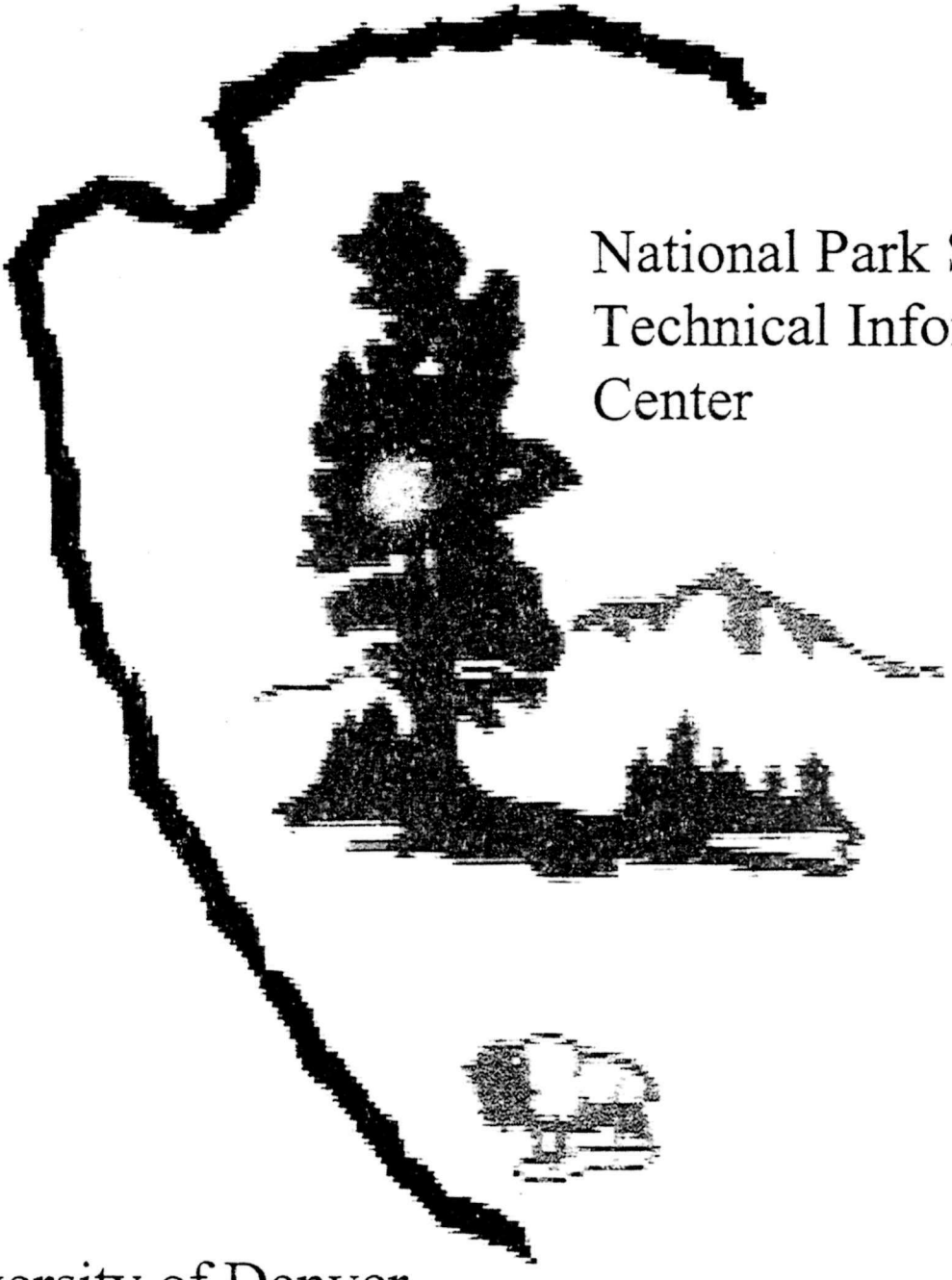

National Park Service
Technical Information
Center

University of Denver
Integrative Challenge
Consulting Team Project

UNIVERSITY OF DENVER

Consulting Team:

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Presented To:

The Technical Information Center (TIC):
A division of the Denver Service Center, National Park Service

August 13, 2001

TECHNICAL INFORMATION CENTER (TIC)

For Release: August 13, 20001
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Daniels College of Business Student Consultants Build Partnership to Market the Technical Information Center of the National Parks Service

Denver, Colorado – The University of Denver, Daniels College of Business in cooperation with the Technical Information Center of the National Park Service unveils the findings of the Integrative Challenge Student Consultancy.

The Technical Information Center (TIC) intends to implement marketing strategies proposed by DCB Consultants in an effort to promote the NPS Technical Archives housed in the Denver Service Center. In the process of doing so, TIC will engage in streamlining its operations and workflow to offer an interactive database to the general public. The interface will serve to act as a self service website to allow interested parties to retrieve general park information, historical site information, topographic maps and receive up to date information regarding TIC news and events. Coinciding with the new site launch, TIC will be co publishing an interactive CD Rom guide to the parks.

The seven-week consultancy has encompassed the entire organization and provided suggestions to implement and execute. The DCB consultants believe the recommendations will improve the flow of information through the organization as well as boost customer service. The following is a brief review of the benefits TIC has realized through the consulting services provided:

- ✓ Greater and easier access to information
- ✓ Better understanding of who TIC is and what TIC does
- ✓ Improved customer service
- ✓ Viable Product Offerings

The Technical Information Center and National Park Service invite you to visit them on the web at http://www.nps.org/dsc/tic

–NPS–
The National Park Service cares for special places saved by the American people so that all may experience our heritage. EXPERIENCE YOUR AMERICA

Executive Summary

The Technical Information Center of the National Park Service is the information storage facility for the entire park system. Our Integrative Challenge student team focused on three main areas when consulting with Edie Ramey and the staff of the Technical Information Center. Our team felt it could add the most value to the center if it concentrated on three main areas: organizational layout, technical efficiency and marketing opportunities. In this report we examine each area in detail and make suggestions in order to maximize future opportunities.

In addition to the three functional areas of concern, our team also developed a situational analysis, industry description, marketing description, competitive description, legal and regulatory restrictions and a SWOT analysis (strengths, weaknesses, opportunities & threats.)

The following is a preview of our recommendations:

- ✓ Increased communication between Denver Service Center departments
- ✓ Acknowledgement by all departments of TIC's mission and goals
- ✓ Increased time for TIC staff to concentrate on larger work orders
- ✓ Increased funding for TIC's capital equipment improvements
- ✓ Better understanding of who TIC is and what TIC does
- ✓ Lower overall costs associated with data storage
- ✓ Greater and easier access to information
- ✓ Removal of tedious data storage tasks
- ✓ Examples Viable Product Offerings
- ✓ Overall Improved Efficiency
- ✓ Improved customer service

We would like to take a moment and thank all of the people within the Denver Service Center for their cooperation. It was because of their generosity and understanding that made this report possible.

It is our hope that the information we have provided will assist the Denver Service Center and the Technical Information Center in their future endeavors.

Regards,

Shochi Onoe Michelle McNeil Doug Wood

TECHNICAL INFORMATION CENTER (TIC)

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TECHNICAL INFORMATION CENTER (TIC)

Introduction

Over the past seven weeks a three-member team from the Daniels College of Business have been outside consultants for the Technical Information Center of the National Park Service, Denver Service Center. As such, the consultants have been exposed to the Denver Service Center and Technical Information Center operations, workflow processes and technological utilization. In determining an understanding of our client and its role within the Federal Government we found the following broad description to be beneficial.

The National Park Service preserves unimpaired natural and cultural resources of the national park system for the enjoyment, education, and inspiration of this and future generations. The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world. The National Park System of the United States comprises 384 areas covering more than 83 million acres in 49 States, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands. These areas are of such national significance as to justify special recognition and protection in accordance with various acts of Congress.

The Denver Service Center (DSC) is the principal office for planning, design, and construction management throughout the National Park Service. Within the DSC is the Technical Information Center (TIC), which is the oldest and largest information office in the National Park Service. TIC is the central repository for managing all NPS generated planning, design, construction drawings and related technical report documents. TIC currently houses over 800,000 drawings, 80,000 technical reports, 300,000 photographs, videos, aerial photographs and Geographic Information System (GIS) data sets. The information is stored in a microfilm database format and contains documentation, photos and related reports on all NPS sites. The information serves as an internal library for the NPS but is also available to the public. Requests for information are fulfilled by TIC staff and reproduced with the help of the internal Reprographic Imaging Center (RIC). The TIC database of digitized data is commonly referred to as Mongoose and can be found on the Internet.

TECHNICAL INFORMATION CENTER (TIC)

The purpose of this consultancy project is to assess TIC's current position in order to develop marketing strategies that will best utilize their resources report the following:

- Reviewed Current Workflow processes
- Determined Internal/External Positioning
- Proposed Marketing Strategies for TIC product offerings
- Conducted Primary and Secondary Competitive Research Assessments
- Conducted a SWOT Analysis

This comprehensive written report and respective presentation of findings to the client will take place on August 13, 2001. It is the ongoing goal of the DCB team to aid TIC, the DSC and the NPS in maximizing their resources, in addition to building a long-term relationship with the Daniels College of Business.

Client Description

The Technical Information Center (TIC) is the central repository for storage and retrieval of documentation related to all National Parks. The National Park System is inclusive of National Parks (in the traditional sense), National Monuments, National Preserves, National Historic Sites, National Historical Parks, National Memorials, National Battlefields, National Cemetery's, National Recreation Areas, National Seashores, National Lakeshores, National Rivers, National Parkways, National Trails, Affiliated Areas and Other Designations. TIC currently houses all recorded documentation related to planning, design and construction conducted in the parks. Furthermore, the informational database includes 800,000 drawings, 80,000 technical reports, 300,000 photographs, videos, aerial photographs and GIS data sets.

Company Mission

TIC is an archive and information system. It's place within the DSC and NPS is fundamental to the ongoing archival of all NPS documentation. The NPS is in the process of vision review to determine future directives and establish specific obtainable objectives. Presently, TIC does not have a Mission inherent to its own division; rather it follows the Mission of the NPS.

> ***"...to promote and regulate the use of the...national parks...which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."***
>
> ***National Park Service Organic Act, 16 U.. .1.***

TECHNICAL INFORMATION CENTER (TIC)

Purpose of the Project

Initial company meetings allowed the team and the client to determine the project direction, with a focus on TIC. TIC was selected to establish a foundation, that is, a beginning point for internal analysis within this division of NPS. The client believes that a TIC focus will establish a baseline for further studies within the NPS by future DCB Consulting Teams.

The project idea was established through an informational meeting on June 22, 2001 with the client representative, Edie Ramey. Although there are several areas of the DSC/NPS that are suitable for review, our focus will concentrate on assessing TIC, it's resources and the development of a marketing strategy. The proposal serves to meet the needs of TIC management and the integrative challenge team.

As agreed upon verbally, all information provided to the consulting team is confidential, thus will not be shared outside the confines of the student-client relationship.

Scope of Project

In consideration of the time constraint, the scope of this project was limited to the development of a marketing strategy for TIC. The team focused on assessing the current workflow, order processing, MIS and operations. As the company currently does not engage in marketing activities, the team performed a situational analysis, competitive assessment, assessed any regulatory restrictions and determined the best use of TIC resources in during marketing strategies and recommendations segments.

