

ODM STREAMING DATA LOADER

An application for loading streaming sensor data into the CUAHSI Hydrologic Information System Observations Data Model

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Prepared by:

Jeffery S. Horsburgh

Utah Water Research Laboratory Utah State University

Distribution

The ODM Streaming Data Loader application and all associated source code and documentation are available at the following URL: <u>http://his.cuahsi.org</u>.

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Disclaimers

Although much effort has been expended in the development and testing of the ODM Streaming Data Loader application, errors and inadequacies may still occur. Users must make the final evaluation as to the usefulness of the ODM Streaming Data Loader for their application.

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Jeffery S. Horsburgh, Research Engineer, Environmental Management Research Group, Utah Water Research Laboratory, Utah State University, Logan, UT.

Justin Berger, Programmer, Environmental Management Research Group, Utah Water Research Laboratory, Utah State University, Logan, UT

David G. Tarboton, Professor, Civil and Environmental Engineering, Utah State University, Logan, UT. **Kim Schreuders**, System Administrator, Utah Water Research Laboratory, Utah State University, Logan, UT **Stephanie Reeder**, Programmer, Utah Water Research Laboratory, Utah State University, Logan, UT

Technical Support

There is no formal ongoing support for this freely distributed open source software. However, we are interested in feedback. If you find errors, have suggestions, or are interested in any later versions, please contact:

Jeffery S. Horsburgh Utah State University 8200 Old Main Hill Logan, UT 84322-8200 jeff.horsburgh@usu.edu

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1.0 INTRODUCTION AND SOFTWARE DESCRIPTION

The CUAHSI Hydrologic Information System (HIS) Project is developing information technology infrastructure to support hydrologic science. One of the components of the HIS is a point Observations Data Model (ODM) (Horsburgh et al., 2008; Tarboton et al., 2008), which is a relational database schema that was designed for storing time series data. The purpose of the ODM is to provide a framework for optimizing data storage and retrieval for integrated analysis of information collected by multiple investigators. The CUAHSI HIS ODM has been implemented by a number of research groups throughout the country, and these researchers are using ODM as a mechanism for publication of individual investigator data, which includes streaming sensor data, and for registering these data with the National HIS.

The ODM Streaming Data Loader (SDL) application was created to allow administrators of local instances of the ODM to automate the process of loading their streaming sensor data from text files generated by their monitoring and telemetry system into an instance of the ODM. The development of the ODM SDL application has several advantages. First, ODM SDL protects the security and consistency of an ODM database because it provides users with a set of automated tools for loading their streaming data into ODM. This minimizes the potential for human caused errors in loading these data into an ODM database. The ODM SDL provides simple visual tools for mapping streaming data files to the ODM schema and for specifying all of the required metadata, which means that users do not need to perform any specialized programming to parse and load the data and that the data are fully qualified with valid metadata when they are loaded. Finally, the ODM SDL application can be scheduled as a Windows task to run on a user customized schedule. This means that loading of sensor data with multiple reporting frequencies can be run automatically and optimized according to a user defined schedule.

1.1 GENERAL FUNCTIONALITY

The main objective of the ODM SDL application is to provide managers of ODM databases with a set of tools for automating the process of loading their streaming sensor data. The ODM SDL is implemented as two separate executable programs. The first is the ODM SDL Configuration Wizard, which allows users to create and save the mapping of their sensor data file and all associated metadata to the ODM schema. The second executable is the ODM SDL Data Loader. It has no user interface and was designed to be run automatically as a Windows scheduled task. It reads the configuration file generated by the Configuration Wizard, parses the streaming data file, and loads the data into the ODM database according to the settings in the configuration file. The Data Loader executable can be scheduled to run automatically on any user defined interval using the Windows task scheduler (so that new data are loaded into the ODM database automatically as they are received), or it can be run manually through the Configuration Wizard.

1.2 SUPPORTED STREAMING DATA FILE FORMATS

The ODM SDL was designed to automatically load data from streaming data files. It currently supports table based, delimited text files, where the date and time of each observation are stored in one column and the observed values are stored in subsequent columns (one column for each variable) delimited by commas or tabs. The following is an example of a streaming data file produced by Campbell Scientific's LoggerNet software. Input files do not have to be generated by dataloggers. Any file that contains a time series of data values for one or more variables that is formatted as described above can be loaded using the ODM SDL.

CR206_ML_Inlet_Turb.dat - WordPad	×
Elle Edit View Insert Format Help	
"TOAS", "CR206_ML_Inlet", "CR2xx", "", "v05", "ML_TURBIDITY.CR", "3164", "Turb" "TIMESTAMP", "RECORD", "Batt_Volt_Avg", "Turb_Avg", "Turb_Var", "Turb_Med", "Turb_BES", "Turb_Min", "Turb_Max", "Wat_Temp" "TS", "RN", "Volts", "", "", "", "", "", "", "", "", "",	
"2007-06-01 14:00:00",0,13.23711,45.59,0.8063,45.63,45.63,43.94,47.46,16.5 "2007-06-01 14:00:00",1,13.2581,47.09,1.5976,46.95,46.99,44.56,51.54,16.8 "2007-06-01 14:00:00",2,13.26885,40,94,0.0472,40,91,40,91,40,91,41,71,17,1	
"2007-06-01 15:00:00",3,13:26145,41.64,0.1651,41.61,41.64,40.84,42.53,17.3 "2007-06-01 15:30:00",4,13:25726,45.06,0.1873,45.11,45.08,44.25,45.9,17.7 "2007-06-01 16:00:00",5,13:25642,41.2,0.9588,40.88,40.97,39.99,43:54,17.8	
"2007-06-01 16:30:00",6,13.25474,40.8,0.1489,40.75,40.79,40.1,41.8,18.5 "2007-06-01 17:00:00",7,13.25558,43.12,0.7347,43.05,43.08,41.71,46.01,18.7 "2007-06-01 17:30:00",8,13.27237,41.78,0.0876,41.8,41.77,41.11,42.54,18.9	
"2007-06-01 18:00:00",9,13.2774,40.02,0.2281,39.91,39.93,39.26,41.26,19.2 "2007-06-01 18:30:00",10,13.29167,45.61,2.5234,45.64,45.62,42.27,49.32,19.4 "2007-06-01 19:00:00",11,13.30679,42.27,0.1714,42.39,42.35,41.26,42.96,19.4	
"2007-06-01 19:30:00",12,13.30007,37.6,0.207,37.51,37.51,37.01,39.03,19.4 "2007-06-01 20:00:00",13,13.20185,41.95,0.157,41.91,41.91,41.2,42.98,19.4 "2007-06-01 20:30:00",14,13.12211,45.92,0.4818,45.79,45.88,44.78,47.63,19.4	
"2007-06-01 21:00:00",15,13.07846,44.8,0.1984,44.79,44.78,44,45.81,19.3 "2007-06-01 21:30:00",16,13.05579,47.11,0.7536,47.14,47.05,45.83,48.95,19.2 "2007-06-01 22:00:00",17,13.04404,45.73,0.3143,45.64,45.67,44.83,47.19,19.1	~
For Help, press F1 NUM	1.4

1.2 PLATFORM AND MINIMUM SYSTEM REQUIREMENTS

The ODM SDL was designed to run on Microsoft Windows XP, Vista, 7, Server 2003, or Server 2008 based computers. It is recommended that machines running the ODM SDL software have at least 100 MB of free disk space and 1 gigabyte of RAM. In addition, computers running the ODM SDL application must have the Microsoft .Net Framework Version 3.5 installed prior to installing the ODM SDL. Instructions for obtaining the .Net Framework Version 3.5 from Microsoft are included in the Installation Instructions section below.

