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Vidya

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Ministry of Science, Technology and Research

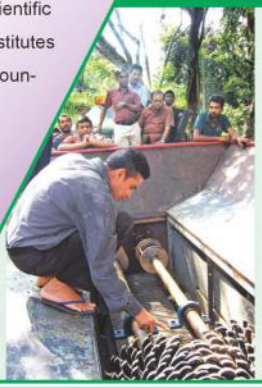
MoU signed between Sri Lanka and Russia to further Science, Technology and Innovation

Mahesh Samarasekara
Media Secretary

On the sidelines of President Maithiripala Sirisena's official tour to the Russian Federation, a bilateral Memorandum of Understanding (MoU) in the field of science, technology and innovation was signed by the relevant ministers of the two countries to further improve our relations in the above fields of research.

On behalf of Sri Lanka, Minister of Science, Technology and Research, Susil Premajayantha inked the agreement while on the Russian side, the Minister in charge of Education and Science, Olga Vasilyeva signed on. The MoU seeks to work on the establishment of a joint science research centre, encourage joint research activities, the exchange of experts and scientists between the two countries and further strengthen existing and individual intra and inter partnerships made between scientific research institutes of the two countries.

Government is ready to further Strengthen The Mechanism of Waste Management



The garbage issue which had caused severe environmental damage and took many human lives in its wake has become the most focused upon and talked about topic of the country at the present time. While various dialogues are taking place focusing on the disposal of solid waste, environmental impacts and human lives, various arguments, suggestions and criticism are leveled at the treatment options that could be adopted as a solution to this grave problem. It was made known by Hiru News on the night of Friday, the 21st that a 35 year old technician ,by the name of WikumSampath ,a resident of Godawela , Gampola, who had foreseen the necessity for a systematic garbage disposal system, had designed a new machine for the management of solid waste.

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Let's get to know the night sky

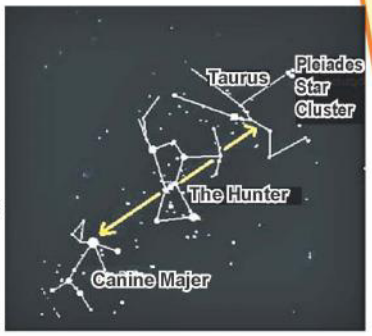
The Sri Lanka Planetarium has decided to introduce a series of articles for children and adults alike who are interested in getting to know the night sky. This is the first article in that series and through this we hope to increase interest among the general public in observing night sky, its star constellations, planets and other treasures of the sky. Our aim through this article is to provide the reader with the information necessary to identify these treasures. The other objective in observing the night sky is to calm one's turbulent mind.

This article has been prepared to coincide with the night sky one can observe at the end of April. As the days go by, the star constellations and relative positions of the planets, move slowly from the East to the West. During the observation of the night sky, we must firstly identify the four main directions in the sky. East and West can be easily identified according to the Sun rise and Sun set. Thereafter if you stand looking to the East, the direction to your right is the South and to your left lies the North. Once this is done, if you have a clear sky on that day, at about 7.00pm, close to the western horizon, you can identify the planet Mars which shines red, brighter than most other stars. At the same time, to the East, a large bright white light will shine to help you identify the planet Jupiter.

The Hunter

Our ancestors who observed this grouping of the brightest stars in the sky created 88 star constellations. Among this 88 star constellations, the 12 star constellations located along the sun's visual path (Ecliptic) are known as the zodiac circle. Let us get to know some of these star constellations.

The picture above shows a star constellation you can identify at around 7.00pm. If you look above your head to the West, you will notice three stars in a row and around that another four. This group of seven stars is surrounded by a few more stars in a circular pattern. This constellation, many can easily identify as the hunter or the Orion star constellation. The three stars in a row depict the hunter's belt. Among the surrounding four stars two are his shoulders and the other two are his knees. On the left knee of the famous hunter constellation is the Rigel star which sits at the seventh position, and to the right shoulder, lies the Betelgeuse star; located at the among the brightest stars in the night sky.



Once the hunter's constellation is recognized, keep in mind the three stars in a row, and follow that line to its North and West in order to trace Taurus. To the opposite of this lies, one of the brightest stars of the night sky; the Sirius star and thisallows you to identify theCanis Major; which the latter belongs to. The three constellations above are shown in the pictures below.

