Fiber to the Home Business Plan Proposal

For
City of Palo Alto Utilities
1007 Elwell Court
Palo Alto, CA 94303

Prepared By
Uptown Services, LLC
Neil V. Shaw
5650 Greenwood Plaza Boulevard, Suite 225E
Greenwood Village, CO 80111
303-290-9756
nshaw@uptownservices.com

November 21, 2002

A HOMETOWN CONNECTIONS BUSINESS PARTNER
Contents

I. BACKGROUND ........................................................................................................................................ 1

II. SCOPE, APPROACH AND DELIVERABLES ...................................................................................... 1
   A. SCOPE OF SERVICES ........................................................................................................................... 1
      1. Engineering Analysis ......................................................................................................................... 1
      2. Partnering and Branding Strategy ...................................................................................................... 1
      3. Comparative Municipal Telecommunications Analysis ...................................................................... 1
      4. Business Plan .................................................................................................................................. 2
   B. APPROACH (BUSINESS PLAN DEVELOPMENT) .................................................................................... 3
      1. Setting Goals .................................................................................................................................. 3
      2. Developing Operating Plans ............................................................................................................. 6
      3. Final Report ................................................................................................................................... 7
   C. DELIVERABLES ................................................................................................................................... 7
      1. Business Structure (Branding) Recommendation ............................................................................... 7
      2. Architecture Analysis and Recommendation ...................................................................................... 7
      3. Municipal Telecommunications Summary ...................................................................................... 7
      4. Mission, Goals, Objectives and Strategies ....................................................................................... 7
      5. Operating Plans ............................................................................................................................... 7
      6. Financial Plan ................................................................................................................................. 8

III. SCHEDULE ....................................................................................................................................... 8

IV. PRICE PROPOSAL .............................................................................................................................. 9
   A. FIXED CHARGES ............................................................................................................................... 9
      1. Consulting Services ......................................................................................................................... 9
      2. Travel expenses ............................................................................................................................. 9
   B. VARIABLE CHARGES ....................................................................................................................... 9

V. APPENDIX ......................................................................................................................................... A1

November 21, 2002
I. Background

The City of Palo Alto Utilities (CPAU) has completed a business case for the deployment of a FTTH system capable of providing cable television, high-speed Internet and telephone services to consumers and businesses in Palo Alto. The initial indicators in the business case were positive for moving forward and CPAU now wishes to complete a detailed business plan for the proposed venture. Uptown Services, LLC (Uptown) completed the FTTH business case and has been asked by CPAU to prepare a proposal for completing the business plan and some additional engineering tasks related to alternative system architectures. This is Uptown’s proposal.

II. Scope, Approach and Deliverables

The process of developing a business plan is made up of several interlocking tasks. This section provides an outline of Uptown’s proposed scope of services, the methods to be used and finally the deliverable to be provided.

A. Scope of Services

While the bulk of this assignment involves the development of a detailed business plan for the broadband business, there are two primary issues to be resolved before the business planning process can be started. First, a final decision must be made regarding the general network architecture to be deployed. The initial business case analysis focused on FTTH, but there has been interest in the deployment of Hybrid Fiber Coax (HFC) as well. The general type of architecture chosen will have a major impact on every element of the business plan.

Second, a final decision must be made relative to the partnering and branding strategies for each service. The business case called for retail video and Internet offerings from CPUA, with a wholesale telephone offering from a third party provider(s). There has been interest in looking at a completely wholesale strategy and there are actually some good possibilities in the Internet and video areas to explore. This strategy needs to be evaluated and a final branding decision should be made prior to commencement of the business planning process.

1. Engineering Analysis

Peregrine Communications (Peregrine) will provide additional engineering services during the business planning process. These services will be focused on developing comparative construction estimates for alternative architectures to the FTTH design completed for the business case. Alternatives might include HFC, all fiber non-PON network and blown fiber solutions.

2. Partnering and Branding Strategy

Through several preliminary discussions with local video, telephone and Internet service providers, Uptown and CPAU have laid a substantial foundation in the area of partnering. Uptown will continue to develop a detailed partnering strategy based on the results of follow-on discussions with those high probability partners on the CPAU broadband system. This strategy will also detail the final branding strategy for the overall business and each individual service. For example, will the telephone offering be “co-branded?” or will CPAU take a back seat from retail and enter into a completely open access business structure? These issues will be researched and resolved. A final recommendation will then be detailed.

