Technical Summary

Presentation Title:	Bathmaster, A system for real-time depth mapping of lakes and reservoirs
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Software:	GeoLink XDS 4.1 for Rockwell PLGR GPS, Arc/Info 7.n, GRID, TIN

Problem:
How to map lake depths and process into useful information for watershed planning?

Solution: *(out of many possibilities)*
Use GeoLink XDS software to synchronize the capture of position from GPS receiver and depth from sonar capable of outputting NMEA 0183 sentence.

Procedural Steps:
1) Capture lake boundary via heads-up digitizing using USGS Digital Orthophotos as base
   Otherwise, digitize from rectified aerial photography and adjust to get a best fit to USGS Digital Raster Graphic
2) Collect data in transect or 'cross-section' fashion on all navigable portions of lake
3) Process data from GeoLink, for import as point cover using *Generate*.
   Sample GeoLink output 'atr' file:

```
2|1|1|733918.632405|4700242.066849|246.31|928419428.6|7.7
2|1|2|733919.244349|4700242.262970|246.38|928419421.8|7.6
```

   Sample aml for processing 'atr' (filenames in this case are hard-coded, and unix Commands used for preprocessing):

```
&sys cut -d\| -f3,4,5 lowoods.atr >lowoods.atr.tmp
&sys tr '|' ',' <lowoods.atr.tmp>sonar.pt
&sys cut -d\| -f3,8 lowoods.atr > lowoods.atr.tmp2
&sys tr '|' ',' <lowoods.atr.tmp2>sonar.dpth.tmp
&sys dos2unix sonar.dpth.tmp sonar.dpth
&sys rm *tmp*
&sys echo "END" >> sonar.pt

generate sonar
input sonar.pt
points
quit
build sonar points

tables
define sonar.lut
sonar-id
4
5
b
depth
8
8
f
1
~
sel sonar.lut
add sonar-id depth from sonar.dpth
q
joinitem sonar.pat sonar.lut sonar.pat sonar-id sonar-id
&return
```

4) *Ungenerate* lake boundary and convert for input as point cover using *Generate*

5) *Additem* ‘depth’ to lake boundary point cover and calc to 0
6) *Append* lake boundary points to lake interior points
7) Create surface from appended point cover using interpolation method that yields best surface, which eventually results in a *GRID* file.
   We have had good luck with *TIN, Spline and Krige,* and usually try several methods, with variation of parameters by method before selecting surfaces that local experts can review. Editing of spurious data from point cover is often required before and after review.
8) Volume determined typically via: E(resolution)^2 * depth,
   where resolution is defined by cell size, and depth is defined as *value* in VAT file