

## **PROFESSIONAL PROFILE**

Civil Engineer having knowledge and experience in Geographic Information Systems (GIS), Hydraulics and Auditing.

## **PUBLICATIONS**

- AERATION IN HIGH VELOCITY FLOWS. Construction of model for the study of the phenomenon. Universidad de los Andes, Bogotá, D.C., (9/86)
- DUCTS WITH LATERAL APPROXIMATION. Hydraulics Applied to Works Design. Sociedad Colombiana de Ingenieros - Colombian Engineers Association. 9th National Seminar on Hydraulics and Hydrology, Manizales, (6/90)
- FUNCTIONING OF ANTIVORTEX STRUCTURES. Hydraulics Applied to Works Design. Sociedad Colombiana de Ingenieros. 9th National Seminar on Hydraulics and Hydrology, Manizales, (6/90)
- CAPACITY OF RADIAL GATES IN SPILLWAYS. Hydraulics Applied to Works Design. Sociedad Colombiana de Ingenieros. 9th National Seminar on Hydraulics and Hydrology, Manizales, (6/90)

## **SOCIETIES TO WHICH I BELONG**

UNIANDINOS (Former students of the Universidad de los Andes).

## **PROFESSIONAL UPDATING**

- Workshop - Cartographic Information: Processing, publication and use by IDE clients based on Free Software. Agustín Codazzi Geographic Institute - IGAC, Bogotá, D.C., (10/09)
- Course "Introduction to ArcGIS I", Prosis, Bogotá D.C., (2/03)
- Course in the handling of the program for the management of aqueduct, sewerage, roads, signaling and parking lots networks -based on Geographic Information Systems (GIS), Cityworks, Azteca Systems, Salt Lake City, Utah, (10/99)
- Training Program for Quality Internal Auditors, Qualitas Ingeniería Ltda, Bogotá D.C., (12/98, 1/99 - 2/99)
- Workshop - Course in Geomatics and Geographic Information Systems, Universidad de los Andes, Bogotá D.C., (11/96)
- Seminar on Programming of AutoLISP (CAD GIS), CHI Information Systems, Bogotá, D.C., (8/95)
- Course in the handling of ArcCAD (CAD - GIS), Prosis, Bogotá D.C., (9/94)
- Seminar on Geographic Information Systems, Universidad del Valle - University -, Cali, Valle, (11/92)

## **PROGRAM & MOBILE DEVICES**

- Operating Systems : Windows
- Text processors (editors) and electronic spreadsheets
- Computer Aided Design : AutoCAD
- Softdesk Civil Engineering Modules
- Geographic Information Systems : ArcGIS (Server, Spatial Analyst, 3D, Network), ArcCAD, Iliwis, AutoCAD Map
- Programming and Development of applications for the handling of Spatial Data Bases (MySQL, Oracle, SQL, Access)
- Google Maps Development Applications by using PHP, Javascript and HTML.
- Visual Basic Development Applications by using ArcObjects and MapObjects.
- Cityworks: Program for the Management of aqueduct, sewerage, roads, signaling and parking lots.
- GPS receiver: ProXH, Field Computer with GPS: GeoXT, GeoXH, Field Computer: Recon.

## **PROFESSIONAL EXPERIENCE**

### **Datum Ingeniería Ltda. – Project Manager - (01/11 – to this date)**

- Project Manager in providing Surveying Services for INGETEC I&D S.A., under the contract for the provision of research services, designs and advice aimed at "studies, detail design and advice during construction of the road project Sector 3 Ruta del Sol", under the Concession Agreement No. 007 of 2010 celebrated between the National Institute for Concessions - INCO and YUMA Concesionaria S.A. for the construction of the road project Sector 3 of the Ruta del Sol. Activities include performing the high-precision surveying LIDAR technology for road corridors included in the Concession Agreement No. 007 of 2010 for the construction of the road project Sector 3 of the Ruta del Sol.