3. Comparative Municipal Telecommunications Analysis

Over 100 municipally owned utilities have entered the telecommunications business by deploying one or more services like cable television, Internet access and telephone. CPAU is interested in
understanding some of the high level marketing, operations, finance and public policy strategies and tactics employed their peers in this area (similar in size, technology deployed or service set). Uptown will complete a survey of at least five of CPAU’s peers and provide a brief summary for each, along with a comparative matrix for all.

4. Business Plan
Uptown will develop one business plan for CPAU’s entry into the business of offering video, data and telephone services over a broadband system. This plan will contain the following elements.

a. Market Strategy
Uptown will develop a detailed marketing strategy for the proposed business. This marketing strategy will address the details related to target markets, product design, sales and marketing tactics and budgeting. These components are outlined next.

i. Target Market Analysis
Uptown will use the results of market research to date (as well as any additional research that might be completed in the future) to identify target markets for the CPAU service offerings. This effort will define the opportunities for each segment in the consumer and business markets. Market segmentation models may be used to help delineate the targets and their primary characteristics. Each segment will have unique requirements and this process will assist in identifying and integrating them into the product-planning phase.

ii. Product Planning
Uptown will develop detailed product plans for services that meet the gaps identified in the target market analysis effort. These plans will address the standard “Four Ps” (Product, Place, Price, Promotion) for the services being offered. It is assumed that there will be some form of video, Internet and telephone service, but this task will further refine the service design to a level of detail that will allow for detailed and reliable budgeting for the operation. Service design components will include features and functionality, capital costs, expenses, pricing, packaging and competitive analysis. The risk posed by alternative technologies will also be addressed in the product planning process.

iii. Acquisition and Retention Strategy
Uptown will develop a detailed acquisition and retention strategy for the broadband business. This strategy will detail the recommended sales and marketing tactics that will maximize CPAU’s acquisition efforts. This section of the business plan will also provide details related to retaining subscribers on a going forward basis and detail alternative strategies for countering competitive responses like aggressive price cutting and bundling of multiple services.

iv. Budget
Uptown will develop a detailed monthly budget for all product development, sales and marketing activities during the first two years of operation.

b. Service Delivery Strategy
Uptown will develop a detailed service delivery plan for the CPAU broadband network. This plan will address the core processes that will be required to deliver the services specified in the product-planning phase of development. It is assumed that several CPAU processes will be impacted by the addition of telecommunications services and those areas will be identified. There will also be new processes that will need to be developed to support the broadband service offerings. Uptown will develop high level process maps for the following areas; sales, order
processing, billing, collections, bill inquiry, customer service, trouble management, installation and repair.

c. **Organization and Management Strategy**

Uptown will develop a detailed organization plan for the new telecommunications operation. The core element of this plan will be an organizational chart. Job descriptions will also be developed for each position in the organization. Wage scales and potential resource pools will also be identified.

d. **Financial Strategy**

Uptown will develop a detailed financing strategy for the broadband business unit. This strategy will outline the issues associated with different financing approaches and provide a detailed monthly view for the recommended approach. One output of this task will be a 24-month operating budget that the managers of the telecommunications venture will use to guide and measure the business by going forward. The results of this effort will also be used to justify investment in the venture (financing).

e. **Legal Strategy**

Uptown assumes that the City of Palo Alto Legal Department will be developing a legal / regulatory strategy in support of the desired business plan. Uptown and CPAU will create a basic outline of the expected business structure and service offerings that the legal team can use to study the legal and regulatory issues and establish guidelines and strategies as appropriate. The business plan will be developed within the legal limits specified by the legal team.

**B. Approach (Business Plan Development)**

Uptown will develop this business plan in coordination with CPAU staff and other stakeholders in the broadband venture. This section outlines the process that will be used to develop CPAU’s business plan.

1. **Setting Goals**

The first step in developing the business plan will be to define the goals for the business. Goals and strategies should be developed and quantified for each element of the business (marketing, service delivery, organizational and financial), such that the ongoing operation might be measured accordingly. Uptown will facilitate a meeting at which CPAU staff and other stakeholders will develop this critical foundation before moving forward.

a. **The Mission – What Business Are We In?**

The first step in developing meaningful goals for the broadband business will be to develop its mission – its underlying reason for existence\(^1\). A good mission statement will define the company’s strategic direction and position in both product and service terms. It should also clarify the competitive arena in which the company operates. At a minimum, the mission statement should answer the following questions:

\(^1\) Any mission statement, goals and objectives developed for the broadband business unit will need to be consistent with those already in place for CPAU.
• What business are we in?
• How do we differentiate ourselves from others? What makes us unique?
• Where do we plan to do business?
• Why are we in business?