Methodology

The following are action items in which the team engaged to accomplish the marketing strategy:

- Reviewed Current Workflow processes
- Determined Internal/External Positioning
- Conducted Primary and Secondary Competitive Research Assessments
- Determined Regulatory status
- SWOT Analysis
- Marketing Strategies: products (bundling), pricing (strategy), place and promotion

The completion of the proposed methodology serves to define TIC, determine the strength of its library resources and provide an action plan for marketing their products. This project serves as the foundation for future studies for how the Denver Service Center and the National Parks Service can develop going forward.

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Central Thesis
The overall objective of this report was to focus attention on areas lacking operational efficiency within the Technical Information Center of the National Park Service and to suggest ways of improving existing processes. Our report focused on three main areas of improvement: Technological, Promotional and Organizational.

The technological section will review TIC's existing storage system and make recommendations for improving data storage. The promotional section will examine the perception of TIC and suggest ways it can improve the accuracy of it message while generating review from its resources. The organizational section will scrutinize how TIC interacts with the other departments and suggest methods for increasing communication within the Denver Service Center.

Preview of Findings & Recommendations
Our assessment has revealed that there are three areas that our efforts will concentrate in, which include the organization and respective workflow, technology and the marketing efforts that will follow.

Initial findings indicate that the Technical Information Center needs to a address a number of technological, organizational and work flow challenges in preparing to utilize the resources, to be offered as various products, in generating revenue.

Organization:
Need for a Denver Service Center committee

- recurrent themes we uncovered was the fact that each departments act independently of the others

- Director turnover causes organizational chaos, no leadership for the interim periods – every four to eight years.

Workflow diagram
Departments what it their way was the right way and all the other departments needed to change to fit their standard. Unification theme should be implemented in order to tie all of the various departments together. The Technical Information Center has many non-standard systems to contend with outside of the Denver Service Center, they should not be subject to standardization dissension with their own ranks.

Existing Data Collection
The Technical Information Center needs to do a 'round –up' in conjunction with the Secretary of the Interior in order to compile all of the drawings scattered around at different park facilities into one location.

We suggest that the highest levels of the organization mandate the information 'round-up' in order to give the directive some clout.

Printing Processes
Streamline the printing system for a more reliable machine, which can print on both sides of the paper. Aside from the labor to layout a printing job the majority of the cost involved concerns the price of raw material (paper.) If the Government Printing Office were able to print brochures on both sides of the paper it would have a tremendous impact of the cost to produce the final product.

Orders / Pricing
TIC needs to streamline the product ordering process is to implement a job tracking system. Rather than using slips of paper to track orders through the system a computerized tracking system could immediately tell the users which employees are working on which projects as well as track and record the pricing of each job. A quality control measure, such as an internal audit, would also be much easier to perform and enable TIC to fine-tune its cost control standards.

Technology:

- **Website Accessibility**

We feel the web link is 'buried' in among other information contained on the National Park Service main website. In order to better serve the public TIC needs to define its 'web-strategy.' Furthermore, the website be updated periodically – perhaps once a month to make the public aware the latest events within TIC. In our technology section we discuss ways to track incoming orders to find out exactly who the customer is and what information is being requested. Without this information is it virtually impossible to improve operational efficiency because there is no way to measure 'what' is going 'where.' In order to improve the process it needs to be measured. Our vision for TIC would include a way to measure what the public is ordering and perhaps guiding them towards the TIC website which should include a self-service menu.

- **Web Based Data ....2% of existing data is on the web**

Only two-percent of the entire TIC library is available on the Internet. For a self-service system to become a reality TIC needs to increase this percentage substantially. We will outline in this report an example of a company that specializes in data storage and handling. Companies such as this are comfortable coping with vast amounts of information in a timely manner and have been contracted by some high profile clients. TIC currently has the ability to transfer 100 microfiche cards to digital data every four hours but because of the overwhelming number of cards (800,000) this process would take approximately 16 years. A company we have found has the capability to handle 15,000 cards per day, which translates to 52 days of contracted work.

We feel this is a much more viable solution because the leasing fee for TIC's current data transfer equipment is $15,000 per plus the labor charge involved for manually transferring the data equates to $20,000 per year. An immediate productivity gain could be realized if TIC chooses to contract out its data transfer work to a specialized private contractor.

- **Incongruent Technology**

The departments responsible for producing and printing information stored within TIC requested almost no information from TIC as to the easiest way to store the data. The first step to communicate, where the incoming Denver Service Center Director should do is bring all of the contributing parties together in one room and work out a system of organization wide standards. It seems that everyone we spoke to agreed that this needed to be done but nobody seemed eager or even willing to make the suggestion. The most rudimentary piece of the puzzle is for all information to be stored in an electronic format. However, for this to happen several decisions must be made by all departments involved. The technology portion of this assessment will further expand on this problem.

Organizations have struggled with this very problem, for instance the auto industry suffered from 'throw it over the wall' mentality prior to quality initiatives being implemented. The design department would develop plans for a new car and then hand-off the diagram to the engineering department. During development of their diagram the design department do not request nor allow any input from the engineering staff and once the plans were completed the design department 'washed their hands' of the project and moved on. No forethought was given to the fact that if engineering would have been included in the design of the car the job could have been done faster and cheaper. TIC is at the end of the process and currently needs to 'make do' with whatever the other departments throw over the wall and this creates problems when the data needs to be retrieved as well. We feel that the Denver Service Center suffers from the same aliments and a cross-functional quality team needs to be put in place to redesign the process from creation of the information to storage.

- **Shelf life of electronic data storage**

The managers of the Technical Information Center are concerned over the length of time data can safely be stored in an electronic format compared with readily available hard copy alternatives. The shelf life of microfiche today is approximately 100 years and some manufacturers of heavy-duty microfiche claim to have a 500-year usable life. The future investigation the contrary is the digital data has an infinite life --- (discussed in the technology section.)

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- **Network Standard**

Needs to be determined, should be consistent, etc.

Marketing:

- ✓ Web strategy (see the technology section)
- ✓ Branding of TIC (see the organizational section)
- ✓ Product Offering (see the organizational section)

Situation Analysis

The DCB consultants have conducted a thorough investigation into the interworkings of the Denver Service Center and, in specific, the Technical Information Center. As an operational unit of the DSC, TIC supports the infacstructure of the National Park Service by serving as a central repository for planning, construction and design documents. More importantly, TIC is an archive and library whose wealth of information has poor awareness to those outside the NPS.

TIC faces a number of challenges in undertaking efforts to market their information as their customer base is not defined, customer needs are not known, the current infrastructure needs to be streamlined as organizational, workflow and technical storage processes are inefficient and the staff needed to accommodate customer orders would need to grow unless outsourcing is utilized.

The intention of this assessment is to provide a practical view of current processes and recommend improvements in order to guide TIC in positioning themselves appropriately to implement the marketing strategies provided.

Industry Description

Technical Information Center (TIC) is one of the national archive institutions to preserve all the data of National Park Service. In fact, there are abundance of national archives such as the national security archive, the national transportation data archive, and so forth. In the national archives, the National Archives and Records Administration (NARA) holds one of the hugest databases. The NARA is an independent Federal agency that helps preserve the nation's history by overseeing the management of all Federal records. In fact, NARA has pursued to make it easy for citizens to access the essential database regardless of the location of the documentation or of the people using it. Thus, the business trend of this industry is to provide documentary/electronic public access to more of the records and services in order to meet the customer's information needs. Each national archive institution has tried to improve the process to enable people to acquire for themselves the data effectively.

Market Description

The preceding industry evaluation has revealed that TIC is one of the few specialized information providers therefore; the TIC customer is one who seeks specific technical information.

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However, general inquiries do occasionally reach TIC, generally by means of direction from a park service employees or specific directive. The customer base includes internal and external clients whose information needs vary. Internal customers include the National Parks, Government Agencies and associated affiliates (i.e. contractors, landscape architects, etc.). External customers include authors, historians, and the general public. Client estimates suggest requests for information are split 50/50 for both internal and external clients however specific customer data is not recorded therefore estimates are deemed accurate.

Conversations with the client revealed that their goal is to promote the archives/library and utilize the information as means to generate funding for ongoing archival and restoration operations. As such, the customer focus will need to be modified to center on educating the public and building awareness of TIC. Thus, enabling TIC to target specific markets where the their resources are best utilized:

- Travel/Tourism
- Authors/Historians
- Architecture/Landscape and Schematic Design
- Preservation Societies

Competitive Description

The broad nature of the market as indicated above is indicative of the large scope of the competitive market. The competition is two–fold as large scale competitors include the National Archives, ESRI Conservation Program Resources for Parks and Reserves and the US Geological Society. The potential for a conflict of interest or duplication of efforts is high as the Technical Preservation Service division of the National Park Service currently offers technical reports, books and other publications to the general public.

As stated earlier, the information TIC manages is only available though them so if a certain market segment is interested in viewing this material they either must contact TIC directly and assemble the information they or pay TIC for a pre-packaged format (CD-ROM or publication). Subjects available on CD-ROM are as wide ranging as those found in books and it is with this background that we feel comfortable suggesting a market niche can be found for TIC information. In researching this project we discovered that the first CD-ROM project produced by a local book publisher was on national park trail maps and to date it is the best selling CD the company has produced. Therefore, we feel that there is a viable market for the information stored in the TIC library.

Legal & Regulatory Environment
The National Park Service and its sub-organizations are severely restricted from directly raising and accruing funds. Directors Order #21 regarding donations and fundraising states:

SECTION 3. AUTHORITY FOR DONATION ACTIVITIES

3.1 Legal Authority

16 U.S.C. §6 expressly authorizes NPS to accept donations for purposes of the National Park System. In addition, the Museum Act of 1955 (16 U.S.C. 18f) authorizes the NPS to accept donations and bequests of money or other personal property and hold, use, expend, and administer it for the purposes of that Act.

The NPS may accept contributions from individuals, organizations, foundations, corporations, businesses, associations, and other entities. Donations may be in the form of cash, securities (common stocks, preferred stocks, bonds), real property (land and improvements), facilities, personal property, and services. Donations of land, buildings, and other property must be within the boundaries of the park unit and are subject to any statutory limitations for that unit.

In addition, NPS partners may be authorized through an agreement with the NPS to 1) undertake specific fundraising campaigns or 2) in the context of other agreements establishing the relationship between the partner and the NPS, to solicit and accept donations for the NPS's benefit.

To aid the NPS in its mission, the Congress chartered the National Park Foundation (NPF) and authorized it to both accept and solicit donations benefiting the NPS. The NPF is unique among NPS fundraising partners since it is the only organization established by Congress explicitly to encourage and accept private sector support for the National Park Service and the National Park System. NPS recognizes NPF as its official, national, non-profit fundraising partner. NPF provides support through grants to parks, manages restricted funds on behalf of individual parks, provides technical assistance and advice to local fundraising efforts, and actively raises funds for parks and programs.

3.2 Delegation of Authority

3.2.2 Approvals. The Deputy Directors, Associate Directors, Regional Directors, National Center Managers, and park superintendents, are delegated authority to accept donations.

The Deputy Directors, Associate Directors, and Regional Directors are delegated authority to authorize an NPS partner to raise funds to benefit the NPS, subject to the restrictions contained in this Directors' Order, except:

(a) Single donations of $1 million or more require the Director's approval. The Director may waive this requirement in the context of an approved fundraising campaign.

