



ISSN: 1545-679X

# Information Systems Education Journal

Volume 8, Number 25

<http://isedj.org/8/25/>

June 10, 2010

In this issue:

## A Database Design and Development Case: NanoTEK Networks

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**Abstract:** This case provides a real-world project-oriented case study for students enrolled in a management information systems, database management, or systems analysis and design course in which database design and development are taught. The case consists of a business scenario to provide background information and details of the unique operating characteristics of the Marketing Department of NanoTek Networks, a description of the functional business requirements, and sample data. What is unique about this case study is that most of the functional requirements and sample data are presented to the students through a series of business emails. The main business issue presented in the scenario is a rather typical management accounting problem: NanoTek Network's financial accounting system does not supply sufficient data for the Marketing Department to manage the financial details of their day-to-day operations. The Marketing Department's functional requirements are somewhat similar to a cost accounting system that a manufacturing job shop would employ. The Marketing Department needs to be able to track costs by the marketing activities associated with specific product promotional campaigns. The case provides sufficient information to design and develop a moderately complex database to assist NanoTek Network's Marketing Department in solving their management accounting problem.

**Keywords:** database design, database development, project case

**Case:** This article is a teaching case. Additional teaching notes and materials for instructors are available for EDSIG members at <http://isedj.org/restricted/>.

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**Recommended Citation:** Ballenger (2010). A Database Design and Development Case: NanoTEK Networks. *Information Systems Education Journal*, 8 (25). <http://isedj.org/8/25/>. ISSN: 1545-679X. (Abstract appears in *The Proceedings of ISECON 2009*: §2336. ISSN: 1542-7382.)

This issue is on the Internet at <http://isedj.org/8/25/>

The **Information Systems Education Journal** (ISEDJ) is a peer-reviewed academic journal published by the Education Special Interest Group (EDSIG) of the Association of Information Technology Professionals (AITP, Chicago, Illinois). • ISSN: 1545-679X. • First issue: 8 Sep 2003. • Title: Information Systems Education Journal. Variants: IS Education Journal; ISEDJ. • Physical format: online. • Publishing frequency: irregular; as each article is approved, it is published immediately and constitutes a complete separate issue of the current volume. • Single issue price: free. • Subscription address: [subscribe@isedj.org](mailto:subscribe@isedj.org). • Subscription price: free. • Electronic access: <http://isedj.org/> • Contact person: Don Colton ([editor@isedj.org](mailto:editor@isedj.org))

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This paper was selected for inclusion in the ISEDJ journal as a teaching case. This is a new category of journal paper and acceptance rates have not been established, but the quality is consistent with the best 50% of papers submitted. It was originally presented at ISECON 2009.

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# A Database Design and Development Case: NanoTEK Networks

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## Abstract

This case provides a real-world project-oriented case study for students enrolled in a management information systems, database management, or systems analysis and design course in which database design and development are taught. The case consists of a business scenario to provide background information and details of the unique operating characteristics of the Marketing Department of NanoTek Networks, a description of the functional business requirements, and sample data. What is unique about this case study is that most of the functional requirements and sample data are presented to the students through a series of business emails. The main business issue presented in the scenario is a rather typical management accounting problem: NanoTek Network's financial accounting system does not supply sufficient data for the Marketing Department to manage the financial details of their day-to-day operations. The Marketing Department's functional requirements are somewhat similar to a cost accounting system that a manufacturing job shop would employ. The Marketing Department needs to be able to track costs by the marketing activities associated with specific product promotional campaigns. The case provides sufficient information to design and develop a moderately complex database to assist NanoTek Network's Marketing Department in solving their management accounting problem.

**Keywords:** database design, database development, project case

## 1. CASE SUMMARY

NanoTek Networks is a \$250 million wholly owned subsidiary of a Fortune 400 computer hardware and technology services company. NanoTek specializes in producing extremely miniaturized network and communications equipment. Over the last four years NanoTek significantly increased the number of products under development. Consequently, it now finds itself struggling with challenges common to expanding firms: tight cash flow and difficulty coordinating new product releases with research and development (R&D), manufacturing, marketing, and sales.

Currently, NanoTek produces three products:

- AngioNet<sup>®</sup> is a miniature wireless network consisting of extremely small wireless monitoring devices that are attached to various parts of the human body to monitor coronary functions

without the need to be physically attached to monitoring equipment. This allows cardiologists to collect valuable patient data while the patient conducts normal day-to-day activities.

- LAZ-NET<sup>®</sup> is a highly portable and extremely secure miniature laser based network that permits very high-speed telecommunications without the need for traditional fiber optic cabling. The product can be used in emergency situations in which traditional communication facilities have been destroyed, e.g. natural disasters.
- LANMax<sup>®</sup> Router is a commercial grade combination intelligent Local Area Network (LAN) hub and WiMax router. The LANMax Router is available in several configurations: 12, 18, & 24 ports.

The success of NanoTek to date has been built upon these three product lines. Nano-

Tek's R&D organization has more than a dozen new products in development. At least six of these products are to be marketed commercially in the next 18 months, presenting a challenge to the marketing department. Marketing must not only maintain its efforts with the three existing products, but must also develop and deploy campaigns for the new products.

Carol Bartlett, newly appointed Vice President of Marketing, committed to other senior managers that few, if any, of the problems experienced with previous new product rollouts would recur. Specifically, she strongly stated her intent for Marketing to coordinate closely with R&D and Manufacturing in planning future product rollouts. Furthermore, she promised close monitoring of all marketing expenses, particularly those associated with new product rollouts; marketing cost overruns have been significant with the three current products. Given the number of products to be introduced in the coming months, such overruns could be debilitating to NanoTek.

