lel Super Computer

(vii) New Electronics Materials & Components

(viii) Microelectronics & Photonics

(ix) Retrofit Automation in economic sector

(x) Future Air Navigation Systems

(xi) Information Technologies

(xii) Production & Application of Biological Pest and Weed Control Agents under IPM

(xiii) Technology Development and Demonstration of Biofertilize - Blue Green Algae and Rhizobium

(xiv) Semi-intensive Prawn Aquaculture in Different Agroclimatic Regions

(xv) Leather -Technology Mission for Sustainable Development

(xvi) Clean Coal Technologies

The objectives of formulating these technology projects in mission mode are to provide focussed thrust in select technology areas for speedier results and to ensure that the fruits of S & T reach our economy for the benefit of common man

Nodal departments for overseeing the execution of the technology projects in mission mode and participating departments/ agencies including postential industries and users have been identified The projects are proposed to be implemented by various institutions in several parts of the country

Some of the above technology projects in mission mode such as Mass Employment Genration through S & T, Bio-Pest Control, Bio-fertilizers, Aquaculture and Leather would directly improve the earning conditions in the villages and the poor people, in general, by providing them gainful employment, enhanced income man by providing them with quality goods, improved services and through general upgradation in the economy

*[English]*

**Space Programmes**

*138 DR KARTIKESWAR PATRA Will the PRIME MINISTER be pleased to state

(a) the major space programmes targeted and accomplished during the Seventh five Year Plan in the country,

(b) the programmes proposed for Eighth Five Year Plan, and

(c) the result achieved from launching of INSAT-2A?

THE MINISTER OF STATE IN THE PRIME MINISTERS OFFICE (SHRI BHUVANESH CHATURVEDI) (a) The main thrust in the Seventh Plan was to rapidly realise satellite-based national systems for telecommunications, breadeasting (TV and Radio, meteorology, and natural resources management on an operational basis, largely based on indigenous satellite and launch vehicle systems Significant progress had been targeted for interlocking the various segments of the national space effort, by completing the linkages between the launch vehicle, satellites, applications and utilisation programmes Reducing external dependence and rapid development of Indian launch vehicle for launching the operational satellites (IRS and INSAT series) was one of the major tasks for this period

*Accomplishments during the Seventh five Year Plan;*

Under Operational INSAT System INSAT-IC and INSAT-ID were successfully launched and operationalised Indigenous development of the second generation INSAT-I Test Spacecraft, as a followup to the bought out INSAT - I series of satellites was initiited during the Seventh Plan period, which calminated in successful launch of INSAT-2A on july 10, 1992 Hence INSAT system was fully operationalised, providing vital national services in the area of telecommunications, nation wide TV and radio networking and impoved weather forecasting through meteorological imaging and data colection Many innovative new initiative such as meteorological data collection from remote platforms, disaster warning, business communications etc , have also been implemented with the help of INSAT system and new initiative such as rural telegraphy, data networks and regional TV feeds have been taken up Application of remote sensing for natural resources has been operationalised with the launch of state-of -art IRS IA on March 17, 1988, followed by the launch of IRS-IB on August 29, 1991

A national Natural Resources Management System (NNRMS) has been established in the country combining optimally the advantages of the satellite remote sensing and conventional methods Five Regional Remote Sensing Service Central (RRSSC) have been operationalised at Bangalore, Dehradun, Jodhpur, Kharagpur and Nagpur Remote Sensing Centers have also been established in 21 States/ Union Territories and the remaining State/Union Territories are in the process of establishing these Centres, During the Seventh Five Year Plan the Department of Space catalysed the setting up of these centres by providing technical assistance and seed money for procuring equipment and data

Application of remote sensing has been operationalised in a number of important areas like forest vegetation cover mapping and change detection, wasteland mapping, ground water targeting, flood mapping etc A number of application missions have been undertaken jointly by the department and the user agencies Strong linkages have been established with the end-users at the grassroot level for ensuring the dissemination of remote sensing technology and Utilisation by the ultimate beneficiary

Two developmental flights of the indigenously developed Augmented Satellite Launch Vehicle (ASLV) have been carried out in 1987 and 1998 with SROSS-I and SROSS-2 satellites onboard Even though these missions were not successful, detailed evaluation analyses provided valuable inputs, which resulted in the successful launch of the 3rd development flight of ASLV on 2 8th May 1992 injecting SROSS-C satellite into orbit

Development of all the Major Systems oif Polar Stellite Launch Vehicle (PSLV), capable of laubching IRS class of satellites in polar sun -synchronous orbits, was completed and the vehicle is scheduled for launch during 1993

The indigenous capability for the launch of INSAT - 2 Spacecraft is planned to be achieved by 1994-95 with the development of Geo-synchronous Satellite Launch Vehicle (GSLV) Initial efforts for the development of the cryo engine/ stages for such an application , was initiated in the Seventh Plan

One of the major initiatives taken up in the area of Satellite Communication is the Satellite-aided Search and Rescue.

A number of ground-based, balloon an d rocket-borne campaign experiments were conducted in the space science area.

Strengthening of the linkages with the Indian Industries has been one of the achievements. Space divisions have been set up in some of the major public sector organisations.

(b) The Programme proposed for Eighth Five Year Plan;

The Eighth Give Year Plan envisages two operational space systems, namely, INSAT system and IRS system, which will need to be maintained expanded to meet the projected demand of services, with the necessary in-orbit replacements and operational ground support systems. In the case of IRS system, the acquisition.processing and dissemination of the satellite date to the user community will also be a major responsibility to be discharged by the Department of Space. During the Eighth five Year Plan period,it is envisaged to complete the opertionalisation of IRS-IB spacecraft, IRS-IC Spacecraft, INSAT-II Test Spacecraft. Augmented Satellite Launch Vehicle (ASLV), and Polar Satellite Launch Vehicle (PSLV), Development of Geo-synchronous Satellite Launch Vehicle (GSLV) and Cryogenics Engine and Stage is also an important activity proposed to be carried out during this period.

(c) After the successful launch and opertionalisation of INSAT-2A satellite, the lease of 12 C-band tansponders from ARABSAT has been terminated with effect from 15th September 1992 thus saving considerable foreign exchange.

INSAT-2A now carries all the traffic carried by ARABSAT-IC satellite. In addition many telecom cirucits and additional TV regional services have been provided through INSAT-2A.

The Data relay service has been reinstated through INSAT-2A. An emergency alert system in the Indian Ocean region using the 406 MHz Satellite-aided Search and Rescue payload on INSAT-2A has been operationalised for the first time. India Meteorological Department uses operationally the improved VHRR imageries from INSAT-2A.

**Development of Non-Conventional Energy Sources**

*139. DR. K.V.R. CHOWDARY: Will the PRIME MINISTER be pleased to state:

(a) the project-wise progress made in research and development of Non-conventional Energy Sources so far;

(b) the steps proposed to be taken for the development of NCES during 1993-94; and

(c) the amount allocated in this regard during the above period?

THE MINISTER OF STATE IN THE MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES AND MINISTER OF STATE IN THE MINISTRY OF AGRICULTURE (SHRI S. KRISHNA KUMAR): (a) The Ministry of Non-Conventional Energy Sources is Carrying out research & development in various technologies of non-conventional energy sources through IITs, Universities and various other scientific and technical institutions in the country. The project programme-wise progress made in research & development of non-conventional energy sources so far is given at statement-I