Given the complex nature of the business being proposed, this step will be critical. It will provide the basis for all goal setting and help bring the diverse group of stakeholders together with a common view of the business.

b. **Defining Goals, Objectives and Strategies**
A goal is a general statement of desired direction and usually relates to improving something. Goals are generally related to filling some sort of gap identified by the company and may or may have a specific time frame attached to their achievement. An objective is a measurable statement of accomplishment and a strategy is a method of achieving goals, objectives or both. A strategy usually includes inputs as well as desired outcomes, a time frame and milestones.

Uptown will facilitate the process of setting goals and objectives for each element of the broadband business. These goals and objectives will serve as the basis for developing specific strategies for the marketing, service delivery, organization and financial operating plans.

c. **Market Goals**
The primary purpose of marketing goals and strategies is to maximize overall sales and revenue potential. A secondary goal is to achieve maximum productivity from sales, promotion and distribution activities. Uptown will work with CPAU to establish goals for the following:

- Sales of specific products and services
- Sales to specific customer segments
- Sales by channel distribution

These goals are obviously interrelated, and it can be assumed that the process of setting them will require several iterations. For example, the expected level of production for the sales channels may not be sufficient to support the expected level of sales for each service.

d. **Service Delivery Goals and Strategies**
The primary purpose of service delivery goals and strategies is to minimize service costs, in order to maximize contribution margins of the company’s services. However, this must be achieved in the context of a strict quality standard in all areas of delivering the service, in support of the overall marketing goal of maintaining and expanding demand for the company’s products and services. Uptown will work with CPUA staff to establish goals for the following:

- Standard (budgetary) costs for supplied materials, products and services that are inputs to the service delivery process
- Productivity standards for all significant service delivery activities or processes
- Standard unit costs for each service
- Staff ratios for each worker group
- Estimate of fixed operating costs
• Service delivery capacity
• Service delivery overhead structure

These goals must match the sales goals set earlier. They will also be critical to the financing plan and development of a detailed operating budget.

e. Organization and Management Goals
The primary purpose of organization and management goals and strategies is to put into place the skilled workforce and organizational environment required to achieve the goals of marketing, service delivery and finance. Uptown will work with CPUA staff to develop goals and objectives for the following areas:

• Productivity standards for all worker classes
• Organizational structure for the broadband business
• Mix of skills and composition of the company’s workforce
• Supervisor to worker ratios and span of management control
• Development of staff skills
• Compensation for all personnel
• Growth and expansion of the workforce

These goals and objectives will have an overarching impact on the marketing and service delivery strategies for the broadband business.

f. Financial Goals
Financial goals and strategies have two primary purposes. First, they should support the capability of the company and generate profits through its operations (sales and service delivery). Second, they should effectively manage the funds generated through operations and ensure the continued financial solvency and growth of the business. An effective financial strategy can supplement operating profits, but the primary purpose of the financial strategy should be to ensure that the business has the financial resources required to support its ability to generate operating profits. Uptown will work with CPUA staff to develop goals and objectives (based on ratios) for the following areas:

• Liquidity
• Asset management
• Profitability
• Cash flow

While the broadband business will likely be under the overall CPUA operating umbrella, it is assumed that these goals and objectives will still be measurable at the business unit level.
2. Developing Operating Plans
Once the goals have been established for each element of the business, Uptown will have the basis by which to begin developing the operating plans for each area of the business. It is assumed that CPAU will develop a legal and regulatory plan in concert with the plans described below.

a. Product, Sales and Marketing Plan
Uptown will develop a detailed sales and revenue plan for the broadband business. This plan will be developed in support of the goals, objectives and strategies specified in the goal setting process. The product, sales and marketing plan will cover the following areas:

- Detailed service descriptions for each service being offered
- Mitigation of risk posed by alternative technologies
- Monthly and nonrecurring prices by service type (e.g. phone, video, Internet, etc.)
- Channel strategies by service
- Marketing strategies by service
- Alternative strategies for addressing competitive responses
- Debunking strategies and tactics to address incumbent “Fear Uncertainty and Doubt” campaigns (e.g., “Muni-Toons”).
- Monthly sales projections for first 24 months
- Monthly marketing expenses for first 24 months

