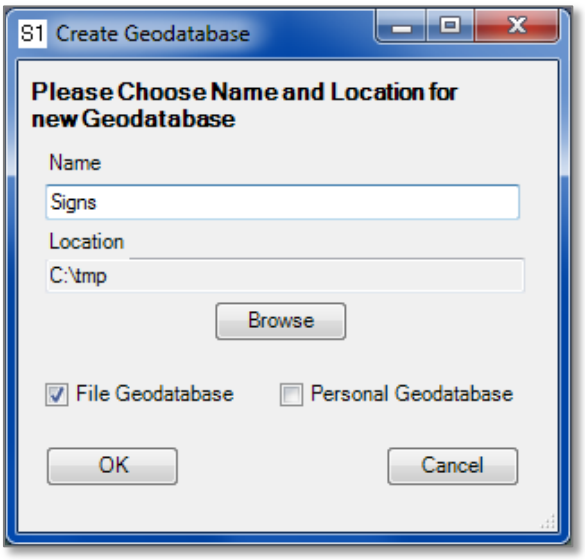


2. Zoom in to the area of interest *(the user-defined map scale limits what is copied to the local GDB).*
3. In ArcMap's TOC, highlight the path of SDE.DEFAULT. *Tip: Click on the TOC's List by Source button.*
4. Click the **Download Schema from SDE tool** on the S1-APDM Toolbar.

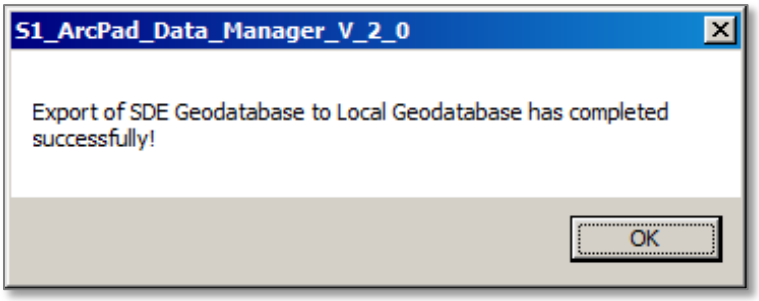
In the Create Geodatabase window, you'll need to specify the following: a new name for the local GDB, a directory location where it will be saved, and the type of GDB (File or Personal) to create.

5. Enter a name for the GDB. *Keep it simple.*
6. Click the Browse button, and choose a directory location where you have read/write permissions (e.g., your GPS workspace). *In the graphic below, the local drive of C:\tmp is used.*
7. Check the type of GDB to create (File GDB or Personal GDB).

8. Click **OK**.



PLEASE READ: Depending upon the size of the GIS data you want exported from SDE.DEFAULT, this process may take several minutes. *Take no action in ArcMap*, until the S1-APDM message window opens indicating the export of SDE.DEFAULT is complete (see next graphic).

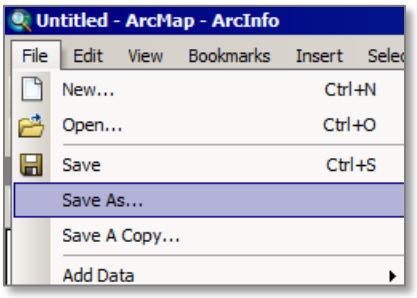


With a successful export, the local GDB created by the tool is listed in ArcMap's TOC. Remember, the feature classes of the GDB are in a schema-only format (i.e., the GDB is empty of data).

8. Click **OK**.

Tip: After the extraction process is complete, the original SDE remains listed in ArcMap's TOC. Saving the map document with the link to SDE.DEFAULT, saves you time later when you use the Upload Data to SDE Version tool.

9. Save the map document to a working directory (e.g., your GPS workspace). *Tip: Give the map document a descriptive name so that it will be easy to locate later.*



IMPORTANT: To download the extracted schema to your mobile device, you'll need to run the Check Out tool on the newly created GDB (see the next subsection).

CHECK OUT TO ARCPAD

From your GPS workspace to a connected mobile device, the Check Out ( ) tool copies and transfers extracted GIS *schema* or GIS *data* from the following types of geodatabases (GDB):

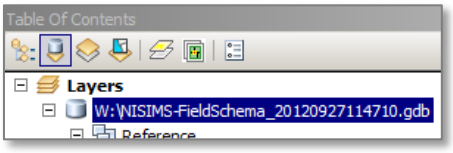
- File GDB
- Personal GDB
- Spatial Database Engine (SDE) – *from a user edit version, not from DEFAULT*

The *schema* check out option is used when you want blank (i.e., empty) GIS datasets loaded on to your mobile device. In contrast, if you want your mobile device loaded with preexisting features and attributes, you can use a *data* check out.

NOTE: Whether you are checking out from a GDB or an SDE edit version, you can specify either schema or data extraction. However, if checking out an SDE edit version, the schema of the checked out data is locked down and cannot be changed.

1. Launch ArcMap, and open the map document representing your project. If this is a new map document, add the layers from the GDB or SDE edit version you will use for check out. *Note: To extract a schema-only GDB from SDE.DEFAULT, first use the Download Schema from SDE tool as described in previous steps.*
2. Prepare your map document for check out (e.g., apply layer symbology).
3. Set the map scale of your project area. The extent of your map determines which reference data is checked out. Keep this in mind as checkouts with large amounts of data can impede performance on your mobile device. As a general rule, zoom in as close as necessary, and avoid zooming out past 1:500,000.

4. In ArcMap's TOC, highlight the path to your either your GDB or SDE edit version that you'll use for the check out. *Remember, you cannot check out directly from SDE.DEFAULT. Run the Download Schema from SDE tool first (see previous subsection).*



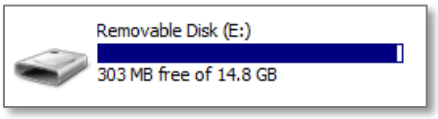
Note: Before connecting your mobile device (next step), confirm it is in USB Mass Storage Mode. This mode setting permits data transfer to/from the device's mass storage card. To confirm the device's mode, use the customized program called S1USBToggle (found under the mobile device's Programs). Whichever mode is "grayed out" is what the device is set to. For further assistance, talk with your local Mobile GIS Coordinator.

5. Connect your mobile device to your computer.

Tip: If you receive a message to "Scan and Fix" the connected device, click "Continue without scanning."

6. After the mobile device is successfully connected, confirm ArcPad is closed *(to avoid data corruption during check out).*

7. Verify in Windows Explorer or My Computer that your mobile device is connected as a lettered drive *(your drive letter will vary).*

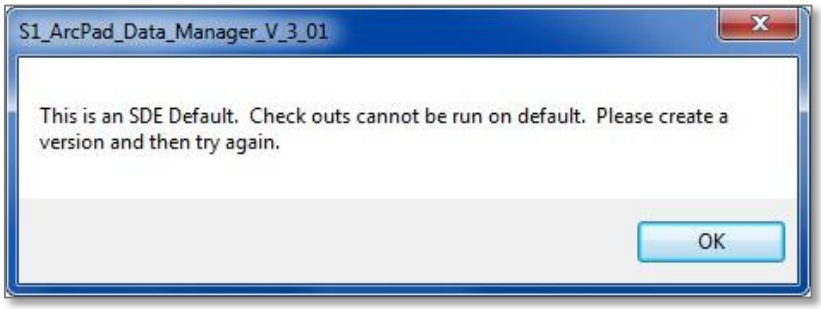


8. On the S1-APDM Toolbar, click the Check Out button.

NOTE #1: If your ArcMap document is Untitled (i.e., unsaved), you will be prompted to save it.

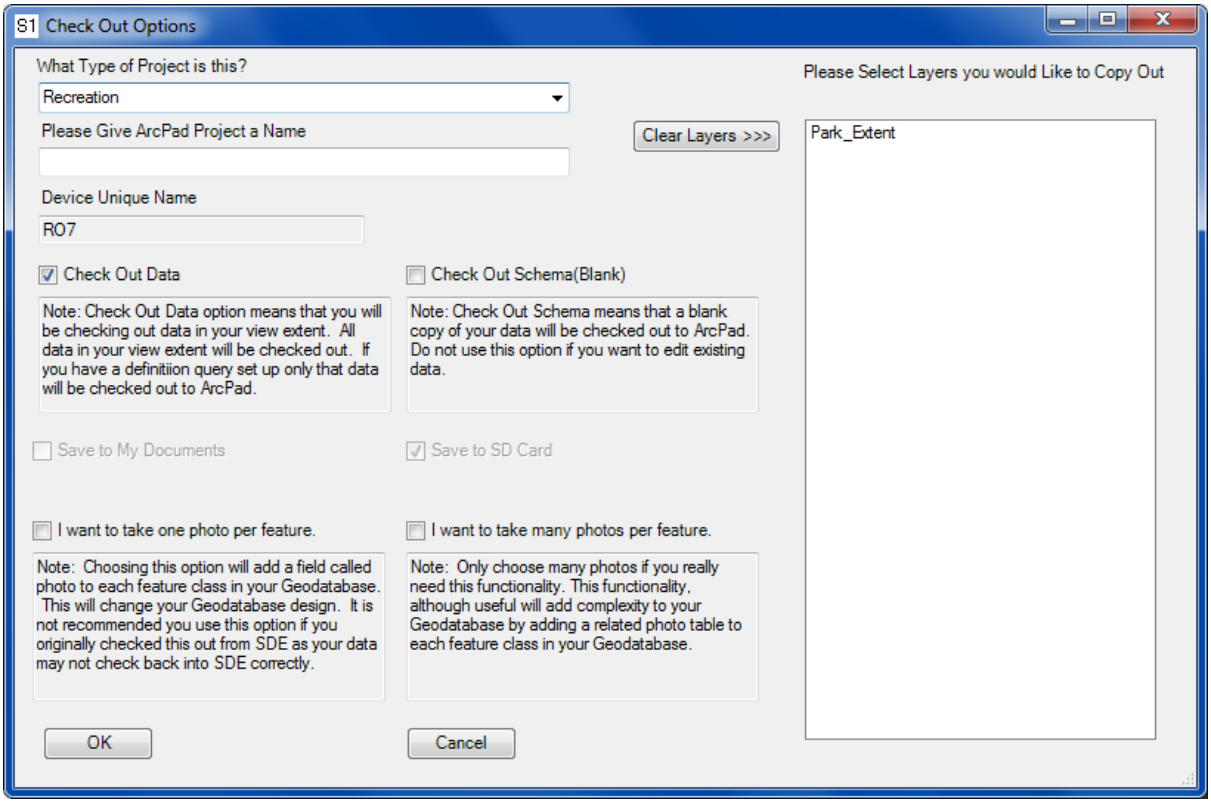
NOTE #2: If you receive a prompt indicating that no mobile device was detected, click "No", and read the WARNING after Step 15.

Final Reminder: If after clicking the Check Out tool, you get the following warning window, you are trying to check out from SDE.DEFAULT. *You first must run the Download Schema from SDE tool (see previous subsection).*



If there are no error messages, then as in the next graphic, the Check Out Options window opens.

Note for Advanced Mobile GIS Users: Submission of a Version back to SDE.DEFUALT is prohibited if the Version's features have geometry errors. During Check *Out* from an SDE Version, a temporary File Geodatabase is created under the user's profile. During Check *In*, the geometry of the field-collected data is verified in the temporary GDB. If geometry errors are found, they are automatically repaired before the features are checked back into the SDE Version. If the Check In is successful, the temporary GDB is deleted from the user's profile.



CHECK OUT OPTIONS

To simplify the ArcPad check-out process, a customized window allows the user to specify the following options:

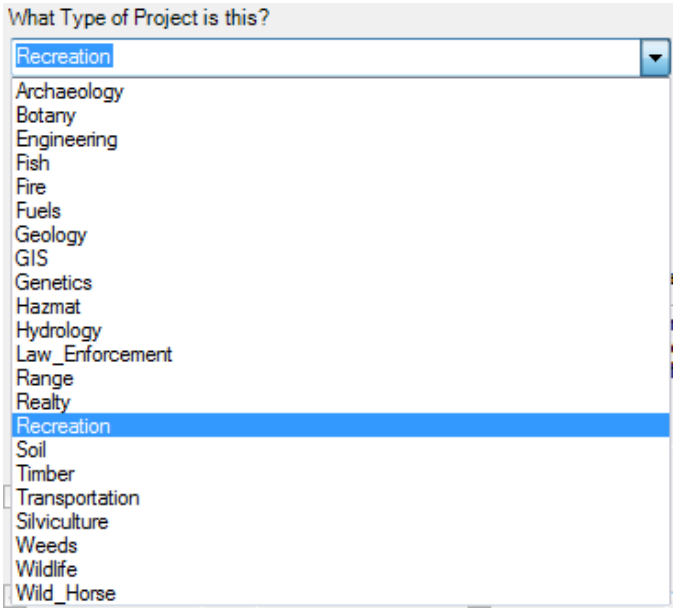
- Type of project (e.g., Recreation)
- Project name
- Whether you want to copy out Data or Schema
- Where you want the data stored on the mobile device
- Type of feature-to-photo relationship the mobile device will use (e.g., one photo per feature)
- Which reference layers, if any, you want transferred to the mobile device

Important: Some check out options are "grayed out" depending upon 1) the mobile device's configuration (e.g. storage mode used), 2) the type of GDB or SDE edit version selected, and/or 3) how previous check outs have modified the GDB (e.g., the feature-to-photos relationship). Here are examples you may encounter:

- Highlighted GDB is empty of data = "Check Out Schema (Blank)" is auto-enabled and grayed out.
- The mobile device is set to USB Mass Storage Mode = "Save to SD Card" is auto-enabled and grayed out.
- If previous check outs to the same mobile device already use the many photos per feature option = both "I want to take one photo per feature" and "I want to take many photos per feature" are auto-enabled and grayed out.

CHECK OUT OPTIONS: PROJECT TYPE

From the drop-down list of projects, the user selects his or her discipline that ArcPad will support. The selected project determines the types of customized ArcPad data collection forms the user will use out-in-the field.