Taurus

The Taurus zodiac sign is depicted by the head of a bull, in this a few of the brightest stars are formed into the shape of the letter "V" stars on the head of the bull and next to it, you can see an open cluster of stars known as the Pleiades star cluster.

Canis Major

Try and identify these star clusters and planets in the night sky.

A presentation by
The Sri Lanka Planetarium

A program to promote Science and technology

The Arthur C. Clarke Institute for modern technology was established through the Act No 11 of 1994 of Parliament to accelerate the process of introduction and development of modern technologies in the fields of Communications, Computers, Energy, Space Technologies and Robotics, through the provision of training and research facilities and is a government agency under the Ministry of Science, Technology and Research.

The Arthur C Clarke's Institute for modern technology regional space applications programme is the National Focal Point for Space Technology Applications in the Island.

In addition, under the careful observation of the Space Application Unit research scientists; research programmes on astronomy, programmes to promote the study of astronomy, the covering of special occasions such as solar eclipses and lunar eclipses are undertaken and constitute some of the main activities of the Institute.

To promote space technology, we provide facilities for research for university students, conduct astronomy programmes for schools children, water boost rocket competitions in schools, camps fornight sky observations and conduct teacher training programmes workshops for officers in the Triforces.

Arthur C Clarke's programmes targeted at the youth involve; practical electronics courses, courses on computer repairs, courses on robotics, workshops on astronomy and space technology and other wide ranging programmes which cover the field of electronics.

The Institute also offers continuous professional development courses for engineers, technicians, and managers related to the field of Microprocessor/ Micro controller system manufacturing, Modern Electronic Test and Measuring Instruments with Digital Emphasis and basic robotics courses among many others. The Institute also is responsible for raising awareness on new technology and information communication technology among the general public.

A few of the workshops organized by the Arthur C Clarke Institute for modern technology to promote science and technology

Sri Lanka will launch its Nano Technology Satellite by 2020

During the President's tour of Russia, relations between Russia and Sri Lanka were further strengthened and the two countries signed on to various MoUs. Minister of Science, Technology and Research, Susil Premajayantha in an interview further elaborated on the MoUs signed between the Russian Ministry of Science, Technology and Education and his ministry.

Could you elaborate further on the MoU signed between Sri Lanka and Russia on science, technology and innovations during the Russian tour?

We entered into a MoU with the Russian Ministry of Science, Technology and Education during the President's last trip to Russia. In that we entered into agreements to further strengthen collaborations and exchanges in the field of education, technology and other relevant fields. In addition we had the opportunity to undertake a tour of the Samara National Research University. They are the pioneers in jet engine manufacturing research in Russia. The manufacturing of nanotechnology has been given prominence in Russia and in addition the university has also made great headway in biotechnology and robotics.

Was there any technological exchanges spoken of between this university and our country?

The Chairman of the Arthur C. Clarke Institute for modern technology and the Vice Chancellor of the Samara University, signed an MoU during the visit. This will allow our scientists and engineers to have the opportunity to visit Russia. At the same time, scientists from Russia can be brought here to aid in research activities in the country. In the same spirit, 12 of our senior engineers and six young engineers have already participated in month's training workshop at Samara University. At the end of this year we hope to send young engineers to complete their PHDs in four relevant sectors. Our goal is also to launch the nanotechnology satellite made by the Arthur C. Clarke Institute for modern technology by 2020. For this we signed an agreement with the Russian institute of Roscosmos. The necessary groundwork for this is now being prepared.

As you have mentioned above,were there any other sectors which had similar study and research conducted?

During our Russian tour we entered into three agreements. We also went on an observation tour of a centre which launches space shuttles from the time of Yuri Gagarin. This centre, has 24 hours, continuous contact with the International Space Station that is 400km away from the Earth's atmosphere. We were able to take away a good understanding of their activities. Russia today is at the forefront of the space field. So we hope to get their assistance in transferring such technologies to our own country, so that we have the ability to get the maximum support needed for our technology field.

What are the changes you expect to make after the President's tour of Russia?

Our young engineers and scientists have been given the opportunity to go there and study space technology. Through that we can produce the technical engineers and scientists in biotechnology and nanotechnology we need. We can also launch our nano satellite, and once we do that we can set up our own GPS system. This can give us the data we need for agriculture and in situations of disaster management. If we achieve this, we will be able to reap great economic benefits and it will be an important step forward in the field of technology.

For now we have chosen the scientists working at the Arthur C. Clarke Institute. Those who are to be sent, should have worked with us for some time, otherwise there will be no benefit in our work. Thus we have now given prominence to the scientists at the Arthur C Clarke Institute and those who are hired by them.

