

PAKSAT – 1R

The 21st century has rightly been termed “the information age”. Information technology, electronic media and the Internet have brought about rapid progress to the way we live and work today. This progress has resultantly increased the importance of telecommunication manifold. The entire world is knit together as a global village and it is practically unimaginable to survive without the communication links even for a brief period. The terrestrial infrastructure that had hitherto been aiding this rapid progress is vulnerable to various types of natural disasters and catastrophes, in the event of which the world could face a serious set back. These constraints of terrestrial infrastructure have paved the way for a rapid shift to satellite-based communication links, which have proved to be a much more reliable alternative in the event of natural disasters and calamities.

Satellite Communication offers a range of telecom services similar to those provided by ground-based systems with the added advantage of being able to reach every point within a large coverage area, unrestrained by borders, oceans, continents or rough terrain – thus extending our reach from the farthest of villages and sparsely populated distant islands to the hardest of mountain terrains. Another benefit is the unmatched advantage of electronic data transfer through satellite connections which bypass congested terrestrial bottlenecks and multiple hops and instantly deliver data to the end user. It also suits the service provider’s perspective as ground equipment for satellite communications can be installed in a relatively shorter period and offers fixed costs for any distance within the satellite footprint. Satellite communication also plays a great role in effective planning, monitoring and execution of government and corporate sector organisations by facilitating e-governance, e-commerce, Tele-education, Tele-medicine and Geographic Information Systems (GIS).

Being fully cognizant of the potential of satellite communications in the context of socio-economic uplift of the country, its security and in bringing rapid growth and development in the fields of information technology and communications, SUPARCO started the “PakSat Project” in 1984. Realizing the importance and the need for a communications satellite as a strategic and national asset, SUPARCO filed an application with the International Telecommunications Union (ITU) for the allocation of two orbital slots (38°E longitude and 41°E longitude) in the Geo-Synchronous Orbit (GSO) for the launch of satellites. A feasibility study of the project was conducted jointly by SUPARCO and M/s Hughes Communication International, USA

in 1985. On July, 1990, SUPARCO launched an experimental communications satellite "BADR-1". However, due to the scarcity of funds, there was no further progress on the project which remained shelved till the late 1990s.

The orbital slots in the GSO orbit in space are allocated by ITU to the countries on first-come-first-served basis. Since Pakistan could not launch its own satellite into the orbit, the due-diligence period for both the initial orbital slots expired in 1994. After the expiry of the first set of filings, a new application for the allocation of five GSO slots (38°E, 41°E, 30°E, 88°E and 101°E) was filed. In June 1998, M/s Alcatel was awarded a license by Pakistan Telecommunication Authority (PTA) for the implementation of PakSat project on self-financing basis. In late 2000, due to M/s Alcatel's dismal progress on the project, PTA declined Alcatel's request for grant of extension in the license and subsequently, the supplier conveyed its inability to proceed with the project. The project was then handed over to SUPARCO through Strategic Plans Division (SPD). On December 10, 2001 Pakistan successfully launched its second experimental satellite "BADR-B".

Of the 5 slots filed for, Pakistan was confronted with the risk of losing the priority of the 38°E longitude over other applicants, in case it failed to occupy the slot with an operational satellite before its due diligence date of 19 April 2003. Adjudging the remaining time insufficient for the design, manufacturing and launch of a new satellite tailored to meet the national needs, the high-powered committee formulated by the Government of Pakistan proposed to resolve the problem in two phases. In Phase-I, a suitable in-orbit working satellite was to be procured and relocated at 38°E longitude, as a 'gap-filler', before 19 April 2003 with the prime objective of protecting the slot; while in Phase-II, a new satellite system was to be designed in conformity with the national needs and orbited at 38°E before the expiry of the interim satellite. A contract with M/s. Intelsat / PanAmSat (then Hughes Global Services) of USA was signed for the lease and relocation at 38°E longitude of their HGS-3 communication satellite for a period of 5 years. The satellite was successfully relocated at 38°E longitude and since 20 December 2002, it has been operating successfully as PAKSAT-1 (formerly Palapa C1).

