Grids & Datums

Central African Republic

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"The Central African Republic (C.A.R.) appears to have been settled from at least the 7th century on by overlapping empires, including the Kanem-Bornou, Ouaddai, Baguirmi, and Dafour groups based in Lake Chad and the Upper Nile. Later, various sultanates claimed present-day C.A.R., using the entire Oubangui region as a slave reservoir, from which slaves were traded north across the Sahara and to West Africa for export by European traders. Population migration in the 18th and 19th centuries brought new migrants into the area, including the Zande, Banda, and M'Baka-Mandjia. In 1875 the Egyptian sultan Rabah governed Upper-Oubangui, which included present-day C.A.R." (*U.S. Department of State Background Notes, 2012*).

"French interests in Central Africa date from early coastal trade and missionary work in Gabon. In 1839 Captain L. E. Bouet-Willaumez completed the first of a series of treaties with local chieftains for coastal rights, so that by 1862 French authority extended along most of the littoral of Gabon. Libreville was founded by the French in 1849, and shortly thereafter, a number of French explorers such as Compiegne, Marche, and Brazza penetrated into the interior. During expeditions in 1874 and 1883, Pierre Savorgnan de Brazza explored the territory of the upper Ogooue and parts of the Congo drainage area. The Berlin Conference of 1885 recognized French claims to the lands explored by de Brazza, which included the territory along the right bank of the Congo. In 1886 Gabon was administered by a lieutenant governor under the authority of Commissioner de Brazza. Later the same year, de Brazza was appointed commissioner general over the colonies of Gabon and French Congo (Congo Francais). A French decree of 1888 united Gabon and French Congo into a single administrative entity until 1903, and during most of this period the combined units were known as the French Congo. Northwestward of French Congo, the territory of Ubangi-Shari (Oubangi-Chari) was formally established by the French in 1894. Starting from Libreville in 1897, a mission headed by Captain Marchand crossed unmapped lands to reach Fashoda (Kodok) and to establish French claims in the area of the upper Nile. Marchand reached his objective the following year, only to discover British forces already in possession of the area. Before Marchand reached Fashoda, however, the French had made plans to occupy the Chari-Baguirmi region south of Lake Chad, and in 1899-1900 three expeditions were organized with the aim of joining France's possessions in central, west, and north Africa. An expedition marched southward from Algeria, a second moved eastward from the Niger area, and a third travelled northward from the French Congo all meeting on April 21, 1900 at Kousseri (Fort Foureau) south of Lake Chad. The campaign was successful in linking together France's African possessions and in expanding the French Congo northward to include Chad as a military territory.

"In 1903 French Congo consisted of the colonies of Gabon and Middle Congo (Moyen Congo) the territory of Ubangi-Shari, and the military territory of Chad. Two years later the territory of Ubangi-Shari and the military territory of Chad were merged into a single territory. The colony of Ubangi-Shari - Chad was formed in 1906 with Chad under a regional commander at Fort-Lamy subordinate to Ubangi-Shari. The commissioner general of French Congo was raised to the status of a governor generalship in 1908; and by a decree of January 15, 1910, the name of French Equatorial Africa was given to a federation of the three colonies (Gabon, Middle Congo, and Ubangi-Shari - Chad), each of which had its own lieutenant governor. In 1914 Chad was detached from the colony of Ubangi-Shari and made a separate territory; full colonial status was conferred on Chad in 1920. In accordance with the constitution of the Fourth French Republic, adopted October 26, 1946, both Chad and Ubangi-Shari became overseas territories within the French Union. As provided in the constitution of the French Republic in 1958, a French Community was established superseding the French Union. Chad and Ubangi-Shari elected to become autonomous members of the French Community and adopted the names of the Republic of Chad and the Central African Republic, respectively. On June 4, 1960, the constitution of the Fifth Republic was amended so that states might become independent and sovereign republics without forfeiting membership in the Community. After agreements of transfer of power and cooperation were signed in Paris on July 12, 1960, Chad proclaimed its independence on August 11, 1960, and the Central African Republic became independent two days later" (*International Boundary Study No. 83 – July 15, 1968, U.S. Department of State*).

Landlocked and in almost the precise center of Africa, the C.A.R. is bordered by Cameroon (797 km) (*PE&RS*, May 2007), Chad (1,197 km), Zaire (1,577 km) (*PE&RS*, June 2005), Republic of the Congo (Brazzaville)(467 km)(*PE&RS*, March 2010), and Sudan (1,165 km). The lowest point is the Oubangui River (335 m), the highest point is Mont Ngaoui (1,420 m) (*NGA GeoNames Search*), and the C.A.R. is slightly smaller than Texas.

On 12 December 1945, the French *Institut Géographique National* issued an instruction (I.G.C. Instruction No.1212) concerning the *systèmes de projection* for French Equatorial Africa (*Afrique Equatorial Francaise*). The Clarke 1880 (IGN) was the ellipsoid of reference for these series where: a = 6,378,249.200, and $^1/_f$ = 293.4660213 . 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. For the C.A.R., two zones were devised: *Fuseau A.E.F. Centre* where the Central Meridian, λ_o = 17° 40' E, Scale Factor at Origin, mo = 0.9999, False Easting = False Northing = 1,000,000 m.; and *Fuseau A.E.F. Est* where

the Central Meridian, λ_o = 24° 30' E, Scale Factor at Origin, mo = 0.9999, and False Easting = False Northing = 1,000,000 m. Within five years, French coordinate systems changed to UTM throughout the world with the exception of Madagascar (PE&RS, February 2000), and for Reunion. In terms of far-reaching developments in grid system usage, this was spectacular! 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*), (or ***MTU*** *– Ed.*) having a unique definition.