This plan will serve as the roadmap for the development of all broadband service offerings. It will also spell-out the specific marketing strategies and tactics to be used during the first two years of operation. Uptown’s plan will be developed as a guide to be used by product managers and marketing personnel in the broadband business unit.

b. Service Delivery Plan
Uptown will develop a service delivery plan for the broadband business. This plan will be developed in support of the goals, objectives and strategies specified in the goal setting process. The service delivery plan will cover the following areas.

- Mapping of all core processes – sales, order processing, provisioning, installation, customer service, help desk, repair, billing, collections, network operations and product development
- Establishment of measurements within each core process
- Development of standards for each process measurement

Process mapping is a critical step in the development of a solid service delivery plan. Given the number of parties involved in the delivery of any broadband service, it will be important for CPUA to understand the various hand-offs and to set standards for each.

c. Organization and Management Plan
Uptown will develop an organization and management plan for the broadband business. This plan will detail the staffing plan along with the management structure of the business. The plan will include the following elements:
- Position descriptions for all new job functions in the business
- Staffing requirements for each position
- Organizational and management structure for new staff
- Broadband business’ position in the CPUA infrastructure – governance and reporting relationships
- Breakdown of overhead costs that flow to new broadband business

Given the highly sensitive nature of these issues, Uptown assumes that there will be a great deal of support provided by the appropriate executives from the City’s utility, finance and human resources departments.

d. **Financial Plan**

Uptown will develop a detailed financial plan for the broadband business. This plan will provide a comprehensive view of the business for the first 24 months of operation. Latter months will be aggregated into annual totals. Uptown’s plan will include an income statement, balance sheet and statement of cash flows. It will also reflect the financing strategy that will be developed by Uptown and the CPAU finance department.

3. **Final Report**

Uptown will prepare a final report that details the outcomes discussed herein.

C. **Deliverables**

Uptown will provide the following deliverables over the course of the development process.

1. **Business Structure (Branding) Recommendation**

Uptown will provide a detailed business structure recommendation for each service to be offered. This recommendation will include updated business model analysis for each alternative that was evaluated.

2. **Architecture Analysis and Recommendation**

Peregrine will provide a spreadsheet-based analysis of the different architectures that were evaluated. This analysis will be similar to that provided as part of the business case development project. Uptown will complete the appropriate level of business case analysis and provide a recommendation regarding FTTH vs. HFC.

3. **Municipal Telecommunications Summary**

Uptown will provide a summary report and matrix for analysis of CPAU’s peers in the telecommunications business.

4. **Mission, Goals, Objectives and Strategies**

Uptown will provide a summary report on the mission, goals objectives and strategies that have been developed by the broadband team.

5. **Operating Plans**

Uptown will provide operating plans for the business plan components discussed in this scope of work.
6. **Financial Plan**

Uptown will provide a detailed spreadsheet based operating budget (income statement, balance sheet and statement of cash flows) for the first 24 months of operation and annually for up to 15 years.

**III. Schedule**

Uptown will make every effort to complete the business plan as soon as possible, but there are other tasks that must be completed prior to full development of the operating plans for marketing, service delivery, organization / management and finance. The following table lists the tasks to be completed in the order of their completion.

