

**Integrated Master Plan to Establish**  
**EDUSAT SERVICES**  
**FOR EDUCATION**  
**AND**  
**KNOWLEDGE EMPOWERMENT**  
**A Project Report of the**  
**Government of Kerala**

*Forwarded by EDUSAT Task Force and*

*Submitted to*

**INDIAN SPACE RESEARCH ORGANIZATION**

**Department of Space**

**Government of India**

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# **EDUSAT SERVICES FOR EDUCATION AND KNOWLEDGE EMPOWERMENT**

## **EXECUTIVE SUMMARY**

This proposal presents a unified master plan to exploit the many opportunities provided by Edusat to enhance the quality of education, training and related services provided under different sectors. All training, education and empowerment services provided by organizations under the purview of different government departments are to benefit from the unified approach to Edusat services. The departments include, (i) School Education; (ii) Higher Education; (iii) Agriculture and related areas; (iv) Health; (v) Home and Modernization of Government Programmes; (vi) Science, Technology and R&D organizations; (vii) Information Technology; (viii) Industries, including small and medium industries; and (ix) specialized need based or demand driven just-in-time training needs of key organizations under other departments.

The approach presented here leverages on the synergy between Edusat and the following several ongoing initiatives and programs in Kerala.

1. The State Wide Area Network (SWAN) under the IT Dept. to link all major educational, government, R&D institutions and reaching up to block level over broadband.
2. The upgraded Education Grid project and IIITM-K to become one Virtual Institute of Science, Technology and Arts [VISTA]. VISTA will equip institutions of higher education, those under the Agriculture, Health and leading R&D organizations with advanced information and collaboration systems, digital libraries, data centres with scientific and computational portals.
3. Proposed Open Learning and Open University Programs under VISTA.
4. KISSAN-Kerala, Krishideepam TV serial To be enhanced with other education or development oriented TV serials), Virtual University for Agriculture Trade and the e-extension services under the Agriculture Department and executed by the present IIITM-K, Kerala Agricultural University and the Directorate of Agriculture.
5. IT@School and SCERT initiatives to enhance school education and induction of IT education and IT facilitated services into schools.
6. Modernization of Government Programs and related training activities under the Institute of Management in Government and other Government training organizations.
7. Telemedicine and Continuing Medical Education.

Under this integrated EDUSAT services proposal for education and knowledge empowerment, the following facilities will be established.

1. Master Edusat Teaching Centre with TV studio and web studio facilities at the VISTA Operations Centre in Technopark. This will be backed by the master data centre and scientific/computational portals for education, R&D and knowledge empowerment services. The Technopark location is close to VSSC, with 24X7 operations and a place for industries, academia and government to work together.
2. Secondary Teaching Centres at nine locations – One each for IT@School/SCERT, College of Engineering, the four major universities – Kerala University, CUSAT, M.G. University, Calicut University, the Kerala Agricultural University, Institute of Management in Government, and the Medical complex of Trivandrum Medical College area. Besides NIT-Calicut and IIM-K will be encouraged to set up under appropriate central schemes.
3. Link 300 colleges with remote interactive Edusat classrooms. Colleges in the interior and rural areas may double as venues for open education and training programs.
4. 1000 schools (in the initial stage, more to be added later) to have remote non-interactive Edusat classrooms. Content development, teacher training programs and a school education portal management will be done by the IT@School and the SCERT.
5. Agriculture education, related extension services, training of extension workers, officials, farmers and agri-enterprises will be facilitated by Edusat remote interactive classrooms in tandem with VISTA Virtual Learning Campus services. A mobile Education Bus fitted with Edusat remote classroom equipment and Internet connection will be added to reach just-in-time location specific education, technology transfer and training. This also envisages having 20 remote Edusat classrooms across the state.
6. Based upon success of the KISSAN Krishideepam TV serial, regular TV programs in education and knowledge empowerment areas are to be produced in agriculture, Public Health, Ecology and Environment, Aquatic and Marine ecology, Science and Technology, Career Counseling and other areas of social relevance.
7. An Advanced Informatics and Systems Integration Laboratory will be set up under VISTA to facilitate technology development, content development, deployment, training and entrepreneurship in state of the art information systems, computational and scientific portals in diverse areas.