As a part of her commitment to senior executives, Bartlett agreed to prepare a monthly status report on the marketing plans for each of the products under development, as well as for those products already on the market. This report, at a minimum, will include the following: 1) a detailed schedule of past and planned marketing activities and 2) an analysis of budgeted versus actual expenses. Carol also realized that several members of senior management may have additional information requirements beyond those stated above.

## 2. DETERMINING THE REQUIREMENTS

You have been retained by NanoTek to provide an expense tracking and reporting system that meets the aforementioned requirements. In your initial meetings with her, Bartlett indicated a preference for "off-the-shelf" software, citing a desire to avoid the long-term software maintenance costs associated with an in-house solution. Your investigation of the few available software packages, however, uncovered none that were suitable due to either lack of functionality or excessive complexity. An in-house solution appears the only workable ap-

proach. Presented with the evidence, Bartlett agrees.

When discussing the alternatives with Carol Bartlett, she informed you that the internal Information Systems staff at NanoTek already faces at least a twelve-month backlog. Therefore, they will be unable to develop the required software in a timely manner. Consequently, the two of you come to the conclusion that your mission has changed from identifying, installing and deploying a canned software package to designing, developing and implementing a custom solution. Complicating matters is the fact that NanoTek has an immediate need for the solution you are to develop; with several new products about to be introduced, time is of the essence!

Bartlett has indicated that she wants you to begin work on the project immediately. You both agree that the project should be divided into two phases. Phase one's deliverable will include the design, development, and implementation of a relational database. The second phase's deliverable will consist of queries, static data input forms, application forms, management reports and a navigational menu system. It will be undertaken subsequent to the completion of phase one. Carol and you had a meeting to review the functional requirements for the project, which appear below.

## 3. FUNCTIONAL REQUIREMENTS

### Phase One Requirements

Phase one requires the creation of a database containing the following:

- Data on all products currently marketed by NanoTek, as well as those to be released in the next 18 months.
- Data on all the various marketing activities undertaken by NanoTek's Marketing Department. Collectively, these activities will serve as a sort of "menu" of all possible marketing activities from which the department's personnel can select when designing a marketing plan for a specific product promotional campaign. A marketing plan for a given product's promotional campaign will consist of a variety of marketing activities. For instance, the marketing plan for the promotional campaign to launch a new

product may include brochure design, product-packaging design, advertising in trade magazines, and conducting seminars in select cities.

- The marketing plan data for each of NanoTek’s promotional campaigns. A marketing plan consists of a schedule of planned marketing activities including the beginning and ending dates of each activity, along with the estimated expenses for each activity. Carol Bartlett informed you that the Marketing Plan data she is providing is only for the currently approved promotional campaigns. Table 1 contains the names of these promotional campaigns. There will be future promotional campaigns for all of NanoTek’s currently released and future products.

**TABLE 1. CURRENT PRODUCT PROMOTIONAL CAMPAIGNS**

| Campaign Name                          |
|--|
| Initial Product Launch for PatientNet  |
| Initial Product Launch for POSNet      |
| Physician's Certification for AngioNet |
| Initial Product Launch for AutoMax     |

- NanoTek requires the capability to track actual marketing expenses for each marketing activity that is a component of the marketing plan for a specific promotional campaign. Each marketing expense must be charged to the appropriate marketing general ledger (G/L) expense account(s). It is very possible for a single marketing activity expense to be broken down and charged to multiple marketing G/L expense accounts. Unfortunately, there is little correlation between the expenses incurred on the behalf of a specific marketing activity and the General Ledger expense accounts that are to be charged. Carol Bartlett provides you a brief example of the required tracking process below.

“The marketing plan for a particular promotional campaign may include the marketing activity of conducting

seminars at trade shows. Of course, the employees who conduct the seminars will most likely incur multiple expenses during their travels to and from the trade shows, i.e. airfare, meals, lodging, etc. The system you implement must be capable of capturing all of the expenses associated with the specific marketing activity (seminars) that was undertaken as a planned element of a particular promotional campaign. In this case, the total cost of the marketing activity (seminars) will be the sum of the individual expenses associated with conducting the seminars (airfare, meals, lodging, etc.). Each of these expenses must be charged to the appropriate Marketing G/L expense account. In this case, the expenses will be charged to the *Travel - Air, Travel - Meals, and Travel - Lodging* marketing G/L expense accounts. But it is absolutely imperative that each of these individual marketing G/L expenses be associated with the marketing activity (conducting a seminar) of a specific promotional campaign for which they were incurred.”

With this recording process in mind, your database must also contain the following:

- Appropriate data on the permissible marketing G/L expense accounts. The marketing G/L expense accounts must be valid accounts when expenses are posted to the marketing activities of each campaign. The system must be able to ascertain the account balance for each of the marketing G/L expense accounts.
- The details for each marketing activity expense transaction must be maintained. This data serves as an audit trail for marketing expense transactions. If the amount of an individual marketing G/L expense transaction is over the preset expense limit for the marketing activity associated with the transaction then the person who approved the expenditure must be stored with the transaction.

At the conclusion of your meeting with Carol Bartlett on the requirements for phase one,

she handed you a stack of internal company emails regarding the project, see Emails 1 through 15. She said you would find additional functional requirements in the emails. She also stated the data for the first phase of the project was contained in various emails. Finally, she asked that phase one employ a simple but user-friendly interface by which NanoTek employees can enter data into the database, without the use of forms.

### **Phase Two Requirements**

Now that you completed and made any necessary modifications to the database developed in phase one of the project, it is now time to move onto phase two. The NanoTek Marketing Department held a meeting to discuss the functional requirements for queries, static data forms, application forms, reports, navigational menu, and other general application guidelines for the development project's second phase. After the meeting, John Wilson crafted an email to Carol Bartlett laying out the department's agreed upon functional requirements. Carol thanks you for a job well done on the first phase. She hands you John Wilson's email, see Email 16. She then requests that you get started on phase two immediately as the department is quite anxious to begin using the new system.

