



**Air Force “910” Underground Command Post
Communication System Engineering
Construction Plan Report
and Construction Duty Assignment**

**Office of Engineering
Air Command Department of
Communication**

March 13th, 2006



1. Abstract

(1) A brief introduction to the Office of Engineering.

Since the formation of the Office of Engineering in March 2005,

Lv Zenlong has been in charge and has categorized the “910” Communication Project into seven design specialties including transmission, switching, cabling, radio equipment, antenna, crafts, and power supplies. **Lv Zenlong** was leading the switching design. **Xu Li** and **Han Guangzhu** were in charge of transmission and cabling design. **Kou Xiaodong** was responsible for installing radio equipment. **Zhu Hailiang** was in charge of antennas and crafts. **Zhang Chunhui** was in charge of the power supplies design.



1. Abstract

Project bases——

Following order [2004] No.673 by Department of Communications of the General Staff Department (GSD), “Communication and Command Control System in Multi-Command Post Construction Project”, Air Force issued construction order (2005) No.36, “Engineering Plan of Command System for 6 Underground Communication Command Posts Including Air Force 550, etc,” to the Air Force Communication Regiment, the Nanjing Command Air Force, and the Air Force Equipment Research Institute, etc.



1. Abstract - (2) Project Overview

[2005] Command Communication No.36

Confidential

PLA Air Force Command (Notice) **Issue to Air Force 550 & the Total 6** **Underground Command Posts** **Communication and Command Control** **System Project Construction Plan**

Air Force of Nanjing and Guangzhou

Military Region, Command of the 15th Airborne Army:

According to the General Staff Department [2004] General Staff Command No. 673 "Reply to the Command Post Communication and Command Control System Construction Project Design Task Report" approval requirements, the Air Force Command Post Communication and Command Control System Project Construction Plan is issued herewith.

It is expected to organize the implementation as soon as possible after receiving this notice, and to complete the construction drawing design by the end of April 2005; complete the construction task by the end of October 2005 and put into system trial operation; before the end of December 2005, the Department will organize the completion of the project acceptance and deliver to use. The relevant situation is clarified as follows.

I. Purpose of the Construction



1. Abstract - (2) Project Overview

Project Coverage——

The construction of the communication system for the “910” Underground Command Posts comprises following aspects: Underground fiber optics construction; Photoelectric transmission system construction; Switching system construction; Cable distribution system construction, Video conference system construction, Military comprehensive intelligence node construction, radio station antenna field construction, radio station shortwave communication equipment installation, and satellite communication system construction, etc.



1. Abstract - (2) Project Overview

Space and locations —————

In terms of locations, the “910” Underground Command Posts comprises two parts, the Main Tunnel and the Transmission Tunnel, which are 17 km apart. The Main Tunnel is located at the village of Xiao Keng, Beituan Town, Liancheng County, Fujian Province. The Transmission Tunnel is located at the village of Lijiaxiang of Sanming city in Fujian province.



1. Abstract - (2) Project Overview

Locations on the Map

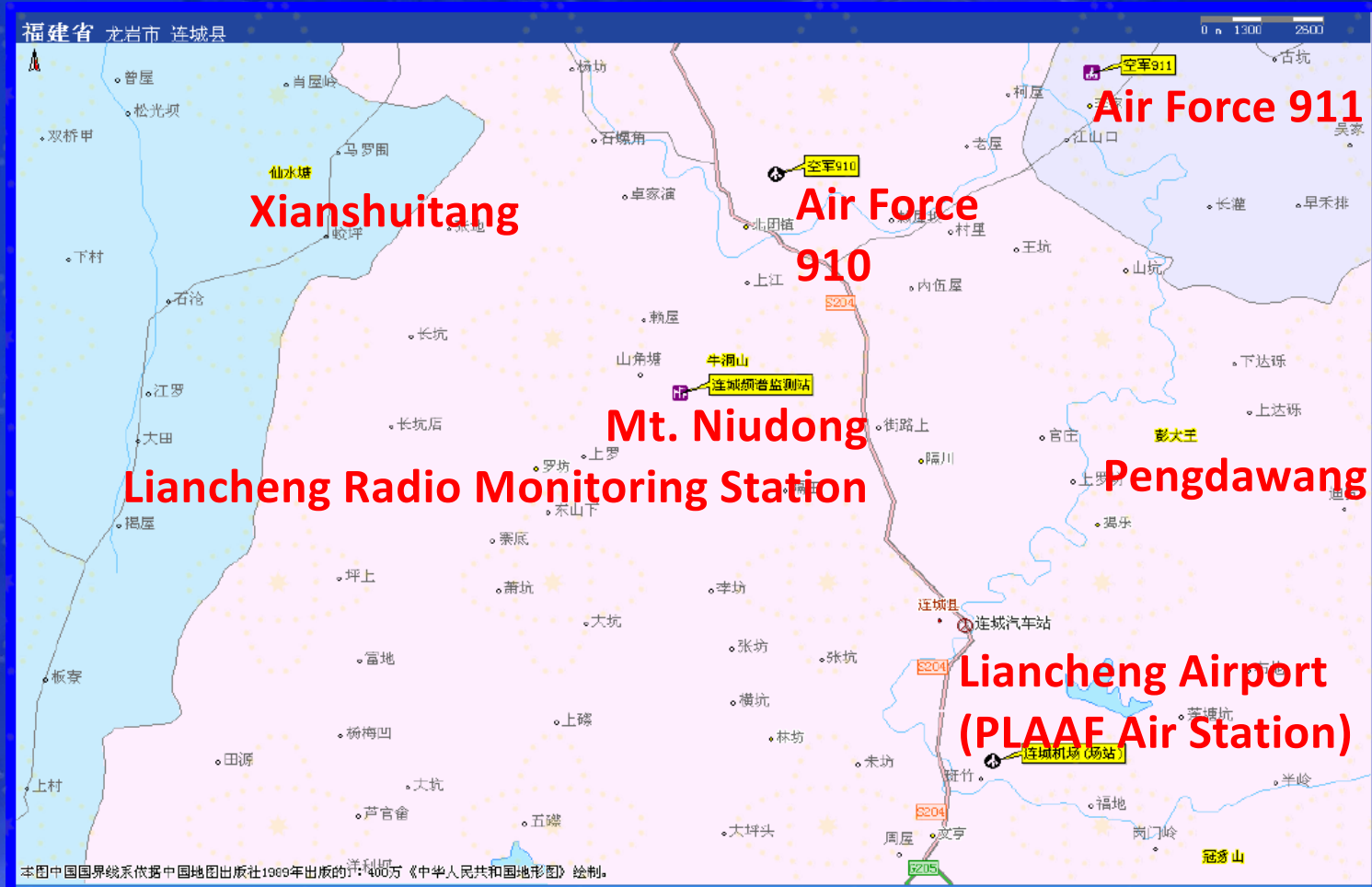


English translation is for reference only, please refer to the original Chinese version for any discrepancies



