

FRAMEWORK DESIGN OF INFORMATION MANAGEMENT AND SUPERVISION PLATFORM ON SOIL AND WATER CONSERVATION

Tao Sun (1), Hui Li (1), Yu Zhao (2), Chang jun Liu(1), Zhe Dong(1), Xia Zhang(1)

¹ China inst. Of water resources and hydropower research, A-1 Fuxing Road, Haidian District, Beijing, 10038, China

² Beijing Soil and Water Conservation Center, A-3 Cuiwei Road, Haidian District, Beijing, 10036, China

Email: sunt@iwhr.com; Lihui@iwhr.com; 371661207@qq.com

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ABSTRACT: With the acceleration of China's modernization, soil erosion caused by illegal activities in production and construction projects is becoming serious. Timely and effective monitoring and supervision is necessary. This paper fully combines remote sensing dynamic monitoring, enforcement inspection and geographic information system technology to put forward a framework designed on soil and water conservation monitoring and inspection platform. Based on the long-term planning and arrangement of the information work of soil and water conservation, the author gives the prototype designed of the provincial and municipal management platform on water and soil conservation information monitoring as well as supervision. Overall design consists of three aspects: construction principles and design objectives; designing and supporting environment. Designed contents mainly include overall deployment, network structure design and platform framework. Construction of the platform will achieve the goal of “space and aerial identification, in situ supervision and network management” that will play an important role on the information management as well as the supervision on possible destruction activities by human beings, especially those construction projects of water and soil construction.

1 INTRODUCTION

With the issue of National Soil and Water Conservation Plan (2015-2030) recently, China put more emphasis on the supervision of soil and water loss caused by human being. The requirement of informationalized supervision on potential illegal activities as well as soil and water loss conservation measures of production and construction projects (PCP) are increasing day by day. Information-based supervision is a key way to control the process and assure the proper operation of conservation measures which affect the soil and water loss of production and construction projects.

With the acceleration of urban construction in China, lots of PCP with a variety of types are boosting in provincial as well as prefectural cities characterized with widely distribution, complex type, different construction period and multiple soil and water loss conservation measures. Traditional methods of supervision can hardly meet the demand of finding and tracing the change of disturbed land, the measures implemented in quantity and types periodically. Remote sensing (RS) has the advantages of larger covering area, higher data precision, better time resolution and

impersonal observation results which can be a good tool to monitor and supervise the land disturbance efficiently.

2 PRINCIPLE AND OBJECTIVES

2.1 Principle

2.1.1 Pertinence

Only the concrete demand of water and soil conservation be understood clearly, can the supervision and management work be smoothly carried out. In view of the complexity, a variety of types, large amount of information, etc., of soil and water conservation work, it is necessary to focus on the key issues which affecting the efficiency. Targeted application system should be developed to ensure its practicability and integrity.

2.1.2 Practicability

Focus on the clients and response to the need are the principle of the platform. Considering the real situation and operation flow, the platform should fully connect the process of design, construction and operation and maintenance so as to be user friendly, function diversify and convenient as much as possible.

2.1.3 Flexibility

Based on the universal requirement and current demand, considering the future expansion of supervision business, the platform designed with block module which have flexibility through different interfaces according to actual requirement.

2.1.4 Safety

Safety is the core of the operational system. During the construction of the platform, data, system and safety of the network are given much attention. Operating safely with high efficiency depending on emergency backup, system encryption as well as monitoring of the network.

2.2 Objective

By means of remote sensing, GIS, GPS, with the pattern of network, platform used by staff of soil and water conservation from provincial, prefectural and county level is developed for comprehensive supervision, mobile inspection, in-situ checking, daily office automation system, information distribution and so on. Which can satisfy the need of “sky observation, ground survey and network management”. Overall object of the platform includes RS monitoring system, mobile inspection system, service management system and office automation system of soil and water conservation.

3 OVERALL DESIGN

3.1 Deployment

RS monitoring system, mobile inspection system, service management system, web portal

propagation and office automation system of soil and water conservation are connected together by the platform which is constructed by the pattern of “observe from sky, ground survey and manage from internet”, satisfying the need of comprehensive and informationalized supervision.

Management center is set up by high definition screens, data and network devices on the platform, which implement the interconnection of business flow and data flow from provincial and prefectural unit of soil and water conservation.