<table>
<thead>
<tr>
<th>Task</th>
<th>Dependencies</th>
<th>Resources</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Signed contract for business plan</td>
<td>None</td>
<td>CPAU, Uptown</td>
<td>Unknown</td>
</tr>
<tr>
<td>2. Evaluate architecture alternatives</td>
<td>#1</td>
<td>Peregrine, CPAU, Uptown</td>
<td>3 weeks</td>
</tr>
<tr>
<td>3. Develop architecture recommendation (FTTH or HFC)</td>
<td>#2</td>
<td>CPAU, Uptown</td>
<td>1 weeks</td>
</tr>
<tr>
<td>4. Develop business structure recommendation</td>
<td>#1</td>
<td>Uptown, CPAU, business partners</td>
<td>3 weeks</td>
</tr>
<tr>
<td>5. Legal / regulatory review of business structure recommendation</td>
<td>#4</td>
<td>CPA Legal</td>
<td>Unknown</td>
</tr>
<tr>
<td>6. Complete municipal telecommunications analysis</td>
<td>#1</td>
<td>Uptown, CPAU</td>
<td>3 weeks</td>
</tr>
<tr>
<td>7. Presentation and approval of architecture and business structure recommendations to UAC (presentation of #6)</td>
<td>#3, #5, #6</td>
<td>UAC, CPAU, Uptown</td>
<td>Unknown</td>
</tr>
<tr>
<td>8. Set goals for business plan</td>
<td>#7</td>
<td>Uptown, CPAU, UAC</td>
<td>4 weeks</td>
</tr>
<tr>
<td>9. Develop operating and financial plans</td>
<td>#8</td>
<td>Uptown, CPAU</td>
<td>10 Weeks</td>
</tr>
<tr>
<td>10. Presentation of business plan to UAC</td>
<td>#9</td>
<td>Uptown, CPAU, UAC</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

As the table shows, a business plan may take up to 17 weeks to complete after a contract is signed with Uptown. This time frame could be compressed by either eliminating elements from the operating plans, or by starting the development of the operating plans prior to finalizing the architecture and business structure strategies. This might shave up to five weeks off the schedule, but there is also the risk that the operating plans would be developed with the wrong assumptions related to business structure and network architecture.
IV. Price Proposal

A. Fixed Charges

1. Consulting Services

Unless otherwise negotiated between CPAU and Uptown, all consulting costs will be charged as fixed. Uptown’s fixed fee for the services (Uptown and Peregrine) described in this proposal will not exceed $123,500 (excluding expenses). A task-by-task breakdown is provided next.

<table>
<thead>
<tr>
<th>Task</th>
<th>Fixed Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I – Strategy Development Wrap - Up</td>
<td></td>
</tr>
<tr>
<td>• Engineering Analysis and Recommendation</td>
<td>$13,500</td>
</tr>
<tr>
<td>• Municipal Telecommunications Analysis</td>
<td>$5,000</td>
</tr>
<tr>
<td>• Business Structure Analysis and Recommendation</td>
<td>$20,000</td>
</tr>
<tr>
<td>Phase II - Business plan development</td>
<td>$85,000</td>
</tr>
<tr>
<td>Total</td>
<td>$123,500</td>
</tr>
</tbody>
</table>

2. Travel expenses

Travel expenses are estimated to be no more than $9,000 for this project. This is for estimation purposes only and will certainly fluctuate according to the costs of air travel, rental car and hotel stays in the Palo Alto area.

B. Variable Charges

Uptown does not plan to bill the City on an hourly basis. However, should work be required over and above the scope originally identified, hourly and daily rates for each resource are provided in the table below.

<table>
<thead>
<tr>
<th>Individual</th>
<th>Company</th>
<th>Hourly Rate</th>
<th>Daily Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neil Shaw</td>
<td>Uptown</td>
<td>$187.50</td>
<td>$1,500</td>
</tr>
<tr>
<td>Donald Thompson</td>
<td>Uptown</td>
<td>$187.50</td>
<td>$1,500</td>
</tr>
</tbody>
</table>
V. Appendix

1. Neil Shaw Resume

2. Don Thompson Resume
NEIL V. SHAW
5650 Greenwood Plaza Blvd, Suite 225E Greenwood Village, CO 80111
303-290-9756 (Office) 303-290-8473 (Facsimile) nshaw@uptownservices.com

Qualifications Summary
BSEE with MBA. Fifteen year career spent in telephone, cable and Internet industries. Extensive technical, quality and operations expertise coupled with business development, product development, sales and marketing experience in voice, video and data. Career specialty - starting new businesses, programs, and projects from scratch.

Employment History

**Uptown Services, LLC  Denver, CO  1997 - Present**


- Developed proprietary decision support software architecture used in sales tools
- Program lead for Public Power telecommunications assessments
- Completed comprehensive business opportunity study of wireless data and Internet access for Tier 2 and 3 U.S. markets
- Led project team that launched cellular resale operation for major utility consortium

**TCI Internet Services, Inc.  Denver, CO  1996**

*Vice President - Commercial Internet Services* Responsible for product development, marketing, distribution and implementation of commercial Internet services (@Work) provided over TCI's cable television infrastructure.