1. Abstract - (2) Project Overview

Locations on the Map



English translation is for reference only; please refer to the original Chinese version for any discrepancies



1. Abstract - (2) Project Overview

Locations on the Satellite Map



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2. Construction Plan for Cable Communication System

- (1) Construction of transmission system
- (2) Construction of switching system
- (3) Construction of video conferencing system



2. Construction Plan for Cable Communication System - **Optical Transmission System**

Air force “910 Underground Command Posts Transmission System Project” includes the installation of transmission equipment, construction of fiber optic cable and its supporting facilities for nine communication command elements of the Air Force in the Liancheng area.

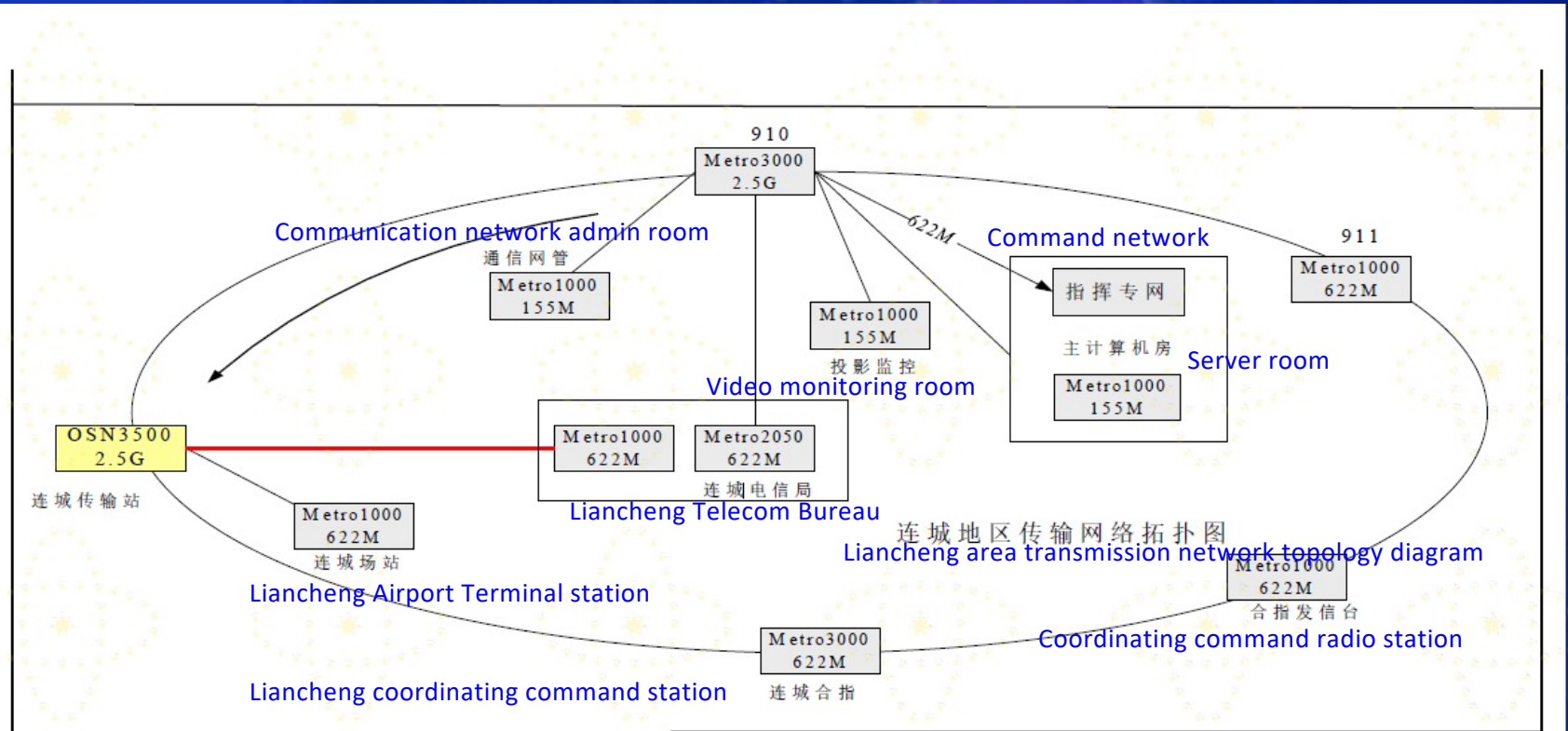
The nine optical transmission stations are:

910 transmission station; 911 station; Liancheng coordinating command station; Coordinating command radio station; Liancheng Airport Terminal station; Communication network admin room; Video monitoring room; Liancheng Telecom Bureau.

New installation: 1 set of 2.5G equipment; 5 sets of 622M equipment; 3 sets of 155M equipment.



