MyHVnet Newsletter

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MyHVnet is the abbreviated name for Malaysian High Voltage Network – a networking group for high voltage engineering in Malaysia.

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2017 MyHVnet AGM

SERDANG, 12 January 2017 – Malaysian High Voltage Network (MyHVnet) 2017 Annual General Meeting (AGM) was held on 12 January 2017 at the Faculty of Engineering, Universiti Putra Malaysia (UPM). It was attended by 28 high voltage experts from 11 organisations (from universities and industries) throughout Malaysia. Some of the attendees first visited the High Voltage Laboratory, Department of Electrical and Electronic Engineering, Faculty of Engineering, UPM, led by Prof. Ir. Dr. Mohd. Zainal Abidin Ab. Kadir of

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MyHVnet members at the 2017 MyHVnet AGM.

2017 IEEE DEIS Malaysia Chapter AGM

SERDANG, 12 January 2017 – The 2017 Annual General Meeting (AGM) of IEEE (Institute of Electrical and Electronics Engineers) Dielectrics and Electrical Insulation Society (DEIS) Malaysia Chapter was successfully held on 12 January 2017 at Universiti Putra Malaysia (UPM), Selangor, Malaysia.

The meeting was attended by active members of IEEE DEIS Malaysia Chapter and chaired by Chapter Vice Chair, Associate Professor Ir. Dr. Mohd Kamarol Mohd Jamil.

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Group photo during IEEE DEIS Malaysia Chapter AGM.

MyHVnet 2017-2018 Chairman's Remarks

Prof. Ir. Dr. Mohd Zainal Abidin Ab. Kadir, Universiti Putra Malaysia

I am delighted that the second Annual General Meeting (AGM) was successfully held at Universiti Putra Malaysia (UPM) with around 30 strong members of Malaysian High Voltage Network (MyHVnet) turned up for this meeting. It was really a wonderful and fruitful two years experiences under the leadership of Prof. Dr. Zulkurnain Abdul Malek of Universiti Teknologi Malaysia (UTM) who has steered MyHVnet to this level. It is indeed a great task for me to lift it further and to become a leading group locally and internationally. We have to work very hard to make ourselves visible. The strength of MyHVnet truly depends on each member's effort in keeping up the frontier research, collaboration works and promoting its strength. Ones should see this MyHVnet as a platform for complementing each other's work and strength, instead of competing and overlapping in carrying research works. This is also a great opportunity to bridge the gap between academics and industries and thus working as a team in high-voltage related research and development. I am sure that many great things can be achieved through this synergy which can be beneficial to the nation and its people. With the advancement in technology and demand in the energy supply, high voltage will emerge as one of the important and niche fields towards the economic transformation. Therefore, our research must be focussed and in line with these needs. We need to work very hard and I wish all the best to MyHVnet members.

MyHVnet 2015-2016 Chairman's Remarks

Prof. Dr. Zulkurnain Abdul Malek, Universiti Teknologi Malaysia.

It has been two wonderful years during which I had the honour to chair our prestige conglomerate of various institutions in Malaysia in the name of Malaysian High Voltage Network (MyHVnet). I can summarise our achievements as follows: established MyHVnet in early 2015 with various committee members appointed; gathered an appropriate number of petitioners for the successful establishment of the Institute of Electrical and Electronics Engineers (IEEE) Dielectrics and Electrical Insulation Society (DEIS) Malaysia Chapter; successfully organised MyHVnet Colloquium in January 2016 with 71 extended abstracts published; and published MyHVnet Newsletter in January 2016. Indeed, we have seen a remarkable progress in collaborations and co-operations among the member institutions including increased interactions between academics and industrial players. Without doubt, MYHVNet has been one of the factors or catalysts towards such co-operations. We are still hoping for more players from both educational and research institutions as well as industries to join MyHVnet in the future. In addition, existing members should be more proactive and aggressive in their pursuit of excellence through collaborative work and engagements. I would like to take this opportunity to thank all MyHVnet committee members for their contributions towards our shared achievements and successes. My special thanks goes to the MyHVNnet secretary, Dr. Lau Kwan Yiew, for his passion and great effort in making MyHVnet vibrant and active throughout. I wish the new chairman Prof. Ir. Dr. Mohd Zainal Abidin Ab. Kadir from Unversiti Putra Malaysia (UPM) all the best and may he bring MyHVnet to greater heights in the 2017-2018 session.

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Inaugural MyHVnet Colloquium Successfully Organised

JOHOR BAHRU, 25 January 2016 – The 2016 Malaysian High Voltage Network (MyHVnet) Colloquium, which was also the very first colloquium for MyHVnet, was successfully held at the Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Johor Bahru on 25 January 2016. The colloquium, being a biennial key event by MyHVnet, was organised to promote networking among academicians, industrialists, and students in Malaysia for the effective communication of high voltage related research and development. The Institute of High Voltage and High Current of Universiti Teknologi Malaysia was the host institution for the colloquium.

The 2016 MyHVnet Colloquium featured five technical tracks, i.e., lightning, insulation and electrical discharges, condition monitoring, transformers, and other high voltage related areas. During the colloquium, five invited talks associated with the tracks were delivered by working professionals from various Malaysian organisations. They were "Challenges in Condition Monitoring" by Dr. Hidayat Zainuddin from Universiti Teknikal Malaysia Melaka, "Asset Management of Transformer Fleet: An Overview" by Mr. Mohd Aizam Talib from Tenaga Nasional Berhad Research, "Comparison of Partial Discharge Models in Condition based Monitoring" by Dr. Hazlee Illias from Universiti Malaya, "The Evaluation of Lightning Return Stroke Current Using Measured Field" by Dr. Mahdi Izadi from Universiti Putra Malaysia, and "Partial Discharge Location Technique for Covered-conductor Overhead Distribution Line" by Dr. Muzamir Isa from Universiti Malaysia Perlis. In addition, the colloquium received 71 extended abstracts for oral presentations by academicians, industrialists, and students from various organisations across Malaysia; the total number of registered participants was 104.