CHECK OUT OPTIONS: ARCPAD PROJECT NAME

Called an APM, the ArcPad Project name is specified by the user. Keep the APM name simple, and one you can remember later.

Tip: Avoid using spaces in the APM.

CHECK OUT OPTIONS: DEVICE NAME

As part of the check-out process, the Check Out tool uses the device's name as part of the name of the check out. Normally, this field is grayed out.

To change a device's name, cancel the Check Out process and disconnect the mobile device from the computer. From the mobile device, run the customized program called S1USBToggle (found under the mobile device's Programs). Tap on "Change Device Name," enter the device's name, and tap SUBMIT. For further assistance, talk with your local Mobile GIS Coordinator.

CHECK OUT OPTIONS: CHECK OUT DATA VS. CHECK OUT SCHEMA

In the Check Out Options window, brief notes describe the difference between "Check Out Data" and "Check Out Schema (Blank)." *Data* check out copies and transfers GIS features and attribute records (within the area of interest) over to the mobile device. Schema check out only copies the framework used to make new GIS features and records.

When should I use Data versus Schema?

Examples of *Data* Check Out:

- Existing data on the GDB is needed for field work (e.g., for reference and/or navigation purposes)
- Existing data on the GDB will be *edited* in the field (e.g., modifications or deletion of selected features)

Examples of *Schema* Check Out:

- The GDB is empty (e.g., the GDB is new; awaiting data from the field).
- Only *new* features will be collected.
- Data exists on the GDB that must be protected from field edits (e.g.., modifications or deletions).
- You have limited storage space on your device, and you will be checking out a large project area. *The more information you check out, the greater the impact on the mobile device's performance.*

Important: If Data versus Schema check out are new concepts for you, talk with your local GIS Coordinator on which option is best for your needs.

CHECK OUT OPTIONS: SAVE TO MY DOCUMENTS VS. SAVE TO SD CARD

If your mobile device is set to USB Mass Storage Mode, these two options are unavailable (grayed out), with "Save to SD Card" checked. Having the device in USB Mass Storage Mode is the normal, preferred setting. However, if your mobile device is set to Active Sync/WMDC mode, then you are given the option to check out data to the following locations on the connected mobile device: My Documents or SD Card.

Tip: To verify which mode your mobile device is set to, run the customized program called S1USBToggle (found under the mobile device's Programs). Whichever mode is "grayed out" is what the device is set to. For further assistance, talk with your local Mobile GIS Coordinator.

CHECK OUT OPTIONS: TAKE ONE PHOTO PER FEATURE VS. TAKE MANY PHOTOS PER FEATURE

In the Check Out Options window, brief notes describe the difference between "Take One Photo per Feature" and "Take Many Photos per Feature."

When you enable "Take One Photo per Feature," you are enabling a simple, one-to-one (1:1) relationship between a selected feature (e.g., a point) and any *single* photo you take of that feature.

When you enable "Take Many Photos per Feature," you are enabling a more complex one-to-many (1:M) relationship between a selected feature and the *multiple* photos taken of that feature.

You also have the option of enable both 1:1 and 1:M relationships. This means, when you are out-in-the field, and you take a picture with your mobile device, you specify if the selected feature will use a 1:1 or 1:M relationship with the photo(s) taken of that feature.

When should I use the 1:1 versus 1:M photo relationship?

Examples of Taking One Photo per Feature:

- You will be taking a single photo of a feature.

- The mobile device's storage capacity is limited. *As you continue to take photos, the greater the impact on the mobile device's performance.*

Examples of Taking Many Photos per Feature

- You will be taking multiple photos of the same feature (e.g., photos using different angles or azimuths)
- You will be taking multiple photos of objects within the feature (e.g., different plant species within the same study area).

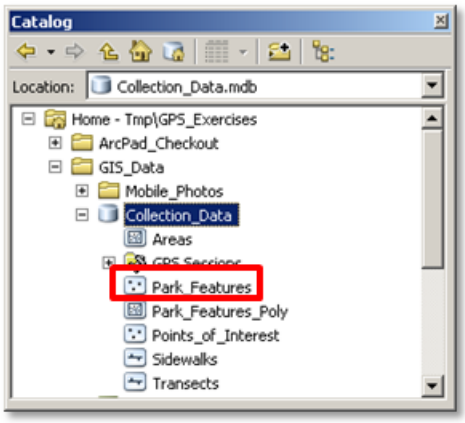
Tip: Keep it simple. If you can, enable only the 1:1 relationship, which satisfies most user needs.

ADDITIONAL INFORMATION FOR ADVANCED MOBILE GIS USERS

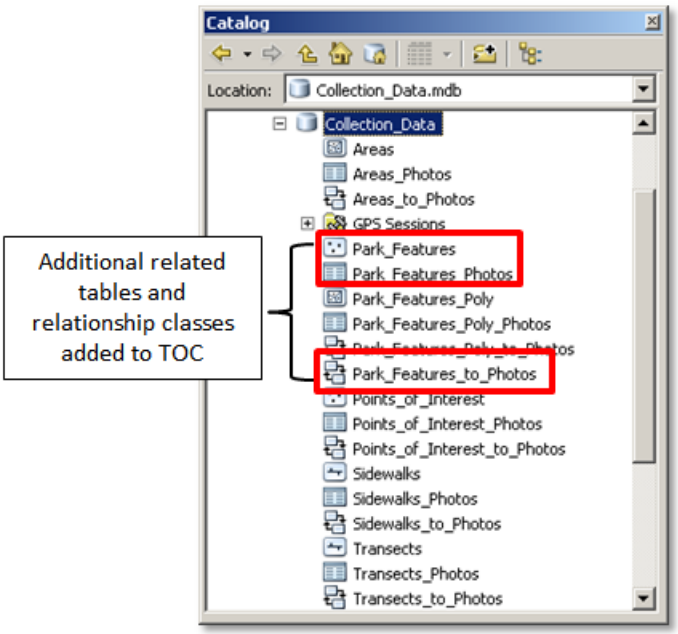
When the Check Out Option of "I want to take many photos per feature" is enabled, additional tables are added to ArcMap's Table of Contents (TOC). Called related tables, both the tables and accompanying relationship classes are added to the TOC from the geodatabase used for Check Out.

The next two graphics illustrate what happens in the TOC when a Check Out uses the 1:1 photo relationship versus the 1:M photo relationship:

GDB SCHEMA FOR SIMPLE 1:1 PHOTOS



GDB SCHEMA FOR COMPLEX 1:M PHOTOS

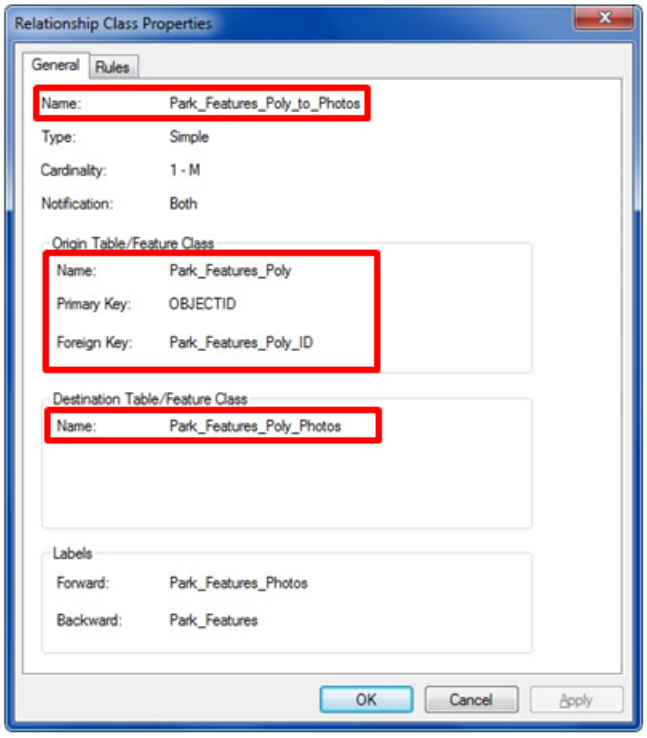


Older versions (< 3.3) of the S1 AP Tools used the field name called OBJECTID to link a feature to a photo.

Example: Park_Features_Poly Layer

1. Relationship Class = Park_Features_Poly_to_Photos

2. Origin Table
   - Feature Class = Park_Features_Poly
   - Primary Key (Origin) = **OBJECTID**
   - Foreign Key (Destination) = Park_Features_Poly_**ID**
3. Destination Table
   - Stand-alone table = Park_Features_Poly_Photos



Later versions (3.3+) of the S1 AP Tools build feature-photo relationships based on the Globally Unique Identifier (GUID) field.

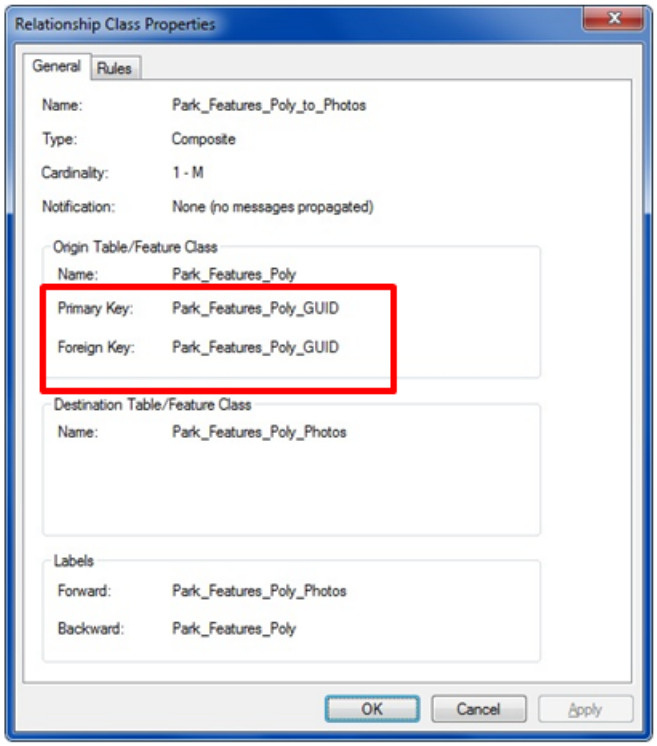
Example: Park_Features_Poly Layer

1. Relationship Class = Park_Features_Poly_to_Photos

2. Origin Table
   - Feature Class = Park_Features_Poly
   - Primary Key (Origin) = **Park_Features_Poly_GUID**
   - Foreign Key (Destination) = **Park_Features_Poly_GUID**

3. Destination Table

- Stand-alone table = Park_Features_Poly_Photos



Important: If in a previous check out you selected "Many Photos per Features," then the GDB is permanently altered with the necessary related tables and relationship classes needed for a 1:M relationship. When you reopen the Check Out Options window, the 1:1 and 1:M photo relationships will remain enabled and grayed out (i.e., unavailable) for the lifetime of the GDB.

CHECK OUT OPTIONS: LAYERS TO COPY OUT

Entirely optional, the user specifies which check out layers will be copied and transferred to the mobile device as a background/reference layer in ArcPad. **Note:** Each reference layer is a non-editable shapefile.

The following steps continue the instructions for the Check Out tool (ref. p. 14) …

Using the next graphic as an example, a user selects the following Check Out Options for a Recreation project:

9. From the drop-down list, choose the type of project (e.g., Recreation).
10. Enter a descriptive ArcPad Project Name (apm) that you will remember later.
11. If available, choose "Data" or "Schema" check out.
12. If available, specify the photo(s) to feature relationship for any pictures taken with the mobile device.

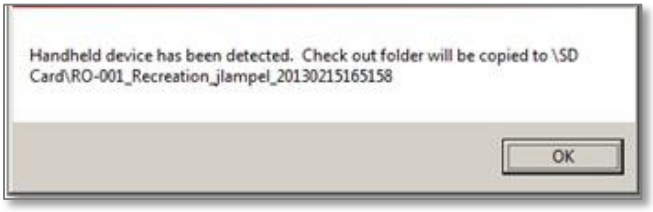
Remember: Once you specify many photos per feature, both types of relationships will be auto-enabled and grayed out, and remain checked on for the lifetime of the GDB. *In the next graphic, a user has already altered the GDB because the 1:M photo relationship is checked on and disabled.*

13. Highlight any layers you want copied and uploaded as reference layers on the mobile device. *Tip: To select multiple layers, use either the <Ctrl> or <Shift> keys.*

NOTE: If during check out you want SDE layers to be used as reference layers on the mobile device, the Check Out tool appends "_reference" to the name of each SDE layer being check out.

14. Click **OK** to close the Check Out Options window, and initiate the Check Out.

Similar to the graphic below, the Check Out tool detects if the mobile device is connected.



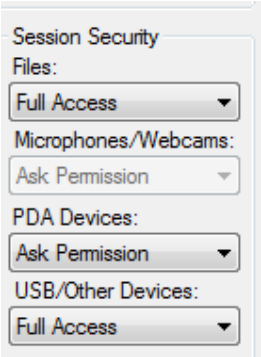
15. If the mobile device is detected, click **OK** to begin uploading data to the mobile device. *Otherwise, read the next WARNING.*

WARNING: If the message window indicates no mobile device detected (as in the graphic below), please read the following bulleted list of reasons as to why the mobile device is undetected:

- The mobile device is improperly connected to the computer. Check connections.
- The device is *not* in USB Mass Storage Mode. Use the device's S1USBToggle program to verify mode.
- You may intentionally have the mobile device disconnected because you want to create a local check out on your GPS workspace. For example, you may require a local checkout for use with Desktop ArcPad. Or, the mobile device may be in the field, and you need to have new checkouts ready for when it returns. *Note: If you are creating check-outs for multiple users, do NOT simply copy the same check-out folder to each user's workspace. You must create a new check-out for each mobile device.*
- The Citrix Client version 12.1 is *not* installed on your computer. To determine if the Citrix Client version 12.1 is installed on your computer, do one of the following:
  - **Windows XP** Click Start/Control Panel/Add or Remove Programs
  - **Windows 7** Click Start/Computer/Uninstall or Change a Program (near top of screen)
  - **Windows XP** Click "Citrix ICA Client," then click "Click here for support information." Note the version #.
  - **Windows 7** Verify that the Citrix online plug-in is in the list of programs and that its version number begins with 12.1 in the Version column to the right.
  - If you do not see the Citrix client in your list of programs or if it is the incorrect version, you have likely found the cause of your Citrix connection problem. You will need to have an IT administrator install the necessary plugin for you, which can be downloaded from: www.citrix.com/downloads/vdi-in-a-box/legacy-client-software/online-plug-in-for-windows-121.html

- Citrix Client's Session Security not configured properly. You must allow "Full Access" to "Files:" and to "USB/Other Devices:" in the Citrix Connection Center. To access the Citrix Connection Center (while in an active Citrix session), right click on the  icon in the lower right corner of your Windows system tray, then choose "Connection Center."