(b) Proposed fundraising campaigns by authorized NPS partners that will benefit the NPS require the approval of the Director if:

(1) they have a goal of $1 million or more;

(2) funds will be solicited nationally;

(3) they involve national advertising or promotional elements; or

(4) there is the likelihood for significant controversy.

Fundraising not subject to the Director's approval may be approved by the appropriate Regional, Associate, or Deputy Director, who may further delegate approval to the NPS manager overseeing the campaign.

The Director's Order also limits marketing campaigns, section 5.3 and 5.4 have the most impact and they state:

5.3 Park-based Cause Related Marketing

A cause related marketing relationship between the NPS and an NPS partner and a business or corporation must be documented in a formal agreement. The agreement must be consistent with this policy and must have a term of 12 months or less, which may be renewed in 12-month increments. Longer-term agreements require the specific written approval of the Director. The content of a standard agreement will be prescribed in the *Reference Guide to Donations and Fundraising*. Parks are also encouraged to consult with the National Park Foundation for guidance and advice on constructing an appropriate agreement. Cause related marketing agreements must receive prior review by the Solicitors Office, and may require approval by the Regional Director or Director, using the same criteria as approval of fundraising campaigns (see section 3.2.2 *Approvals*). See following section for those limited instances, including restrictions on agreement renewals, when the national cause related marketing program affects park-based cause related marketing.

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5.4 National Cause Related Marketing

> By written agreement, the NPS has delegated to the NPF, in recognition of its charter to support the entire NPS, management of all national cause related marketing campaigns that have Service-wide benefits. With the prior written approval of the Director, the National Park Foundation may enter into a limited number (the number to be determined by the Director) of national cause related marketing agreements defining the relationship in a business, product or service category that may take precedence over a park-based cause related marketing effort involving the same business or product category.
> When the NPF has secured the Director's approval and signs such an agreement, the Director will notify all park managers of the new national donor, the purpose of the donation, the category of corporate or business donor affected, and the effective beginning and end dates of the agreement with NPF.
> When such agreements are in effect, no new park-based cause related marketing agreement in this business, product, or service category may be signed. Park-based cause related marketing already in progress might continue until the end of the agreed-upon term. A park-based cause related marketing agreement under negotiation at the time a national agreement is announced might be referred to the ADCRSP for a determination as to its status. All questions about the effect of a national agreement on park-based cause related marketing should be referred to the ADCRSP for resolution.
> All other donations, including gifts from donors in the same business category as a national donor, that do not involve advertising, may be accepted by parks and authorized park partners and recognized under all other NPS donor recognition standards.
> Procedures to govern NPF cause related marketing programs would be developed and included in the *Reference Guide to Donations and Fundraising*.

TIC needs to adhere to these regulations if they are to undertake an external marketing program.

Third Party Regulation

In discussing the generation of profits by TIC through marketing efforts we learned that a third party non-profit organization must be involved to act as an intermediary. Revenue collected by this third party cannot be used by TIC to hire more staff but can only be used to pay for existing resources. We were given the task of finding a third party to work in conjunction with our proposed marketing plan. The person we were asked to contact was the regional director of the National Park Conservation Association, Dave Simon. After a lengthy discussion with Mr. Simon we learned that the NPCA is strictly a lobby group for the National Park Service and does not involve itself in third party marketing efforts. The NPCA act as a non-profit citizens organization and as a 'constructive critic' for the National Park Service.

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The only support that the NPCA offered our project was the appearance of TIC's dilemma in their bi-monthly newsletter, but Mr. Simon added that because the newsletter only comes out six times a year he could not guarantee when or if the article would make it to print.

SWOT Analysis

In order to further assess TIC's strengths, weaknesses, opportunities and threats, a SWOT analysis was conducted. The purpose of which is to provide an outside, objective assessment in order to formulate the basis of our findings, results and respective recommendations. (See Appendix A)

Findings and Results

Organizational Challenges: DSC Wide

The technical information center is one, of numerous, business units that make up the Denver Service Center (DSC). To gain an understanding as to how the organization functions the organizational structure was evaluated. In the broad scope, the DSC is lead by one Director and respective support staff. As an appointed position, the post turns over post Presidential elections. The interim time between elections and the selection / nomination of an NPS appointee, an acting director fills the post as with the present interim director. The acting interim director has authority over the direction and function of the DSC and its units however, true authority and accountability are difficult to achieve when the when the organization is aware someone is not permanent and will be replaced. The organizational upheaval created with twelve-month interim management every four to eight years creates organizational chaos, as units' function unto themselves amidst the year time frame. A potential remedy to this situation is the creation of the new position of deputy director who would support the acting director. Furthermore, in interim times would fill the role of acting director, establishing a clear management direction, authority and accountability at all times. Thus, eliminating the probability that DSC units would assume self–management.
(See Appendix C for current and proposed organization charts)

To further enhance leadership amongst DSC units the creation of cross functional teams organization wide would aid in the development of equality, in that each, department within the organization contributes to the success of DSC going forward. Furthermore, working together to shape policies, procedures and technological initiatives provides the opportunity for the business units to share knowledge, ideas and gain true insight as to the contribution each makes to the success of the DSC and Park Service at large. The later is crucial as the understanding of TIC's value contribution is not understood organization wide. While TIC has created opportunities to be embraced by the organization, the realization will not occur without management buy in, functional teamwork and the organization embracing long-term, ongoing combined efforts to further DSC and NPS.

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Organizational Challenges within TIC

Situational analysis of the present organizational structure of TIC has revealed that operations need to be streamlined and direction established. Within the Information Services division (TIC) there are Micrographics, Reprographics, Archival and Scanning departments in addition to Contractors. Examination of the departments reveals that while Archives and Scanning work closely together, Micro and Reprographics function alone. The impact of this is that technology is incongruent, the culture is somewhat burocratic, the focus is muddled, management direction is unclear and employee learning is on a need to know basis. In order to establish solidarity, TIC needs to reorganize, creating a management structure where representatives or managers within the departments form a committee or cross-functional team, reporting to the Chief IT Specialist and the proposed position of Deputy Chief IT specialist. The Chief and Deputy Chief will be instrumental in creating an open culture where ideas can be discussed freely but management direction is clear. Employee development is imperative in adopting the new direction, enabling employees to embrace their roles, accountability in being involved in the team environment and building cultural respect for their counterparts, in fostering TIC's success.

The organizational structure (See Appendix C) is highly linear and has a number of employees in concentrated areas (Scanning and Archives). In considering the limited means available to TIC it would be beneficial to realign positions to enable the best use of human resources. As such, there are three staffers in the scanning department and one in the printing department. In considering that the printing specialist supports all of the DSC and has a consistently heavy workload, it would be beneficial to move one staff member to the printing department. Furthermore, implementing management within each area (Micro and Reprographics, etc.) will provide clear direction and, if used in conjunction with a cross-functional management team, will provide leadership and direction for TIC.

By addressing the challenges within TIC, the department will achieve consistency and solidarity as well as aid in providing the best contribution to the DSC team and the organization as a whole. (See Appendix C of organization charts)

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Present Workflow

One of the objectives of this analysis is to evaluate TIC's resources and establish their respective marketability. In doing so, the current workflow process was assessed to determine how a customer order is executed (See Appendix E). The current workflow is as follows:

- TIC receives a customer call for an order.
- The Order is written down by the Archives Staff.
- Order distributed to respective archive technician.
- If the order is small (i.e. a single photocopy), it is processed and sent to the customer.
- If the order is more complex it goes to the in-house printing specialist. If it requires less than 25,000 impressions it is processed and returned to archives staff for mailing. If it is greater than 25,000 impressions or a special order the job is sent to the Government Printing Office (GPO) where the job is bid upon by vendors. A vendor is selected, the job is processed and returned to the archives staff for mailing.

The department as four archive technicians receiving approximately 120 unpaid (those that are under ten dollars) orders a month and 22 paid (those over ten dollars) orders a month. The present number of orders is manageable yet, if TIC proactively markets its products, their capacity will be exceeded thus, creating a backlog. Furthermore, the number of unpaid orders is troublesome, as it is costing TIC $1,200 a month plus postage, which is an annual charge of $14,400 plus postage costs. This makes a significant impact on the budget considering that there is no allocation for miscellaneous charges.

To remedy this situation we propose that TIC charge for all orders and eliminate this substantial annual charge thus, being consistent in its order processing and customer message. Furthermore, Micrographics sets prices to recoup costs associated with paper, printing and machine usage but does not include a labor charge ($20/hour), unless it is a large order or specialized order. In consideration of the labor it takes to fulfill an order, a pricing should be set recoup labor costs.

The process starts with the 270 engineers and architects that design and create the technical information that TIC will eventually have the pleasure of storing for future use. However, we noted that there was very little interaction between these two very important departments. In an effort to streamline this process we suggest that representatives from all of the departments meet regularly to discuss ways of improving the process. We think that if the Engineers and Architects saw how the data was handled once in left their shop they might be able to make suggestions as to how is it stored and concessions on how and in what manner it is created.

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The obvious solution to this problem is for TIC to work in conjunction with the engineering and architectural department to figure out a way to store the information electronically. This would greatly reduce the cost of storage as well as cut down on the amount of space needed to warehouse the data.

The current process could be improved upon to decrease the probability of error by using a database system to track customer orders. The probability that an order can be lost, spilled on or inadvertently thrown away is high. Furthermore, building a database would enable TIC to truly track, monitor and assess its customer base. Its present customers have been determined from past orders but not truly evaluated to true potential.

Current & Ideal Workflow Process

In the interest of efficiency, a streamline process is proposed to remedy the current system. The proposed modified process is as follows:

- Customer Calls a toll free number and is directed to the designated order line
- Order Taken, Price Quoted and Order Documented in a Database (Excel or Customer Tracking Software)
- Order distributed to appropriate staff member for processing and returned to Order Staffer
- Processed by Order Staff and Completed Or Sent to Printing Staff (2 Internal Staff Members)
- Upon job size, processed In-house (Returned to TIC Order Staff for Mailing) Or Outsourced to Government Printing Office (GPO)
- Order returned to TIC Order Staff and Mailed to Customer

This process establishes a designated staff member to receive and process customer orders, eliminating the chance for loss or mishandling of the order. Providing the customer a flat price will allow for no customer confusion and no additional cost to TIC. The customer data is entered into a database system, which serves to act as a tracking system to monitor orders taken and to serve as a 'data mining system,' (understanding whom the customer is and how they are reaching TIC.) The internal printing department has an added employee to aid in supporting all of the DSC in printing needs and assisting in the overall workload. Moving a employee from the scanning department to the printing department will aid in turning more jobs in-house because capacity is increased. The order is returned to the appropriate TIC Staffer for mailing to maintain quality control.

