

# Grids & Datums

## REPUBLIC OF CÔTE D'IVOIRE

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According to the Library of Congress Country Study, the first recorded history of Côte d' Ivoire is found in the chronicles of North African traders who, from early Roman times, conducted a caravan trade across the Sahara in salt, slaves, gold, etc. The first Europeans to explore the West African coast were the Portuguese. The earliest recorded French voyage to West Africa took place in 1483. The first West African French settlement, Saint Louis, was founded in the mid-seventeenth century in Senegal, while at about the same time the Dutch ceded to the French a settlement at Ile de Gorée of Dakar.

A French mission was established in 1687 at Assini, and it became the first European outpost in that area. Assini's survival was precarious, however, and only in the mid-nineteenth century did the French establish themselves firmly in Côte d' Ivoire. The colonies of French Sudan and Côte d' Ivoire were included in the federation of French West Africa when it was constituted on 16 June 1895. A French decree of 17 October 1899 transferred a number of administrative units from French Sudan to other members of French West Africa, including Bquna, Kong, and Odienné to Côte d' Ivoire. The remainder of French Sudan was organized into the civil territory of Upper Senegal and Middle Niger along with two and later three (after 20 December 1900) military territories having headquarters at Timbuctou, Bobo Dioulasso, and Zinder. On 23 March 1902, the Governor General of French West Africa issued an *arête* modifying the boundary between Côte d' Ivoire and the Second Military District headquartered at Bobo Dioulasso.

Côte d' Ivoire lies on the West African coast on the Gulf of Guinea. Its outline is roughly that of a square 560 km on a side, with an area of 322,460 km<sup>2</sup> - nearly the same size as New Mexico. It is bounded on the east by Ghana (*PE&RS*, June 2000) (668 km), on the north by Burkino Faso (*PE&RS*, January 2005) (584 km), and Mali (532 km), and on the west by Guinea (*PE&RS*, June 2002) (610 km). The entire southern border is the Gulf of Guinea coastline (515 km). The Côte d' Ivoire is mostly flat to undulating plains with mountains in the north-west. The lowest point is the Gulf of Guinea (0 m), and the highest point is Mont Nimba (1,752 m). The republic achieved independence from France on 07 August 1960, and the national capital since 1983 is Yamoussoukro, although Abidjan remains the administrative center.

There was no topographic survey of the French Equatorial Africa or "*Afrique Equatorial Francais*" (*AEF*) until after WWII. In December 1945 the *Cabinet du Directeur, Institut Géographique National* in Paris issued an instruction concerning the systems of projection to be utilized in French West Africa. The instruction detailed that a Gauss (Gauss-Schreiber Transverse Mercator) system of projection was to be used for the group of regular map compilations and related works that included geodesy, topography, photogrammetry, and cartography

for a range of scales that included 1:200,000. All of the map series were to be cast on the International Map of the World sheet system based on the graticule. During the war, the Ivory Coast Belt Transverse Mercator ("*Fuseau Côte d' Ivoire*") was used such that the ellipsoid of reference was the Hayford 1909 (International 1909). The unit of measurement was the meter, the Central Meridian, ( $\lambda_o$ ) = 6° 30' West of Greenwich, and the Latitude of Origin, ( $\phi_o$ ), by definition was the equator. The Scale Factor at Origin ( $m_o$ ) = 0.999, the False Northing = 100 Km, and the False Easting = 100 Km. D. R. Cockburn and W. L. Barry of Army Map Service translated the *IGN* Instruction dated 20 September 1950, "1. The General Directorate has decided to abandon the projection systems now in use in the French Overseas Territories and Departments and to utilize henceforth, in all these territories, a new projection system called the Universal Transverse Mercator (*Mercator Transverse Universelle*), having a unique definition." The full translation of that directive can be found in the *Grids and Datums of the Republic of Bénin* (*PE&RS*, July 2003).

The practice of the *Institut Géographique National* (*IGN*) for West Africa at the time was to provide mapping control in the form of astronomical points ("Astro Stations") at approximately 60 km intervals. Curiously, the local datum, known as Abidjan Datum, used the Clarke 1880 ellipsoid of reference where  $a = 6,378,249.145$  meters, and  $1/f = 293.465$ . **"The reader is cautioned to not confuse the Abidjan Datum of 1948 with the Blue Nile Datum of 1958 which is commonly misnamed for its origin point at Adindan, Egypt!"** Thanks to Roger Lott, retired Chief Surveyor of British Petroleum, the European Petroleum Studies Group (*EPSG*) database lists the Abidjan Datum of 1948 (surveyed in 1948 by Vantroys according to *Annals Hydrographique*, 1961) origin as:  $\Phi_o = 05^\circ 18' 51.01''$  N,  $\Lambda_o = -04^\circ 02' 06.04''$  West of Greenwich. The *EPSG* database lists the transformation from Abidjan to WGS84 as:  $\Delta X = -124.76$  m,  $\Delta Y = +53$  m,  $\Delta Z = +466.70$  m. The Locodjoro 1965 Datum is listed by *EPSG* as an *alias* of the same datum.

A datum listed in *Annals Hydrographique* for the western Côte d' Ivoire port is the Tabou Datum of 1950 where:  $\Phi_o = 04^\circ 24' 40''$  N,  $\Lambda_o = -07^\circ 21' 29''$  West of Greenwich. The local survey grid, presumably based on the Hatt Azimuthal Equidistant projection, has its origin at the East End of the Tabou baseline where  $X = 50,000$  m and  $Y = 50,000$  m and the Y axis is defined as being parallel to the meridian. The datum origin point has local grid coordinates of  $X = 50,228.36$  m, and  $Y = 50,460.60$  m.



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*).