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Chapter 4 - PROJECT DIRECTORY STRUCTURE

CADD Production Criteria Handbook

4.1 STANDARD PROJECT DIRECTORY

The data for each Florida Department of Transportation (FDOT) Project shall be organized and delivered using a standard directory structure as described later in this chapter. In order to ensure the uniqueness of the Project directory name, the project directory folder will be named the FDOT Financial Project Identification Number (FPID), using a minimum of all eleven digits. The FPID is available from FDOT Project Management. New (seed) projects should be created using tools developed and provided by the Engineering/CADD Systems Office (ECSO), and delivered with the FDOT CADD Software. FDOT provides an application called **FileChecker** to help confirm directory structures and file names.

4.1.1 CREATE PROJECT PROCEDURE

The “Create Project” procedure, included in Electronic Delivery Indexer (EDI) application, creates the seed project directory structure and prompts the user for additional project specific information. This information can be entered or modified at any time using Professional’s Electronic Data Delivery System (PEDDS) application. A seed project is a copy of the FDOT standard directory structure created under the project directory (FPID) name as defined in this chapter.

The project directory structure tree is a list of the required directories. These directories are required in the hierarchy as shown and none are to be deleted. Even when a directory is not used in a specific project, the directory shall remain. The project directory contains standard sub-directories for defined disciplines, PEDDS data, along with support and resource files specific to the project.

For example, a cell library developed for a specific project has a holding subdirectory, *lcell*. The *_META_INFO* subdirectory contains the files created and used by PEDDS and used by the FDOT MicroStation workspace to establish the top level of the project directory structure. Therefore only one *_META_INFO* subdirectory should exist in a project directory structure from the initial creation of the project.

Users must use common sense when deciding where to locate working files within the project. If an impasse is reached deciding where data should be placed, the appropriate Project Management staff should be contacted for advice or referral. Deviation from standard practice should always be documented in the project’s Journal file.

4.1.2 DISCIPLINE SUBDIRECTORIES

The discipline subdirectories are defined for the division of work by file ownership, not necessarily the type of work. As files are developed by the various disciplines, those files should generally be placed into the project subdirectories corresponding to the creator of the work. Roadway designers would typically place their files (the files they create and own) under the \Roadway subdirectory, Surveyors under the \Survey subdirectory, and so forth. In some cases, disciplines may have work that overlaps with other components of a design.

For example, if a roadway designer develops the drainage sheets, the files produced would, by the above convention, go in the \Roadway directory, rather than the \Drainage directory, as the “roadway” designer is the owner of the work.

However, if so desired, the files could be put in the \Drainage subdirectory, but file permissions and electronic signing and sealing must be taken into consideration, which leads to questions such as: Does the “roadway” designer have permission to write to the \Drainage subdirectory? Or could problems be encountered merging files across multiple disciplines, i.e., multiple copies of the files?

4.1.3 DUPLICATE FILES

There shall be no duplicate graphical file names (of any file type) within a project directory structure to avoid ambiguity and problems downstream in the projects development. FDOT delivers the ***FileChecker*** application that can be used to find duplicate filenames (different or same content) across different sub-directories of the project, or files of the same content but different filenames (even in the same folder).

In MicroStation, to have proper attachments of reference files within a project, **a subdirectory** named “_meta_info” must be listed under the root of the project. The MicroStation FDOT workspace configuration is set up such that, when attaching a reference file, the software looks for the _meta_info directory, then goes up one folder level (the root directory of the project) and scans down the entire project directory structure, listing all directories below that level in the reference file path for MicroStation. The first occurrence of the file name is used as the reference file, if no relative path was used to attach the reference file.

Under no circumstances should absolute path be used when attaching reference files. All reference files for the project must reside within the project directory structure. For this reason, there should be no duplicate graphical file names within a project.

4.1.4 CUSTOM DIRECTORIES

Custom directories can be created under the standard discipline directory folders, but are not to be created under the root directory for the project. If a custom directory is needed, it is to be created under one of the project sub-directories that comprise the standard project directory template mentioned earlier.

Certain characters are not readable by some programs for directory structure names. Alphanumeric characters, dashes (-) and underscores (_) are the only allowable characters. Spaces are never to be used in any directory or file names and directory names must not exceed 16 characters.

