

24/04/1998

Mustafa's love is fibre optics

Adnan Abdul Kader

ONE of the world's top scientists in the field of fibre optics, Professor Mustafa Abushagur, visited Malaysia recently.

The visit was in response to Prime Minister Datuk Seri Dr Mahathir Mohamad's speech in Los Angeles about our venture into information technology through the Multimedia Super Corridor (MSC).

Abushagur, who is from the University of Alabama, Huntsville, also met members of the Prime Minister's delegation. Impressed by their seriousness and commitment in making the MSC a reality, he believes that Dr Mahathir has a clear vision of where Malaysia is heading.

He believes Malaysia has the credibility to carry the MSC through, thus taking a huge leap towards achieving the Wawasan 2020.

A meeting with Mustafa reveals a great many facts about fibre optics that leaves one flabbergasted.

Abushagur says fibre optics (which will be the backbone of the MSC) will replace the good old copper wire which is coming to the end of its lease. It is only a matter of time before it is phased out completely.

"When we talk about communication, we are talking about a very hungry type of bandwidth that can only be provided by fibre optics. Copper cables would only cause bottlenecks if they are not replaced. Through fibre optics, massive amounts of information can be processed and shifted at considerable speeds as if there is no time lapse. This is what the technical people term as 'real-time'," says Abushagur, who set up the optoelectronic engineering programme for the undergraduates' and graduates' degrees at the University of Alabama.

His field of interest is optical computing, optoelectronics (integration of optic fibres and electronics) and fibre communication.

Looking through his resume is like reading a book. It shows a long list of professional memberships and awards from Nasa, the US Army, various institutes and government agencies. His expertise is also used by various specialised journals in the US.

Fibre optics is his forte and his love. He has written over 70 technical papers, numerous books and chapters in books on this field. He has also been an active participant in many conferences.

"Since 1976, the use of fibre optics has skyrocketed to the extent that it can go round from the earth to the moon 28 times!" he says.

However, the potential has hardly been tapped. The real stumbling block is to get the fibre to the desks and to the homes which at the moment entails a lot of work and cost. Nonetheless, the advantages of fibre optics are numerous and its drawbacks, none.

For example, it can carry thousands of television channels while at the same time allow for the Internet, teleconferencing, telecommunication and hundreds of other possibilities. Lifestyles will change as people will have more time to spare for social interaction without affecting productivity and efficiency, as they will need to spend very little time moving from one place to another to accomplish work of any kind.

Abushagur has contributed a lot to the industry. His inventions have made possible the use of lasers to measure fibre optic properties while they are being made. It is used by all manufacturers including Corning, the biggest manufacturer of fibre optics in the world. He has also introduced a device that increases the capacity of the fibre optics by using different wavelengths of light.

Remember the explosion of the space shuttle Challenger in 1986? It was discovered that the cause was a gas leakage because the "O" ring had shifted. He remedied that in 1992 through the use of fibre optics in the "O" ring which can continuously monitor the quality and give a warning in case of a fault.

Fibre optics can be used as "smart structures" on bridges to monitor the conditions of the structures, like stress or temperature. In aircraft, it is the "smart skin" used on the outer hull which can monitor the airframe structure for weaknesses. It far outperforms all the other existing means including ultrasonic.

In medicine, we don't need to use the needle to count red cells in blood. A fibre optic strand which is so much thinner can, at a touch on the skin and without causing any pain, measure the sugar level in blood, the pH level, temperature, etc.

The 46-year-old Abushagur is a treasure trove of information, as he is continuously accumulating new ideas. He belongs to that rare breed of scientists thrust into the frontline of technology who are relentlessly pushing the limits of science further and further.

Easily approachable, he remains humble despite his vast knowledge. He attributes his character to a very pleasant upbringing in Libya. Abushagur's emphasis on integrity, honesty and hardwork propelled him through Tripoli University with the highest grades, before leaving Libya in 1975 to do his Ph.D at the California Institute of Technology.

He then taught at the University of Rochester, after which he moved to the University of Alabama, Huntsville. Huntsville is a major high technology centre in the United States. It is also home to the Nasa centre, the US Army's missile command and many big computer and electronics companies.

He shares his excitement with Malaysia regarding the future of the MSC. He believes Malaysia will be among the forerunners in multimedia information technology. He emphasises that education is the key in helping to push the nation ahead.

Since the MSC will be among the leaders in the multimedia field, it should develop its own technology and not just copy wholesale under licence from others. Abushagur has expressed his willingness to share his knowledge. He feels he can help develop devices to increase the capacity of fibre optics which could be manufactured in Malaysia for export.

He also stressed the importance of Malaysia's nation's youth. Abushagur says great knowledge cannot become possible without a good education, and this, they must pursue, in addition to the right spiritual knowledge.

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