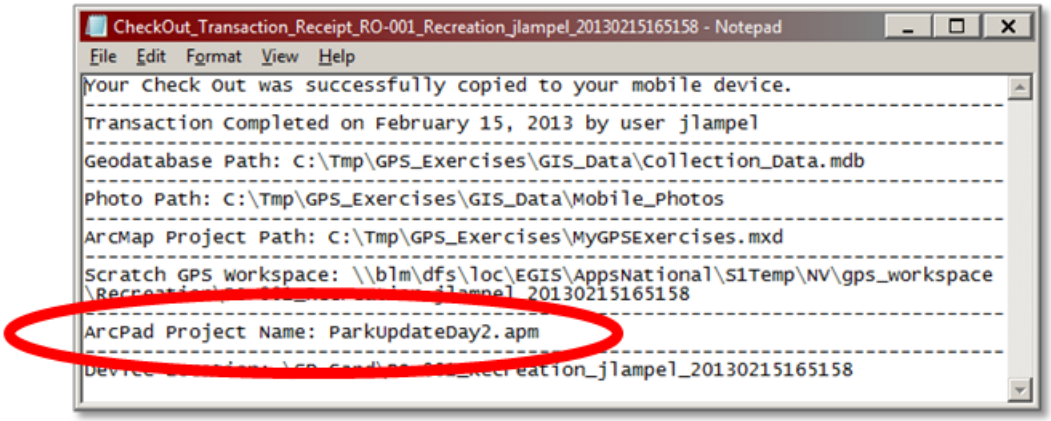
  Tip: Make sure your Citrix Session Security settings are set to match this. If changes need to be made you may need to make them, log out of Citrix completely, then log back into Citrix and then re-launch ArcMap in order for changes to take effect.



Depending upon the size of your check out, the extraction process can take several minutes. When the extraction is complete, a check-out transaction receipt is generated (see next graphic) listing the details of the check-out process. The receipt is a text file listing various paths and filenames involved in the check out.

Note: Check Out transaction receipts are saved to the S1 Working Directory's "discipline" folder (e.g., <your GPS workspace>/Archeology, <your GPS workspace>/Fire, <your GPS workspace>/Recreation, etc.). *You set your GPS workspace with the S1 Working Directory tool.* Linked photos (to collected features) are saved to the Mobile_Photos folder found at the same level as the local GDB. Or, for an SDE GDB, linked photos are saved to <your GPS workspace>/<discipline folder>/Mobile_Photos.

Tip: Make note of the ArcPad Project Name (apm) so that you know which map to open in ArcPad.



16. Close the transaction receipt, and disconnect your mobile device from the computer.
17. Optional: If you made further changes to the map document (e.g., change in map scale), you may want to save the MXD.

CHECK OUT OPTIONS WITH TRIMBLE POSITIONS

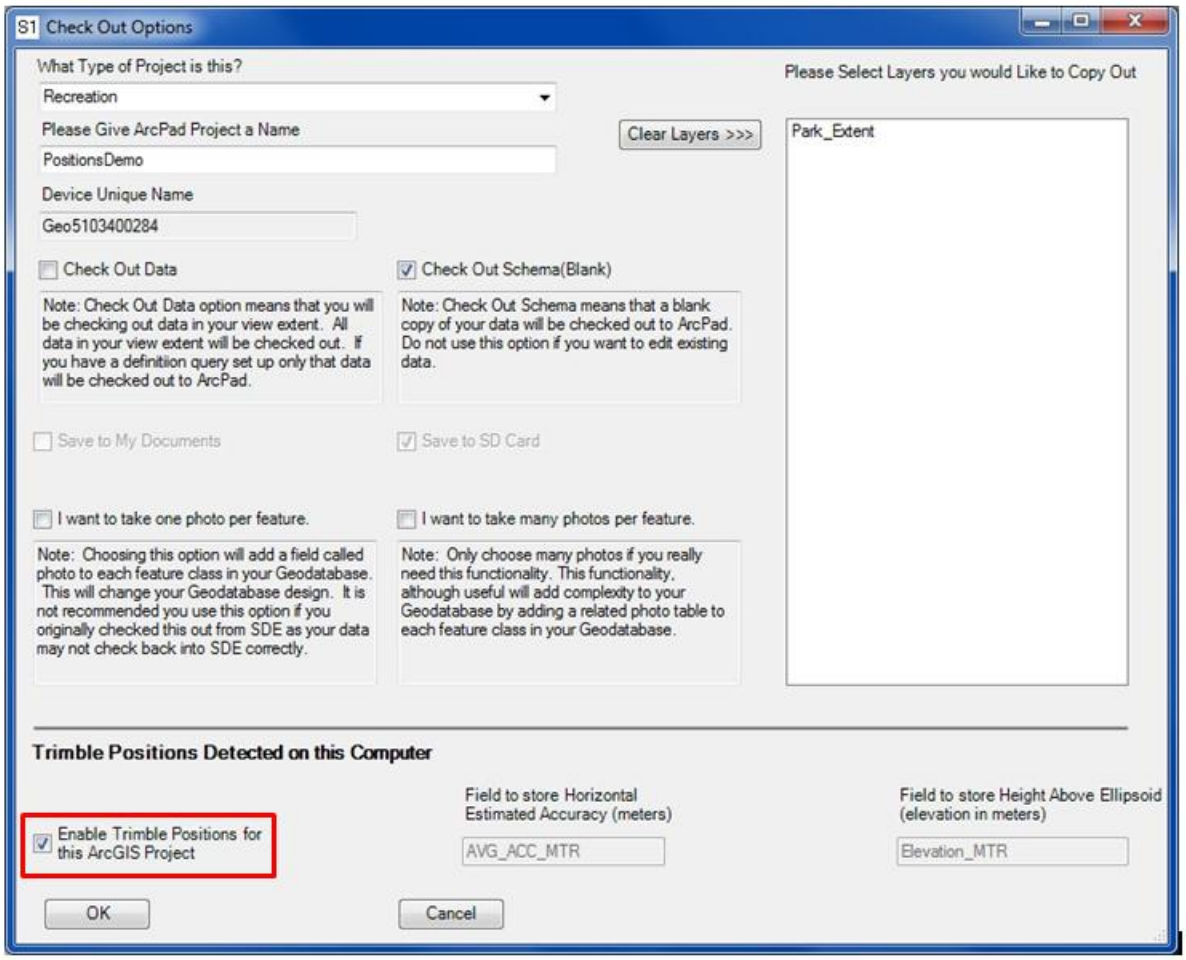
If you plan to use Trimble Positions to differentially correct collected data, you can use the S1-APDM to enable Trimble Positions as part of the S1-APDM Check Out process. The following list is the normal workflow for using Trimble Positions in conjunction with the S1-APDM:

1. In ArcMap, turn on the Trimble Positions Extension and Toolbar
2. Prepare data for Check Out
3. Use the S1-APDM to Check Out data/Enable Positions
4. Collect data in the field
5. Use the S1-APDM to Check In data from mobile device

NOTE: For details on how to use Trimble Positions to differentially correct collected data, please refer to documentation available from the SharePoint site *(ref. last section for URL)*/Trimble Positions.

Assuming you have already installed Trimble Positions with the S1 Auto Installer *(see the section in this document titled "Installing Trimble Positions Add-In")*, and also installed the Trimble Positions Extension for ArcPad for your mobile device *(ref. SharePoint*), you can use the S1-APDM Check Out tool to enable Trimble Positions for data collection.

To enable Trimble Positions, add a check mark at the bottom of the Check Out Options window (see next graphic).



With Trimble Positions enabled, two new "accuracy" attributes, AVG_ACC_MTR and Elevation_MTR, are added automatically as attributes to all spatial datasets involved in the Check Out.

IMPORTANT: Although Trimble Positions supports all Geodatabase formats such as Personal (*.mdb), File Geodatabase (*.gdb), or SDE, the Check Out process does *not* auto-create the necessary Trimble Positions attribute fields for a geodatabase Checked out directly from SDE, which prohibits Trimble Positions from differentially correcting data stored in SDE.

The Check Out process creates a Trimble Positions Project that is saved to the user's TP DB. So long as the TP Project remains associated to the current MXD, Trimble Positions remains enabled for each Check Out until the user deletes the Trimble Positions Project. Deleting a Trimble Positions Project is done through ArcMap/Trimble Positions Desktop Administrator/Projects.

CHECK IN FROM ARCPAD

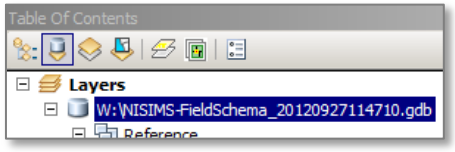
From a connected mobile device, the Check In tool ( ) transfers new and/or modified GIS features, attributes, and related photos back into the local GDB. The following types of GBDs are supported by the S1-APDM's Check In tool:

- File GDB
- Personal GDB
- Spatial Database Engine (SDE) – *from a user edit version, not from DEFAULT*

NOTE: If you are checking in GIS data to the local GDB created by the Download Schema from SDE tool (described in a previous section), remember that the local GDB is unregistered with no links to SDE.DEFAULT. After running the Check In tool, use the Upload Data to SDE Version tool (describe in a later section) to post your edits to SDE.DEFAULT.

This step demonstrates how to download field data from your mobile device back into a GDB or SDE version.

1. Start ArcMap, and open the map document you created during check-out.
2. In ArcMap's TOC, highlight the path to either your GDB or SDE edit version that you used for the check out. *Remember, you cannot check in data directly from the mobile device back to SDE.DEFAULT. First check in the data, then run the Upload Data to SDE Version tool (see next section).*

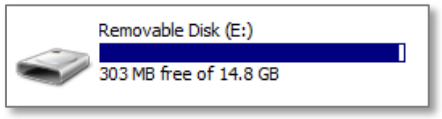


Note: Before connecting your mobile device (next step), confirm it is in USB Mass Storage Mode. This mode setting permits data transfer to/from the device's mass storage card. To confirm the device's mode, use the customized program called S1USBToggle (found under the mobile device's Programs). Whichever mode is "grayed out" is what the device is set to. For further assistance, talk with your local Mobile GIS Coordinator.

3. Connect the mobile device to a computer.

Tip: If you receive a message to "Scan and Fix" the connected device, click "Continue without scanning."

4. After the mobile device is successfully connected, confirm ArcPad is closed *(to avoid data corruption during check in)*.
5. Verify in Windows Explorer or My Computer that your mobile device is connected as a lettered drive *(your drive letter will vary from the graphic below)*.



6. Click the **Check In tool** on the S1-APDM toolbar.

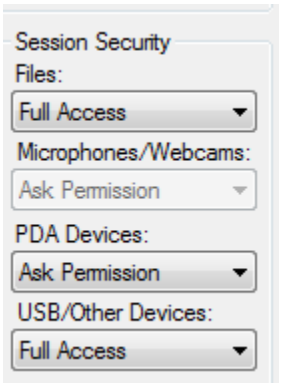
WARNING: If a message window opens (see next graphic) telling you that the mobile device is disconnected, you are asked to confirm whether or not you want to use a previously created Check Out folder for the check in process. For example, you might answer yes if you know other mobile devices still out-in-the field will also check in data to the same local GDB. *Note: Answering No cancels the Check In process.*

Other possibilities for an undetected mobile device: As with the Check Out process, the following bulleted list of reasons can result in the previous graphic of an undetected mobile device:

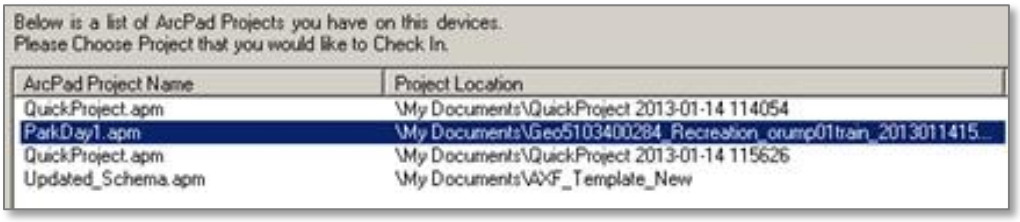
- The mobile device is improperly connected to the computer. Check connections.
- The device is *not* in USB Mass Storage Mode. Use the device's S1USBToggle program to verify mode.
- You may intentionally have the mobile device disconnected because you want to use a local check out on your computer. Answer No.
- The Citrix Client version 12.1 is *not* installed on your computer. To determine if the Citrix Client version 12.1 is installed on your computer, do one of the following:
  - **Windows XP** Click Start/Control Panel/Add or Remove Programs
  - **Windows 7** Click Start/Computer/Uninstall or Change a Program (near top of screen)
  - **Windows XP** Click "Citrix ICA Client," then click "Click here for support information." Note the version #.
  - **Windows 7** Verify that the Citrix online plug-in is in the list of programs and that its version number begins with 12.1 in the Version column to the right.
  - If you do not see the Citrix client in your list of programs or if it is the incorrect version, you have likely found the cause of your Citrix connection problem. You will need to have an IT administrator install the necessary plugin for you, which can be downloaded from: www.citrix.com/downloads/vdi-in-a-box/legacy-client-software/online-plug-in-for-windows-121.html
- Citrix Client's Session Security not configured properly. You must allow "Full Access" to "Files:" and to "USB/Other Devices:" in the Citrix Connection Center. To access the Citrix Connection Center (while in an active Citrix session), right click on the icon in the lower right corner of your Windows system tray, then choose "Connection Center."