If we are to go beyond Colombo, what are the technological changes we can expect at the village level?

If we take the collapse of the Meethotumulla garbage dump, our scientists took 3D pictures of the disaster site, and we can now find out what would happen to the garbage dump in future. Also we can use this technology to collect data in situations of disaster. This technology can be widely used to identify the likelihood of disasters at any location and to prepare post disaster situation reports on disasters once it has occurred. Thus we can predict disaster prone zones.

What is the level of penetration of technology into our school curriculum?

Our main aim here is to upgrade the 1061 A/L science laboratories to the standard of A/L science laboratories in international schools. We will support the Ministry of Education to achieve this. We are preparing the groundwork for that. We have already chosen four schools to be upgraded as part of a pilot project. This alone will not be sufficient as relevant instructions for this also have to be changed. For this task, we are looking to the aid of four ministries and we hope to take this project, which is at present in the conceptual stage, forward with the input of all. We have come to the point where we have to modernize our subjects, if this does not happen the scientists which come out of our universities will be outdated. We have given leadership to bring about these changes.

What criteria will you use to choose the scientists who are to be sent to Russia?

For now we have chosen the scientists working at the Arthur C. Clarke Institute for modern technology. Those who are to be sent, should have worked with us for some time, otherwise there will be no benefit in our work. Thus we have now given prominence to the scientists at the Arthur C Clarke Institute for modern technology and those who are hired by them. But when we send our second team, we hope to involve professors from the Engineering Faculties of the University of Moratuwa and Peradeniya. In future we also hope to send A/L students and teachers who teach physics on such trips.

Through these activities what kind of changes can we expect for the country?

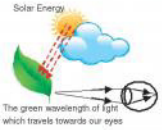
We have made plans for eight specialized sectors. For example we have started nanotechnology. Similarly we are going to start biotechnology by this year. We are also trying to acquire space technology. We have made plans for what we need to achieve in the next three years. These plans are being coordinated through 12 agencies which come under the ministry. As we move ahead with our plans, the country will achieve great progress in technology and in the economy, no one will able to stop that. The country is set to achieve great transformational change.

Duminda Aluthgedara
Pics- Gayan Pushpika

A National Centre for Earth observation data

Many countries today have accepted the fact that we need to utilize space technology for sustainable development. The Sun as a source of natural energy emits electromagnetic energy towards the Earth, when this meets the Earth's atmosphere, a certain amount is absorbed while the rest is reflected back into space. Thereafter when light from the Sun hits an object, the object absorbs some of the light and reflects the rest; the light that is reflected back determines the colour of the object. For example if a plant absorbs all wavelengths of light except that of green, the green wavelength of light is that which reaches our eyes and the leaf appears green.

This data which is reflected off solar energy is captured by the sensors of satellites which orbit the Earth. The sensors of the satellite can also detect data from certain wavelengths which cannot



The green wavelength of light which travels towards our eyes

be seen by our own eyes.

Through the use of such natural energy sources such as solar power, satellites carry out observationactivities of the Earth's surface and when this is not sufficient, laser and SAR sensors which have been fitted to the satellite aid the satellite, allowing it to at any time of day, release electromagnetic waves to the earth's atmosphere on to the area which needs to be monitored and the data from the reflected waves are collected for analysis.

Observation of the earth

When the satellite travels over the island, its stored remote sensing data is transmitted to the relevant ground station. Thereby allowing it to send the data which was collected while observing the Earth to a Geographical Information System (GIS), and this is used to map out important natural, environmental and archaeological sites in addition to coastal and oceanic surfaces that can be mapped out and important aspects uncovered.

This electromagnetic technology can be used in the various fields of; agriculture, archaeology, meteorology sciences, management of irrigation and water resources, management of natural resources, environmental management, observing of oceans, urban development, disaster management and transport among many other subjects.

Catastrophes like coastal erosion, floods, landslides, drought, disease and epidemics wreak havoc among the local populace due to the fact that many are caught unaware and at times certain man-made disasters are overlooked. But predictions and early warning systems can be utilized to minimize harm and for this purpose relevant data and information on the place and the appropriate mechanism which need to be implemented can be ascertained using the aid of space technologies such as the Global Navigation Satellite System (GNSS), Remote Sensing and GIS.

To protect the Earth's equilibrium and to aid in disaster management many experts have now turned their attention towards this technology.

