



Implementation Scheme of whole life cycle intelligent pipeline based on the Internet of Things and Big Data

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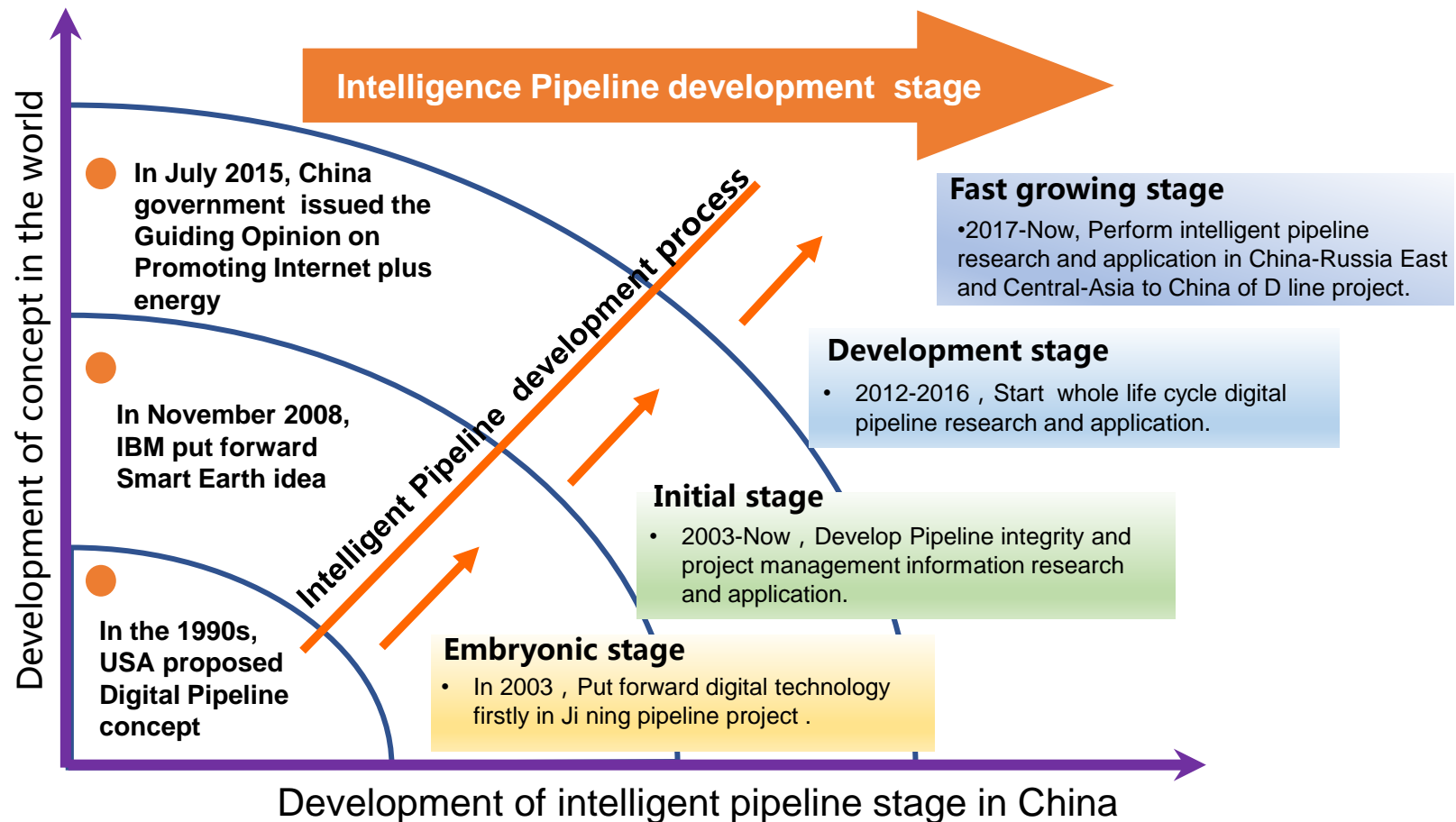
Inevitable Trend in the Future

Basically realized digital & information but still have issues

- Low efficient management
- High labor cost
- Technical decision-making risks

Intelligent Pipeline is an inevitable trend in the future

- Rapid development of “Internet+” energy revolution
- Booming of pipeline industries
- Increasing of mileage of Oil & Gas pipeline



