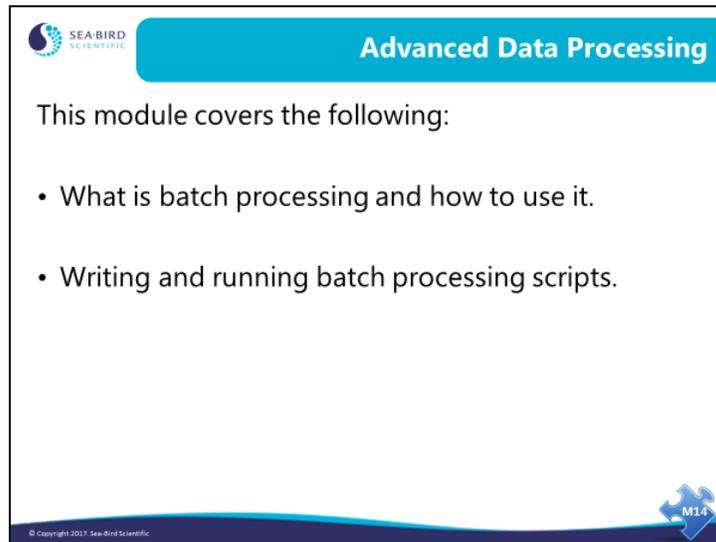




Advanced Data Processing:  
Batch Processing  
Sea-Bird Scientific University Module 14



## Overview



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### Advanced Data Processing

This module covers the following:

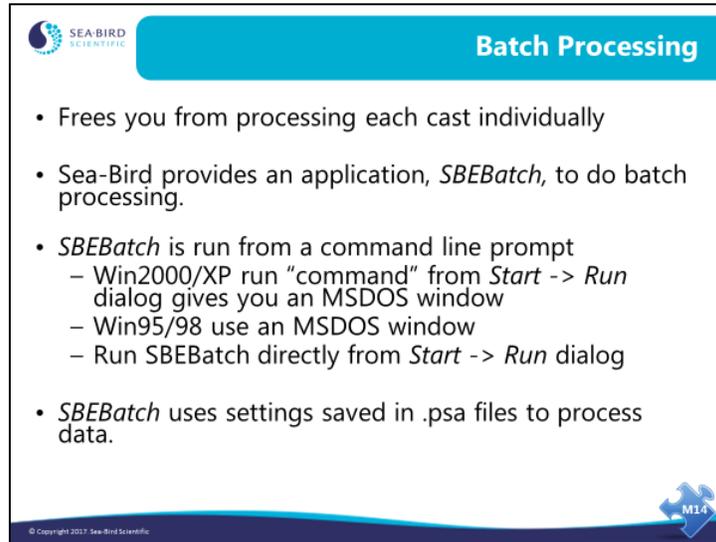
- What is batch processing and how to use it.
- Writing and running batch processing scripts.

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This section of the course is the final topic in profiling. We will talk batch processing large numbers of files.

## Data Processing Large Numbers of Files



**SEA-BIRD SCIENTIFIC** **Batch Processing**

- Frees you from processing each cast individually
- Sea-Bird provides an application, *SBEBatch*, to do batch processing.
- *SBEBatch* is run from a command line prompt
  - Win2000/XP run “command” from *Start -> Run* dialog gives you an MSDOS window
  - Win95/98 use an MSDOS window
  - Run *SBEBatch* directly from *Start -> Run* dialog
- *SBEBatch* uses settings saved in .psa files to process data.

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For processing large sets of cast data, batch mode processing automates the job. You can use the windows scripting host or a program provided with SBE Data Processing, *SBEBatch.exe*. Your batch file can take advantage of command line parameters and wild card characters.

You can run *SBEBatch* from a DOS window or from the Windows Run dialog (Start -> Run). In all the examples we’ll use today (and the examples in the SBE Data Processing manual), we’re assuming you are running from the Windows Run dialog box.

## Data Processing Large Numbers of Files (*continued*)



**Batch Processing**

- Use an application to run other applications (*i.e.*, data processing applications)
- You may use Windows Scripting Host or the application Sea-Bird provides, *SBEBatch*
- Applications that batch processor runs are listed in a text file that you make with a text editor like Notepad
- SBEBatch reads each line of the text file and runs each application in turn
- Data processing parameters must be set in Sea-Bird Data Processing software Program Setup (.psa) files before batch scripting is run.