2. Construction Plan for Cable Communication System - Optical Transmission System



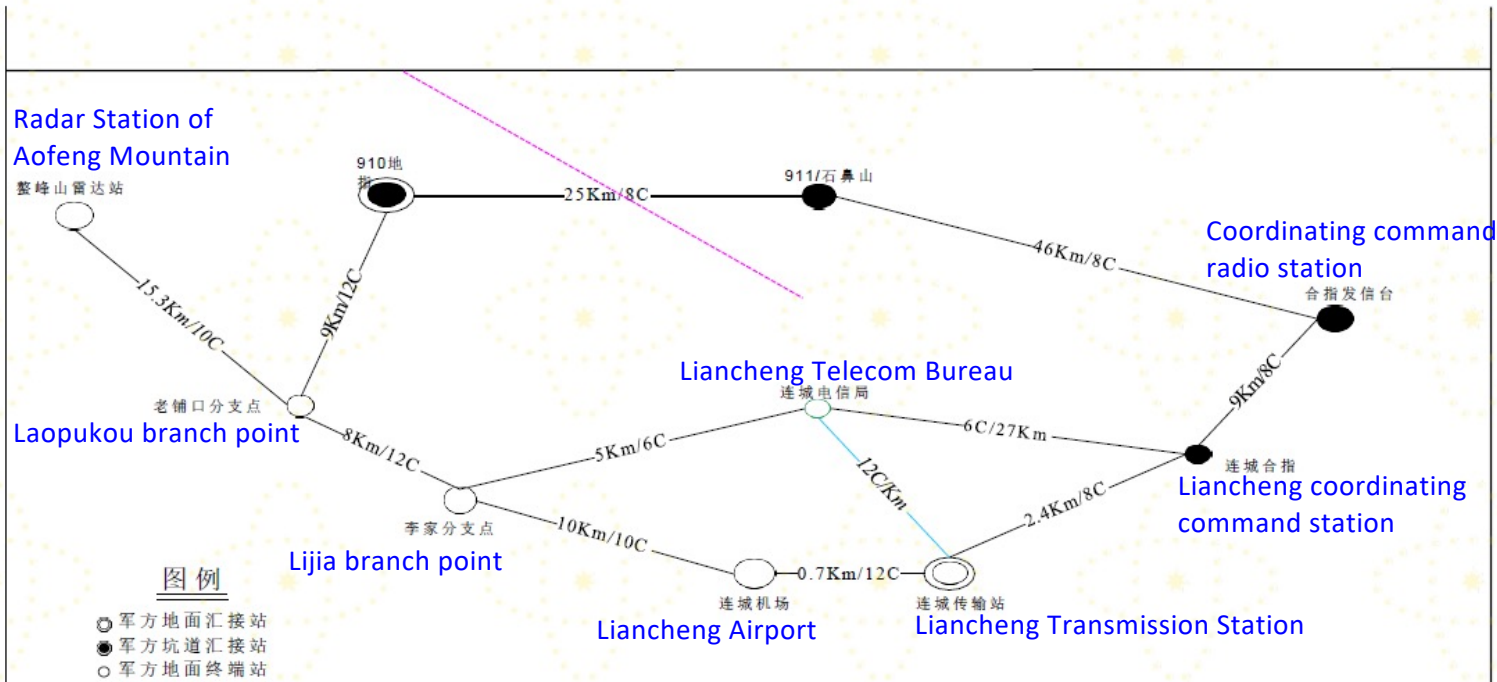
Air Force Command Communication
Engineering Design Institute

空军司令部通信工程设计所				工程名称	空军910地指通信系统工程
设计证书等级和编号：乙级：建设部011045-sy				图名	910传输系统安装工程 光传输网络拓扑图
批准		审核		日期	
设计负责人		描图		图号	0502S-CS006
单项负责人		单位			
设计		比例			

Optical transmission network topology diagram of
The Air Force 910 underground command communication system project



2. Construction Plan for Cable Communication System - Optical Transmission System



图例

Air Force Command Communication Engineering Design Institute

空军司令部通信工程设计所

工程名称

空军910地指通信系统工程

批准

审核

图名

910传传传传传传传传
传传传传传传传传

设计负责人

描图

日期

图号

0502S—CS004

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单位

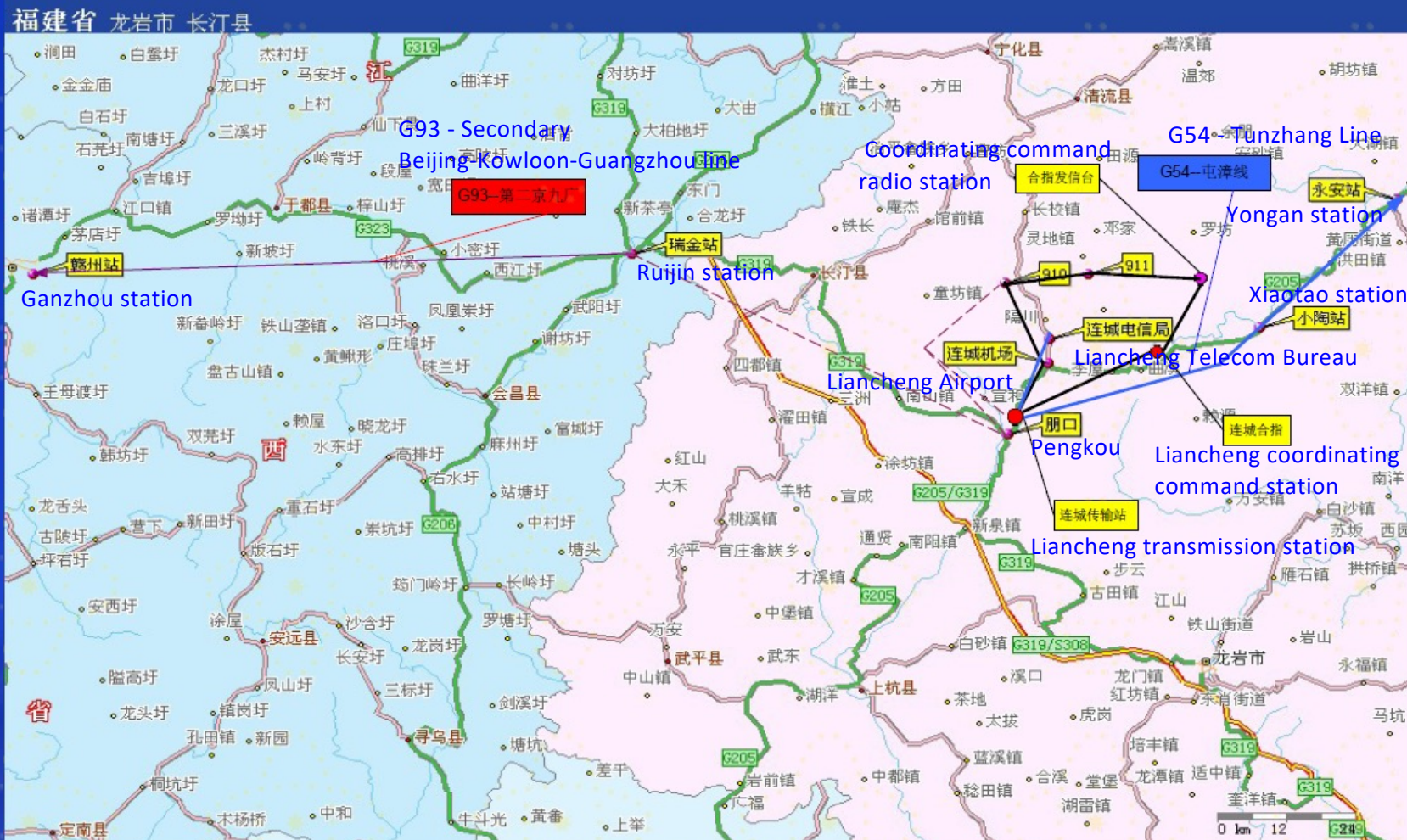
设计

比例

Air Force 910 Underground Command Communication System Project



2. Construction Plan for Cable Communication System - Optical Transmission System



English translation is for reference only, please refer to the original Chinese version for any discrepancies