TECHNICAL INFORMATION CENTER (TIC)

Conversations with TIC management revealed that a long-term objective is to alleviate the simple orders TIC currently processes, that is a one page Xerox or similar types of basic orders. In considering this, the DCB team has developed and "ideal" workflow process that is as follows:

- TIC Database is an Interactive US Map on the NPS homepage. The customer can scroll over the states where a dropdown menu gives a list of the NPS sites within that state. A further dropdown menu, lists basic park information, visitor hours, maps and historical information. The customer is satisfied or if the customer requires further information they are directed to call the TIC toll free number or are directed to a contracted vendor.
- Customer Calls TIC to place an order or contacts a vendor.
- TIC Processes order or Vendor Processes Order
- Job Completed and Customer Satisfied

The ideal process would involve a number of parties to be enacted. The NPS and TIC could work together to develop the site, choose the appropriate information and off set the costs of construction. (See Marketing/ Web Strategies Section) If the customer is directed to TIC the order is processed and completed as stated above. Orders directed to a vendor would alleviate any external customer contact; allowing TIC to continue to conduct normal operations. An outside vendor, such a printing house, or partnerships with a bookstore such as Barnes & Noble, would allow the TIC database information to be stored and retrieved on CD and printed on demand. The challenge in pursuing this path would be getting all of the stored data in a digital format that could be utilized by outside vendors. At present, only two percent of the data housed in the library is in a digital format. As previously stated, this is an ideal solution that would require a number of parties and additional funding. The study of which would involve intense investigation beyond the scope of the DCB consultant's involvement.

Internal / External Positioning

The Technical Information Center is faced with an identity crisis, internally the organization is challenged to understand their role and externally there is a lack of awareness. As previously addressed, TIC needs to have internal solidarity to foster the knowledge of their role and contribution to the organization. To coincide with the organizational changes, we believe that TIC should brand itself by building on its primary strength, the archives. As such, changing its name from the Technical Information Center to the Technical Archives Center, is an accurate representation of their functional role. Furthermore, the acronym TIC conveys a negative connotation in the public's mind. This is especially true for those not familiar with the Denver Service Center but who are avid outdoor enthusiasts who know the parasite for which the TIC acronym resembles. The relation to the two names is coincidental but nevertheless the association is still made in the customer's mind.

Therefore, a name that accurately reflects the archive will aid in building a brand identity. Brand identity will help the organization resonate meaning to its customers and represent what the organization will stand for over time. To further enhance the transformation, TIC should develop its own mission statement, reflecting contributory efforts toward the overall mission of the National Park Service. The implementation of recommendations will serve to provide TIC with an opportunity to reinvent itself, enabling new beginning post reorganization, defining who they are and developing a guiding mission. The undertaking of such measures needs careful management, as employee commitment is critical. Management needs to convey the benefits, reinforce necessity and ensure employees of their own commitment.

As in the TIC example stated earlier, we feel that the name 'Mongoose' does not correctly convey the idea of what it really is. Again, the names 'Library', 'Archives' and 'Depository' more aptly apply. We understand what a challenge it is to inform the public about the Technical Information Center and what it does. Therefore, we suggest that branding efforts coincide with the database as well. In the interest of simplicity, the use of "TAC" would minimize any confusion among customers.
By following the DSC business card initiative, which requires that all business cards reflect the official NPS logo, the consultants believe this consistency should follow through to all internal and external communications for the Denver Service Center. Engaging in consistent communications conveys a consistent message to all levels of the organization and to the general public.

Building brand identity enables the organization to externally position its relative to competitors. The "technical archives center" conveys a meaning of specialized collections of information, which resonates with the general public but more importantly with the target market.

Management Information Systems (MIS) Plan

Situation Analysis

Technical Information Center (TIC) has developed an information system as well as an archive. The main purpose of its information system consists of three factors: to store all national park's data, to provide the data to customers on the Internet, and to communicate within the organization effectively.

The database is currently loaded on a Lotus Notes Domino Web Server and is available on the National Park Service Internet Site, www.nps.gov/dsc/tic. The system holds over 200,000 data records, which consists of 800,000 microfilm aperture cards of maps, plans, and drawings; 1,500 records of resource and site aerial photography; and 85,000 planning design, construction, natural resource, and cultural resource documents.

TECHNICAL INFORMATION CENTER (TIC)

Lotus Notes used by TIC will eventually allow park units to send their document electronically to the Mongoose, which is a name of database for drawing, reports & project information, and enter descriptive information for each item submitted. Lotus Notes enables communication, collaboration and coordination among employees effectively. Lotus Notes as groupware has lots of functions for communication: email, discussion group, group calendar, and so forth. Thus, TIC uses Lotus Notes as an Internal and Intranet groupware system that allows asynchronous collaboration within workgroups.

However, the TIC information system has two main problems: No standard and Lots of analog data. First of all, various platforms exist within the company. For example, regarding operating system, there are the following choices include Windows 95, 98, NT, MacOS, UNIX, and so forth. In addition to operating system, two different e-mail systems exist. Microsoft Exchange, CC-mail that are not supported by Lotus Notes. Thus, the system has no standard and many different platforms, which prohibits the employees from sharing the information and communicating one another effectively.

TIC holds almost all its data in an analog format. In fact, TIC uses a microfilm system for distribution and storage of the national park data. There are two microfilm formats used in this process: the aperture card for maps, plans, and drawings and microfiche for report documents. The use of analog data cause several serious problems; for example, compared to digital data, its more time consuming and expensive to search, copy, and maneuver the analog data. Furthermore, due to the fact that almost all data is stored in analog format, only 2% of existing data is available on the website. Therefore, TIC needs strategic solution for the problems in order to develop the effective information system.

Proposed Changes

As mentioned above, TIC needs to solve the limitations of the current system, which include no standard and large quantities of analog data, in order to develop information system to store and sell the data effectively. In order to achieve the goals, the following three keys IT concepts with specific strategies: Leadership, Integration, and Digitalization.

Leadership

Although leadership is not technical stuff, strong leadership is one of the most important factors to succeed in developing the information system. In fact, TIC/DSC seems to have not enough leadership to change the information system. For example, although the organization has decided some standard such as Lotus Notes as groupware, the employees use their own software by themselves. Thus, TIC should exercise stronger leadership in solving the problem, integrating the processes, systems and tasks, and proceeding to digitalize the existing products. In addition, the managers should understand accurately an information system in itself. Although an information system sounds special and technical, *an information system is not an end but a means.*

TECHNICAL INFORMATION CENTER (TIC)

The main purpose to implement the information system is to store and sell the data effectively, not to develop the information system. TIC should not miss the main purpose anytime. Therefore, in developing the new information system, TIC should exercise strong leadership with focusing on the main purpose.

Integration

Our recommendation is that TIC integrates all processes, systems, and tasks to work together. In fact, there are no standard and different platforms in the current system, which causes inability to share information/data among employees smoothly, to distribute the data effectively, and to make business decisions quickly. Regarding integration, there are two significant tools: database and groupware. We recommend the Oracle-Lotus Notes hybrid system with the system development life cycle. We analyze and explain our recommendation from three aspects: database, groupware, and SDLC.

Database

Our recommend is that Oracle 9i Database Enterprise Edition be used as the database standard of the new information system. Oracle 9i Database Enterprise Edition is the most powerful database available for enterprise applications including Web sites, transaction processing, multimedia, content management, and decision support. The Oracle Database delivers record-breaking performance and scalability with complete compatibility from single processor servers to the largest SMP servers to massive clusters and mainframes. Oracle also has unprecedented ease-of-use, availability, security, and price/performance. Thus, compared to other databases, Oracle has great advantages as a whole. (See Appendix F)

Oracle has five factors as the best database for TIC: superior scalability, multimedia extensibility, complete web-enablement, multi-platform support, and usability of the existing resource.

(1) Superior scalability - Oracle database can run on everything from laptops supporting to massively parallel systems with terabytes of data and/or thousands of users. The database has efficient management of terabytes of data with parallel processing of all operations. This allows TIC to minimize costs and maximize personnel skills by using a single database for all its application needs no matter what the scale. TIC can also rest assured that its applications will not fail because the database ran out of gas. In addition, Oracle has top market share, 46%, and is on the top rank in almost all market types. This affects the scalability in the future. (See Appendix G)

(2) Multimedia extensibility - Oracle database allows TIC to extend the capabilities of the database to meet its specific organizational requirements. This includes the ability to support for more types of data than any other database involving multimedia data such as documents, images, and so forth.

(3) TIC could develop applications that use technology to gain competitive advantage in ways not previously possible or practical. Oracle database could replace aperture cards and microfiche as an archive.

(4) Complete web-enablement - One of the key new application areas is e-business. Oracle database is fully integrated with web technology so that data can be easily accessed from the Internet or from its intranet with complete security. Oracle has the most advanced SQL, Java, XML, Web services and complete browser-based systems management for all features. This feature could provide competitive advantage, greater customer service or reduced costs, when TIC develops the system to sell the data on the Internet.

(5) Multi-platform support - Oracle database is one of the most open database platforms available. It runs on the most popular UNIX and Intel server platforms including Windows NT/2000 and so forth. It supports for tens of thousands of applications available from Oracle and its partners and all major industry standards relevant to distributed data so that it can be accessed using thousands of existing tools and applications, and can be easily managed within an open, network-computing environment. These capabilities allow TIC to reduce costs and improve cycle-times by leveraging its current investments in data, hardware, software, and skills.

(6) Usability of the existing resource - TIC could use some of the existing resource by implementing Oracle as the database standard, because it uses the database currently. TIC can make the most of the existing resource such as servers, data, and expertise. This allows TIC to reduce costs and develop the system efficiently.

[System Requirements]: See Appendix H

Groupware

Our recommendation is that Lotus Notes R5 should be the groupware standard of the new information system. Lotus Notes R5 is the leading integrated e-mail and e-business software for the Internet and corporate intranets. An intuitive, Web-inspired environment, Notes integrates its highest priority information sources, including e-mail, calendaring, group scheduling, to do list and more. The employee can exchange messages via the Internet, work with any Web application, read and post topics to Internet newsgroups, search Web directories, and use X.509 certificates for security. Notes even lets them access their e-mail and other applications while they are off-line with full access and gives them the option to synchronize their work later. In addition to these advantages, there are three specific reasons why Notes R5 is appropriate to TIC.

First of all, TIC could use Notes R5 with Oracle database, because Notes R5 supports Oracle server. TIC make the most of Notes R5 as a groupware as well as Oracle database, which causes synergy effect. Additionally, it is Usability of the existing resource.

In fact, Notes R5 supports multi-platform, such as Windows 95/98/NT, MacOS, UNIX (operating system), Microsoft Exchange, Outlook (application). This means that TIC could use some of the existing resource and reduce costs to develop the new system. Finally, many employees of TIC are familiar with Lotus Notes, which means that TIC could minimize a risk to make employees be confused with the new system.

[System Requirements]: See Appendix H

System Development Lifecycle

In order to develop the information system by integration and digitalization, System Development Life Cycle (SDLC) method is one of the most typical and effective ways. SDLC is composed of six phases: plan, analysis, design, development, test, and implementation. In the plan phase, TIC should consider that "is this project worth looking at?" to establish the project charter. In the next phase, TIC should analyze the problem, requirements, and decision processes. After analysis phase, TIC could design the information system in order to transform the business requirements into design specifications for implementation. In the development phase, TIC could build a system that fulfills the requirements and implement the interfaces. In addition, TIC should test task condition after development. Finally, TIC could deliver the information system into operation through implementation phase. This method gives TIC a smooth and effective way about integration and digitalization process.

Digitalization

We recommend that TIC proceed to digitalize all archive and data about national parks. In fact, lots of analog data such as aperture cards and microfiche makes difficulty in handling the data effectively, redundancies to copy or send data to other places, and inability to distribute or sell all data on the Internet. In order to solve these problems, TIC should proceed to digitalize the analog data as soon as possible. We recommend three significant methods to digitalize the analog data: Digital camera, Outsourcing, and Backup system.