The ODM SDL is a client application. It must be connected to an instance of the CUAHSI HIS ODM that has been implemented in Microsoft SQL Server 2005 or 2008. The SQL Server database can be located on the same machine as the ODM SDL application, or the ODM SDL has the capability to connect to a remote ODM database provided that the database server name and ODM database name are known and the user has been given access to, and SQL Server authentication information for, that server and database.

1.3 ODM COMPATIBILITY

Version 1.0 of the ODM SDL is compatible with Version 1.0 of ODM. Version 1.1 of the ODM SDL is compatible with ODM Version 1.1. Please consult the ODM design specifications documents for the differences in ODM Versions. You can install both versions of the ODM SDL software on the same machine if you are using both ODM 1.0 and ODM 1.1 databases. ODM and the ODM Design specifications documents can be obtained from http://his.cuahsi.org.

2.0 INSTALLATION INFORMATION

2.1 INSTALLATION PREREQUISITES

Prior to running the ODM SDL installation, you must first install the Microsoft .Net Framework Version 3.5 (if it is not installed already). If you have Microsoft SQL Server 2008 installed, Version 3.5 of the .Net framework will be installed already. The .Net Framework Version 3.5 is free, and is required to run software applications developed in Microsoft's Visual Studio .Net 2008. Instructions for downloading and installing the .Net Framework Version 3.5 can be obtained from the Microsoft website via the following URL:

http://www.microsoft.com/downloads/details.aspx?FamilyId=AB99342F-5D1A-413D-8319-81DA479AB0D7&displaylang=en

Once the .Net Framework Version 3.5 has been installed, you can continue with the ODM SDL installation.

NOTE: ODM SDL requires that you have an ODM database implemented in Microsoft SQL Server 2005 or 2008. If you do not already have an instance of Microsoft SQL Server running, you can download and install Microsoft SQL Server 2008 Express from Microsoft for free. It is recommended that you download and install either the "Runtime with Management Tools" or the "Runtime with Advanced Services" version of SQL Server 2008 express. You can get these products and instructions for installing them at the following Microsoft URL:

http://www.microsoft.com/express/sql/download/

Directions for attaching a blank ODM database to your instance of Microsoft SQL Server can be downloaded from the CUAHSI HIS website <u>http://his.cuahsi.org</u>.

2.2 INSTALLING THE ODM SDL APPLICATION

Install the ODM SDL using the following steps:

- 1. First, ensure that you have installed the Microsoft .Net Framework Version 3.5. See the previous section if you have not done so.
- 2. Double click on the ".msi" installation file. This will begin the installation of the ODM SDL application. After a few moments, the following window will appear:



3. Click the "Next" button to continue with the ODM SDL installation. You will see the following window.

ODM SDL 1.1.2.2		
License Agreemer	t	
Please take a moment to read Agree", then "Next". Otherwise	he licerse agreement now. If you a click "Cancel".	accept the terms below, click "1

Copyright (c) 2007, U	Itah State University	-
All rights reserved.		
Redistribution and use modification, are perm	in source and binary forms itted provided that the follo	s, with or without
I Do Not Agree	Agree	
	Cancel	< Back Next >

4. Read the license and then click on the radio button next to "I agree" to accept the license. Click the "Next" button. The following window will appear:

Select Installation Folder	
he installer will install ODM SDL 1.1.22 to the following folder.	
o install in this folder, click "Next". To install to a different folder, ente	t below or click "Browse".
Folder	
C\Program Files (x86)\CLIAHSI HIS\ODM SDL 1.1.2.2\	Biowse
	Disk Cost

5. It is recommended that you install the ODM SDL to the default location. Click the "Next" button to continue. The following window will appear:



6. Click the "Next" button to continue. If you are prompted with a security warning that asks you if you want to allow the installation to make changes to your machine, click "Yes" to continue. When the installation is complete, the following window will appear. Click the "Close" button to finalize the installation.

ODM SDL 1.1.2.2		×
Installation Comple	ete	
ODM SDL 1.1.2.2 has been su	ccessfuly installed.	
Click "Close" to exit.		
Please use Windows Update to	check for any critical updates to th	e .NET Framework.
	Cancel	< gack Close

3.0 MAPPING A STREAMING DATA FILE TO AN ODM DATABASE

NOTE: The steps in this section assume that you already have an ODM database set up and running within an instance of Microsoft SQL Server 2005 or 2008. If you do not have SQL Server or a working ODM database, please consult the information in the Installation Prerequisites section above and in the appendices of this document for information on how to remedy this situation.

The first step in loading streaming data is to map the streaming data file to your ODM database using the ODM SDL Configuration Wizard. Use the following steps to map a streaming data file to your ODM database.

 Open the Configuration Wizard by double clicking on the shortcut on your desktop (Setup ODM SDL) or by selecting "ODM SDL Config Wizard" from the Windows Start Menu (Start – All Programs – CUAHSI HIS – ODM SDL Config Wizard). The following window will appear.



This is the main window of the Configuration Wizard. The table view on this form will list all of the streaming data files (i.e., the text files containing time series of data for one or more variable) that you have mapped to your ODM database. You will notice that the window is currently blank since no streaming data files have been mapped to your ODM database.

NOTE: You will have separate shortcuts on your desktop and in the CUAHSI HIS group in the Start menu for ODM SDL 1.0 and ODM SDL 1.1 if you have them both installed on your machine. Run the version that corresponds to the version of ODM that you are loading data into.