## Appendices

### EMAIL 1.

**Subject: Requested R & D Information**

**Date:** 07/15/2008

**From:** Travis Jenkins, Corporate V.P. Research & Development

**To:** Carol Bartlett, Corporate V.P. of Marketing

Below is the information you requested at the Board of Directors meeting last week. Please note that the release date is the date the product was released to manufacturing or the date we currently plan to release the product to manufacturing. As you are aware these dates can be slippery. You will need to contact legal to get accurate patent numbers.

| Project     | R & D Manager  | Phone          | Release Date |
|-------------|----------------|----------------|--------------|
| AngioNet    | Mary Sparrow   | (540) 555-1212 | 01-Jan-05    |
| LANMax      | Henry Check    | (717) 555-1212 | 01-Jun-06    |
| LAZ-NET     | Bill Parsons   | (814) 555-1212 | 01-Mar-05    |
| MobileMax   | Charles Wilson | (415) 555-8870 | 10-May-08    |
| AutoMax     | Betty Barfield | (814) 555-8899 | 25-Nov-08    |
| POSNet      | Sally Soran    | (215) 555-2323 | 14-Dec-08    |
| PatientNet  | Dr. Lisa Walsh | (215) 666-9909 | 20-Jan-09    |
| PetNet      | George Plumber | (412) 345-1212 | 15-Feb-09    |
| RFIDNet     | Dave Stafford  | (540) 555-3256 | 22-Apr-09    |
| POS RFIDNet | Jane Wishing   | (540) 666-4545 | 18-Jun-09    |

**EMAIL 2.****Subject: Requested Estimated Expenses and Cash Flow****Date:** 07/25/2008**From:** Dr. Lisa Walsh**To:** Kristy Young, Marketing Budget Analyst

Carol Bartlett asked me to forward this information to you. Attached is the output from my spreadsheet. If you have any questions, call Bill Johnson. He handled this for me. There will, of course, be more items to add to this as we progress.

**PatientNet - Initial Product Launch Budget**

| <b>Start</b> | <b>Finish</b> | <b>Description</b> | <b>Amount</b>       |
|--------------|---------------|--------------------|---------------------|
| 1-Feb-09     | 1-Oct-09      | Trade Magazines    | \$26,750.00         |
| 15-Feb-09    | 16-Feb-09     | Seminars           | \$75,500.00         |
| <b>Total</b> |               |                    | <b>\$102,250.00</b> |



**EMAIL 3.****Subject: Patent Numbers****Date:** 07/25/2008**From:** Sarah DuWright, Corporate V.P. Legal**To:** Carol Bartlett, Corporate V.P. of Marketing

Here are the product patent numbers you requested on the phone this morning. If we can be of further assistance please let me know.

| Product  | Patent Number |
|----------|---------------|
| AngioNet | 1545689       |
| LANMAX   | 1155556       |
| LAZ-NET  | 1645899       |
| RFIDNet  | 1228956       |

**EMAIL 4.****Subject: Cash Flow and Budget for POSNet – Initial Product Release****Date:** 07/28/2008**From:** Sally Soran, Product Director R & D**To:** Carol Bartlett, V.P. of Marketing

Carol here is a preliminary version of the information you requested. As I told you on the phone I am not happy with the budget you are providing this project and we really need to increase these numbers and review your department's marketing plan within the next two weeks if we are to have a successful launch.

| <b>Budget</b>        | <b>Amount</b> | <b>Start Date</b> | <b>Stop Date</b>  |
|----------------------|---------------|-------------------|-------------------|
| Promotional Material | \$17,000.00   | June 3, 2008      | October 30, 2008  |
| Trade Mark Creation  | \$15,500.00   | June 5, 2008      | July 25, 2008     |
| Packaging Design     | \$17,500.00   | August 1, 2008    | November 10, 2008 |
| 35mm Slides          | \$ 4,550.00   | October 15, 2008  | November 30, 2008 |

**EMAIL 5.****Subject: Marketing Budget: AngioNet Physician's Certification Campaign****Date:** 07/30/2008**From:** Mary Sparrow, VP Product Development**To:** Carol Bartlett, Corporate VP Marketing

Below is the budget and scheduling data you requested.

| Description          | Start Date | Estimated Completion Date | Budget Amount |
|----------------------|------------|---------------------------|---------------|
| Brochures            | 08/15/2008 | 01/15/2009                | \$19,500.00   |
| Art Work             | 08/30/2008 | 12/15/2008                | \$11,750.00   |
| Magazine Advertising | 03/01/2009 | 06/01/2009                | \$29,500.00   |
| Seminars             | 11/15/2009 | 11/17/2009                | \$65,750.00   |

P/S – Looking forward to your meeting at Vail next month. Will you and your husband have time to get in some golf? Give me a call.