MyHVnet wishes to thank all the participants of the colloquium for sharing their work on high voltage engineering during the colloquium. MyHVnet would also like to acknowledge the committee members for their voluntary efforts and contributions for making the colloquium a success. The next MyHVnet Colloquium will be held again in 2018 – see you again then! More details on MyHVnet is available at http://ivat.utm.my/myhvnet/

Dr. Lau Kwan Yiew, Universiti Teknologi Malaysia.

Group photo during 2016 MyHVnet Colloquium.

Opening ceremony of 2016 MyHVnet Colloquium.

Registration during 2016 MyHVnet Colloquium.

Promoting IEEE DEIS Malaysia Chapter

MALACCA, 29 November 2016 – In conjunction with the 2016 IEEE 6th International Conference on Power and Energy (PECON) held from 28-29 November 2016 at Hatten Hotel Melaka, the committee members of the IEEE DEIS (Dielectrics and Electrical Insulation Society) Malaysia Chapter, Dr. Lau Kwan Yiew and Dr. Hidayat Zainuddin, set up a promotion booth for DEIS. The main objective for setting up the booth was to bring awareness to the public, especially those attending the conference, on the presence of the recently established IEEE DEIS Malaysia Chapter in Malaysia, and to promote activities relevant to DEIS.

Dr. Lau (left) and Dr. Hidayat at the IEEE DEIS Malaysia Chapter's promotion booth during PECON 2016.

For the dielectrics community in Malaysia to enhance networking and stimulate research and development in the field of dielectrics and electrical insulation, IEEE DEIS Malaysia Chapter was established in Malaysia in mid-2015. Its field of interest is in line with that of DEIS, i.e., the study and application of dielectric phenomena and behavior and the development, characterization and application of all gaseous, liquid and solid electrical insulating materials and systems utilized in electrical and electronic equipment. Through committees, IEEE DEIS Malaysia Chapter hopes to promote the close cooperation and exchange of technical information among its members.

Those joining DEIS will have the possibility of networking with a large number of experts worldwide, including Malaysia (through IEEE DEIS Malaysia Chapter), to show the results of their research activity or remain informed in the latest developments in their field. For more information, please visit:

http://deis.ieeemy.org/ (IEEE DEIS Malaysia Chapter)

http://www.ieeedeis.org/ (IEEE DEIS)

Dr. Lau Kwan Yiew, Universiti Teknologi Malaysia.

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MyHVnet Members Visiting the High Voltage Laboratory of Universiti Putra Malaysia

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Universiti Putra Malaysia (UPM), the newly elected 2017-2018 MyHVnet Chairman. All the attendees later on sit in the AGM which took place at Dewan Seminar, Faculty of Engineering, UPM, chaired by Prof. Dr. Zulkurnain Abdul Malek of Universiti Teknologi Malaysia (UTM), i.e., the 2015 -2016 MyHVnet Chairman.

Prof. Dr. Zulkurnain addressed his hopes that the year 2017 will see a better chance for MyHVnet to excel, especially to extend the collaboration between universities and industries throughout Malaysia. To date, MyHVnet have had 2 meetings previously, i.e., one each in 2015 and 2016, one colloquium on 26 January 2016, and published 1 newsletter in January 2016.

The AGM was later on followed by the endorsement of the 2016 Meeting Minutes, 2016 Treasurer's Report,

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MyHVnet members at the High Voltage Laboratory, Department of Electrical and Electronic Engineering, Faculty of Engineering, Universiti Putra Malaysia.

2017 IEEE DEIS Malaysia Chapter Committee

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The meeting began with an opening remark by the meeting chair, followed by presentation of Chapter annual report, website, Treasurer's report and account, endorsement of 2016 AGM minutes, dissolution of 2016 committee and the election of 2017 committee.

The elected IEEE DEIS Malaysia Chapter committee members for 2017 are as follows:

Chair: Dr. Lau Kwan Yiew
Vice Chair: Assoc. Prof. Ir. Dr. Mohd Kamarol Mohd Jamil
Secretary: Dr. Hazlee Azil Illias
Treasurer: Dr. Nor Asiah Muhammad
Executive Committee:
Dr. Zulkarnain Ahmad Noorden (Chapter activities)
Dr. Mohd Hafizi Ahmad (Chapter activities)
Dr. Norhafiz Azis (Industrial relation)
Dr. Muzamir Isa (Industrial relation)
Dr. Amir Izzani Mohamed (Publicity and promotion)
Dr. Hidayat Zainuddin (Publicity and promotion)
Dr. Md Nor Ramdon Baharom
Dr. Yanuar Zulardiansyah Arief

The meeting was continued with the appointment of an auditor, address by 2017 Chapter Chair and discussion on activity plans for 2017. Among proposed activities are journal writing workshop, Professional Engineer workshop for academicians, high voltage conference, membership drive, Distinguished Lecturer Program (DLP), dielectric-related workshop/tutorial, industrial talks and industrial visits.

Dr. Hazlee Azil Illias, University of Malaya.

Proceedings of the 9th International Conference on Robotic, Vision, Signal Processing and Power Applications published in LNEE, Springer 2017

GELUGOR, 30 December 2016 – The 9th International Conference on Robotic, Vision, Signal Processing and Power Applications (RoViSP 2016) was successfully held at PARKROYAL Penang Resort Hotel in Penang, Malaysia on 2nd and 3rd February 2016. The RoViSP 2016 was hosted by School of Electrical and Electronic Engineering, Universiti Sains Malaysia (USM). The conference aims to provide an open forum for researchers, scientists, academician, engineers as well as industrial professionals to share knowledge, experience and creative ideas, and to discuss their latest innovations.

With the theme "Empowering Research and Innovation" RoViSP 2016 accepted more than 90 technical papers from various disciplines of electrical and electronic engineering. The papers were classified into a few topics of interest such as follows:

- Robotics, Control, Mechatronics and Automation
- Vision, Image, and Signal Processing
- Artificial Intelligence and Computer Applications
- Electronic Design and Applications
- Biomedical, Bio-Engineering and Applications
- Telecommunications, RF, Antenna and Applications
- Power Systems, High Voltage Engineering, and Renewable Energy
- Electrical Machines, Drives and Power Electronics
- Numerical Computations and Optimizations
- Sensors and Sensing Techniques

The conference started with the opening remarks by Assoc. Prof. Ir. Dr. Dahaman Ishak, the Conference Chairman, followed by the welcoming speech by Dean of School of Electrical and Electronic Engineering and officiated by Prof. Dato' Omar Osman, the Vice Chancellor of USM. There were 2 keynote speeches delivered by Prof. Hanamoto Tsuyoshi from Kyushu Institute of Technology and Prof. Mohd Rizal Arshad from USM after the opening ceremony and another 2 keynote speeches given by Dr Tan Chua Aun from ViTRox Corporation Bhd and Prof David Banjerdpongchai from Chulalongkorn University on the second day of the conference.