### **Consorcio INTERPLANES - GIS Specialist Engineer - (02/10 – to this date)**

- "Technical, administrative, legal, environmental and financial Interventory to a Consulting Contract for the studies and designs of water and wastewater systems in urban areas, towns and regional systems that are necessary for the five Huila Department subregions" for Aguas del Huila S.A. - E.S.P.

### **HIDROTEC LTDA. CONSULTANT ENGINEERS - GIS Specialist Engineer - (08/08 – 12/09)**

- "Evaluation, modelling and design of the hydraulic division of the potable water distribution network of the San Antonio de Pichincha, Pomasquí, Calderón, Calacalí, Llano Chico, Zámboza and Nayón counties" for the Compañía Metropolitana de Alcantarillado y Agua Potable de Quito - EMAAP-Q

### **THE WORLD BANK - GIS Specialist Engineer - (05/08 – 07/09)**

- "The Disaster Risk Management team of the Urban and Water unit of Latin America Region", bringing technical support to CAPRA Project (Central America Probabilistic Risk Assessment) in the basic data capture and processing by using Google Maps and MySQL.

### **EUROLATINA Consultores Ltda. - GIS Specialist Engineer - (08/08 - 10/08)**

- Update 440 km of railroad including all the adjacent elements to the route and capture of twenty (20) control points by using GPS technology. The project zone was between Buenaventura (Valle del Cauca) and La Tebaida (Quindío) cities. The railroad data capture was sub meter and the twenty (20) control points accuracy was 5 cm in X (horizontal) and 10 cm in Y (vertical).

**Mat & Deco Ltda. - GIS Specialist Engineer - (04/08 – 05/08)**

- Design, development and implementation of an internet application for vehicle control in an excavation site by using cellular phones, internet and MySQL.

**PROCALCULO PROSIS S.A. - GIS Specialist Engineer - (10/07 – 01/08)**

- Update information associated to the digital rural street database in the next routes: Bogota – Medellín – Pereira, Bogotá – Cúcuta, Costa Atlántica, Llanos Orientales, Neiva – San Agustín by using GPS receiver ProXH and Field Computer Recon, for 6,417 km.

**CAMINOSCA – Caminos y Canales Cia. Ltda. - GIS Specialist Engineer - (05/07 – 08/08)**

- Consulting services for the Hydraulic Modeling of the water distribution main systems of the city of Quito (Ecuador), for a contract between C. Lotti & Associati S.p.A. and the Compañía Metropolitana de Alcantarillado y Agua Potable de Quito - EMAAP-Q.

**Empresa de Acueducto y Alcantarillado de Bogotá ESP - GIS Specialist Engineer - (12/06 – 05/07)**

- Generating and/or unifying, validate in the field, convert and migrate aqueduct geographic information levels of adduction and conduction with its respective attributes to the GIS. The main activities were: Compilation of information in office that includes digitizing and scanning raw data, capture elements in the field with sub meter precision GPS (Trimble's GeoXT) and update the Corporative Geodatabase by using ArcGIS.

**PROCALCULO PROSIS S.A. - GIS Specialist Engineer - (07/06 - 08/06)**

- Update information associated to the digital rural street database in the routes Bogota - Ipiales and Cali – Buenaventura by using GPS receiver ProXH and Field Computer Recon, for 1,264 km.

**Engineer Fabio Castellón Sánchez - GIS Specialist Engineer - (06/05 - 12/05)**

- Development of a tool that allows to indicate the sectors of the city with a greater probability of requiring intervention with the purpose of rehabilitating the sewage system elements, this tool have total connectivity with the Geodatabase in order to make on line analysis. Empresa de Acueducto y Alcantarillado de Bogotá, ESP.

**Empresa de Servicio Público de Aseo de Cali – EMSIRVA ESP - GIS Specialist Engineer - (09/04 – 10/04)**

- Technical concept about a route handling program developed in order to define if it fills with the object contracted.