Today we have noted that development should be carried out having ensured environmental equilibrium. Government agencies which need to be in line with sustainable development goals can achieve their national goals using Remote Sensing data as a valuable source. But the lack of important data, lack of awareness, high costs, lack of training for scientists and engineers have led to the above mentioned technology not being utilized to their maximum potential. The Arthur C Clarke Institute has taken on the responsibility of setting up of a national centre to gather data on the Earth's movements and for its dissemination to relevant agencies.

Under the Western Province Megapolis development plan, a Technology zone is to be set up in Homagama- Pitipatha-Mahenawatte and it is here, on 10 acres of land that a Ground Station, with the assistance of foreign countries is to be built. The Infrastructure of the Ground Station will allow it to receive data from a couple of satellites. At the Ground Situation, a couple of antennae dish would be installed for the transmission of electromagnetic waves both vertically and horizontally. The Ground Station will also use parabolic antennae with cassegrain configuration. The E-band is the waveguide used by the control unit to send signals to the relevant satellite.

Satellite dishes, which operate on the bands of S,X and Ka wavelengths at Goram Aerospace Centre 2016.

K-band waveguide will be used.

The Institute's Space Technology and Application unit's project to establish a National Centre will also develop the information and communication system through the development of an efficient computer system network. For the uncovering of geographical information using Remote Sensing and the GIS system, a Space Technology Application Unit has been set up. These computers will be used to store Earth observation data received by the Ground Station. This GIS and Geo Portal, will be established at a certain location and to disseminate this data to other government agencies, a web service will be started. Facilities will be made to collaborate within and between various agencies.

This project aims to not only further enhance the knowledge of scientists and engineers at the Arthur C Clarke institute and other government agencies but the setting up of the National Centre will provide the opportunity for space technology to be used in a fruitful manner and to increase interest and support in the development of new technology.

The installation of a satellite dish at the Ground Station at the European Space Agency

W.K.M. Mahindapala
Research Engineer
Space Technology and application unit
New Technologies, Arthur C Clarke Institute for modern technology

Space Technology An Imperative In Sri Lanka's Road Map

Eng. Sanath Panawennage,
Director General of the Arthur C. Clark Institute for Modern Technology

The following Speech was delivered by Eng Sanath Panawennage, Director General of the Arthur C. Clark Institute for modern Technologies at the 42nd convocation of the Sri Jayawardenapura University.

Let me start by outlining rather than attempting to define Space Technolgy and its applications. The term Space Technology, from a functional perspective, refers to an ensemble of technologies that are used in the Exploration and Use of outer space the multitude of technologies involved in the development, Launch and operation of Artificial Satellites and Space Shuttles. This includes such core technologies as aeronautical engineering, electronic & telecommunication engineering, power systems, robitics, mechanical engineering, information technology, materials engineering and chemical engineering. The term outer space generally refers to the region beyond 100 kilometer altitude, although international agreement on such delimitation is yet to be reached.

The enormous technological capabilities brought about by the fusion of those multiple technologies, are mainly put into use in two distinct spheres of activity involving outer space. One sphere of activity involves more fundamental more idealistic, search into the greater depths of outer space, in the solar system and beyond - and enterprise known as 'Space Exploration' The other involves the exploitation of the vantage point of space for literally more down -to - earth, nevertheless more enterprising, realm of space technology applications, where the activity can be identified in three distinct domains, namely satellite communication systems, atmospheric and earth observation satellite systems, and global navigation and positioning satellite systems.

Turning to the domain of satellitecommunications systems, we may find numerous applicions exampified by inter-continental,mare-border, and even sub-national domestic telecommunications, including satellite based mobile telephony, radio and television broadcasting, Internet connectivity, as well as global maritime communications. Naturally, satellite communication can transcend the barriers that impede terrestrial communication. Whilst extending their coverage from tropics to poles, and from Amazon to Himalays. Communication satellites are positioned in what is known as Geo-stationary orbit (GEO). This is at an altitude of 36,000 kilometers above the equator, on the equatorial plane, which makes the stellite revolve around the earth at the same angular velocity as that of earth's rotation, thereby making the satellite appear stationary with respect to earth.

As we know the proposition of intercontinental wireless communications through manmade satellites placed in the Geo-stationary orbit was made by Arthur C Clarke in 1945 almost two decades bedore thechnology was ready to realize that feat.

