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

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Contents

01 BeiDou Short Message and Service Platform

02 Project Introduction

03 Project Highlights

01 BeiDou Short Message and Service Platform

BeiDou Short Message

Short Message Communication is one of the characteristic services of BDS

14000 bits

Amount to

1000 Chinese characters

60*60 Color graph

2 secs Voice message

Terminal transmit power: ≤3W

System capacity:

uplink 12 million times/hr

downlink 6 million times/hr

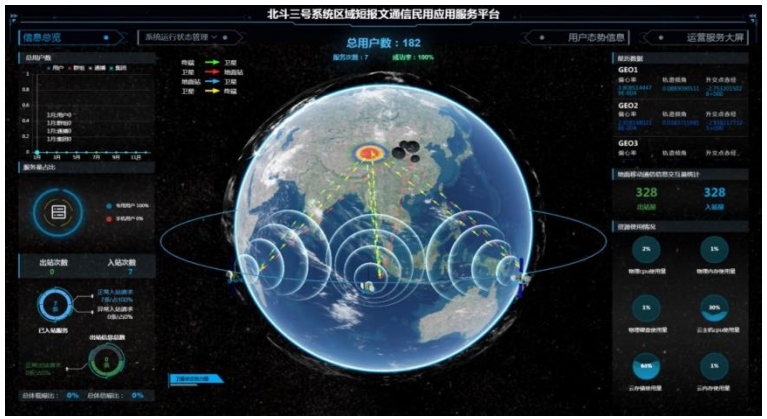
Communication capability

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

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

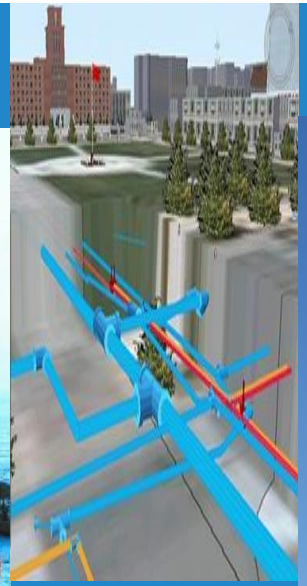
Geological monitoring

Depopulated zone communication

Meteorology and hydrology

Emergency relief

Marine fishery



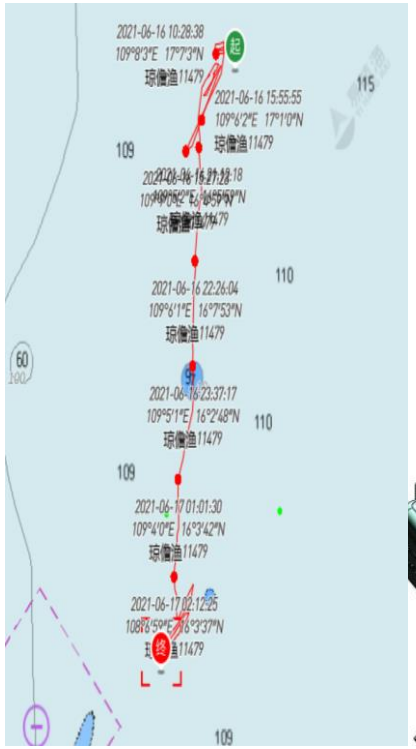
Oil and gas transmission

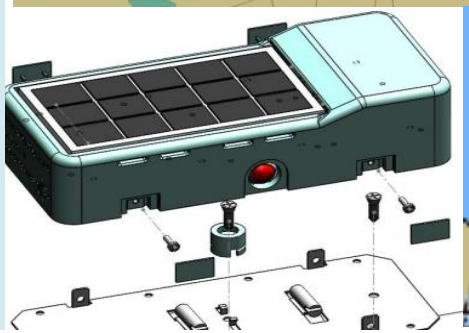
Special populations

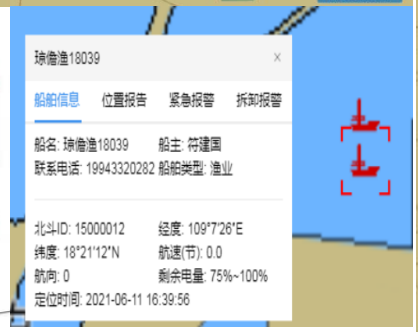
BDS RSMC applications

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.

