**Geologic Data Document Conversion and Digital Data Storage** | **FY2006 Request: $58,000** | **Reference No: 39989**

**AP/AL:** Appropriation
**Project Type:** Planning
**Category:** Development
**Location:** Statewide
**Contact:** Rod Combellick
**House District:** Statewide (HD 1-40)
**Contact Phone:** (907)451-5007
**Estimated Project Dates:** 07/01/2005 - 06/30/2006

**Brief Summary and Statement of Need:**
AK41.08.030 instructs the AK Div. of Geology & Geophysical Surveys to "…print and publish an annual report and such other special and topical reports and maps as may be desirable for the benefit of the state…" To fulfill this mission, DGGS utilizes a multitude of technological tools to generate, analyze, distribute, and archive geologic information. Hardware/software changes, and exponential increases in digital information volume have caused vulnerabilities to our data storage and distribution infrastructure. To protect the State's digital information investment DGGS needs to upgrade the battery back-up system, build a PC backup system, and reformat our online image collection from MrSID MP 2 to Adobe PDF.

| **Funding:** | FY2006 | FY2007 | FY2008 | FY2009 | FY2010 | FY2011 | Total |
|---|---|---|---|---|---|---|---|
| Gen Fund | $58,000 | | | | | | $58,000 |
| Total: | $58,000 | $0 | $0 | $0 | $0 | $0 | $58,000 |

☐ State Match Required ☑ One-Time Project ☐ Phased - new ☐ Phased - underway ☐ On-Going
0% = Minimum State Match % Required ☐ Amendment ☐ Mental Health Bill

**Operating & Maintenance Costs:**

| | Amount | Staff |
|---|---|---|
| Project Development: | 0 | 0 |
| Ongoing Operating: | 0 | 0 |
| One-Time Startup: | 0 | |
| Totals: | 0 | 0 |

**Additional Information / Prior Funding History:**
This is a new project request.

**Project Description/Justification:**
In the 40 years since statehood, DGGS and its predecessors have published a wealth of geologic research and information about the geology, natural resources, and geologic hazards of Alaska. The maps, reports, and informational publications produced by the USGS in Alaska are widely utilized by oil companies, mining companies, resource-based companies, consultants, universities, schools, government agencies, scientists, and private individuals.

Over the past ten years DGGS users have become increasingly technologically proficient. Users ranging from small Alaskan owned family mining operations to internationally recognized oil companies now utilize digital data as a primary tool for analyzing Alaska's geologic information. They have come to expect that paper maps be available as GIS coverages and have come to appreciate the instant online availability of DGGS publications. To most cost effectively and efficiently respond to user demands for digital information, DGGS geologists interact with a sophisticated hardware and software array. Geologists use a variety a data management and GIS software packages to analyze and publish their field data and the DGGS publications team is actively developing new database and Web applications to facilitate growth in our online digital data distribution process.

The move from paper to digital data has required that DGGS invest heavily in providing project geologists with adequate PC processors and organizationally shared UNIX servers. Much of the funding for equipment upgrades/replacement and

image conversion has been obtained from individual project grants. Several years ago, courtesy of a grant from the USGS under the Minerals Data and Information Rescue in Alaska program (MDIRA), DGGS was able to carry out a project to archive its library of publications to electronic files and convert them to a format optimized for WWW distribution. More recently MDIRA funding was also obtained to purchase sorely needed Web and database servers.

These MDIRA funded improvements have enabled DGGS to meet public demands for digital data availability and will provide DGGS with adequate server space for many years to come. However, the DGGS digital infrastructure has three vulnerabilities that could negate our investment and cause a major interruption in service to our customers. Our UPS battery back-up system is failing, we do not have an automated PC back up system in place, and our image library is archived exclusively on CD-ROM and is being distributed online in an outdated format (MrSID MP 2).

Online Document Distribution Improvements

Several years ago, DGGS was able to carry out a project to archive its library of publications as tiff files and convert them to electronic files that were optimized for WWW distribution. All pages were scanned as tiff files and archived to CD. For online distribution standard sized text pages were converted to Adobe PDF format and oversized pages were converted to LizardTech MrSID MP 2 format. The DGGS website received 33,679 hits in FY04; about 50% of these users were accessing scanned publications. Online access to our publications saves state users as well as the DGGS public customer base time and money. Our customer feedback indicates that customer satisfaction with the online availability of our maps is high.