**DERSIS S.A. - GIS Specialist Engineer - (08/00 – 05/07)**

- Development of a System - Phase I for the study in the elaboration of the geographic database of the main cities in the Atlantic Coast in the Republic of Colombia, Asia Air Survey Co Ltd. for the agreement between the Japanese International Agency of Cooperation - JICA and the Geographic Institute Agustín Codazzi - IGAC.
- Pilot Project for the Maintenance of the inventory of networks of the aqueduct in zones 2 and 5 of Bogotá, Aguazul Bogotá S.A. ESP for the Aqueduct of Bogotá - ESP.
- Analysis, design and implementation of a system that allows the suitable management of mining titles in Colombia. Colombian Institute of Geology and Mining - INGEOMINAS
- Checking alphanumeric data base of the SIDEP implemented in Oracle, necessary variables identification to relate with geographic entities (urbanizations, lots and urban furniture), design geographic data base, development module SIG. Departamento Administrativo Defensoría del Espacio Público – DADEP.
- Updating network information of the aqueduct in ArcGIS, in the zone 5 (Ciudad Kennedy, Bosa and Soacha, for 1'200,000 hab. Aprox.) by using sub meter precision GPS and Ground Penetrating Radar. Aguazul Bogotá S.A. ESP. Capture position and attributes of visible elements with GPS of sub meter precision in the field. 905 hydrants, 8739 valves and 1371 km of network.
- Updating network information of the aqueduct in ArcGIS, for the hydrants from field data captured with GPS. Empresa de Acueducto y Alcantarillado de Bogotá ESP.
- Elaboration of the design and implementation of the Geographic Information System for the control and follow up on the spillage in the sewerage system that the enterprise operates. Empresa de Acueducto y Alcantarillado de Bogotá ESP.
- Carrying out of research related to the design, development and implementation of an automated system based on computer aided drawing technologies CAD, and Geographic Information Systems GIS - compatible with the existing tools at the enterprise - for the capture, quality control, registration, edition, spreading out, printing and updating of the information corresponding to the “constructed work of the aqueduct networks” data - in the city of Bogotá, D.C. Empresa de Acueducto y Alcantarillado de Bogotá ESP.
- Development, analysis, design, programming and alphanumeric & spatial implementation of the “Territorial Environmental Information System” (a Geographic Information System) from CORPONOR.
- Carrying out of inventory of residual water direct discharge to the surface streams (Tunjuelo, Salitre and Fucha Rivers), and design, installation and start up of a data base for the handling of captured information. Departamento Técnico Administrativo del Medio Ambiente - Technical and administrative Department for the Environment - DAMA.

**Unión Temporal Planeamiento y Gestión de Proyectos - Temporary Link, Planning and Management of Projects - PGP LTDA. - HIDROTEC LTDA. - GIS Specialist Engineer - (08/01 – 12/02)**

- Elaboration of diagnosis on the urban environment in this Country, by examining and integrating the ecologic impact caused by the various social, economic and cultural activities proper of each municipality in an urban and urban - regional context. Implementation of a Geographic Information System. Ministerio del Medio Ambiente - Ministry of the Environment.

**Universidad de los Andes - Professor on Geographic Information Systems (GIS) - (01/01 - 08/07)**

- The course introduces the student to the foundations of the Geographic Information Systems (GIS). It includes a brief introduction the principles of basic cartography. A revision is made on the equipment and programs that can be used with the GIS, emphasizing the use of AutoCAD and ArcView programs - so that the student acquires skill and a conceptual basis on which he/she can use GIS in the future.

**Energía Integral Andina (EIA) - GIS Specialist Engineer - (12/00 - 03/01)**

- Implementation of a Geographic Information System with information obtained from the survey field at the installation of twenty two (22) points - on the optical fiber route -, and the results of the tests carried out on the fibers of the network at various places in Colombia. Celumóvil - Cocolco.
- Implementation of a Geographic Information System for the rehabilitation of telephone networks in three different Districts located in Fontibón - as a pilot project. 3M - Empresa de Telecomunicaciones de Bogotá - ETB.

**Engineer Jairo René Rojas - GIS Specialist Engineer - (09/00 - 05/01)**

- Survey for the evaluation of the condition of the main distribution network for the aqueduct system, and formulation of a structured program for its rehabilitation by using Geographic Information Systems. Empresa de Acueducto y Alcantarillado de Bogotá - Acueduct and Sewerage Enterprise of Bogotá -, ESP.