A marketing company "PAKSAT International (Private) Limited" was formed as the commercial arm of SUPARCO in January 2006 to market and lease out PAKSAT-1's bandwidth and communication resources. PAKSAT International has successfully established a solid customer base for PAKSAT-1 across Middle East, Africa, South

and Central Asia and Europe. PAKSAT-1 today has the fastest growing Pakistani TV channel neighborhood. Additionally a number of i-direct and DVB-S2 hubs are using PAKSAT-1's capacity to offer innovative and cost effective data & Internet services. PAKSAT-1 offers C and Ku band coverage in over 75 countries and currently serves a number of regional customers including, TV broadcasters, telecom companies, data and broadband Internet service providers as well as government organizations. Since PAKSAT offers the most cost effective communication and broadcasting solutions the entire PAKSAT-1 communication bandwidth has been leased out and there is an ever-increasing demand by local as well as foreign customers for procurement of more bandwidth.

In Phase-II of the PakSat Project, PAKSAT-1 will be replaced before its end of life by Pakistan's 2nd communication satellite PAKSAT-1R to ensure continuity of service. PAKSAT-1R's Feasibility and System Definition Study (FSDS) was undertaken in 2004-2005 by SUPARCO, with the help of a reputed foreign consulting firm M/s Detecon, Germany. Based on the results of an extensive market research (both within and outside Pakistan) and analysis of the frequency coordination and regulatory constraints confronted by PAKSAT-1/1R, an advanced system design was developed and finalized for PAKSAT-1R.

On 17th April 2007, China (as a strategic partner) signed an accord with Pakistan to enhance cooperation in the areas of space science and technology. In conformity with the Government of Pakistan's decision to establish and strengthen a long-term strategic relationship with the People's Republic of China, it was decided to procure PAKSAT-1R satellite systems from CGWIC (China Great Wall Industry Corporation) with two main objectives: (i) acquisition / transfer of comprehensive know how and technology (KHTT) and (ii) development of relevant infrastructure / facilities, in order to realize the long-term goal of development of indigenous capabilities.

The main objective of PAKSAT-1R project is to design, manufacture and launch a 30-transponder (18 Ku-band and 12 C-band) communication satellite in the ITU-regulated Geo-Synchronous Orbit in order to replace the existing leased satellite PAKSAT-1. SUPARCO has developed an experimental payload for technology validation in space for 15 years. Four satellite subsystems of a typical communication satellite have been designed, developed, manufactured and tested by SUPARCO engineers & scientists. This experimental payload called "Customer Furnished Instruments (CFIs)" was launched onboard PAKSAT-1R without disturbing

any of its main sub-system. SUPARCO utilised its indigenous capability and in-house facilities for development of this payload. For this, facilities at SUPARCO were upgraded with a long-term goal of achieving self-reliance in design, launch and operation of a satellite, which is within the plan of the Government of Pakistan's National Space Programme – 2040. PAKSAT-1R has been placed at 38° East longitude in the GSO. The design/ service life of the PAKSAT-1R is 15 years. It has been designed to have its coverage footprint over Pakistan, India, Afghanistan, Iran, UAE, Qatar, Oman, Yemen, Saudi Arabia, Kuwait, Iraq, Bangladesh, Nepal, Bhutan, Myanmar, Sri Lanka, Somalia, Ethiopia, Kenya, Tanzania, Mozambique, Uganda, Tajikistan, Kyrgyzstan, Turkmenistan, Arabia Sea, Persian Gulf, Red Sea, and parts of: China, Syria, Egypt, Sudan, Zambia, Zimbabwe, South Africa, Israel, Lebanon, Turkey, Ukraine, Belarus, Poland, Germany, France and UK.

The project was approved by the Government of Pakistan and a commercial contract for the manufacturing and launching of PAKSAT-1R was signed on 15 Oct 2008 between Pakistan and China. A dedicated team of SUPARCO engineers/scientists undertook a know-how development and training program at CGWIC's premises in China and worked along with their Chinese counter parts to realize the dream of self reliance in hi-tech field of satellite design and development.

PAKSAT-1R was successfully launched on 12th August 2011, and will start its commercial operations in October 2011. It is a great milestone in the field of science and technology for the people of Pakistan and a big step towards the economic prosperity of the country.