Statement of Qualifications

Geographic Information Systems
Photogrammetry and LIDAR Services
CAD Services

SECON Private Limited

http://www.secon.in

1. Profile

SECON is an ISO 9001:2000 certified GIS Driven Multidiscipline Engineering company with around 620 personnel. SECON is a financially sound, stable, zero-debt company that was established in 1981. SECON is one of the leading multidiscipline engineering consulting firms and the largest and oldest surveying and mapping firm in India with over 28 years of experience. Most of SECON's clients are repeat and long-term clients.

SECON provides world-class GIS services and software solutions at cost-effective rates by using the global delivery model. SECON is an ESRI Business Partner and a member of the Autodesk Developer Network (ADN).

SECON has long-term partnerships with international engineering firms and can operate in most areas of Asia, the Middle East, and North Africa. SECON prefers the partnering model for its US and European areas of operations.

The key differentiator for SECON is that the company is a well-established (established in 1981) financially stable (Zero Debt and Consistently Profit Making) Multidiscipline Engineering firm that provides a total solution from a single window for the entire lifecycle of an Infrastructure development project.

The SECON QA/QC staff working on the surveying and mapping projects have firsthand experience in dealing with SECON's Engineering Consulting staff that provide input while working on SECON's engineering consulting projects.

SECON personnel have access to SECON's engineering talent and domain expertise in:

- Oil and Gas Pipeline Transportation Routing
- Water and Sanitation Engineering
- Highway and Transportation Engineering
- Civil and Structural Design
- Irrigation and Flood Control Engineering
- Electrical Engineering
- Environmental Engineering
- Geotechnical Engineering
- Cadastral and Parcel Mapping
- Land Surveying and Mapping
- Photogrammetry, LIDAR and Image Processing
- GIS Driven Software Development
- GIS Data Conversion and Maintenance

SECON has the following standing in India:

- The largest private (non-government) surveying and mapping firm in India
- The dominant pipeline corridor mapping firm in India
- The largest private (non-government) mapping and design firm for irrigation and water management projects

- One of the largest private (non-government) highway mapping and design firms in India

SECON has executed over:

- 52,000 km of large-scale Pipeline Corridor Mapping – this includes Route Engineering, Topographical and Cadastral Mapping and Rights-of-Way Acquisition assistance and management. This is the largest amount of Pipeline Corridor mapping done by any corporation in India.
- 10000 km of mapping, design, and construction supervision of highways
- 1,195,000 Hectares of large-scale mapping (topographical and cadastral) for Irrigation projects
- 795,000 Hectares of Irrigation and Water Management design projects
- 600 infrastructure development projects (includes subdivision/township mapping, design and planning)
- 600,000 meters of geotechnical investigation and drilling in various soil strata.
- SECON has also extracted the Detailed Project Report data for 7,300 km of National Highways in India and collated this data for entry into the NHAI Road Information System.
- SECON is currently short-listed for the pioneering National Highway Asset Inventory project in India. This project is to perform the asset inventory of 5,700 km of National Highways in India.
- SECON is currently executing a major multimillion dollar mapping and consulting project for the planning and design of the Water and Sanitation system for 13 municipalities (100 settlements) in Libya.
- SECON was the only firm selected in India by OPUS, New Zealand (http://www.opus.co.nz) to be their offshore design center.

2. SECON's GIS Service

SECON has been offering GIS services since 1995 and has vast experience in the creation and maintenance of GIS databases and applications for diverse clients.

SECON is one of the oldest users of Autodesk, Bentley and ESRI software in India. SECON was one of the first ESRI Business partners in India and is also a member of the Autodesk Developer Network and the ESRI Developer Network.

Capabilities

GIS Driven Software Development

SECON has vast experience and proficiency in developing applications on ESRI, Bentley Microstation and Autodesk platforms. SECON is also familiar with Geomedia and open source GIS software. SECON has a proficiency in developing applications for Pipelines, Right of

Testimonial

"We are very satisfied with the services rendered by Secon Surveys Pvt Ltd and would strongly recommend them for GIS services and software solutions"

Mohd Ahsan, MIS Expert, PACT,
UP Water Sector Restructuring Project,
Irrigation Dept, UP, India

Way Management and Water & Sanitation applications. The spectrum ranges from simple desktop applications to Web enabled enterprise GIS application development. Please refer to the experience section for a sample of the relevant experience of SECON in GIS driven application development.

GIS/CAD Data Conversion

SECON has a large team of GIS technicians to provide GIS/CAD data conversion services for a variety of industries such as:

- Water and Sanitation
- Oil & Gas
- Cadastral and Parcel Mapping
- ALTA and Title Mapping
- Water Resources and Floodplain mapping
- Environment and Natural Resources
- Irrigation and Flood Control
- Photo Interpretation and Data Capture
- Electric Utilities
- Telecom

Testimonial

"We are very satisfied with the services rendered by Secon Surveys Pvt Ltd and would strongly recommend them for GIS services and software solutions"

Program Manager, Information Solutions, PBS&J

SECON has executed GIS conversion projects across the globe for clients in the US, Canada, Italy, Africa and India.

Capacity

GIS Driven Software Development

SECON has a team of 25 developers with a capacity of 4000 hours/month for software development. With 2 months notice, SECON can ramp this capacity to 35 developers.

GIS/CAD Data Conversion

SECON has a team of over 150 GIS/CAD personnel for data conversion with a capacity of 24000 hours/month for data conversion. With 2 months notice, SECON can ramp this capacity to 220 personnel with a capacity of 35000-40000 hours /month.