Key technologies of Intelligent Pipeline

Internet of Things

Provide an accurate technical methods for whole life cycle pipeline perception

Cloud computing

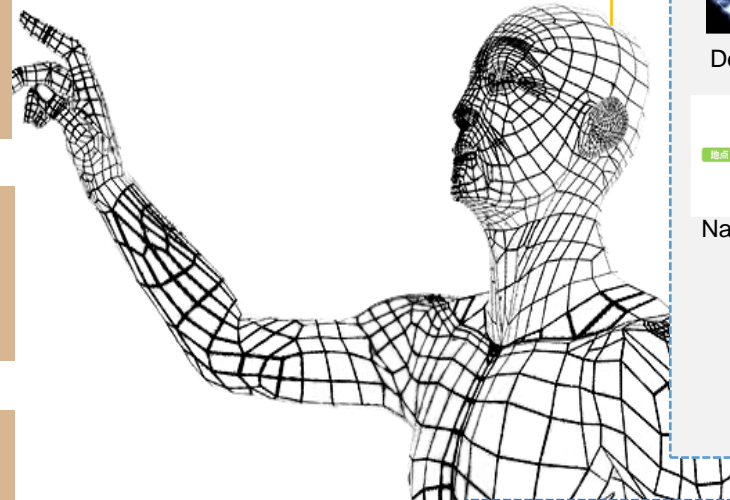
Provide reliable technical support for model calculation and data storage

Big data

Provide a scientific and reasonable technical platform for pipeline production and asset management

Artificial Intelligence

Provide innovative technical support for intelligent control and decision-making



AI and Big data application



Deep-learning



Machine vision



Natural language processing



Optimization techniques



Virtual reality

Station data collection



RFID TT PT

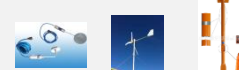


Camera Compressor Pump

Pipeline data collection



Fiber Inspection terminal UAV



Stress sensor Wind sensor CP

Market data collection



Public opinion data Policy data



Risk warning data User data

Key technologies of Intelligent Pipeline

Line D Project Overview

Line D Project information

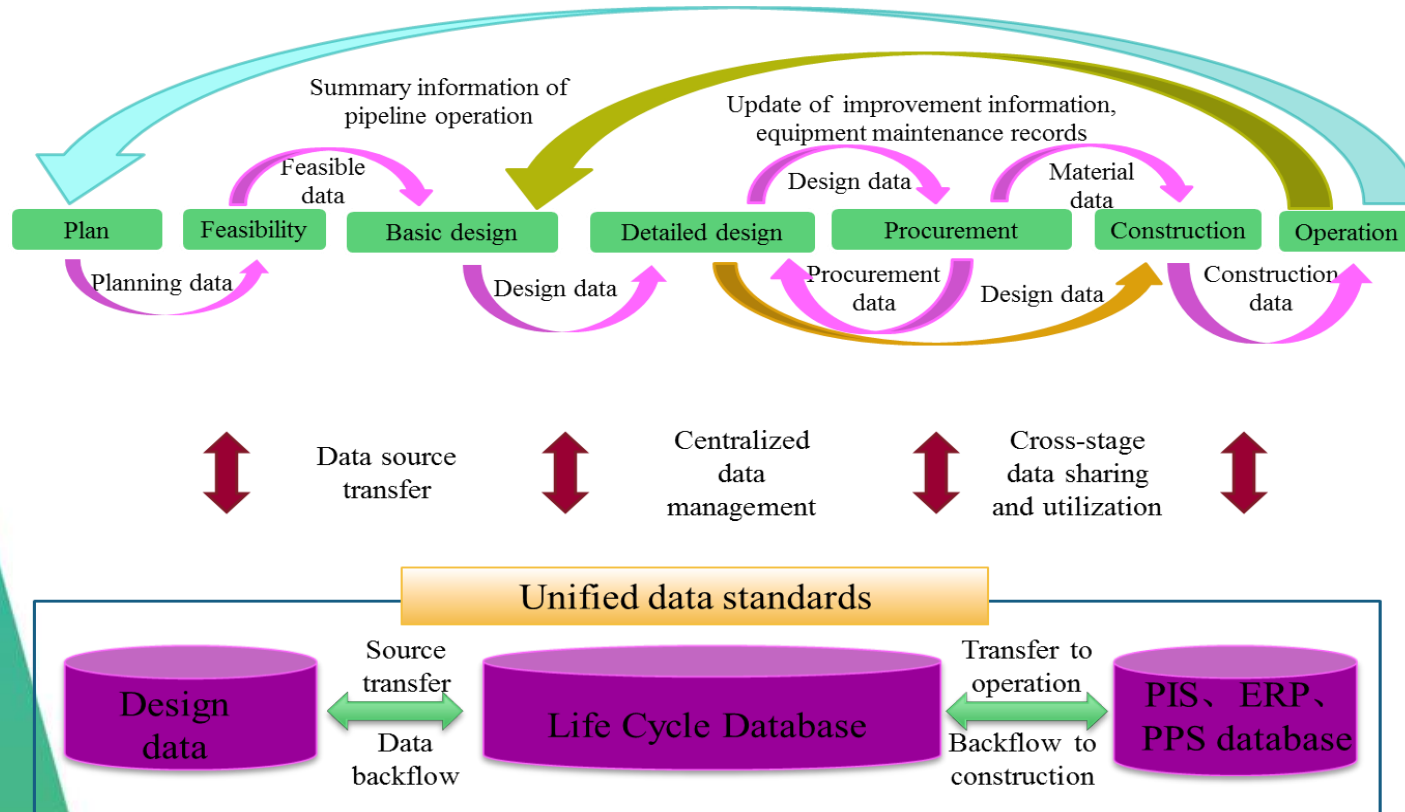
- Through 4 countries (Uzbek, Tajik, Kyrgyz, China)
- Length :1000Km
- Design pressure:12Mpa
- Diameter:1219mm
- Design capacity:30 billion Nm³/a
- 9 stations
- 48 Block valve stations
- Operation time: June,2022(Phase I)