(1) Construction of Transmission System——PCM Dedicated Line System

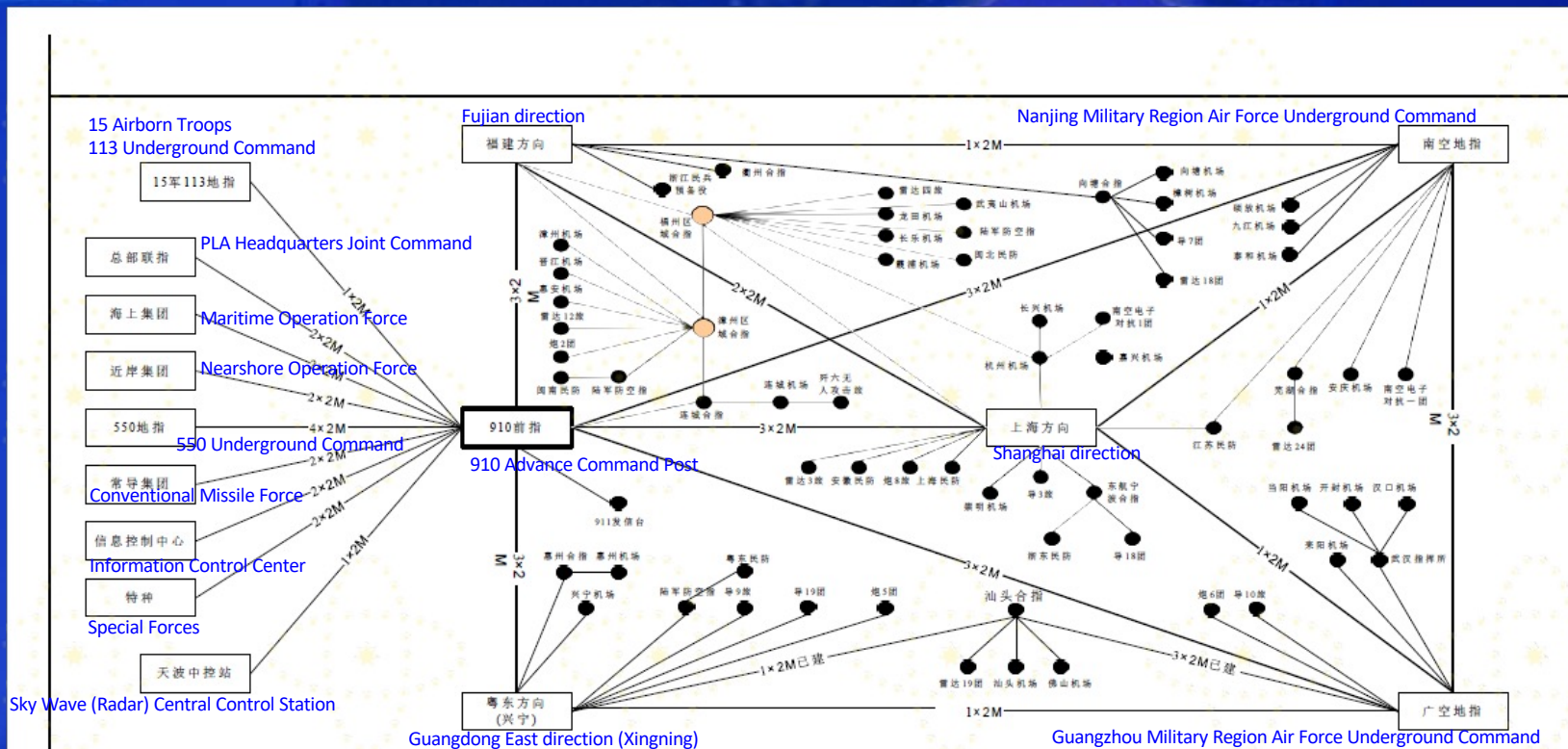
In Project 910, the following 5 stations are installed with PCM dedicated line systems:

910 Transmission Station, 911 Station, Liancheng Coordinating Command Station, Coordinating Command Radio Station, and Liancheng Field Station.

Installed 14 sets of PCM equipment. Capacity of the 2M port in the private line system is 128. Line capacity of the private line system is 1600