Digital Camera

Compared to microfiche, digital camera is more effective to input and store graphic data of national parks to a digital archive directly, because the employees do not have to create, scan, and copy microfiche. In fact, the analog data procedure causes time and cost consuming seriously.

In order for the Denver Service Center to become more efficient the switch from hard copy formats to digital storage needs to be made. A perfect example of this is the recent trip made by Van Brower to a Civil War Cemetery in order to photograph 1100 headstones. For the trip Van purchased over forty rolls of film costing five dollars each and then developed the photographs at a cost of five dollars and forty-cents per roll.

Finally, the images were privately scanned by a private firm, which charged a dollar-fifty per scan. The total cost of the job (not including labor) was approximately two thousand dollars. If a digital camera had been utilized the job would have cost the Denver Service Center half as much (only eleven hundred and fifty dollars) and the Digital Camera included in the cost equation could be spread out over several hundred jobs (over the life of the camera.) Again, we feel this scenario is analogues to the entire Denver Service Center.

Example:
1100 Headstones (40 x 36 = 1440 images)
40 rolls of film x $5 per roll ($200)
40 x $5.48 (36 exposure) processing ($219.20)
1100 x 1.50 per scan (private) ($1,650)
$2,069.50

Digital Sony Camera - $1100 + 2 Disks

1100 Images
800 Images per disk
E-mail to customer

$1,100
As the example shows, the cost difference between analog and digital procedure is $969.5, which is only one job (not including labor). If TIC makes all jobs be efficient by introducing digital camera, it could reduce the costs and improve the productivity dramatically. In addition, the picture by digital camera could reduce redundancies of the process and could enhance the archive ability to research, duplicate, and distribute the data. Therefore, in order to make the information system be more effective, we recommend that TIC introduce digital camera instead of analog procedure such as microfiche.

Outsourcing
We recommend that TIC should outsource the digitalization procedure about the existing archive. In fact, if TIC digitalize all the existing data in-house, the cost and risk could be significant. There are three advantages to outsource: to reduce costs, to minimize risk, and to use expertise. First of all, by outsourcing, TIC could reduce the costs of digitalization, such as purchasing lots of equipment, hiring expertise, and paying labor costs. In addition, outsourcing could minimize the risk about digitalization. For one thing, if TIC proceeds to digitalize in-house, it has to spend many resources on doing it, which could loose business opportunities during the procedure. For another, the equipments that TIC has to purchase for digitalization would be exposed to obsolescence. Furthermore, TIC could acquire expertise by outsourcing without a long-term contract, which makes TIC catch up with the IT trend effectively.

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One of the outsourcing companies that we recommend is GET Imaging (www.getimaging.com). GET Imaging is an Oklahoma City based corporation that provides high-volume document conversion services and turnkey image management solutions to clients around the world. GET Imaging specializes in the conversion of microfilm, microfiche, aperture cards, and paper into digital images. The company provides value-added indexing, coding, optical character recognition, and data entry services. We typically deliver TIFF, PDF, or text delimited files to our customers. For example, in the conversion service, GET Imaging operates a high-volume document conversion facility in Oklahoma City, Oklahoma. The facility is equipped with the imaging industry's finest equipment and software. The company possesses the capacity to convert more than 250,000 frames of microfilm, 250,000 frames of microfiche, 15,000 aperture cards and 100,000 pages of paper per day. Its production employees have delivered more than 200 million images to various customers. These features are appropriate to TIC.

Back-up System

One of the most important issues regarding digitalization is how to keep the collected data infinitely. Currently, TIC uses aperture cards and microfiche as the source document storage system. After digitalization, TIC must keep the collected data almost infinitely. In fact, digital data lifetime is almost infinite. For example, in digital camera, CompactFlash memory can operate between temperatures of 25°C to 75°C and claims a 100-year usage life (Microfilm lasts around 50 years) -The PC Technology Guide, http://www.pctechguide.com/19digcam.htm.

We recommend DLT backup system. As storage capacities have expanded, system managers have increasingly chosen to standardize on Digital Linear Tape (DLT). Originally developed to serve the needs of minicomputer customers, DLT has emerged as a high-performance option for NetWare, UNIX and Windows NT systems. DLT drives feature a half-inch cartridge design with multi-channel, linear serpentine recording, low tape tension, and sophisticated error detection and correction methods. Current DLT 4000 drives offer a data cartridge that stores 20 GB of uncompressed data and up to 40 GB with average 2:1 compression. Designed specifically for high-performance systems, DLT offers capacity, performance, and reliability levels not available from tape technologies that were designed for less demanding applications.

An inherently high-performance technology, DLT provides up to three times the per drive performance of DAT or 8 mm, allowing users to achieve their performance goals with fewer drives. DLT derives its performance edge from its ability to record and read multiple channels simultaneously. Current DLT drives--specified at a maximum native data transfer rate of 1.5 MB per second--record and read two channels at once, effectively doubling the transfer rate possible at a given drive speed and recording density. Data integrity is paramount and DLT offers features that ensure against loss of data due to dust particles or damaged tape.

TECHNICAL INFORMATION CENTER (TIC)

DLT drives can recover data even if up to two inches of tape is damaged within an eight-inch tape segment. Robust data recovery and resistance to environmental contamination allows DLT the flexibility to be placed almost anywhere.

Ideal Changes

TIC would be ready to sell the products on the Internet after integration and digitalization. In fact, the Internet has huge opportunities to make the customers know the national park's products including the information data and purchase the products anytime and anywhere. We will introduce the charging system on the Internet briefly.

In order to sell the products on the website, TIC should develop a charging system effectively. One of the easiest ways to charge on the Internet is credit card (Visa/MasterCard). SET stands for Secure Electronic Transactions and is a proposed standard for performing credit card transactions over the Internet. Visa and MasterCard are developing it jointly, with technical assistance from various Internet, information systems, and cryptology companies. The SET payment process is slightly complicated because of the need to pass public keys between parties and verify certificates during the transaction. Whole steps in making a credit card purchase using the SET protocol is in Appendix K and L. In addition to SET, TIC should develop the hardware system for the charging system. Basically, TIC could use Microsoft Proxy Server 2 or Microsoft Internet Security & Acceleration (ISA) Server 2000. However, the system development process needs expertise. GAIA Net Charger (www.sbss.com) would be a technical support.

This plan is just an ideal change plan. We recommend that TIC focus on integration and digitalization at first. After then, TIC could stand the line to sell the products on the Internet.

Marketing Strategies

The preceding assessment has evaluated the industry, market, competition that TIC faces in choosing to market the archives. The challenge is marketing TIC is build general awareness yet reach the target markets for highly specialized information.

Product Offerings:

Promotion

The Technical Information Center needs to do a better job of promoting itself and its services to the public. It does have a website which the public can access but, as stated previously, it is buried deep within the National Park Service maze of websites. One of the ways we feel that TIC could at least promote use of its website is through the use of CD business cards. These cards, once placed in the 'D' drive of a computer, effectually 'take control' of the computer and direct to a specific website.

In this case, TIC could send out a CD business card to with each order that it processes thereby targeting the people who are using TIC's services but have not yet learned of the benefits of accessing the information via the Internet. One major drawback in this plan is the fact that only about 2% of TIC's total library of information is currently available on-line. Prior to any marketing / educational push to get people to utilize TIC's website a major technological overhaul would have to be undertaken.

In addition to using CD-ROM technology to promote itself we also feel TIC can use it to publish information contained within its library. The goal of such a strategy would be to recoup some of the costs involved in storing and handling the archived information. Prior to publishing any information TIC needs to define the scope of such a project. This first step is the most important because it will help identify what type of technology is used (CD-ROM or standard printing technology). If a CD-ROM format is chosen for the project then almost any CD manufacturer within metro Denver could handle such a job. However, if standard printing technology is used the first criterion that must be meet is that the publisher is a non-profit organization. A book published by TIC will be limited in scope of audience and marketability therefore a non-profit publisher is ideal because there is less worry regarding financial gain. The second hurdle in identifying a publishing partner deals with the type of book proposed. Publishers usually specialize in certain core areas such as, cookbooks, camping guides or biographies. Therefore, a candidate might seem ideal because they are non-profit but may not be interested in taking on a project because their specialization is not a good match. We feel we have identified at least one publisher that fits the description and would be willing to take on such a project. After consulting with several local publishers we were fortune enough to speak with Marlene Blessing, Managing Editor of Fulcrum publishing, in Golden, Colorado. She suggested we try calling a publisher in Seattle, Washington named Mountaineers Books. We then discovered that Mountaineers Books is not only a non-profit organization but that they also specialize in U.S. outdoor guidebooks as well as books on natural history and hiking and trail guides. We feel that Mountaineers Books is a good candidate for a joint project with TIC in publishing books base on information stored within the TIC library. In researching this project we came across a valuable source of publishing information contained in the 2000 – 2001 Catalog & Directory of the Premier Publishers of the West. This resource lists the names and contact information of all the major publishers in the western half of the United States. A copy of the directory will be included in the final report submitted to TIC.

In discussing this project with several publishers we were told repeatedly to first define the scope of the project i.e. photo essay of Civil War battlefields, collection of architectural plans of prominent historic sites, etc. The next step is to find a writer and a researcher willing to cull marketable information from the TIC archives and packages the information into a manuscript, which can then be submitted to a publisher.

The CD-ROM community, on the other hand, only required that the information be in a digital format ready to be recorded on to a master. CD manufactures are not proprietary to their customer base the way the publishing community is so there are many more options in terms of which company TIC would like to work with.

In our work for this project we identified several Denver based CD-ROM manufacturers and settled on one in particular. Coda Inc. is located in Englewood, Colorado and has the capability of handling an entire job in-house from start (pressing the CD master) to finish (printing four-color graphics on the face of the CD). Coda Inc. is the only local manufacturer who has the space and technology to do this. To give the reader some idea of the costs involved in this process we offer the following example:

Run Size:	1000 CD's
Replication:	$.60 each
Mastering Fee:	$350.00
Four Color	$.06 each
Clamshell packaging	$.42 each
Total job cost:	$1,430.00

Jobs larger than a thousand pieces experience greater economies of scale, which reduce the price even further. We feel this is a viable option for TIC if it wants to market products in this manner. (See Appendix J)

Place

After a book or CD-ROM has been published we envisioned the material either being available on the TIC website or sold in the many gift boutiques operating in the National Park System. Currently, there are 384 parks under NPS control and each attracts a wide range of visitors. If TIC publishes a CD-ROM on Civil War battlefields the distribution can be limited to only those parks that have something in common with the material. In the technology section of this report we will outline how TIC could sell published products on its website without having to put a strain on its human resources.

Price

The price of published products should be in accordance with the current market level for such information. However, depending on the project, the pricing may be increased if the information is highly specific. Due to the fact that TIC information is so exacting and TIC is the only source of the data then a premium may be derived when charging for the product. TIC has a virtual monopoly on the information it manages and therefore could use this to their advantage when marketing and pricing the published products.

TECHNICAL INFORMATION CENTER (TIC)

We suggest that a future Integrative Challenge team under take the task of surveying the CD-ROM and book markets if TIC decides to take this idea further.

Web Strategies

The Internet has emerged as the primary resource for consumers seeking information. As such, the NPS and TIC need to have a web strategy that is more users friendly. In order to assess the customer experience the DCB consultants utilized the web to search for information about the NPS, TIC and Technically Related Information. The results of these searches present challenges because a number of mainstream web directories do not lead consumer to the NPS or Parks, rather consumers are directed to travel and tourism sites that have information about the parks. Furthermore, within the NPS website a consumer would need to know how to find the Denver Service Center in order to reach TIC and the TIC database. In making the data accessible to consumers, this web placement will need to change or be linked directly to the NPS homepage.