Route of Central Asian-China Gas Pipeline of Line D Project

Implementation Scheme of Intelligent Pipeline of Line D

1. Establish a uniform data standards and model



Unified data standards and model implementation ideas

- **International data standard & model**
 - PODS (Pipeline Open Data Standard)
 - APDM (ArcGIS Pipeline Data Model)
- **China data model**
 - CPDM (China Pipeline Data Model)
 - PIDM (Pipeline Integrity Data Model)
 - 60,000km
 - 7TB
- **Line D standard & model**
 - PODS and PIDM

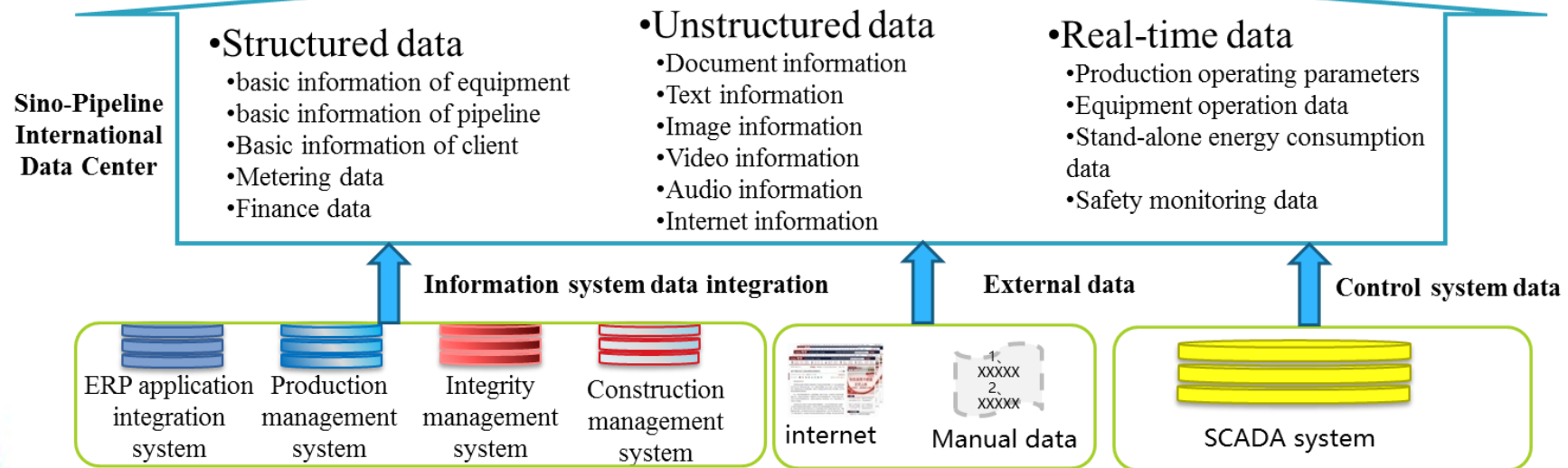
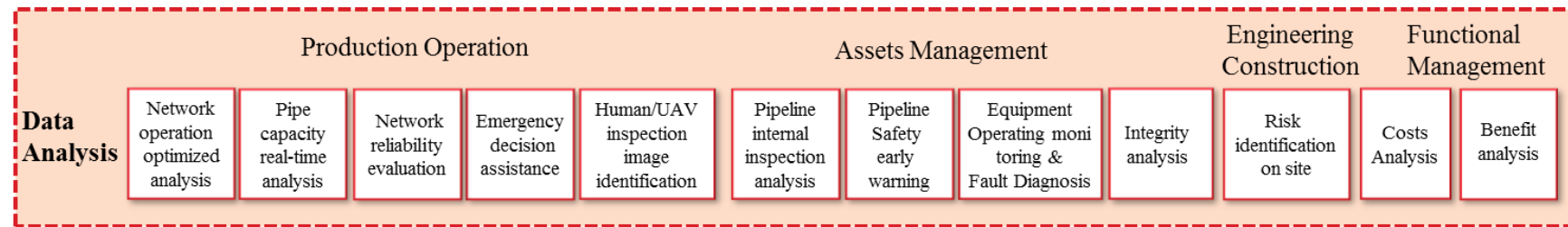
Implementation Scheme of Intelligent Pipeline of Line D