The Health and Telemedicine area are mentioned in this proposal and not budgeted as the same has been considered another approved proposal of the Health Department. This proposal will ensure that VISTA services will be extended to the Health sector as well.

### **Funds requirement and mobilization for the EDUSAT services related programs**

This proposal recommends that the proposed VISTA will be the coordinating centre for the diverse Edusat related facilities deployment, systems and programs integration and maintenance. The required funds for this purpose, although on paper appear rather large, are available to a large extent under the different departments for training and different extension services. A significant part of the funds for VISTA will also serve the master EDUSAT services centre establishment. Besides VISTA will generate the necessary technology manpower needed under the different programs. In summary the funds needed under the different agencies are given below.

i) ISRO	- Rs. 1,300 Lakh (NR);	Rs. 220 Lakh (R)
ii) Depts. of Higher Edu. & IT (for VISTA)-	Rs. 3,380 Lakh (NR);	Rs. 2,170 Lakh (R)
iii) School Education	- Rs. 1,120 Lakh (NR);	Rs. 870 Lakh (R)
iv) Department of Agriculture	- <u>Rs. 290 Lakh (NR);</u>	<u>Rs. 690 Lakh (R)</u>
<b>Total Project Outlay*</b>	<b>- Rs. 6,090 Lakh (NR);</b>	<b>Rs. 3,950 Lakh (R)</b>

Much of the above funds needed are to be re-appropriated from the different plan allocations and funds earmarked otherwise practically for VISTA, Education Grid, KISSAN, Virtual University for Agriculture Trade, IT@School programs and others. Adding EDUSAT services increases the capabilities to achieve the intended objectives under existing allocations.

The Advanced Informatics Laboratory is proposed to be established with support from ISRO, IT Department and proposals submitted to the Centre in the initial stages. Later it will generate its own funds through major project proposals.

[K.R. Srivathsan]

Dated: Jan. 29, 2005

Director, IIITM-K

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# **EDUSAT SERVICES FOR EDUCATION AND KNOWLEDGE EMPOWERMENT**

## **1. INTRODUCTION**

EDUSAT, the first geosynchronous communication satellite exclusively dedicated for education and knowledge services, was launched in Sept. 2004 by the Indian Space Research Organization (ISRO). The EDUSAT program envisages many teaching-end classroom uplink facilities and interactive or receive only remote classrooms in thousands of colleges and schools. It will also serve the educational and knowledge empowerment related communications for Agriculture, Health, E-Governance and many such diverse sectors of importance to social welfare and rural prosperity. It is in the spirit of Dr. Vikram Sarabhai's vision that India shall be, "second to none in the application of advanced technologies to the real problems of man and society".

Kerala, as a state prides itself as the first in India to achieve 100% literacy and world recognized level of social development. It has also achieved sufficiency in number of schools and colleges for its young population. However, the state has been rather weak in providing quality education at secondary, post secondary and professional education levels. The emerging knowledge economy dictates that educational institutions are modernized and their curricula brought closer to providing real-world problem solving education to the students.

Based on the integrated perspective of all the education sectors – school, higher education, agriculture, health, the needs of professional and continuing education – the Government of Kerala puts forth in this proposal an action plan for a combined and comprehensive EDUSAT services and terrestrial broadband network infrastructure linking all the education sectors in the state. As explained later in this document, the unified educational services network will form the Virtual Learning Campus and form the basis of the proposed Virtual Institute of Science, Technology and Arts [VISTA]. This proposal also includes how the same set of services for education at school and higher education levels will be extended to cover the EDUSAT applications in Agriculture, Health, training needs of Government and others. Such a unified approach leads not only to greater efficiency in the use of EDUSAT resources, but also adds much through synergy across different sectors.

