

Analyze Business Models for Implementation and Operation of a Statewide GNSS RTN

Final Project Presentation

November 7, 2022

Research Motivation

- Pilot “limited area” networks (or subnetworks) had been implemented in different parts of the state over the previous decade.
- Strong interest in realizing the many benefits a statewide network would bring to the state and its constituents.
- Lack of National guidelines or “best practice” documents on building and operating statewide GNSS-RTN systems.
- Lack of uniformity in the way current systems are established and operated.

Project Objective

Identify and evaluate various business models to help the state's efforts in the planning, implementation, and operation of the statewide GNSS-RTN system.

Project Tasks

1. Project Management
2. Literature Review,
3. State-of-the-Practice Assessment,
4. Characterize Montana Existing GNSS-RTN Infrastructure
5. Identify and Catalog Viable Business Models for Statewide GNSS-RTN
6. Business Model Evaluation for Future Montana GNSS Alternative Systems
7. Performance Measures Report
8. Final Report
9. Implementation Plan

Major Task Findings

2. Literature Review

- Recent advancements in GNSS-RTN technology and an overview of conventional and emerging applications were briefly discussed to provide familiarity with the system and its potential uses.
- GNSS-RTN business plans were summarized, and best practices and guidelines were presented.
- System design considerations were reviewed by examining characteristics of existing systems and reviewing available guidance.

3. State-of-the-Practice Assessment

- Task objective is to screen the current practice in the US for building and operating GNSS-RTN systems.
- Task involved:
 - I. Practice survey to learn about the current practices in building and operating GNSS-RTN systems. Thirty-eight respondents submitted the survey representing 30 states.
 - II. Interviews via video conferencing were conducted with major vendors/manufacturers of the GNSS-RTN products and services to learn about costs, recent trends in technology, and system operations.

3. State-of-the-Practice Assessment

Major Findings:

- Most systems surveyed are owned by state agencies (primarily DOTs). Around 90% of the systems provide 1- to 2-inch accuracy in geospatial data.
- Around two thirds of CPC owners are responsible for user and IT support service costs, the cost of communication between the CPC and CORSs and for the cost of CPC maintenance.
- Approximately 60 % of GNSS-RTN systems offer entirely free access to both public and private users.
- Most states relied on state funds or a combination of state and federal funds in establishing their respective statewide systems.

4. Characterize Montana Existing GNSS-RTN Infrastructure

- Task involved an assessment of all existing GNSS-RTN infrastructure in Montana.
- The task identified aspects such as CORS ownership, sampling rate, location coordinates, mounting type, and the networks each station contributes to.
 - A total of 62 CORSs in Montana owned by both public and private entities, of which 57 are publicly owned.
 - The Montana State Real Time Network (MTSRN) is the largest public network in Montana; then consisting of 54 CORSs.
 - Most of the CORSs in Montana provide a sampling rate of 15 seconds or less.
 - The communication between CORSs and the CPC were almost equally split between the internet and the cellular service.

5. Catalog Viable GNSS-RTN Business Models

- Task cataloged eight distinct business models identified in previous project tasks.
 - Models were adequately described with a summary of the merits and demerits of each model.
- Task laid out the conceptual elements of any GNSS-RTN business model.
- Used the conceptual elements in laying out all possible business models using four variables: the CPC ownership/operation, CORSs ownership, CORSs operating and maintenance costs, and user access charges.
- High-level assessment of possible business models was performed using three criteria: agency control over system, sustainability, and state financial obligations.

8. Final Report

- Documentation of all project tasks
- Major task findings and recommendations
- Draft submitted to Tech Panel, revised to address panel comments, and resubmitted for panel approval.
- Final meeting (today)

8. Implementation Plan

- Overall implementation recommendations and guidelines stemming from all prior tasks
- Important for successful implementation of research results
- Implementation meeting (Today)
- Implementation report

Questions?