Attachment A – Summary of WinRiver II new features and system requirements

<u>**New features:**</u>
- A measurement centric design – All site, rating, configuration, QA/QC, and references to raw data files are stored in a single measurement (*.mmt) file.
- A new measurement control is provided to work efficiently with all associated measurement data.
- Built-in support for the StreamPro ADCP
    - Can be used to configure and collect StreamPro data (Bluetooth serial port required)
    - Provides more detailed feedback on data quality, compared to using the StreamPro PocketPC software.
    - Preferred method for collecting StreamPro data
- Ability to identify and collect data for stationary and loop moving-bed tests
- An enhanced setup and configuration wizard
    - Site and rating information can be entered prior to the measurement
    - Instrument type is verified by the software, if connected to an ADCP
    - Support for a secondary depth field for measurements in streams with a shallow measurement section in one part of the channel.
    - The logic for configuring water modes has been enhanced to optimize use of water mode 12 through both automated and customized configuration tools
- A summary of the wizard's configuration including estimates for maximum and minimum depths and estimates of uncertainty for some water modes
- Enhanced graphics including:
    - Multiple contour plots in a single window
    - User selectable variables in plots
    - Time series plots of GPS quality variables
    - Plots to compare water and boat speeds
    - Plots to compare bottom track, GGA, and VTG measured boat velocities
    - Zoom and pan within graphic windows
- Integrated self-test and compass calibration
- Ability to synchronize time with GPS, if available
- Ability to add text notes to measurements during and after measurements
- Ability to quickly move forward and backward through data files
- Use of depth weighted average depth
- User-customized ASCII output files
- Export of an XML file summarizing a measurement

<u>**System requirements:**</u>
- Windows XP Pro® or Windows 2000® Operating System
- Pentium III 400 MHz class PC (higher recommended)
- 64 megabytes of RAM (128 MB RAM recommended)
- 31 MB Free Disk Space plus space for data files (A large, fast hard disk is recommended)
- One Serial Port (two or more High Speed UART Serial Ports for GPS and/or depth sounder)
- Minimum display resolution of 1024 x 768
- Mouse or other pointing device

Attachment B – Detailed Description of Selected Enhancements

New Measurement Process

The process of making a discharge measurement in WinRiver II now begins by selecting "New Measurement" from the File menu. When a new measurement is selected, a measurement file (*.mmt) is created. Only one .mmt file will exist for a given discharge measurement. The *.mmt file contains:

- Site Information – Station name, station number, date/time, measurement conditions, etc
- Rating Information – Gage height, control conditions, etc.
- Configuration information – The **Field Configuration** for each transect contains the settings used to collect the data. No changes can be made to this information once recording of a transect has started. A **Playback Configuration** is created when a transect is reprocessed
- QA/QC information - Diagnostic tests, Moving bed tests, Compass calibrations, etc.)
- Raw ADCP data files have a new filename extension (*.PD0*). These files contain all data sent from the ADCP and other devices during data collection. Each time you start a transect (using the **Acquire** menu or the shortcut key **F5**), WinRiver II adds a transect node to the **Measurement Control** window (figure A) and opens a new *.PDO* raw data file.
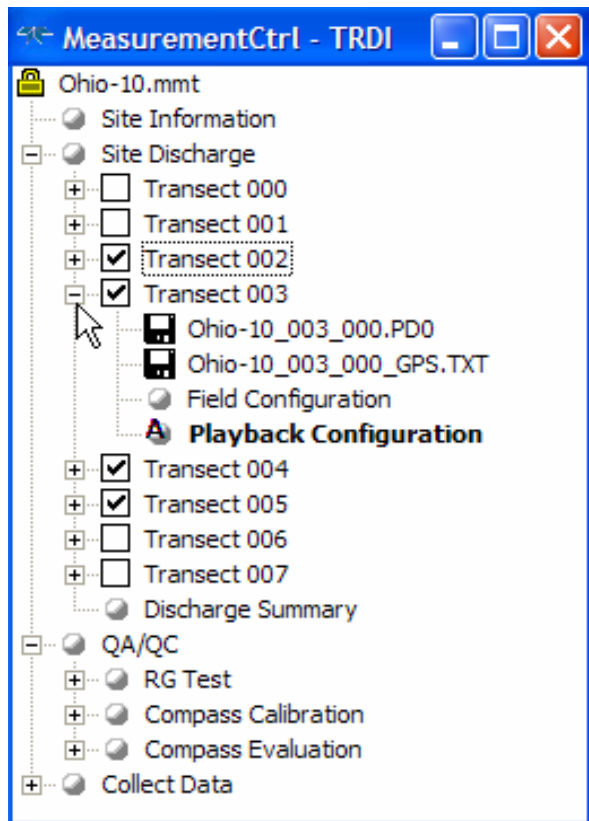

Figure A - WinRiver II measurement control window.