The proceedings of RoViSP 2016 has been published in Lecture Notes in Electrical Engineering (LNEE), volume 398, 2017, which is distributed through Springer's print and electronic publishing channels. With this attainment, the RoViSP 2016 proceeding is expected to be indexed in ISI web of science alike as the previous edition of RoViSP 2013 proceeding, which had been indexed in ISI web of science. We hope the achievement of RoViSP 2016 may encourage more researchers, scientists, engineers and academician as well as industrial professionals in various disciplines of electrical and electronic engineering to submit their technical papers and participate in the upcoming RoViSP 2018 conference.

Associate Prof. Ir. Dr. Mohamad Kamarol Mohd Jamil, Universiti Sains Malaysia.

Group photo of participants of RoViSP 2016.

Proceedings of RoViSp 2016 published in LNEE by Springer.

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New High Voltage Facilities at Faculty of Engineering, Multimedia University

CYBERJAYA, 31 October 2016 – In October 2016, a 300kV, 10 kA, 30kJ Impulse Voltage / Current Generator test system was successfully installed and commissioned at the High Voltage (HV) Laboratory, Multimedia University (MMU). The High Voltage Laboratory is one of the laboratories under the Centre of Electric Energy and Automation (CEEA) of the university.

On the 13th May 2016, Prof. A. Haddad of Cardiff University, UK, Ir. Noradlina, Ms. Nurul Azlina, and Mr. Shahirad of TNB Research (TNBR), Mr. Surian Rasol of Teraohm Powermark Sdn. Bhd., Dr Rohisyam and Dr Saufi of Universiti Tun Hussein Onn Malaysia (UTHM), and Dr Fahmi of Universiti Kuala Lumpur (UniKL) witnessed part of the installation and commissioning work done at the HV laboratory. It was later followed by some discussions among the participants.

Part of the commissioning tests in HV laboratory at MMU.

Due to the importance of site measurements on earthing systems under high impulse conditions, the impulse generator was designed such that it can be mobilised to the required sites for testing. The unit can also be used for training, education, and research and is suitable for the testing of electrical equipment such as lightning arresters, grounding systems, insulators, bushings.

Since collaboration has been an integral part of research for a long time, CEEA members would like to take this opportunity to welcome any proposals for future collaboration with other universities and companies.

Associate Prof. Ir. Dr. Normiza Mohamad Nor, Multimedia University.

The HV equipment can be mounted on a lorry for field measurements.

Visit of Ministry of Energy, Green Technology and Water (KeTTHA) to TNB Research

KAJANG, 24 November 2016 – TNB Research (TNBR) Sdn. Bhd. had the honour of being visited by the Head of Secretary KeTTHA, Ybhg. Dato' Seri Dr. Ir. Zaini bin Ujang, to monitor the projects that were being conducted under the AAIBE fund. Accompanying the Head of Secretary KeTTHA, were TNBR's General Manager of Transmission and Distribution, Dr. Mohd Fadzil Mohd Siam, General Manager of Generation, Dr. Mohd Hariffin Boosroh, Senior Managers and Researchers from TNBR. The guest of honor was escorted around TNBR's laboratory to view the latest research activities and innovations

Ybhg. Dato' Seri Dr. Ir. Zaini bin Ujang.

One of the laboratories that was visited by Dato' Seri Dr. Ir. Zaini bin Ujang was the gas analysis laboratory. The "Development of Gas Analysis Laboratory for Reduction of Greenhouse Gas in Energy Industries" project was one of his key interests during the visit. A short presentation by Mr. Mohd Nur Khaidir and Dr. Avinash Ashwin Raj about TNBR's initiative to reduce the usage of SF_6 (Sulfur Hexaflouride) in the power industry was presented. The focus to reduce SF_6 gas is because it is a potent greenhouse gas with a global warming potential of 23,900 times of CO_2 (carbon dioxide).

Scene during the visit.

Ir. Sanuri Bin Ishak, Dr. Avinash Raj, Mohd Nur Khaidir, High Voltage Diagnostic Laboratory, TNB Research Sdn. Bhd.

Group photo.

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Partial Discharge Sensors Made from Recycled Material Won Several International Awards

PERLIS, 01 November 2016 – In high voltage (HV) engineering, partial discharge (PD) is an electrical discharge or a spark that bridges a small portion of an insulation material. PD resembles a cancer in an insulated cable before a fault happens. Therefore, a PD sensor has to be installed in an existing power network during operation while minimising the risk of failure to the network. The low detection limit (in terms of sensitivity and frequency) of a PD sensor is a fundamental limitation for PD measurements, and is a major concern in insulation monitoring. High frequency current transformer (HFCT) has traditionally been used well for the measurement because of its additional ability to produce higher outputs needed by electromechanical equipment. However, issues like saturation, size, weight and high costs are among the factors that limit its common usage as a PD monitoring sensor.

Wireless inductive coil sensor made from ABS for PD detections.

Dr. Muzamir and his doctoral student (Muhammad Nur Khairul Hafizi) from the School of Electrical System Engineering, Universiti Malaysia Perlis (UniMAP) recently came out with an inspiring design of a wireless inductive coil sensor that is both cost effective and efficient (with high sensitivity and wide bandwidth) as a smart on-line PD detection technique in HV power distribution systems. The area of condition monitoring for the sensor is up to a range of 0.5 km radius. The core sensor, which is made from the recycled Acrylonitrile Butadiene Styrene (ABS) filament material using the Marker Bot Replicator 2X 3D printer, produces higher accuracy based on the geometry of the sensor. It should be noted that ABS is a preferred plastic for engineering product in professional applications. The ABS material is light in weight, low in cost, and has high temperature resistance, so is advantageous over many other materials.

