APPLICATION NOTE NO. 7

# Calculation of Calibration Coefficients for Sea Tech and Chelsea (Alphatracka) Transmissometers

*Revised May 2011*

Deck re-calibration 27 March 2013

Deck air = 4.97802
Deck dark = 0.00611

Print version

*Note: See Application Note 91 for the WET Labs C-Star Transmissometer.*

Sea-Bird SEASOFT V2 software (Seasave V7 and SBE Data Processing) can output the following transmissometer results:

**Light transmission [%] = ( M * voltage output ) + B**

**Beam attenuation coefficient c = - ( 1 / z ) * ln ( light transmission [decimal] )**

*where*

- M and B are the calibration coefficients.
- z is the transmissometer path length (meters)
- Light transmission [decimal] is light transmission [%] divided by 100.
- M, B, and z are input to the CTD configuration (.con or .xmlcon) file.

**Note**: Edit the CTD configuration (.con or .xmlcon) file using the Configure Inputs menu in Seasave V7 (real-time data acquisition software) or the Configure menu in SBE Data Processing (data processing software).

M and B are listed on the Sea-Bird Calibration Sheet, and are calculated by Sea-Bird as follows:

$M = ( Tw / [ W0 - Y0 ] ) * ( A0 - Y0 ) / ( A1 - Y1 )$ $\frac{100}{(4.754-.009)} * \frac{(4.869-.009)}{(4.978-.00611)} = \frac{100}{4.745} * \frac{4.86}{4.97191} = 20.6004$

$B = - M * Y1 = -20.6004 * .00611 = .125868$

*where* the parameters are listed on the Sea-Bird Calibration Sheet:

- A0 = factory voltage output in **air** (factory calibration from transmissometer manufacturer)
- Y0 = factory **dark or zero** (blocked path) voltage (factory calibration from transmissometer manufacturer)
- W0 = factory voltage output in pure **water** (factory calibration from transmissometer manufacturer)
- Tw = % transmission in pure water
  For transmission **relative to water** (light transmission in pure water = 100%), set Tw = 100%. **or**
  For transmission **relative to air** (light transmission in air = 100%), set Tw to a value from Table 1 in this document.
- A1 = current (most recent) voltage in **air**
- Y1 = current (most recent) **dark or zero** (blocked path) voltage

Because obtaining a good pure water calibration can be difficult in the field, the voltage output in air is used as the reference to track the instrument drift over time. By comparing the original voltage output in air to subsequent voltage outputs in air in the field, the initial instrument slope (derived from the pure water calibration) can be