However, market research indicates that the DGGS online image distribution and digital image archival systems need to be modified to insure their long term utility. At the time of project initiation, the LizardTech MrSID MP 2 format was the only image compression format that would generate quality map and oversized page images small enough to be efficiently served and viewed via the Web. Industry standards for oversized page compression formats have changed over the intervening years and are currently in a state of flux. LizardTech was recently bought out by another company, they are phasing out the MP 2 format as their primary distribution format, and they are involved in a series of lawsuits regarding copyrights to their compression technology.

Relative to the Adobe PDF format, the MrSID format is expensive for DGGS to generate and is perceived by many among our customer base as “unfriendly” because it requires that users interact with an “unfamiliar” software viewer that can only be utilized by PC computers. We find that many of customers, particularly those in the private sector and in educational fields use Mac computers and don’t have easy access to PC computers. With the emergence of superior file compression algorithms in Adobe Acrobat Version 6, DGGS can now cost effectively distribute oversized page image files in PDF format that are comparable in file size and image quality to MrSID images. DGGS considers the Adobe PDF (the non-GIS industry standard for image document distribution) to be a safer long term investment than the MrSID MP 2 format because PDF is the world wide standard for distributing non georeferenced documents.

Automated PC Back-up System

Reliable storage and backup is a vital part of daily computer use and archiving. With the 1200GB of image data which has been recovered or restored through the MDIRA grant and with at least 1000GB of working data which is presently residing on local workstations, our goal is to see that all DGGS digital information is on media which will guarantee the future of DGGS collections for years to come. Currently, DGGS geologists can only manually and selectively back up their data. Individual workstation data back up is limited by availability of affordable storage media and the non-automated nature of this process. CD-ROM data storage is prohibitively time consuming to maintain access and equipping each individual workstation with adequate duel hard drives and RAID array would be prohibitively expensive.

Recently a DGGS experienced a vital PC hard-drive failure. The cost to recover the data was well over $2,500 dollars. We also commonly experience situations where project workflows are interrupted due to lesser hardware failures on workstations prevent access to stored data. Such interruptions in work and associated expenditures could be relatively inexpensively prevented by building and initiating an automated PC-Back up system. The system would insure immediate and long access to working and archive datasets by incorporating a PC back-up server into existing our UNIX server and tape back up infrastructure.

UPS Battery Back-up System

Fairbanks is plagued with frequent nuisance power outages and fluctuations. Sudden looses in power potentially damage sensitive equipment/data and interrupt user access. Rebooting systems after total power failure takes a considerable amount of time and halts the workflow of project geologists and administrative staff. A UPS (Uninterrupted Power Supply)

guarantees the best use and care of server equipment, provides the opportunity for users not in the outage area to continue to access essential data, and gives time for IT staff to safely bring the system down if the power outage is expected to continue for an extended time. Our present UPS unit provides only 12 to 15 minutes of back up time, the needed time is 1.5 to 2 hours. To prevent expensive damage to the DGGS network infrastructure and insure uninterrupted user access DGGS needs to upgrade our existing UPS system with a ten bay battery storage unit, eight additional batteries, and a redundant power supply.

**Why this project is needed now:**
The FY06 fiscal year would be the opportune time to complete this project. It is extremely urgent that DGGS address the PC back-up and UPS upgrades aspects of this project as soon as possible. Additional wait time increases the risk that DGGS could suffer from a severe and unrecoverable data loss or equipment failure. Completing the document conversion aspect of this project at this time is also ideal because preemptively transferring this collection to Adobe PDF insures DGGS against potential image compression market instability and litigation issues that could render MrSID MP 2 files useless and thereby curtailing the availability of the DGGS online map collection and eliminating the investment already made in having digital files on-line.

**Specific Spending Detail**:
Line Item Expenditures:
Personal Services $0
Services $38,000 - Contract for image conversion to private sector or state entity
Capital Outlay $20,000 - Servers for automated PC back-up and data archival, UPS and related cost, and a redundant power supply.