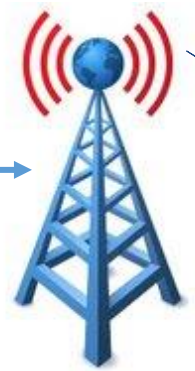
BDS RSMC applications

BDS RSMC integrated into mobile phone

BDS Short message Phone

BDS RSMC Service Platform

China Mobile Short Message Center



Mobile cellular network

General phone

Users call for help in distress

Distress message received

The mobile phone with short message will be available at the end of 2021

BDS RSMC Service Request

BDS RSMC Service Request

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

Project Introduction

1. Background

- 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.

Project Introduction

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.

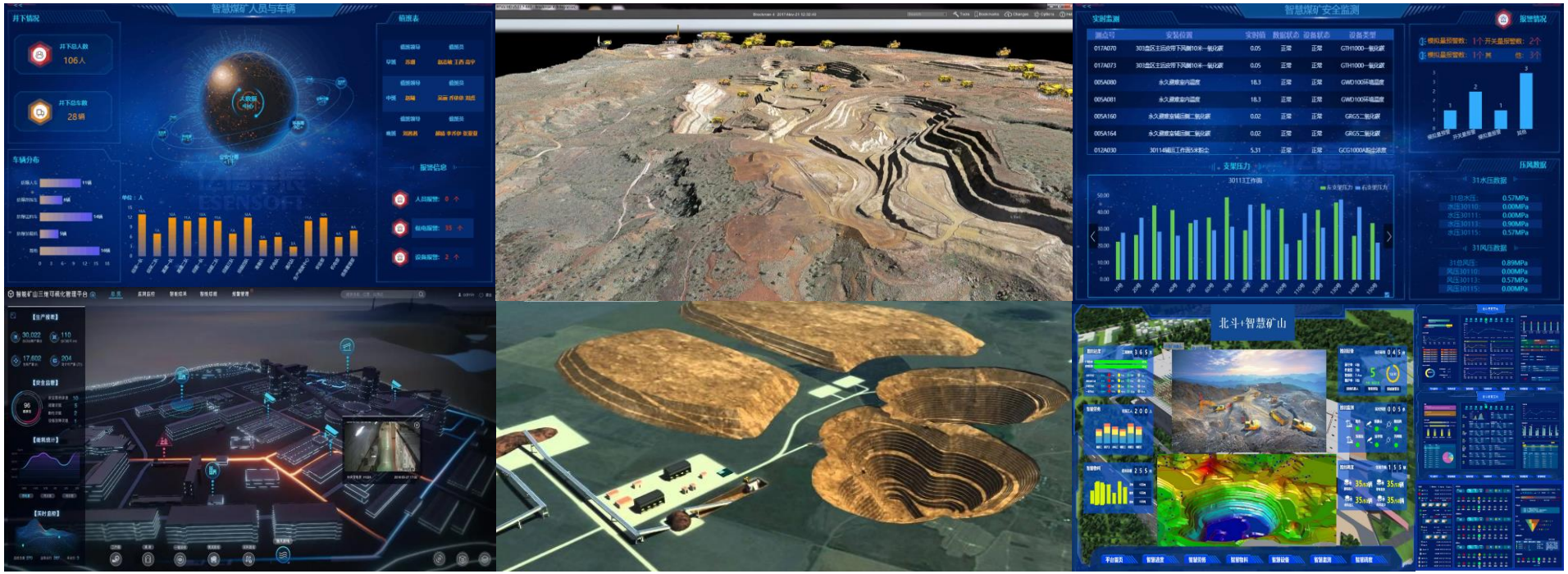
- **Backward work appraisal methods:**

  The work appraisal methods for **vehicles** and **employees** in mining and transportation are backward.