Pricing

GIS Driven Software Development

For short-term, low-volume projects, SECON's billing rate for GIS Software development ranges between is $20/hour-$26/hour. SECON can offer significant discounts of upto 15% if its business partners outsource long-term, high-volume projects. A typical long-term, high-volume project would be 2,000 hours/month for a minimum of 10-12 months.

GIS/CAD Data Conversion

For short-term, low-volume projects, SECON's billing rate for GIS/CAD Data Conversion ranges between is $10/hour-$14/hour. SECON can offer significant discounts of upto 15% if its business partners outsource long-term, high-volume projects. A typical long-term, high-volume project would be 5,000 hours/month for a minimum of 10-12 months.

3. SECON's Photogrammetry and LIDAR Service

SECON has embarked on a planned strategic initiative to become a major player in the Photogrammetric and LIDAR services arena.

SECON has embarked on this initiative for two reasons:

- To become a major offshore service provider in the Photogrammetric and LIDAR services arena. SECON is one of the pioneering Indian offshore companies offering LIDAR processing services. SECON intends to sell its services to clients in North America, Europe, the Middle East and North Africa. SECON is in the process of spinning off its offshore services (exports) as a separate revenue stream.

- To use these services for its engineering projects in India and other parts of the world.

SECON's corporate strategy is based on building long-term business relationships that are mutually beneficial, working with partners that are willing to outsource their Photogrammetry and LIDAR processing services to SECON's Bangalore, India facilities.

SECON's operations center is certified to the world standard ISO 9001:2000 quality management system.

SECON is willing to perform small (up to 100 hours) pilots at no cost as a proof of concept and to build its partners confidence in SECON. SECON can offer significant discounts of up to 15% of its normal billing rates if its business partners outsource long-term, high-volume projects.

SECON also is seeking partners who can offer their services (with cameras and sensors) for upcoming projects in India. The Photogrammetry and LIDAR market in India is opening up to private agencies and SECON intends to capitalize on this opportunity. The government of India has the following projects underway:

- Mapping of the entire country with private agency participation
- The river interlinking project. This project will link the perennial and flood-prone rivers to the seasonal rivers of India. This will be one of the largest projects ever undertaken in the world and will span at least 2 decades, involving significant Photogrammetric and LIDAR mapping services to map the basins and watersheds of these rivers.

SECON is the only agency in India with the experience to perform both the mapping and design of these projects. SECON is well positioned to be a significant player for these projects with its sterling reputation and extensive experience and network of clients.

Capabilities

Photogrammetry

SECON offers a full range of Digital Photogrammetry processing services. These include:

- Aerial Triangulation
- Topographic/Planimetric Mapping
- DTM/ Contour Generation
- Feature collection (3D Vectorization)
- Orthophoto generation/ Mosaicing/ Tiling

LIDAR

SECON offers a full range of LIDAR processing services. SECON has the requisite capabilities for classifying and editing (filtering/cleanup) LIDAR data.

SECON offers the following LIDAR services:

- Classification of ground and non-ground points (using automated classification and manual filtering methods)
- Removal of noise points
- Transmission line LIDAR processing
- DEM and contour generation
- 3D surface model generation
- Land use classification
- Flood plain mapping (hydrological modeling of watersheds)
- LIDAR tool automation

Software

Photogrammetry

SECON uses Photogrammetric software from Inpho and DAT/EM. The software from these companies integrates with each other and the entire process is seamless and result in industry standard deliverables.

LIDAR

SECON uses Terrasolid software for processing of LIDAR data. The software includes TerraScan, TerraModeler, TerraPhoto and TerraMatch.

TerraScan has proven to be an industry standard for LIDAR data processing and classification. The filtering process is performed with TerraScan to extract the "bare earth" points, which are used to represent the terrain. Bare earth filtering is required in order to generate contours and DTMs. A LIDAR processing professional determines the techniques to apply, and manual classification is applied to obtain the bare earth surface.

Routines/Algorithm: TerraScan macros are used for filtering. If required, specific macros can be developed in-house based on specific project requirements.

SECON also is developing custom macros and software to assist in the classification process and to further reduce processing costs.

Various quality control steps are built into SECON's processing procedures to ensure quality data.

Capacity

Photogrammetry

SECON has 6000 hours/month of Photogrammetry capacity. Based on awarded projects, SECON can ramp up its capacity to 8000 hours/month or as required within two months.

LIDAR

SECON has 10000 hours/month of LIDAR capacity. Based on awarded projects, SECON can ramp up its capacity to 13000 hours/month or as required within two months.

Pricing

Photogrammetry

For short-term, low-volume projects, SECON's billing rate for Photogrammetry is $17/hour. SECON can offer significant discounts of 15% if its business partners outsource long-term, high-volume projects. A typical long-term, high-volume project would be 2,000 hours/month for a minimum of 10-12 months.

LIDAR

For short-term, low-volume projects, SECON's billing rate for LIDAR is $17/hour. SECON can offer significant discounts of 15-20% if its business partners outsource long-term, high-volume projects. A typical long-term, high-volume project would be 2,000 hours/month for a minimum of 10-12 months.

4. Security at SECON's ISO 9001:2000 Certified Operations Center

SECON has a state of the art 105000 sqft ISO 9001:2000 certified operations center that is fully owned by the company.