2. Build a unified data platform

Aims:

- Break information barriers
- Eliminate Information Islands
- Realize information systems integration

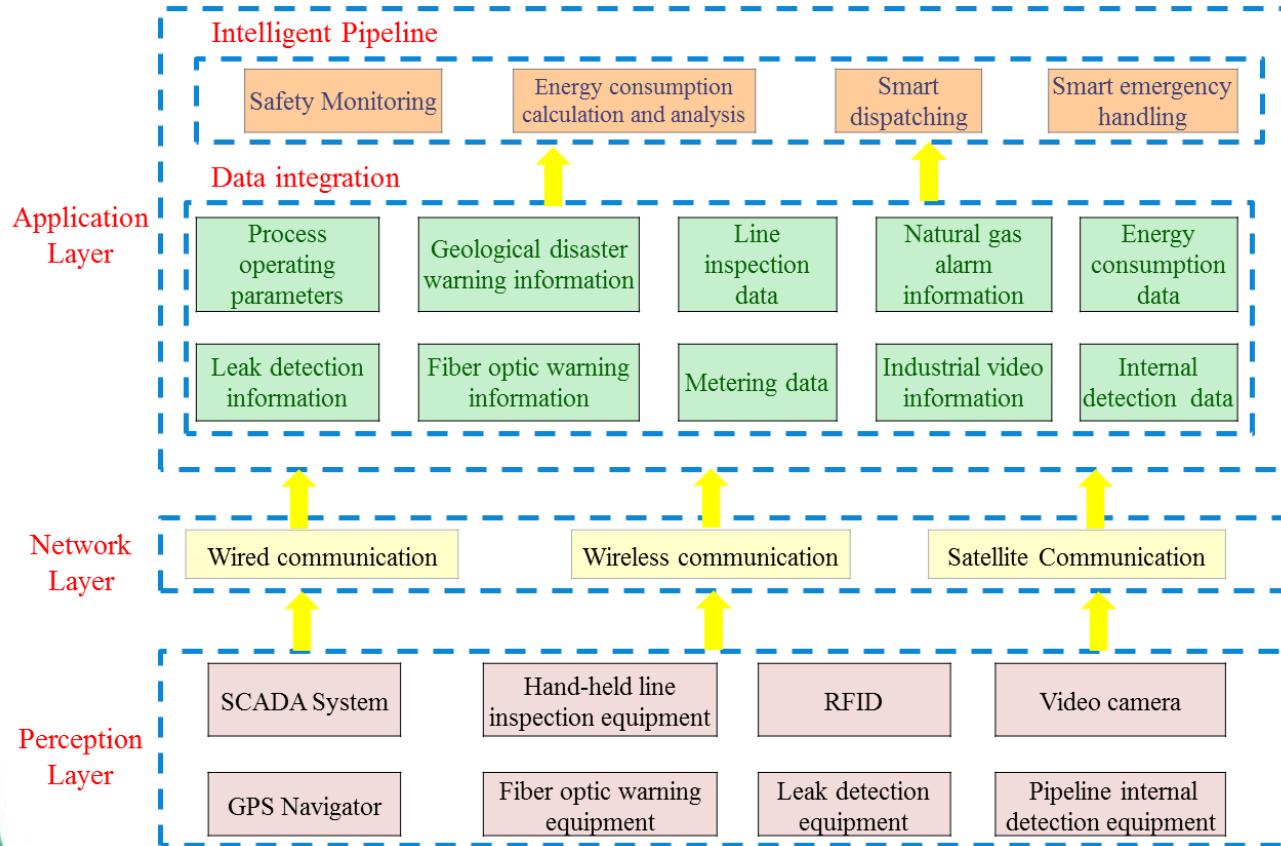


Unified data platform implementation ideas

Implementation Scheme of Intelligent Pipeline of Line D

3. Enlarge application of Internet of Things and mobile intelligent terminals

Three layers : Perception Layer, Network Layer, and Application layer



Internet of Things implementation ideas

