

## C.2 ZONING

Fugro Pelagos, Inc. acquires and reviews all preliminary data relative to the ellipsoid. This enables a rapid approach to data quality review shortly after acquisition and automated processing. Verification of ellipsoid referenced data is also more efficient in the FPI workflow. The preliminary tide zoning supplied by NOAA CO-OPS was used only for the manual tide reduction of raw depths over significant features observed during, and just following, the data acquisition period. The reduced depths of these significant features were reported to the NOAA Atlantic Hydrographic Branch as Dangers to Navigation (DTONs).

The final tide zone model was developed and provided to FPI by JOA. This tide model was based on observations at Key West and Smith Shoal Light, the bottom mounted gauge deployments at the Quicksands and Boca Grande Key and the COOPS tide station datum points at West Jetty, Sand Key Lighthouse, Boca Grande Key, Garden Key (Dry Tortugas), Loggerhead Key, Fleming Key, White Street Pier and Snipe Point. Further details are provided at Appendix II of the Horizontal and Vertical Control Report.

Each of the discrete tide zones use time and range correctors relative to the Key West NWLON tide station and the subordinate tide station installed by JOA at Smith Shoal Light. For final tide application, the time and range correctors were applied to NOAA verified and JOA quality controlled tide data, smoothed by JOA. Raw depth soundings were then reduced to MLLW using these final tides. An analysis of depth benchmark and crossline comparisons, and overlaps of the main lines of sounding concluded that final tide zoning was adequate.

The value for the difference between MLLW and MHW at the Key West NWLON tide station is 0.463m. From the final zoning, only Key West data was applicable to Sheet 6, and the range factors of discrete zones covering the drying areas of this sheet were 1.27, 1.19, 1.12, 1.12 and 1.19, resulting in a mean MHW value of 0.55m.

### C.3 HORIZONTAL CONTROL

Data collection and processing were conducted on the AS and GCS in World Geodetic System (WGS84) on Universal Transverse Mercator (Northern Hemisphere) projection UTM (N) in Zone 17, Central Meridian 081° W. These data was post-processed and all soundings are positioned relative to the North American Datum 1983 (NAD83). All units are in meters.

#### C.3.1 LADS Local GPS Base Stations – Key West International Airport

Throughout the survey the real-time positioning of the SHOALS system was in Wide Area Differential GPS (WADGPS) mode, derived from a NovAtel Millennium GPS card aided by OmniSTAR or Wide Area Augmentation System (WAAS) Differential. The use of WAAS was due to a temporary problem with updating the SHOALS OmniSTAR subscription.

For all sorties, post-processed positions were obtained by simultaneous data logging with the roving receiver onboard the aircraft and a NovAtel DL-V3 GPS L1/L2 reference receiver at the coordinated local GPS base station at the Key West International Airport. The final KGPS solution was then improved by integrating the 200Hz POS AV IMU inertial data.

For each flight, a KGPS navigation solution was processed in Applanix POSPac software. GPS data from the airplane and ground control base stations were input in a POSPac project and post-processed to obtain an optimal inertially-aided KGPS navigation solution. In general, the best possible KGPS solution would present a small separation difference between forward and reverse solutions when combined, ideally <0.10 m RMS and remain fixed throughout the flight period. The final smoothed best estimated trajectory (SBET) was then used by GCS during lidar auto processing.

In late October 2011, the local GPS reference station required re-location due to an aircraft parking overflow issue at the Key West International Airport. The ‘reset’ FPI GPS reference station was established and checked with a 24-hour certification, using the same procedures as those employed for the initial GPS base station.

The derived NAD83 coordinates for the local GPS base stations are:

Station	NAD83 (CORS96)		UTM (N) Zone 17 (m)		
	Latitude (N)	Longitude (W)	Easting	Northing	Ellipsoid Height
KEYW	24° 33' 16.9196"	081° 45' 45.5728"	422763.737	2715855.398	-21.417
KEYW2	24° 33' 17.5360"	081° 45' 51.1661"	422606.486	2715875.226	-21.607

**Table 9: Local GPS Reference Station Positions**