2. To map a sensor data file, click on the "Add" button 🎽 at the top of the form. The following window will appear.

Id New Fi	le		_				
Location							
Local File							
) Website							
Delimiter:	<comma d<="" td=""><td>elimited></td><td>~</td><td></td><td></td><td></td><td></td></comma>	elimited>	~				
Rur Every:	1	0	min	utes	~		
Start	6/25/200	18 💌	@	12:00:00 PM	-		
Peace te	lect a Datab	are.					
Microsoft	SQL Server	0.00					
Server	Address: (k	ocal)					
Databas	e Name:						
Server	User ID:						
Server Pa	essword:						
Column Hea	ders on Row	# 0			0	(0 for None)	
Data Stade	on Bow #	1			(2)		
Data Statis	D.1	is to Data	Valu	ues that are alre	adu in	he Database.	
	Data previou		10/02/16				
Include	Data previou						
Include	Data previou						

On this form you can specify the location of the file that you are loading data from, information about the server and database that you are loading data to, and information about the format of the file that you are loading.

- 3. First, specify the location of the text file that contains your sensor data. You can load data from local text files (i.e., files on your machine's hard drive, OR files that are accessible via file sharing over a local intranet) or remote text files (i.e., files that are available via a website using either HTTP or FTP protocols). In this example, we will use a local file. Click on the browse button next to the Local File input text box
 - In this will open the standard Windows "Locate file" dialog.



Navigate to the location of your streaming data file, select it, and then click on "Open." You will notice that the "Local File" input text box is now populated with the path to your streaming data file.

NOTE: In the case that your monitoring and telemetry system creates a new streaming data file for each datalogger each time data is downloaded, you can connect to multiple local files containing data from the same datalogger by using wildcard characters (i.e., entering 'C:\StreamingData\ThisSite*.dat' will use all files within the C:\StreamingData folder that begin with 'ThisSite' and have a '.dat' extension. All of these files must be formatted exactly the same. The ODM SDL will scan each file each time the update is run for new data to load into the database.

4. Next, you need to select a delimiter for your file and an interval on which the update will be run. ODM SDL supports comma and tab delimited text files. Choose the appropriate delimiter for the file that you are loading. The interval that you input here will control how frequently the data from this file will be loaded to the database. This interval should be set so that it is consistent with the schedule under which data are being added to the text file. For example, if new data are being written to the streaming data text file once per day, you should select 1 day as the interval on which the update will be no new data in the file to load into the database. You should also carefully select a start time for the update to be run that is consistent with your data collection schedule. For example, if new data are written to the streaming data text file daily at midnight by your monitoring and telemetry system, you may choose to start the update at 1:00 AM to ensure that the newest data get written to the streaming data text file before you try to load them into the ODM database.

For this example, we are using a comma delimited streaming data text file to which data are being added hourly. Given this, we will choose to run the update every 1 hour, and we will leave the start time alone. This means that the Data Loader application will try to open the file and parse new data into the database every hour starting on 6/25/2008 at 12:00 PM. See the following figure.

Add New File							
Location Local File Website	C:\Working\	Projec	ts\M	ud Lake\Data\/	CR20	0_ML_Weather_Hourly_MeData.dat	
Delimiter:	Comma Delin	nited>	~				
Run Every: 1			hou	rs	~		
Slart	6/25/2008	۷	@	12:00:00 PM	٢		
Please select Microsoft SQ	t a Database L Server						
Server Add	iress: (loc-al ame:)	-		_		
Server Use	er ID:						
Server Passa	word:						
Column Header	rs on Row #	0			٥	(0 for None)	
Data Starts on	Row #	1			٢		
Include Da	ta previous to	Cata	Valu	ies that are alrei	sdy in	the Database.	lext

NOTE: The interval that you set here is independent of and overrides the frequency with which you schedule the Data Loader application to run using the Windows Task Scheduler. For example, if you choose 1 day as the frequency on the "Add New File" form but schedule the Data Loader to run every hour using the Windows Task Scheduler the database will still only be updated once per day.

5. The next step is to specify the connection information for your ODM SQL Server database. In the boxes provided, you should enter your server address, the name of the database to which you are loading data, and the username and password for your SQL Server authentication account. See the following figure for an example.

ld New File	e						_ 0
Location							
Local File	C:\Wo	rking\Proje	cts\N	fud Lake\Data\	CR20)_ML_Weather_Hourly_MetData.dat	
 Website 							
Delimiter:	<comma< td=""><td>a Delimited</td><td>~</td><td></td><td></td><td></td><td></td></comma<>	a Delimited	~				
Run Every:	1	\$	ho	urs	~		
Start:	6/25/2	2008 💌	@	12:00:00 PM	-		
Please sele Microsoft S Server A	ict a Data IQL Servi ddress:	abase: er (local)					
Database	Name:	OD					
Server U	ser ID:	sa					
Server Pas	sword:	•••••	••				
Column Head	ters on R	ow # 0			٢	(0 for None)	
Data Starts o	n Row #	1			\$		
include D	lata previ	ious to Dat	a Vali	ues that are alrei	ady in	the Database.	

NOTE: In this example, we are connecting to a database called "OD" on the local instance of SQL Server using the "sa" account. You can connect to your ODM database using any SQL Server account, but you must have permission to read and write to the database.

6. The final step on this form is to specify a bit of information about the text file that we are loading data from. First, we need to enter the number of the row in the text file that has the column headers (if they exist) and the number of the row on which the data start. For our example file, the column headers are on the second row and the data starts on row 5 (see below).

CR200_ML_Weather_Hourly_MetData.dat - WordPad	. 🗆 🔀
Elle Edit View Insert Format Help	
<pre>"TOAS", "CR200_NL_Weather", "CR2xx", "", "v05", "HL_Weather.CR2", "20564", "Hourly_MetData" "TIMESTAMP", "RECORD", "Batt_Volt_Min", "WS_ms_Avg", "WS_ms_S_WVT", "WindDir_D1_WVT", "WindDir_SD1_WVT", "BP_mmHg", "J "TS", "RN", "Volts", "meters/sec", "meters/sec", "meters/sec", "Millimeter", "mm", "Deg C", "4", "W/m2" "", "", "Hin", "kyg", "WVC", "WVC", "WVC", "Smp", "Tot", "kyg", "Smp", "Avg" "2007-07-03 14:00:00", 0, 13.28412, 2.798057, 2.798057, 346.3505, 67.02611, 618.2066, 0, 27.21799, 13.946, 1006.803 "2007-07-03 15:00:00", 1, 13.30175, 4.340146, 4.340146, 323.1014, 27.04951, 618.2295, 0, 27.84651, 14.526, 976.9249 "2007-07-03 16:00:00", 2, 13.27153, 3.033747, 3.083747, 3.868118, 25.54711, 617.822, 0, 28.48821, 15.346, 891.8502 "2007-07-03 17:00:00", 3, 13.26062, 2.763456, 2.763456, 335.1534, 27.86988, 617.6228, 0, 28.83837, 15.151, 763.7211 "2007-07-03 18:00:00", 4, 13.24718, 2.855469, 2.855469, 32.25775, 617.5976, 0, 29.05801, 18.54, 589.0848 "2007-07-03 18:00:00", 4, 13.24718, 2.855469, 2.365469, 332, 12.556, 12.4282, 0, 28.83837, 15.151, 763.7211 "2007-07-03 18:00:00", 4, 13.24718, 2.855469, 2.365469, 32.212556, 612.4282, 0, 28.83837, 15.454, 589.0848 "2007-07-03 18:00:00", 4, 13.24718, 2.855469, 2.365469, 3.212575, 617.5976, 0, 29.05801, 18.54, 589.0848<">""""""""""""""""""""""""""""""""""</pre>	Rain_
"2007-07-03 20:00:00", 6, 13.26817, 2.317532, 2.317532, 309.0062, 12.65954, 617.4625, 0, 27.77884, 29.544, 213.2747	~
<	>
For Help, press F1	NUN

NOTE: If your file does not have column headers, you should enter 0 in the column headers box. You can still load your data, but you must know which variables are in which columns.