Benefits:

- Obtain and report information anytime, anywhere
- Improve work efficiency
- Provide decision support for top leader



Mobile Intelligent terminal implementation ideas

Implementation Scheme of Intelligent Pipeline of Line D

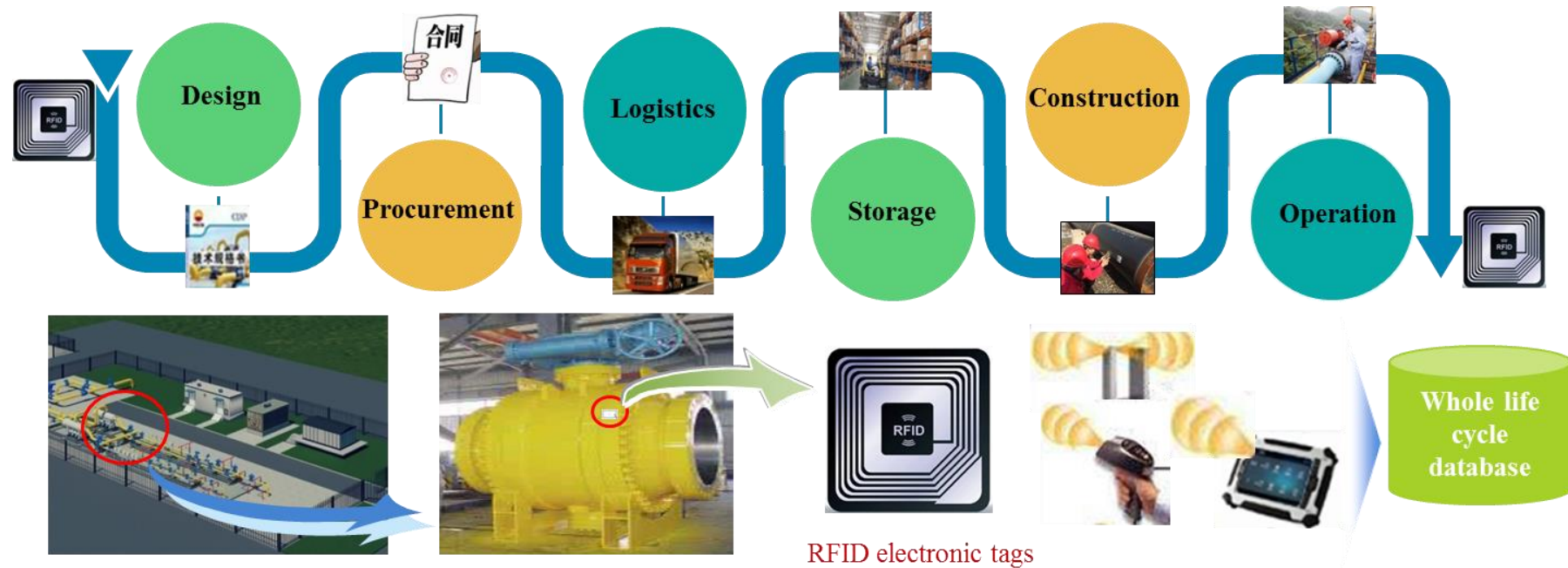
4. Deploy an intelligent material supply chain system

Benefits:

- Procurement management digitally
- Materials allocation automatically
- Maintenance management smartly

Technologies:

- RFID electronic tags
- GPS
- Internet of things



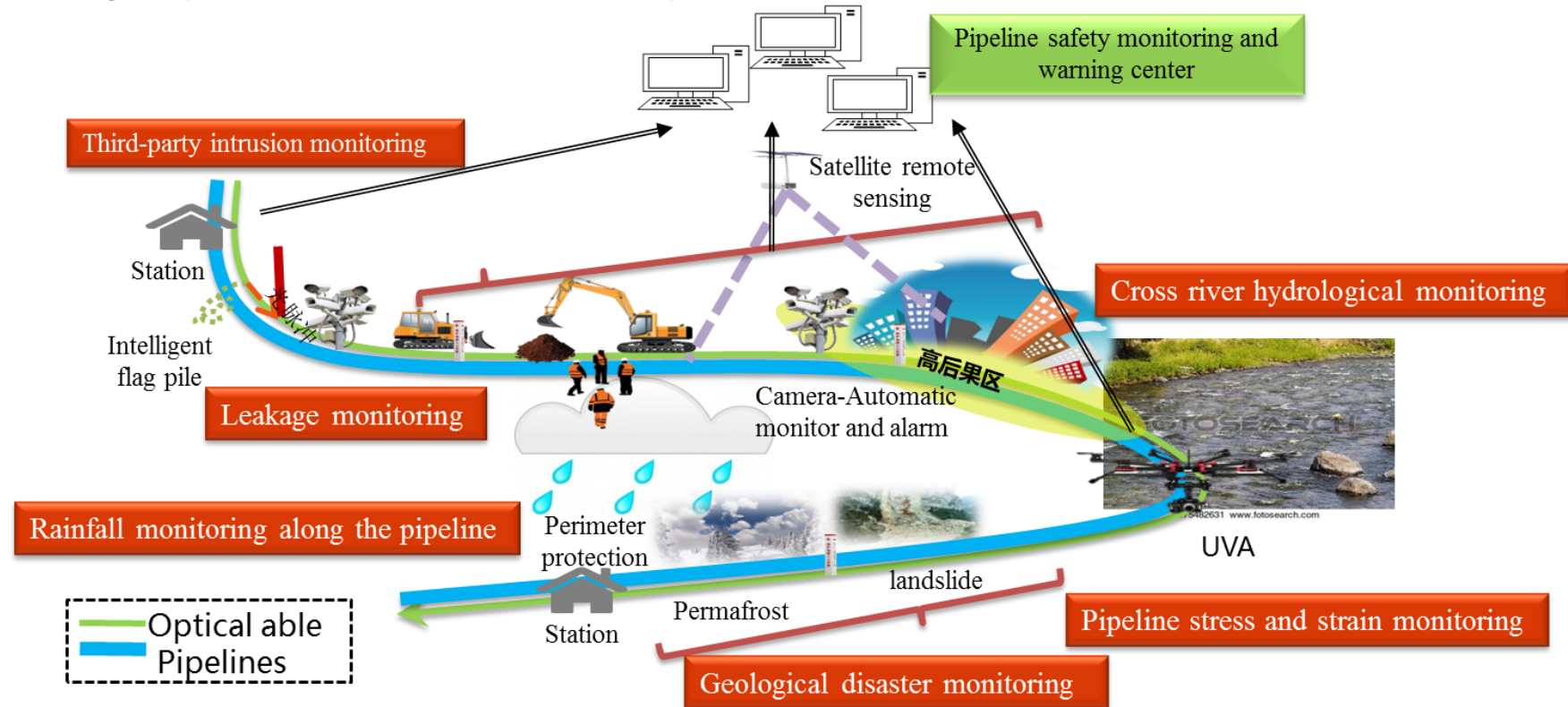
Intelligent material supply chain system implementation ideas

Implementation Scheme of Intelligent Pipeline of Line D

5. Ensure the pipeline predictive and controllable

Benefits:

- Identify the risks and push early warning information intelligently and in real time.
- Generate emergency response plan automatically



Pipeline prediction and early warning implementation ideas

Conclusion

1. Strengthen the top layer design of Intelligent Pipeline

- Learn advanced experience from high level company
- Pay more attention to our own characteristics

2. Focus on the data interconnection issues of Intelligent Pipeline

- Write Data share solution in the government agreement
- Build effective Information communication mechanism

3. Continue to study the technologies of Intelligent Pipeline

- Information exchange technology
- Coordinated dispatch control technology
- Network integration platform technology
- Data deep-mining technology
- Internet of Things application technology

Thanks for your listening!

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