**PRESEA S.A. ESP - GIS Specialist Engineer - (01/00 - 12/00)**

- Operation of the Networks Management System (Cityworks) for the maintenance of sewerage networks. Empresa de Acueducto y Alcantarillado de Bogotá, ESP.

**Engineer Carlos Alberto Giraldo López - GIS Specialist Engineer - (12/99 - 12/00)**

- Assembly of the Networks Management System (Cityworks) for the maintenance of aqueduct. Empresa de Acueducto y Alcantarillado de Bogotá, ESP.

**Consorcio IEH - GRUCON Ltda. - Engineer Jairo René Rojas - GIS Specialist Engineer - (10/99 - 05/00)**

- Advising to the Intervening during the execution of the Survey for the Sectoring, Rehabilitation, Leakage control and Determining of the amounts and causes of not accounted water, for the Optimization of the operational conditions and control of losses from the distribution networks by using Geographic Information Systems in the service zones S1, S6, S7, S13, S14, S17, S15, S20, S22, S23, S24, S26, S30, S31, S32, S21, S25, S33, and S34 in Santa Fe de Bogotá. Empresa de Acueducto y Alcantarillado de Bogotá, ESP.

**Consorcio IEH - GRUCON Ltda. - SOPRIN Int. - CAD - GIS Support Engineer - (07/97 - 09/99)**

- Survey for the Rehabilitation of the Sewerage System for the Salitre, Torca, Conejera and Jaboque watersheds of Bogotá. Implementation of a Geographic Information System. Empresa de Acueducto y Alcantarillado de Bogotá, ESP.
- Survey for the Rehabilitation of the Sewerage System for the Fucha, Tunjuelo, Tintal and Soacha watersheds of Bogotá. Implementation of a Geographic Information System. Empresa de Acueducto y Alcantarillado de Bogotá, ESP.

**ADMINISTRATIVE DEPARTMENT OF DISTRICT PLANNING - Bogotá, D.C.****Coordinating Engineer for the Assistant Direction of Urban Productivity - (10/96 - 07/97)**

- Steps for the issuance of the excavation Licenses. Decree 039, dated January 21 1997 was passed - through which the procedure for the issuance of excavation licenses - in order to carry out infrastructure works for the rendering of public services in Bogotá, D.C. - was regulated, and Decree 220, dated April 2, 1997 - modifying the 039 one of 1997.
- Incorporation of information - on digital format - of the public services enterprises to the Geographic Information System of the Capital District. Decree 785 was passed, dated December 23, 1996 through which the exchange - in magnetic media - of the information of networks of enterprises that render domiciliary public services and District Planning, was regulated.
- Regulation of the Use of the Underground Public Space. Intervener for the survey and design of a sump system (Galerías de Servicios - Service Galleries) for the orderly use of the Infrastructure of Public Services in the city of Bogotá, D.C.
- Project of the Franja Seca - Address: Calle 13 de Bosa. Intervener for the designs of the rain water and house sewage sewerages and of the pavement structure of the road.
- Survey of Urban Renewal in the Las Cruces - Santa Bárbara zone. Elaboration of the reference terms of the Survey, which includes - among others - the routing of the Avenida Los Comuneros for the Av. Caracas - Av. Circunvalar span, adapting it to the particular urbanistic conditions of the sector.
- Project for the modification of Agreement 2 of 1980 and Regulating Decree 317, dated May 29, 1992. Intervener for Advising the State, on the elaboration of the bid for the Road Plan, in order to submit it for consideration to the Concejo Distrital - District Council, in the area between Avenida Boyacá and the Bogotá River, inside the limits of the Capital District, which included the defining of intersections, praedial affectation, transversal sections and the description of track center lines by way of identification of the reference points with coordinates from the Geographic Institute Agustín Codazzi.