  Tip: Make sure your Citrix Session Security settings are set to match the graphic below. If changes need to be made you may need to make them, log out of Citrix completely, then log back into Citrix and then re-

launch ArcMap in order for changes to take effect.



If the mobile device is detected, then, similar to the next graphic, a window opens asking you to select the ArcPad Project (apm) to check in.

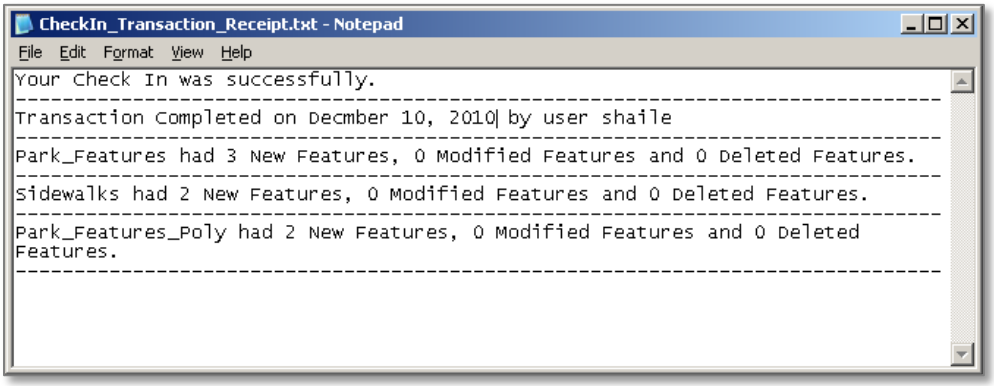


7. Click on the ArcPad .apm you would like to check in, then click **OK**.

Depending upon the size of the collected data, the check in process may take several minutes.

Note on auto-correction of geometry errors: As the data is transferred from the mobile device back to the computer, the Check In tool also verfies the geometry of the features being copied back into the GDB. For example, if a collected polygon contains gaps, slivers, and/or crossed polylines, the Check In tool automatically corrects any geometry errors. If you intend to submit your SDE edit version for posting back into SDE.DEFAULT, all geometry errors must be resolved. For further questions, regarding feature geometry errors, consult with your local GIS Coordinator.

At the end of the check in process, a transaction receipt opens (see next graphic) listing the number of new and/or modified features and collected photos that were checked in.



Note: Check In transaction receipts are saved to the S1 Working Directory's "discipline" folder (e.g., <your GPS workspace>/Archeology, <your GPS workspace>/Fire, <your GPS workspace>/Recreation, etc.). *You set your GPS workspace with the S1 Working Directory tool.* Linked photos (to collected features) are saved to the Mobile_Photos folder found at the same level as the local GDB. Or, for an SDE GDB, linked photos are saved to <your GPS workspace>/<discipline folder>/Mobile_Photos.

8. Close the Check In Transaction Receipt window.

Note #1: At this point, it is unnecessary to save ArcMap as the check in process made changes directly to the GDB or SDE version, and not to the map document.

Note #2: Once the Check In process is successfully completed, the Check Out folder on the mobile device is automatically deleted.

UPLOAD DATA TO SDE VERSION

The Upload Data to SDE Version tool ( ) appends checked in data (saved to the local GDB you created with the Download Schema from SDE tool) back to a SDE edit version. Then, your SDE edit version can be submitted for posting to SDE.DEFAULT by a SDE administrator.

The tool is intended for mobile devices that will be disconnected from the network for extended periods of time (e.g., the mobile device is out the entire field season).

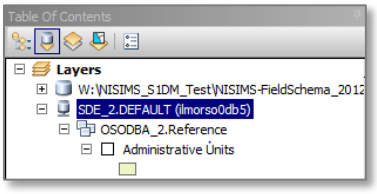
For example, after several months of using a local, disconnected GDB copy of your SDE edit version's schema, the mobile device is returned to office, and the collected data has been checked in to the local GDB. All that remains is to use this tool to get data back into a SDE edit version.

Notes on use:

- Before using this tool, you'll first need to run the Check In tool to transfer any collected data from the mobile device to a local GDB.
- Even after using the Check In tool to update the local GDB, the GDB still remains unregistered with no links to your SDE edit version until you use the Upload Data to SDE Version tool.
- In ArcMap's TOC, the tool looks for the highlighted pathname of the SDE. You can select either your SDE edit version or SDE.DEFAULT.

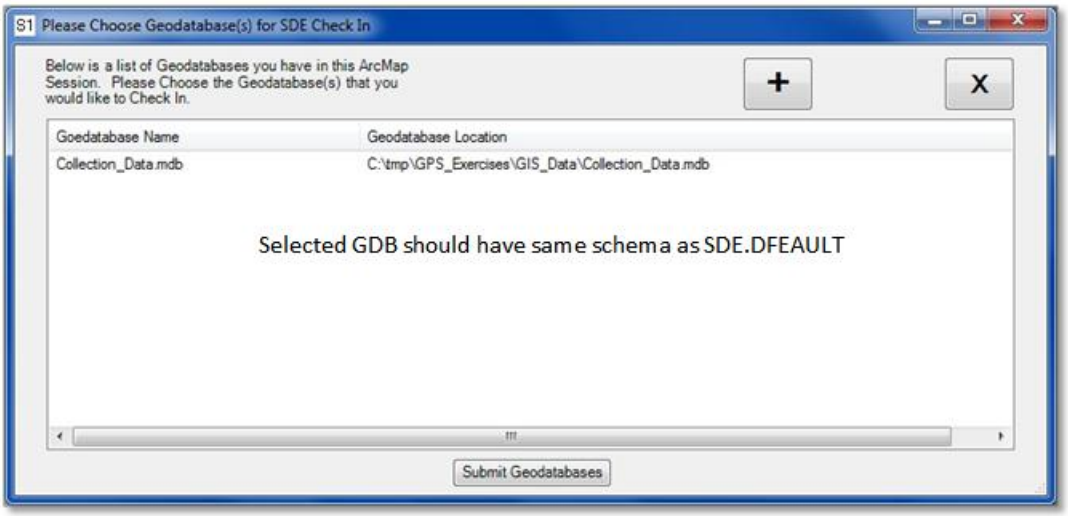
REMINDER: The Upload Data to SDE Version tool ( ) appends GIS data back to your SDE edit version for eventual posting to SDE.DEFAULT. The tool does *not* transfer data collected on a mobile device. *Refer to the previous section on using the Check In tool to transfer collected data from a mobile device.*

1. If not already listed in ArcMap's TOC, click the Add Data button (), navigate to either the SDE edit version or to SDE.DEFAULT you used for check out, and add the same feature classes and tables.
2. In the TOC, highlight the path of the SDE edit version or SDE.DEFAULT. *Tip: Click on the TOC's List by Source button.*



3. Click the Upload Data to SDE Version tool on the S1-APDM Toolbar.

Similar to the next graphic, a window titled "**Please Choose Geodatabase(s) for SDE Check In**" opens.



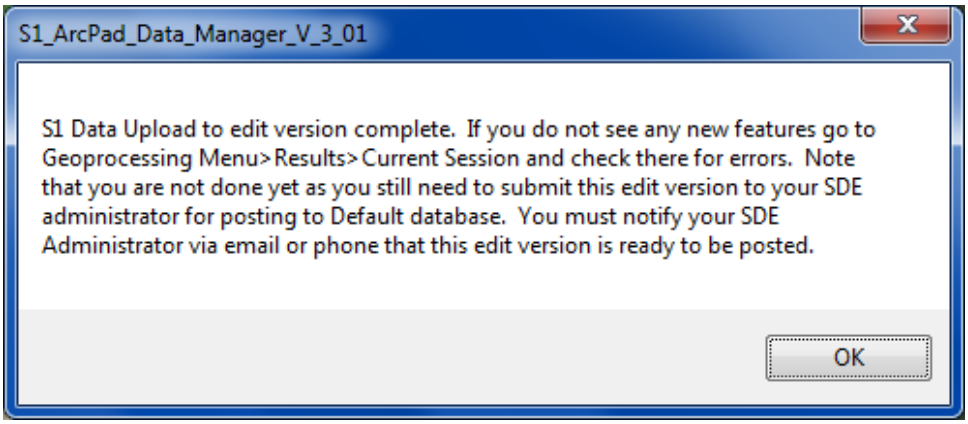
4. Select the name of the local GDB containing the features and attributes you checked in from the mobile device. Tip: You can also select multiple GDBs. If a GDB is not listed, click the plus (+) button, and browse for the GDB. You can click the minus (-) button to remove a selected GDBs from the list.

WARNING: If the schema of the selected local GDB is not identical to your SDE edit version (or SDE.DEFAULT), data will append only where schema formats are the same between the local GDB and your SDE edit version. Any unmatched values are dropped.

5. Click **Submit Geodatabases**.

PLEASE READ: The Upload Data to SDE Version process may take several minutes. *Take no action in ArcMap*, until the S1-APDM message window opens indicating the data has been transferred to your SDE edit version (see next graphic).

When your SDE edit version is finished updating, a message window (see next graphic) opens informing you to notify your SDE Administrator of your version changes, and that the SDE administrator can now proceed to post your edits back to SDE Default.



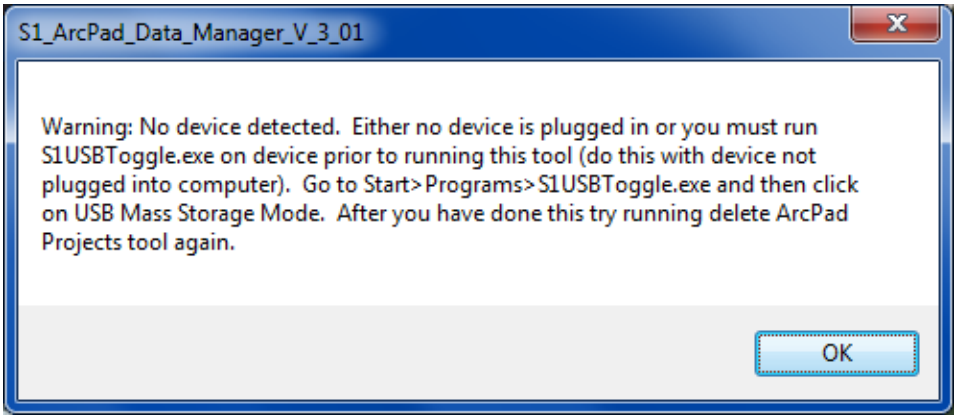
6. Click **OK**, and notify your SDE administrator that your edits can be posted to SDE.DEFAULT.

DELETE ARCPAD PROJECTS FROM GPS WORKSPACE AND MOBILE DEVICE

The "**Delete ArcPad Projects from GPS Workspace and Mobile Device**" tool lists all ArcPad Project Names (APMs) found in your GPS workspace, and reports their status (e.g., checked in, not checked in, unknown, etc.). From the list, you specify which APMs to delete. If the selected APMs are also found on the mass storage card (e.g., SD Card) on a connected mobile device, those same APMs are also deleted from the mobile device.

To rephrase: The tool only deletes those APMs off the mobile device's mass storage card that have identical names to APMs found in your GPS workspace. As part of the check-in process, a successfully checked in APM is automatically deleted from the mobile device, but the processed check in remains in your GPS Workspace until you use this tool to delete it.

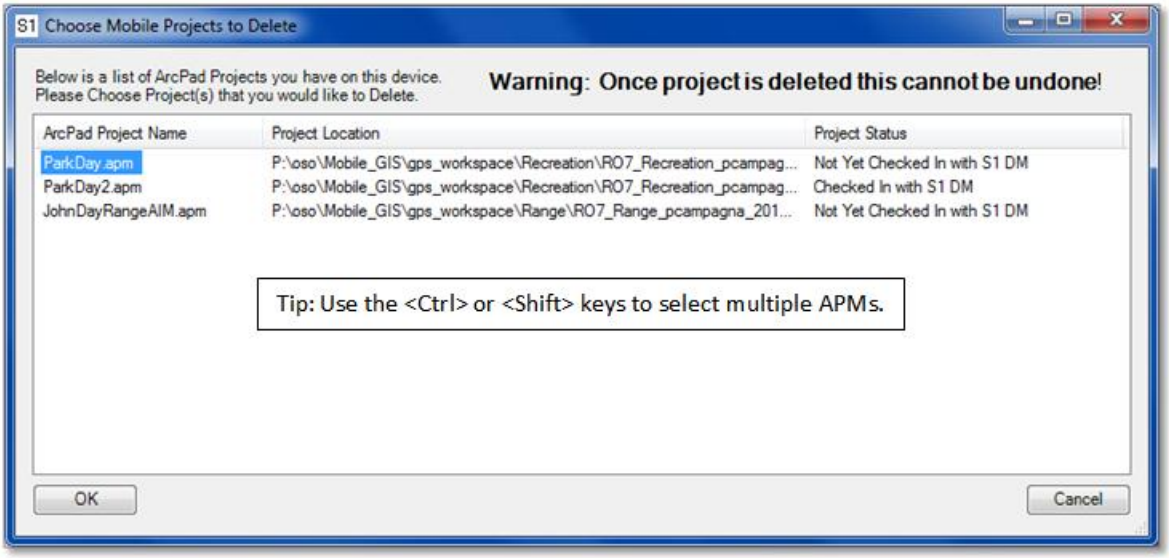
Note: A mobile device MUST be connected to your computer in order to run "**Delete ArcPad Projects from GPS Workspace and Mobile Device**" tool. If the "Delete ArcPad Projects from GPS Workspace and Mobile Device" tool does not detect a device, the following warning message opens:



Important: After the tool executes, all files and folders belonging to the selected APM are *permanently* deleted.