- Authored strategy for marketing Internet services to the small office/home office market
- Created cross functional assumption sets for telecommuting and Internet access products
- Synthesized proforma and business plan components for @Work product line

*Senior Director - Consumer Internet Services* Responsible for product development, marketing, distribution and implementation of consumer Internet services (@Home Network) provided over TCI's cable television infrastructure.

- Implemented phased roll-out schedule for four major market launches based on product development, marketing, operations, engineering and customer service readiness criteria
- Oversaw creation of a comprehensive marketing strategy for @Home roll-out that included public relations, retail, direct marketing and advertising
- Led execution of multiple wave direct marketing campaign for @Home roll-out in extremely competitive Bay Area Internet market

November 21, 2002

Vice President - Marketing & New Business Development (1994-1996)  Responsible for establishing Jones Lightwave, Ltd. (JLW) as a regional network provider for telephone, video and Internet services. Also responsible for day to day operation of JLW competitive access networks in Tampa, FL and Atlanta, GA.

- Authored strategy to build and operate regional networks that supported the delivery of voice, video and data services via independent cable television systems
- Led development team that created in-depth business plan and deal structure for massive regional network venture in Pennsylvania
- Presented regional network business plans to several key investors, lenders and affiliates

Director - New Market Development (1994)  Responsible for expanding competitive access provider (CAP) operations into new markets. Also responsible for all business planning, market development, technical design, and sales functions on a national level.

- Executed intense direct sales campaign with heavy access users like AT&T, MCI, Sprint and WiTel in an effort to acquire anchor customers in key markets
- Evaluated over 50 U.S. markets for CAP business
- Developed detailed cash flow analyses that decided feasibility for selected markets
- Recommended that Jones drastically change CAP strategy and pursue regional networks

U S WEST Communications  Denver, CO  1987-1994

Account Manager - Strategic Accounts (1993-1994)  Managed national Sears and IBM account relationship. Prepared and presented large telecommunications contract proposals to Sears and IBM headquarters groups.

- Exceeded sales quota by 100%
- ‘Excellence In Selling’ Gold Medal Winner at intensive U S WEST Sales Academy

Group Manager - New Product Development (1991-1993)  Managed the development and introduction of new products for the interexchange carrier market including; Calling Card Validation Service, 800 Data Base Service, and ISDN Access Services. Served on team that redesigned several key marketing processes in U S WEST.

- Team leader for U S WEST SS7/800 conversion over 14 states
- Created automated system to manage over 1,800 simultaneous project tasks
- Exceeded new product revenue objective by 50%

Group Manager - Enhanced Services Center (1990-1991)  Managed vertically integrated operations department. Responsible for project management, engineering, installation, system administration, and maintenance for Voice Messaging Services.

- Oversaw installation, operation and maintenance of 125 voice mail systems in 8 locations
- Programmed 24 hour intelligent monitoring and surveillance system

Education

University of Colorado at Denver  1995 - MBA, Marketing Emphasis
Iowa State University  1986 - BS, Electrical Engineering

November 21, 2002
Donald H. Thompson
2688 E Easter Ave., Littleton, Colorado 80122 (303)721-7234

Qualification Summary:
Over 20 years of experience developing products and services for the telecommunications industry, including management and executive positions. Involved in engineering throughout my career with experience in business planning, management and working with customers, manufacturing, accounting, legal and human resources. I have the skills to lead, organize, manage, and motivate technical professionals to produce high quality results and the discipline to meet schedule and cost objectives. Experience in general management and working directly with customers has taught me the importance of focus on customer requirements and business objectives.

Professional Experience

Uptown Services, LLC.; Denver, Colorado 2/98 to present
Develops and markets business planning tools and performs consulting services in the telecommunications industry. Main product is business modeling tools based on Microsoft Excel and Visual Basic for Applications.

Vice President of Engineering (2/98 to present)
Development of databases, applications, and processes to support the operations of the North American Numbering Plan Administration (NANPA) which administers the telephone numbering system for the US. Includes working with website developers and web-based applications developers for interfaces to NANPA’s website.
Development of new business modeling tools based on Microsoft Excel and Visual Basic for Applications. Assisting in new business planning consulting projects.

Imagelink Technologies, Inc.; Boulder, Colorado 8/96 to 2/98
Develops, manufactures, and markets a line of PC based videoconferencing products for use over ISDN, fractional T1/E1, LAN and TCP/IP connections.