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### Applications:

Module	Process Name
Align CTD	Alignctd
ASCII In	Asciin
ASCII Out	Asciout
Bin Average	Binavg
Bottle Summary	Bottlesum
Buoyancy	Buoyancy
Cell Thermal Mass	Celltm
Data Conversion	Datcnv
Derive	Derive
Filter	Filter
Loop Edit	Loopedit
Mark Scan	Markscan
Sea Plot	Seaplot
Section	Section
Split	Split
Strip	Strip
Translate	Trans
Wild Edit	Wildedit
Window Filter	Wfilter

## Data Processing Large Numbers of Files (*continued*)



Batch Processing

- Each command line in the batch file contains
  - Name of application
  - Name of files to operate on
  - Any additional parameters needed to do the job
  
- Applications are the same as the graphical interface, e.g.
  - Data Conversion → *Datcnv*
  - Align CTD → *Alignctd*
  - Cell Thermal Mass → *Celltm*
  
- Parameters are denoted by '/' character and an identifier
  - Configuration file → */c*
  - Input file → */i*
  - Output directory → */o*
  - Program setup file (.psa) → */p*
  
- Comments start with @



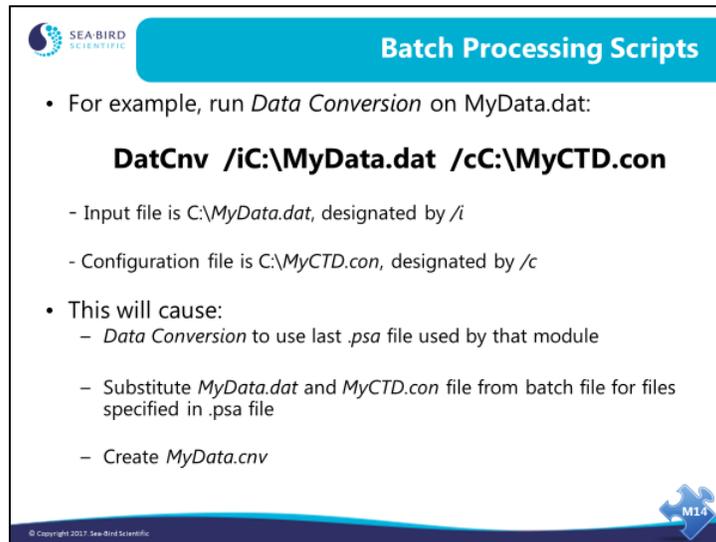
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A list of the most commonly used parameters follows; see the SBE Data Processing manual for a complete list:

Parameter	Description
<i>/cString</i>	Use <i>String</i> as instrument <b>configuration (.con or .xmlcon) file</b> . <i>String</i> must include full path and file name. Note: If using <i>/cString</i> , must also specify input file name (using <i>/iString</i> ).
<i>/iString</i>	Use <i>String</i> as <b>input file name</b> . <i>String</i> must include full path and file name. This parameter supports standard wildcard expansion: <ul style="list-style-type: none"> <li>• ? matches any single character in specified position within file name or extension</li> <li>• * matches any set of characters starting at specified position within file name or extension and continuing until end of file name or extension or another specified character</li> </ul>
<i>/oString</i>	Use <i>String</i> as <b>output directory</b> (not including file name).
<i>/fString</i>	Use <i>String</i> as <b>output file name</b> (not including directory).
<i>/aString</i>	<b>Append <i>String</i> to output file name</b> (before extension).
<i>/pString</i>	Use <i>String</i> as <b>Program Setup (.psa) file</b> . <i>String</i> must include full path and file name.
<i>/xModule: String</i>	Use <i>String</i> to define an additional parameter to pass to Module. Not all modules have x parameters; see module descriptions for details. If specifying multiple x parameters, enclose in double quotes and separate with a space. <i>Example:</i> Run Data Conversion, telling it to skip first 1000 scans: <i>/xdatcnv:skip1000</i>
#m	Minimize SBE Data Processing window while processing data, allowing you to do other work on computer.