In so far as Madagascar is concerned, the use of the Laborde Projection will be continued without change. Similarly for Reunion, the Gauss system, in which the triangulation of the island has been computed, will be retained. With the exception of these two particular cases, the U.T.M. projection will from now on be the only official projection in the French Overseas Territories and Departments.

Consequently I.G.C. instruction No.1212, dated 12 December 1945, is rescinded.

2. The new projection is a Gauss conformal projection applied to zones of 6° of longitude in width. These zones, identical to those of the 1:1,000,000 International Map of the World, are indicated on the attached index map.

3. For a long time, views have been expressed in the international meetings of geodesists in favor of a universal projection system, which would be adopted by all the countries of the world. Inspector General Tardi proposed himself at the General Assembly of the International Association of Geodesy at Edinburgh (1936), a Gauss projection in 6° zones for the African continent, which is the same as the UTM projection. These views remained the dead issue for a long time. Before 1940, each country was quite satisfied with its own projection system and was reluctant to undertake the enormous task of converting coordinates into a universal system. They were especially reluctant to modify their quad printing plates. However, during the course of the last war, the extension of military operation to vast regions of the globe, the strategic deployments on a great diversity of war-fronts entailed the creation of a great number of projection systems (in 1945, over 100 of these systems were in use). As a result, a state of utter chaos ensued and considerable expense was entailed for the computation of the transformation and the adaptation operations. Consequently, the prospect of a universal projection system aroused much interest in the post war period.

The United States was very much in favor of the project and to facilitate its adoption by the various countries, Gauss projection tables (called a UTM projection) were computed and published. These tables were computed in the sexagesimal angular division system. The American agencies also computed the same tables on a centesimal system.

The *Institut Géographique National*, when asked to adopt the new projection in December of 1949, did not hesitate in agreeing to its use for French Colonial regions with certain exceptions, which are explained below. In point of fact, it was entirely possible to adopt this new projection for the major part of the colonial possessions at a very small cost. However, a problem arose for its use in France proper and in North Africa. For France itself, a 6° belt UTM projection leads to very extreme scale changes, i.e., extreme from the point of view of civilian use.

4. Actually, it was not merely in a spirit of international cooperation that the *Institut Géographique National* agreed to the new projection but also because it offers incontestable practical advantages. In December 1949, the situation was as follows:
After long conferences in which various proposals were suggested, we finally adopted the solution proposed by General Laborde for our overseas possessions at the end of 1945. This solution was as follows: A Gauss system (double projection) on the international Ellipsoid with φ_o equaling 0° in French East Africa and French West Africa. For the smaller regions (Guadeloupe, Martinique, Reunion, etc.) the value of φ_o is equal to the mean latitude of the territory, φ_o being the latitude of the central point. This procedure leads to the establishment of separate tables for each value φ_o.

Tables for the conversion of geographic coordinates into rectangular and vice versa (tables which would produce the centimetric precision necessary for geodetic computations) had not been set up at the end of the year 1949 with the exception of tables covering a few small regions. Although this is a very pressing urgency, the *Institut Géographique National*, due to limit (*sic*) means, has neither the facilities for computing the tables rapidly nor for editing them without detriment to other equally urgent tasks. Considering on one hand the small number of stations to be converted into the new system (for astro points the work involved is insignificant) and considering that the dimensional variations of the sheets already published would be less than the standard size, the *Institut Géographique National* has agreed to rapidly extend the UTM projection in these territories being aware of the following factors:

That the United States was in a position to immediately deliver to us as many copies as was necessary of the tables computed on the sexagesimal system and contracted to compute the same tables on the grad system; that the United States was able to undertake the conversion of coordinates into the system using data obtained from electronic computing machines.

5. In point of fact, the UTM projection as it has been already adopted (or in the course of being adopted) by a number of countries is not absolutely 'Universal.' This would have been the case if a uniform ellipsoid had been chosen for all the countries. However, the difficulties entailed in changing ellipsoids are common knowledge and because of this, the basics of the ellipsoids in use for the various continents have been retained. Accordingly, the Clarke 1866 ellipsoid has been kept in use for North America; the International Ellipsoid has been adopted for South America and the Pacific regions, and the Everest Ellipsoid has been chosen for the East Indies and the adjacent regions. So as to fulfill a request made by the British who have already computed vast geodetic nets on the Clarke 1880 Ellipsoid, the *Institut Géographique National* has adopted this ellipsoid for the entire African continent. In addition, this ellipsoid was used for French geodetic work previous to 1945.

6. The UTM projection may be defined as having the following intrinsic properties:

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It is a Gauss conformal projection, a direct projection of the ellipsoid on the plane. Linear values are maintained on the prime meridian of the projection with the exception of a scale-reduction which is defined by the following coefficient: mo = 0.9996.

The zones have an overall width of 6° in longitude (3° on each side of the central meridian). The zones coincide with those of the 1:1,000,000 International Map. The Greenwich meridian is at the limit of two zones (zone numbers 30 and 31). These basics will suffice to define the projection for any given ellipsoid.

7. The new UTM projection differs from the Gauss projection adopted at the end of 1945 in the sense that it is a direct projection of the ellipsoid on the plane instead of being an indirect projection employing the intermediary of a sphere upon which the ellipsoid is first applied before projecting it on the plane."

Apparently, there is no information on the current or past datums for the Central African Republic. This situation is likely similar to many other former French colonies in Africa such that mapping was and is controlled by sparsely-spaced astronomical observations, or "Astro Stations."