TIC is an information resource. Consumers seeking information turn to the Internet. It is clear that the two need be in sync with one another. As discussed above, developing an interactive US map on the NPS homepage that would serve to provide general park information (hours, directions and facilitates, etc.), historical information, basic topographic maps and links to TIC as well as a toll free number for highly specialized technical information. In order to develop a site, such as this, TIC data will need to be in a digital based format to allow for consumer inquiries. Considering the vast amount of data to be transferred and the potential cost of doing so, it would be best to determine a corporate partner whose corporate philanthropy and resources would coincide with the need s of TIC and the NPS. The NPS Business Plan Initiative has tremendous resources. in the friends of the parks, a potential partner or partners may already exist within the network the NPS already has established. Other potential partners include:

- **3Comm Corporate Commitment**
- **The Ben & Jerry's Foundation**
- **BP Oil**
- **Cable and Wireless Company Community Involvement**
  DuPont Social Responsibility
- **Gap, Inc. / Gap Foundation**
- **Heinz Endowments**

- **J.P. Morgan & Co. Inc**
- **Samsung Social Activities**
- **Texas Instruments / TI Foundation**
- **Turner Foundation**
- **Union Carbide - Community**

To further enhance the benefit of the website for the NPS a mechanism within the database would serve to act as a datamining tool. In order to obtain a printable version of the information a guest book must be signed, where the user submits their information and email address. Furthermore, consumers are asked if they would like to receive email updates from the NPS/TIC. The database of names collected can be used to promote parks, alert consumers to passes, events, news and TIC products and services.

TV and Production Partnerships

To further promote the TIC archives or projects that TIC is undertaking, Media provides the reach of exposure that could truly be impactful. In order to obtain a production partner a pitch will need to be developed which details a certain element of interest to the general public. A pitch can be sent to independent producer that contract (distribute to) with companies such as National Geographic and The Discovery/Learning Channel. While this method can yield favorable results yet, the operative method is to develop relationships with publishers who have the resources to production, as a number of the larger publishers of educational product such as Simon & Schuster and Alfred & Knoff do. Again, the leveraging the National Park Foundations ongoing relationship with the National Geographic Society and the Discovery &Learning Channels is the most direct way to pitch the resources of TIC and their benefit to consumers. Potential Pitch ideas include and angle that will appear to consumers, an inducement to watch a show, buy a book or purchase an interactive CD Rom. The following are suggested topics that could generate consumer interest:

- Historic Bridges
- Trails through Time
- Yosemite Post Flood Restoration (features how park preservationists utilize TIC to aid in restoration efforts).
- Arial Park Photography A to Z
- Recent Interest in Pearl Harbor (U.S.S. Arizona) due to the movie release of *Pearl Harbor*.

TECHNICAL INFORMATION CENTER (TIC)

Organizational Benefits

Our consulting plan encompasses the entire organization and implementation of our suggestions will take time and effort to execute. However, we feel confident that our recommendations will improve the follow of information through the organization as well as boost customer service. The following is a brief review of the benefits TIC could realize by adopting our recommendations:

- ✓ Greater and easier access to information
- ✓ Better understanding of who TIC is and what TIC does
- ✓ Increased communication between DSC departments
- ✓ Increased time for TIC staff to concentrate of larger work orders
- ✓ Lower overall costs associated with data storage
- ✓ Removal of tedious data storage tasks
- ✓ Improved customer service
- ✓ Acknowledgement by all departments of TIC's mission and goals
- ✓ Increased funding for TIC's capital equipment improvements
- ✓ Improved Efficiency
- ✓ Viable Product Offerings
- ✓ Unbiased Consultancy Approach to Challenges facing the Org.

Action Plan

Throughout our seven weeks with the Technical Information Center the DCS consultants have

- Develop a Proposal to aid in acquiring a technology partner to make the NPS an Interactive, User-friendly database.
- Implement organizational recommendations
- Streamline and optimize workflow
- Enact positioning suggestions
- Incorporate MIS networking standards
- Utilize Product Offering Suggestions

Appendices

TECHNICAL INFORMATION CENTER (TIC)

Appendix A

SWOT ANALYSIS

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
• Wealth of Information • Archival and Record Storage to Date • Facilities (In-house) and Equipment for Record Storage and Printing • Highly Qualified & Knowledgeable Staff • Monopoly position • Backing of the Department of Interior • Congressional Support • Charged with important mission • Established networking infrastructure	• Leadership from top Management within the Denver Service Center • Focus on Individuality; Antithesis of a Team or common goal(s) • Under funded and under staffed • Efficiency of Procedures • Adverse to change • Technological upgrade desperately needed • Internal Support Needed • Management of documents and records is fragmented by many different practices and the use of technology • Time Consuming &Expensive to Digitalize the Archives	• Cross Functional Teamwork (to include all areas within TIC and other partnering departments) • Standardized Technology (organization wide including all parks) • Streamline Efficiency through Procedure, Protocol and Accountability • Employee Development • Clear Management Direction • Branding of TIC and Database • Customer Ordering/Pricing to Cover All Costs • Marketability of TIC Information & Partnerships • Awareness & Presence of TIC Via Visible Web Presence • Physical Space Needs decline rapidly w/ digitalization • Employee Development • Better management arising from better IT mediated management information. • Utilize Outside Contractors who have the capacity to transfer data rapidly.	• Market Segment (i.e. Books, CD's, etc,) Competition • Jeopardy of losing funding

TECHNICAL INFORMATION CENTER (TIC)

- Streamline Organizational and Operational Workflow to enable Marketability
- Customer Centric Focus (end User Based)
- Improve customer service through greater access
- Centralize the info system to control the system as a whole
- Make the data flow and communication within the organization more efficient
- Enable the system to be more accessible anywhere and anytime

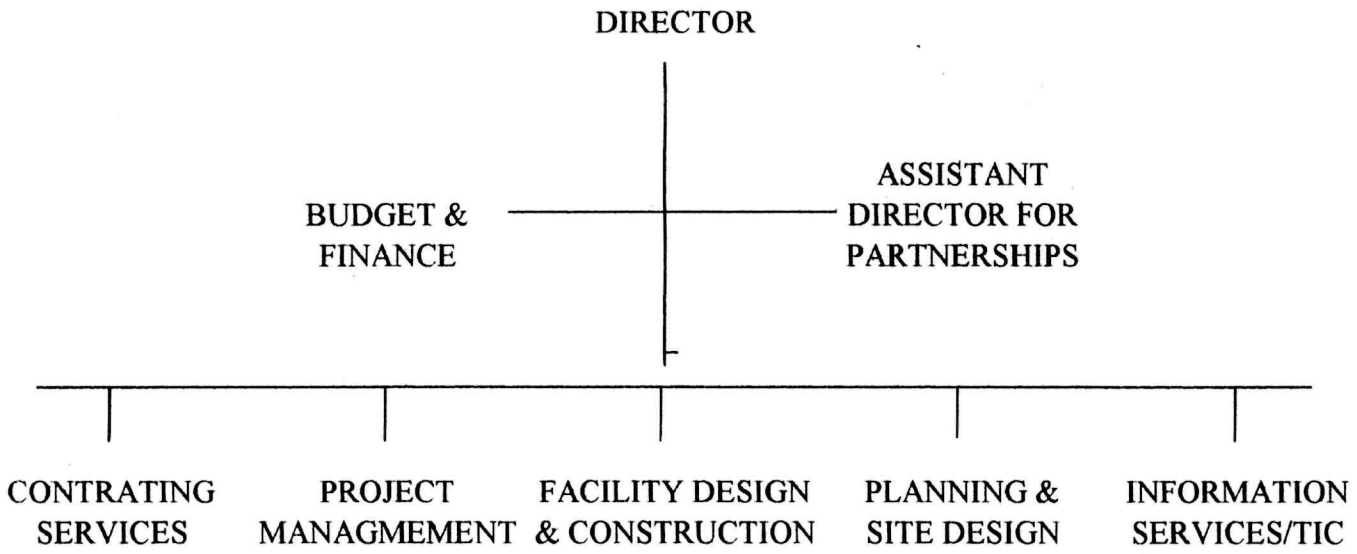
- Enable TIC to Market Products
- Achieve optimal Organizational Structure to do so
- Generate Supplemental Funding Via Partnerships (to coincide with NPF)
- Update all the archive and data to digital format
- Enable the national park's data to be marketable product on the Internet
- Enhance TIC's image through internal/external positioning and promotion
- Improve the accessibility of the library

- Reorganization to Include the DSC Leadership and TIC Operations
- Streamline Workflow Processes
- Create TIC Brand Awareness
- Standardize the system platform to operate effectively
- Digitalize the data to store in the archive and sell on the Internet

- Implementation of Organizational Suggestions
- Incorporate Workflow Changes
- Implementation of Oracle database
- Integrate groupware to Lotus Notes
- Outsource digitalization process
- Web Presence must be Customer Focused, Redesigned Interactive Interface that allows customers to access basic information and print from home. Technical Information is provided by TIC or Outsourced.
  Product Offerings: Books, CD Rom, Television Specials, Web Alliances (Discovery Channel, Ford, etc.)