Project Introduction

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

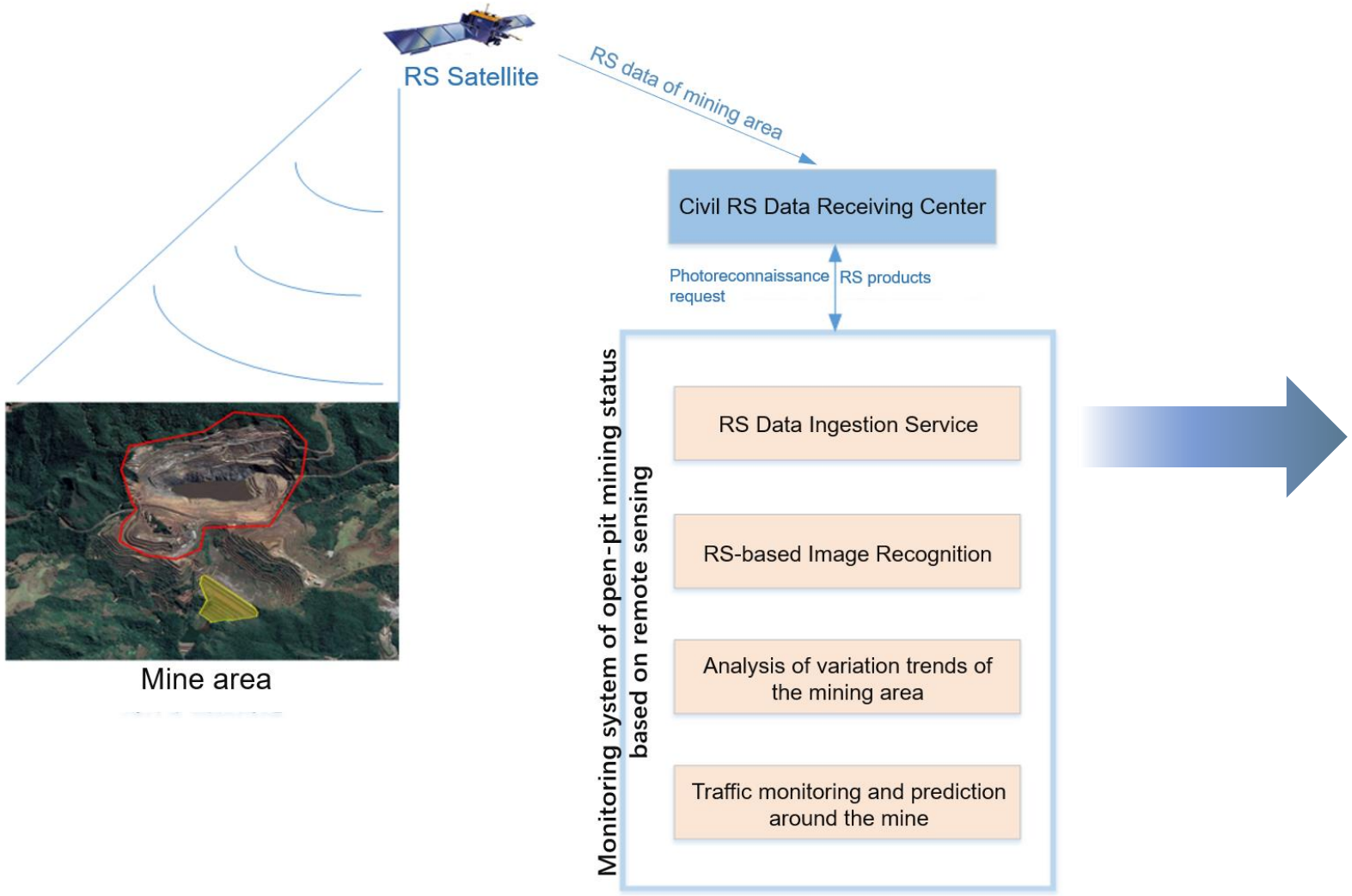
(1) Monitoring system of open-pit mining status based on remote sensing