**HIDROTEC LTDA. CONSULTANT ENGINEERS - CAD - GIS Support Engineer - (09/94 - 09/96)**

- Geotechnical -Environmental Surveys, and design of roads for the locations and access roads to the Dele-e and Dele-f ponds BP Exploration, Colombia.
- Survey of feasibility for the river - port in Cañas River and the optimization of a coal-bearing port in Santa Marta. PRODECO.
- Inventory of Hydroelectric projects between 10 and 100 MW, in the States of Tolima and Huila. ISAGEN.
- Pre-feasibility Survey on the habilitation of an area - by way of hydraulic filling -, and the development of an industrial project for the Morro island in the Municipality of Tumaco. Corpes de Occidente.
- Conceptual survey on the Main System of Aqueduct and Sanitary and Pluvial Sewerage Main at the North Edge. EAAB.
- Survey on the Aqueduct and Sewerage Master Plan for the city of Montería. Fiduciaria La Previsora Ltda.
- Implementation of a Geographic Information System for the Survey on the Regulation of Public Use Streams at the watersheds of the Subachoque, Frío and Bogotá rivers. CAR.
- Survey 1 on Feasibility for the Tierras Guacavía - Guatiquía - Adapting of Land. FONADE - INAT.
- Updating on the Feasibility Survey for the Fundación - Ariguaní Project. INAT.

**GRUCON LTDA. - Design Engineer - (11/91 - 08/94)**

- Implementation of a Geographic Information System - at municipality (urban and rural) level in the Municipality of Chía.
- Surveys and Designs for the emptying, treatment and final disposal of sewage and emptying of rain waters, for the Municipalities of Apartadó and Chigorodó, State of Antioquia.

- Elaboration of three (3) Maps for the survey of Land Use in the bean field and tobacco zone of Barichara, Villanueva and part of San Gil, Santander, during years 1954/56, 1976 and 1991/92, by way of air photographs and using Geographic Information Systems for the CIAT.
- Analysis by way of Geographic Information Systems, in the defining of the Fitness of the Irrigation Plan inside the Survey on Feasibility of the Irrigation District of Patía, Cauca, for FONADE-HIMAT.
- Aqueduct and Sewerage Systems of the Municipality of Nunchía, Casanare, for the Departamento Administrativo de Planeación - Administrative Department of Planning - of the State of Casanare.
- Technical Unit of Support of the Chocó State for the Corpes de Occidente.
- Coordinating Engineer of Intervening for the Inter-administrative Contracts for the Repair and Keeping of forty (40) Jail Establishments for the Ministerio de Justicia y del Derecho - Ministry of Justice and of the Law.

**CONTRACTING ENGINEER - (08/90 - 09/91)**

- Preparing and fitting of lands for the cultivation of the sugarcane in the sugar mills of Cauca and Providencia in Valle del Cauca - Colombia.

**HIDROESTUDIOS S.A. - LABORATORY OF HYDRAULIC TESTS - Design Engineer - (11/86 - 08/90)**

- Survey on Feasibility of the port expansion capacity for the marine terminal of Buenaventura - for the Puertos de Colombia Enterprise.
- Elaboration of the report on the Applied Technical Research: follow up on the Closing Works of the Secondary Branches of the Magdalena River - for the Ministry of Public Works and Transport.
- Elaboration of the plans of constructed work for the Bogotá IV Project - for the Empresa de Acueducto y Alcantarillado de Bogotá.
- Hydraulic Models of the Hydroelectric Miel I Project - for ICEL - CHEC.

**Field Engineer**

- Advisory to the Intervening of the closing works of the secondary branches of the Magdalena River at the Puerto Wilches sector, Santander - for the Ministry of Public Works and Transport.
- Advisory to the Intervening for the river banks defense works - by way of the closing of the secondary branches of the Magdalena River in Barranco de Loba, Bolívar - for the Ministry of Public Works and Transport.
- Advisory to the Intervening for the construction of the Public Wharf in Tolú, Sucre - for the Ministry of Public Works and Transport.
- Hydraulic designs for the survey on optimization of the Hydroelectric Central of Florida I of CEDELCA in Popayán.