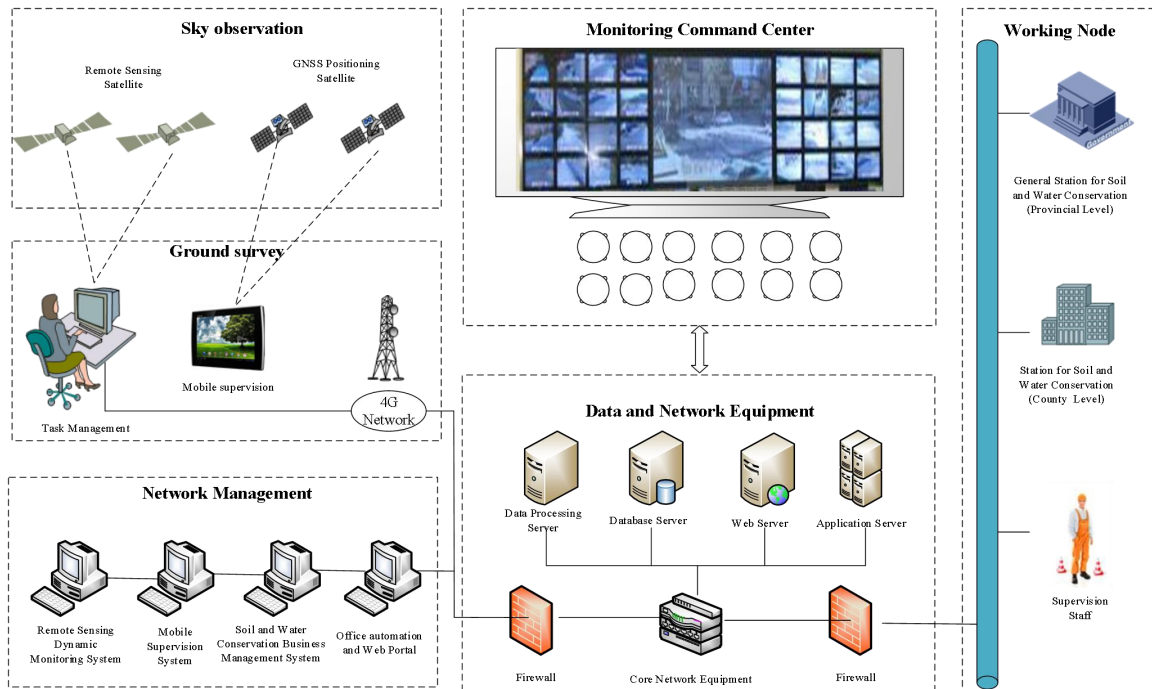


Fig.1 Overall deployment of the platform

3.2 Network Structure

Three-layer topology structure covering provincial general station, county-level conservation station and mobile terminals, web portal is set up. The former two units are connected from private internet of ministry of water resources. Remote sensing monitoring system, mobile inspection system, service management system, web portal propagation and office automation system of soil and water conservation are connected together through the network.

Municipal (county level or prefectural) station, mobile inspection staff, construction and production units and the public are connected by internet which may meet the interaction among the mobile inspection terminal, web portal and the outside information.

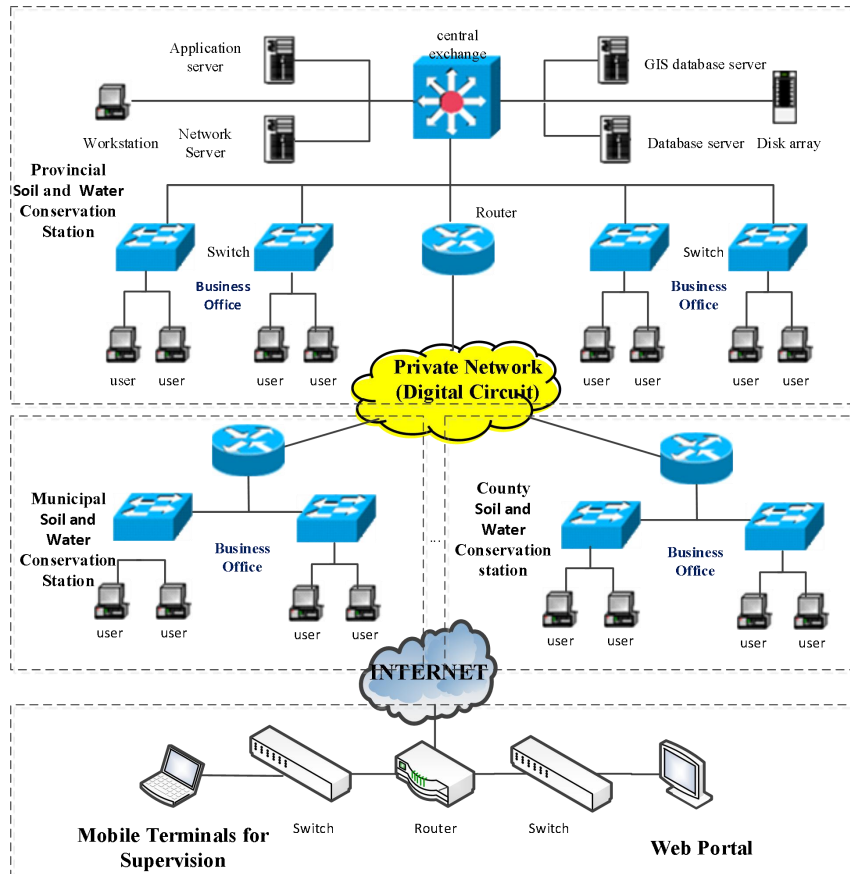


Fig. 2 Diagram of network structure

3.3 Diagram of Platform

The construction of the platform includes the layer of support, data layer, business layer and application layer. Supporting layer carries hardware and software, network, safe suits. Data layer meets the demand of storage, index, management and maintenance of basic data, huge amount of RS data, business data of soil and water conservation, etc.

