Project Startup Report

Presented to the IT Committee September 9, 2010

Project Name: Statewide Seamless Base Map (BMAP)

Agency: Department of Emergency Services

Business Unit/Program Area: Division of State Radio

Project Sponsor: Mike Lynk, Director of State Radio

Project Manager: Justin Data, ITD Project Manager

Project Description
To obtain a statewide, seamless, spatially accurate, and complete base map dataset of the State of North Dakota that is to be accessible by all state agencies, local and tribal governments, the commercial sector, and the general public. The State, local and tribal governments, and the private and public sectors would benefit from a seamless base map data set that is spatially accurate and contains the necessary attributes to be used by multiple applications and users that have a need to leverage mapping services.

Business Needs and Problems
In particular, such a dataset is needed for emergency services in order to provide the most accurate and efficient means of map-based emergency management activities across disparate public safety answering points (PSAPs) and other jurisdictional entities. In terms of Emergency Management, this base map will become the foundational element of the Computer Aided Dispatch system. Specific improvements over the current system that will result from implementing the new map include: ▪ Accurately defined emergency response zones statewide ▪ Ability to visualize locations via landmarks on a photographic map ▪ Ability to measure area and distance more accurately ▪ Different jurisdictions will have a single, highly accurate data set for mapping that stems from a single, common datum standard ▪ Decreases in response times for emergency dispatch ▪ Better accuracy in dispatch (currently, at least two or three times per month units are dispatched either to the wrong place, or the wrong response unit is dispatched, all due to mapping inaccuracies) ▪ Elimination of paper maps ▪ Better dissemination of emergency information via reverse-911

Key Metrics		
Project Start Date	Project End Date	Original Baseline Budget
07/01/2010	09/28/2012	$1,959,809

**Note: Budget does not include costs for adding address points to map at this time. This budget will be determined via RFP process, as this will is the one component of the project that will need to be done by a vendor.*

Objectives	
Project Objectives	Measurement Description
Prepare the DOT/Photogrammetry data storage infrastructure to accommodate the	Infrastructure is in a condition that can process the information

volume of information to be processed	
Capture raw, high resolution aerial photography at "sub-foot pixel resolution" for the 53 North Dakota counties	Flight lines for the state have been flown, with the images captured, and subsequently downloaded onto a storage environment at the DOT
Post-processing of the photo data to create a seamless map of the state that includes centerline information for established, maintained roads	Final image produced that is a seamless image of the state containing the designated road information
Transfer of final imagery and associated data products to the ND GIS Hub for distribution to a general audience	Appropriate data is available on the GIS Hub

Cost/Benefit Analysis

The core benefits/driving factors for sponsoring the project.

Anticipated benefits to emergency services and public safety

- Will assist in providing emergency responders the fastest and safest route to an emergency scene
- Will provide more accurate information regarding jurisdictional boundaries, allowing better accuracy in dispatching the proper resources
- One of the technical foundations of a dispatching system is the mapping system. By improving the detail and accuracy of the base map, you are improving the dispatch process.
- Assists in achieving interoperability in that one map will be available for use by many jurisdictions during times of emergency events.
- Supports Auto-Vehicle Location.

Residual benefits from executing the project that entities outside of the sponsors may realize if they choose to leverage the data within their own separate project efforts:

Anticipated benefits to the general public

- The base map is to be available to the general public as well, which will allow those using commercialized mapping products for tourism, outdoor recreation, etc., to have greater detail and accuracy in their maps (when those commercial products are based on the State Base Map information).