Another major domain of space technology applications constitutes observation of the Earth's surface, both land and sea, and its atmosphere through satellites - a process also known as space-borne remote-sensing.

Remote sensing is the science of identification of earth surface features, and estimation of their geographic, physical and biological features with electromagnetic relocation as the means of interaction.

The electromagnetic signals reflected or emitted by those earth surface features are intercepted and analyzed by powerful sensors on board satellites. Different earth surface features such as different types of vegetation, different types of soil, dimerent conditions of water, and objects at different temperatures etc, behave differently form one another when reflecting or emitting electromagnetic waves at differng wavelengths. Thus, differing earth surface features tend to show their 'identity' of 'signature' in terms of edelectromagnetic radiciation that they emit of reflect, and such 'spectral signetures' provide a means of discrimination and estimation of such earth surface features by the sensors on board thearth observation satellites.

Besides those spectral characteristics represented by the 'Spectral Signature', different earth surface features also lend themselves for discrimination, identification and estimation on the basis of three other types of signature that characterize them, namely spatial, temporal and polarization signatures. Spatial signature simply refers to the characteristic shaped the earth feature or the object, in three - dimensional space. Temporal signature characterizes the variations that occure over time. The polarization signaturecharacterizes the variations in orientation of the electromagnetic waves, depending on the earth surface features, or objects, that reflect or emit them. Specific combinations of those signatures are used in distinctive identification as well as estimation of desired earth surface features.

A satellite orbiting in space provides both a synoptic view of the earth, as well as repetitive coverage of any given point on the-earth throughre-visits to the same orbital position at regular intervals of time -typically one or several days depending on the orbit chosen.

Earth observation satellites thus provide a far more efficient and effective means of monitoringand management of any spatially distributed resources, compared to the traditional ground-based monitoring techniques.

The fields of applicaton, naturally span across an extensive and diverse spectrum of fields encompassing agriculture, forestry, water and irrigation, environment, coastal and marine resources, management of other natural resources, lands & surveying, urban planning, climate change and disaster management.

In the meantime, those dedicated meteorological satellites, which are mainly responsible for atmospheric observations, operate on principles similar to those of earth observation satellites.

The third domain of application of satellites is in Global Positioning and Navigation. The category of satellite networks, knownby the generic name Global Navigation Satellite Systems (GNSS), is responsible for determining and providing precise position of any point on the surface of the earth, or in its atmosphere, and thereby facilitating navigation from pre pint to another, on land, on ocean or in air, with precise positioning accuracy. GNSS also provides precise timing at any point on the earth. The system obviously provides and indispensable technology tool in today's aviation, maritime navigation, as well as in inland transportation, among other applicaions. There are several GNSS networks currently in operation, GPS system of the US, GLONASS system of the Russian federation, both with comprehensive global coverage, and several other systems with semi-global or regional coverage such as Beidiuoof China, Galileo of Europe. Compassof Japan and IRNSS of India.

Current Position

By the end of Year 2014 there were at least 1235 active satellites orbiting the planet. The vast majority of these satellites exist in two distict regions in space. There are approximately 650 in the low earth orbit (LEO) between 200 and 2000 km altitudes, used mainly for Earth Observation. There are approximately 460 other active satellites in the geo stationary orbit (GEO) 36000 km above the equator, mainly used for communication applications. Currently there are at least 13 national or intergovernmental space agencies processing satellite launching capabilities, with six of them namely those of US Russia, China, Europe. Japan and India having advanced capabilities. The world today witnesses typically 80 to 90 launches per year. Each launch typically results in orbital insertion of up to a dozen satellites.

In addition to the major space faring nations mentioned above, the other countries with substantial investments on national space programmes include Canada. South Korea, Ukraine, Argentina, Iran, Spain, Netherlans, Sweden, Brazil, Pakistan, South Africa, Switzerland and Mexico.

From an economic perspective. Outer Space is treated as a global common. similar to Ocean. Atmosphere and Antarctica. Though outer space at large is treated as a public good. therefore of public good does not, however, hold good for the two most congested orbits, Low Earth Orbit (LEO) and the Geo-stationary Orbit (GEO). Thus, the orbital slots and frequencies, in other words the 'orbital frequency resources, used in respect of LEO and GEO are best treated as Common Pool Resources, within the larger global common of outer space.