**If specifying multiple parameters, insert a space between each parameter in the list.**

## Writing Batch Processing Scripts



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### Batch Processing Scripts

- For example, run *Data Conversion* on *MyData.dat*:  
**DatCnv /iC:\MyData.dat /cC:\MyCTD.con**
  - Input file is *C:\MyData.dat*, designated by */i*
  - Configuration file is *C:\MyCTD.con*, designated by */c*
- This will cause:
  - *Data Conversion* to use last *.psa* file used by that module
  - Substitute *MyData.dat* and *MyCTD.con* file from batch file for files specified in *.psa* file
  - Create *MyData.cnv*

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## Writing Batch Processing Scripts (*continued*)



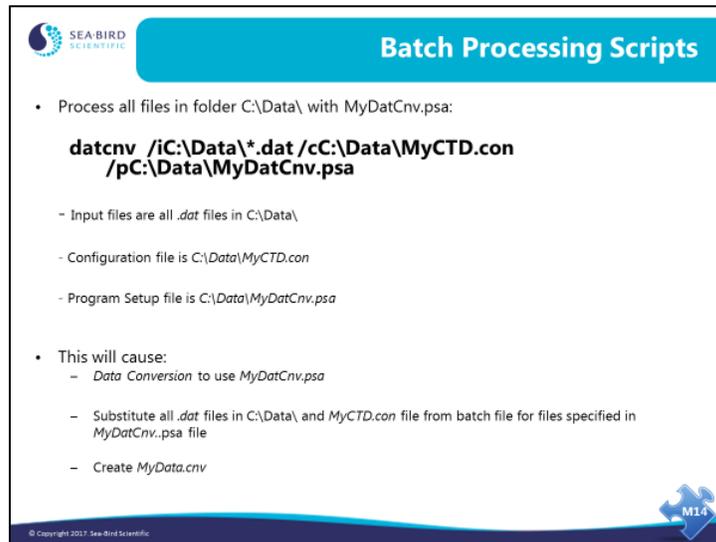
### Batch Processing Scripts

- Process all files in folder C:\Data\ using a wildcard '\*' character:  
**datcnv /iC:\Data\\*.dat /cC:\Data\MyCTD.con**
  - Input files are all .dat files in C:\Data\
  - Configuration file is C:\Data\MyCTD.con
- This will cause:
  - *Data Conversion* to use last .psa file used by that module
  - Substitute all .dat files in C:\Data\ and MyCTD.con file from batch file for files specified in .psa file
  - Create MyData.cnv



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## Writing Batch Processing Scripts (*continued*)



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### Batch Processing Scripts

- Process all files in folder C:\Data\ with MyDatCnv.psa:  
**datcnv /iC:\Data\\*.dat /cC:\Data\MyCTD.con  
/pC:\Data\MyDatCnv.psa**
  - Input files are all .dat files in C:\Data\
  - Configuration file is C:\Data\MyCTD.con
  - Program Setup file is C:\Data\MyDatCnv.psa
- This will cause:
  - Data Conversion to use MyDatCnv.psa
  - Substitute all .dat files in C:\Data\ and MyCTD.con file from batch file for files specified in MyDatCnv.psa file
  - Create MyData.cnv

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## Writing Batch Processing Scripts (*continued*)



Batch Processing Script

@Enter the following command into the Run or Sea-Bird Data Processing Command Line Options:  
 @ sbebatch C:\Batch.txt C:\InstrumentData  
 @ make sure folder "C:\InstrumentData" contains relevant PSA files  
 @ %1 represents data path "C:\InstrumentData"  
 @ use %1\\*.HEX as a wildcard to find all .HEX files

Datcnv /i%1\*.HEX	/p%1\DatCnv.psa	/o%1\cnv\	/c%1\MyCruise.xmlcon
Filter /i%1\cnv\*.cnv	/p%1\Filter.psa	/o%1\cnv\	
Alignctd /i%1\cnv\*.cnv	/p%1\AlignCTD.psa	/o%1\cnv\	
Celltm /i%1\cnv\*.cnv	/p%1\CellTM.psa	/o%1\cnv\	
Loopedit /i%1\cnv\*.cnv	/p%1\LoopEdit.psa	/o%1\cnv\	
Derive /i%1\cnv\*.cnv	/p%1\Derive.psa	/o%1\cnv\	/c%1\MyCruise.xmlcon
Binavg /i%1\cnv\*.cnv	/p%1\Binavg.psa	/o%1\cnv\	