**EMAIL 6.****Subject: Initial Product Launch Budget Info for the AutoMax****Date:** 08/05/2008**From:** B2**To:** Kristy Young, Marketing Budget Analyst

Kristy we have been swamped down here. We had endless issues with the FCC last week, but it looks like we now have it all squared away. I know Carol is on vacation this week and she was screaming at me to get you this info ASAP.....so here it is.....enjoy. I hope this is what she wants. She knows I hate this administrative busy work. If the numbers don't look right call Cindy and she will straighten it out.

| Begin      | End        | Budget Item                  | Estimate   |
|------------|------------|------------------------------|------------|
| 05/20/2008 | 09/12/2008 | Demonstration Materials      | \$9,500.00 |
| 08/12/2008 | 09/30/2008 | Art Work                     | \$7,750.00 |
| 09/15/2008 | 10/30/2008 | Product Specification Sheets | \$1,250.00 |
| 11/01/2008 | 11/02/2008 | Meetings                     | \$9,750.00 |

**EMAIL 7.****Subject: Product Costs and Selling Prices****Date:** 08/05/2008**From:** Harold Hudson, Controller**To:** Kristy Young, Marketing Budget Analyst

Carol asked me to send this information to you before she left on vacation. The manufacturing costs are estimated for unreleased products, but purchasing and manufacturing feel that they are accurate and should change little as we near actual production. As I am sure you know, it is company policy for all our products to have at least a 50% gross margin. Of course we expect our newer products to carry much higher margins. Our manufacturing costs include all variable costs and manufacturing overhead only.

| Product     | Mfg Cost    | Price        | Gross Margin |
|-------------|-------------|--------------|--------------|
| AngioNet    | \$15,250.00 | \$49,500.00  | 69.19 %      |
| LANMAX      | \$12,500.00 | \$27,900.00  | 55.20 %      |
| LAZ-NET     | \$84,589.50 | \$175,000.00 | 51.66 %      |
| RFIDNet     | \$12,500.00 | \$29,500.00  | 57.63 %      |
| MobileMax   | \$4,595.00  | \$9,995.00   | 54.03 %      |
| PatientNet  | \$25,000.00 | \$79,950.00  | 68.73 %      |
| PetNet      | \$24,650.00 | \$49,950.00  | 50.65 %      |
| AutoMax     | \$1,595.00  | \$3,995.00   | 60.08 %      |
| POS RFIDNet | \$65,000.00 | \$149,000.00 | 56.38 %      |
| POSNet      | \$35,250.00 | \$69,995.00  | 49.64 %      |

**EMAIL 8.****Subject: Fwd: Expense Accounts****Date:** 09/11/2008**From:** Kristy Young, Marketing Budget Analyst**To:** Carol Bartlett, VP Marketing

Per your request, I am forwarding a list of our general ledger (G/L) expense accounts that George, my assistant, generated off the mainframe the other day. Please read his email. You might want to kick some butt to get accounting off the dime.

**Subject: Expense Accounts****Date:** 09/09/2008**From:** George Wellard, Junior Budget Analyst**To:** Kristy Young, Marketing Budget Analyst

Attached is the list of the Marketing Department's G/L accounts and their current balances I pulled off the mainframe this morning. Note that accounting still hasn't setup that new Consultants Expense Acct. I told them to use Acct # 575-00. We haven't charged anything to it yet.....but I know we will next month!!

| <b>Account Number</b> | <b>Expense Account</b>         | <b>Balance</b> |
|-----------------------|--------------------------------|----------------|
| 500-01                | Advertising - General          | \$0.00         |
| 500-02                | Advertising - Video Production | \$0.00         |
| 500-03                | Advertising - Agency Fees      | \$25,750.00    |
| 510-00                | Printing                       | \$15,300.00    |
| 520-01                | Payroll                        | \$5,000.00     |
| 520-02                | Contract Labor                 | \$600.00       |
| 525-01                | Graphics - Production          | \$21,350.00    |
| 525-02                | Graphics - Proofs              | \$7,625.00     |
| 530-01                | Travel - Air                   | \$47,700.00    |
| 530-02                | Travel - Rail                  | \$2,500.00     |
| 530-03                | Travel - Automobile            | \$750.00       |
| 530-04                | Travel - Meals                 | \$1,750.00     |
| 530-05                | Travel - Lodging               | \$12,150.00    |
| 540-01                | Photography - Camera Work      | \$31,150.00    |
| 540-02                | Photography - Developing       | \$11,250.00    |
| 550-00                | Training Expenses              | \$100.00       |
| 560-00                | Promotional Expenses           | \$48,100.00    |
| 599-99                | Miscellaneous                  | \$0.00         |

**EMAIL 9.****Subject: Marketing Expenses****Date:** 09/11/2008**From:** Kristy Young, Marketing Budget Analyst**To:** Carol Bartlett, VP Marketing

As you know Greg's last day was yesterday. I checked the hard drive on his computer this morning to see what he had relating to marketing activity and expense distributions. The information attached came from a spreadsheet on his computer. Please pass this on to the team developing our Marketing Tracking System; they will definitely need this information. I am sure there is more someplace but I just have to find it. His computer files are an absolute mess. However, to check the accuracy of his data, I totaled up the amounts distributed to each G/L expense account and the totals agree with the balances in the G/L Expense Accounts email I sent you earlier today.

I also noticed that Greg has some limited vendor data in the spreadsheet. I know we will need to expand the data we collect on our vendors (address and contact information), but it may take me a while to gather that data. Please pass this point on to our consultants.

One last point, I verified the invoice numbers on Greg's spreadsheet with the invoices we received from the vendors and they agree. All I can say is that some of our vendors use highly unusual invoice numbering schemes to insure their invoice numbers are unique.

