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IT Strategy in Defence Environment*

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ABSTRACT

The growth of information technology (IT) has influenced the national economy, security, health and education, tremendously. The author highlights the impact of IT on defence research and development activities as well as his concern in using commercially available operating systems for accessing information as there exists a possibility of international bugs which will be detrimental to the national security. The author emphasises that appropriate ways and means are to be evolved to take care of this aspect, particularly in the Air Force environment where cryptography with its two components—encryption and decryption will have the dominance.

1. ONSET OF IT REVOLUTION

The dimensions of warfare has changed the world in the last five decades, particularly in the environment of new technology of aerospace vehicle, communication and computers. Information Technology (IT) is all pervasive. Today, its growth has a tremendous influence on the national economy, war theatre, health sector and education. IT area, even though in the initial phase, had full support and thrust from defence establishments. In the last one decade, IT has revolutionised on its own, driven primarily by commercial push.

The Technology Information, Forecasting and Assessment Council (TIFAC) has generated the Technology Vision 2020 document with the help of 500 experts in multiple fields for transformation of developing India into a developed India in two decades. One of the five major areas identified by Technology VISION 2020 is IT. Fortunately in India, IT has been recognised as a mission area and given national focus by many governmental actions.

2. PROGRESS & THE CONCERN

The high performance computers and microprocessors have become one of the most important modules in revolutionising IT. This can be seen that the PCs took about 16 years to reach 50 million people, whereas connectivity i.e., Internet alone has reached the same number of people in just four years. Likewise, the processor speed in terms of MIPS is doubling every two years.

Computers performance has now been established. One can obtain all published human knowledge available today in our midst anytime. However, technology denial unfortunately has constrained this great trend of the spread of human knowledge. Technology denials of the developed world creates a hurdle in the progress of the developing countries in this field.

Today, virtual library exists and is accessible through Internet. The operating system available commercially may have intentional bugs which will be detrimental to the national security. In view of this, there is a necessity for developing one's own operating system. Similarly, it has been reported by many countries that every user of Windows NT will be identified by the

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supplier of this system. This vulnerability is more predominant when one goes in the network conditions. Similarly, many of the chips come with embedded software. This embedded software could be carrying invisible 'information soldiers'. The same problem exists when one buys a modem and encryption algorithms. Hence, on selective basis, the Armed Forces, R&D Estts and industries should take up the challenges of making their own operating systems, own microprocessors and own encryption/decryption technology.

It is essential for security reasons, especially for military system, to have a clean silicon chip with indigenous embedded software. The strength of Information technology in a country is directly proportional to the strength of the indigenous capability, particularly in the computer software and microprocessor industry.

3. TECHNOLOGY MODULES OF IT

A very important design tool, Virtual Reality (VR) Laboratory, has been specifically established for the development of Light Combat Aircraft by Defence Research & Development Organisation. This Laboratory is the culmination of multiple technologies of CAD, graphics and high performance computers with powerful software. The VR capability has enabled virtual wind tunnel (Fig. 1) and also virtual prototyping.

IT level is calibrated through two major technological bench- marks: (i) India's supercomputer status, and (ii) development of India's own microprocessor (Fig. 2).

With the networking of multiple sensors and communication network (Fig. 3) in super-computer environment together with indigenous microprocessor, a tremendous effort is possible to realise a dominant battlefield knowledge (DBK). The DBK needed can be developed through our core competence to meet unified battlefield strategy (Fig. 4).

4. IT ENHANCES WEAPON CAPABILITIES

Effectiveness of weapons in IT environment is vital, particularly in respect of military dominance, range, lethality and speed. It is the networked environment which gives the advantage of having both range as well as speed. Organisation evolution, IT evolution and access control evolution are the prime factors for graduation of IT reaching anyone, anywhere and anytime. What can be the defence strategy in such environment? Surely, the open algorithm has to gradually graduate to its own algorithm, own software with encrypted system (Fig. 5).

The role of Industry for partnership with Defence sector in the areas of IT is of utmost importance (Fig 6). Cryptography with its two components, encryption and decryption, will have the dominance, particularly in the Air Force environment. In this regard, it is essential that

(a) The government must encourage research in cryptography and generate trust in private companies and individuals that their information is indeed secure.

(b) A good research base is available for this.

(c) A national debate be initiated for a secure information interchange policy for India.

(d) An inter-country debate be initiated for cross-border communication and cryptographic standards.

(e) A national security policy and a global security IT policy need should be generated.

In this direction, five task teams have been formed in the Ministry of Defence for industries, defence production and DRDO to work together in multiple areas including communication and IT. This partnership will draw upon design strength in DRDO labs/estts to enrich industries to deliver products on demand. So, it is necessary that industries have partnership with the Ministry of Defence, particularly to meet the challenges in the IT sector.