Assoc. Prof. Dr. Muzamir (left) and Prof. Dr Syed Idris showing their inventions

The invention by Dr. Muzamir and his student possesses potential novelty and industrial applicability. The invention has won several awards in a number of international exhibitions including the 2015 and 2016 Innovation and Technology Exhibition (ITEX), the 2016 Bangkok International Intellectual Property, Invention, Innovation and Technology Exposition (IPITEX), the 2016 Istanbul International Inventions Fair (ISIF), and the 2016 Seoul International Invention Fair (SIIF).

Assoc. Prof. Dr. Muzamir Isa, Universiti Malaysia Perlis.

Workshop on Paper Writing for IEEE TDEI

KUALA LUMPUR, 31 March 2016 – The Institute of Electricl and Electronics Engineers (IEEE) Dielectrics and Electrical Insulation Society (DEIS) Malaysia Chapter has successfully organised a Workshop on "How to Write Papers for IEEE Transactions on Dielectrics and Electrical Insulation (TDEI)" on 31st March 2016 in Universiti Teknologi Malaysia (Kuala Lumpur Campus). The workshop was also supported by Institute of High Voltage and High Current (IVAT), Universiti Teknologi Malaysia (UTM), Malaysian High Voltage Network (MyHVnet) and University of Malaya High Voltage Research Group (UMHVRG).

The lead facilitator of the workshop was Dr. Hazlee Azil Illias, from the Department of Electrical Engineering, University of Malaya, who is the current Head of UMHVRG. The workshop was attended by 15 participants, whom majority of them consists of postgraduate students and a small number of academic staffs and from industry.

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High Voltage Calibration, Testing, Consultancy, Training, Research and Development at Institute of High Voltage and High Current, Universiti Teknologi Malaysia

Introduction

- The Institute of High Voltage and High Current, or in Malay, Institut Voltan dan Arus Tinggi (IVAT), was established in Universiti Teknologi Malaysia in 1991
- IVAT's establishment stems from the need of the country for a centre which carries out research and development, testing and calibration work, and training in the field of high voltage engineering
- IVAT is a laboratory accredited under the Laboratory Accreditation Scheme of Malaysia and meets the requirements of MS ISO/IEC 17025:2005 (general requirements for the competence of testing and calibration laboratories)

Accredited Calibration and Testing Services

Ensure the reliability of your high voltage equipment through

Accredited Calibration & Testing Services

STANDARDS MALAYSIA ACCREDITED LABORATORY

MS ISO/IEC 17025
CALIBRATION
SAMM NO. 285

Accredited scope of calibration:

- AC – up to 180 kV rms
- DC – up to 180 kV
- Impulse – 50 kV to 140 kV
- High current – up to 1000 A

STANDARDS MALAYSIA ACCREDITED LABORATORY

MS ISO/IEC 17025
TESTING
SAMM NO. 709

Accredited scope of testing:

- Power cable AC voltage withstand test from 2 kV to 180 kV at 50 Hz

Research and Development

IVAT has 2 main research divisions covering comprehensive research on high voltage engineering:

Lightning Research and Safety Division:

- Lightning monitoring, detection, and protection system
- Lightning characterization, electromagnetic field, and radio frequency emission
- Overvoltage protection system and insulation co-ordination, measurement techniques, surge arresters, and magnetic engineering
- Grounding system improvement and measurement method
- Super capacitor application in high voltage systems
- Electromagnetic compatibility and interference in high voltage systems

Dielectrics, Discharges and Diagnostics Division:

- Electrical discharge, detection, and monitoring
- Partial discharge analysis on polymeric insulating materials
- Condition monitoring of high voltage equipment
- Diagnosis and fault analysis
- Forensic investigation
- Material assessment
- Plasma and ozone generation applications
- Low voltage and telecommunication surge protective devices

Consultancy and Training Services

IVAT offers consultancy services for the following areas:

- Laboratory accreditation based on MS ISO/IEC 17025: 2005
- Lightning protection systems for buildings
- Protection systems for electrical power networks
- Grounding systems installations
- High voltage product development
- Low voltage and telecommunication surge protective devices

IVAT also organises training, visits, workshops, seminars and short courses. Some popular modules include:

- Electrical Safety Seminar
- Fundamentals of High Voltage Technology
- Three-day Short Course on High Voltage Testing Techniques and Safety
- Two-day Short Course on Grounding Systems
- Short Course on Lightning Protection for High and Low Voltage Systems
- Short Course on Partial Discharge Phenomena

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Opinion: High Voltage Research at Universiti Malaysia Pahang

At Universiti Malaysia Pahang (UMP), I am the only researcher in high voltage engineering. Research on high voltage engineering as conventionally known, requires expensive and huge apparatuses such as those available at the Institute of High Voltage and High Current, Universiti Teknologi Malaysia and other well-known universities. Since these apparatuses are not available at UMP, I am motivated to carry out high voltage research at a broader aspect such as applications of high voltage itself with low current regions. This can be translated into the application of electric fields generated by high voltage to be used as energy sources for moving dielectric elastomer actuators or moving dielectric liquids. If successfully developed, the weight of conventional motors to drive robot hands or motor pumps for liquid pumping can be reduced.

Knowledge on electrostatics enables the development of engine oil quality sensors. The production of carbonised-particles during engine running time may disturb the ability of free charges to pass through it. Thus, by applying high voltage between a 1 mm gap, we will be able to determine the quality of the engine oil throughout the mileage of a vehicle through the variation of current produced. Further studies are needed in determining the quality of oil with regard to the travelling distance of a vehicle. This kind of sensor can also be used at a night market stall which uses a lot of oil for cooking purposes. This is important because the by-product of cooking oil could contain carcinogen.

High voltage-low current can also be used as an electrical discharge source. Therefore, plasma jet devices have recently been developed at with the aim for surface treatments and medical applications. A plasma jet has a low temperature high-ion radical condition and can be used for medical surgeries for cutting tissues. Recently, the automobile industry applies plasma jet treatments on vehicles before paint coatings to improve the quality and durability of the paints. Figure 1 shows the plasma jet device made at the Faculty of Electrical and Electronic Engineering (FKEE), UMP.

Fig. 1 AC plasma jet with argon gas at FKEE UMP.