Vice President of Engineering and Operations (8/96 to 2/98)
Managed all technical aspects of the company including Strategic Planning, Research & Development, Customer Service, Manufacturing and MIS. Managed the release of a new generation of products that improved performance, increased standards compliance, and reduced costs by a factor of three.

Jones Lightwave, Ltd.; Denver, Colorado 6/95 to 8/96
Originally owned and operated fiber optic links that provide large corporations access to long distance carriers bypassing the local exchange carrier. Recently, developed a strategy and business plan for providing telephony and high speed data services to homes and businesses over two-way fiber and coax CATV systems.

Vice President of Services Development (6/95 to 8/96)
Part of a small team that developed a strategy and business plan for providing telephony and high speed data services to homes and businesses over two-way fiber and coax Cable TV systems. Lead responsibility for developing the data services plan, the network plan, the organizational plan, and the initial implementation project plan. The team produced the new business plan and several board presentations in record time and set a new company benchmark of quality in a business plan.

Jones Futurex, Inc.; Rocklin, California 9/83 to 6/95
Develops and manufactures data security products including add-in boards for PCs, systems and application software; and stand-alone devices. These products protect confidentiality and integrity of data for both communications and applications subsystems.

November 21, 2002
Vice President and Chief Technology Officer (7/92 to 6/95)
As General Manager of the Systems Integration Services business unit with profit and loss responsibility. Formed this business unit after 6 years of success performing engineering services contracts within the engineering department. Successfully completed more than 12 hardware and software development projects ranging in size from about $5,000 to $1,200,000 and involving from one to fifteen people (direct, indirect, and contract) including project managers, engineers, tech-writers, and support people. Included evaluating customer needs, developing and selling proposals, negotiating contracts and changes, project management, managing the relationship with the customer, and collecting payments. Also included strategic planning, budgeting, and profit/loss management. Developed a reputation with customers of providing creative, high quality solutions under tight schedule and cost constraints which kept them asking us to do more.

As General Manager of the FAX Security business unit, added through acquisition, from initial concept through the first year after completion of the acquisition. Included planning and executing the transfer of the unit into the company, re-staffing key positions, release of new products, and restarting the marketing effort. The first years sales after acquisition exceeded any previous year. After the first year, the unit was turned over to a staff member.

As Chief Technical Officer, continued to provide strategic leadership of the company’s technology development and implementation including: participation in ANSI; development and maintenance of company software standards; and development and motivation of the technical personnel.

Director of Engineering (11/85 to 7/92)
As the technical leader of the company, reporting to the president, managed the development of hardware and software products, user manuals, and engineering documentation. The department also provided technical support to customers, manufacturing, and sales. The Engineering Department included up to six software engineers, two hardware engineers and a drafter.

Negotiated technical aspects of various development contracts, both as a buyer and a seller. Discussed requirements with potential customers, conceived solutions to meet both technical and business needs, then prepared and presented project proposals. Responsible for budgeting, planning, recruiting, training, and evaluating performance. Established company policies and procedures for product releases, configuration control, engineering change control and field problem reporting. Significantly improved project scheduling and product quality. Directly participated in the design of several hardware and software products.

Represented the company on four American National Standards (ANSI) Committees including being co-chair of a working group and a primary author of three standards. Invited speaker at three national conferences on data security.

Project Manager (8/84 to 11/85)
Managed the encryption products engineering group of hardware and software engineers. Directed development and release of the company's first successful security products. Participated in hardware and software design. Responsible for budgeting, planning, and evaluating performance.

Associate Engineer (9/83 to 8/84)
Led a project to design a specialized computer system to deliver a large database via satellite and Cable TV. Performed the system design, designed a high speed interface circuit, and participated in the software design. Also provided system design and market research support for an interactive information retrieval system for the cable TV market.

Halifax Engineering, Sacramento, California 1/82 to 7/83
Performed engineering services under contract to the Air Force at McClellan AFB.

Electronic Engineer (1/82 to 7/83)
Investigated fiber optic communications for existing Air Traffic Control Systems. Designed an interface for a Bit Error Rate Tester. Evaluated the design of a custom bit slice computer. Designed hardware and software for a micro-controller based signal detection system. Responsibilities included project budgeting and scheduling.

EDUCATION
BS degree in Electronic Engineering received March 1981
California Polytechnic State University, San Luis Obispo, California

November 21, 2002