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## Running SBEBatch

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### Running SBEBatch

- SBEBatch is run from command line
- The format for sbatch is:
 

```
sbatch filename parameters
```

  - *filename* is the name of the batch file that SBEBatch will open and execute
  - *parameters* are referenced in the batch file
- For example: **sbatch c:\MyBatch.txt**
  - Causes SBEBatch to open MyBatch.txt
  - Runs the applications a line at a time

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Here's an example of how to use batch processing to run Data Conversion and Derive to process all the files in C:\Data:

1. Run Data Conversion, entering the desired choices in the File Setup and Data Setup dialog boxes. Upon completing setup, press Save or Save As on the File Setup tab. The configuration is stored in the .psa file. Repeat for Derive.
2. Create a batch file named batch.txt in C:\Data, which contains the following lines:
 

```
@Lines starting with @ are comment lines, and have no effect on the result
@Use these to document what you are doing in the batch file
@Processing data from February 2006 Cruise
datcnv /iC:\Data\*.dat /cC:\Data\MyCTD.con
derive /iC:\Data\*.cnv /cC:\Data\MyCTD.con
```
3. Select Run in the Windows Start menu. The Run Dialog box appears. Type in the batch processing program name and the .txt file name:
 

```
sbatch c:\Data\batch.txt
```

The results:

1. Data Conversion uses its last .psa file, substituting the .con file from the batch file for the .con file specified in the .psa file, and processes **all** .dat files in C:\Data, creating a .cnv file from each .dat file.
2. Derive uses its last .psa file, substituting the .con file from the batch file for the .con file specified in the .psa file, and processes **all** .cnv files in C:\Data (which were just created by Data Conversion), creating a .cnv file from each .cnv file.

## Running SBEBatch (*continued*)



### Running SBEBatch

- Remember that the format for running SBEBatch is:  
**sbatch filename *parameters***
- You can operate on files in different folders with the same batch file by using command line *parameters*
- These are entered after the batch file name and are denoted by the '%' character and a number
  - First command line parameter is %1, second is %2, etc.
- Batch file must have entries that use the '%' parameters
- For example: **sbatch c:\Batch.txt C:\InstrumentData**
  - Causes SBEBatch to open MyBatch.txt
  - Enters C:\InstrumentData as parameter %1 into batch script
  - Runs the applications a line at a time



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## Running SBEBatch (*continued*)

**SEA-BIRD SCIENTIFIC** **Batch Processing Scripts**

For example, a batch file that has this line in C:\MyBatch.txt

```
DatCnv /i%1\*.dat /c%1\MyCTD.con
```

Executed with this command line:

```
SBEBatch C:\MyBatch.txt C:\Data
```

Defines C:\Data as the %1 parameter, and will cause Data Conversion to be run like this:

```
DatCnv /iC:\Data\*.dat /cC:\Data\MyCTD.con
```

And converting all .dat files in C:\Data.

For the same batch file, if the command line is

```
SBEBatch C:\MyBatch.txt C:\NewData
```

All .dat files in C:\NewData will be converted

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Now let's add a bit more flexibility to the process. Here's an example of how to use batch processing to run Data Conversion and Derive to process all the data files in C:\Data\Leg1, C:\Data\Leg2, and C:\Data\Leg3:

1. Run Data Conversion, entering the desired choices in the File Setup and Data Setup dialog boxes. Select *Match instrument configuration to input file* on the File Setup tab. Upon completing setup, press Save or Save As on the File Setup tab. The configuration is stored in the .psa file. Repeat for Derive.
2. Create a batch file named batch.txt in C:\Data, which contains the following lines:
 

```
@Processing data from 3 legs of February 2006 Cruise
datcnv /i%1\*.dat
derive /i%1\*.cnv
```
3. Select Run in the Windows Start menu. The Run Dialog box appears. Type in the batch processing program name, the .txt file name, and the %1 parameter:
 

```
sbebatch C:\Data\batch.txt C:\Data\Leg1
```