UMP is the only full engineering university located at the east-coast of Malaysia, and is near to the location for the oil and gas industry in Malaysia. The industry has a plenty of combustible materials and may cause catastrophic accidents even with a small ignition. Fire can be caused by the availability of oxygen, fuel and igniter. An ignition can be produced not only by cigarette, but also by electrostatic discharges due to the friction between materials. When dielectric materials collide or have friction with each other, charges in the materials will polarise and cause a potential difference to happen. As the potential difference exceeds the limits that the materials are not able to withstand, electrostatic discharges will occur. For example, a petrochemical plant that produced polyethylene in Malaysia caught fire in 2015. The fire was suspected to be ignited by electrostatic discharges in the silo used to store polyethylene; as the polyethylene pellets were dried with air in the silo, they kept moving and colliding with each other, thus generating electrostatic discharges.

Meanwhile, Malaysia is a region with a high probability of lightning occurrence. It has been an interesting topic to understand how lightning occurs and how people can benefit from it. Recently, there are interests to harvest energy from lightning. Above the thundercloud, there are several lightning types that cannot be commonly observed. This group of lightning phenomenon is called Transient Luminous Event (TLE). At the moment, we at UMP are trying to capture the TLE event from the second floor of the FKEE block 1 by using a monochrome camera. Hopefully, successfully capture TLE can assist in our future research on TLE.

Dr. Amir Izzani Mohamed, Universiti Malaysia Pahang.

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IEEE International Conference on High Voltage Engineering and Application (ICHVE 2016)

CHENGDU, 30 September 2016 – The 5th IEEE International Conference on High Voltage Engineering and Application (ICHVE 2016) was successfully held in Days Hotel Suite, Dading Chengdu from 18th to 23rd September 2016. Assoc. Prof. Ir. Dr. Normiza presented the paper entitled 'Methodologies of Impulse Tests on Earthing Systems by Field Measurements with Different Remote Earth' in one of the oral sessions.

ICHVE 2016 was organised by Chongqing University, Chengdu China, Southwest Jiaotong University, and Mississippi State University. ICHVE 2016 was sponsored by the Institute of Electrical and Electronics Engineers (IEEE) Dielectrics and Electrical Insulation Society (DEIS), technically co-sponsored by National Natural Science Foundation of China, the Chinese Society for Electrical Engineering, and the China Electro-technical Society. It was supported by Qingdao TGOOD Electric Co. Ltd & Chuan Kai Electric Co. Ltd and Yangzhou Xin Yuan Electric Co. Ltd.

Assoc. Prof. Ir. Dr. Normiza with Prof. I. Gonos, one of the Chairpersons for her Oral Session in the 5th ICHVE 2016.

The conference provided an excellent platform to share knowledge and experiences on high voltage engineering, and on the latest achievements in power engineering, including topics of ultra high voltage, smart grid, new insulation materials and their dielectric properties.

The technical programme of the conference consists of papers presented in oral, poster, and plenary sessions covered a broad range of areas such as:

- High Voltage Insulation System and New Insulation Materials
- Aging,Space Charge, and Industrial Applications
- Online Condition Monitoring, Fault Diagnosis
- Outdoor Insulation: Insulator, Environmental Effects
- Electromagnetic Fields: Computation, Measurement
- New Features and Special Interests in High Voltage Engineering
- High Voltage Cable Insulation
- Insulation of High Voltage Transformer and Machine
- Aging, Space Charge and Grounding Systems
- High Voltage Apparatus: Reliability and Maintenance
- Grounding Systems
- Transients and EMC: Lightning, Switching and Repetitive Transients

More than 200 papers from the conference will be published in IEEE Xplore. The next ICHVE will be organised by National University of Athens, Greece, in 2018.

(Part of the text above was excerpted from http://www.ichve2016.cqu.edu.cn/index.php/ichve/callforpapers)

Associate Prof. Ir. Dr. Normiza Mohamad Nor, Multimedia University.

MyHVnet 2017-2018 Committee

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and dissolution of the 2015-2016 Committee. The election of the 2017-2018 Committee (with specific tasks) came next, with a few new committee members appointed, and many of the previous committee members maintained, in order to ensure a smooth transition for MyHVnet. The newly elected 2017-2018 MyHVnet Committee members are as follows:

Chairman:
Prof. Ir. Dr. Mohd. Zainal Abidin Ab Kadir (Universiti Putra Malaysia)

Co-chairman:
Assoc. Prof. Ir. Dr. Mohd. Kamarol Mohd. Jamil (Universiti Sains Malaysia)

Secretary I:
Dr. Wan Fatinhamamah Wan Ahmad (Universiti Putra Malaysia)

Secretary II:
Dr. Nor Asiah Muhamad (Universiti Sains Malaysia)

Treasurer:
Dr. Mohd. Taufiq Ishak (Universiti Pertahanan Nasional Malaysia)

EXCOMM Members (Specific Portfolio):
Industrial Relations:
Ir. Surian Rasol (Grandtop High Voltage Technology Sdn. Bhd.)

Industrial Visits:
Ir. Iryani Mohamed Rawi (Tenaga Nasional Berhad Transmission)

Newsletter:
Dr. Lau Kwan Yiew (Universiti Teknologi Malaysia)
Dr. Norhafiz Azis (Universiti Putra Malaysia)

Database:
Dr. Mohd. Hafizi Ahmad (Universiti Teknologi Malaysia)

Website:
Dr. Zulkarnain Ahmad Noorden (Universiti Teknologi Malaysia)

General:
Assoc. Prof. Dr. Muzamir Isa (Universiti Malaysia Perlis)
Ir. Sanuri Ishak (TNB Research)
Dr. Amir Izzani (Universit Malaysia Pahang)
Dr. Hazlee Illias (Universiti Malaya)
Dr. Hidayat Zainuddin (Universiti Teknikal Malaysia Melaka)
Mr. Mohd. Nor Khaidir Hussein (TNB Research)

Among the highlights concluded from the 2017 MyHVnet AGM were publications would be from the MyHVnet Newsletter, plus the biennial MyHVnet Colloquium, with the next round to be held in January 2018 at UPM. Also, MyHVnet members were encouraged to participate in activities organised by the Institute of Electrical and Electronics Engineers (IEEE) Dielectrics and Electrical Insulation Society (DEIS) Malaysia Chapter, especially in the planning for a flagship conference for IEEE DEIS Malaysia Chapter and several technical visits to be organised together with IEEE DEIS Malaysia Chapter in the near future.

