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Space environment-Technical requirements for meteor radar

空间环境 流星雷达技术要求

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Table of Contents

Preface... III 1 Scope 1
2 Normative references 1
3 Terms and Definitions 1
4 Meteor Radar 1
4.1 Overview 1
4.2 Classification 2
4.3 Composition 2
5 General requirements 2
5.1 Size, color, marking, appearance and completeness 2
5.2 Man?Machine?Environment System Engineering Requirements 3
6 Main technical requirements 3
6.1 General Requirements 3
6.2 Transmitting Antenna 4
6.3 Receiving Antenna 4
6.4 Feeder 4
6.5 Transmitter 5
6.6 Receiver 6
6.7 Data Processing and Display and Control Terminal 7
6.8 Power Supply 8
7 Quality Assurance Requirements 8
7.1 Environmental adaptability 8
7.2 Reliability and Maintainability 9
7.3 Electromagnetic compatibility 9
7.4 Security Requirements 9
7.5 Interchangeability 10
8 Installation Requirements 10
9 Deployment Requirements 10
9.1 Single-station meteor radar 10
9.2 Distributed Meteor Radar 10
Appendix A (Informative) Schematic diagram of meteor radar detection 11
Appendix B (Informative) Example of Meteor Radar Horizontal Wind Detection Data 13
Appendix C (Informative) Meteor Radar Receiving Antenna Array Configuration 15

References 16

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting is required.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

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Technical requirements for space environment meteor radar

1 Scope

This document specifies the general requirements, main technical requirements, quality assurance requirements, installation requirements and layout requirements of Meteor Radar.

This document is applicable to meteor distribution surveys that operate in the 25 MHz to 65 MHz frequency band and use meteor trails as the main tracer.

and meteor radar for neutral atmospheric wind detection.

2 Normative references

GB/T 12506-2017

GB/T 12648-1990

GB/T 12649-2017

GB/T 30114.1

3 Terms and definitions

The following terms and definitions as defined in GB/T 12506-2017, GB/T 12649-2017 and GB/T 30114.1 apply to this document.

3.1 meteor trail

When a meteoroid enters the atmosphere at high speed, it rubs against the surrounding atmosphere, causing the material on the surface of the meteoroid to evaporate and ionize.

Due to the violent collision with the meteoroid, it is ionized and diffused to form a plasma gas column centered on the meteor track.

3.2 meteor radar

A radar device that uses the scattering effect of meteor trails on electromagnetic waves to detect meteor distribution and neutral atmospheric winds.

Note. Generally, it can detect the distribution of meteors within the range of 70 km to 110 km above the radar station, as well as the wind speed and direction in the neutral atmosphere.

Satellite and debris detection, near-space atmospheric wind field monitoring and early warning, etc.

3.3 Yagi antenna

An end-fire type consisting of an active oscillator (usually a folded oscillator), a passive reflector and several passive directors arranged in parallel. antenna.

4.1 Overview

The meteor trails produced by the ablation of meteors entering the atmosphere can scatter radio waves in the medium frequency, high frequency, very high frequency and ultra-high frequency bands.

The meteor radar involved in the document operates in the 25 MHz to 65 MHz frequency band, uses meteor trails as the main tracer, and adopts a wide beam