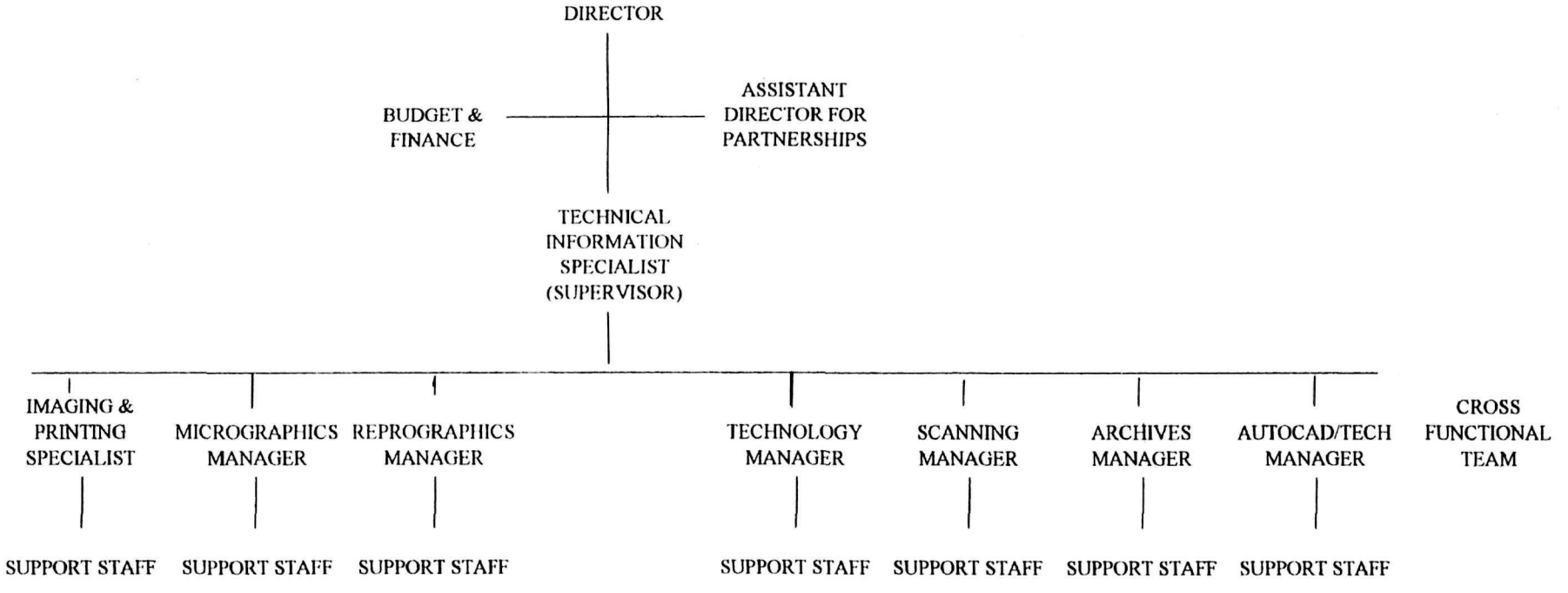
CURRENT DSC ORGANIZATIONAL FLOW

Appendix C

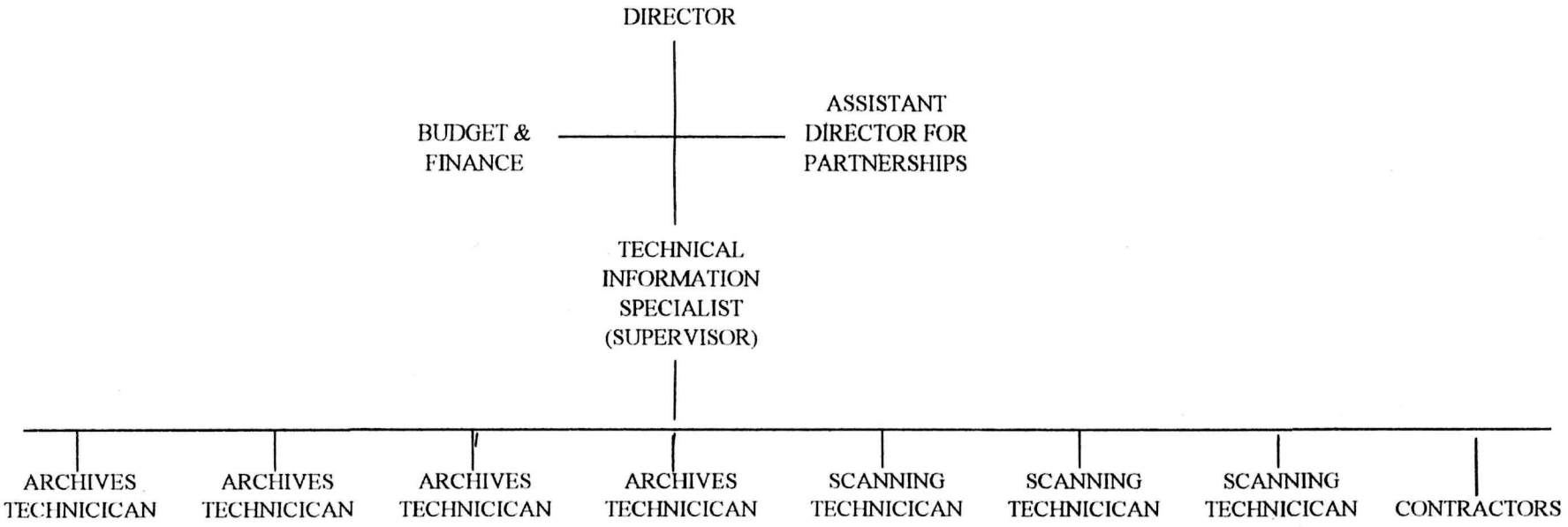


CURRENT TIC ORGANIZATIONAL FLOW

Appendix C

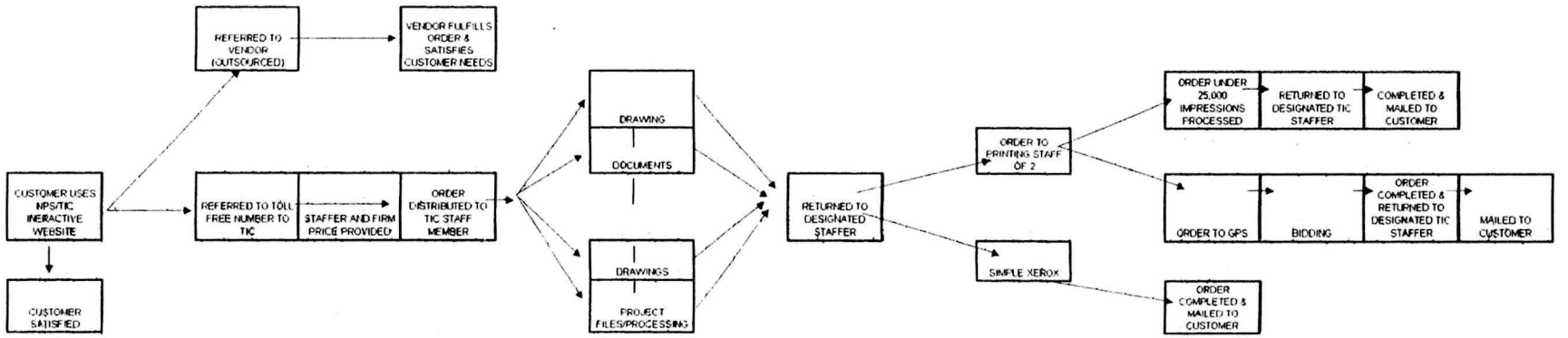


CURRENT TIC ORGANIZATIONAL FLOW



IDEAL TIC WORKFLOW

Appendix E



TECHNICAL INFORMATION CENTER (TIC)

Appendix F Groupware Comparison (email system)

Comparison by email system

Function	Microsoft Exchange	NT/SMTP	Lotus Notes	Note
Supportedrveratforms				
Windows NT 3.51	No	No	No	
Windows NT 4.0	Yes	Yes	Yes	
SBS 4.0 (Exchange conector)	Yes	Yes	Yes	
SBS 4.5 (Exchange connector)	Yes	Yes	Yes	
Supported Client platforms				
Win16	Yes	Yes	Yes	
Windows 95	Yes	Yes	Yes	
Windows 98	Yes	Yes	Yes	
WIN NT 3.51	Yes	Yes	Yes	
Win NT 4.0	Yes	Yes	Yes	
MAC	No	Yes	Yes	Only with SMTP gateway and Lotus Notes
Unix	No	Yes	Yes	Only with SMTP gateway and Lotus Notes
Microsoft Exchange client	Yes	Yes	Yes	
Microsoft Outlook	Yes	Yes	Yes	
Exchange Web connector support	Yes	No	No	
Fax address				
More fax numbers to one recipient	Yes	Yes	Yes	Depend on used E-mail client
Outlook contacts support	Yes	No	No	
Database and archive				
Archivation into Exchange Public Folder	Yes	No	No	Only Exchange connector, external archivation - FX API example
Microsoft Access database	Yes	Yes	Yes	
Microsoft SQL	Yes	Yes	Yes	
Oracle SQL server	Yes	Yes	Yes	

Source: Enterprise International

FaxRobot	Yes	Yes	Yes	
FaxRouter	--	add-on *)	add-on *)	FaxRouter can't be used on SBS version
HP Digital Sender	Yes	Yes	Yes	
Integration of a paper (classic) fax	Yes	Yes	Yes	
OCR module	add-on *)	add-on *)	add-on *)	
Oracle SQL Server	add-on *)	add-on *)	add-on *)	
Scanner module	Yes	Yes	Yes	
Statistic module	Yes	Yes	Yes	
Microsoft SQL add-on	Yes	add-on *)	Yes	
WebAccess module	Yes	Yes	Yes	
User rights				
Sending faxes	Yes	Yes	Yes	
Sending faxes inside PBX	Yes	Yes	Yes	
Sending faxes locally	Yes	Yes	Yes	
Intercity calls	Yes	Yes	Yes	
International calls	Yes	Yes	Yes	
Fax scheduling	Yes	Yes	Yes	
Setting fax priority: High, Normal, Low	Yes	Yes	Yes	

Source: Enterprise International

TECHNICAL INFORMATION CENTER (TIC)

Appendix F Groupware Comparison (Function)

Comparison by function

Function	Small Business	Standard	Enterprise	Note
Server functions				
Total lines per server	2	2	99	
Total of client licenses in the server price	5	5	5	
Max. client licenses per server	25	---	---	
Supported server platforms				
Windows NT 4.0	No	Yes	Yes	
SBS 4.0 (Exchange connector)	Yes	Yes	Yes	Small Business version runs only on MS SBS Server
SBS 5.0 (Exchange connector)	Yes	Yes	Yes	Small Business version runs only on MS SBS Server
Supported client platforms				
Win16	Yes	Yes	Yes	Client printer is not available
Windows 95	Yes	Yes	Yes	
Windows 98	Yes	Yes	Yes	
WIN NT 3.51	Yes	Yes	Yes	
Win NT 4.0	Yes	Yes	Yes	
MAC	No	Yes	Yes	Only with SMTP gateway and Lotus Notes
Unix	No	Yes	Yes	Only with SMTP gateway and Lotus Notes
Microsoft Exchange client	Yes	Yes	Yes	
Microsoft Outlook	Yes	Yes	Yes	
Exchange Web connector support	Yes	Yes	Yes	
ADD-ON modules in server license				
Cost Management Model	add-on *)	add-on *)	add-on *)	
Ericsson Internal Routing Model	add-on *)	add-on *)	add-on *)	
FaxChange API	Yes	Yes	Yes	

TECHNICAL INFORMATION CENTER (TIC)

Appendix G Database Comparison

	Candidate systems	Oracle	IBM DB2	MS SQL Server 7	Informix	Sybase	Sun StarOffice	MS Access	Corel Paradox	FileMaker Pro
	Criteria									
1	Platforms	1	1	1	1	1	1	1	1	1
2	Ease of use	4	4	2	4	4	1	1	1	1
3	Full functionality	1	1	2	1	1	4	4	4	5
4	Industrial strength	1	1	2	1	1	5	5	4	7
5	Marketplace	1	1	2	3	4	4	1	4	4

Source: the University of Minnesota

The lower the score the better

Notes

- Oracle: Full system, including Designer 2000, can be bundled with the text for $10 extra.
- IBM DB2 Personal Developer's Edition Version 7 freely downloadable. Not time-limited.
- Informix: No details of downloadable versions on Web site.
- Microsoft SQL Server 7: Full system with 120-day limit is free.
- Sun StarOffice: Suite is **free**, with no limitations.
- Microsoft Access: No limited.
- FileMaker Pro: 30 days and 50 records storage limit trial version available.

TECHNICAL INFORMATION CENTER (TIC)

Appendix H

The system requirements for Typical and Minimal are described below. The requirements for Custom depend upon the components selected for installation.

