Universiti Malaysia Perlis

INVENTORS

DR. AMIR RAZIF ARIEF JAMIL ABDULLAH
PROF. DR. SYED ALWEE ALJUNID SYED JUNID
IR. DR. ANUAR MAT SAFAR
DR. JUNITA MOHD NORDIN
DR. HASSAN YOUSIF
MR. ABDUL RAHMAN KRAM
MR. MOHD RASHIDI CHE BESON
MR. ABDULLAH OMAR ALI AL-DHAIBANI

CONTACT DETAILS

Centre of Excellence Advanced Communication Engineering School of Computer and Communication Engineering (CoE ACE-SCCE),
Universiti Malaysia Perlis (UniMAP)
E-mail : amirrazif@unimap.edu.my

NEW DUAL-DIFFUSER MODULATION FSO TECHNIQUE FOR AGRICULTURE APPLICATIONS

* Collaboration with:
Salman bin Abdulaziz University

PRODUCT DESCRIPTION

New Dual-Diffuser Modulation Free Space Optical (DDM-FSO) technique allows high-speed data transmission, cost effective and optimum bandwidth utilization for agriculture applications. DDM technique mitigates the atmospheric turbulence effect which associate with optimum power efficiency, link coverage and signal threshold detector. DDM-FSO is potentially to be commercialized in modern agriculture industries such as the palm oil plantation, paddy field and other advance farming monitoring systems.

APPLICATIONS

Wireless Sensor Network (WSN)-Hybrid (FSO/RF)

- Optimize efficient energy, enhance system lifetime and improve network Quality of Services (QoS), Fig. 1.
- Optimum bandwidth utilization for sensor positioning.

Routing Network

- Enable multiple power nodes at physical layer with efficient energy, Fig. 2.
- Enhance network performance connectivity and QoS.

Farming Monitoring

- Farm monitoring; provide the efficient data and controlling of agricultural inputs for water availability and ripeness level, Fig. 3.
- Minimize spread of agricultural diseases caused by pests such as snails, caterpillars and other pests attack.
- Controlling ideal temperature and humidity levels for efficient agricultural growth rate.

Space Solution Agriculture

- Provide satellite navigation services with precision.
- Enable advanced services of satellite remote sensing within specific field, Fig. 4.

NOVELTIES

- New Dual-Diffuser Modulation Free Space Optic (DDM-FSO) technique in agriculture.
- DDM-FSO transceiver development.

INVENTION ADVANTAGES

- Increase link coverage for remote agriculture fields, Fig. 5 and 6.
- Frequency utilization is Compliance to the Federal Communication Commission (FCC).
- Fast installation and cost effectiveness.
- Compliance to Restriction of Hazardous Substances Directive (RoHS).
- Environmental friendliness; immune to EMI/RFI radiation and provide eye safety at higher wavelength.

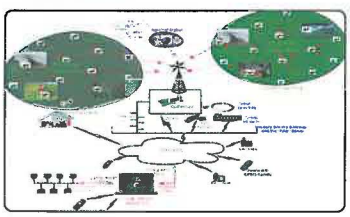

Fig. 1 WSN-Hybrid (FSO/RF) Agriculture Application.

Fig. 2 Routing Agriculture Network Application.

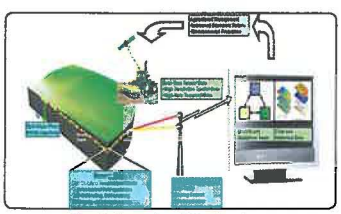

Fig. 3 Farming Monitoring.

Fig. 4 Space Solution Agriculture Application.

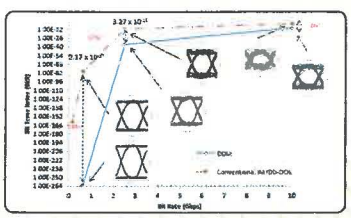

Fig. 5 Data bit rate performance of DDM versus CIM/DD-OOK for 1.5 km link.

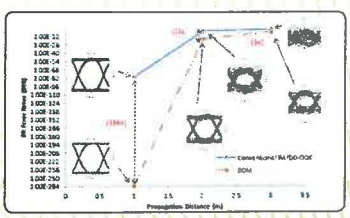

Fig. 6 Link performance of DDM versus CIM/DD-OOK for 622 Mbps bit rate.

PUBLICATIONS

- Rahman A.K, AlJunid S. A., Anuar M. S., Fadhil H.A., A.R. Arief, C.B.M.Rashidi, et al., *Wulfenia*, 2014. (IF: 0.467)
- Rahman A.K, AlJunid S. A., Anuar M. S., Fadhil H.A., et al., *Key Engineering Material*, 2014. (Scopus)
- Rahman A.K, AlJunid S. A., Anuar M. S., Fadhil H.A., et al., *Journal of Theoretical and Applied Technology*, 2013. (Scopus)