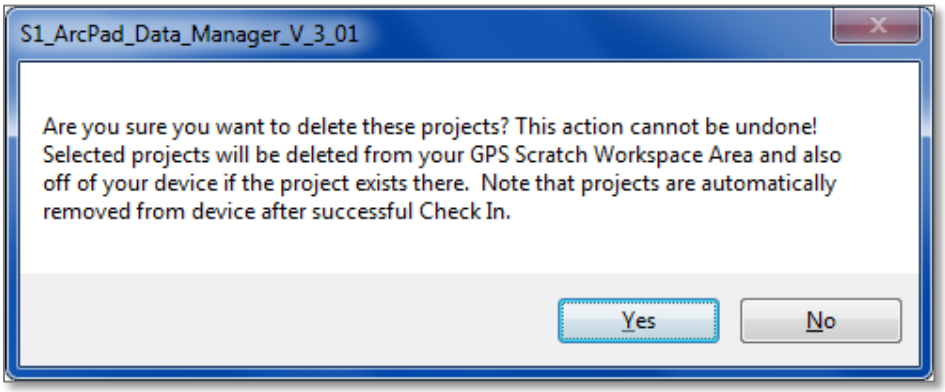
1. Optional: Connect your mobile device to your computer.
2. From the S1-APDM Toolbar, click "**Delete ArcPad Projects from GPS Workspace and Mobile Device**" tool.

Similar to the next graphic, a window opens asking you to choose those APMs found in your GPS workspace that you want to delete. In this example, the first APM listed is selected for deletion.



3. Click **OK**.

You are given a final chance to abort the deletion process.



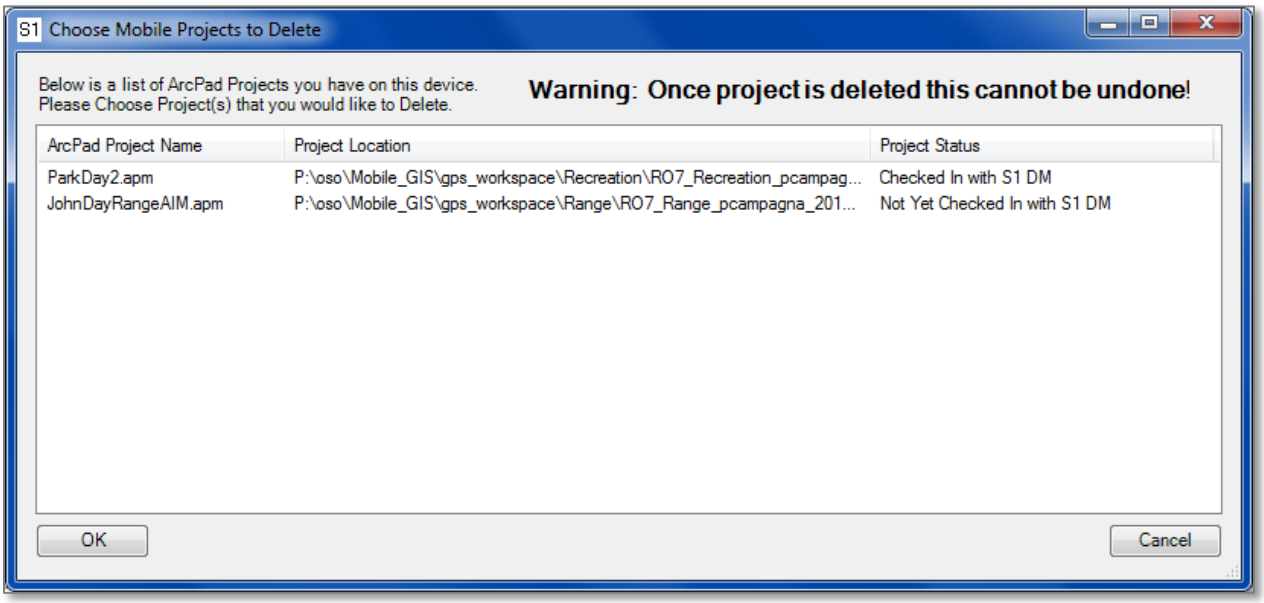
4. If you wish to proceed, click **Yes**.

If connected, the tool also looks at the GPS workspace on the mobile device's mass storage card, and deletes the same selected APMs from the mobile device.

When the deletion process is complete, you are returned to ArcMap.

Tip: If you need to confirm the deletion of selected APMs, re-click on the "Delete ArcPad Projects from GPS Workspace and Mobile Device" tool to re-display a revised list of APMs (if any) in your GPS workspace (see next

graphic).



Comments about the "Delete ArcPad Projects on Mobile Device" tool:

- Collected data already checked into a GDB are unaffected by this tool.
- As part of the Check In process, the APM used for check in is automatically deleted from the mobile device.
- The tool is intended to clean up your GPS workspace. Use it regularly. Removing old APMs eliminates the risk of checking in the data a second time and prevents users from collecting data using an APM that's already been checked in.
- If you receive an error message during the deletion process, and the tool aborts, try closing ArcMap, then re-open your map document, and attempt to delete the APMs a second time. Lock files are sometimes created by ArcGIS that prevent you from deleting certain files. Closing ArcMap and re-opening it will remove the lock files, and allow the data to be deleted.

COPY GEOTAGGED PHOTOS FROM MOBILE DEVICE

Geotagged photos are images embedded with XY coordinates (either geographic or projected). A geotagged photo is unassociated with any GIS feature (i.e., point, line, polygon). However, with the "Copy Geotagged Photos from Mobile Device" tool, geotagged photos can be copied from a mobile device connected to your computer, and saved to a user-specified directory (e.g., GPS workspace). Then, with the S1-APDM's "Geotagged Photos to Features" tool (discussed in a later section), the XY coordinates of the geotagged photos can be used to create point features in ArcMap.

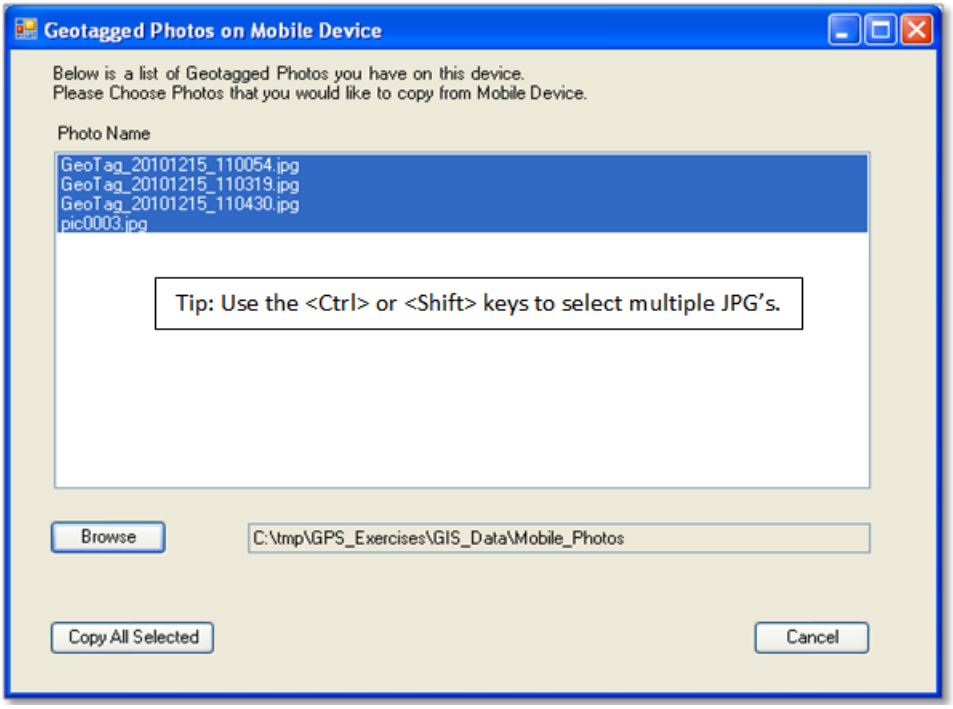
1. Connect your mobile device.
2. From the S1-APDM Toolbar, click the "**Copy Geotagged Photos from Mobile Device**" tool.

Similar to the next graphic, a window opens listing those JPEG (a.k.a., jpg) images found on your mobile device.

NOTE: The tool only looks for JPEG images. Any other image formats are ignored.

3. Click the Browse button, and navigate to a folder location either on your computer or on the network (e.g., your GPS workspace/Mobile_Photos folder)
4. From the list of photos, select the ones you want to download onto your computer.

In this example, all JPEG images on the mobile device have been selected to be copied to the local GPS workspace.



5. Click "**Copy All Selected**".

A message reports the successful copying of the geotagged images.

6. Click **OK**.

You are returned to ArcMap.

Tip: You can use Windows Explorer to confirm that the selected photos were successfully copied and downloaded to the directory you specified.

Comments about the "Copy Geotagged Photos from Mobile Device" tool:

- It is possible to copy images from a digital camera or other mobile device (e.g., smart phone) provided the images are embedded with valid XY coordinates, and you have permission and/or authorization to connect your device to an agency computer.
- The tool only copies JPEG (*.jpg) photos.
- The tool does **not** delete the original photos from the mobile device. Refer to the next section on deleting photos from the mobile device.

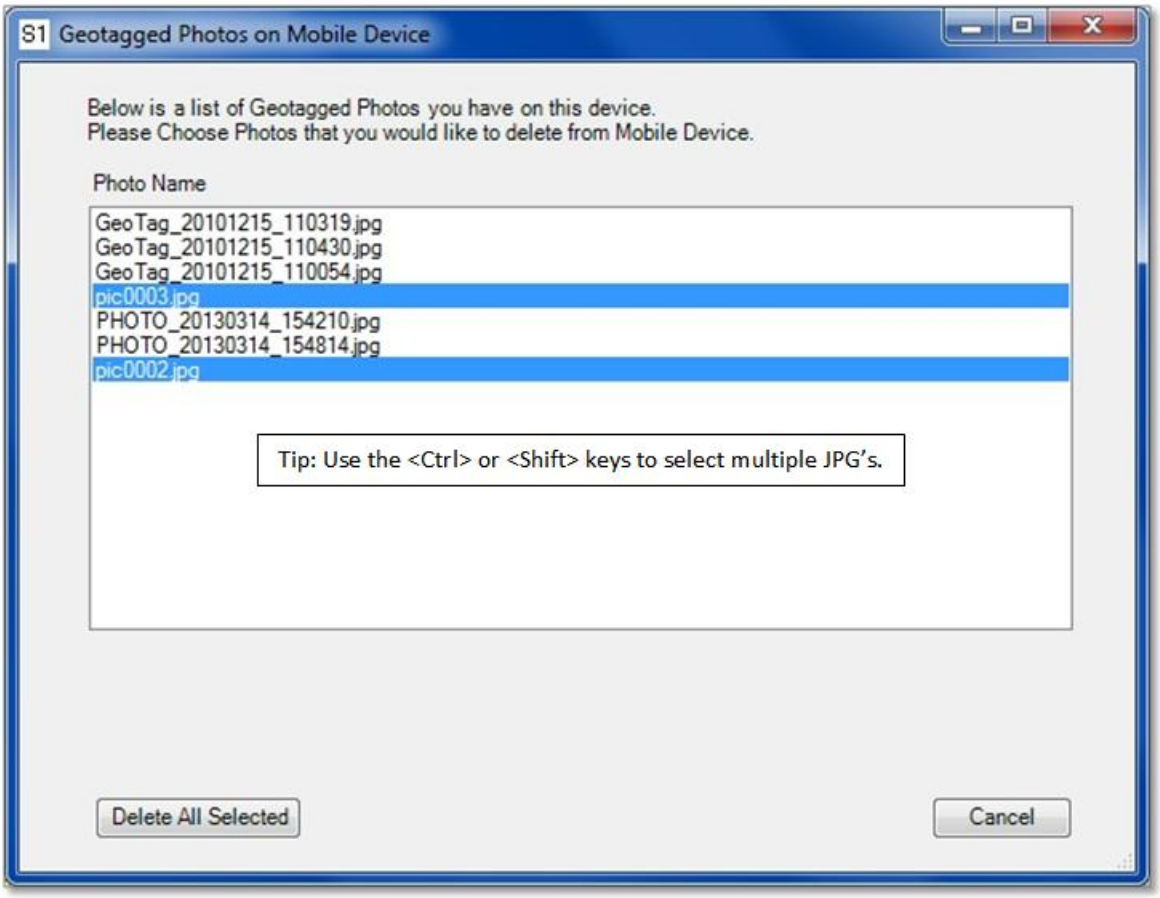
DELETE SELECTED GEOTAGGED PHOTOS FROM MOBILE DEVICE

If your mobile device is in USB Mass Storage Mode, then the "Delete Selected Geotagged Photos from Mobile Device" tool references the My Pictures folder on the mass storage card (e.g., SD Card). Otherwise, the tool references the My Documents\My Pictures folder on the connected mobile device. The tool lists all geotagged photos in the My Pictures folder, and allows you to select one or more photos for permanent deletion from the mobile device.

Note: The tool only lists JPEG images.

1. Connect your mobile device.
2. From the S1-APDM Toolbar, click "**Delete Geotagged Photos from Mobile Device**" tool.

Similar to the next graphic, a window opens asking you to select those geotagged photos found on your mobile device that you want deleted. In this example, two photos are selected for deletion.



WARNING: This tool *permanently* deletes the selected photos off the mobile device.

3. Click **Delete All Selected**.

Tip: If you need to confirm the deletion of the selected geotagged photos, re-click on the "Delete Geotagged Photos from Mobile Device" tool to re-display a revised list of photos (if any) on the connected device.

GPS PHOTO VIEWER

The GPS Photo Viewer tool allows you to view feature-linked photos. During the Check In process, any feature-linked photos taken with the mobile device are copied to your GPS workspace into a folder called Mobile_Photos, which resides in the same directory as the local GDB. Pathnames of the copied photos will be assigned as hyperlinks to their respective associated (i.e., linked) features.

