ICTRFN806 Analyse satellite communications systems

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 7.0.

Application

This unit describes the skills and knowledge required for a new installation project, an upgrade of capacity or technology in an existing network or as a result of convergence to next generation networks (NGN).

It applies to individuals working as supervisors and engineers, who plan, design and implement satellite communications systems.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Unit Sector

Telecommunications – radio frequency networks

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes.	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
1. Research satellite communication systems	1.1 Research satellite applications with various orbit types and assess their spatial positioning for specific purposes 1.2 Analyse and report on architecture, major subsystems and critical components in communication systems of recently launched commercial satellites 1.3 Research and report on multiple access techniques and their typical applications
2. Analyse uplink and downlink variables	2.1 Determine uplink and downlink criteria that impact on carrier-to-noise ratio 2.2 Determine up/down link criteria that impact on baseband signal-to-noise ratio 2.3 Determine critical parameters of satellite system

ELEMENT	PERFORMANCE CRITERIA
	2.4 Research common types of baseband signal processing, and their spectral and noise improvement parameters and determine criteria for link budget evaluations
3. Conduct link budget analysis	3.1 Produce satellite link budget and calculate link margin for satellite system with specified modulation types
	3.2 Analyse relationship between bit-error-ratio (BER) for given energy per bit-per-noise power density (Eb/No) and forward error correction (FEC) parameter for determining operational performance of link
4. Analyse properties of geostationary satellites	4.1 Calculate look angles for geostationary satellite from any receiving location
	4.2 Research and report on frequency re-use in conjunction with polarisation selection and use of spot beams
	4.3 Analyse and specify major features of very small aperture terminal (VSAT) systems, and calculate link reliability in high rainfall regions

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

SKILL	DESCRIPTION
Numeracy	• Applies knowledge about space and shape, including angle properties, when analysing variables • Applies knowledge about space and shape, including angle properties, when analysing variables • Determines link budgets by selecting antennae size, power requirements, link availability and bit error rate (BER) by solving complex mathematical formulas
Reading	• Interprets complex technical information in a variety of forms and applies the knowledge gained to solve complex problems by making informed judgements and assumptions
Writing	• Uses clear, specific and industry related terminology to prepare detailed reports containing recommendations for relevant personnel
Planning and organising	• Analyses data and seeks feedback to improve plans and processes • Makes high impact decisions in a complex and diverse environment, using input from a range of sources • Identifies key factors that impact on decisions and their outcomes,

SKILL	DESCRIPTION
	drawing on experience, competing priorities and decision-making strategies where appropriate
	• Operates from a broad conceptual plan, developing the operational detail in stages, regularly reviewing priorities and performance during implementation, and identifying and addressing issues as the work progresses
Problem solving	• Addresses complex problems involving multiple variables, using formal analytical, lateral thinking techniques, experience and knowledge to focus on the root cause
Self-management	• Takes responsibility for high impact decisions in complex situations involving many variables and constraints

Unit Mapping Information

Supersedes and is equivalent to ICTRFN803 Analyse a satellite communications system.

Links

Companion Volume Implementation Guide is found on VETNet -
https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=a53af4e4-b400-484e-b778-71c9e9d6aff2