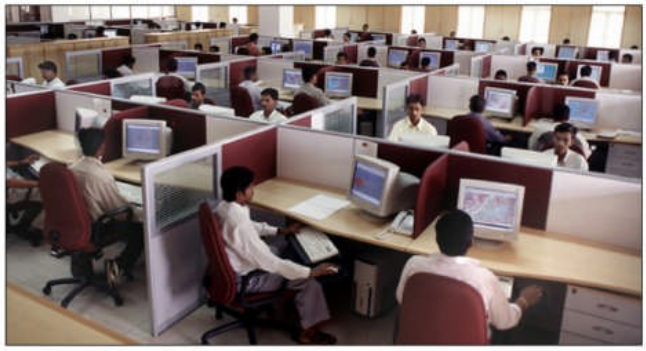
Aesthetically designed 105,000 sft. Company owned office space

This operations center is a secure facility and has robust security controls.

The controls include:

Security - Physical Controls

- 24X7 security guards
- Access Control Devices to restrict access to the different areas of the Operations Center.



Security - Technical Controls

- Network Monitoring Tools
- Web content filtering tools to restrict websites and ftp sites.
- Anti-Virus Tools
- Firewalls
- Secure Servers
- Encryption
- Restricted and controlled access to floppy drives, zipped drives and CD/DVD writers- these are disabled on all machines. Disabled USB drive data transfer on all machines. Only the network administrator can do data transfer to external devices and closely controls this external data transfer.
- Restricted access and monitoring of SECON FTP site.
- Regular backup of data on daily and weekly intervals
- Power Backup with UPS and Generators
- Leased Line Backup for Internet Connectivity

5. SECON's Global Delivery Model

Project Management

Weekly progress reports will be sent by email from SECON to the client project manager. The SECON Project Lead will interact on a frequent basis (more than 2-3 times a week) with the technical lead from the client during the project.

SECON will extensively use webconferencing tools such as Webex and Citrix Online to interact with the client on an as-required basis. Project documentation will be exchanged by Microsoft Word, Excel, Visio, and MS Project.

Communications Protocols

Email will be the preferred method of communication. In addition teleconferencing and webconferencing will be used. File transfer will be done through FTP. Large file transfers (>40gb) will be transferred by Courier. SECON has a 1mbps leased line for Internet and File Transfer purposes.

6. Offices and Contact Information

India	USA
147, 7B Road, EPIP, Whitefield Bangalore 560066 Phone:91-80-41197778 Fax:91-80-41194277 Email: feedback@SECON.in	10460 Roosevelt Blvd N, Ste 387 St Petersburg, FL 33716 Phone: 727-493-2214 Fax: 727-499-6945 Email: dhyan.appachu@secon.in
LIBYA SECON Private Limited PO Box 13456, Tripoli,Libya Phone: (218)914624857 Rupesh Jang Shah Email: Rupesh.shah@SECON.in	

7. Resources

Software

Photogrammetry and LIDAR Processing

- Aerial Triangulation:
  - Match AT from Inpho, Germany
- DTM Extraction (Automatic):
  - Match T from Inpho, Germany
- Ortho Rectification:
  - OrthoMaster from Inpho, Germany
- Mosaicing/ Tiling/ Seam Editing:
  - OrthoVista from Inpho, Germany
- Feature collection/ Editing:
  - SummitEvolution from DATEM, USA
  - AutoCAD Map from AutoDesk
  - Microstation V8 from Bentley
  - ArcView / ArcInfo from ESRI
- Image Enhancement:
  - Adobe Photoshop CS
- Image Compression:
  - GeoExpress with Mr.SID

- LIDAR Data Processing:
  - Terrasolid TerraScan, TerraScan, TerraModeler, TerraPhoto and TerraMatch. Custom classification macros.

GIS

- AutoCad Map 3D, Autodesk Raster Design, Autodesk MapGuide
- ArcGIS ArcView, ArcGIS ArcInfo, ArcGIS Spatial Analyst, ArcGIS 3D Analyst
- ArcSDE, ArcIMS, ArcGIS Server
- ArcEngine, ArcPad
- MicroStation, Geographics, Descarte

CAD

- AutoCAD, MicroStation V8, MicroStation J, IntelliCAD, Surfer

Software Development

- Visual Studio.NET Enterprise
- Visual Studio.NET Enterprise Architect
- Visual Studio.NET Professional
- Visual Studio Enterprise Developer
- MSDN Universal
- Mantis

Civil Design

- AutoDesk Land Development Desk Top
- AutoCad Revit Structure
- Auto Civil Rel. 8.0, Autodesk Civil 3D,
- Staad Pro, Geopak, Nova Point Road Professional, MXRoadMax
- WaterCAD, WaterGEM, SewerCAD, SewerGEM, StormCAD

SECON has an extensive library of custom in-house developed software for all its areas of operation.

Computers and Peripherals

Description and Make	Quantity
Personal Computers- Intel Pentium, AMD Athlon, Cyrix	Over 600
Laptop Computer – Toshiba, Acer, Vesta, Compaq	65
Compaq Ipaq	4
Large format Design Jet Plotter – HP	10
Laser Jet Printer – Rex Rotary, HP	16
InkJet Printer – EPSON	15
Dot Matrix – Wipro, TVS	4
Digitizers – Calcomp	6
CD Writer – HP, LG	4
Modems - D-link	10
Hubs	7
Switches	3
Scanner – HP	2
UPS	300 kVA
Captive Power Generator – Kirloskar, Simpson, Escon	750 kVA

Precision Survey Instruments

Sl. No.	Description and Make	Quantity (No)
1	Dual Frequency Real Time (RTK) Global Positioning System (GPS) - LEICA	2 Set
2	Hand-held GPS – Garmin, Magellan	20
3	Total Stations High-end – LEICA, TOPCON, TRIMBLE, PENTAX	62
4	Automatic Levels – WILD, NIKKON, SOKKIA, PENTAX, TRIMBLE	70
5	Pipeline Locator - Fischer TW-6	6
6	Compact Flash GPS	4

8. Experience

The following projects are representative samples of SECON's experience.