WHAT'S NEW IN THE GPS PHOTO VIEWER

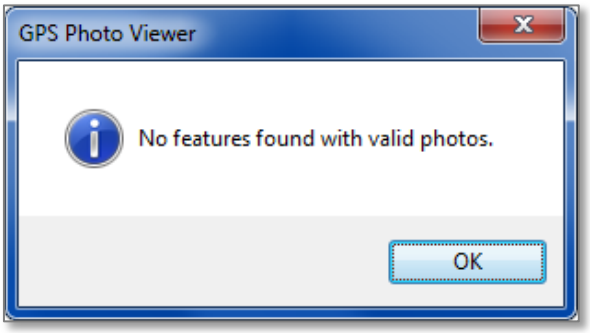
- Streamlined interface window
- Displays only those photos linked to features
- Print photo capability
- Canned map layout (complete with photo, map features, title, legend, north arrow, etc.)
- Export photo with XY watermark

HOW TO USE THE GPS PHOTO VIEWER

1. Launch ArcMap, and display those layers whose features have linked photos.
2. On the S1_APDM toolbar, click on the GPS Photo Viewer tool.

In ArcMap's Data View, the mouse cursor is a pointing arrow with a miniature camera icon attached to it.

3. In the Data View, click on a feature. *Note: If the feature has no hyperlinked photos, the following message appears:*



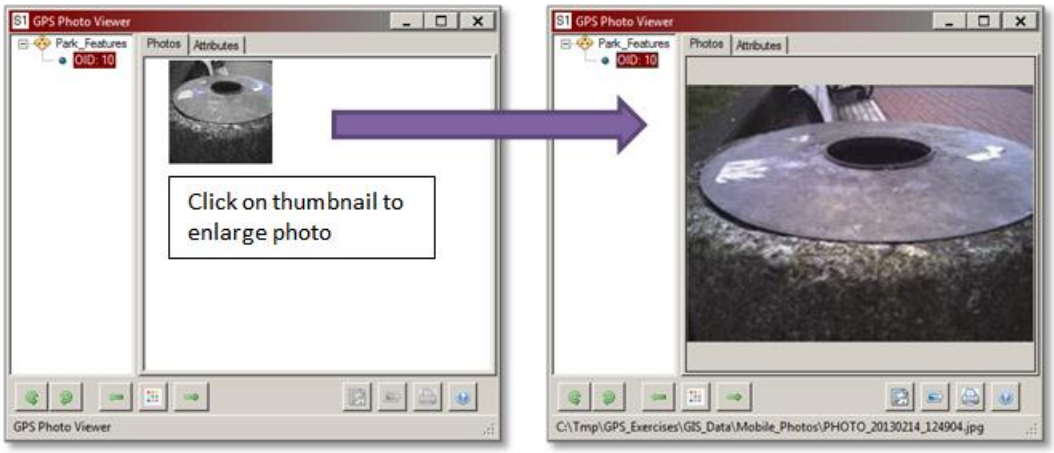
If the feature of interest has one or more hyperlinked photos, the GPS Photo Viewer opens.

As in the next two graphics, the GPS Photo Viewer window is divided into two screens, with one screen listing any Object Identifiers (OIDs) for those features with linked photos.

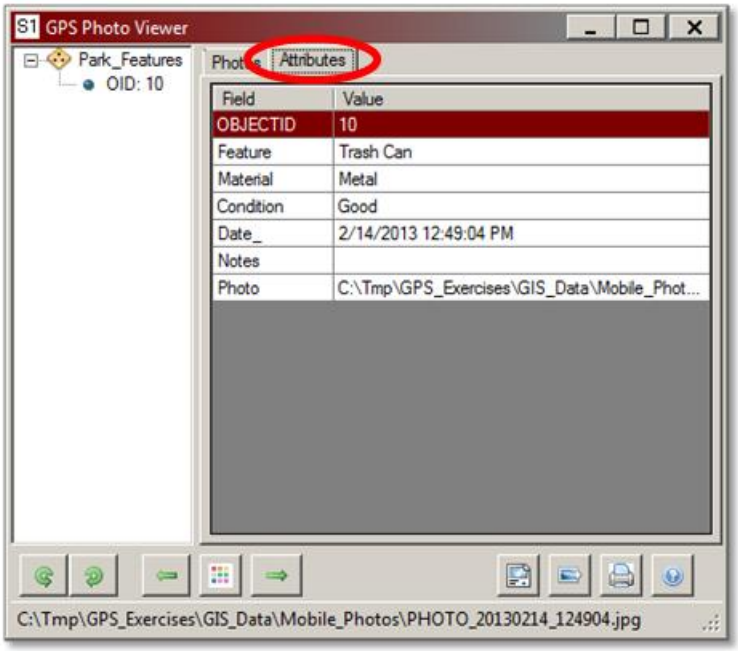
Each OID pertains to a single feature in the map, and each feature may contain one or more photos (assuming "Take Many Photos per Feature" was enabled in the Check Out Options). Selecting a listed OID displays thumbnails of all photos associated with that feature.

Once an OID is selected, the second screen in the GPS Photo Viewer displays the linked thumbnail images. This screen can also display a larger image of a user-specified thumbnail, or display the selected photo's attributes (e.g., file pathname).

4. Select an OID to display thumbnails of linked photos.
5. Single click on a thumbnail to see an enlarged photo.



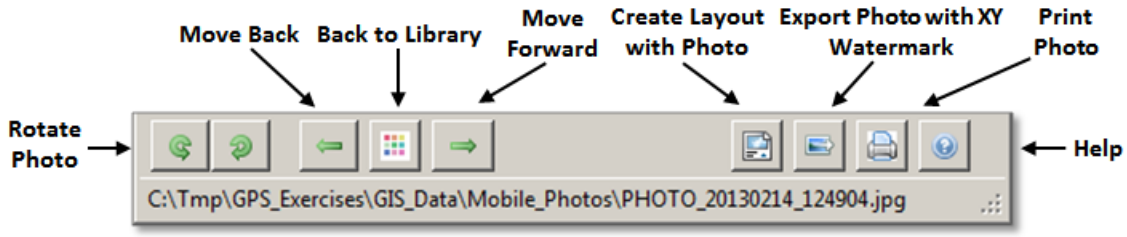
6. With the full-sized image displayed, click the **Attributes tab** to display the photo's attributes table.
Important: *You can only display a photo's attributes for a full-sized photo; not for a thumbnail.*



7. When done using the GPS Photo Viewer, click the **X** button in upper right to close the window.

ADDITIONAL GPS PHOTO VIEWER FUNCTIONS

At the bottom of the GPS Photo Viewer window are buttons that provide additional options for manipulating single full-sized photos (see next graphic).



- Rotate Photo

  A full-sized photo can be rotated clockwise or counter clockwise using the Rotate Left or Rotate Right arrows, respectively.

  Tip: To return to the view of thumbnail images, click on the Back to Library button (the multi-colored icon between the Move Back/Forward arrows).

- Flip through Photos and Return to Thumbnail Images

  When multiple photos are linked to a single feature (i.e., a many-to-one relationship), you can flip through the full-sized photos of the selected feature by clicking either the Move Back or Move Forward arrows.

  Tip: To return to the view of thumbnail images, click on the Back to Library button.

- Create Layout with Photo

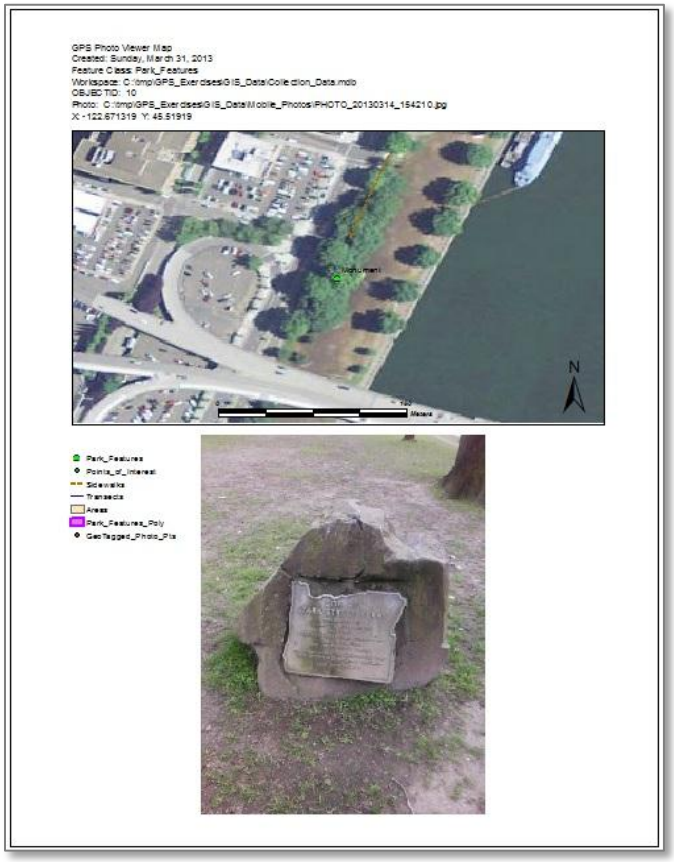
  For a full-sized image in the GPS Photo Viewer, clicking on the “Create layout with photo” button on the GPS Photo Viewer takes the current map extent, visible layers, and the selected image to create a basic map Layout in ArcMap with essential map elements such as a title, North arrow, legend, etc. The next graphic is a sample map

layout created after clicking the "**Create layout with photo**" button.

Tip #1: Any map element can still be moved, resized, or otherwise modified.

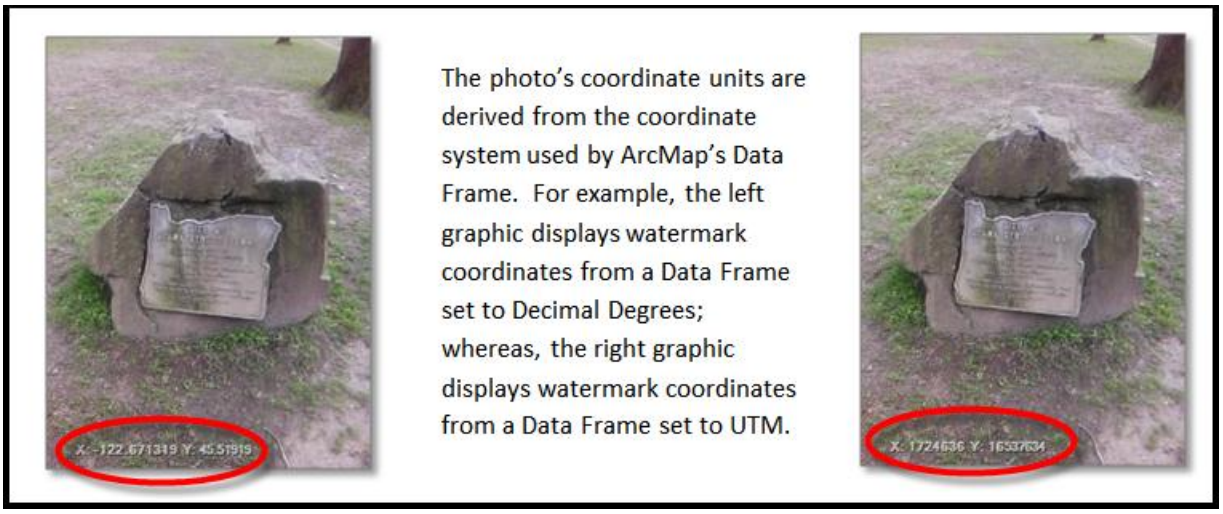
Tip #2: The layout can be printed, or exported to a PDF or image file.

Tip #3: Saving the map document also saves the map layout.



- Export Photo with XY Watermark

  A full-sized image can be exported as a new JPEG image file at a user-specified file location. Embedded on the new image is a watermark of the photo's geographic coordinates.



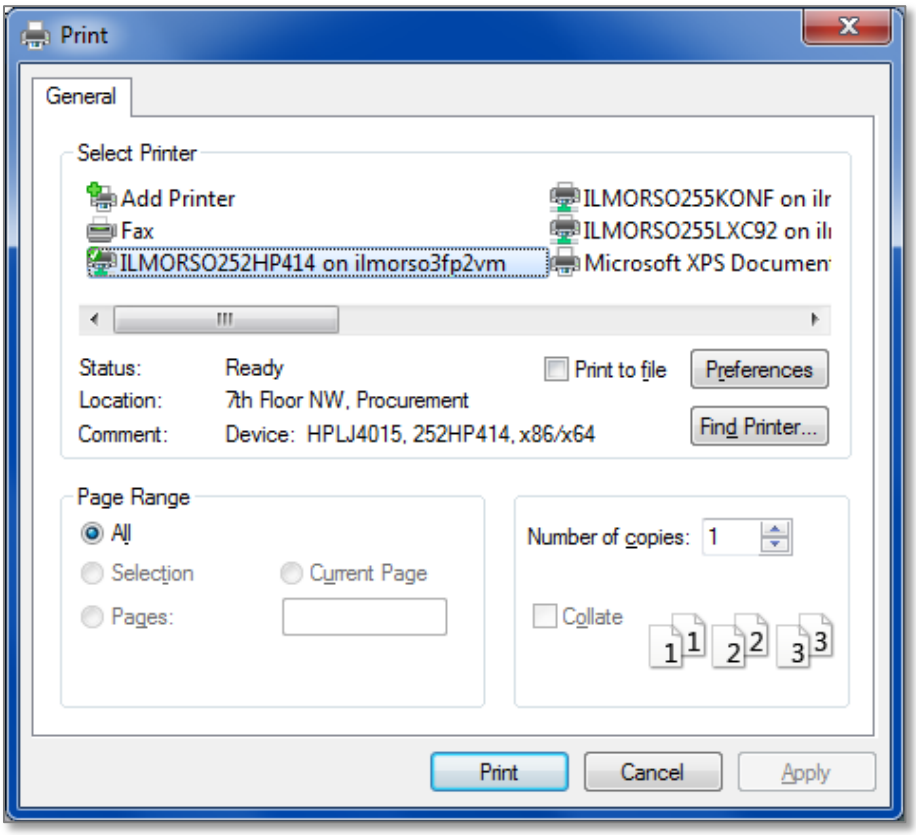
Tip: There are several options for changing ArcMap's Data Frame coordinate system:

a. In the TOC, right click on the word Layers/Properties/Coordinate System tab.
b. With a standard ArcMap tool active (e.g., Select Features), right click in the Data View/ Data Frame Properties/Coordinate System tab.
c. From the View menu/Data Frame Properties/Coordinate System tab.