EMAIL 9. ATTACHMENT

| Vendor               | Invoice #  | Date      | Invoice Amt | Product Name | Activity                   | G/L Expense Acct          | Amount       | Marketing Activity Expense Limit | Approved By  |
|----------------------|------------|-----------|-------------|--------------|----------------------------|---------------------------|--------------|----------------------------------|--------------|
| RCS Associates       | 5589       | 7-Jul-08  | \$500.00    | AutoMax      | Demonstration Materials    | Graphics - Proofs         | \$200.00     | \$5,500.00                       |              |
|                      |            |           |             | AutoMax      | Demonstration Materials    | Printing                  | \$300.00     | \$5,500.00                       |              |
| Cheiola              | 656522     | 7-Aug-08  | \$15,000.00 | AutoMax      | Meetings                   | Travel - Lodging          | \$5,000.00   | \$500.00                         | Jill Smith   |
|                      |            |           |             | AutoMax      | Meetings                   | Travel - Air              | \$10,000.00  | \$500.00                         | Jill Smith   |
| Progressive Image    | RD2344     | 10-Aug-08 | \$600.00    | POSNet       | Packaging Design           | Promotional Expenses      | \$600.00     | \$3,500.00                       |              |
| Progressive Image    | RD2399     | 12-Aug-08 | \$2,650.00  | POSNet       | Packaging Design           | Travel - Lodging          | \$2,650.00   | \$3,500.00                       |              |
| Xireme Design        | 2890-1     | 15-Aug-08 | \$20,000.00 | AngioNet     | Brochures                  | Printing                  | \$15,000.00  | \$5,000.00                       | Steve Floyd  |
| Xireme Design        | 2975-0     | 19-Aug-08 | \$750.00    | POSNet       | Trade Magazine Advertising | Graphics - Production     | \$2,250.00   | \$5,000.00                       | Bob Bower    |
| Xireme Design        | 3015-5     | 20-Aug-08 | \$4,000.00  | POSNet       | Promotional Materials      | Graphics - Production     | \$250.00     | \$3,000.00                       |              |
|                      |            |           |             | POSNet       | Packaging Design           | Photography - Camera Work | \$500.00     | \$3,500.00                       |              |
| Xireme Design        | 3015-5     | 20-Aug-08 | \$4,000.00  | AngioNet     | Brochures                  | Graphics - Proofs         | \$1,500.00   | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Trade Magazine Advertising | Travel - Rail             | \$2,500.00   | \$2,250.00                       | Carol        |
| Progressive Image    | RD2775     | 20-Aug-08 | \$4,900.00  | POSNet       | Packaging Design           | Graphics - Production     | \$100.00     | \$3,500.00                       |              |
|                      |            |           |             | POSNet       | Packaging Design           | Travel - Air              | \$4,200.00   | \$3,500.00                       | John Wilson  |
| PromoHQ              | 89979      | 20-Aug-08 | \$7,600.00  | POSNet       | Packaging Design           | Contract Labor            | \$600.00     | \$3,500.00                       |              |
|                      |            |           |             | POSNet       | Promotional Materials      | Travel - Air              | \$1,500.00   | \$3,000.00                       |              |
| Progressive Image    | RD2895     | 21-Aug-08 | \$400.00    | POSNet       | Packaging Design           | Graphics - Proofs         | \$6,000.00   | \$3,500.00                       | John Wilson  |
| Xireme Design        | 3259-0     | 22-Aug-08 | \$3,500.00  | POSNet       | Packaging Design           | Training Expenses         | \$100.00     | \$3,500.00                       |              |
| Delta Airlines       | 455588     | 25-Aug-08 | \$11,500.00 | AngioNet     | Packaging Design           | Photography - Camera Work | \$400.00     | \$3,500.00                       |              |
| Xireme Design        | 250CR      | 25-Aug-08 | (\$400.00)  | POSNet       | Packaging Design           | Graphics - Production     | \$3,500.00   | \$3,500.00                       |              |
| Kinkos               | 69996      | 27-Aug-08 | \$325.00    | AngioNet     | Seminars                   | Travel - Air              | \$11,500.00  | \$3,500.00                       |              |
| Progressive Image    | RD2967     | 27-Aug-08 | \$500.00    | POSNet       | Packaging Design           | Graphics - Proofs         | (\$400.00)   | \$3,500.00                       |              |
| Progressive Image    | RD2972     | 28-Aug-08 | \$250.00    | POSNet       | Packaging Design           | Travel - Air              | \$500.00     | \$3,500.00                       |              |
| United Airlines      | 3347-6     | 29-Aug-08 | \$6,000.00  | POSNet       | Packaging Design           | Photography - Developing  | \$250.00     | \$3,500.00                       | John Wilson  |
| UPS                  | 33648-5589 | 30-Aug-08 | \$15,000.00 | PatientNet   | Seminars                   | Graphics - Production     | \$6,000.00   | \$3,500.00                       | Ron Likovich |
| MedDesign            | 56995663   | 30-Aug-08 | \$47,500.00 | PatientNet   | Seminars                   | Travel - Air              | \$15,000.00  | \$3,500.00                       | Ron Likovich |
|                      | 7721       | 5-Sep-08  | \$10,750.00 | AngioNet     | Brochures                  | Promotional Expenses      | \$47,500.00  | \$3,500.00                       |              |
|                      |            |           |             | AngioNet     | Brochures                  | Graphics - Proofs         | (\$1,500.00) | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Brochures                  | Photography - Camera Work | \$5,000.00   | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Brochures                  | Travel - Automobile       | \$750.00     | \$5,000.00                       |              |
| Cheatham & Howe, LTD | 5993       | 5-Sep-08  | \$20,000.00 | PatientNet   | Trade Magazine Advertising | Photography - Developing  | \$6,500.00   | \$5,000.00                       | Jill Smith   |
| Xireme Design        | 3424-0     | 5-Sep-08  | \$25,000.00 | POSNet       | Packaging Design           | Advertising - Agency Fees | \$20,000.00  | \$2,250.00                       | Bob Bower    |
| MedDesign            | 7787       | 7-Sep-08  | \$18,250.00 | AngioNet     | Packaging Design           | Photography - Camera Work | \$20,000.00  | \$3,500.00                       | Scott Luttig |
|                      |            |           |             | AngioNet     | Art Work                   | Photography - Developing  | \$5,000.00   | \$3,500.00                       | Scott Luttig |
|                      |            |           |             | AngioNet     | Art Work                   | Travel - Meals            | \$1,750.00   | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Art Work                   | Travel - Lodging          | \$4,500.00   | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Art Work                   | Photography - Camera Work | \$750.00     | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Art Work                   | Graphics - Proofs         | \$500.00     | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Art Work                   | Advertising - Agency Fees | \$5,750.00   | \$5,000.00                       | Carol        |
| Xireme Design        | 3498-0     | 7-Sep-08  | \$5,000.00  | POSNet       | Packaging Design           | Travel - Air              | \$5,000.00   | \$5,000.00                       |              |
| MedDesign            | 7792       | 8-Sep-08  | \$11,500.00 | AngioNet     | Brochures                  | Payroll                   | \$5,000.00   | \$3,500.00                       | John Wilson  |
|                      |            |           |             | AngioNet     | Brochures                  | Graphics - Proofs         | \$1,000.00   | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Brochures                  | Photography - Developing  | (\$500.00)   | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Brochures                  | Photography - Camera Work | \$4,500.00   | \$5,000.00                       |              |
|                      |            |           |             | AngioNet     | Brochures                  | Graphics - Production     | \$6,500.00   | \$5,000.00                       | Steve Floyd  |