In MicroStation, reference file path lengths are limited to 255 characters total. This must be taken into account when creating directory names (for overall path length) and limit the number of directory levels below the project level.

Note For more information on the project directory format, see Section 4.1.9 of this handbook.

4.1.5 ENGINEERING DATA DIRECTORY

Each discipline sub-directory will contain an additional sub-directory named *leng_data*. These sub-directories were designated to contain the sheet image files of the plan sheets for that discipline, the Quality Control (QC) reports (produced by the QC tools), and the ASCII Engineering Data output files. More information on the files that go in the *leng_data* sub-directories can be found in Chapter 3 of the FDOT **CADD Manual** and an extensive description of the Engineering Data requirements are defined in Chapter 8 of this handbook. Some disciplines may require additional Engineering Data information which are specific to that discipline, in which case those supplementary requirements will be listed in that discipline's chapter of this handbook.

4.1.6 SUB-DIRECTORIES UNDER THE DISCIPLINE DIRECTORIES

In some cases, it is advantageous to create "non-standard" directories for additional segregation of work. This is common when multiple parties work on a single discipline design and the data must be managed and merged. These additional directories can be created under the discipline specific sub-directories to accommodate these circumstances. **These custom sub-directories shall adhere to the restrictions for directories as defined in Section 4.1 of this handbook.** It is the responsibility of data producers to manage their data which includes the merging of data without conflict. Therefore, it is advised that persons managing multiple sub-producers plan accordingly, and coordinate the creation of subdirectories under the disciplines, taking into account file naming conventions and other considerations.

4.1.7 FILE SHARING AND MERGING

Data for each discipline will be maintained in its sub-directory, thus ensuring the ability to merge data from different providers or disciplines. **If a discipline requires information from another discipline or shares files with multiple disciplines, the needed files should be referenced from the original directory in place and not copied (if possible).**

In MicroStation, for example, the Signing and Pavement marking design file will reference the Roadway design file and the Topography file. These files should not be copied into the Signing and Pavement Marking discipline directory unless absolutely necessary.

Note If there is a specific justification to copy a file into another directory, the filename shall be modified to reflect the discipline file name usage. For example, topord01.dgn would become toposp01.dgn, if copied, or as a minimum the sequence number would change to ensure that there is no doubt the copied file differs from the original file.

The data producer holds the responsibility for ensuring that up-to-date content of the original file is always reflected in their copied design file, and for this reason making copies of design files to different locations is strongly discouraged. This deviation from standards shall be documented in the journal along with the justification. To avoid the need by other disciplines to copy and modify shared files, such as the topography file, each discipline shall provide their electronic files in the standard format in accordance with the defined FDOT standard symbology for that file. This ensures the proper use of data and eliminates the possible errors introduced through the cavalier duplication of files.

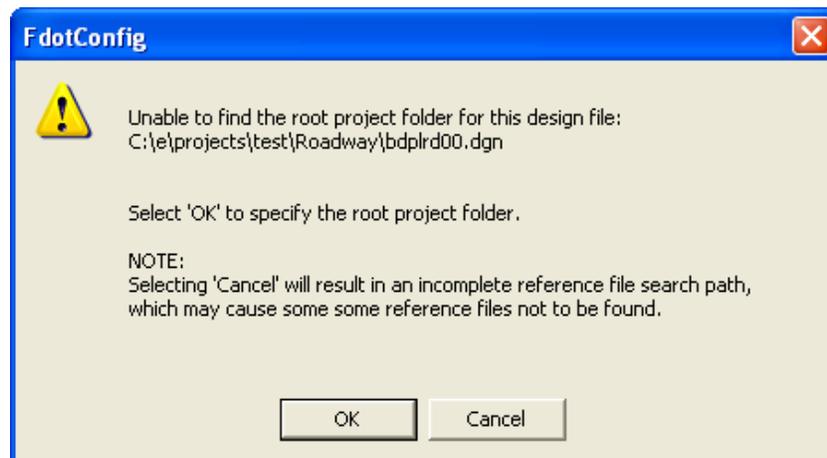
4.1.8 REFERENCE FILES

A reference file can be a MicroStation design file, an AutoCAD design file (permitted use is only for Architectural design files or utility files) or a raster image file. A reference file is attached as a background file to an active design file, thus allowing multiple users to share the same information without the need to copy the file(s) into the active design file directory, or copy the referenced file's content into the active design file.