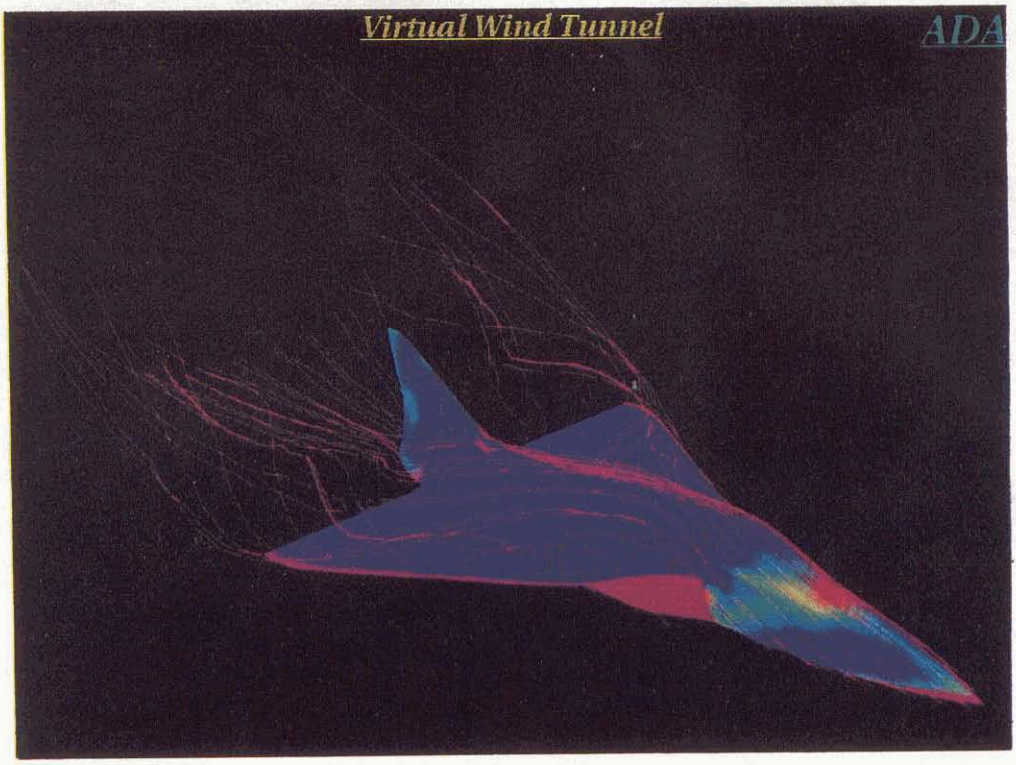

Figure1. Virtual wind tunnel

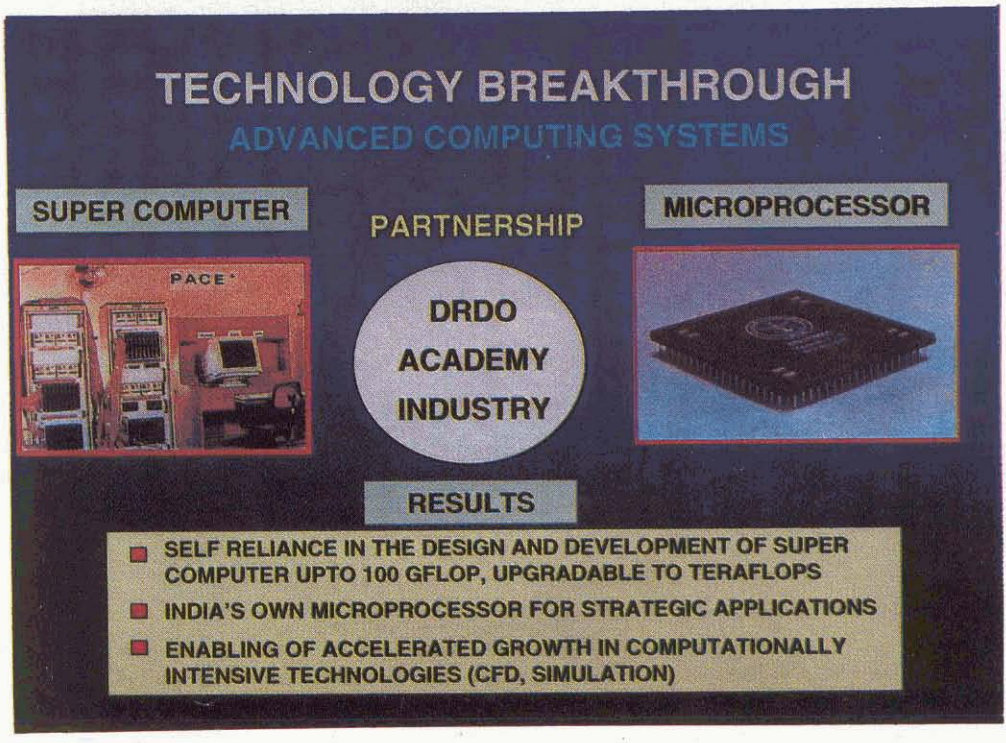

Figure 2. Technology breakthrough: advanced computing systems

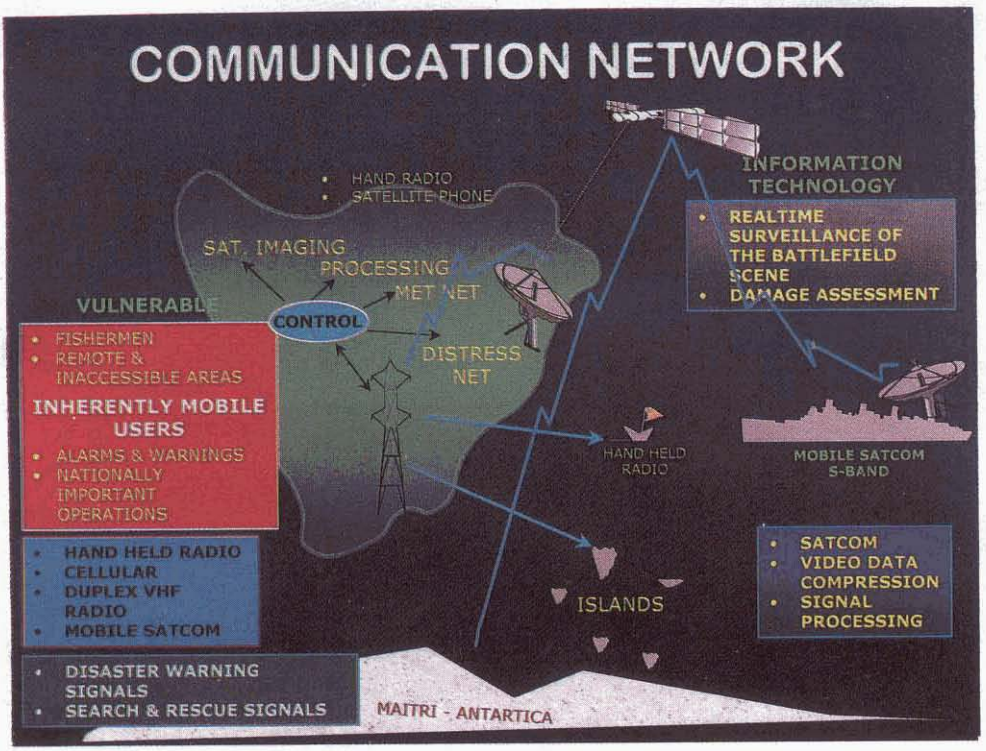

Figure 3. Communication network

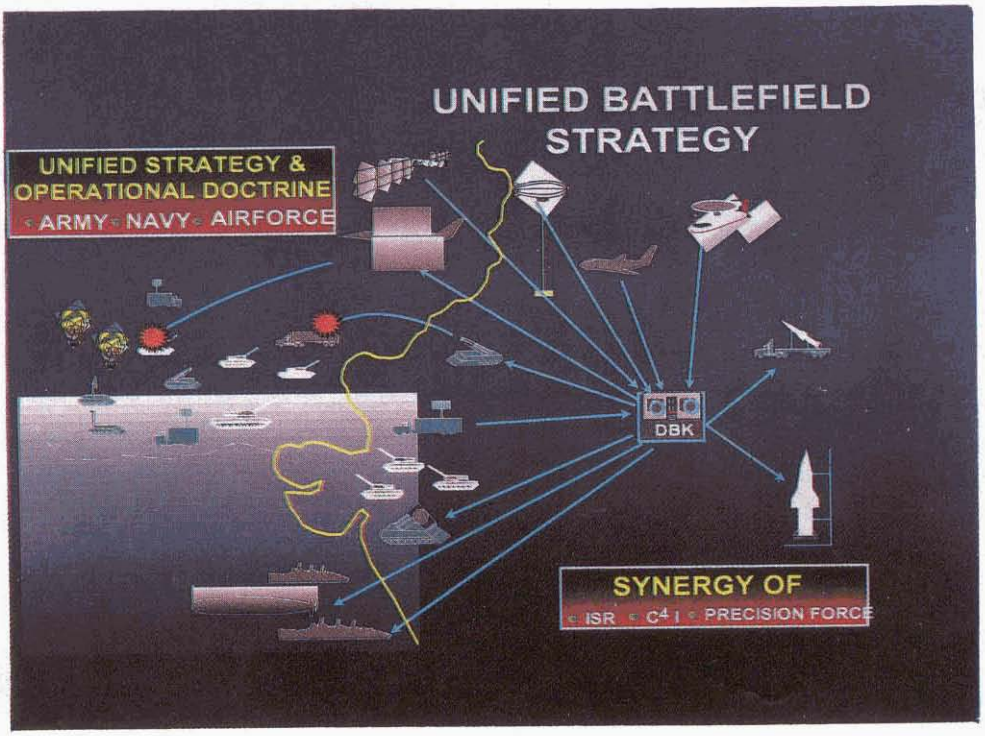

Figure 4. Unified battlefield strategy

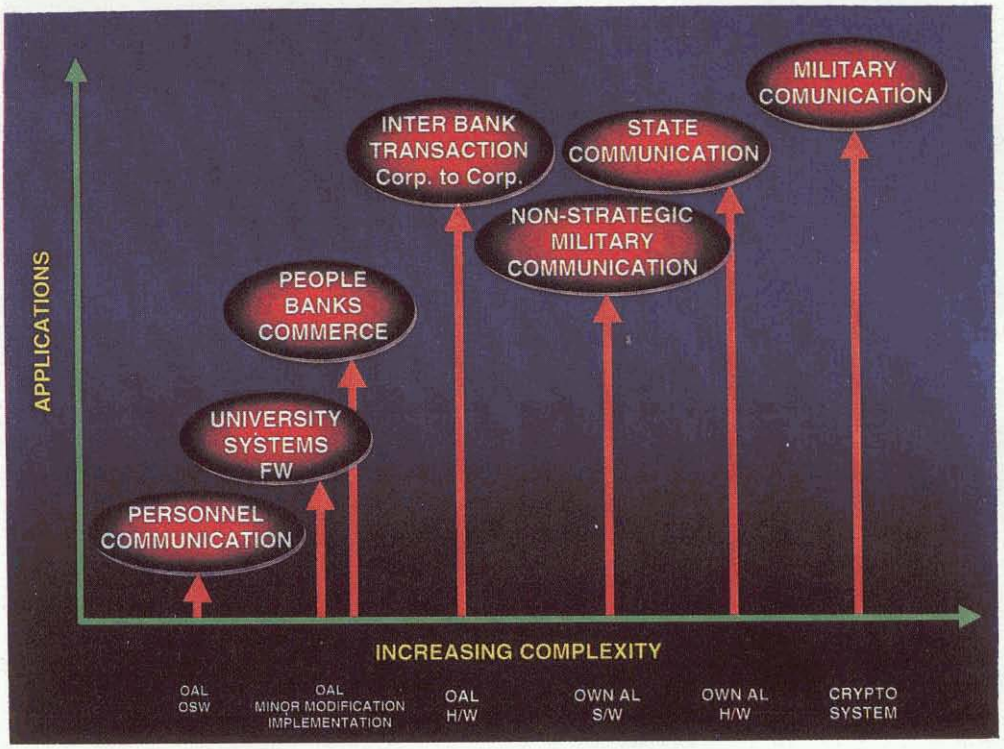

Figure 5. IT applications

Figure 6. DRDO—CII partnership

Contributor

Dr APJ Abdul Kalam is the Principal Scientific Adviser to the Govt. of India. He is also the Chairman of Technology Information Forecasting and Assessment Council (TIFAC), which generated the 'Technology Vision 2020' documents. Born in 1931 at Rameswaram, Dr Kalam specialised in Aero Engineering from Madras Institute of Technology, Chennai. He initially joined Defence Research & Development Organisation (DRDO) in 1958 and then joined Indian Space Research Organisation (ISRO) in 1963. He made contributions for SLV-3 to inject *Rohini* satellite. He rejoined DRDO in 1982 and conceived the integrated guided missile development programme (IGMDP) for indigenous missiles. Dr Kalam has also made significant contribution to Indian satellite and launch vehicles programme. He is called the father of missile development programme of India. He is the recipient of several awards including *National Design Award; Dr Biren Roy Space Award; Om Prakash Bhasin Award; National Nehru Award, Prof Y Nayudamma Memorial Gold Medal* (1996); *GM Modi Award for Science* (1996); *HK Firodia Award for Excellence in S&T* (1996); *Veer Savarkar Award* (1998) and *Indira Gandhi Award for National Integration* (1997). He has been awarded *Padma Bhushan* in 1981, *Padma Vibhushan* in 1990 and *Bharat Ratna*, the highest civilian award of India, in 1997. Recently, the Visva Bharati conferred its highest award *Deshikottam* on him.