A more accurate and detailed base map can assist other government agencies in their activities

- Anticipated benefits to state government
  - Sales tax collection
  - Human and animal disease control and tracking
  - Mapping of sex offender residences
  - Essentially, any agency that would have a need to provide or track data spatially on a map would benefit from access to this mapping data set.
- Anticipated benefits to local government
  - Sales and land valuation tax collection
  - Multi-county emergency response
  - Improved management of land use, facilities, infrastructure
- Additionally, Governments will not need to acquire map data via subscription, so can save those costs if they have mapping subscriptions currently

Project Startup Report

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Anticipated benefits to private industry

- Map-based research for economic development
- Improved locating of oil and gas field access points
- Improved siting for pipeline, electric transmission, wind power, telecom
- Improved dispatch potential of private fleets

Key Constraints or Risks

Project Startup Report

Presented to the IT Committee September 9, 2010

Assumptions:

- Actual flight schedules will be dictated by weather factors
- Additional storage will be required for the GIS Hub to house the final map product
- At some point during the project the DOT airplane's engine will likely need to be rebuilt
- DOT survey work will impact the schedule. The timing and amount of this work is unknown
- Certain areas of the state will be best produced utilizing "leaf-off" imagery, others will not. This determination will be planned into the flight mission plans at the discretion and best judgment of the DOT team

Constraints:

- Because of weather conditions or other factors the schedule and area to be flown will be prioritized by both DES and DOT agencies in the following fashion:
    - The highest priority will be to collect imagery that will enable the DOT to complete the digitizing phase of the project
        - Flight is allowable even if there is tree cover over certain streets, however, enough surface area should be visible in order to digitize the maintained roads
    - Next in priority is to get as much coverage as possible within the "22 Counties" for which State Radio servers as a PSAP
    - The third priority is coverage of large metropolitan areas
- Up to 328 GB of images can be captured during one flight outing
- There are only one plane and camera available for the project
- Scope, schedule, quality and budget constraints may be in conflict; sponsor priorities are:
    1. Budget
    2. Quality
    3. Scope
    4. Schedule

Risks:

Risk ID	Risk Description	Risk Response Plan (Required Actions and Contingency Plan)
1	General personnel absences	In general, vacations will be scheduled around key times to ensure only unexpected absences occur. Unexpected absences will be managed as they occur. Attempts wherever possible may be covered by a secondary resource.
2	Two resources trained on the camera system	There is one backup available for the camera. Only will impact schedule if both resources are unavailable.
3	Weather	Can re-configure the flight plans when possible -- for example, if weather is foul in one area, a different area could be flown. However, there will be situations in which weather contingencies cannot be accommodated, and the only option will be to extend timelines. The original schedule was built on historical data which analyzed the average amount of "photo-appropriate" flight days per month for the past two years. The timelines reflect these limitations.
4	Condition of plane	Plan for replacement parts, engine rebuilds ahead of the flying time where required.
5	State Emergencies: Flooding, Fire, Snow, Pandemic Flu, etc.	This is a workload issue that will be managed if emergency items occur. Some smaller emergencies have little impact on staff availability, whereas others have a great impact and may require schedules to be redrafted to accommodate.