For further assistance, contact your local Mobile GIS Coordinator.

- Print Photo

Clicking the Print Photo tool opens your computer's Print window where printing/plotting capabilities are limited only by the printers and plotter you have access to.

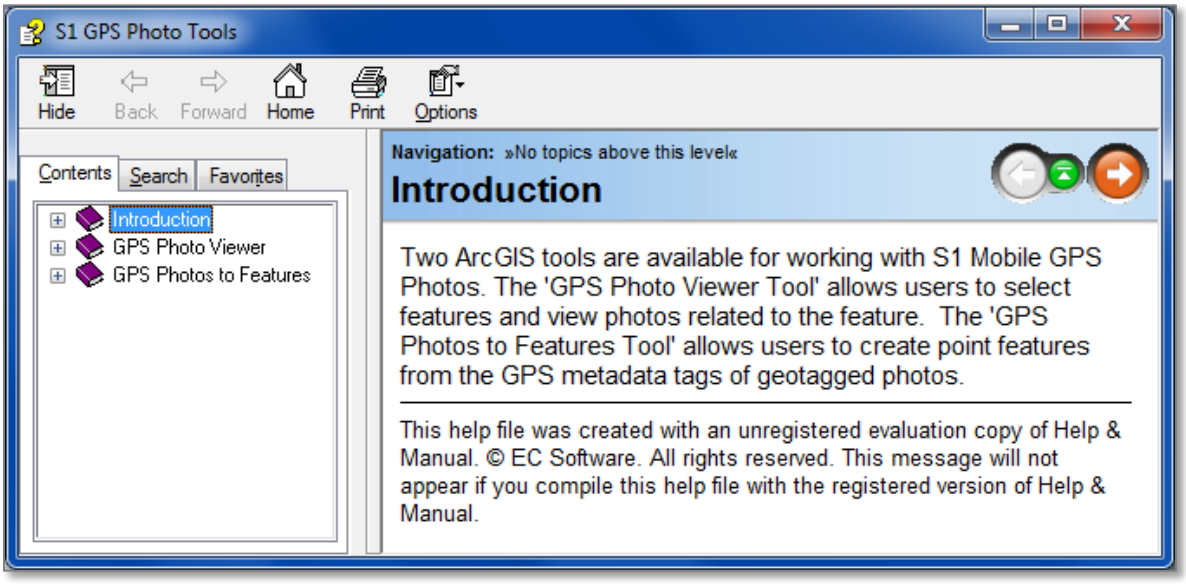


Note: The Print Photo tool only sends the image to the printer (e.g., no watermarks, map elements, etc.).

- To print a photo with the watermark, use Windows Explorer to navigate to the directory containing the photo (e.g., <your GPS workspace>\Mobile_Photos\<XY_photo>.jpg). Right click on the file, and choose Print. To modify the photo before printing (e.g., crop, rotate, etc.), right click the photo, and choose Preview. Alternatively, open the photo in a graphic editor such as Paint or Adobe Photoshop.
- To print a map layout with the photo, use ArcMap's Print command (File menu/Print).

- Help

As in the next graphic, clicking the Help tool opens a separate ArcGIS-based, Help window. The Help content is specific to the S1 GPS Photo Tools (e.g., the GPS Photo Viewer).



How to use: In the Help window, you can …

- Click on a topic to display specific content (e.g., text about the GPS Photo Viewer tool)
- Type in a keyword (e.g., viewer) to search for in all topics
- Read through all content pages using the window's navigation tools

When finished with the Help window, click the window's close button (**x**).

GPS PHOTOS TO FEATURES

Based on a user-specified file location, the "GPS Photos to Features" tool references the XY coordinates embedded in geotagged photos that have been copied from your mobile device to your GPS workspace. The photo's XY coordinates are used to create point features that are stored in a user-specified GDB.

FUNCTIONS OF THE GPS PHOTOS TO FEATURES TOOL

- User specifies input folder containing geotagged photos
- Optional functionality to filter photo files by prefix (e.g., find only those photos with prefix GeoTag)
- User specifies if photo points will be stored to a new or existing GDB
- User specifies if photo points output to a new or existing point feature class

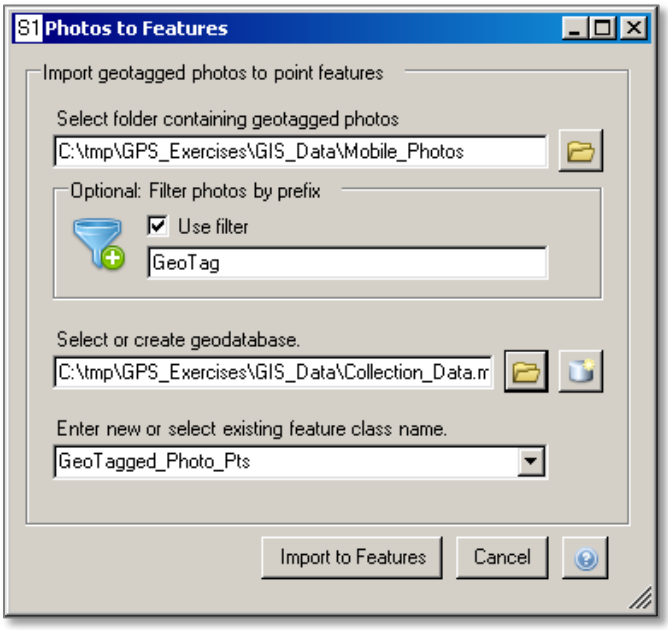
HOW TO USE THE GPS PHOTOS TO FEATURES TOOL

1. Launch ArcMap. *It can be helpful to display the area of interest where the geotagged photos were taken.*

NOTE: The following steps assume that geotagged photos have already been copied from your mobile device to your GPS workspace. For further details, reference the "Copy Geotagged Photos from Mobile Device" tool, which is described earlier in this user guide.

2. On the S1_APDM, click on the **GPS Photos to Feature** tool.

As in the next graphic, the Photo to Features window opens. Start at the top of the window, and work your way down as you complete the required fields of directory input, GDB output, and the name of the new or existing point feature class. Note: Providing a photo-filter prefix is optional *(explained in detail on the next page).*



The user specifies the input location of the geotagged photos (). The tool looks for JPEG image files that are imbedded with valid XY coordinates.

Can I show point locations from photos taken from my smart phone or digital camera? Yes. Any JPEG photo with imbedded XY coordinates can be downloaded to your GPS workspace.

Benefits of using a photo-filter prefix: If you took geotagged photos from a mobile device using the S1 Toolbar, the JPEG filenames are automatically prefixed with "GeoTag." For example, if you took a few hundred photos on your mobile device—some using the S1 Toolbar, and other photos without using the S1 Toolbar—your mobile device will have a mix of different photo filenames. The Photos to Features window can be set to create photo points from those photos with a user-specified prefix (e.g., GeoTag) in each photo's filename.

For the output GDB, photo points can be stored in an existing GDB (), or in a new File or Personal GDB ().

You must also specify the name of the point feature class that will represent and store the photo points. The feature class can be a new or an existing dataset—as long as the dataset is a *point* feature class.

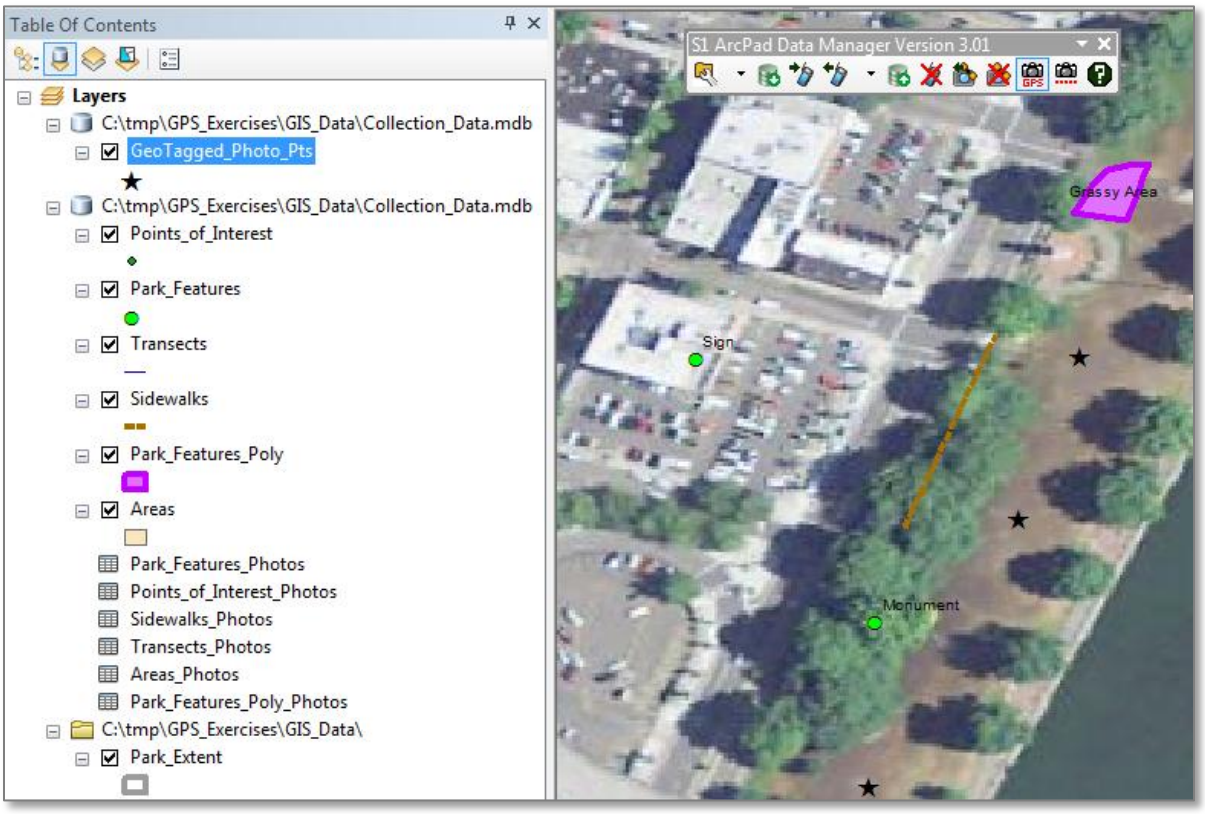
3. When you've completed the Photos to Features window, click the **Import to Features** button.

A window opens summarizing the success or failure in importing photos, and linking them to GIS points.

4. When ready, close the Summary Report window.

If you specified the creation of a new feature class, then a new photo-points layer is added to ArcMap's TOC (see next graphic). As needed, change the symbology of the layer to improve the visibility of the points. In ArcMap's Data View, new points are drawn on the map. If you don't see the photo points, try zooming to the extent of the photo-points layer (right click on the layer's name/Zoom To Layer). The next graphic is an example of ArcMap's Data View with the photo points symbolized as black stars.

CAUTION: Although rare in occurrence, nothing prevents you from capturing multiple geotagged photos at the exact same XY location. Regardless, the "GPS Photos to Features" tool creates one point feature for each geotagged photo. Therefore, it is possible to have stacked photo points (one on top of the other), which in ArcMap may appear as a single point on the map. If you select the stacked points in ArcMap, and open the layer's attribute table, you can 1) find out how many photo points are stacked at that location, and 2) highlight a specific record, and use the value in the "Photo" field to determine the photo filename used to create the highlighted photo point. For further assistance, consult with your local Mobile GIS Coordinator.

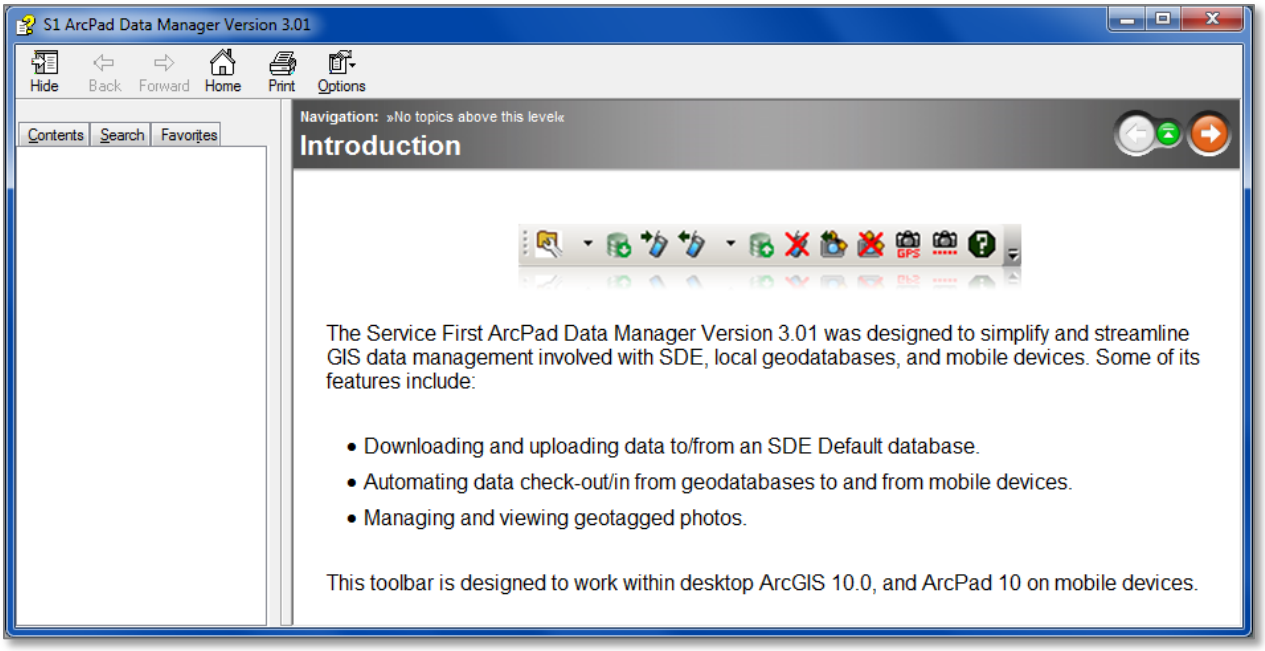


5. With the GPS Photo Viewer tool ( ), click on a photo point to view the photo linked to the point.

NOTE: For details on using the GPS Photo Viewer, reference the "GPS Photo Viewer" tool, which is described earlier in this user guide

ABOUT S1 ARCPAD DATA MANAGER

As in the next graphic, clicking the **"About S1 ArcPad Data Manager"** tool opens a separate information window (that's similar to a standard Help window). The window's content is an overview of S1_APDM and its functions.



