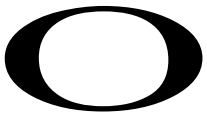
الآية

قال تعالى :



[وَالشَّمْسُ تَجْرِي لِمُسْتَقَرٍّ لَّهَا ذَلِكَ تَقْدِيرُ الْعَزِيزِ الْعَلِيمِ * وَالْقَمَرَ قَدَّرْنَاهُ مَنَازِلَ حَتَّى عَادَ كَالْعُرْجُونِ الْقَدِيمِ * لَا الشَّمْسُ يَنبَغِي لَهَا أن تُدْرِكَ الْقَمَرَ وَلَا اللَّيْلُ سَابِقُ النَّهَارِ وَكُلٌّ فِي فَلَكٍ يَسْبَحُونَ]

صدق الله العظيم
(سورة يس)
الآية :
40-38

Dedication

For every one who gives me the ability to find my self , encourages me to keep walking in this path and helps me in solving problems .

To my mother , father , brothers and sisters .

To whom who gave me the straight light in my brain , my teachers .

To those who strengthen me in a middle of depressions and make me standing to a gain . . . . .

Always . . . my friends and all care about me .

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My great indebtedness to my teachers in the department of electronics Engineering in Sudan University of science & Technology , and to my family who gave me great offers to overcome my research .

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Abstract

Satellite link design is nothing but estimation of power that is to be transmitted from an earth station towards the satellite or from a satellite towards the earth station, so that the study and calculation of power budget is reasonable. This link design calculation takes into account several factors such as look angel, absorption of signal , various kinds of noise sources in the satellite system , parameters of transmitting and receiving antennas of both the satellite and earth stations (e.g: effective area of antenna (A_0), Equivalent isotropic radiated power (EIRP)) and also uplink and downlink frequencies (atmospheric absorption varies with frequencies) .

This research helps in calculating and estimating the received power at both ends, and evaluate the [EIRP] and carrier to noise (C/N) ratio in each case.

The calculator was designed by using Visual Basic .Net to work with every windows environment.

The calculator contributes in calculating the power budget of satellite communication system easily and also gives some practical solutions for good link budget.

المستخلص

إن عملية ربط القمر الصناعي بالمحطة الأرضية ما هي الا تقدير القدرة التي يجب ارسالها من المحطة الأرضية الى القمر الصناعي (uplink power) أو من القمر الصناعي الى المحطة الأرضية (Down link power) ، لذلك تعتبر دراسة وحساب القدرة الواصلة الى كلا من القمر الصناعي والمحطة الأرضية على قدر كبير من الأهمية ، وعند حساب هذه القدرة نأخذ في الاعتبار عدة عوامل مؤثرة مثل زوايا النظر ، امتصاص الإشارة ، الأنواع المختلفة من التشويش في نظام القمر الصناعي ، بارامترا ت هوائي الإرسال والاستقبال لكل من المحطة الأرضية والقمر الصناعي (المساحة الفعالة للهوائي **(A_0)** – الاستطاعة المشعة الأيزوتروبية **[EIRP]**) أيضاً ترددات الإرسال والاستقبال (وذلك لأن امتصاص الإشارة في الفراغ يعتمد على قيمة التردد).

هذا البحث يساعد في حساب وتقدير القدرة الواصلة الى كلا الطرفين (المحطة الأرضية والقمر الصناعي) ويقوم بتحديد وتقييم [EIRP] ونسبة قدرة الحامل (carrier) الى الضوضاء (noise) أي (C/N) ratio.

تم تصميم البرنامج بلغة Visual Basic .Net للعمل مع جميع بيئات ويندوز ، يساهم البرنامج في تسهيل حساب القدرة لوصلة الأقمار الصناعية ويعطي كذلك بعض الحلول العملية التي تعطي وصلة جيدة .

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List of abbreviation

AA	Atmospheric Absorption Loss
AML	Antenna Misalignment Loss
ARABSAT	Arab Satellite Communication Organization
BSS	Broadcasting Satellite Service
CNSA	China National Administration
DBS	Direct Broadcast Satellite
EIRP	Equivalent Isotropic radiated power
ESA	European space agency
FEC	Forward Error Correction
FL	Feeder Loss
FSL	Free Space Loss
FSS	Fixed Satellite Service
GEO	Geostationary earth Orbit
GHz	Giga hertz
GPS	Global Positioning Satellite
G/T	Gain / Temperature
GUI	Graphical User Interface
HPA	High Power Amplifier
INTELSAT	International Telecommunication Satellite
ITSO	International telecommunications satellite organization
LEO	Low Earth Orbit
LNA	Low Noise Amplifier
MEO	Medium Earth Orbit
MHZ	Mega Hertz
MSS	Mobile Satellite Service
NF	Noise Figure
OL	Other Losses

RFL	Rain Fall Loss
SSPA	Slide Single Power Amplifier
TWTA	Traveling Wave tube Amplifier