Software Development

Project: Web-enabled Watershed Monitoring and Management System (GIS)	**Country :** Canada
Location within Country: Toronto	**Professional Staff Provided by your firm:**
Name of Client : Toronto Region Conservation Authority (TRCA) & York University	**No. of Staff** : 3
Address: Toronto Region Conservation Authority (TRCA) 5 Shoreham Drive Downsview Ontario M3N 1S4 Canada	**No. of Staff Months** : 30
Start Date (Month/Year) June 2003	**Completion Date** (**Month/Year**) January 2004
Name of Association Firm(s) if any:	**No. of Months of Professional Staff provided by Associated Firm(s)** : NA
Narrative Description of Project: This consolidated GIS system, Watershed Monitoring and Management System provides a web-based data uploading, mapping, assessment, and reporting service for various indicators like Fish, Benthol & Water Chemistry of watershed health.	
Description of Actual Services Provided by SECON Staff: This pilot project focuses on the development of a Web-based data assessment and reporting system to support the TRCA's Regional Watershed Monitoring Program. As a pilot project, its purpose is to demonstrate how biological monitoring and abiotic data can be presented in a geographic context to facilitate the sharing of watershed monitoring data with civic, scientific and political stakeholders. This consolidated system will provide for a web-based data uploading, mapping, assessment, and reporting service for various water quality indicators. A three-tier architecture infrastructure was implemented in a Windows 2000 environment to allow map services to be served through an ArcIMS server and presented through a customized thin HTML interface. All data will be contained in Geodatabases and managed by ArcSDE. Additional services and functionality (e.g., data entry, catalogues indexing and dynamic web reporting) is provided through custom MapObject programming, Java 2 Enterprise Edition (J2EE) and integration with other supporting applications (e.g., Crystal Decisions)	

Project:

SECON Alignment Sheet Generator (SASG)

With the development of the Alignment Sheet Generator, SECON has achieved a fully automated technique to generate Alignment, Cross section details & Reports for the entire length of the pipeline.

SASG is a high-end engineering application, which can process the survey data with details like Planimetry, profile, cross-sections, soil investigation / soil resistivity, etc. SASG was developed in-house by SECON and can be customized to meet a client's requirements for generating pipeline alignment sheets.

SASG has the following features:

- Effective Survey Data Management
- Generates Ready to plot Alignment Sheets & Cross Sections
- Cross Sections with Geotech Details & Jurisdiction Details
- Various Reports on Population Density Index, visual Classification of Bore Holes & Soil Strata and Soil Resistivity
- Reports on TP/IP Bearing Angle/ Deflection Angle with List of Coordinates and Progressive Chainages

Testimonial

"SECON's Pipeline management modules for generating crossing drawings, bore logs, reports, etc., ensures mapping and capturing with much higher speed and excellent repeatability compared to conventional methods. Updating and retrieval of data and information is greatly simplified. Being GIS compatible, the product has the capability for a seamless integration with other available pipeline application to perform "End-to-End" functions for Pipeline facility in all phase of its life cycle, viz., Concept to Commissioning, ***Asset Management and Statutory Compliances.*** *The modules are field proven"*

Senior Officer, Gas Transportation Infrastructure & Co. Ltd (Reliance Group)., Mumbai, India

SASG is currently being customized for a leading European engineering firm. This will help the company generate survey and engineering alignment sheets for their water transmission pipeline projects.

SASG has been customized for Reliance (http://www.ril.com/), the largest private sector Indian corporation, and is extensively used by them for their large oil and gas transmission pipeline network.

Project:

Irrigation Resource Information System (IRIS)

The Uttar Pradesh Water Sector Restructuring project is aimed to promote more sustainable development and use of the state's limited water resources. As part of this contract, SECON developed IRIS.

The application allows staff to upload, assess, and extract their data on demand and in a geographic context. Among other features, a cartographic interface allows users to query and view geographic details of catchments area in an irrigation network. The tailor made geo-database is used to monitor water resource data.

Testimonial

"We are very satisfied with the services rendered by Secon Surveys Pvt Ltd and would strongly recommend them for GIS services and software solutions"

Mohd Ahsan, MIS Expert, PACT,
UP Water Sector Restructuring Project,
Irrigation Dept, UP, India

IRIS helps water resource agencies lower operational costs while improving the effectiveness of their monitoring programs and the quality of services. IRIS can be further customizable to cater to any client's requirement. The system is developed using ArcObjects.

Project :	**Country :**

Pipeline Database Management System - Development of Comprehensive, software for generation of GIS/MIS database for survey and ROU/TOW data, engineering applications, to facilitate Disaster Management Module, Pre construction, Construction, Post construction, Operation Maintenance		India
Location within Country: Gujarat		**Key professional staff Provided by your Firm/entity (profiles):**
Name of Client : GSPL		**No. of Staff** : 10
Address: ----------		**No. of Staff Months** : 90 **Duration of assignment** : 9 months
Start Date (Month/Year) February 2003	**Completion Date** (**Month/Year**) November 2003	
Name of Association Firm(s) if any: Nil		**No. of Months of Key professional staff, provided by Associated Consultants** : Not Applicable

Narrative Description of Project:

Integrating pre construction, post construction and O&M details into database with user-friendly GIS tools developed for easy retrieval of data, reports generation and presentation

Description of Actual Services Provided by SECON Staff:

- Carrying out user assessment study
- Procurement of Satellite imagery and preparation of base map
- Georeferencing of the seamless map based on established ground control points
- Convert all engineering details like alignment sheets, pipe books, P&ID drawings, As-built drawings, Geotech details into computer format
- Integration of Cadastral survey details & Acquisition details
- Carrying out Ground survey for as-built updating – Deployment of GPS interfaced with Pocket PC in order to collect the ground truth data and the pipeline details involving bends, SV, CP, CV, Main line Valve stations, etc.,
- Collecting Disaster management support details like Hospitals, Fire extinguishers, Police stations, etc and integrating in GIS Map
- Converting all maps & large scale survey details to GIS format & Creation of GIS database
- Development of exclusive software for GIS/LIS including Training and Implementation. Application modules for Disaster Management support, Land/survey details, Document management system, WEB based O&M and Crossing details access are provided

Project: ROU Master – Right of Way Management Software		**Country:** India
Location within Country: Karnataka,Maharastra,Gujarat,Goa,Punjab, Andra Pradesh,Tamil Nadu,Madhya Pradesh,Rajasthan ,West Bengal and Orissa		**Professional Staff Provided by your firm:**
Name of Client: GTIL		**No. of Staff** : 8
Address: ----------		**No. of Staff Months** : 95
Start Date (Month/Year) October 2003	**Completion Date** (**Month/Year**) December 2004	
Name of Association Firm(s) if any: NIL		**No. of Months of Professional Staff provided by Associated Firm(s)** : Not Applicable

Narrative Description of Project:

ROU Master a Right of Use (RoU) Acquisition software is an advanced windows based software that provides details about land records, ownership details and automates the complete land acquisition process.

It is useful for managing enormous data collected & generated for various activities involved with ROU Acquisition. The laborious work of generating reports and notices for individuals is replaced by a few keystrokes on the computer.

Remote Upload: The data updated at all the sites offices is uploaded to the central server using “Remote Upload”, a special tool of ROU Master. The data is transferred through secured FTP.

Description of Actual Services Provided by SECON Staff:

- Requirements Analysis
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training

Project: ROU Master – Right of Way Management Software		**Country:** India
Location within Country: Gujarat		**Professional Staff Provided by your firm:**
Name of Client: GSPL		**No. of Staff** : 10
Address: ----------		**No. of Staff Months** : 125
Start Date (Month/Year) January 2003	**Completion Date** (**Month/Year**) February 2005	
Name of Association Firm(s) if any: NIL		**No. of Months of Professional Staff provided by Associated Firm(s)** : Not Applicable

Narrative Description of Project:

ROU Master a Right of Use (RoU) Acquisition software is an advanced windows based software that provides details about land records, ownership details and automates the complete land acquisition process.

It is useful for managing enormous data collected & generated for various activities involved with ROU Acquisition. The laborious work of generating reports and notices for individuals is replaced by a few keystrokes on the computer.

Data Migration: The data for 16 pipeline projects spanning 700 kilometers was automated using ROU Master.

Description of Actual Services Provided by SECON Staff:

- Requirements Analysis
- Application Development
- Application Testing
- Implementation
- Customer Support
- Documentation
- Application Training
- Data Migration

Topographic and Cadastral Mapping

<table>
<tr><td colspan="2">Project :

Topographic and Cadastral Survey & Preparation of Land Records (World Bank aided)</td><td>Country:
India</td></tr>
<tr><td colspan="2">Location within Country:
Uttar Pradesh, India</td><td>Professional Staff Provided by your firm:</td></tr>
<tr><td colspan="2">Name of Client:
UPWSRP(World Bank), Uttar Pradesh Irrigation Department, Govt. of Uttar Pradesh</td><td>No. of Staff : 125</td></tr>
<tr><td colspan="2">Address:
----------</td><td>No. of Staff Months : 2750</td></tr>
<tr><td>Start Date (Month/Year)
January 2004</td><td>Completion Date (Month/Year)
Jan 2006</td><td>Number of Parcels: Project scope covered app. 1,521,352 acres(2377 sq miles, 615658 Hectares) – 2,500,000 parcels app.</td></tr>
<tr><td colspan="2">Name of Association Firm(s) if any:</td><td>No. of Months of Professional Staff provided by Associated Firm(s) : NA</td></tr>
<tr><td colspan="3">Narrative Description of Project:
Topographic and Cadastral survey and preparation of Land records and establishment of a survey grade GIS database. The project area covered 1,521,352 acres (2377 sq miles) – 2,500,000 parcels app. The outputs of the assignments are used for redesigning and rehabilitation of all the Irrigation and Drainage systems. Various analysis such as flow analysis and spatial analysis are performed using the GIS coverage's that is created as the output. This is the largest topographic and cadastral mapping project done in India by a private (non government) agency.</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by SECON Staff:
Topographic mapping 1,521,352 acres (615658 Hectares/2377 sq miles) with 20cm contour interval at 1:5000 scale.
Cadastral mapping of approximately 2,500,000 parcels -field data collection, Field surveys for control, conversion from hardcopy to GIS format
Generation of survey grade GIS database with combined topographical and cadastral details.
GIS software development of customized application for the GIS database—generates custom views, reports, queries.
GIS training for the irrigation staff</td></tr>
</table>

Project: Gujarat State Industrial Landuse Base Map Generation, Gujarat, India		
Client Name: GSPL		
Project Performance Period	**From:** January 2000	**To:** January 2005
Location of Project: Gujarat, India		

Brief Description of the services for this project:
Mapping of 1581 km long Gas Pipelines in Gujarat and preparation of GIS based Industrial Database for 2,35,000sq km

Services provided :

