Construction of An Integrated Intelligent Supervision Platform for Mongolian Mining Based on BeiDou Short Messages

CHINA NORTH INDUSTRIES GROUP CORPORATION LIMITED (NORINCO GROUP)

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Beidou Short Message

Short Message Communication is one of the characteristic services of BDS

Communication capability

- **Terminal transmit power:** ≤3W
- **System capacity:**
  - Uplink 12 million times/hr
  - Downlink 6 million times/hr

Coverage area

In order to facilitate the promotion of applications and provide users with better services, a BDS Regional Short Message Communication Service Platform (BDS RSMC Service Platform) that provides open services has been built.
BDS RSMC Service Platform

- National infrastructure
- Standardized services
- Global open

Hardware and software facilities of the platform
BDS RSMC Service Platform

Integration and empowerment

**BDS RSMC + GSM**

- Realize the information intercommunication among BDS regional short messages, mobile-phone messages and the internet
- Reduce blind zone and provide backup communication methods for mobile IoT, and the user's SIM card can support BeiDou short message and mobile IoT simultaneously

**Open capability**

- Provide customers with a unified R&D and testing platform, provide cloud storage, big data analysis and other cloud service resources, lower the barriers to industry use, and promote the rapid implementation of BDS RSMC applications
Efficiently reduce blind zone
In the blind zone of mobile communication, the BDS RSMC can be used as an effective supplementary mean of mobile communication.

Redundant backup
In the case of sudden geological hazards and breakdown of conventional communication methods, the BDS RSMC can still provide basic communication and emergency backup capabilities for terrestrial mobile communications.

Wide-area IOT
The BDS RSMC relies on the advantages of low cost and wide coverage, combined with the IoT to meet the requirements of information monitoring and data collection.
BDS RSMC applications

Application area

- Logistics and transportation
- Geological monitoring
- Depopulated zone communication
- Meteorology and hydrology
- Emergency relief
- Marine fishery
- Oil and gas transmission
- Special populations
- Marine fishery
BDS RSMC applications

The project of coastal ship management in Hainan Province, China

- Public network cannot be covered, and real-time supervision of ships is difficult to carry out
- Use the BDS RSMC to realize automatic supervision and statistics of ship in and out of the port, traffic, voyage and operation
- Installed and deployed on more than 3,000 ships at present, and more than 30,000 ships in the future
BDS RSMC applications

Cases in disaster mitigation and relief

Wenchuan Earthquake in 2008
- The communication channel was completely cut off in the disaster area
- With nearly a thousand RSMC terminals, the rescue force quickly set up a communication channel between the front-line troops and the headquarters for earthquake relief

Nepal Earthquake in 2015
- Poor communications between various countries' rescue teams became one of the obstacles to rescue.
- The Chinese rescue team carried the BDS RSMC terminal could send rescue location and information, and the BDS RSMC play a significant role in the relief work in Nepal.
The mobile phone with short message will be available at the end of 2021.
International promotion policies, user instruction manuals, user application procedures, etc. are in the process of upgrading and launch. For details, please pay attention to the official website of BeiDou: http://www.beidou.gov.cn/
02 Project Introduction
In 2019, NORINCO signed the “CM-ECMIP”:

- The Tavan Tolgoi Mine (TT Mine) is about **200 kms** away from China-Mongolia border.
- The world’s **largest** open-pit coking coal mine (Not fully developed).
- **High-quality** hard coking coal, which is an important resource in short supply.

In 2019, NORINCO signed the “CM-ECMIP”:

provide mine services for TT Mine, including coal mining, road transportation within Mongolia, customs clearance at bilateral ports, warehousing logistics, coking coal export sales, etc.
2. Requirements

- **Inadequate monitoring information:**
  The information regarding to mining, infrastructure construction, cross-border transportation and personnel safety.

- **Location information could not be uploaded in time:**
  The coal transportation road from TT mine to Mandula Port in China is 460-500 kms long. There is **no public network** in most areas along the line.

- **Backward work appraisal methods:**
  The work appraisal methods for **vehicles** and **employees** in mining and transportation are backward.
Integrated Intelligent Supervision Platform

Based on BeiDou high-precision positioning and BeiDou short message, this platform aims to realize the full-process supervision of mining-storage-transport-sales for TT mine.
Project Introduction

3. Main items

(1) Monitoring system of open-pit mining status based on remote sensing

(2) 3D visualization system of mining areas based on GIS and UAV

(3) Supervision and dispatching system of transportation vehicles based on BeiDou short message
(1) Monitoring system of open-pit mining status based on remote sensing

- Analyze the mine activity
- Monitor the mine variation trend
- Monitor and predict the traffic around the mine
Project Proposal

(2) 3D visualization system of mining areas based on GIS and UAV

- UAV platform subsystem
- Map data collection subsystem
- 3D map reconstruction subsystem

GIS

VAV

Spatial positioning

Open-pit 3D model
(3) Supervision and dispatching system of transportation vehicles based on BeiDou short message
03 Project Highlights
Project Highlights

**BeiDou Short Message - Special feature of BDS**
The unique advantages of BDS over other satellite navigation systems

**Solve difficulties and serve projects with GNSS**
Benefit from the BeiDou short message, solve difficulties of cross-border transportation without public network, and enhance the safety of transportation vehicles and personnel

**GNSS application demonstration – come from China, but for the world**
Based on the BeiDou short message, combined with a variety of technical means, it provides a reference and demonstration for the comprehensive application of GNSS in the industry, especially in the field of mining.
THANKS