Business layer combines the module of system function and supervision and management function. By developing the business systems of RS monitoring, the mobile supervision system, management system, automatic office system and the web portal, the comprehensive supervision platform with BS framework is setup which satisfy the need of information sharing, inquiring and decision making among different level of supervision staff.

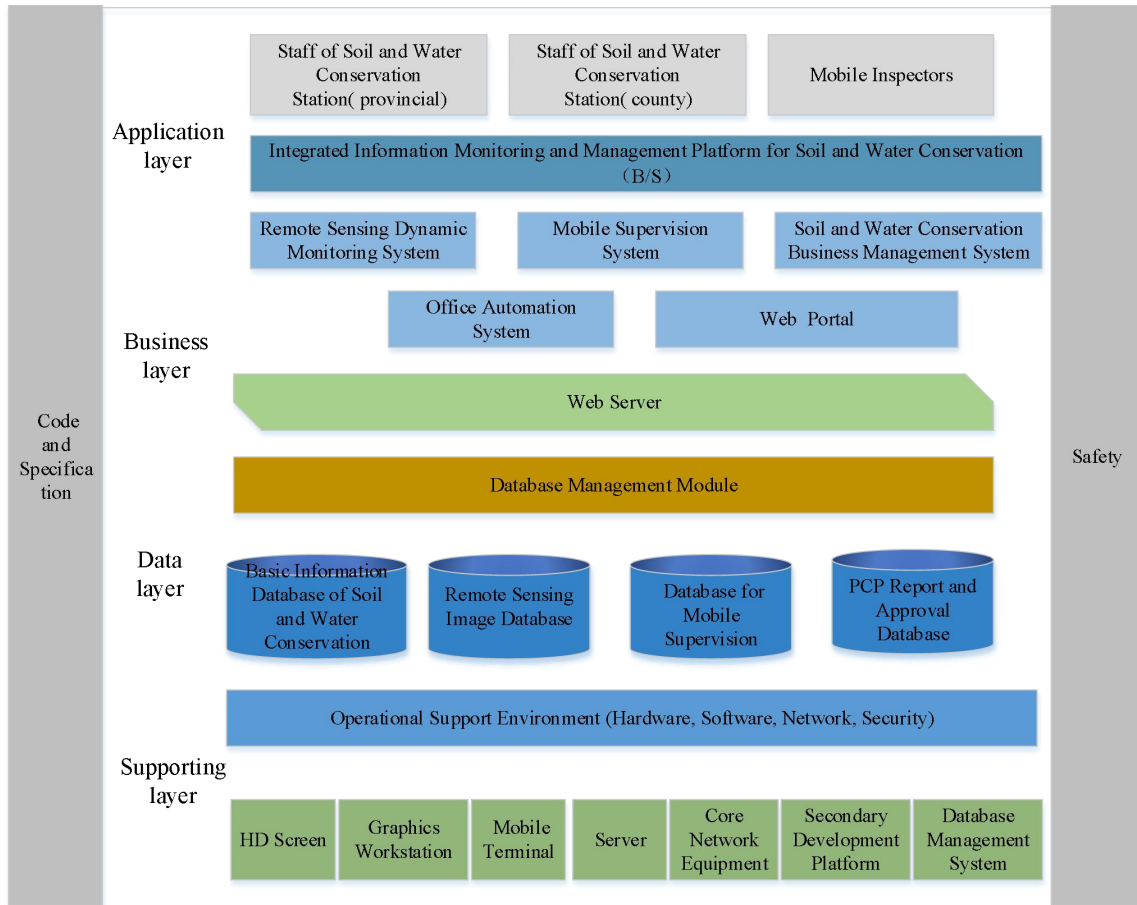


Fig.3 Diagram of platform frame

4 SUPPORTING ENVIRONMENT

Main supporting environment consists of the secondary development platform, database management system, core network devices, server, terminal devices used for mobile supervision, graphic workstation, large-scale screens. ARCGIS is suggested as secondary developing platform for GIS, Oracle as database management system so as to meet the demand for efficiency, stability, portability and handing capacity of huge amount of data. Hardware and network environments involve application system server, database server, WEB server, disk array, equipment cabinet, HD screen, graphics workstation interchanger, PAD and other peripheral equipment.

5 CONCLUSION

This paper based on the demand of informationalization of soil and water conservation, related plan concerning the monitoring information management and the platform construction are introduced which could give a clue to the design and construction of soil and water conservation information management and supervision system for governments for provincial, prefectural or county level.

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