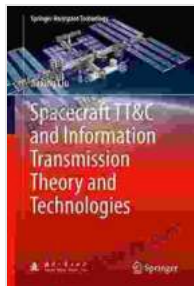# Spacecraft Telemetry and Information Transmission Theory and Technologies: State-of-the-Art and Emerging Trends

Spacecraft TT&C and Information Transmission Theory and Technologies (Springer Aerospace Technology)

by Sara Dyer

★ ★ ★ ★ ★   5 out of 5

Language	: English
File size	: 19590 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 894 pages

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Spacecraft telemetry and information transmission are critical technologies for the successful operation of spacecraft. Telemetry data provides information about the health and status of the spacecraft and its subsystems, while information transmission enables the spacecraft to communicate with ground stations and other spacecraft. In recent years, there have been significant advances in spacecraft telemetry and information transmission theory and technologies, including the development of new modulation and coding schemes, the use of artificial intelligence and machine learning for data analysis, and the development of new high-speed data links. This book provides a comprehensive overview of the state-of-the-art in spacecraft telemetry and information transmission

theory and technologies, and discusses emerging trends and cutting-edge technologies.

Telemetry Data

Telemetry data is information about the health and status of the spacecraft and its subsystems. This data is collected by sensors throughout the spacecraft and is transmitted to a ground station or another spacecraft for analysis. Telemetry data can be used to:

- Monitor the performance of the spacecraft and its subsystems

- Identify and diagnose problems

- Plan maintenance and repairs

- Improve the design of future spacecraft

Information Transmission

Information transmission is the process of sending data from one point to another. In the case of spacecraft, information transmission is used to communicate with ground stations and other spacecraft. Information transmission can be accomplished using a variety of methods, including:

- Radio waves

- Optical links

- Laser beams

Modulation and Coding

Modulation is the process of converting digital data into a signal that can be transmitted over a communication channel. Coding is the process of adding

redundancy to the data to improve its reliability. Modulation and coding are essential for reliable information transmission in space applications.
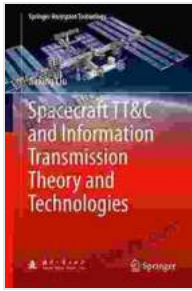
Artificial Intelligence and Machine Learning

Artificial intelligence (AI) and machine learning (ML) are rapidly changing the field of spacecraft telemetry and information transmission. AI and ML algorithms can be used to analyze telemetry data to identify trends and patterns, diagnose problems, and predict future events. This information can be used to improve the operation of spacecraft and to develop new and innovative applications.

High-Speed Data Links

The development of high-speed data links is essential for meeting the increasing demand for data from spacecraft. High-speed data links enable the transmission of large amounts of data at high speeds, which is necessary for applications such as video streaming and high-resolution imaging.

Spacecraft telemetry and information transmission theory and technologies are critical for the successful operation of spacecraft. In recent years, there have been significant advances in these fields, including the development of new modulation and coding schemes, the use of artificial intelligence and machine learning for data analysis, and the development of new high-speed data links. This book provides a comprehensive overview of the state-of-the-art in spacecraft telemetry and information transmission theory and technologies, and discusses emerging trends and cutting-edge technologies.

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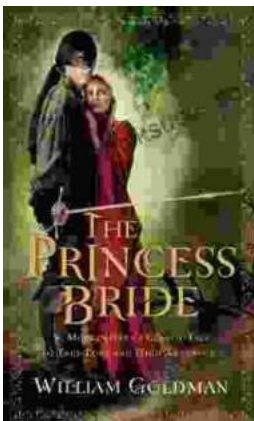by Sara Dyer

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