- Generation of maps from Satellite Imagery and SOI Topo Maps(1:50000 scale)
- Creation of GIS database for the pipeline corridor
- Centre line survey, detailed engineering survey, soil investigation and soil resistivity survey, cadastral and ROU acquisition as per P&MP Act.
- Study of alternatives and finalisation of optimum corridor.
- Establishment of trench centre line, profile survey
- Survey of Pipeline corridor using GPS and high end Total Stations
- Soil investigation and soil resistivity survey at 500 m intervals
- Collection of Population Density and Social data
- Hydrological and geotechnical investigations for River crossings
- Cadastral survey and preparation of land plan schedule
- Preparation and serving of notices under Section 3(i) and 6(i) of P&MP Act, 1962 and publication of the same in the Gazette of India
- Generation of data for Environment Impact Assessment and Environmental Clearance from the Ministry of Environment and Forests.
- Obtaining clearances for various crossings, such as Expressways, National Highway, State Highways, Railways, Utilities, etc.
- Generation of Gujarat Map Database from Satellite Imagery using latest practices.
- Development of exclusive software for GIS/LIS and ROU acquisition including Training and Implementation

Data Conversion

Assignment Name : Valley Center Municipal Water District		**Country :** USA
Location within Country: California		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 12
		No. of Staff Months : 38
Start Date (Month/Year) August 2006	**Completion Date** (**Month/Year**) March 2007	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Name of Senior Staff (Project Director / Coordinator, Team Leader) involved and functions performed

Mr. Dhyan Appachu	Client coordination
Mr. Aditya Sinha	Project Management, Client Management, Submissions, Timelines
Mr. Gopal G.R	Technical lead, Production control, Quality control

Narrative Description of Project:

The project is to geo-reference the scanned 4000 as-built drawings to the City of Valley Center parcel base and digitizing the water & sewer features to create an ESRI geo-database.

The work also involves creation of Map Book for both Water and Sewer utilities of the entire project area.

Description of Actual Services Provided by your Staff:

Pre-production: Convert the Base data Shape File (Source File) to the AutoCAD drawing Format which consisting of City limit, Parcels, Reservoir, Streets. Geo-reference the image (.Jpeg) in the drawing referring the street name specified in the Base data followed by Image name, Drawing name respectively.

Production: Digitize or Draft the Water & Sewer features except hidden or dashed features in the image. Attach the attribute to those features, such as Drawing name, Image name, Manhole elevation, Material, Install date, Diameter referring the information provided in the Access database and in the As-Built.

QA: Check for the Geo-referencing of the image to the corresponding street name and Parcel number and other surrounding details. Checking the missing entities & attributes, Dangling, duplicate features and also check for Continuous network of sewer and water features.

Finalization: Edge matching of Sewer and Water features to make the seamless network Creation of Geo-database of Water & Sewer networks using the shape file.

Project: City of Chino Hills, CA—Water/Sewer Geodatabase and Mapbook Creation		
Client Name: Under NDA		
Project Performance Period	**From:** May 2004	**To:** December 2004
Location of Project: Chino Hills,California		
Brief Description of the services for this project: The City of Chino Hills is located NE of Anaheim Ca, It has a population of @ 66,500 people, covers about a 45 square miles, and has roughly 200 miles of water and sewer pipes. **Services provided :** ▪ Georeferencing ▪ GIS Data conversion from Scanned Water/Sewer plans and creation of the geodatabases for Water and Sewer Networks ▪ Creation of Mapbooks - a series of atlas maps of the service area network of 8.5*11 size with proper annotation placement.		

Project: City of La Mesa. CA —Water/Sewer Geodatabase QC		
Client Name: Under NDA		
Project Performance Period	**From:** June 2005	**To:** July 2005
Location of Project: La Mesa,California		
Brief Description of the services for this project: **Services provided :** ▪ QC, correct and update the City of La Mesa's sewer geodatabase, attributes, and map book		

Project: GIS Cleanup of Floodplain Mapping		
Client Name: Under NDA		
Project Performance Period	**From:** August 2005	**To:** Sept 2005
Location of Project: 3 counties in USA		
Brief Description of the services for this project: **Services provided :** 1. To "clean up" the floodplain mapping in three Counties. Clean up means to attribute the 100 year and 500 year floodplains on both the polylines and polygons and digitize missing floodplain boundaries. a. Make sure the polylines and polygons have arc/node topology. The datasets must not contain slivers or dangles. 2. The final deliverable was arc and polygon files that contains all floodplain boundaries for the entire county that that meet FEMAs Guidelines & Specifications Appendix L.		

Project: City of Tampa 911 Street Network Correction		
Client Name: subcontract from Advanced Mapping – City of Tampa		
Project Performance Period	**From:** Feb 2005	**To:** March 2005
Location of Project: Tampa,Florida		
Brief Description of the services for this project: **Services provided:** The scope of the project is to correct the "not true to ground" situation and update associated attributes (street name, address range) of its roads centerline to support for geocoding.		

Assignment Name : FERC – Plats mapping (pipeline)		**Country :** USA
Location within Country: Texas		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 5
Address:		**No. of Staff Months** : 7.5
Start Date (Month/Year) February 2006	**Completion Date** (**Month/Year**) April 2006	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Name of Senior Staff (Project Director / Coordinator, Team Leader) involved and functions performed

Mr. Dhyan Appachu	Client coordination, Business deals
Mr. Aditya Sinha	Project Management, Client Management, Submissions, Timelines
Mr. Gopal G.R	Technical lead, Production control, Quality control

Narrative Description of Project:

The Plats (Parcels / PropertY sketches) to be platted individually to individual drawings in DWG format corresponding to the Layout size (8”X11”)

Input files include Property Shapes ("Zone 14 Plat base.dwg"), Alignment Sheets in PDF format, List of Land Owners and Drawing Layout.