7. The last option on the form allows you to specify whether you want to check the text file for data that are older than those in the database as well as those that are newer than those in the database. If this box is checked, data that precede those that are in the database will be added. For this example, our database is empty so all of the data in the file will be loaded. We will leave this box unchecked. This completes the input on this form. When you click on "Next," the following form will appear.

AddN	ew File					-	
	TIMESTAMP	RECORD	Batt_Volt_Nin	WS_ms_Avg	WS_ms_S_WVT	WindDir_D1_WVT	Win
•	2007-07-03 14:0	0	13.28412	2.798057	2.798057	346.3505	67.0:
	2007-07-03 15:0	1	13.30175	4.340146	4.340146	323.1014	27.0-
	2007-07-03 16:0	2	13.27153	3.083747	3.083747	3.868118	25.5
	2007-07-03 17:0	3	13.26062	2.763456	2.763456	335.1534	27.8
	2007-07-03 18:0	4	13.24718	2.855469	2.855469	342.6023	23.2!
	2007-07-03 19:0	5	13.26062	3.081793	3.081793	319.0023	21.2
	2007-07-03 20:0	6	13.26817	2.317532	2.317532	309.0062	12.6
	2007-07-03 21:0	7	13.1347	1.901091	1.901091	319.427	12.9
	2007-07-03 22:0	8	13.03145	1.395135	1.395135	314.0611	33.4
	2007-07-03 23:0	9	12.98024	1.372859	1.372859	313.9571	15.4:
	2007-07-04 00:0	10	12.93995	0.5063113	0.5063113	89.74508	49.3
	2007-07-04 01:0	11	12.91393	0.26203	0.26203	212.8163	35.1:
	2007-07-04 02:0	12	12.90469	0.7846345	0.7846345	289.7945	15.8
<		111					>
C III	must select at least 2 ITC Date Time ocal Date Time	 	Value Col S	0 Vari Olfs∉	et T Offset M	1et Sou Qu	ia 🗲
	Time Zone	DST	<]	ш	Bac	k Fin	

8. The Configuration Wizard has now read the streaming data text file and is displaying it in the table at the top of the form. On this form, we must first specify the column that holds the date and time information (see the options at the lower left on the form). The ODM SDL is capable of handling dates and times in either UTC or as local dates and times. You must check one of these options. In our example, the datalogger is being run on local standard time and does not use daylight savings time. In order to capture this, we can click on the "Local Date Time" radio button and then select the column name in which the dates/times are stored. We then select the time zone in which the data collection site is located and specify whether daylight savings time is used (for Utah, we use Mountain Standard Time, which has a UTCOffset of -7 – again, no daylight saving time is used). See the following figure.

_	The second state	100000						
	TIMESTAMP	RECORD	Batt_Volt_Min	WS_ms_Avg	WS_ms_S_WVT	WindDir_D1_WV1	Win	
•	2007-08-27 13:0	C	13.25978	2.461744	2.461744	164.4146	38.9	
	2007-08-27 14:0	1	13.32945	3.228402	3.228402	226.3928	55.11	
	2007-08-27 15:0	2	13.33449	5.324374	5.324374	253.1307	21.8	
	2007-08-27 16:0	З	13.31434	5.286458	5.286458	271.6489	29.6!	
	2007-08-27 17:0	4	13.31266	6.385627	6.385627	267.2643	13.6	
	2007-08-27 18:0	5	13.32777	5.027084	5.027084	256.6893	14.6	
	2007-08-27 19:0	6	13.32022	2 4.186457 4.186457		296,7874	29.5!	
	2007-08-27 20:0	3	13.24634	2.531665	2.531665	18.12896	19.7	
	2007-08-27 21:0	8	13.13806	0.6974998 0.6974998 1.427222 1.427222 1.046736 1.046736 0.8937498 0.8937498	0.6974998	17.31116	49.8	
	2007-08-27 22:0	9	13.09608		1.427222	301.1205	36.3	
	2007-08-27 23:0	10	13.04992		1.046736	69.95727	23.6	
	2007-08-28 00:0	11	13.02809		0.8937498	308.0151	51.6	
	2007-08-28 01:0	12	13.01802	0.5817363	0.5817363	308.1(5	17.3	
1					1000 J.V.+ 36 2.979 2411 441		+	
Time	e (must select one optio	n)	Value Col	umn Site	Variable Offset 7	vpe Offset Valu		
D	UTC Date Time	Υ.						
0	Local Date Time TIM	ESTAMP -					1	
	Time Zone	• I DST					12	
	THE LET'S						-	
					-		-	

9. Now, we must map each of the individual columns in the file as separate variables, as well as associate the data in the file with a site, methods, a source, etc. This is done column by column because each column represents a different data series in ODM. To do this, we first select a column that contains data by

clicking on its header at the top of the table and then clicking the "Add" button in at the bottom right of the form. For this example, we will select the "WS_ms_Avg" column, and after clicking on the "Add" button, the following window appears, indicating the column that we have selected.

readed annound a	alue Columr				
WS_ms_Avg					
Time Interval Ad	justment				
Instantaneo	s Data (no nterval adjust	ment)			
Aggregate C	ata (can adjust Interval)				
Data in this co	lumn is recorded at the Si No	art of the interval			
Data in this of	lumn shouk be saved to No	the database at the	Start of the Interval		
Length of Inter	al: Days: 0 🔆	Hours: 0	Minutes: 0	* Seconds: 0	

10. On this form, we can specify whether the data in the column are instantaneous values or values that represent some sort of aggregation over a time interval. We can also control whether the data are loaded into the ODM database with times at the beginning of the measurement interval (which is the ODM convention) or whether the SDL should load them as end of interval values. For this example, the "WS_ms_Avg" column represents one-hour averaged wind speed values that are recorded at the end of the measurement interval by the datalogger. To correctly load these data, we will choose the radio button next to "Aggregate Data," which will enable the additional options on the form. We will then

specify that the data are not recorded by the datalogger at the beginning of the interval by clicking the "No" radio button. Following the ODM convention, we will select the "Yes" radio button indicating that we want SDL to load the data into the database at the beginning of the interval and then we will specify the interval as 1 hour (see figure below).