In the closing remark, Prof. Ir. Dr. Mohd Zainal thanked the whole 2015-2016 MyHVnet committee on their relentless efforts in bringing MyHVnet to reality. He hoped that MyHVnet will continue to be the best platform to establish a strong collaboration between universities and industries in Malaysia in high voltage related matters. He also wished all the best to the newly elected 2017-2018 MyHVnet Committee members.

Dr. Wan Fatinhamamah Wan Ahmad, Universiti Putra Malaysia.

Some of the MyHVnet members at the 2017 MyHVnet AGM.

Prof. Mohd. Zainal was addressing his speech to MyHVnet members.

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Discussion: On the Replacement of SF_6 in HV Applications

In an electricity network, some of the high voltage applications make use of sulphur hexafluoride (SF_6) gas as an insulation medium, such as in the gas insulated transmission line (GIL), gas insulated switchgear (GIS), and gas circuit breaker (GCB). Due to its superior insulation properties, SF_6 has been the primary insulator for many high end electrical applications. However, many studies show that SF_6 greenhouse effects raise concerns to its environmental impact. There are three major types of global warming potential (GWP) gases: these are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and SF_6. In addition to having high GWPs, SF_6 and PFCs have an extremely long atmospheric lifetime, resulting in an accumulation in the atmosphere once released [1]. Some of the studies in the awareness of the hazard caused by SF_6 have been well described in the following statements:

"SF_6 is a strong greenhouse gas and the molecule is very resistant against attack in the atmosphere. The natural self-cleansing property of the atmosphere is insufficient to deal with such super molecules. Its production is now restricted under the Kyoto Protocol." [2]

"Sulfur hexafluoride is the most potent greenhouse gas in existence. With a global warming potential 23,900 times greater than carbon dioxide, one pound of SF_6 has the same global warming impact of 11 tons of carbon dioxide." [3]

"The atmospheric lifetime of SF_6 is 3,200 years, which results in essentially irreversible heat trapping within the atmosphere." [4]

For that reason, the electrical power industry has been working hard to find a replacement for SF_6 with a smaller GWP and less environmental impact. Until recently, researchers have been trying to find suitable alternatives for SF_6. Gases and gas mixtures, especially the ones containing carbon (C) and fluorine (F), can have better dielectric strength than SF_6. Some perfluorocarbons and related mixtures are showing breakdown strengths as high as 2.5 times that of SF_6, but these are also greenhouse gases [5].

One of the very promising candidates is trifluoroiodomethane (CF3I). Due to its high boiling point property, CF_3I gas is mixed with other gases such as CO_2 and N_2 to provide a more practical way of deploying it as an insulation medium, since CO_2 and N_2 have lower boiling temperatures. But those were the cases in countries with four seasons. In Malaysia however, or tropical countries, there is no winter, hence there is no need to mix CF_3I with other gases, since our temperature will not fall below its boiling point. Hence, there is a possibility of using CF_3I as an insulator, and we can be the pioneer in using them. But more research works have to be carried out, particularly in terms of its effects on the high voltage equipment in the long run.

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Dr. Muhammad Saufi bin Kamarudin, Universiti Tun Hussein Onn Malaysia.

UTeM High Voltage Engineering Research Laboratory's Open Day

MALACCA, 26 May 2016 – The High Voltage Engineering Research Laboratory (HVER Lab), Universiti Teknikal Malaysia Melaka (UTeM) in collaboration with the IEEE DEIS Malaysia Chapter have successfully organised the HVER Open Day on 10th and 26th May 2016. The program was mainly for the third year undergraduate students of Industrial Power Course at the Faculty of Electrical Engineering, UTeM. During the program, students were exposed with safety procedures and research activities in the HVER Lab.

Various scenes during HVER Lab Open Day at UTeM.

The objectives of the program are to provide early exposure and sparking students' interest in the field of high voltage engineering before they undertake final year project in the following semester. To note, the high voltage engineering subject is only offered in the final semester of their study. Thus, this program is an initiative to assist them to see a wider view of potential field of project particularly related to high voltage.

In addition, the program is also beneficial for their preparation before undergoing industrial attachment at any electrical power related companies in terms of basic knowledge associated with high voltage insulation. It is also promoting a higher prospect of furthering their studies to Master or PhD level.

Dr. Hidayat Zainuddin, Universiti Teknikal Malaysia Melaka.

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PhD studies at University of Malaya High Voltage Research Group (UMHVRG)

Greetings,

We would like to invite applications for Doctor of Philosophy (PhD) studies for projects in University of Malaya High Voltage Research Group (UMHVRG). The scopes of the projects include but are not limited to:
- Partial discharge measurement and simulation
- Dielectric material characterisations
- Artificial intelligence techniques in condition monitoring
- Optimisation techniques in high voltage equipment parameters' estimation
- Other high voltage engineering studies

STUDY MODE: Full-time research (Minimum 2 years and maximum 4 years)

REQUIREMENT:
- Academic qualification:
  - [Bachelor's Degree in Electrical Engineering with CGPA ≥ 3.7 or equivalent] OR;
  - [Bachelor's Degree in Electrical Engineering with CGPA ≥ 3.0 or equivalent] AND [Master by research in Engineering OR Master by Coursework in Engineering with CGPA ≥ 3.00]
- Self-funded or having scholarship
- Proficient in English language (written and spoken)
- Pleasant personality, hardworking and self-motivated
- Ability to carry out research work independently, quickly and efficiently
- Willing to write review and research papers

Advantages of pursuing PhD in UMHVRG:
- Widely experienced supervisors
- Great high voltage laboratory facilities
- Excellent working environment
- Friendly and helpful colleagues
- Top-class facilities in University of Malaya

Interested candidate please send your resume with academic qualifications, transcripts and research proposal to Dr. Hazlee Illias at h.illias@um.edu.my anytime throughout the year.

For more information on University of Malaya High Voltage Research Group, please visit http://umhvl.um.edu.my

For more information on guidelines for PhD application, please visit http://ips.um.edu.my/

Thank you.

