Technical Information

Merrill Creek Reservoir(MCR) is using satellite technology to track two bald eagles that will fledge from the nest this year (2011). A GPS PTT-100 (Global Positioning System Platform Terminal Transmitter) was fitted to each of the juvenile bald eagles when they were 8 weeks old. The transmitter is positioned to rest on the birds back and is secured using a tephlon harness. The transmitter is expected to remain operable for 3 years.

Microwave Telemetry, Inc developed the solar powered GPS PTT-100 using the Argos satellites ability to receive low power signals and combined it with GPS accuracy. Argos is a worldwide location and data collection system dedicated to studying and protecting the environment.

The transmitters on the eagles automatically transmit messages to Argos receivers on NOAA satellites. The satellites then transfer the messages to ground receiving stations. These stations automatically transfer the message to Argos processing centers. Then the processing centers deliver the results to the users.

Argos data is collected and transmitted on a 3-day schedule. The GPS data is collected daily and stored in the transmitter. It is then sent with the Argos data on the Argos 3-day schedule.

For additional information on Argos Worldwide tracking and environmental monitoring by satellite visit: http://www.argos-system.org/?nocache=0.5433722616657023

For additional information on Microwave Telemetry, Inc. visit: http://www.microwavetelemetry.com/

Sensor stats:
GPS accuracy - Lat/Lon +/- 18m
Altitude +/- 22m (transmitted at 10m resolution)
Speed +/- 1 km/h, only at speed of >40 km/h
Course +/- 1degree, only at speed of >40 km/h
GPS Datum = WGS-84

Raw Data

The Argos data is sent as raw data and looks like this.

```
04083 098584  57 32 L 2 2011-07-16 01:19:20  40.738  284.893  0.224 401673538
      2011-07-16 01:15:50  1         15           07           00           40
                                    4425           01           75          664
                                      00           00           43           09
                                      00           40         4426           01
                                      75          663           00           00
                                      42           11           00           40
                                    4424           01           75          663
                                      00          357           43        29260
      2011-07-16 01:16:54  1         15           13           00           40
                                    4424           01           75          663
                                      00           00           43           15
                                      00           40         4424           01
                                      75          664           00           00
                                      43           17           00           40
                                    4424           01           75          663
                                      00           00           42        48068
```

Parsed Data

The data is then run through parsing software that extracts and organizes the data. The software is unique to the transceiver, not Argos. The raw data above shows 2 messages sent to the satellite on a single pass over the transmitter. All of the messages received in a single pass (an average of 10 minutes) are combined to create one line of the files indicated in tables below. The Microwave Telemetry, Inc. software creates the following 4 files.

*a.txt = locations calculated by Argos. Data collected every three days.

Date	Time	Fix	Lat1(N)	Long1(W)	Msg Count	Satellite
08/06/2011	13:43	1	40.7360	75.1120	8	M
08/06/2011	14:24	3	40.7340	75.1030	9	A
08/06/2011	19:03	1	40.7320	75.0870	7	N
08/06/2011	19:15	2	40.7380	75.1050	8	K
08/06/2011	20:54	1	40.7380	75.1040	5	K
08/06/2011	22:33	1	40.7280	75.1040	8	L
08/06/2011	23:25	1	40.7360	75.0810	11	M

*g.txt = GPS locations determined by the PTT's GPS receiver. Fixes taken daily but only transmitted every three days.

Date	Time	Latitude(N)	Longitude(W)	Speed	Course	Altitude(m)
08/08/2011	7:00	40.7340	75.1105	0	321	290
08/08/2011	9:00	40.7338	75.1103	0	0	290
08/08/2011	11:00	40.7370	75.1112	0	0	360

*- *e.txt = engineering data (every 8th transmission)

Tx Date	Tx Time	Satellite	Temp C	Battery Voltage	Latest Latitude(N)	Latest Longitude(W)	
08/08/2011	14:26	A	32	3.97	40.7373	75.1100	1
08/06/2011	19:01	N	32.4	3.93	40.7348	75.1098	1
08/06/2011	19:17	K	32	3.93	40.7348	75.1098	1
08/06/2011	22:35	L	26.3	3.91	40.7357	75.1100	1
08/06/2011	23:22	M	26.6	3.89	40.7357	75.1100	1

*.kml = Load Google Earth on you computer. Download this file. Open the file and it will plot the eagles path in Google Earth.