(1) Construction of Transmission System——PCM Dedicated Line System

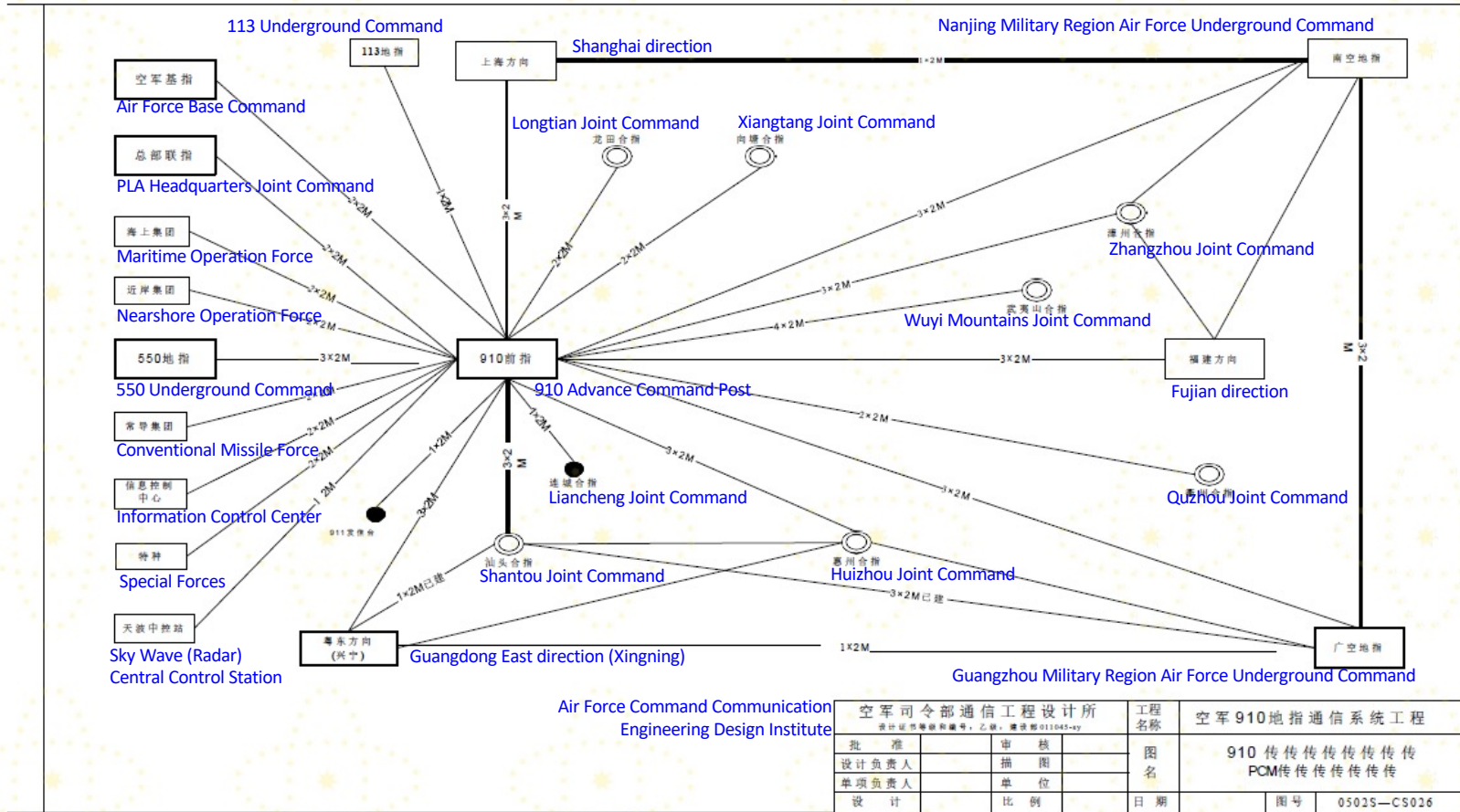


Air Force Command Communication Engineering Design Institute

空军司令部通信工程设计所 设计证书等级和编号：乙级；建设部011045-sy			工程名称	空军910地指通信系统工程	
批准		审核	图名	910 传传传传传传传传 PCM传传传传传传传传	
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设计		比例		日期	图号



(1) Construction of Transmission System—PCM Dedicated Line System





(1) Construction of Transmission System——Wiring System Engineering

In the comprehensive wiring installation project of the 910 station, the total wiring frame uses the JPX170-F-5000 type total wiring frame produced by Letong Telecom Equipment Co., Ltd. The wiring cabinet inside the communication room of the command center is rack mounted. The company's ST0-82C type is chosen for the wiring frame and the testing wiring configured in the command center. The company's FA8-71C type is chosen for the security wiring.



(1) Construction of Transmission System——Program-Controlled Switching System

The design and installation of Air Force 910 Underground Command Post's program-controlled telephone switch equipment and its supporting facilities are as follows:

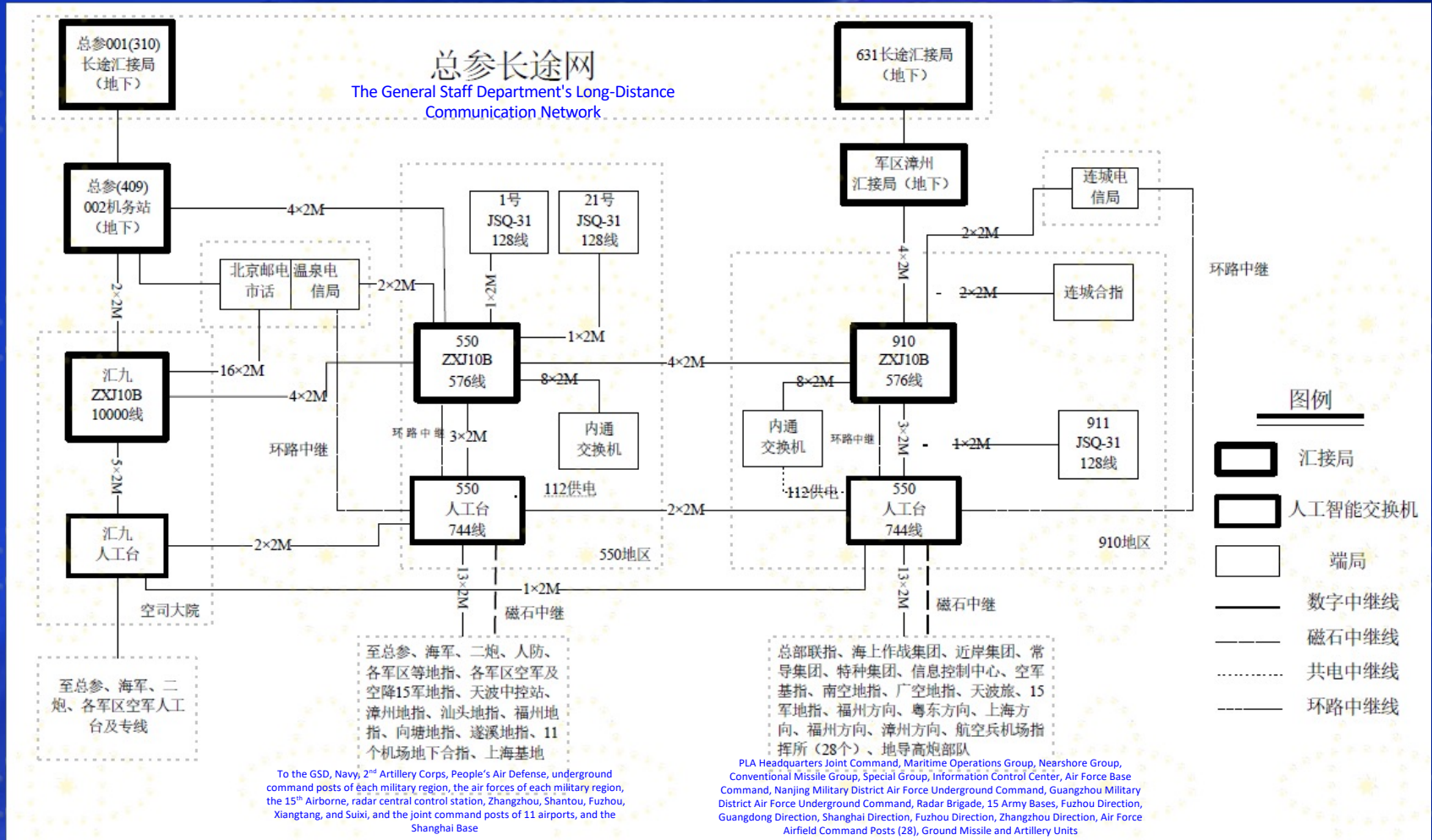
Model ZXJ10B (version V10-3.04) from Shenzhen ZTE Equipment Co., Ltd., serves 910 station's automatic telephone communication. Model JSQ-31 (version V5) program-controlled telephone switch from Beijing Yanxin Communication Equipment Co., Ltd. serves 911 radio station's automatic telephone communication.