Please Select a Value (Column											
WS_ms_Avg												
Time Interval Adjustm	ent											
Instantaneous Dat	a (no Inte	rval adju	ustment)									
Aggregate Data (c)	an adjust	Interval)									
Data in this column	s recorde	d at the	Start of th	ne Inten	ral							
🔿 Yes 💿 No												
Data in this column	ehould be	eaved	o the dat	abase a	the S	art of the k	Isuate					
Yes No		saveu		suase a	Luie S		ILCI VOI					
165 0 110												
Length of Interval:	-						-				-	
Day	rs: 0	-	Hours:	1	0	Minutes:	0	÷	Seconds:	0	÷	

Note: The options that we have selected on this form will result in our data being loaded to the ODM database with the timestamp of each measurement shifted back one hour to the beginning of the measurement interval.

11. Click "Next" to continue, and the following form will appear.

efine Series							
Please Select a Site.							
riess + to Lieate a N SiteCode	ew Site. SiteName	Latitude	Longitude	Lati opgDatumD	Elevation m	VerticalDatum	Local
3855006	Siteradine	Lawage	Longhade	Edicongo atamo	Elevator_III	Ventedio diam	2000
					P.		Mout
					Ва		Next

This form lists all of the monitoring sites in the database. If you are adding new data to an existing site, you would be able to pick the site from the list and then move on by clicking "Next." However, since our database is empty, there are no existing sites, and so we must create one for our data. Click on the "Add" button is at the bottom of the form to create a new site. The following is an example of the "Add New Site" form with all of the required attributes filled out. When you are finished filling out the form, click on "OK."

Hequired	
Site Code	
USU-ML-Weather	
Site Name	
Mud Lake Weather Sta near Paris, Idaho	ion Near the USFWS shop
Latitude	Longitude
42.20854	-111.3393
Latitude/Longitude Datum	
4269 - NAD 83	
Optional	
Elevation in meters	Vertical Datum
	N
LocalX	Local Y
Local Projection Datum	Positional Accuracy in mete
Chala	
Idaha	Lounty
Idario	Dear Lake
Lomments	

NOTE: You will notice that the required fields are organized near the top of the form and the optional attributes are at the bottom. You must fill out all of the required fields. You will also notice that the Latitude/Longitude Datum input is a drop down box. This drop down lists all of the items in the SpatialReferences ODM controlled vocabulary table. In general, when you are required to input a value for an attribute that is tied to a controlled vocabulary you will be supplied with a list of the controlled vocabulary terms to choose from.

12. You will now notice that your new site has been added to the site selection form. Make sure that it is selected by clicking on it and then click "Next." The following form will appear.



On this form, you will select a variable to associate with your data. Again, you will notice that there are no variables to choose from in the list. Click the "Add" button to create a new variable. The following is an example of the "Add New Variable" form with all of the required attributes populated appropriately for this wind speed data series.

Required			
Variable Code			
USU0001			~
Variable Name			
Wind speed			~
Speciation			
Not Applicable			~
Variable Units			
meters per seco	nd • m/s	U	~
Sample Medium		Value Type	
Air	~	Field Observation	~
Time Support Value		Time Support Units	
1	۲	hour - hr	~
Data Type		General Category	
Average	~	Climate	~
No Data Value (#.#)		Is Regular	
-9999		True]~

NOTE: In this example, we are creating a variable for field observations of hourly average wind speed measured in meters per second. These data are collected regularly by a sensor connected to a datalogger. All of the variable attributes are required.

13. Click "OK" to create the new variable and return to the variable section form. You will notice that the new variable has been added to the list. Make sure it is selected by clicking on it and then click "Next". The following form will appear.

efine Series				
Please Select a Method.				
MethodDescription	MethodLink			
No method specified	1			
		 	_	4
			Back	Next
			DOCK	New

14. On the Select Method form you can associate a method with the observations in your data series. You can either select the default value (i.e., "No method specified"), or you can create a new method by clicking on the "Add" button. The following is an example of the required field populated on the "Add New Method" form.

Re	equired	
De	escription Measured using an R.M. Young Wind Sentry Set	~
0p Lir	ptional nk	

Click on the "OK" button to return to the Select Method Form, make sure that your new method is selected by clicking on it and then Click on "Next". The following form will appear.



15. Click on the "Add" button to create a new source in your database. The following is an example of the "Add New Source" form populated with all of the required fields.

lequired		
Organization		
Utah Water Research	h Laboratory	^
		÷
Description		
Data collected as par in the Mud Lake area Wildlife Refuge, dah	t of a sediment budget study of the Bear Lake National o	*
Contact Address		
8200 Old Main Hil		
		-
Otation		
Horsburgh, J.S., 200 Lake Area of the Bea Refuge, Idaho, Utah Utah State University	9. Data collected in the Mud ar Lake National Wildlife Water Research Laboratory, y, Logan, UT, USA	· ·
Contact Name	Contact Phone	
Jeff Horsburgh	1(435) 797-294	6
City	State	
Logan	Utah	
Zip Code	Contact Email	
84322-8200	jeff.horsburgh@usu.e	edu
ISO Metadata		
Unknown - Unknown	, .	-
Intional		
Link		

NOTE: If you want to create a new record in the ISOMetadata table to associate with your Source, click on the "Add" button next to the ISOMetadata drop down to create a new ISOMetadata record.

15. Click on "OK" to return to the Select Source form. Make sure that the new source that you just created is selected by clicking on it and then click "Next." The following form will appear.

ase delette d'unse	Tune and Offeet Value		
ss + to Create a N	ew OffsetType.		
UnitsName	OffsetDescription		
<none></none>	<none></none>		
setValue			

16. On this form, you can select an offset for your data values. Since there are not offsets currently defined in the database, we must create one. Click on the "Add" button to create a new offset. The following is an example of the "Add New Offset Type" form with all of the required fields populated.

Require	d		
Abo	tion ve the grou	ind surface	_
Unit:			~
mete	er • m		~

Click on OK to return to the Select Offset Type form. You will notice that the new offset type that you just created is now in the list. Make sure that it is selected and then input a value for the offset in the "Offset Value" field at the bottom of the form. In this example, we are measuring wind speed 8 feet (2.44 meters) above the ground surface, so we will enter 2.44 for the offset value and then click on "Next". The following form will then appear.

