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## Malaysia's dream takes flight

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"TIUNGSAT is deployed." These words were uttered in Russian, but in that instant the years of frustration and sometimes helplessness, negative feelings I had struggled to rise on top of, simply evaporated. And in that instant, my heart was flooded with joy and I felt free, like I was also floating with TiungSAT, 600km above in the perfect blue sky.

Norhizam Ritchie de Souza, Fadzil Sayuti and Ramesh Ramasamy were the lucky ATSB engineers who had the last physical contact with her but TiungSAT will remain etched in the hearts and memories of the people who gave birth to the idea of building a microsatellite, nurtured it and finally launched it.

Nordin Baharuddin, director of Binariang, first alerted me to the opportunity of launching a microsatellite when Binariang was negotiating the launch of Measat 1.

Halim Hamid, Dr Chuang Kwang Li and Ali Ebadi, also from Binariang, took over from there and together we had the first meeting of interested parties that included the private sector, universities and government agencies.

We had regular meetings to discuss the ultimate objective of the programme and our strategies to achieve them.

Enthusiasm was high: for instance, Prof Khalid Mohd Nor from Universiti Malaya was interested in power systems, Prof Ibrahim Seeni from Universiti Teknologi Malaysia gave advice on camera systems, etc. But we had no funding and the mechanism for implementation was non-existent.

Baksa (the Space Science Division in the Ministry of Science, Technology and Environment) by itself did not have the human resources to execute the project and we were acutely aware of the need to move quickly, efficiently and effectively.

These impediments led us to the idea of setting up a microsatellite national committee consisting of high-level decision makers. It was at the first meeting of this committee, chaired by Tan Sri Ahmad Sarji Abdul Hamid, that it was decided that the project would be executed within the framework of a government-owned company.

Datuk V. Danabalan, who was then director-general of the Ministry of Science, Technology and Environment, and Datuk Hadenan Jalil of the Ministry of Finance, oversaw the formation of ATSB and Datuk Seri Abdul Ghani Aziz, the former Chief of the Air Force, was appointed the board's first non-executive chairman.

Tan Sri Omar Abdul Rahman, the Science Adviser to the Prime Minister, was added to the board which was thereafter instrumental in overseeing the implementation of the project.

At this point, Dr Sabirin Arshad from Universiti Sains Malaysia was appointed the project manager and we despatched eight engineers under the leadership of Dr Zainol Abidin Rashid from Universiti Kebangsaan Malaysia to Surrey University in England to build the microsatellite alongside the Surrey engineers.

We moved quickly as the circumstances allowed us to meet the 1997 launch deadline set by Prime Minister Datuk Seri Dr Mahathir Mohamed, who, kept in close touch with all aspects of the work.

We were originally promised a launch set for October 1997, piggy-backing the OKEAN satellite aboard a Russian Zenit rocket. But October 1997 came and went without any sign of the launch. We decided to take the bull by

the horns to solve the launch problem ourselves. And what a feisty bull it turned out to be!

We had almost no experience in the launch business; we did not even have a complete list of launch providers. Offers for launch would appear and then disappear.

We explored a sea-launch, a submarine launch, and then an air launch. At one time, we even envisaged launching TiungSAT from Malaysian soil onboard a converted Russian ICBM.

We came very close to sealing a deal with the Indians, while the Chinese, Japanese, American and French had no imminent launch opportunities to offer us.

Sabirin trudged the snow of Moscow many times before we were given a concrete offer by the Russian Space Agency.

The good news is that during the period that TiungSAT was languishing in the lab, we were not idle.

Together with the Surrey engineers, our engineers added a new experiment to measure cosmic rays, changed the transmitter filter, etc. And since TiungSAT operates on amateur radio frequencies, Sangat Singh, an original stalwart of the project, put us through the paces of radio communication theory to license us as hamradio operators.

I remember well the gruelling hours in the radio shack at the Planetarium, learning to receive and send morse code. To lessen the pain and to entice us to attend classes, Sangat's wife supplied home-made chapatti and chicken curry.

Meanwhile, Science, Technology and Environment Minister Datuk Law Hieng Ding, always supportive, had the onerous task of answering Cabinet and Parliamentary queries regarding the delay.

The wheels that took us to the launch ground slowly as our Ambassador in Moscow, Datuk Yahya Baba, negotiated and negotiated some more. Eventually, Kosmotras gave us a definite launch date and we finally had countdown.

As is common knowledge, the excitement that was built up towards the Aug 25 attempted launch was dashed because of engine malfunction. But we learnt something even from that: there was a possibility we might have to launch TiungSAT the next day with a possible change in launching time and so in a few short intense hours we were forced to calculate and analyse the risks to the spacecraft if she had to be put into orbit during an unfavourable position of the sun. This was something we would not have undergone had the delay not arisen.

Despite advancements in rocket technology and rocket science, there is still a significant amount of uncertainty and risk involved in launching a rocket and the failure or success of a launch is veritably in the hands of God.

And so it was on Sept 26, under perfect blue skies, a week short of the 43rd anniversary of the launch of Sputnik 1, TiungSAT, modestly named after our Mynah bird, took her place in the sky, among the other satellites of the world.

For a while I thought I had achieved closure on another turbulent but challenging chapter of my life, but obviously real success is measured by how well TiungSAT now functions in space. The question we should all ask ourselves is: where do we go from here?

My answer is: the road to self-reliance is still a very long one for us. TiungSAT's design was not ours and we built her in someone else's lab. Hence, it is not yet time to pat ourselves on our backs.

Moreover, we built her conventionally, because we did not know any better then, to go to a high inclination orbit. What we really ought to do now is to build one of our own design and place her in near equatorial orbit, even though nobody has done it before, because that is where we are on the

globe.

The challenge to do this is in front of us. It has been said that the space business is not for the faint-hearted and after our adventure with TiungSAT, we certainly subscribe to this sentiment.

We now have a deeper insight into the intricacies of the business and we are better aware of what the critical enabling technologies are. But above all, it has taught us what our own space infrastructure should be in order to solve our own special problems.

With the spirit of our team of young engineers at ATSB, such as the likes of Dr Nafizah Goriman Khan, Annanthan Naranayasamy, How Chee Hua, Zairy Yusof, etc., our future is indeed bright.

Our forays into the exclusive space community have also forged strong collaborations with new technology partners, such as the South Koreans and the Americans.

We should, therefore, keep our doors open to whichever technology, whoever it belongs to, to complement our own.

In that way, we can build a robust capability in space that serves our own specific needs and will eventually allow Malaysians to venture forth into space and other worlds.

We must continue to persevere to surmount innumerable obstacles and remain true to the spirit and ideals of using space for the benefit of all humanity. God willing, we will be successful.