In order to allow a project to be moved to a different drive without the loss of reference file attachments, specifically at the time of delivery to FDOT, **the reference files must be attached such that MicroStation can resolve the reference file attachments regardless of the project directory location.** Reference files shall be attached using the file name only, without the full path. Thus the option to "Save Full Path" when attaching reference files shall not be used. Always attach using relative path to the project root folder, allowing the project to be moved from drive to drive without losing the reference file attachments when accessed through the FDOT workspace. If one is certain of the uniqueness of file names, an attachment using no path can be used.

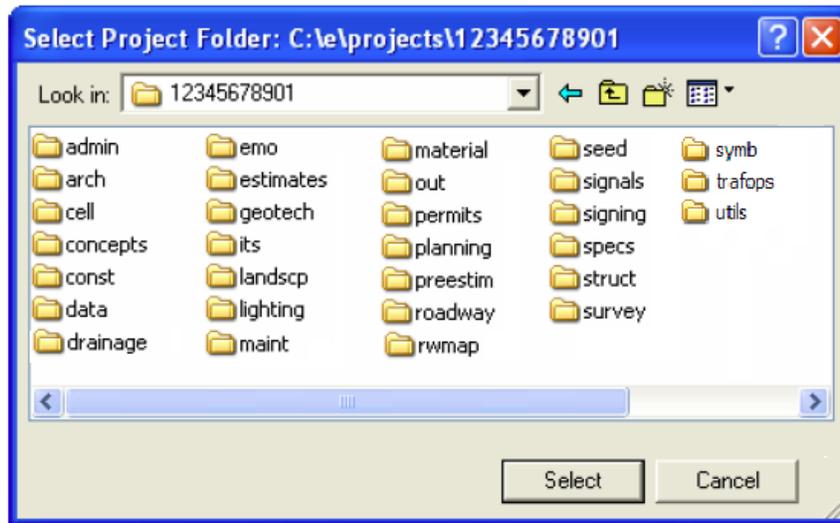
This capability is managed by an application (FDOTCONFIG) that is run at startup of any MicroStation file opened in the FDOT workspaces. This application looks for the _meta_info folder and then moves up one folder to set the parent directory of the project. It then dynamically sets the MicroStation configuration variable, MS_RFDIR, to search downward from the parent directory through all the found subdirectories to identify any reference files. Therefore all design files for a project must reside in the standard FDOT directory structure or its subdirectories in order to be located as a reference file. If it is necessary to reference a file that is external to the project, it must be done through the FDOTCONFIG application. FDOTConfig will manage the path to the file for referencing purposes. This capability is available from the FDOT Menu option **Actions > Reference File Utilities > Attach Project External Reference Files.** The configuration variable that initiates this application is preset in the FDOT workspace in the *sitefdot.txt* file.

When a file is opened in MicroStation in an FDOT workspace, if the _meta_info does not exist, the user will be prompted to define the parent folder of the project, so that the application can set the search path for reference files. See the image below.



If Cancel is selected any reference to the models of files located in different subdirectories will not be displayed because the MS_RFDIR variable could not be populated automatically.

If OK is selected the user will be given the opportunity to define the root of the project. The user can then navigate to the root of the project, named for the Financial Project Identification Number. In the example below notice the directory shown in the title bar of the dialog. A _meta_info folder will be created directly under the directory shown in the title bar.



Important: If duplicate file names exist in the sub-directories of the project, MicroStation will attach the first matching filename it finds in the path. Therefore, duplicate file names are not allowed. For additional information on reference file limitations, please see Section 4.1