The capacity of the 910 station's ZXJ10B program-controlled switching system is 576 analog lines, and 960 digital trunk lines. The capacity of the 911 station's JSQ-31 program-controlled switch is 128 analog lines, and 30 digital trunk lines.



(1) Construction of Transmission System——PCM Dedicated Line System

910, 550 Underground Command Post Network Topology Diagram





(1) Construction of Transmission System—Program-Controlled Switching System

The command system will be set up as follows:

910 - Zhangzhou, 550, Hui9, Liancheng Telecom – NO7;

910 - Operator, 911, Intercom - China No.1

Topology Diagram



(1) Construction of Transmission System——Video Conferencing System

➤ **Project Overview:**

Air Force “910” Underground Command Video Conferencing System is a major part of the “910” Underground Command Communication System. The project is designed with 2 individual video conferencing systems. One is M2T300 broadcasting-grade audio-visual system for the 910 station to transmit video conferences to PLA Headquarters Joint Command. The other one is ZTE ZXMvc8900 video conferencing systems for the 910 station to transmit video conferences to its superior station Air Force 550, and to its subordinate units in three strategic directions including 2 regional coordinating command posts, Guangzhou Military Region Air Force, Nanjing Military Region Air Force, 15th Airborne Corps underground command post, and the Sky Wave (Radar) Brigade.



(1) Construction of Transmission System——Video Conferencing System

➤ **Project Overview:**

The construction of Air Force “910” underground command video conferencing system follows the guideline of unified planning and phased implementation. First, it should complete constructing major nodes of communication hubs and combat command facilities, before moving on to basic combat unit integration.

The project is designed to install a total of 8 nodes of MCU (Multipoint Control Unit) video conferencing systems. That is, the 910 station monitoring room, nodes for Shanghai direction, Fujian direction, East Guangdong direction, Zhangzhou area, Guangzhou Military Region Air Command, Nanjing Military Region Air Command, and the 550 station monitoring room.



(1) Construction of Transmission System——Video Conferencing System

➤ **Project Overview:**

The project is designed to install a total of 63 nodes of 4050B video conferencing terminal. That is, 28 airfields, 20 surface-to-air missile units, 9 radar brigades (regiments), technical reconnaissance units, and 8 electronic countermeasure units.

The project will adopt the Optix Metro2050 from Tektronix Corporation U.S.A. and the ZTE's MVC8900 multipoint control unit and MVC4050B video conferencing terminals, which will be distributed by the Dept. of Communications of General Staff Department (GSD). MVC8900 multipoint control units and MVC4050B video conferencing terminals will be ordered by the Air Command Communications Department. The remaining audio and video auxiliary equipment will be distributed accordingly by the command-and-control center.



Network Topology

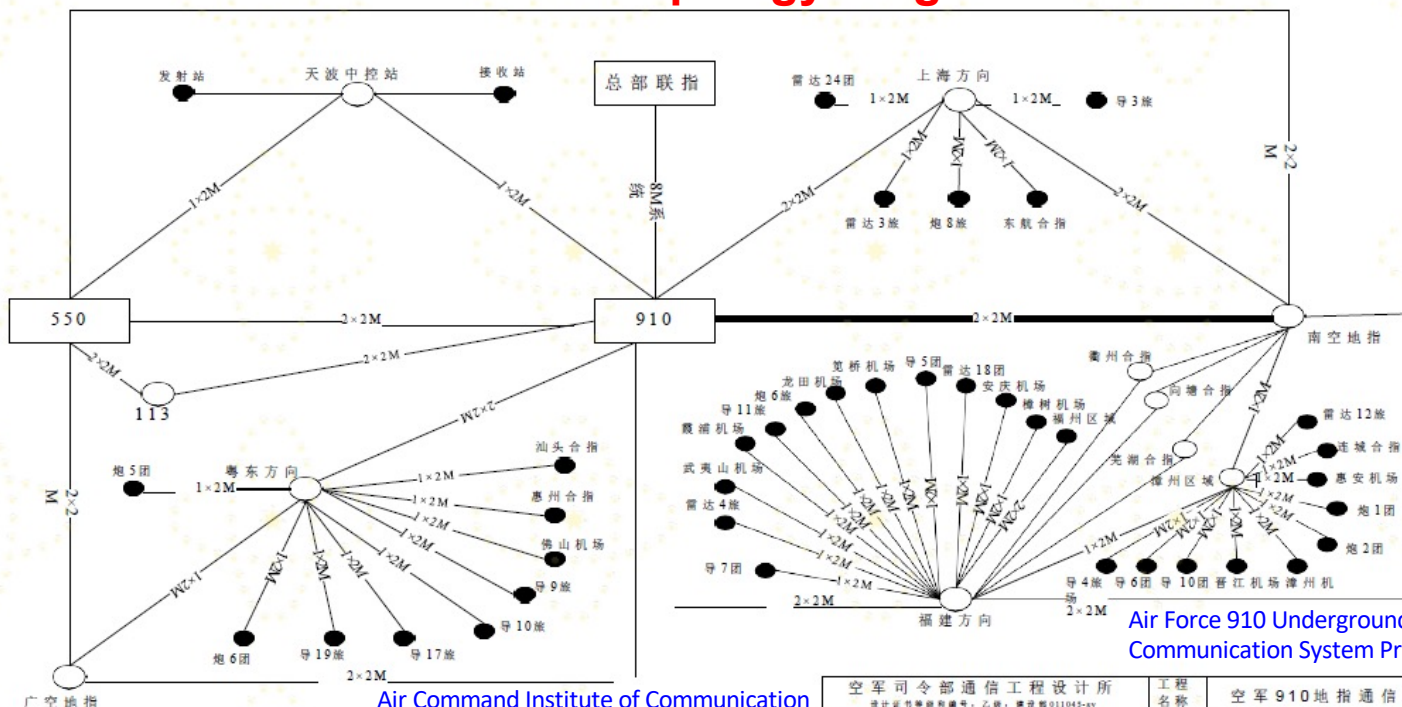
- (1) Air Force “910” underground command video conferencing system will be based on star schema, with three-level tandems
- (2) (2) The design takes into account the integration between surface unit and underground unit, between the short-term need and the long-term planning, and between the new and legacy system.
- (3) (3) The design follows the principle of interface equipment redundancy and 1+1 backup of critical equipment to configure 2 critical nodes, 910 and the 550. Meanwhile it adopts dual-routing guaranteeing measures on channels