- **Phase-1**

Marshall, Nemaha, Brown and Doniphan Counties of **Kansas** State, Buchanan, Clinton, Caldwell, Carroll and Chariton Counties of **Missouri** State, Gage and Jefferson Counties of **Nebraska** State.

- **Phase-2**

Weld, Logan and Sedgwick Counties of **Colorado** State, Laramie County of **Wyoming** Sate, Kimball, Perkins, Lincoln, Dawson, Frontier, Gosper, Phelps, Kearney, Franklin, Webster, Nuckolls and Thayer of **Nebraska** Sate.

Description of Actual Services Provided by SECON:

1. Access the CAD drawing and Select Layout “Model ". With the aid of the PDF file, locate tract 001 in the Model Space, determine the XY center co-ordinate for the tract 001 X=2266631.75, Y=14534498.51. Use this Coordinate to zoom the view in paper space to locate the tract to be drawn. Use “8.5x11H “Border for this drawing.

2. Select Layout 8.5x11H. Highlight the Viewport (layer VP) and access the properties dialog box. Under Misc. select “Display Locked “to unlock the display. Then select “Custom scale ". Select any below mentioned scale to fit the border of the tract with in the Viewport.
   Scale is calculated by (1 divided by the potential Scale) 1 / 500 = .002

Engineering scales used are 10, 20, 30, 40, 50, 60, 80, 100, 200, 300, 400, 500, 600, 800, 1000, 2000, etc.

3. Then select model view and select the command “Zoom Center “type in the co-ordinates from step 1. Hit the return twice and the property will appear in the view. Adjust scale in step 2 to fit tract in the border. Once the scale is adjusted, in properties lock the display by selecting " Display Locked "

4. In Paper Space trace over the drawing entities using the following layers.
(Existing Pipeline, Proposed Alignment & P.I.'s Features)

Line Work		**Layer**
Property Line	-	Property Line
Section Line	-	Sec
State Line	-	STATE_LINE
Existing Pipeline	-	Exist PL
Proposed Alignment	-	Prop Alignment

Turn off Viewport. Start adding Bearings and distance labels in the model space. Show bearings to the nearest Min & distance to the nearest foot. Ties to the corners of the property should be measured in model space. Sections, County and State names are extracted from the given input i.e. PDF's. Name of land owners are found on the line list XLS file. The Rods are calculated by measuring the total distance across the subject property in model space and dividing by 16.5. (16.5 Ft. = 1 Rod).

Calculation of the New Permanent Easement Acres (Ac.) & Temp.
Construct Workspace Acres (Ac.). In model space draw a shape the limits of the Permanent Easement (Perm RW layer) crossing the tract. Then use the command Tools / Inquiry / Area. Then select O for Object and select the shape. It should give you the area of 125011.78 sq. ft. this divided by 43560 (1 Ac. = 43560 sq. ft.) I.e. in acreage. 2.87 Ac.

Do the same for the boundaries for the 2 Temp Work Space (Temp WS layer) Shape on South Side = 171501.50, North Side = 23321.01

Total = 194822.51 / 43560 = 4.47 Ac. Leave the shapes on in the file (Calc Temp WS layer & Calc Perm RW layer).

As deliverable the individual drawings for Parcels / Owners in DWG format are submitted to GIE.

Project:		
Peace Creek—Contour Digitization from Aerial Photos and DTM creation		
Client Name: Under NDA		
Project Performance Period	**From:** August 2003	**To:** March 2004
Location of Project: Peace Creek,Florida		

Brief Description of the services for this project:
Services provided :

- Georeferencing
- Digitization of contours and break lines from scanned aerial photographs

Photogrammetry and LIDAR processing

Assignment Name : County 7535 LIDAR data cleanup and Contour Generation		**Country :** USA
Location within Country: PA		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 10
Address:		**No. of Staff Months** : 15
Start Date (Month/Year) 15th May 2006	**Completion Date** (**Month/Year**) 28th July 2007	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Name of Senior Staff (Project Director / Coordinator, Team Leader) involved and functions performed

Mr. Dhyan Appachu	Client coordination, Business deals
Mr. Rajdeep Amatya	Project Management, Client Management, Submissions, Timelines, Quality Control

Narrative Description of Project:

The project is to filter Laser points to respective classification. Some of the ground points are taken back to default points and some default points are converted back to ground points. Contours are generated using model key points and photogrammetrically collected Breaklines.

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are open in LiDAR software to check the data quality and corrupt files.

Production: LiDAR clean up work using TerraScan where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

Finalization: Final checking in TerraScan/Terra Modeler with generated contours and surface.

Assignment Name : PaMAP LiDAR data cleanup and Contour Generation	**Country :** USA
Location within Country: PA	**Professional Staff Provided by your firm:**
Name of Client : Under NDA	**No. of Staff** : 10
Address:	**No. of Staff Months** : 25
Start Date (Month/Year) 15th Dec 2006 / **Completion Date** (**Month/Year**) 28th Mar 2007	
Name of Association Firm(s) if any:	**No. of Months of Professional Staff provided by Associated Firm(s)** :

Name of Senior Staff (Project Director / Coordinator, Team Leader) involved and functions performed

Mr. Dhyan Appachu	Client coordination, Business deals
Mr. Rajdeep Amatya	Project Management, Client Management, Submissions, Timelines, Quality Control

Narrative Description of Project:

The project is to filter Laser points to respective classification. Some of the ground points are taken back to default points and some default points are converted back to ground points. Contours are generated using model key points and photogrammetrically collected Breaklines.