How to use: Activate the Contents tab to list the "About S1-APDM" topics. To read through the Help window's content, use the window's navigation tools to scroll through the "About" pages.

When finished reading about the S1-APDM, click the window's close button (**x**).

ADVANCED TOPICS FOR MOBILE GIS USERS

This section provides useful information intended for experienced mobile GIS users.

CUSTOMIZING ARCPAD DATA COLLECTION FORMS

The customized forms used in ArcPad for data collection are defined by a single file called an ArcPad Exchange File, or AXF for short. An AXF is a relational database automatically created during the Check Out process and copied to your mobile device.

An AXF can contain any of the following:

- Feature Layer: Similar to an ArcMap layer file, a Feature Layer contains information on how to represent feature data in ArcPad such as symbology.
- Feature Table: Similar to a shapefile, a Feature Table stores both geometry and attributes data of a GIS dataset. A Feature Table also stores projection and metadata information.
- Data Table: A Data Table is a stand-alone table with no spatial component. Examples include related tables and coded value domains.
- AXF external files (e.g., scripts)
- AXF properties (e.g., date and time AXF was created)
- Customizations for each Feature Layer
- Coordinate system metadata
- Spatial and attribute indexes, which are automatically maintained
- Icons for Feature Layers
- Data rules (which are defined from the Check Out GDB) such as subtypes, coded value domains, and range domains
- Relationships between feature tables and data tables

Note: Because an AXF is a Microsoft SQL Server Compact Edition relational database, the Microsoft SQL Server Compact Edition runtime must be installed on your mobile device in order for ArcPad to recognize and use an AXF. Windows Mobile version 6.0 and above have this functionality included as part of their OS. The runtime is automatically installed together with ArcPad on your computer.

BEHIND THE SCENES OF AXF CREATION

From ArcMap, clicking the Check Out button on the S1-APDM automatically creates the AXF and stores is it in the user's Check Out directory (found under the GPS Workspace).

During the Check Out process, the properties of the source GDB will be used to define the AXF. For example, the Check Out tool automatically reads the GDB schema, including relationship classes, and uses the schema to construct the AXF used by ArcPad. Depending upon the agency's discipline (i.e., the user-defined project such as Archeology, Fire, Range, etc.), the AXF created during Check Out is customized with data input forms appropriate for the project's data collection.

Once created, an AXF's structure *cannot* be changed (i.e., added, modified, or deleted). For example, say you add a new attribute field to the source GDB with the intention of displaying the new field on your data collection form. Despite the modification to the GDB, the AXF remains unchanged. You would need to run a new Check Out in order to create a new AXF for your mobile device.

Warning: Changes to the source GDB (e.g., a feature class is added to the GDB) causes Check In problems because of the data mismatch between the AXF and the source GDB. After creating an AXF, *avoid changing the source GDB's schema*.

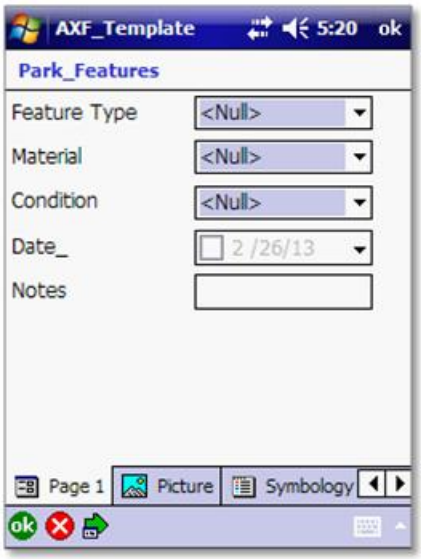
CUSTOMIZING AN AXF

It is possible to view and edit the contents of an AXF in ArcPad or ArcPad Studio. For example, in ArcPad, you can add and remove Feature Layers. Note: Related tables are only visible in ArcPad when you select a feature from a Feature Layer that has an associated related table.

In ArcPad Studio, you can view the contents of an AXF and customize layer icons, symbology, labeling, scripting, and forms. Examples of form customizations include any of the following:

- Expansion of controls
- Setting of default values
- Activation/deactivation of fields
- Placement of controls and fields into logical groups
- Addition or removal of pages
- Assignment of labels to pages
- Setting of standard layer symbology
- Embedding of code into forms

ORIGINAL (DEFAULT) FORM



CUSTOMIZED FORM

Important considerations before customizing an AXF:

- Using a customized AXF requires ArcPad 10.0 SP1 or higher, the S1 Toolbar ver. 3.3 or higher, and the S1-APDM ver. 3.01 or higher. Note: ArcPad Studio comes with Desktop ArcPad.
- Determine whether or not you are customizing an AXF linked to a File or Personal GDB, or linked to an SDE Version. The remainder of this section provides two sets of instructions for customizing an AXF based on its link to the source GDB.
- For customizing an AXF linked to a File or Personal GDB, customize an *AXF template* (i.e., a copy of the original AXF). Before creating an AXF template, first add *all* layers of the source GDB's to ArcMap before running the Check Out that creates the AXF you will use for your template.
- Do NOT delete/turn off fields from the source GDB that are referenced by your AXF template.

CUSTOMIZING AN AXF LINKED TO A FILE OR PERSONAL GDB

For customizing an AXF linked to an SDE Version, you won't be modifying an AXF template. Instead, you'll modify a copy of the temporary AXF created from the Check Out process.

1. Launch ArcMap, and set your S1 Working Directory (a.k.a., GPS Workspace).
2. For the user-selected GDB, add *all* its layers to ArcMap's TOC. Then, run a normal Check Out using the S1-APDM. *This process creates an AXF that you will use as a template for customization.* Note: For SDE Check Outs, first click the "Download Schema from SDE.DEFAULT" button on the S1-APDM Toolbar to create either a local File or Personal Geodatabase, and then follow the appropriate naming convention for the AXF template (see next step).
3. After Check Out is successfully completed, copy the AXF from the Check Out folder, and paste the file into the AXF_Templates folder located in your GPS Workspace. **Important:** For the AXF template, use the same name as the original AXF. An AXF uses a specific naming convention that is nearly identical to the source GDB. For example, if the Check Out GDB is a Personal Geodatabase (mdb) called *Collections.mdb*, then the AXF is called *Collections_mdb.axf*. Or, if the Check Out is a File Geodatabase (gdb), *Collections.gdb* becomes *Collections_gdb.axf*.
4. Since you will no longer need it (and it may be confused with other Check Outs), delete the original Check Out folder.
5. Launch ArcPad Studio, and open the AXF template from the AXF_Templates folder. *For details on how to use ArcPad Studio, refer to the software's Help.*
6. When done with your customizations, save the modified AXF, and exit ArcPad Studio.
7. Create a new Check Out from the same GDB in the usual manner, and your mobile device's data-collection forms will match those of the customized AXF.

CUSTOMIZING AN AXF LINKED TO AN SDE VERSION HOSTED BY ORACLE SERVER

1. Launch ArcMap, and set your S1 Working Directory (a.k.a., GPS Workspace).
2. For the user-selected SDE Version, add *all* its layers to ArcMap's TOC. Then, run a normal Check Out using the S1-APDM.

3. After Check Out is successfully completed, make note of the "Scratch GPS Workspace" in the "Check Out Transaction Receipt" window.
4. Copy the AXF from the "Scratch GPS Workspace" checkout folder, and paste the file into the AXF_Templates folder located in your GPS Workspace. The rest of the contents of that "Scratch GPS Workspace" folder can be deleted.
5. Rename the AXF to match this naming convention: sdeoracle$*<SDE Instance name>*

Important: The naming convention of the copy AXF must match: sdeoracle$*<SDE Instance name>*. The SDE Instance is determined through the Connection Properties of the SDE (In ArcCatalog, you can right click on the SDE/Connection Properties…). For example, if the SDE Instance is sde:oracle11g:orsodev, then the temporary AXF will be called sdeoracle$ sdeoracle11gorsodev. **Note:** With the exception of the dollar sign ($), do not use special characters in the AXF name. Remove any ":" or "/" or "\"

6. Launch ArcPad Studio, and open the renamed AXF. *For details on how to use ArcPad Studio, refer to the software's Help.*
7. When done with your customizations, save the modified AXF, and exit ArcPad Studio.
8. Create a new Check Out from the same SDE Version in the usual manner, and your mobile device's data-collection forms will match those of the customized AXF.

CUSTOMIZING AN AXF LINKED TO AN SDE VERSION HOSTED BY MS SQL SERVER

For customizing an AXF linked to an SDE Version, you won't be modifying an AXF template. Instead, you'll modify a copy of the temporary AXF created from the Check Out process.

Important: In order to customize an AXF file linked to SDE Version hosted by an MS SQL Server, *you must be the database owner of the Version*.

1. Launch ArcMap, and set your S1 Working Directory (a.k.a., GPS Workspace).
2. For the user-selected SDE Version, add *all* its layers to ArcMap's TOC. Then, run a normal Check Out using the S1-APDM.
3. After Check Out is successfully completed, make note of the "Scratch GPS Workspace" in the "Check Out Transaction Receipt" window.
4. Copy the AXF from the "Scratch GPS Workspace" checkout folder, and paste the file into the AXF_Templates folder located in your GPS Workspace. The rest of the contents of that "Scratch GPS Workspace" folder can be deleted.
5. Rename the AXF to match this naming convention: sdesqlserver*<SDE Instance name>*

Important: The naming convention of the copy AXF must match: sdesqlserver*<SDE Instance name>*. The SDE Instance is determined through the Connection Properties of the SDE (In ArcCatalog, you can right click on the SDE/Connection Properties…). For example, if the SDE Instance is ilmcasdeilmcasodb1, then the temporary AXF will be called sdesqlserverilmcasdeilmcasodb1. **Note:** Do not use special characters (e.g., backslash (\)) in the AXF name. Remove any ":" or "/" or "\"

6. Launch ArcPad Studio, and open the temporary AXF. *For details on how to use ArcPad Studio, refer to the software's Help.*
7. When done with your customizations, save the modified AXF, and exit ArcPad Studio.
8. Create a new Check Out from the same SDE Version in the usual manner, and your mobile device's data-collection forms will match those of the customized AXF.

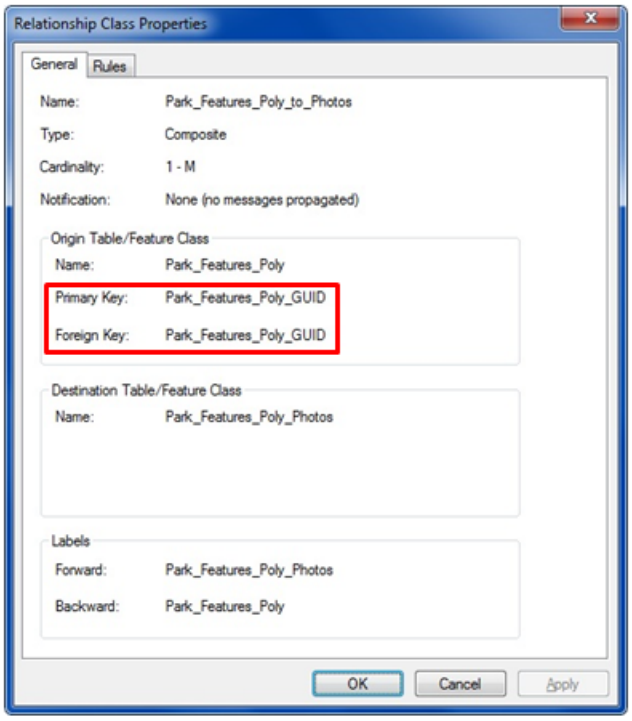
WHAT ARE GLOBAL IDENTIFIERS, AND WHY ARE THEY IMPORTANT?

If you examine the attributes of a GDB feature class used for mobile data collection, there is a field name titled Global ID, which is short for Global Identifier. The purpose of the Global Identifier is to store a unique registry string of 36 characters enclosed in curly brackets.

There are two types of Global Identifiers: Global ID and GUID. Either Global Identifier uniquely identifies a feature or table row within a GDB and across all GDBs. Through either the Global ID or GUID fields, features can be tracked during GDB replication (e.g., Check Out from a local GDB on your computer to the AXF on your mobile device).

An important difference between the Global ID and GUID fields is that mobile GIS developers can manually add a GUID to a feature class, and use the field for creating and working with GDB relationships (e.g., the relationships used by the Mobile Photo App when taking many photos of one feature). The next graphic illustrates the relationship properties between a feature class called *Park_Features_Poly* with that of a stand-alone table called *Park_Features_Poly_Photos*.

Notice both the Primary and Foreign Keys reference GUID fields.



Why are Global Identifiers important for Mobile GIS:

During Check Out, the Check Out tool adds a GUID field to each feature class of the source GDB; otherwise, the Check Out process fails. *It is important you do not delete the GUID fields nor change their values*.