Fair and Responsible use of this limited natural resource for the benefit of Humanking and the Planet, naturally calls forreflective international cooperation on the one hand and, international and national legislation enabling the same on the other. The United Nations Committee on the Peaceful Uses of Outer Space UNCOPUOS, established by the United Nations as early as 1958, within just two years of the launch of the first Satellite Sputnik-1, is the apex international body mandated for this purpose. I am pleased to tell you that .last year Sri lank was admitted as a full member of UNCOPUOS

On the space legislation front. There are five international treaties forming the backbone of space law that governs all forms national and international space activities. They are commonly known as 'Outer space treaty , which indeed is considered the the magna Carta of outer space, Rescue and Return Agreement ' , 'Liability Convention' ,'Registration Convention 'and moon agreement'

Let us too look at the world of science from distant Peramaduwa

The Kantale, PeramaduwaVidyalaya recently held a practical science camp for students under the guidance of the Kantale Zonal Education Office. In the East, Kantale is one of the most underdeveloped areas, and the PeramaduwaVidyalaya located within the Kantale Educational Zone is the most underserving school in the area. The school which is located 15km away from Kantale town, has around 115 students studying from the grades of 1 to 11.

Many of the parents of the students do not have permanent jobs and more often than not engage in agriculture work or are daily labourers. They cannot afford to send their children to better schools in an urban area and their children have to make do with the educational benchmark given to them by PeramaduwaVidyalaya.

It is quite tragic that the students of this school are not given the same opportunities for education as those in other parts of the country. Though the school conducts classes up to O/Ls, they do not have laboratory facilities and the students in Grade 11 study in a makeshift classroom made out of coconut palm. An unpleasant room made up of old wooden instruments make up for a science laboratory and for many years, the school had not received any scientific instruments or chemicals needed for a laboratory. Thus many experiments which were part of their school curricula were not carried out. The students have not only had the opportunity to witness any scientific experiments but they also have no idea what scientific instruments look like.

As a temporary solution to the problem, the Zonal Office took steps recently to hold a practical science camp using equipment and chemicals from the science lab at the KantaleVendrasanpuraVidyalaya at one of the makeshift classes the students used. The students who had thus far only seen these instruments and experiments in their books, took great interest in seeing them come to life. While a certain section of our society has progressed into the internet in the search for knowledge, another section we find has to fight everyday pressures of life to even access basic knowledge and information. If any person or organization were to come forward to aid these children with their education, it would be an act of kindness that would help brighten the future of these students who deserve to succeed in life.

Isuru Rangajeewa Jayasundera

Post Script-
We have been pleased to learn that the Ministry of Science, Technology and Research together with the Ministry of Education is working on a program to help raise the standard of education in such deserving schools.

"Sustain Lanka - 2017" National Exhibition

A prosperous tomorrow through NERD Technology

The National Engineering Research and Development Centre (NERD) recently participated in the "Sustain Lanka - 2017" National Exhibition at the BMICH. The organization's stall which was located right in front of BMICH attracted many a crowd. The exhibition stall had the participation of many of the departments at NERD including the; civil engineering, design fabrication, electrical, electronic and mechatronic, agriculture and post-harvest technology, energy management and renewable energy. Many of the new products introduced by these departments were greatly appreciated for their commercial value by many who chose to visit the stall.

The civil engineering department had set up a demonstration of how one could construct a house in the most financially efficient manner using better technology. This allowed many who were looking to build a modern house, the opportunity to experience and get firsthand knowledge on it. It also showed the use of Ferrocement sheets and clay to make 'clay bricks'instead of Asbestos roofing sheets as a more cost effective and environmentally friendly material to be used.

In the manufacturing area,design fabrication unit had set up a stall to show many new machinery and fittings for small and medium entrepreneurs. These fittings and technological innovations were aimed at helping manufacturers modernize or fulfil any shortcomings in their manufacturing processes. The unit also introduced small and medium dye mould instruments for rubber, plastic, glass and iron industries along with the technological know-how for these instruments.

The demonstration of a smart parking system and a modern public address system was the main attraction at the electrical and electronics stall and the audience was made aware of the various light structures available in the market. The mechatronics unit had displayed a semi-automated hopper producing machine and a simple milking machine to aid many small time businesses. To solve the world energy crisis while producing the energy needs of the home- a bio gas exhibit was installed and the promotion of a biomass rice cooker won the notice of many homemakers. The post-harvest production unit in the meantime introduced a coconut fertilizer production machine for cultivators and a machine to remove weeds among paddy to increase productivity and the economy of our producers. The Ayurvedic manufacturers had the opportunity to experience the infusion of modern technology into their age old productions through an Ayurvedic pellet making machine and a juicer able to extract the essence of leaves.