Participants of IEEE TDEI Paper Writing Workshop

(… continued from page 9)

The objectives of the workshop were: i) to understand the requirements and scope of IEEE TDEI; ii) to learn the skills of writing winning IEEE TDEI papers; and iii) to encourage authors to start writing papers for IEEE TDEI.

Workshop participants.

During the workshop, the participants were briefed about IEEE TDEI's aims and scope, criteria of acceptable papers and how to write a paper title, abstract, introduction section, methodology, results, discussion, conclusions and references. Participants were also trained on how to write a paper title and an abstract based on their research work through hands-on sessions.

From the workshop, it was hoped that many papers from institutions across Malaysia could be submitted to IEEE TDEI and accepted for publication.

Dr. Hazlee Azil Illias, University of Malaya.

Article: Evaluation of Unsynchronized Signals for Locating Partial Discharge Source in Medium Voltage Lines

Muzamir Isa, Haziah Abdul Hamid and Nuriziani Hussin
School of Electrical System Engineering, Universiti Malaysia Perlis (UniMAP)
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Abstract

A correlation of unsynchronized multi-end windows technique is used for locating partial discharge (PD) source in medium voltage lines. The maximum correlation factor between signal arrivals at two-end measuring points is used in order to find the ratio of correlation. Then the ratio of correlation signals is plotted against its ratio of distance difference. The graph is plotted using LAB Fit software. The algorithm is developed and tested by the means of simulation. Electromagnetic Transient Program-Alternating Transient Program (EMTP-ATP) is used to implement and analyze a PD monitoring system. The proposed algorithm performance is evaluated by extracting the high frequency features using windowed-standard deviation (STD). The simulated evaluation proves that an accurate PD source location can be achieved using the proposed algorithm technique.

Introduction

Detection and location of partial discharge (PD) pulse source is becoming an important task in order to locate the PD source location on the overhead and underground power lines. Active research in highly distributed systems of small, wireless, low-power, unattended sensors and actuators are results of recent advances in efficiency and low-cost, low-power design [1-3]. Researchers aim to invent 'smart-environments' with deployment of thousand sensors. Synchronization means two items are adjusted to do the same thing. Distributed wireless sensor networks make use of synchronized time extensively. Time synchronization is a critical infrastructure for any distributed system. The main error sources of synchronization are from global positioning system (GPS) timing error. The accuracy of the GPS received signal is a function of the error. The GPS signals are also affected by the same types of phenomena as found in microwave-range systems. Both types of systems are highly affected by humidity and multi-path. Humidity can delay a time signal up to approximately 3 m. Sunspots and other electromagnetic phenomena cause errors in GPS range measurements of up to 30 m during the day and as high as 6 m at night. Such errors can be estimated, although they are not predictable [3], [5-8].

Correlation of unsynchronized multi-end windows

The opportunity to improve the PD location accuracy emerges since the rapid development of effective means of communication between the line terminals. The first solution appeared is unsynchronized sampling at the line terminals while the synchronized sampling, provided with the GPS, is also coming into applications as well. This section deals with two-end PD location based on unsynchronized measurements. In case of unsynchronized measurements at the line terminals, the gathered measurement data is generally shifted in time. This can be caused by the detection of fault at both the line terminals at slightly different instants, no synchronization of the clocks which are controlling the sampling at the line ends and different sampling rates and/or the phase shifts introduced in the measurement channels. In [1], localization of PD source location on overhead lines using multi-end correlation technique based on three measuring points has been successfully presented. The technique has shown a good result in localization of PD source, provided the synchronization of measured data signal is assured for the correlation. The locator accuracy depends on the time synchronization. In order to avoid the dependency on the time synchronization of measured signals, a correlation of unsynchronized multi-end windows technique is introduced. Based on different location of PD source on line between sensors A and B, the theory of maximum correlation factor is used in order to find the ratio of correlation between two-end unsynchronized-measuring points. The ratio of correlation, *CR* is plot against its ratio of distance difference, *LR*. Referring to Fig. 1;

$$CR = (|MCR_{AA} - MCR_{BB}|)/MCR_{AB} \quad (1)$$

$$LR = (|L_A - L_B|)/L_{AB} \quad (2)$$

$$L_A + L_B = L_{AB} \quad (3)$$

Windowed standard deviation (STD)-based feature extraction is used as the technique to extract the transient PD pulse from the measured signal. This extraction technique has been presented in [1], [4]. MCR_{AA} and MCR_{BB} is the maximum correlation factor for the measured signal at Rogowski coil A and Rogowski coil B respectively. MCR_{AB} is the maximum correlation factor between measured signal at Rogowski coil, A and Rogowski coil, B. L_A is the distance of Rogowski coil A from the PD source, and LB is the distance of Rogowski coil B from the PD source. While L_{AB} is the distance between Rogowski coil A and Rogowski coil B. The ratio of correlation, *CR* stated above in (1) is valid for both cases of $MCR_{AA} > MCR_{BB}$ or $MCR_{AA} < MCR_{BB}$. If $MCR_{AA} > MCR_{BB}$, it means Rogowski coil A is located nearer to the PD source compared to Rogowski coil B ($L_A < L_B$). Meanwhile, if the $MCR_{AA} < MCR_{BB}$, the Rogowski coil B is located closer to the PD source, $L_A > L_B$.

Based on information in (1), (2) and equation (3), the distance of PD source location from Rogowski coil A is determine as:

$$L_A = [(L_{AB}*LR) + L_{AB}]/2 \quad \text{for } MCR_{AA} < MCR_{BB} \quad (4)$$

and

$$L_A = [-(L_{AB}*LR) + L_{AB}]/2 \quad \text{for } MCR_{AA} > MCR_{BB} \quad (5)$$

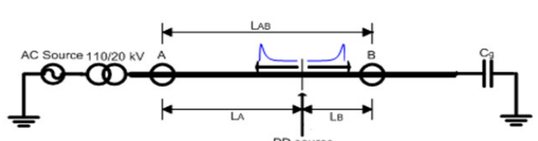

Fig. 1 Simulated three-phase system. *A* and *B*, are measuring points of the Rogowski Coil, C_g is the terminating capacitance to the ground.