Description of Actual Services Provided by your Staff:

Pre-production: All tiles are open in LiDAR software to check the data quality and corrupt files.

Production: LiDAR clean up work using TerraScan where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both directions (vertical and horizontal). Edge match check with adjacent tiles.

Finalization: Final checking in TerraScan/Terra Modeler with generated contours and surface.

<table>
<tr><td colspan="2">Project :

Scottsdale DTM collection</td><td>Country :
USA</td></tr>
<tr><td colspan="2">Location within Country:
California</td><td rowspan="2">Professional Staff Provided by your firm:

No. of Staff : 12</td></tr>
<tr><td colspan="2">Name of Client :
Under NDA</td></tr>
<tr><td colspan="2">Address:
Under NDA</td><td>No. of Staff Months : 6</td></tr>
<tr><td>Start Date (Month/Year)
14th Dec 2005</td><td>Completion Date (Month/Year)
6th Jan 2006</td><td></td></tr>
<tr><td colspan="2">Name of Association Firm(s) if any:</td><td>No. of Months of Professional Staff provided by Associated Firm(s) : NA</td></tr>
<tr><td colspan="3">Narrative Description of Project:
The project is of collecting DTM (breaklines and mass points) to create 2’ accurate contours.</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by SECON Staff:

As per clients request and sample file, priority was given to collect more breaklines in undulating areas. Almost all models contain golf courses and undulating hills/ lands and hence more time has spent to capture breaklines.

Pre-production: Convert the image file to standard image format. Orient the images according to exterior orientation parameter (georeferencing)

Production: 3D compilations in stereo plotters where 3D breaklines are mass points are collected. All files are edge-matched at the edges.

QA: Check for floating and digging of breaklines and mass points in stereo mode. Check for edge matching with adjacent tiles. Check with QC routines for crossing of breaklines.

Finalization: Final checking in stereo plotter with generated contours.</td></tr>
</table>

Project : Cherokee County LiDAR data cleanup		**Country :** USA
Location within Country: Kentucky		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 10
Address: Under NDA		**No. of Staff Months** : 5.5
Start Date (Month/Year) 16th Dec 2005	**Completion Date** (**Month/Year**) 13th Jan 2006	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** : NA

Narrative Description of Project:
The project is to filter Laser points to respective classification. Some of the ground points are taken back to default points and some default points are converted back to ground points.

Description of Actual Services Provided by SECON **Staff**:

Pre-production: All tiles are open in LiDAR software to check the data quality and corrupt files.

Production: LiDAR clean up work using TerraScan Software where default points are changed to ground and ground points are changed to default wherever necessary.

QA: Cross section check throughout the tile in both direction (vertical and horizontal)

Finalization: Final checking in TerraScan/Terra Modeler Software with generated contours and surface.

Assignment Name : Coweta Orthophoto production		**Country :** USA
Location within Country: Georgia		**Professional Staff Provided by your firm:**
Name of Client : Under NDA		**No. of Staff** : 5
		No. of Staff Months : 10
Start Date (Month/Year) 2nd May 2007	**Completion Date** (**Month/Year**) 28th June 2007	
Name of Association Firm(s) if any:		**No. of Months of Professional Staff provided by Associated Firm(s)** :

Name of Senior Staff (Project Director / Coordinator, Team Leader) involved and functions performed

Mr. Dhyan Appachu	Client coordination, Business deals
Mr. Rajdeep Amatya	Project Management, Client Management, Submissions, Timelines, Quality Control

Narrative Description of Project:

The project is to prepare a digital ortho mosaice for entire county containing 1300 frames.

Description of Actual Services Provided by your Staff:

Pre-production: Frames are oriented with EO data and checked with control points.

Production: All aerial images are orthorectified with LiDAR DEM. Seam lines are drawn for all the overlapping portion of the aerial images. Finally all orthorectified images are mosaiced, color balanced and tiled

QA: All the mosaiced tiles are checked in Photoshop and distorted features are adjusted.

Finalization: Entire digital ortho mosaiced tiles are opened and checked.

<table>
<tr><td colspan="2">Assignment Name :
Avondale Planimetric Mapping</td><td>Country :
USA</td></tr>
<tr><td colspan="2">Location within Country:
Arizona</td><td rowspan="2">Professional Staff Provided by your firm:

No. of Staff : 10</td></tr>
<tr><td colspan="2">Name of Client :
Sanborn</td></tr>
<tr><td colspan="2">Address:
1935 Jamboree Drive, Suite 100
Colorado Springs, CO. 80920
Tel: 719-264-5488
Cel: 719-659-2403</td><td>No. of Staff Months : 10</td></tr>
<tr><td>Start Date (Month/Year)
12th Mar 2007</td><td>Completion Date (Month/Year)
28th Apr 2007</td><td></td></tr>
<tr><td colspan="2">Name of Association Firm(s) if any:</td><td>No. of Months of Professional Staff provided by Associated Firm(s) :</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director / Coordinator, Team Leader) involved and functions performed
Mr. Dhyan Appachu Client coordination, Business deals
Mr. Rajdeep Amatya Project Management, Client Management, Submissions, Timelines, Quality Control</td></tr>
<tr><td colspan="3">Narrative Description of Project:
The project is to prepare a planimetric map from UltraCam images. Total area of the project is 36 square miles.</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by your Staff:

Pre-production: Stero models are oriented with EO data and checked with control points.

Production: All planimetric features are captured in digital photogrammetric workstations

QA: Undershoot, overshoot and dangles were checked using QC routines.

Finalization: Photogrammetric product is verified with available ortho mosaic tiles.</td></tr>
</table>