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**SMART COMMUNICATION PLATFORM SYSTEM
FOR LOW ALTITUDE APPLICATIONS**

By

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LIST of ABBREVIATION

APD	Avalanche Photo Detector
BER	Bit Error Rate
CW	Continuous Wave
DC	Direct Current
FSO	Free Space Optics
FSO/RF	Hybrid Radio Frequency/ Free-Space Optics
FOV	Field-Of-View
GS	Ground Station
GPS	Global Positioning System
IEEE	Institute of Electrical and Electronics Engineers'
LAN	Local Area Network
L-APs	Low- Altitude Platform Systems
LoS	line-of-side
MEMS	Micro-Electro-Mechanical-Systems
MGU	Main Ground Unit
NRZ	Non Return To Zero
OOK	On-Off Keying
PIN	Positive Intrinsic Negative
PI	Proportional- Integral
PIN	Positive Intrinsic Negative
PID	Proportional-Integral-Derivative
PON	Passive Optical Networks
RF	Radio Frequency

RN	Root Node
ROF	Radio Over Fibre
RoFSO	Radio over Free-Space Optics
SCPSv1	Smart Communication Platform System Version One
SCPSv2	Smart Communication Platform System Version Two
s-function	System-Functions
S-GUs	Sub-Ground Units
SNR	Signal-to-Noise Ratio
VoIP	Voice over Internet Protocol
WLAN	Wireless Local Area Network
WIDIS	Disaster Information and Sharing System
1 ^L Ns	First-Level Nodes
2 ^L Ns	Second-Level Nodes
3 ^L Ns	Third-Level Nodes
2 nd N	Second Node
3 rd N	Third Node

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LIST OF SYMBOLS

C	Programming Languages
dB	Decibel (logarithmic unit)
Den	Denominator (s)
dBi	dB (isotropic)
dBm	Power Ratio in Decibels
dB/Km	Decibels Per Kilometre
erfc	Complementary Error Function
f_n	Natural Frequency
rad/s	Radian Per Second
g	Gravitational
Gb/s	Gigabit Per Second
GHz	Gigahertz
kbps	Kilobit Per Second
km/h	Kilometres Per Hour
m	Meter
m^2	Square Metre
Mb/s	Mega Bit Per Second
Mbps	Megabit Per Second
Mm/hr	Millimetre Per Hour
mrad	Mill Radians
mV	Mill Volt
mW	Mill Watt

N	Newton
Num	Numerator (s)
N/s	Newton Per Second
P	Proportional Controller
Q	Quality Factor
RF	Radio Frequency
Sec	Seconds
°	Degrees
λ	Wavelength

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Sistem komunikasi pintar untuk aplikasi platform kegunaan yang rendah

ABSTRAK

Bencana alam boleh menyebabkan kemusnahan besar-besaran, yang membawa kepada kehilangan nyawa dan harta benda. Bencana menyebabkan kerosakan yang luas dalam infrastruktur dan sistem komunikasi, contohnya kabel gentian optik, stesen pangkalan, menara dan lain-lain bantuan peralatan. Kemusnahan infrastruktur komunikasi akan menghalang kawasan yang terjejas dari menghubungkan semula dengan Rangkaian Global. Negara Pasifik mula memberi tumpuan kepada peranan komunikasi untuk mengurangkan kesan bencana. Remote sensing dan pertukaran maklumat dari kawasan acara ini adalah salah satu keutamaan yang perlu ditangani. Platform udara dengan teknologi rangkaian wayarles moden dianggap kes positif untuk beberapa aplikasi. Terutama sekali, dalam pengurangan risiko bencana kerana mereka memberikan maklumat yang kritikal untuk merealisasikan penilaian risiko. Platform rendah altitud (L-AP) kaedah yang boleh digunakan untuk meningkatkan penggunaan rangkaian. Walau bagaimanapun, sistem ini telah menghadapi cabaran akibat daripada gangguan atmosfera. Seperti ketidakstabilan sistem komunikasi di dalam platform dan keperluan untuk meningkatkan pembiakan kadar data. Malah, terdapat hubungan antara kedua-duanya. Changeableness yang telah berlaku dalam komunikasi ke arah platform akibat angin adalah factor yang menyebabkan kehilangan line-of-penglihatan (LOS) antara nod rangkaian. Optik tawarkan-ruang (FSO) komunikasi untuk menyumbang kepada pengukuhan kadar data pembiakan antara nod rangkaian. Walau bagaimanapun, pilihan disertai dengan cabaran tertentu. FSO mempunyai perbezaan rasuk yang sempit dan perlu rasuk laser panduan dalam ruang bebas antara sistem FSO terbahagi kepada dua arah. Selain itu, pengecilan dalam saluran penghantaran akibat daripada pergolakan atmosfera menyebabkan kadar ralat bit tidak boleh diterima (BER) di FSO menerima sebelah bahagian saja. Had sebelum ini yang diketuai untuk mewujudkan Komunikasi Pintar Platform Sistem versi satu (SCPSv1) sebagai Telecom Stesen Udara untuk penempatan rangkaian tahap tinggi. Sistem ini telah dicirikan dengan keupayaan untuk faktor-faktor luaran yang menghalang pelarasan penstabilan platform. SCPS terdiri daripada sistem kawalan dua bahagian dan sistem komunikasi. SCPS boleh mencapai status penstabilan dengan menggunakan sistem kawalan yang mengekalkan los terputus antara nod rangkaian. Kestabilan sistem membantu untuk menggunakan FSO akan berfungsi di platform mudah alih untuk meningkatkan saluran penghantaran. Untuk lanjutan penempatan bersih, reka bentuk seni bina rangkaian telah komited untuk membina sebuah nod pusat untuk menyediakan berbilang titik-ke-titik disambungkan pelbagai syarat-syarat yang dikenakan di rangkaian diperlukan untuk mewujudkan satu model pemaju mempunyai pelbagai spesifikasi SCPS supaya sesuai dengan tahap penggunaan. Komunikasi Pintar Platform Sistem versi kedua (SCPSv2) berkhidmat sebagai stesen Sky-HUB yang serupa dengan versi pertama dari segi mencapai penstabilan ke sistem komunikasi Negara. Walau bagaimanapun, berbeza dari segi prestasi, dengan kaedah penghantaran, kepada lebih daripada satu nod pada satu-satu masa. Penugasan rangkaian dipanggil untuk menubuhkan Unit Ground Utama (MGU) untuk memindahkan data dari paras tanah untuk L-AP. Dalam kajian ini, kemungkinan menggunakan L-AP di Multi peringkat satu bagi pergerakan telah disahkan. Sistem inovasi SCPS-v1, SCPS-v2 dan MGU dicipta untuk mengurangkan kesan bencana