Requirement	Typical	Minimal
Operating System	Windows NT 4.0 and Windows 2000	Windows NT 4.0 and Windows 2000
Windows NT 4.0 Service Pack	Certified with 5.0 and 6.0a	Certified with 5.0 and 6.0a
Minimal Processor	Pentium 166 or Pentium 200	Pentium 166 or Pentium 200
Recommended Processor	Pentium 233 or Pentium 266[Foot 1]	Pentium 233 or Pentium 266
RAM	96 MB (256 MB recommended)	96 MB (256 MB recommended)[Foot 2]
FAT file system:		
Oracle home drive	1.92 GB	1.57 GB
System drive	69 MB	68 MB
NTFS file system:		
Oracle home drive	1.26 GB	1.08 GB
System drive	69 MB	68 MB
Video	256 color	256 color

[1] If you run the Oracle Intelligent Agent, Oracle Management Server, and Oracle Enterprise Manager Client on the same computer, the minimal processor requirement is a Pentium 166, the recommended processor requirement is a Pentium II 300, the minimal RAM requirement is 128 MB, and the recommended RAM requirement is 256 MB.

[2] You cannot run Oracle Universal Installer and Oracle Data Migration Assistant or Oracle Database Configuration Assistant during the same installation session on a 64 MB computer. To run these assistants, answer No when prompted to migrate or create a database. After installation is complete and Oracle Universal Installer has exited, run these assistants. Oracle Corporation also recommends increasing virtual memory to 200 MB. (Modify it in the Performance tab of System Properties in the Control Panel.)

Source: otn.oracle.com

TECHNICAL INFORMATION CENTER (TIC)

Appendix I Lotus Notes R5 System Requirements

Memory Requirements:
Microsoft Windows 95 & 98 - Minimum 8 MB, 32 MB or more recommended.

Microsoft Windows NT 4.0 - Minimum 16 MB, 32 MB or more recommended.

Microsoft Windows 2000 - Minimum 128 MB, 256 MB or more recommended*.

Mac PPC MacOS 9.0 - Minimum 32MB physical 64MB virtual, 64MB physical 80MB virtual recommended

Disk Space:
Minimum 70 MB, 112 MB or more recommended.

Protocols:
TCP/IP, SPX, NetBIOS/NetBEUI, VINES, ISDN and X.PC supported on all platforms. SPXII supported on selected platforms.

Source: www.lotus.com

TECHNICAL INFORMATION CENTER (TIC)

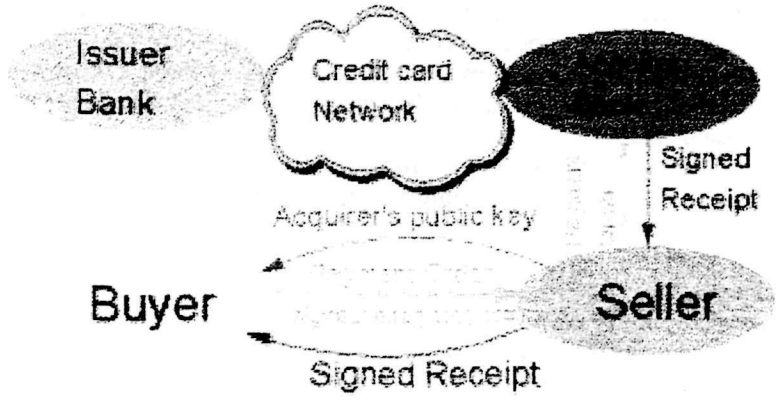
Appendix K
Steps in making a credit card purchase using the SET protocol

1. The buyer indicates that they are interested in making a credit a card purchase.
2. The merchant's system generates and sends the buyer an invoice for the purchase.
3. The buyer selects a VISA or MasterCard credit card for payment from the ones they can use with their SET payment software.
4. The buyer's software initiates the payment process by sending a request to the merchant's software for both their encryption public key and the public key of the payment gateway (acquiring bank's system) that the merchant uses. The request indicates the type of credit card the buyer will use, as a merchant may use different payment gateways for different types of cards (probably not).
5. The merchant's software generates a response to the request and replies back to the buyer's software. This response includes:
6. The buyer's software then verifies the merchant's and payment's gateways
7. The buyer's software generates two packets of information to send back to the merchant, the Order Information packet (OI), and the Purchase Instructions (PI) packet. Each packet is encrypted separately. The PI is encrypted with the payment gateway's public key since the merchant is not meant to have access to it.
8. The buyer's software transmits the OI and PI to the merchant.
9. The merchant's software checks the message from the buyer with the OI and PI for any tampering. If no tampering is found, the software starts the process of requesting authorization from the merchant's acquiring bank.
10. The merchant's software generates an authorization request for the credit card payment request. Included in this request is the transaction identifier that the merchant generated at the beginning of the payment process.
11. The merchant sends to the payment gateway of their acquiring bank a message encrypted using the payment gateway's public key. This message includes the following:
12. The payment gateway then decrypts the message and its various components such as the PI from the buyer. It checks the various parts of the message for any tampering. These checks include:
13. The payment gateway then sends a request for payment authorization to the buyer's credit card issuer through customary bankcard channels, i.e.. the same as the acquiring bank would request authorization for any typical credit card transaction.
14. The issuing bank sends back an approval or denial response and code to the payment gateway in response to the authorization request. This happens over regular bankcard networks.
15. The payment gateway generates an authorization response message to be sent back to the merchant. This message includes:
16. The payment gateway encrypts and sends the authorization response message back to the merchant's software.
17. The merchant's software decrypts the authorization notice from the payment gateway. It examines the notice to find out if the request was approved or not. It then stores the authorization response and capture token sent by the payment gateway for later use when capturing the sale.
18. If the transaction is approved, the merchant's software then creates a purchase response message, which is sent to the buyer's software. This message informs the buyer that payment was accepted and that the product or service that they purchased will be delivered.
19. The buyer's software processes the purchase response message and informs the buyer that payment was accepted.

At a later time, the merchant's software generates a capture request message to send to the payment gateway. This request includes the capture token (optional), transaction ID, and authorization information.

The sequences of events surrounding the capture are very similar to steps 13 - 15 of the authorization process.

Appendix L
Credit Card Payments with SET



CODA INC.

Appendix J

7374 South Eagle Street
Englewood, CO 80112
Ph: 303-680-1101
Fax: 303-680-5611

CD Replication Pricing

Replication		Glass Mastering Fee				
Run Size	**Unit Cost**	**7+ Days**	**5-6 Days**	**3-4 Days**	**2 Days**	**1 Day**
100	$0.88	$350.00	$450.00	$500.00	$650.00	$900.00
500	$0.81	$200.00	$250.00	$450.00	$600.00	$800.00
1,000	$0.60	N/C	N/C	$350.00	$550.00	$650.00
2,500	$0.56	N/C	N/C	N/C	$500.00	$550.00
10,000	$0.52	N/C	N/C	N/C	$450.00	N/A
20,000+	Call for Quote					

Extra Colors

Run Size	3rd Color	4TH Color	5TH Color	Jewel Box (Includes Assembly & Shrink Wrap)
100	$0.05	$0.05	$0.05	$0.45
500	$0.04	$0.04	$0.04	$0.40
1,000	$0.03	$0.03	$0.03	$0.35
2,500	N/C	$0.03	$0.03	$0.35
10,000	N/C	$0.02	$0.02	$0.35

Film Generation: $25.00 Per color.
Paper Window Envelope & Insertion: $0.15
Tyvek Window Envelope & Insertion: $0.20
Clam Shell & Insertion: $0.42
Other packaging options available.

Services Available

Compact Disc
- Premastering
- CD Replication
- CD-Recordable
- DVD
- Diskettes
- Tape
- Audio & Video

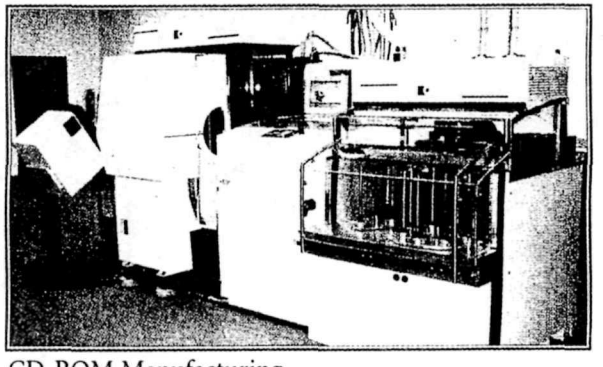
Silk Screening
- 1-5 Color Art
- CD or CD-R's

CD Business Cards

In-House Pre-Press Services
- Film Imagesetting
- Mac / PC
- All Major Design Programs
- Matchprints
- Epson Pro 5000 Fiery Proofs

VHS to CD Transfers

Blank Media



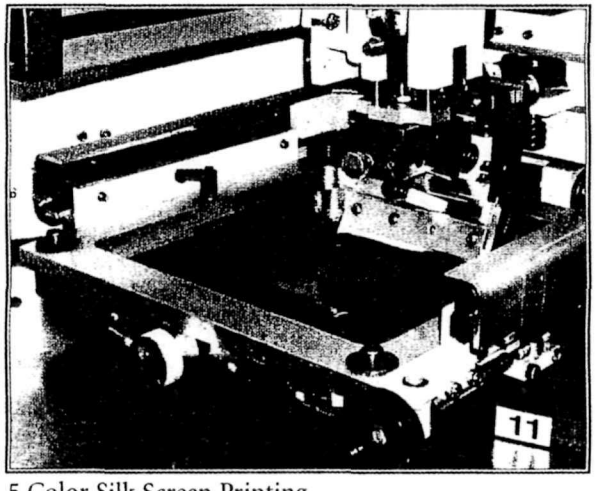
CD-ROM Manufacturing

Packaging
- Clam Shells
- S Shell
- Tyvek Sleeve
- Paper Sleeve
- Jewel Cases
- Slim Line
- Vinyl
- Custom Packaging

Printing
- Manuals
- Booklets
- Mailers
- Software Boxes
- Inserts & more

Order Fulfillment

CODA will get your products or information to your clients anywhere in the world, cost effectively and on time.



5 Color Silk Screen Printing

Contact Information

Web
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coda@coda-inc.com

Phone
1-888-699-9952
303-680-1101

Mail
CODA Inc.
7374 S. Eagle Street
Englewood, CO 80112

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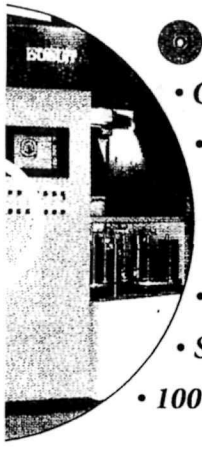

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- *One-Stop Shopping*
- *Customer Service*
- *On-Time*
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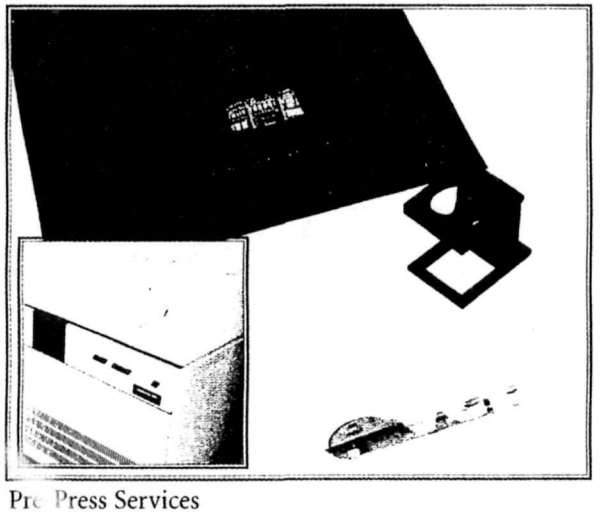
- *100% Satisfaction*



Pre Press Services

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