(1) Construction of Transmission System—Video Conferencing System

网络组织图

Network Topology Diagram



Air Force 910 Underground Command Communication System Project

Air Command Institute of Communication Engineering & Design

空军司令部通信工程设计所 设计证书编号: 乙级, 证书号: 011045-xy			工程名称	空军910地指通信系统工程	
批准		审核	图名	910会议电视	
设计负责人		制图		安装工程网络组织图	
单项负责人		单位	日期	图号	0502S-HS002
设计		比例			



Radio Shortwave Communication System Construction Proposal - Project Overview

910工程位于福建省龙岩市连城县北团乡小坑村，工程设2个收信机房，可安装收信机和终端40部。

The 910 Project is located in Xiaokeng Village, Beituan Town, Liancheng County, Longyan City, Fujian Province. The project has two receiving-machine rooms in which forty receiving machines and terminals can be installed.

2005 11 6



911工程位于福建省龙岩市连城县
李家乡，工程设3个发信机房，可安装
1000W发信机60部，10千瓦发信机5部

The 911 project is located in Lijia Town, Liancheng County, Longyan City, Fujian Province. The project will set up three transmitter rooms in which sixty 1000W transmitters and five 10kW transmitters can be installed

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Radio Shortwave Communication System Construction Proposal - **Project Overview**

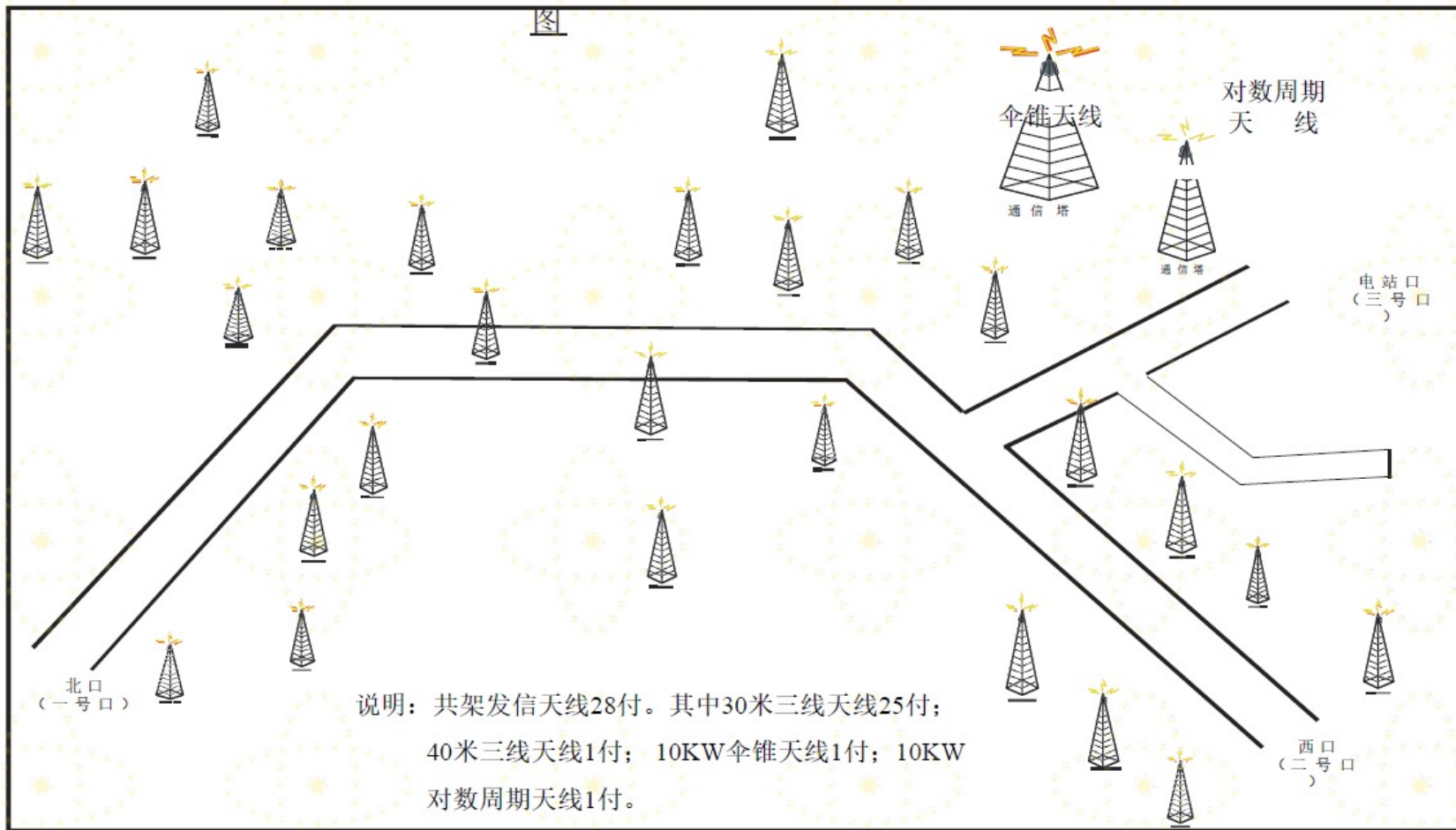
According to combat requirements, the 910 radio shortwave communication system will set up a total of 32 shortwave communication networks and dedicated networks (including mobile communication network, dedicated command network, integrated data network, radar shortwave network, air-to-air network, notification network, alarm network, and duty network, etc.). It will also install a total of 40 shortwave adaptive transceivers.