Defin	ie Series		
Please	Select a Quality Control Level		
	QualityControlLevelCode	Definition	Explanation
	0	Raw data	Raw and unprocessed data and data products that have not undergone quality of
	1	Quality controlled data	Quality controlled data that have passed quality assurance procedures such as it
	2	Derived products	Derived products that require scientific and technical interpretation and may inclu
	3	Interpreted products	Interpreted products that equire researcher driven analysis and interpretation, ma
	4	Knowledge products	Knowledge products that require researcher driven scientific interpretation and m
	-9999	Unknown	The quality control level is unknown
۲]			د ج
			Back Finish

17. On this form, you can select a quality control level to go with your data. Since this is raw sensor data, we will select a quality control level of 0 and then click "Finish". You can add a new quality control level by clicking on the "Add" button at the bottom of the form. Once the quality control level has been selected, you will be returned to the "Add New File" form and it will look like the following.

Addh	lew File									-	
	TIMESTAMP	RECORD	Batt	Volt_Min	WS_	ms_Avg	WS_ms_	S_WVT	WindD	ir_D1_WVT	Win
•	2007-07-03 15:0	1	13.30	0175	4.340	146	4.340146		323.10	14	27.0-
	2007-07-03 17:0	3	13.26	5062	2.763	456	2.763456		335.15	34	27.8
	2007-07-03 19:0	5	13.26	6062	3.081	793	3.081793	Ĺ	319.002	23	21.2
	2007-07-03 21:0	7	13.13	347	1.901	091	1.901091		319.42	7	12.9
	2007-07-03 23:0	9	12.98	8024	1.372	859	1.372859	l.	313.95	71	15.4:
	2007-07-04 01:0	11	12.91	393	0.262	03	0.26203		212.81	63	35.1:
	2007-07-04 03:0	13	12.89	3042	0.583	6292	0.583629	2	293.62	1	33.9:
	2007-07-04 05:0	15	12.87	7867	0.577	4493	0.577449	3	74.215	55	42.1
	2007-07-04 07:0	17	12.87	7699	1.414	081	1.414081		346.58	24	15.9
	2007-07-04 09:0	19	13.49	9818	0.135	084	0.135084		168.64	18	6.72
	2007-07-04 11:0	21	13.35	5631	1.145	517	1.145517	1	99.669	6	35.3
	2007-07-04 13:0	23	13.27	774	1.272	201	1.272201		229.49	51	32.5
	2007-07-04 15:0	25	13.25	5306	1.642	895	1.642895		284.32	31	43.2!
<											>
Time	(must select at least 2)		Value Colur	nn	Site	Variable	Ofiset 1	(vpe	Offset Valu	e 🚅
0	UTC Date Time	~	•	WS_ms_Av	g	1	1	1		2.44	
⊙ L	ocal Date Time TIM	ESTAMP 🔽									
	Time Zone -7	DST	<		1111						
							[Bac	*	Fini	sh

You will notice that a new row has been added to the table at the bottom right of the form representing the column that you just mapped. At this point, you can either go on and map all of the other columns in

your file using the same steps outlined above, or you can click on "Finish," which will save the configuration for the current file and take you back to the main Configuration Wizard form. If you wish to edit the configuration for the column that you just mapped, select its record in the table at the bottom right of the form and click on the "Edit" button \bigcirc . You will then be able to revisit the mapping for that column in the file. You can also remove the mapping for the column from the configuration file by clicking on the "Delete" button \bigcirc .

WARNING: If you edit the mapping for a data series after an update has been run and data have been added to the database it is likely that any new data with the updated mapping will show up as a different data series in your ODM database because you have edited the attributes of the data series.

18. If you click "Finish", you will be taken back to the main Configuration Wizard form, which will look like the following.

🔊 OD	M Stream	ning Data Loader						
File	Help							
-	/ - 1							
	ID	Server Address	Database Name	File Location Type	File Location	Schedule Period	Schedule Beggi	Last Update
Þ	1	(local)	OD	Local	C:\Working\Pioj	1 hours	6/25/2008 2:00:	1/1/0001 12:00:

A record has been added for the file that you just mapped. You will notice in the attributes of this file, the server address, the name of the database to which you are adding the data, the type of file you are adding, the location of the file, and the information about scheduling the update. You will notice that the "Last Update" field is not initialized because the update has not been run yet.

19. Congratulations! You are now ready to run the update either manually through the Configuration Wizard, or automatically by scheduling the data loader using the Windows Task Scheduler. The mapping that you have just created has been stored as XML in a configuration file. This file is located in the AppData folder (C:\users\jeff\AppData\Local\CUAHSI\StreamingDataLoader\Version\ - where "jeff" would be your Windows user name and "Version" would be a folder named with the version number for the version of SDL you are running). The configuration file stores all of the information that is needed to parse the streaming data from the text file into the ODM database. The configuration file for the example that we just completed is shown below.

	_ 🗆 🔀
Green Files (CUAHSI HIS (OM SDL 1.1 (Config.xm)	P -
Ele Edit Yew Favorites Iools Help Google G - 🐨 Go 🛷 🥵 - 🏠 Bookmarks - 🌺 Settings-	lenovo
😪 🐼 🌈 C:\Program Files\CUAHSI HIS\OOM SDL 1.1\Config.xml	0 - 🚑 🖏 -3
<pre><?xml version="1.0" encoding="utf-#" ?> < Config> - <file id="1"> <gentgs - <file id="1"> <gentyset <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=> <guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></guestion=></gentyset </file></gentgs </file></pre>	D8 0 0 AD tion>
Done 🔮 My Computer	at 100% •

4.0 RUNNING THE ODM SDL MANUALLY

Once you have created a mapping for a streaming data file, you can run the data loader manually directly from the Configuration Wizard. To do this, select a row in the main Configuration Wizard window (remember that each row represents a file mapping) and then click on the "Execute" button \mathbb{B} , which is located on the toolbar, to run the update.

When you click on the "Execute" button, all of the set time intervals for the updates are overridden and the update is run at once. The Configuration Wizard launches the Data Loader, which opens the streaming data file, checks for any new data that have not already been added to the database, and then parses any new data into the database. Manual updates can be run at any time from the main form of the Configuration Wizard.

5.0 RUNNING THE ODM SDL AUTOMATICALLY

If you wish to automate the execution of the SDL application, you can schedule it as a regular task using the Windows Task Scheduler. When the Data Loader is run as a Windows task, it is exactly the same as if it were run manually from the toolbar of the Configuration Wizard. Windows executes the SDL application, which opens the configuration file and the streaming data file, and then parses any new data into the ODM database for data series that have been mapped. The following steps were written for a computer running Windows 7 or Windows Server 2008. For instructions on how to schedule a Windows Task Using Windows XP, consult Appendix B of this document.