4.1.9 STANDARD PROJECT DIRECTORY FORMAT

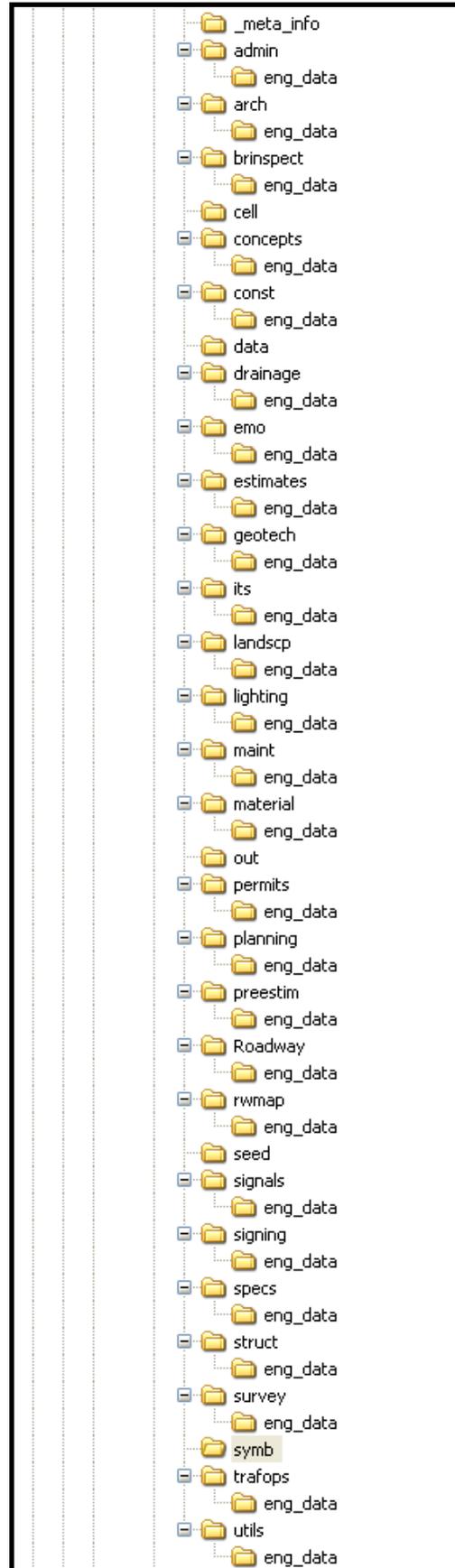
The FDOT standard project directory structure and file naming conventions are based on the normal workflow of FDOT projects and the separation of workgroups. This allows permissions to be set so that the individual disciplines can manage their own files, including maintaining discipline specific project index information, creating PostScript Image Files for plan sheets, creating ASCII engineering data output, and doing electronic signing and sealing. Thus ensuring the entire project is packaged together for delivery without assimilation problems.

The standard directory structure with a description of each directory's purpose and a screen shot of Windows Explorer, showing the directory structure are shown below.

Folder Names	Folder Descriptions and/or Purpose
Project Name (FPID)	
_meta_info	PEDDS files
admin	Administration documents
eng_data	
arch	Architectural design files
eng_data	
brinspect	Bridge Inspection files
eng_data	
cell	Project specific cell libraries
concepts	Various preliminary concepts
eng_data	
const	Construction files for "As-builts"
eng_data	
data	Project data files, for example material backgrounds for rendering
eng_data	
drainage	Drainage calculation files and design files
eng_data	
emo	Environmental Management files
eng_data	

	estimates	Estimates files
	eng_data	
	geotech	Geotechnical data
	eng_data	
	ITS	Intelligent Transportation Systems
	eng_data	
	landscp	Landscape design files
	eng_data	
	lighting	Lighting design files
	eng_data	
	maint	Maintenance division (This is not Maintenance of Traffic).
	eng_data	
	material	Material Specification files.
	eng_data	
	out	Output files created by MicroStation
	permits	Permits for various items, ponds, etc.
	eng_data	
	planning	Planning department
	eng_data	
	preestim	Preliminary estimates
	eng_data	
	roadway	Roadway files
	eng_data	
	rormap	Right of Way files
	eng_data	
	seed	Project specific seed files
	signals	Signalization files
	eng_data	
	signing	Signing and Pavement Marking files
	eng_data	
	specs	Specification package
	eng_data	
	struct	Structure calculations and files
	eng_data	
	survey	Survey database and files
	eng_data	
	symb	Project specific resource files for fonts and custom line styles
	trafops	Traffic Operations data
	eng_data	
	utils	Utility files
	eng_data	

The image to the right is a screen shot of Windows Explorer displaying the directory structure.