**EMAIL 10.****Subject: Marketing Activities****Date:** 09/13/2008**From:** Kristy Young, Marketing Budget Analyst**To:** Carol Bartlett, VP Marketing

After analyzing the report I sent you two days ago from Greg's computer I realized that several key marketing activities were missing. Below is a list of the missing activities. The development team will need these. I am sure there are expenses for these, but I am still trying to make sense of Greg's computer files. As soon as I do find something, I will forward the information on to you. BTW, accounting is no help they aren't even aware that we need to track expenses by activity!!

| Description                   | Expense Limit |
|-------------------------------|---------------|
| Product Specification Sheets  | \$1,500.00    |
| Video Advertising             | \$7,500.00    |
| General Advertising           | \$4,500.00    |
| Confidential Presentations    | \$1,200.00    |
| Manufacturer's Reps Materials | \$4,250.00    |
| Release Package               | \$1,750.00    |
| Sales Contests                | \$4,750.00    |
| 35mm Slides                   | \$3,500.00    |
| Mail Campaigns                | \$3,100.00    |
| Trade Mark Creation           | \$5,000.00    |
| Sales Training                | \$2,750.00    |

**EMAIL 11.****Subject: Invoice Expense Distributions****Date:** 09/15/2008**From:** Harold Hudson, Controller**To:** Carol Bartlett, VP Marketing**Cc:** Kristy Young, Marketing Budget Analyst

In a meeting the other day Kristy Young asked for clarification of our invoice distribution procedures for marketing related expenses. As you know she is concerned with being able to reconcile the expenses of your department's planned Marketing Plan and Expense database with the corporate A/P and G/L systems on the mainframe. My recommendation is quite simple; your new database needs to be able to track all individual G/L expenses back to a vendor's invoice. A given invoice may have multiple G/L expense distributions per invoice. As you know, we only track G/L expense distributions at the corporate level. However, my understanding is that a single corporate G/L expense distribution may actually be distributed to multiple marketing activities and/or campaigns. I hope this helps with your cost management efforts.

**EMAIL 12.****Subject: Manager Approvals****Date:** 09/16/2008**From:** Kristy Young, Marketing Budget Analyst**To:** Carol Bartlett, VP Marketing

Per our phone conversation this morning, I have been thinking more about Harold Hudson's September 15<sup>th</sup> email and realized that we will need to change the way in which we approve "over the limit" marketing expenses. I suggest that in order to capture the expenses as soon as we know them, that we enter the invoices into the system immediately upon receipt. If an individual expense distribution requires approval, we can route the original invoice to the approving manager and once received the manager could approve it online. Ideally, the manager would only see those expense items requiring his/her approval and should be able to approve each item individually by simply entering in their employee number for each item they are approving. I assume the employee number would be automatically verified by the system. To make this work we will have to include in the database the manager that is responsible for each portion of the marketing plan.

Of course, the system needs to adhere to our SOP of allowing you and John Wilson to approve any expense item when managers are on vacation or out of the office for extended periods of time. BTW, Jill Smith did a great job filling in for Steve Floyd overseeing the AngioNet brochures while he was on special assignment last month.

Because some of the initial marketing expenses are approved by the R&D Manager responsible for the product they would have to be include in the database as well.

I suggest that we keep the following information on the Marketing Managers and R&D Contacts: Name, Department, Phone Number, and Employee Number. I am sure that we will need to generate several queries and reports sorting on the employee's last name. I will contact HR to get an accurate list of their employee numbers.

Attached is a list of our Marketing Manager's current assignments:

**EMAIL 12. ATTACHMENT**

| <b>Manager</b> | <b>Product Name</b> | <b>Marketing Activity</b>    |
|----------------|---------------------|------------------------------|
| Carol Bartlett | AutoMax             | Art Work                     |
|                | AngioNet            | Art Work                     |
| Steve Floyd    | AngioNet            | Trade Magazine Advertising   |
|                | AngioNet            | Brochures                    |
| Ron Likovich   | PatientNet          | Seminars                     |
|                |                     | Trade Magazine Advertising   |
| Scott Luttig   | POSNet              | 35mm Slides                  |
|                |                     | Packaging Design             |
|                |                     | Promotional Materials        |
| Jill Smith     | AutoMax             | Product Specification Sheets |
|                |                     | Meetings                     |
|                |                     | Demonstration Materials      |
| John Wilson    | POSNet              | Trade Mark Creation          |
|                | AngioNet            | Seminars                     |