For further information on any of the products which were displayed at the NERD stall contact 011 2236284, 011 2236384 or email - tmdd@nerd.lk .

Remote Voltage Data Logger

The Arthur C Clarke Institute has manufactured a new instrument which can remotely monitor and prepare data reports on fluctuations in our national electricity grid. This will solve many of the issues in our network. The instrument which has been introduced as the Remote Voltage Data Logger, is an innovation on the earlier instrument introduced by the same Institute called the True RMS Voltage Recorder. This instrument which has been equipped with mobile network properties can be used from any location and the voltage data obtained is recorded and transferred automatically to a main server.
The voltage data thus logged from various parts of the country can be brought together in one server and accessed through a web browser via the internet to be used by the control centre to monitor places of concern.
This data in tabular or chart form wouldbe most beneficial to decision makers regarding the national grid and in assessing any problems in it.

Electronic and Engineering Division, Arthur C. Clarke Institute for Modern Technology

A software system for Disaster and Disaster relief Management

Over the last couple of years, Sri Lanka has faced many natural disasters (the Tsunami in 2004, floods, landslides, etc…) and as a result many have suffered displacement with extensive damage to property. Those displaced suffered additional inconvenience thereafter due to various issues in the management of relief. As a measure to reduce such instances, the Arthur C. Clarke Institute for modern technology is in the process of building software which would aid in the management of relief delivery during a disaster in an efficient and transparent manner. This is to be known as the *Disaster Relief Management Software System*.
The main goal of this software is to aid in data collection in order to help those in assessing disastersto come up with solutions and to have them prepared when managing the public.
The program will also help build greater coordination among donor agencies, civil society and thewhile improving the exchange of information between them.
The aim thus was to introduce an online software programme to increase coordination during situations of disaster and to minimize chaos and have better management in the search for the missing, relief management, supervision of volunteers.

• Organization and Volunteer Registry
This is to be used for the register of officers and volunteers from the public during times of disasters. It will supply answers to the questions of 'who?', 'what?', 'where?' and 'when?', and will collect data on those who respond during situations of disaster (such as organizations, officers responsible, volunteers)

• Missing Personal/Disaster Victims Registry
The aim of this is to search for and keep a record of the missing, those who have been found, dead, injured and to help in the finding of those who have been separated from their families.
• Request and Resource Management
This will help in the planning, preparation and systemization of resources and people so that aid is immediately supplied to areas where disaster has struck.
• Geospatial Analysis of data
Model disaster scenarios would be run and analysed using maps to assess the available camps, hospitals and efficiency in relief reporting and coordination in specific areas.

The most important advantages of this software is to be able to: 1. The ability to bring families together through the registry of missing and found people, 2. The proper coordination of relief from people and organizations, 3. Transparency in handing over of relief and to cover and treat all camps and centres equally, 4. The furnishing of information quickly for the management and coordination of donations from organizations, volunteers, NGOs and government agencies, 5. To provide aid to the displaced with minimum of time and to ensure their further safety.

Vidya

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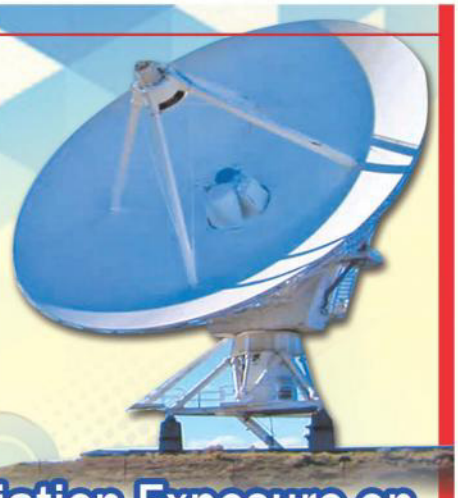

Effects of Radio Frequency Radiation Exposure on Human Safety

Today'slifestyle highly depends onwireless communication means and methods either long range or short range, using Radio Frequency (RF) signals. During the last decade we all have witnessed the boosted evolution of modern communication systems of mobile,community broadcasting and wireless networking using RF frequenciesHF (3MHz to 30MHz), VHF (30MHz to 300MHz), UHF(300MHz to 3GHz) and microwave bands (3GHz up). This rapid growth of global RF usage raises the concerns of electromagnetic radiation (EMR) health hazards.