4.2 STANDARD FILE NAMES

The following file naming conventions shall be used for all design files, standard input files and criteria files. In the event a particular file type that is needed for the project is not addressed by this document, use the file naming convention as a template for selecting an appropriate name, or consult with either the Project Manager or the District CADD Manager to determine the proper file name.

Document all files, both standard and project specific, in the Project Index file. File names should only include alphanumeric characters and the dash (-) or underscore (_), no spaces or special characters.

In MicroStation, models within a design file should follow the same file naming conventions as the standard file names. For additional information on the use of models per discipline and the standard names see the specific discipline chapter.

FDOT identifies all standard file names as Critical or Non-critical. Critical files are used in downstream applications, shared across disciplines and used in quantifying pay items. These critical files must meet a minimum compliancy threshold for CADD Level-Symbology as detailed in Chapter 7 of this document. Standard file names are discipline specific and are listed in whole within the respective discipline chapters of this document.

4.2.1 STANDARD FILE NAMING CONVENTION

FDOT utilizes standard naming conventions for all of its files within both MicroStation and AutoCAD. The standard file names for each discipline are listed in the respective discipline chapters. Some of the automation implemented in various tools provided by FDOT depend on naming conventions being met. More importantly, the naming convention confers information to the downstream customer of the data.

Standard file names should follow this format: **AAAABB##.ext**

Where

- AAAA** = abbreviated file description,
- BB** = Discipline Denotation,
- ##** = Sequence number (a padded integer, i.e. "00", "01", "02" ... "99"),
- ext** = File extension indicating the type of file as shown in section 4.2.1.

Example: The first roadway cross section file created would be named – **rdxsrd01.dgn**

Large projects might necessitate the need to exceed two digit sequence numbers; otherwise the sequence should be limited to two digits. If it is necessary to add additional descriptive information in the filename, this descriptive information should be inserted after the discipline denotation "BB" and preceding the sequence number "##". However, this should not be the norm and the additional descriptor should be kept to a minimum. Example: rdxsrdrmpa01.dgn, indicating this cross section sheet includes ramp A.

4.2.2 POSTSCRIPT NAMING CONVENTION

In MicroStation, **Sheet Navigator** is an interactive application that is also ran in the background by **Electronic Delivery Indexer (EDI)** to extract the sheet labels from design files that contain sheets and to define the components of the project. **Sheet Navigator** uses the SheetInfo.xml control file to provide the component order for sheets according to their location in the project directory structure in conjunction with the sheet prefix. The Sheetinfo.xml control file defines the standard search criteria to identify sheets in a project and is located in the `\\FDOT_2008\mdlapps\` folder.

4.2.2.1 Sheet Numbers

Sheet numbers used in plans can be composed of multiple parts using the format: **AAA-####A**.

AAA Represents the Project Component, using multiple alpha characters as placeholders.

####(A) Defines the numeric order of the sheets within the Project Component. The (A) allows for the insertion of appended sheets after the project has started. A single alpha character, A-Z, is added for each subsequent sheet inserted.

(Examples: S-001A; PNC-01; A-15; A-16; T-1; T-2; and of course 1, 2, 3, etc).

Structures and Architecture disciplines have extended the sheet numbering schema and the respective discipline manuals should be consulted for guidance. These manuals are found at:

- [FDOT Structures Manual](#)
- [CADD Production Criteria Handbook \(CPCH\) Chapter 23](#)

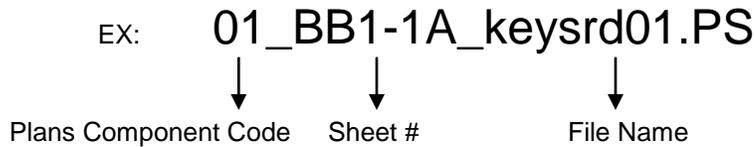
The following shows how **Sheet Navigator** and **EDI** will interpret sheet numbers to attempt to discern what plans component each sheet belongs to:

<u>Prefix</u>	<u>Component</u>
No prefix	Roadway Plans (<i>Typically - only an integer is used for sheet number</i>)
CTL	Roadway Plans
GR	Roadway Plans
PNC	Roadway Plans
PTM	Signalization Plans
TR	Roadway Plans
UTV	Roadway Plans
S	Signing and Pavement Marking Plans
GS	Signing and Pavement Marking Plans
T	Signalization Plans
GT	Signalization Plans
IT	Intelligent Transportation System (ITS) Plans
GI	Intelligent Transportation System (ITS) Plans
L	Lighting Plans
GL	Lighting Plans
LD	Landscape Plans
BG	Structures Plans
A	Architectural Plans
Begins with "B"	Structures Plans
Begins with "U"	Utility Joint Participation Agreement Plans
Begins with "A"	Architectural Plans

Roadway plans is typically the primary component of a FDOT Project plans set containing multiple plans components and can have non-prefixed sheet numbers (1,2,3,... etc.). Other disciplines can be the primary plans component only in the absence of a Roadway plan component. For example: a Lighting only project may omit the plans component prefix, and use the numbering format of 1,2 3, etc, although this practice is strongly discouraged.

4.2.2.2 Postscript File Naming Format

EDI implements an output file naming scheme for Postscript files that removes ambiguity about which sheet the file represents (regardless of the sheet-numbering scheme used in the design file) and supports the more complex sheet numbering now be expected by some disciplines. The format file naming convention will be:



Plans Component Code [01] The first two numbers represent the Plans Component with zero (0) used as place holder (for sorting purposes).

The FDOT Standard Plans Component codes are as follows:

- 01 – Roadway Plans
- 02 – Signing and Pavement Marking Plans
- 03 – Signalization Plans
- 04 – Intelligent Transportation System (ITS) Plans
- 05 – Lighting Plans
- 06 – Landscaping Plans
- 07 – Architectural Plans
- 08 – Structures Plans
- 09 – Utility Joint Participation Agreement Plans
- 10 – Right of Way Maps
- 99 – Unknown

Sheet # (BB1-1A) After the Plans Component Code, an underscore (_) is inserted followed by the actual sheet number.

File Name (keysrd01) After the Sheet #, an underscore (_) is inserted followed by the name of the source design files. The last two integers are used to assign unique sequential numbering.

4.2.3 STANDARD FILE NAME EXTENSIONS

File Name	Extension	Saved-in Folder
3 Port Criteria files	.3pc	Most appropriate discipline folder
Adobe Acrobat files	.pdf	Most appropriate discipline folder
Cell Count Report	.ccp	Most appropriate discipline folder
Comma Separated Values	.csv	Most appropriate discipline folder
Coordinate Geometry Database files	.gpk	Most appropriate discipline folder
Cross Section Sheet Design files	.shg	Most appropriate discipline folder
Cross Section Sheet Layout files	.plg	Most appropriate discipline folder
Crystal Reports	.rpt	Most appropriate discipline folder
Descartes Raster Image files	.hmr	Most appropriate discipline folder
Electronic Delivery Index Settings files	.edi	Project Root folder
GDM QC Rule files	.rul	Most appropriate discipline folder
GEOPAK Criteria files	.x	Most appropriate discipline folder
GEOPAK D&C Manager Database files	.ddb	Most appropriate discipline folder
GEOPAK Input files	.inp	Most appropriate discipline folder
Microsoft Excel Spreadsheets	.xls	Most appropriate discipline folder
Microsoft Word Documents	.doc	Most appropriate discipline folder
MicroStation & GEOPAK resource files	.rsc	\eng_data subfolder for discipline
MicroStation Batch Plot Job files	.job	\eng_data subfolder for discipline
MicroStation Cell Libraries	.cel	Cell Folder
MicroStation Design files	.dgn	Most appropriate discipline folder
MicroStation Pen Tables	.tbl	\eng_data subfolder for discipline
MicroStation Plot Drivers	.plt	\eng_data subfolder for discipline
Postscript Sheet Image Files	.ps	\eng_data subfolder for discipline
QC Exception files	.xcp	\eng_data subfolder for discipline
QC Reports, QC"folder name"	.rpt, .txt	\eng_data subfolder for discipline
Web Pages	.htm	Project Root folder and \data subfolder
Web Pages	.html	Project Root folder and \data subfolder
XML files	.xml	Project Root folder and \data subfolder