Support for StreamPro

WinRiver II may now be used to both collect (if your computer has a Bluetooth serial port) and process StreamPro data files. Data collected with the handheld StreamPro software may be processed in WinRiver II by creating a WinRiver II measurement (.mmt) using the Create Measurement from Data Files menu item. There is no need to use the ini2xml program to convert the StreamPro configuration files.

Locking a Measurement

Instead of locking individual transects as in WinRiver 10.06, WinRiver II now has the ability to lock entire measurements. Use **Lock Measurement** to write-protect the measurement file. If a measurement file is locked, any changes made to the playback configuration nodes will not be saved unless the measurement file is first unlocked. This prevents accidental saving of changes made to configuration nodes while experimenting with different settings. To lock a measurement file, right-click on the **measurement file name** and select **Lock Measurement**. To unlock a measurement file, right-click on the **measurement file name** and select **Unlock Measurement**. The icon next to the measurement file name will change from a lock to a clipboard to let you see if it is locked or not.

New Graphics Displays

Several new graphical displays have been created and the behavior/capability with some graphical displays has been changed. These include:

- "Lost" ensembles are plotted the same way as "bad" or invalid ensembles (figure B and figure C).
- A field has been added to the Processing tab in the configuration properties section of WinRiver II called "Mark below sidelobe bad". This option (turned on by default) does not allow water data below the area of sidelobe interference to be displayed in the WinRiver II software.
- "Stacked" contour plots of backscatter or intensity by beam are now available.
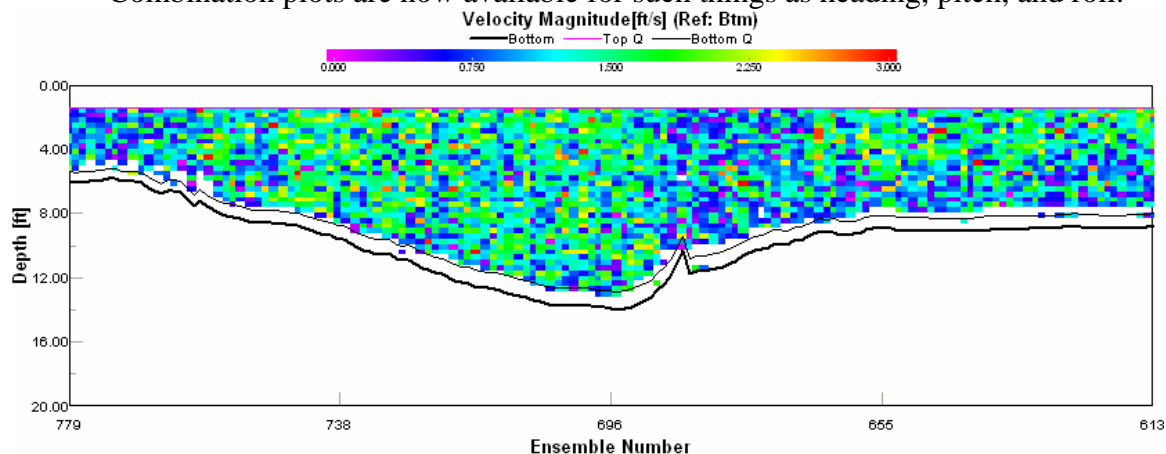- Combination plots are now available for such things as heading, pitch, and roll.

Figure B - Contour plot of a transect containing lost ensembles displayed using WinRiver 10.06
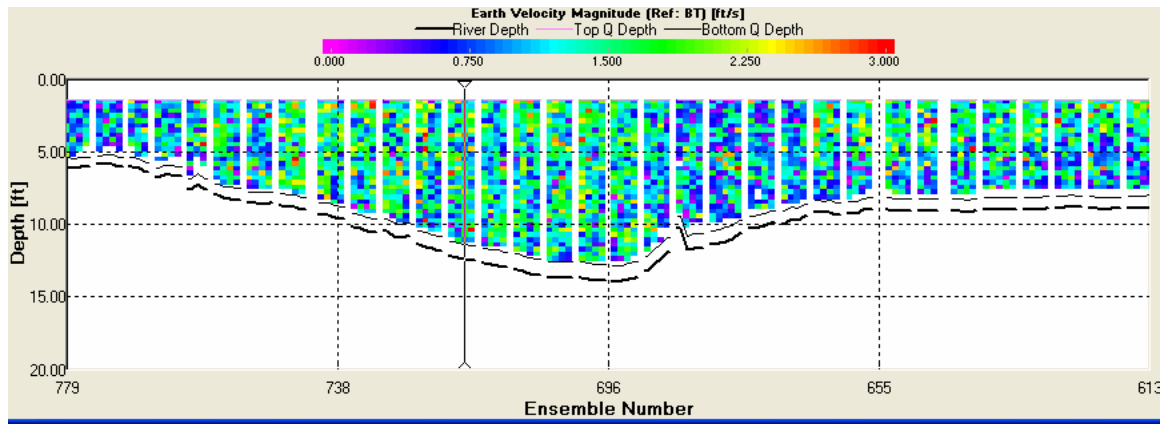
Figure C - Contour plot of data set used in Figure A, but displayed using WinRiver II. Note that white gaps now appear in the plot to indicate lost ensembles. Note also that by default, any depth cell that is at or below the sidelobe is no longer plotted in WinRiver II. These changes in the graphical displays do not affect discharge calculations.