(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

Project Proposal

(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

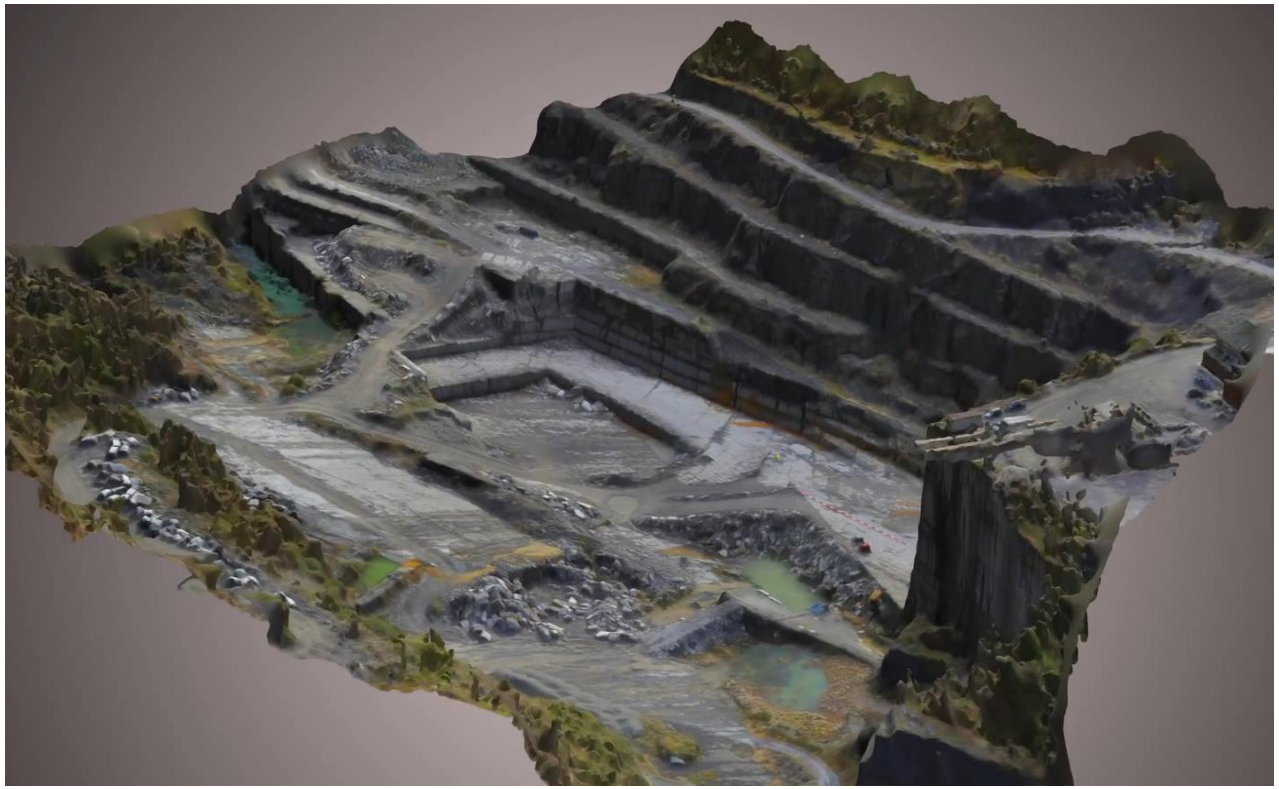
Project Proposal

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

GIS

VAV

Spatial positioning

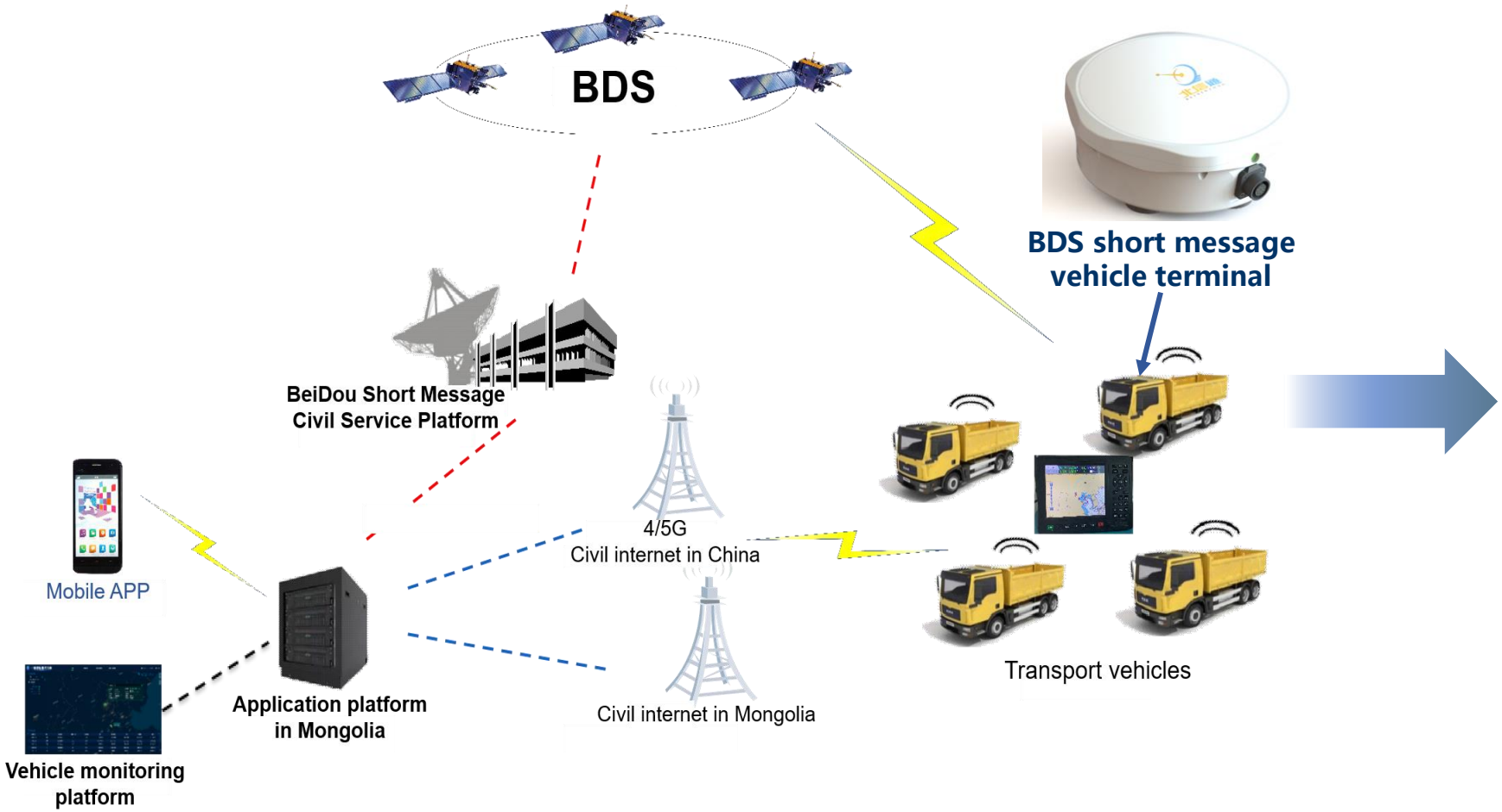


Open-pit 3D model

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

Project Proposal

(3) Supervision and dispatching system of transportation vehicles based on BeiDou short message



- real-time monitoring and positioning
- route planning
- maintenance
- driving record
- usage report statistics
- Electronic fence
- ……

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