RF electromagnetic radiation (EMR) is the transfer of energy by radio using electromagnetic waves. RF EMR lies in the frequency range between 3 kilohertz (kHz) to 300 gigahertz (GHz). RF EMR is non-ionising radiation, meaning that it has insufficient energy to break chemical bonds or remove electrons meaning it is not capable of ionizing. But EMR interacts with biological processes in the human body tissues may cause health hazards. Studies so far claim that the EMR has linkwith various health problems such as effects on cell growth, cell differentiation, DNA, immune system, hormonal effects, reproduction, neurological, cardiovascular systems,blood brain barrier, stress proteins, skin, sleep disorder and so on.

Therefore there exist several National and International standards, regulations and recommendations for RF energy exposure, separate for the general public and the occupational exposures.

In SriLanka only one survey that has been carried out by Prof. I.J. Dayawansa in 2005 by using spectrum analyzer and dipole antenna (with only limited resources). And the measuring has been done in few major cities and no suburbs. This slightly fulfilled the necessity of social and industrial societyby that time.

After a decade of time with the advancement of technology in both RF transmission and measuring equipment there is unavoidable requirement of an in depth survey and analysis of the electromagnetic compatibility to identify the level of radiation from RF emitters such as Wi-Fi, Bluetooth, home security, telemetry devices and automobile alarm applications, transmitting antennas of TV, FM radio, Cellular Mobile base stations, dish antenna based up linking and radar. The EMR levels and the public exposures to those RF fields should comply withlocal or international RF safety standards and regulations.

{Typical measuring using the NARDA NBM550 RF radiation measuring system in free space)

The planned survey isto be carried out all over the country in 200 sample value points covering villages, towns and cities. The measurements are planned to be evaluatedaccording to the international standards namely the International Commission on Non-Ionizing Radiation-Protection (ICNIRP), which is accepted in Telecommunication Regulatory Commission (TRCSL) policy.

The results will be analyzed and published in technical forums and will be available to community in a more understandable manner in tabular and graphical forms in the Sri Lankan geographic scenario. Also the final information will be available to respective parties especially who are operating RF emissions and government and none government organizations interested on human health risks (ex. WHO, Central Environment Authority etc.)

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Communication Engineering Division
Arthur C Clarke Institute for Modern Technology

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Government is ready to... Waste Management

The Hon. SusilPremajayantha , Minister of Science, Technology and Research, upon seeing this news telecast,had taken prompt action to get in contact with the said technician who had designed this machine, with the help of the said T.V.channel and based on the information gathered at the time , had initiated immediate steps on the following morning ,Saturday the 22nd,for the execution of a future course of action as a remedial measure of addressing the garbage problem.

As a result ,by 9.00 on the morning of Sunday the 23rd,a group of academics and scholars,led by the Hon. Minister had arrived on the doorstep of Mr.WikumSampath,at Godawela,Gampola. The group was made up of Prof.Ajith de Alwis(Coordinating Secretariat for Science,Technology and Innovation),Dr. MaheshEdirisinghe (Commissioner / Sri Lanka Inventors Commission),Mr. AnandaNamal (Director General/National Engineering,Research and Development Centre),Eng.D.M.Punchi Banda National Engineering,Research and Development Centre),who hold higher ranking positions in several institutions functioning under the purview of the Science, Technology and Research.

Mr.WikumSampath who gave an elaborate description of the machine that he had created,and its functionality to the Hon. Minister and to the group of officials,had expressed desire to further develop and enhance his machine with the assistance of the Ministry of Science, Technology and Research,thereby ensuring its productive utilization towards resolving the garbage issue.

The group officials having initiated a discussion with him S & T knowledge and insight for the further enhancement and development of the machine.

The officials were satisfied with the technical functionality and operation of the machine and provided the Hon. Minister with details of its feasibility. The Hon. Susi premajayantha, Hon. Minister of Science, Technology& Research, upon talking into consideration the details this provided, assigned the National Engineering Research & Development Centre, With the task of manufacturing this machine through further improvement being made to it as a remedial measure of addressing the garbage problem rising by the day.

It was discussed and a decision was reached to initiate a programme by NERD for the designing of a more technology and Scientifically advanced machine under the supervision of Mr. WikumSampath by awarding him the patent of this machine which was designed by him on a concept of his own.

A letter expressing his desire for the manufacture of a technically enhanced machine and requesting funds for the preliminary design work was handed over to the Hon. Minister which was received by the Hon. Minister.

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