**EMAIL 13.****Subject: Requested Employee Numbers****Date:** 09/17/2008**From:** Mary Fansler-Jolly, HR Director**To:** Carol Bartlett, VP Marketing

Here is the list of employee numbers you requested. If you need any more please let me know.

| Employee Number | Name           |
|-----------------|----------------|
| 00857           | Charles Wilson |
| 01501           | Carol Bartlett |
| 02546           | Dave Stafford  |
| 03842           | Jill Smith     |
| 04622           | Jane Wishing   |
| 05877           | Lisa Walsh     |
| 07958           | Sally Soran    |
| 08792           | Bob Bower      |
| 08962           | Betty Barfield |
| 09231           | Ron Likovich   |
| 10050           | Mary Sparrow   |
| 10069           | Steve Floyd    |
| 10084           | Henry Check    |
| 10168           | John Wilson    |
| 10195           | Bill Parsons   |
| 10589           | George Plumber |
| 12085           | Scott Luttig   |

**EMAIL 14.****Subject: Dept Manager's Phone Numbers****Date:** 09/17/2008**From:** Jason Preston, Administrative Assistant**To:** Carol Bartlett, VP Marketing

Per your request below is a list of the Marketing Manager's Phone Numbers:

| <b>Name</b>    | <b>Phone</b>   |
|----------------|----------------|
| Bob Bower      | (540) 555-8965 |
| Carol Bartlett | (540) 555-1258 |
| Jill Smith     | (540) 555-4562 |
| Ron Likovich   | (540) 555-3698 |
| Scott Luttig   | (540) 555-2528 |
| Steve Floyd    | (540) 555-7412 |
| John Wilson    | (540) 555-4563 |

**EMAIL 15.****Subject: Harold Hudson's Email of Sept 15, 2008****Date:** 09/17/2008**From:** Kristy Young, Marketing Budget Analyst**To:** Carol Bartlett, VP Marketing

Carol, based on my review of Harold Hudson's email, we must have the ability to track ALL marketing activity expenses back to a single invoice otherwise we will never be able to reconcile our expenses back to corporate. Simply put we need the ability to enter the Vendor's Id, Invoice Date, Invoice Number, and Invoice Amount, then distribute the entire amount of the invoice to as many planned marketing activities and G/L expense accounts as necessary until the entire amount of the invoice has been entered. Also we will enter only the net amount of all charges and credits on a single invoice charged to the same product, activity, and G/L expense account.

I realize that this is more involved than we originally planned but unless we do this we will never be certain that we have captured all of the expenses.

If you or the developers have any questions please don't hesitate to call me.

**EMAIL 16.****Subject: Marketing Database Requirements Summary****Date:** 10/18/2008**From:** John Wilson, Assistant V.P of Marketing**To:** Carol Bartlett, VP Marketing

Per your request, attached is a below of the Marketing Database functionality requirements for queries and basic forms that we all agreed to in our department meeting yesterday.

**Query Requirements**

1. **Patent Numbers**  
What products have patent numbers? Display Product Name and Patent Number.
2. **Marketing Department Phone Numbers**  
Create a list of all employees in the Marketing Department. Display First Name, Last Name, and Phone Number (properly formatted) and sort by Last Name.
3. **R & D Contacts**  
Create a list of the R&D contacts for each product. Display Product Name, Contact's Name (first and last name in a single column), and Phone Number (properly formatted). Sort the list by the contact's Last Name.
4. **Marketing Plan**  
What is the marketing plan for each campaign? Display Campaign Name, Product Name, Marketing Activity, Marketing Manager's First Name, Marketing Manager's Last Name, Estimated Expenses (formatted as currency), Start Date, and Scheduled Completion Date. Sort by Campaign Name, Product Name then by Marketing Activity.
5. **Marketing Managers Responsibilities**  
What marketing activities have been assigned to each marketing manager? Display Manager's Name (first and last name in a single column), Campaign Name, Product Name, and Marketing Activity. Sort by the marketing manager's Last Name.
6. **Over Limit Expense Approvals**  
What over the limit expenses have been approved and by whom? Display Campaign Name, Marketing Activity Name, Vendor's Name, Invoice Number, Invoice Date, Expense Account Name, Expense Amount, Approver's First Name, and Approver's Last Name. Sort by Campaign Name, Marketing Activity, and then by Date.
7. **Invoice Register**  
Create an Invoice Register. Display Vendor's Name, Invoice Number, Invoice Date, and Total Invoice Amount. Sort by Invoice Date.
8. **Reconcile Expense Summary**  
Create a list of all expenses distributions than can be used to reconcile our distributions with those of the corporate A/P and G/L systems. Display Expense Account Number, Expense Account Name, Date, and Individual Expense Distribution Amount. Sort by Expense Account Number and Date.
9. **Total Campaign Marketing Expenses**  
What are a campaign's total planned marketing activity expenses to date? Display Campaign Name, Marketing Activity Name, and Total Expenses.
10. **Campaign Marketing Plan Variance**  
What is the budget and total expense variance for each campaign's planned marketing activity? Display Campaign Name, Marketing Activity Name, Estimated Expenses, Total Expenses, and Variance (difference between budget and actual).



**EMAIL 16 – PAGE 2.****11. Expense Account Balances**

What is the current balance for each G/L expense account? Display G/L Expense Account Number, G/L Expense Account Name, and G/L Account Balance. Sort by G/L Expense Account Number. Include accounts that have no balance. If there is no balance, then display a zero currency value.

**12. Gross Margins**

What are the product's gross margins? Display Product Name, Manufacturing Cost, Selling Price, and Gross Margin (displayed as a percentage, i.e. 76%).