1. Start the Windows Task Scheduler by clicking on Start – Control Panel – Administrative Tools – Task Scheduler. The following window will open.

Task Scheduler (Local)	Task Scheduler Summary (Last)	efreshed: 9/1/2011 1:27:	48 PM)		Actions
Jask Scheduler Library	Overview of "ask Scheduler Voucan use Task Scheduler spediy. To begin, cl Task are stored in fi perform an operation Task Status Status of tasks that have sta Summary: (total - 0 runnin Task Nam:	heduler to create and m will carry out uutomatic ck a commard in the A alders in the Task Sched n on an individual task, nr and rörk m a comm rted in the following g, 0 succeeded, 0 stopp Run Result	anage common t ally at the times yr ction menu. uler Library. To vir select the task in t select the Artion Last 24 hours ed, 0 failed Run Start	atks ou ew or the Run Env	Task Scheculer (Local) Connect to Another Computer Create Basic Task Transcream Import Task Display All Running Tasks Enable All Tasks History AT Service Account Configuration View Refresn Import

2. Click on "Creat Task" in the Actions panel at the right side of the form. On the form that pops up, give your task a name and a description:

Consul Tr.		812.1			
General Ing	gers Actions C	onditions	Settings		
Name:	ODM Streaming	Data Load	ler		
Location:	1				
Author:	water\jeff				
Description:	ODM Streaming) Data Load	der		
Security opt	ions	he followir	a user account:		
water\jeff	ing the topic use t	inc renorm	ig our account		Change User or Group
<u>Run only</u>	when user is log	ged on			
🔘 Run <u>w</u> he	ther user is logge	d on or no	t		
🗌 Do n	ot store password	. The task	will only have acces	s to local compute	er resources.
🔄 Run with	highest privilege	5			
Hidden	Configure	for: Wind	dows® 7, Windows S	erver™ 2008 R2	•

3. The task is automatically configured to run using the Windows account under which you are currently logged in. If you need to change which account the task runs under, click the "Change User or Group" button. You will also want to specify whether the task is run only when you are logged on or whether you are logged on or not. If you want the task to run on a regular schedule, regardless of whether you are logged in, click the radio button next to "Run whether user is logged on or not." You should also run the task with the highest priveleges available for your Windows User. Your form should now look something like the following:

General Trig	gers Actions Con	ditions Settings	
Na <u>m</u> e:	ODM Streaming Da	ita Loader	
Location:	Υ		
Author:	water\jeff		
Description:	ODM Streaming Da	ata Loader	
Security opt	tions	following war account:	
water\jeff	ing ne task, use the	ronowing user account:	Change User or Group
Bun only	y when user is logged	d on	
Run whe	ether user is logged o	on or not	
Do r	not store gassword. T	he task will only have access to lo	cal computer resources.
🖉 Run wjt	h highest privileges		
	Configure for:	Windows® 7, Windows Server*	* 2008 R2 +
Hiddgn			

4. At the top of the "Create Task" form, click the "Triggers" tab. On this tab you will specify how the task will be triggered to run. Click the "New..." button at the bottom of the "Triggers" tab. The "New Trigger" window will open. For this example, we will configure a trigger that will run SDL on a schedule (see the top drop down box), and we will specify that we want to run our task daily, repeating every hour. This will execute the SDL once per hour every day. You can customize the trigger to suit the schedule that meets your needs. Your "New Trigger" form should look something like the following:

Settings	On a schedule		•	
 One time Daily Weekly Monthly 	Start: 9/ 1/2011 Regur every: 1	• 2:00:00 P	M 🔄 🗖 Synchronize acro	ss time zones
Advanced setti	ngs forun to (random delav)	t lbour		
Repeat tas	k every: 1 hour all running tasks at end	• of repetition durati	for a duration of: 1 day	•
Stop task i	it runs longer than:	3 days	*	
	/ 1/2012 2:00:1	9 PM	Synchronize across tim	ne zones
Expire: 9				

- 5. Click the "OK" button on the "New Trigger" form to go back to the main "Create Task" window. You will notice that the trigger that you just created has been added to the list on the "Triggers" tab.
- 6. Next, click the "Actions" tab at the top of the "Create Task" window. On the "Actions" tab you will specify that the Windows Task should execute the SDL. Click the "New..." button at the bottom left of the "Actions" tab.
- 7. On the "New Action" form that opens, select "Start a program" from the "Action" pull down list.
- Next, click the "Browse" button. A file dialog will open. Navigate to the location of the SDL executable and select it on the form (the path for Windows 7 is C:\Program Files (x86)\CUAHSI HIS\ODM SDL 1.1.2.2\ODMSDL.exe). Then, click the "Open" button. Your "New Action" form should now look like the following:

w Action	1		
You mu	st specify what action this	task will perform.	
Action:	Start a program		-
Setting	s		
Progra	am/script:		
"C:\Pr	ogram Files (x86)\CUAHSI	HIS\ODM SDL 1.1.2.2\OE	Browse
Add a	rguments (optional):		
Start i	n (optional):		

- 9. Click the "OK" button on the "New Action" form to return to the main "Create Task" window. You will notice that the action that you just created has now been added to the list on the "Actions" tab.
- 10. As a final step, you can configure the options on the "Conditions" and "Settings" tabs of the "Create Task" form, but for this example we will use the default options on those tabs.
- 11. Click the "OK" button on the "Create Task" window. You will be prompted to input the password for the Windows user that you configured the task to run under. Enter the password and then click "OK". Your task has now been added to the list of Active Tasks on your computer. To view the Active Tasks list, scroll down in the middle panel of your Task Scheduler Window (see below)

Task Scheduler (Local)	Task Scheduler Summary (Last refreshed: 9	9/1/2011 1:27:48 PM)		Actions
 ■ Task Scheduler Library ■ Apple ■ Microsoft ■ OfficeSoftwareProtect ■ WPD 	Tasks are stored in folders in th perform an operation on an inc Task Scheduler Library and clic Task Status	Task Scheduler (Local) Cennect to Another Computer Cieste Basic Task Cieste Task		
	Active Tasks Active tasks are tasks that are currentl Summary: 40 total	y enabled and have not ex	pired.	Import Task Display All Running Tasks Erable All Tasks History AT Service Account Configuration View
	Task Name GoogleUpdateTaskUserS-1-5-21-8 ODM Streaming Data Loader GoogleUpdateTaskMachineUA RacTask	Next Run Time 9/L/2011 2:47:00 PM 9/L/2011 3:00:00 PM 9/L/2011 3:01:00 PM 9/L/2011 3:05:58 PM	Triggers At 3:47 F At 3:47 F At 10:01 Multiple	Ca, Karesh
	Last refreshed at \$/1/2011 1:27:48 PM		Refresh	

12. Congratulations! You have now created an automated Windows task that will run the SDL. On the schedule that you just created, Windows will open your SDL configuration file and perform the data load for any streaming data files that you have mapped in the configuration file. You can modify or delete your task at any time if you double click on its name in the list of Active Tasks in the Windows Task Scheduler.