Radio Shortwave Communication System Construction Proposal - Project Overview

Schematic Diagram of the Construction of the 911 Antenna Field

911天线场建设平面示意

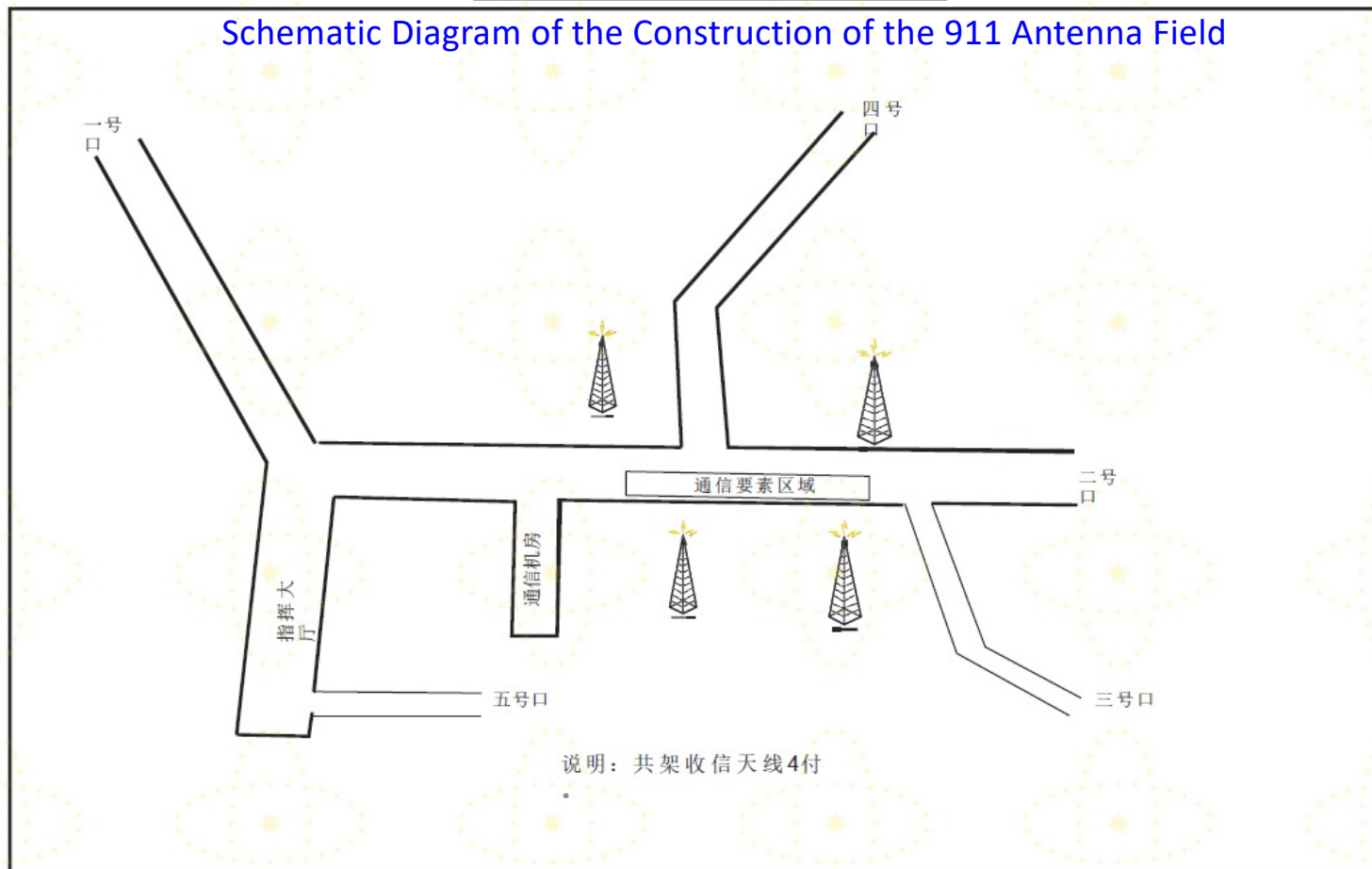




Radio Shortwave Communication System Construction Proposal - Project Overview

910收信天线建设平面示意图

Schematic Diagram of the Construction of the 910 Antenna Field





Radio Shortwave Communication System Construction Proposal - Project Overview

The Air Force 910 wireless shortwave equipment installation project consists of a centralized shortwave radio receiving station and a centralized transmitting station. The shortwave centralized receiving station was established in the Fujian Liancheng 910 command post project, and the shortwave centralized transmitter station was set up separately in the 911 project.

A total of 3 sending rooms are set up in the centralized shortwave radio transmitter station, with a total area of 534.1 square meters. The computer room is designed to install 58 400W/1000W transmitters. In this phase, 40 pieces of sending equipment will be installed.



(4) Power System Construction Plan - The Communication System Workflow

Air Force 910 shortwave receiver equipment installation project includes a total of 2 receiver rooms, with a total area of 124.1 square meters. The design and installation capacity of the computer room is 36 receivers.



(4) Power System Construction Plan - **The Communication System Workflow**

- The first part is the UPS power supply, which is used to ensure the uninterrupted power supply of AC equipment such as switching/transmission, encrypted calls, AI workstation, plotting, and other equipment;
- The second part is the power supply of the tunnel, which is used to ensure the power consumption of AC equipment such as receivers, maintenance terminals, consoles, air traffic control, wiring, and other elements.
- The third part is the power supply of the tunnel, which is used to ensure the set of main and standby high-frequency switching power supplies as the AC input power of the DC power supply.



(4) Power System Construction Plan

The Use of New Technology

1. Wired Telecommunications - Using the Automatic Optical Switching Network (AOSN)

The optical communication technology; the program-controlled switching uses the multi-routing technology; the wiring system uses the fiber-to-desktop technology

2. Radio Communication - Using the antenna exchange technology, the centralized control technology of the receiving system, and the optical fiber remote control technology; it allows one point to control multiple points, and multiple points can mutually control each other.

3. Conference TV Technology - Using high-definition technology.

4. Power supply - Using the technology of dual-channel optimal automatic transfer switch (ATS)