All query column headings are to be clear, concise and accurately describe the contents of the column to the average user. Only universally accepted abbreviations are to be used. All queries, when printed out, should fit on standard 8 ½" by 11" paper when printed in landscape mode. The queries are to be named as they are listed above.

**Static Data Form Requirements**

Forms are to be developed for the tables that contain static data (non-transaction data), see the list below. These forms are to allow a user to add, maintain, delete, and query rows in the table attached to the form. These forms are to be columnar type forms that display data or allow for input of one record at a time. The forms are to be user friendly with all the prompts consisting of user-friendly descriptive names.

- Campaigns
- Employees
- Expense Accounts
- Marketing Activities
- Products
- Vendors

**Application Form Requirements****1. Marketing Plan**

This form is to allow for the input and query of the marketing plan for a given campaign. This form when properly formatted is to display the Campaign Number, and Campaign Name at the top of the form in columnar format. The Campaign Number, Activity Code, Start Date, Scheduled Completion Date, Estimated Expenses, and Marketing Manager ID are to be in tabular format below the campaign information. The tabular portion is to allow for the input or listing of all of the marketing activities planned for the campaign displayed in the columnar section in the top portion of the form.

**2. Marketing Activities Planned**

We want this form to be used to view our planned marketing activities from a different perspective. Here we want to view all the campaigns that have this marketing activity as part of its marketing plan. Along with the campaign data, we want to display the specific marketing activity information relating to each campaign. The top portion of the form is also to be in columnar format and include the Marketing Activity Code and Description. The lower portion of the form is to include the Campaign Number and Name, Start Date, Estimated Completion Date, Budget Amount, and the name of the responsible Manager. This portion of the form is to be in tabular format and is intended to be used to query and not input data.

**3. Invoice Data Entry**

The purpose of this form is to allow for the data entry or querying of the information associated with a single invoice including the distribution of that invoice to various marketing activities and expense accounts. The form is to be divided into two sections. The first section is to allow for the entry of specific invoice related

**EMAIL 16 – PAGE 3.**

data: Vendor Number, Invoice Number, and Date. The second section is to allow for the distribution of the invoice amount to as many marketing activities and expense accounts as necessary until the entire amount is distributed. This section is to include the following fields: Vendor Number, Invoice Number, Campaign Number, Activity Code, Expense Account, Amount, and Approver ID. The bottom portion of this section is to contain a textbox that keeps a running total of the amount that has already been distributed. This field should look like a total field on a report and appear under the amount column and be labeled: Total Amount Distributed.

**Reports Requirements**

The individual report specifications appear below. The data items provided in each report specification are to appear on the report, reading from left to right, in the same order they are listed. All totals and sub-totals are to be highlighted and clearly labeled as to what the total represents. If totals are specified, then a single solid line is to appear on the line immediately above the total.

**1. Marketing Managers Responsibilities Report**

This report is based on the Marketing Managers Responsibilities Query and is to display each marketing manager's name along with the campaign and marketing activities for which they are responsible. Display Marketing Manager's name (first and last name together), Campaign Name, and Marketing Activity Description. Group the report by Marketing Manager.

**2. Total Campaign Marketing Expenses Report**

This report is based on the Total Campaign Marketing Expenses Query. The report is to display the Campaign Name, Marketing Activity Description, and Total Expenses. Expenses are to be totaled by Campaign. Sort the report by Campaign and Marketing Activity.

**3. Campaign Marketing Plan Variance Report**

This report is based on the Campaign Marketing Plan Variance Query. The report is to display the Campaign Name, Marketing Activity Description, Budgeted Amount, Total Expenses, and Variance. The report is to be sorted by Campaign and then Marketing Activity. Budgeted Amount, Total Expenses, and Variance are to be summed by Campaign Name.

**4. Expense Account Details Report**

This report is to provide a detailed listing of all the charges to individual expense accounts. The report is to display the following: Expense Account Number, Expense Account Name, Date, Vendor Name, Invoice Number, and Expense Amount. Expense Amount is to be totaled by Expense Account. The Expense Account Number and Account Name are to appear on the same line.

**5. Invoice Details Report**

This report is to provide a detailed listing of the expense distributions for each invoice. The following information is to be displayed: Invoice Date, Vendor Name, Invoice Number, Campaign Name, Marketing Activity Description, Expense Account Name, and Expense Amount. Total Expense Amount by Invoice and subtotal by Campaign Name for each Invoice. Invoice Date, Vendor Name, and Invoice Number are to appear on the same line in the report.

**EMAIL 16 – PAGE 4.****Navigational Menu System Requirements**

The database is to have menu system designed for our everyday users. The menu is to be user-friendly and contain selections for all the forms and reports. The menu is also to contain an exit selection that will exit the database application. It is to be executed automatically when the database is opened and the database window is to be displayed in the background.

**General Guidelines**

- The forms and reports are to be user friendly with all the prompts and column headings consisting of user-friendly descriptive names but not overly descriptive. Keep the prompts and column headings short and to the point.
- All fields on forms and reports are to be appropriately sized to fit the data. The fields should not be too long where they waste space or too short. All the data in the field is to be displayed on a single line. You may use either portrait or landscape orientation for your reports.
- Record counts are not to appear on reports.
- All currency fields are to be formatted as currency fields. Sub-totals and grand totals are to appear on all reports with currency data. Sub-totaling is to be done by groups. Sub-totals should have a line above the sub-total. The sub-totals and grand totals are to be appropriately labeled with the label describing what is being totaled and appearing immediately to the left of the totals.

This has been a learning experience for us all. Finally, we see light at the end of the tunnel and it is not a train!!