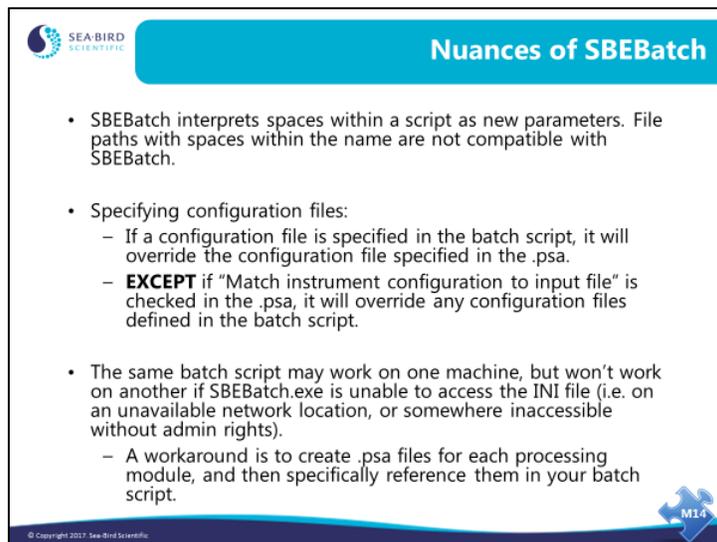
 Repeat for the files in Leg2 and Leg3:
 

```
sbebatch C:\Data\batch.txt C:\Data\Leg2
sbebatch C:\Data\batch.txt C:\Data\Leg3
```

The results:

1. Data Conversion uses its last .psa file, substituting the matching .con file for the .con file specified in the .psa file, and processes **all** .dat files in C:\Data\Leg1, creating a .cnv file from each .dat file.
2. Derive uses its last .psa file, substituting the matching .con file for the .con file specified in the .psa file, and processes **all** .cnv files in C:\Data\Leg1 (which were just created by Data Conversion), creating a .cnv file from each .cnv file.
3. Steps 1 and 2 are repeated for the files in C:\Data\Leg2 and C:\Data\Leg3.

## Nuances of SBEBatch



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### Nuances of SBEBatch

- SBEBatch interprets spaces within a script as new parameters. File paths with spaces within the name are not compatible with SBEBatch.
- Specifying configuration files:
  - If a configuration file is specified in the batch script, it will override the configuration file specified in the .psa.
  - **EXCEPT** if “Match instrument configuration to input file” is checked in the .psa, it will override any configuration files defined in the batch script.
- The same batch script may work on one machine, but won't work on another if SBEBatch.exe is unable to access the INI file (i.e. on an unavailable network location, or somewhere inaccessible without admin rights).
  - A workaround is to create .psa files for each processing module, and then specifically reference them in your batch script.

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## Activity: Use Beach Scripting to Process Data

Explanation: We will prepare Data Conversion and Bin Average to operate with your batch file, by setting up the desired output parameters, bin size, etc. The saved .psa files contain all the information on the setup. And then we will create a batch processing script to process a large number of files in the same way.

1. In SBE Data Processing, run *Data Conversion*:
  - Use C:\Data\Module9\Batch\Puget00.hex
  - Downcast only
  - Calculate Pressure, Temperature, and Salinity
  - Save .psa file as C:\Data\Module9\Batch\DatCnv.psa
2. In SBE Data Processing, run *Bin Average* to create 1 decibar bins:
  - Use C:\Data\Module9\Batch\Puget00.cnv
  - Name append *B*
  - Data Setup
    - Choose Pressure for *Bin Type*
    - Enter *Bin size* of 1
    - Process* the downcast
    - Make other selections as desired
3. Delete Puget00.cnv and Puget00B.cnv.
  - Delete these output files from Data Conversion and Bin Average because they will be recreated by the batch processing script.
4. Create a batch processing script to process **all** files in C:\Data\Module9\Batch (Puget00.hex, Puget01.hex, etc.):
  - Use Notepad to write your batch file, using a %1 parameter for the file locations.
  - Save your batch file as C:\Data\Module9\Batch\MyBatch.txt
5. Launch a command line session: Click Start > Run.
6. Run your batch file with the command line:  
**Sbbatch C:\Data\Module9\Batch\MyBatch.txt C:\Data\Module9\Batch**
7. Check to see that you were successful with Notepad