HYSWEEP Logging of Raw GPS Data

By Mike Kalmbach

HYSWEEP® SURVEY has never logged raw GPS data (WGS-84 latitude, longitude, height and UTC time of fix) to HSX files. Most of the time this isn't a problem because projected XY positions and RTK tides calculated in SURVEY are correct. But sometimes XY or tide are off and that is a bit of a problem. Corrections can be made in editing with a somewhat clunky adjustments tool (HYPACK® RAW File Adjustments) that uses GPS data from our RAW files to correct the HSX files. It's better to log the GPS to the HSX files themselves.

THE RAW MESSAGE

This change doesn't show up in the SURVEY user interface. It's just a single line in the HSX files for each GPS update:

```
RAW 0 51248.150 4 413561.17194 -724341.79081 1.67920 181408.15000
```

The format is identical to GPS logging in HYPACK® RAW files:

```
RAW d t 4 latitude longitude height utc_time
```

- **d** is the HYPACK device number
- **t** is the HYPACK time tag
- **4** is the number of values that follow,
- **latitude** in DDMMM.MMMMM format
- **longitude** in DDMMM.MMMMM format
- **height** is the ellipsoidal elevation is meters
- **utc_time** is HHMMSS.SSSSS past midnight

The latitude and longitude numbers have strange encoding. Divide by 100 to get NMEA coding, which is less strange and easier to read. For example, the HYPACK office lower parking lot is at:

413561.17194 -724341.79081 =

41 degrees, 35.6117194 minutes north

72 degrees, 43.4179081 minutes west

PROCESSING IN *MBMAX64*

1. **Set HYPACK® geodesy** before running MBMAX64. If you don't know the exact geodesy, get it as close as you can.

2. **Load your files into MBMAX64 and select TOOLS-GPS RECALC.**

Figure 2: Run GPS Recalc using MBMAX64 Tools menu.

(GPS Recalc is disabled when raw GPS isn't logged. So first we need files logged with the new HYSWEEP® SURVEY. Fortunately, I have some!)

3. **Run the recalculation.** In GPS Recalc, things are fairly obvious.

   a. **Set check boxes** depending on what you want to do.

   b. **Set GPS offsets** from boat reference.
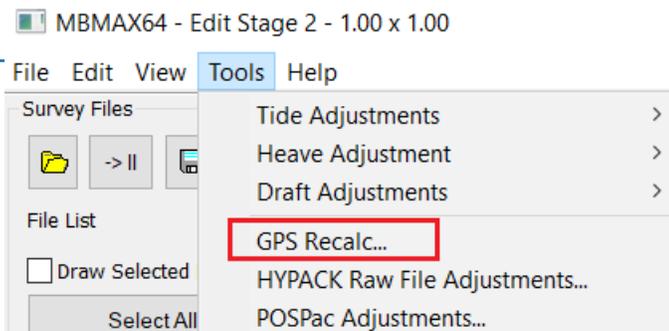
   c. **Click [Adjust]** for the recalculation. Done.

The group labeled First (Latitude, Longitude, etc.) gives a useful real-world check. It shows GPS data from the first position point. So, if you have an HSX file and no idea where it was logged you can use this for reference.

Lastly, GPS Recalc replaces real-time position and tides with a pseudo device; GPS_RECALC. You can see that in Read Parameters, Devices tab, Device Offsets. MBMAX64 allows you to switch between devices (real-time and recalculated).

Figure 4: GPS Recalc pseudo device in Read Parameters.