“Human habitation of the Qatar Peninsula dates as far back as 50,000 years, when small groups of Stone Age inhabitants built coastal encampments, settlements, and sites for working flint, according to recent archaeological evidence. Other finds have included pottery from the Al Ubaid culture of Mesopotamia and northern Arabia (circa 5000 B.C.), rock carvings, burial mounds, and a large town that dates from about 500 B.C. at Wusail, some twenty kilometers north of Doha” (Library of Congress Country Studies).

Ruled by the al-Thani family since the mid-1800s, Qatar transformed itself from a poor British protectorate noted mainly for pearling into an independent state with significant oil and natural gas revenues. During the late 1980s and early 1990s, the Qatari economy was crippled by a continuous siphoning off of petroleum revenues by the Amir, who had ruled the country since 1972. His son, the current Amir HAMAD bin Khalifa al-Thani, overthrew him in a bloodless coup in 1995. Oil and natural gas revenues enable Qatar to have one of the highest per capita incomes in the world. With a coastline on the Persian Gulf of 563 km, Qatar is slightly smaller than Connecticut and borders Saudi Arabia (60 km). International boundaries have been signed with Bahrain (PE&RS, October 2007), Iran, Saudi Arabia, and Abu Dhabi of the United Arab Emirates, (PE&RS September 2001). The lowest point is the Persian Gulf (0 m), and the highest point is Qurayn Abu al Bawl (103 m). The climate is arid and mild, with pleasant winters and very hot, humid summers. The terrain is mostly flat and barren desert covered with loose sand and gravel (CIA World Factbook).

It seems that the oldest Astronomical Station recorded for Qatar is at Om. Al Dā'asa the origin of the 1941 datum and coincident with the Cassini-Soldner Grid referenced to the Helmert 1906 ellipsoid where \( a = 6,378,200 \) meters and \( 1/f = 298.3 \). The Latitude of Origin \( (\varphi_o) = 25^\circ 22' 56.50'' \text{ N} \), the Central Meridian \( (\lambda_o) = 51^\circ 36' \) East of Greenwich, the Scale Factor at Origin \( (m_o) = 0.99999 \), and the False Northing = the False Easting = 300 km.

I am informed by Gener Bajao that for offshore Qatar, the UTM Grid is used as referenced to the first major geodetic Datum of the Persian Gulf area established by W.E. Browne of the Iraq Petroleum Company in 1927-1931 at the South End Base at station Nahrwan (East of Baghdad) such that: \( \varphi_o = 33^\circ 19' 10.87'' \text{ North}, \lambda_o = +44^\circ 43' 25.54'' \text{ East of Greenwich} \), and the Clarke 1880 is the ellipsoid of reference where: \( a = 6,378,300.782 \text{ m} \), and \( 1/f = 293.4663077 \).

“Hunting Surveys, Ltd. performed a survey of Qatar that was completed in 1972. First Order Tellurometer (EDM) traverses were performed over the entire country that comprised 92 traverse stations forming 10 closed loops and 2 junction figures. [Nine hundred thirty-seven] 937 line kilometers were measured with an average distance between stations of 8.76 km. Traverse observations at each station consisted of 10 or 12 rounds of horizontal angles, half of which were measured in the evening and half in the following morning. Eight sets of Tellurometer measurement, 4 in each direction were taken at different times on different days. Three sets of simultaneous reciprocal vertical angles were measured in the middle of the day. The average standard deviation for the observed horizontal angles was 0.41" and the worst value obtained for a full set of observations was 0.86". The average standard deviation for the measured distances was 1,876,000 and the worst value obtained was 1:198,000. Standard deviations were not calculated in the case of vertical angles where spreads of up to 10 seconds of arc were accepted. LaPlace azimuth control was provided by 16 star Black’s azimuth programs at twelve traverse

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stations spaced at approximately 60 to 70 km intervals around the network. The average standard deviation for the azimuths obtained was 0.41” and the worst value obtained was 0.63”.

“The Qatar Local system coordinates were converted to Ain el Abd Datum by means of a datum and spheroid change by Cartesian shifts. The comparison of the values obtained from the two survey systems is given for Station ‘G16,’ the common station. … The Qatar value: $\phi = 24^\circ 40' 21.6345''$ N, $\lambda = 50^\circ 51' 37.0981''$ E, and the Saudi value: $\phi = 24^\circ 40' 22.4297$ N, $\lambda = 50^\circ 51' 35.7352$ E” (National Geodetic Survey Final Report, September 1972, Hunting Surveys Limited).

Thanks to a complete report on the Qatar National Datum of 1995 that I received from Alistair Strachan back in July of 1996, the 3-parameter transformation from WGS84 Datum to QND 95 is: $\Delta X = -127.781$ m, $\Delta Y = -283.375$ m, and $\Delta Z = +21.241$ m, and the Qatar National Local Grid on the QND95 is where the Latitude of Origin ($\phi_o$) = 24º 27’ N, the Central Meridian ($\lambda_o$) = 51º 13’ E, the Scale Factor at Origin ($m_o$) = 0.99999, the False Northing = 300 km, and the False Easting = 200 km. The ellipsoid of reference is again the International 1924. A coordinate transformation package called “QTRANS” is available from the government that includes the local geoid relations. Although a 7-parameter transformation is available from the Qatar Geographic Information Systems Centre, the three parameters given above are estimated to be good to about one meter. Extensive geodetic documentation is available freely from the government and nothing geodetic appears to be considered a military secret – a most enlightened philosophy that should be practiced by many larger nations throughout the world.

The contents of this column reflect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the American Society for Photogrammetry and Remote Sensing and/or the Louisiana State University Center for Geoinformatics (C4G).