Project Startup Report
Presented to the IT Committee September 9, 2010

6	Equipment delivery delays	Delayed hardware received may result in delays to the project. Orders will be placed as far in advance as is possible.
7	Data storage safety	Provide redundant storage capabilities.
9	Data transfer	If the SSD becomes full, photo capture cannot continue until the data is dumped onto a different device. State Radio will purchase additional storage devices to ensure there is enough storage to perform the flights.
10	Network outage	Outage will impact processing component. Standard mitigation processes are already in place in the state to minimize downtime and downtime potential.
10	Network slowness	Network slowness also impacts the ability for imagery to be processed. This is all in terms of efficiency -- less work can be done in a given time. Mitigation is the same as for outage.
11	Camera problems	Only one camera available. If it breaks it may be sent out of the country for repair depending on the type of problem. This may cause the schedule to be revised. Some problems, however, may be fixed on-site per maintenance agreement.
12	Image quality lacking	Standard quality processes are in place at the DOT to mitigate. If quality is lacking anyway, the area would need to be re-flown. There is risk time in the schedule that could accommodate this. By image quality, the team is referring to the positional accuracy of the image, the resolution, and items related to its applicability to generating a centerline. Items such as color variations are not considered a quality issue.
13	Funding	Funding for the project will be tight. DES will look into securing additional funding through 2011-2012 Legislative session, as well as through outside grant sources.
14	Software compatibility	Sometimes there are compatibility issues between various tools utilized by the DOT. Any purchases of upgrades to software will be analyzed to ensure version compatibility is achieved as much as is possible. However, there are times when compatibility issues occur despite the careful planning.
15	Staffing: Employees quitting after being trained, requires additional time to hire and train new staff	Being that some staff is temporary employees, the risk for this happening is greater. There is nothing that can be done to avoid this except for changing the positions to full-time permanent. If staff quits, an impact will be issued.
16	Staffing: Delays in finding qualified employees to perform photogrammetry-related work	This is going to be something that happens as it will be difficult to find already trained and experienced staff at the pay grade that is being provided for the temporary position. Impacts to schedule will be issued if necessary.
17	GPS Satellite Standard Issues	There are issues that impact the quality of the GPS accuracy, such as solar flares/storms. During these times flights are typically cancelled due to the loss in capture accuracy. Risk time in the schedule is built in to accommodate potential activity. Typically, this may be up to 20 days out of the year.
18	GPS Satellite Extraordinary Issues	This relates to larger potential satellite disasters, such as a satellite failure. Nothing can be done to prepare for an event such as this. May require a re-baseline.
19	Military operations	If there is a military operation in a part of the state it will be restricted as a no-fly area. There is a service that the flight team can contact to determine if an area they are going to fly is restricted and plan accordingly. However, sometimes these operations occur on such short notice that the photo crew will arrive at an area only to be turned away. If this occurs there may be an impact to the schedule.
20	Photogrammetry desktop failure	The SSK desktops are covered by a unique support contract with the company that provides these. Historically the contract support has been quick at getting these fixed. Regardless, there will be some downtime associated with any large-scale desktop failure.
21	Data storage "jukebox" disk failure	The two 50 TB box will have RAID 6 controllers to provide data duplication. If this happens there will be downtime while the storage is brought back online. If a drive has failed and needs to be replaced, the system can still be used utilizing RAID while a replacement is procured. ITD will provide monitoring services to provide alerts, although it is stored at DOT. If there is an issue, DOT will alert DES and DES will perform any maintenance work.

22	Power outages	There are no backup power supplies for the DOT equipment. DES has some extra UPSes that they will install on the data jukebox.
23	Proposal delays	In RFI and RFP process, of key vendors need more time to prepare their proposals than was given, there will be a need to extend the schedule, potentially impacting the project end dates.
24	RFP procurement process -- technology vs. engineering	At this point in the project it is unclear as to whether the procurement process for adding address points is a software and/or data collection/consolidation project, or an engineering project. Continued research and discussion will be held with State Procurement to determine the best path moving forward. The project will currently be planned as a standard technology procurement. If this method changes, the schedule will be rebaselined with the new method.
25	DOT Management Change	DeLane Meier (DOT photogrammetry manager) plans to retire early on in the project lifecycle. This means there is a potential reorganization and management change to come. Any changes may impact the schedule.
26	No viable RFP proposals received	Reissue the RFP. Impact to schedule.
27	RFP proposals exceeds current $2.1M allocation	If negotiations can't bring price in line, sponsorship will look for other funding sources such as grants, additional funding requests, to make up shortfalls.
28	Piecemeal fashion of flying blocks	Although everything is aligned via GPS, there is the chance that some blocks may not align properly. Some options to resolve may involve a reflight, which would necessitate an impact to the schedule. In general there is some risk time added to the schedule to accommodate this potential.
29	Address point technical risk	These types of risks will be evaluated during the RFI and RFP work for these services.
30	GIS Hub Storage budgetary constraints	With the target of having the production data being stored on the GIS Hub, there is potential for the Hub to not have either capacity or the budget to purchase the required capacity to store the map. The Sponsors, GIS Manager, and ITD Directors may need to work on a future strategy. Lack of funding or storage will prohibit the data from being put into production on the state Hub. Additionally, by the time these are ready to be placed on the Hub, the landscape of GIS storage technology may be very different than it is today.