6.0 VIEWING THE ODM SDL LOG FILE

Each time an update is run, information about that update is written to the ODM SDL log file. For Windows 7 and Windows Server 2008 users, this log file is a text file and is located in the AppData folder

(C:\Users\jeff\AppData\Local\CUAHSI\StreamingDataLoader\1.1.2.2 – where the "jeff" would be your Windows user name and the "1.1.2.2" would be the version of ODM SDL that you are running). A summary of the update is written to the log file as well as any errors that are encountered. The following is an excerpt from a log file.

```
📕 Log.txt - Notepad
                                                                                                                   - 🗆 🗙
File Edit Format View Help
Wednesday, June 25, 2008
Config File Loaded.
Ignoring Update Schedule...
                                   3:06:14 PM
         Loading File #1...
                 Loading C:\working\Projects\Mud Lake\Data\CR200_ML_weather_Hourly_MetData.dat ...
                 C:\Working\Projects\Mud Lake\Data\CR200_ML_weather_Hourly_MetData.dat Loaded.
         Server: (local)
         Database: OD
User: sa
                 Loading Data For New Series...
                 Rows to Add to New Series: 1319.
         Updating File #1.
         Rows Added to Database: 1319.
Updating series Catalog Table...
Series # 7 added to series catalog table.
Series Catalog Table Updated.
Update Completed @
Wednesday, June 25, 2008
                                  3:07:03 PM
```

REFERENCES

- Horsburgh, J. S., D. G. Tarboton, D. Maidment, and I. Zaslavsky (2008), A Relational Model for Environmental and Water Resources Data, Water Resources Research, Vol. 44, W05406, doi:10.1029/2007WR006392.
- Tarboton, D.G., Horsburgh, J.S., and D.R. Maidment. 2008. CUAHSI Community Observations Data Model (ODM) Design Specifications Document: Version 1.1. <u>http://his.cuahsi.org.</u>

APPENDIX A: SCHEDULING THE STREAMING DATA LOADER USING WINDOWS XP

This appendix describes the steps for scheduling the Streaming Data Loader to run as a Windows Scheduled Task using Windows XP.

 Start the Windows Task Scheduler by clicking on Start – All Programs – Accessories – System Tools – Scheduled Tasks. The following window will open.



2. Double click on "Add Scheduled Task". The following window will open.

Scheduled Task Wiza	ırd 🛛 🔀
2	This wizard helps you schedule a task for Windows to perform. You select the program you want Windows to run, and then schedule it for a convenient time. Click Next to continue.
	< <u>Back</u> <u>N</u> ext > Cancel

3. Click "Next". On the Window that opens click "Browse" to browse to the location of the ODM SDL Data Loader executable.

	Click the program you want Wind To see more programs, click Bro	lows to run. wse.	
1	Application	Version	-
4	.NET Help for VS2005	8.0.50727.42	C
11	Access Connections	4, 11, 0, 0	
	Access Help	5.2.3790.245	
	Accessibility Wizard	5.1.2600.218	
~	Address Book	6.00.2900.21	
-	📶 Adobe Reader 7.0		~
		Biowse	

4. On the "Select Program to Schedule" form navigate to the following location: C:\Program Files\CUAHSI HIS\ODM SDL 1.1.X. In this folder you will find an executable called ODMSDL.exe. Select this executable and then click "Open."

Select Program	n to Schedule			? 🗙
Look in:	DDM SDL	1.1	G 👂 🖻 🖽 -	
My Recent Documents	Config.xml	n Wizard.exe		
My Documents				
My Computer				
	File rame:	ODMSDL.exe	~	<u>O</u> pen
Mu Network	Files of type:	Programs	× (Cancel

NOTE: The location of ODM SDL 1.0 is C:\Program Files\CUAHSI HIS\ODM SDL rather than the path shown above. Make sure you use the correct executable for the version of ODM that you are loading data into.

5. On the next form that opens, give the task a name and then select the schedule that you wish to use for your automated update. Click the "Next" button.

C. S. Contractor	<u>I</u> ype a name for this task. The task name can be the same name as the program name.
1	ODMSDL
4	Perform this task:
ZE	⊙ <u>D</u> aiy
	O₩eekly
	○ <u>M</u> onthly
	O One time only
	When my computer starts
	O When I log on

NOTE: If you wish to schedule the Data Loader to run more frequently than daily, select daily on this form and then use the advanced options available later to specify a more frequent interval.

6. Next, select the time and day you want the task to start. Then click "Next."

	Select the time and day you want this task to start.
	Start time:
1 0	12:00 PM 📚
X	Perform this task:
7 -	Every Day
	<u>○</u> <u>W</u> eekdays
-	O Every 1 ♦ days
	Start date:
0	6/25/2008
	< <u>Back</u> Next> Cancel

7. You must now specify a valid Windows username and password for the task to use so that it can be run whether you are logged on or not. Enter your authentication information and then click "Next".

Contractory of	Enter the name and pa run as if it were started	issword of a user. The task will by that user.
• 9	Enter the user name:	PESCAD0\jeff
1	Enter the password:	•••••
	Confirm password:	•••••
	If a password is not ent not run.	tered, scheduled tasks might

8. On the final form, you can either finish the task, or you can check the box next to the option to open the advanced option. If you wish to schedule a task more frequently than daily, you must use the advanced options.

Scheduled Task W	izar d 🛛 🔀
T	You have successfully scheduled the following task:
2	Windows will perform this task: At 12:00 PM every day, starting 6/25/2008
	Open advanced properties for this task when I clck Finish.
	Click Finish to add this task to your Windows schedule.
	< <u>Back</u> Finish Cancel

9. When you click "Finish," the following form will appear. This form contains all of the settings for the task that you just created. To access the advanced settings for the schedule, click on the "Schedule" tab and then click on the "Advanced" button. If you do not need to change any other settings for this task, click the "OK" button.

<u>B</u> un:	rogram Files\CUAHSI HIS	SVODM SDL 1.1VODMSDL.exe
		Browse
Start in:	"C:\Program Files\CUAH:	SI HIS\0DM SDL 1.1"
<u>C</u> omments:		

10. Congratulations! You have now created an automated Windows task that will run the ODM SDL. On the schedule that you just created, Windows will open your configuration file and perform the data load for any streaming data files that you have mapped in the configuration file. The Windows task will run regardless of whether you are logged in to your computer or not. If you wish to remove a scheduled task, just right click on it in the list of scheduled tasks and click on "Delete."