Discharge Computation Changes

WinRiver II should compute the same discharge as WinRiver 10.06, with the following exceptions:

- Instead of computing the mean depth as the simple mean of all four beams, by default WinRiver II computes the mean depth for each ensemble as a weighted mean of all four beams.
- The conversion factor used in the software to change between English and SI units now contains more decimal places. This results in slightly different data values when using English units.

Output File Changes
- There is a new HYDROML output file that is an extension of the eXtensible Markup Language (XML) providing the hydrologic scientific community with a standard definition of XML tags and concepts of structure to allow the definition of hydrologic information. The HYDROML now contains all the data pertinent to a measurement of discharge. Once National Water Information System (NWIS) support for the data stored in the HYDROML exists, USGS scripts will be used to parse the data from the HYDROML and store it in NWIS. The hydroml file replaces the discharge measurement wizard (.dmw) output in prior versions of WinRiver.
- Files containing ASCII text can be created during post-processing. During playback, files may be subsectioned, averaged, and otherwise processed and with the resulting data written to an ASCII file. In addition to WinRiver 10.06 compatible ASCII out files, now called **Classic,** there is now a Custom ASCII output in which the user can select what data is included in the output file.
- Naming convention changes:
    - Raw data file extension has been changed to .PD0
    - A single measurement file (*.mmt) now contains all configuration settings for all transects in a measurement.
    - Navigation filename changed to *_GPS.TXT
    - Depth sounder file name changed to *_SND.TXT
    - Classic ASCII output file name changed to *_ASC.TXT

Attachment C – Known Bugs with WinRiver II

The following bugs have been identified in WinRiver II version 2.00.
- If measurement files are moved from their original output directory, changing the measurement number stored in the site information may cause the measurement .mmt file to be saved in the incorrect location. If the measurement number must be changed, use the File… Save… menu option and ensure the .mmt file is saved in the correct directory. To avoid this issue, make sure the measurement number is correct before attempting to move or rename data files.
- Incorrect default depth sounder header. The default header for echo sounder data is $GPDBT. This is incorrect, the correct header as used in WinRiver 10.06 is $SDDBT. The configuration interface allows changing the header so the user can make the needed correction and can successfully collect data.
- When sub-sectioning, lost ensembles at the end of a transect may cause discharge to not be computed for the transect. If this problem is encountered, change ending subsection ensemble number so that a discharge is computed.
- Cannot make moving bed test after recording a regular transect without stopping and starting pinging. The menu option to "select moving bed test" is not selectable after recording a transect until pinging is stopped. To record additional moving bed tests after collecting a transect, select stop pinging from the menu, then start pinging again.
- There has been one reported instance of WinRiver II creating a corrupt ASCII output file. The corrupt ASCII output file contained ensembles from a previous transect in a measurement.
- Loading a workspace created with a previous version of WinRiver II or one that has become corrupt, may cause the software to function erratically. Reset the workspace to the default by selecting "Global Parameters" from the "Configure" menu item. Check the "Reset to Factory Defaults" check box then press the OK button.
- If the GPS output rate for the VTG and/or GGA strings is greater than 10 messages per ensemble, the software buffers the additional strings which results in GPS data erroneously lagged in time when compared to the bottom track. To avoid this issue, it is recommended to use a GPS output rate of 5 Hz or less and keep the time between ensembles less than one second. When collecting GPS data, carefully review and compare GPS and bottom track referenced data in the ship track and boat velocity time series graphs.
- GPS data collected with WinRiver II version 2.00 cannot be processed in previous versions of WinRiver.
- The measurement locking and unlocking feature is based solely on the setting the *.mmt file's "Read Only" bit. Due to the different ways Windows, Samba, and Unix handle group permissions it is possible that only the owner of the *.mmt file will be able to both lock and unlock a measurement. Other users will not be able to unlock a locked measurement or lock an unlocked measurement. This behavior can create one of two problem situations. A user may not be able to make changes to a locked measurement. A user may accidentally save changes to a file that appears to be locked. If a user with insufficient permissions to change the "Read Only" bit of the *.mmt file locks a previously unlocked the measurement, WinRiver shows the measurement as locked during that session but changes can be saved to the measurement even though the lock symbol appears in the measurement control window.