Table 1 The Calculation of Ratio of Correlation, *CR* and Ratio of Distance, *LR*

L_A(m)	L_B(m)	*LR*	MCR_{AA}	MCR_{BB}	MCR_{AB}	*CR*
2000	2000	0	$1.68e^{-04}$	$1.68e^{-04}$	$1.68e^{-04}$	0
1800	2200	0.1	$1.65e^{-04}$	$1.68e^{-04}$	$1.65e^{-04}$	0.01464
1700	2300	0.15	$1.64e^{-04}$	$1.69e^{-04}$	$1.66e^{-04}$	0.02866
1600	2400	0.2	$1.63e^{-04}$	$1.73e^{-04}$	$1.68e^{-04}$	0.06187
1500	2500	0.25	$1.62e^{-04}$	$1.76e^{-04}$	$1.67e^{-04}$	0.08781
1400	2600	0.3	$1.62e^{-04}$	$1.80e^{-04}$	$1.69e^{-04}$	0.10933
1300	2700	0.35	$1.62e^{-04}$	$1.80e^{-04}$	$1.71e^{-04}$	0.10785
1200	2800	0.4	$1.61e^{-04}$	$1.83e^{-04}$	$1.71e^{-04}$	0.13118
1100	2900	0.45	$1.60e^{-04}$	$1.89e^{-04}$	$1.73e^{-04}$	0.1679
1000	3000	0.5	$1.61e^{-04}$	$1.94e^{-04}$	$1.76e^{-04}$	0.18281
500	3500	0.75	$1.58e^{-04}$	$2.17e^{-04}$	$1.83e^{-04}$	0.32437
400	3600	0.8	$1.58e^{-04}$	$2.37e^{-04}$	$1.92e^{-04}$	0.41108
300	3700	0.85	$1.57e^{-04}$	$2.62e^{-04}$	$2.02e^{-04}$	0.52086
200	3800	0.9	$1.55e^{-04}$	$2.96e^{-04}$	$2.13e^{-04}$	0.65943
100	3900	0.95	$1.54e^{-04}$	$3.46e^{-04}$	$2.28e^{-04}$	0.84358
50	3950	0.975	$1.54e^{-04}$	$3.78e^{-04}$	$2.40e^{-04}$	0.93411

Simulated study

Considering the network shown in Fig. 1, EMTP-ATP is used to implement and analyze a PD monitoring system. The network is simulated for a case of PD occurs in section A-B on the line. The distance between each Rogowski coil is fixed at 4 km. The simulation started with the PD source is injected on the middle of the conductor line, A -B. Then, the location of PD source is moved at certain distance towards Rogowski coil, B. All measured data are stored. From the simulated study, the ratio of correlation between two measured signals is plotted against its ratio of distance difference, *LR*. The ratio of correlation, *CR* and the ratio of distance difference, *LR* is calculated based on equation in (1) and (2) and shown in Table 1.

The graph is plotted using LAB Fit software as shown in Fig. 2 and the hyperbolical sine equation, $Y = 0.793e^{-3}\sinh(7.588X) + 0.3103X$, is found as the best function correlated to this plot where $Y = CR$ and $X = LR$. Referring to the plotted graph in Fig. 2, the PD source on the lines can be localized using either equation (4) or (5), depends on the values of maximum correlation factor, MCR_{AA} and MCR_{BB}. For example, if the correlation ratio, $CR = 0.0872$, the ratio of distance difference, $LR = 0.25$. Solving the equation in (4), the PD source location is found located at 1.5 km from Rogowski coil A. From this result, the evaluation proves that an accurate PD source location can be achieved using the proposed algorithm technique. This helps to solve the problem the difficulty to get the synchronized measured signals between two measuring point.

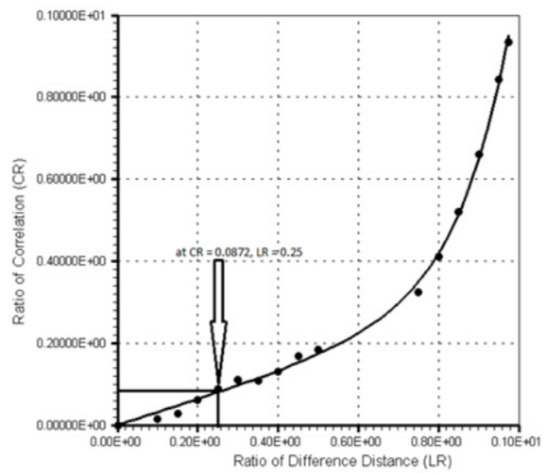

Fig. 2 The Ratio of Correlation against the Ratio of Distance.

Conclusion

For unsynchronized measured signals, the locator function algorithm was developed based on multi-end correlation signals. The ratio of correlation has been plotted against its ratio of distance. The hyperbolic sine equation was found to be the best function correlated with the plotted curve. This technique helps to solve the problem of the unsynchronized measured signals between two measuring points. In future, the performance of locator function algorithm developed in this work can be tested using the unsynchronized measured signals obtained from both the laboratory and the real field. More research need to be done in this direction and field data is required to verify the algorithm. Furthermore, experience in the line modeling is also required.

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Welcome to UTM IVAT

The Institute of High Voltage and High Current (IVAT), Universiti Teknologi Malaysia (UTM) is committed to entertain visits by delegates from not only its own university, but also as far as overseas. The main aim for IVAT organising visits is to share their research, services and consultancy experience to as many people as they could, especially in areas relevant to high voltage engineering.

For interested students from schools or higher learning institutions, the focus of visit would be on IVAT's role in building the nation through their technical support to electrical energy industries to achieve reliable and efficient operations. This is inculcated through their fascinating demonstration on high voltage air discharges (either impulsive or sustainable low current arcs).

For representatives from private companies, IVAT showcases their services and consultancy capabilities, as well as their research achievements, in attempts to increase the return of investments to the university. As for executives of ministerial bodies and government parastatals, IVAT extends their knowledge and experience to open possible collaborations on research works.

A routine visit to IVAT would include a 5-minute video presentation on IVAT, followed by a 10-minute briefing by an IVAT's academician, then a question-and-answer session on any topic relevant to the visit. Interested parties are most welcome to visit IVAT.

Photos taken during various visits to UTM IVAT.

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