The potential to apply EDUSAT in education and knowledge empowerment is vast and varied. To realize this potential, we must exploit the synergy arising from the convergence of both terrestrial broadband network services and the education satellite services. The two are largely complementary. The terrestrial broadband network is best used for applications like Internet

access, digital library services, research data and publications access, asynchronous interaction and collaboration through messaging and discussion boards, content development and dissemination and such others where the time and target groups are not necessarily known fully. On the other hand the geographic reach of EDUSAT is practically universal and it is excellent for interactive real-time and streaming services like remote classrooms, television and compressed video broadcasting and reaching data services to where the terrestrial network is unable to reach. The only limitation of EDUSAT is the finite capacity in terms of number of channels, bandwidth and time slots for carrying out different programs. Hence a hybrid approach optimally combining both terrestrial broadband and EDUSAT in time, space and services mix is the best to derive maximum benefit for the country.

There are several areas related to education that have immense potential to benefit from using such hybrid network supporting technology enhanced learning services. An indicative list of such services is given below.

### **1.1. Universal School Education**

School education may be layered into elementary, primary and secondary levels. At all levels we need to have highly motivated and competent teachers. Hence teacher training and support services and equipping the schools to use audio-visual and streaming multimedia content effectively are important. EDUSAT services will address teacher training and associated support services. Besides, both EDUSAT and broadband will help disseminate multimedia content of relevance for use by the teachers. Discussion boards and asynchronous consultations with experts to answer their queries will help teachers in participatory learning and content development. The school management will benefit by support for automation of the administrative processes.

At the senior secondary level, in addition to teachers training and administrative support functions, students need counseling, career orientation, enhancing motivation through studies of real-world situation and solutions. They will profit a great deal by motivational online seminars by subject experts. In all these, the EDUSAT has central role to play.

### **1.2. Higher Education**

With India having a large percentage of youth aspiring for education and career, Higher Education is one major area where we have to speedily enhance the quality of education offered in the colleges. The number of colleges has gone up. But there are not enough qualified

or capable teachers. Different states and the centre are responding to this in different fragmented ways. Kerala has commenced the Education Grid project to address this in a holistic manner. Higher Education will benefit from wide and easy availability of web-accessible information and computational resources, besides benefiting from remote classroom services for both the students and teachers.

### **1.3. Agriculture**

Besides the higher education programs offered by Agricultural Universities and other institutions, extension services related education programs in Agriculture, Animal Husbandry, Fisheries, Poultry, need based and just-in-time educational needs of farmers, small and medium agro-enterprises, agriculture related trade awareness and support services, capacity building programs, wide dissemination of research findings and technology transfer and such others are of great importance to the economy and rural prosperity. The MS Swaminathan Research Foundation (MSSRF) and the National Farmers' Commission have initiated the "Mission-2007 – Every Village a Knowledge Centre". This will require many education and advisory programs of relevance to employment, development, gender equality, virtual academy programs, health and education in the rural areas. All these services stand to gain from EDUSAT services supported at the backend by broadband and mobile access to valid and timely information and knowledge services.

### **1.4. Health Services**

Telehealth services and Continuing Medical Education are the two issues being addressed already by EDUSAT supported programs. The scale and deployment of these have to be expanded vastly so that it serves the "Mission- 2007" vision and objectives. To this we must add strengthening the Public Health and Disaster Management services by the combination of EDUSAT and Broadband network. Both will need both smart distributed information and alert systems augmented by public education programs.

### **1.5. Vocational and Industry Training Programs**

Quality vocational and need based training will provide large-scale employment among youth. Present vocational schools like the ITIs and polytechnics are in dire need of curriculum upgrade and support for the training instructors. They also need to work closely with the manufacturing, trade and other industries to align their training, certificate and diploma programs with the changes in technology and industrial practices. New vocational areas in IT related services and

systems management have to be introduced. A good way to achieve this will be to establish a referral institution in the state that generates content and provides training to the teachers in the vocational institutions using EDUSAT facilities.

### **1.6. Training Needs of Government Employees and NGOs**

With many changes taking place in the government through Local Self-help Groups, Panchayati Raj and introduction of E-Governance at different levels, there is a need for massive training and reorientation at all levels of government employees and those working under various NGOs. Much better coordination and effective delivery of training will be possible by having training needs analysis and content development carried out in relevant government institutions and taking the training programs to all locations in the state through EDUSAT facilitated delivery. The E-Governance functions over the State Wide Area Network (SWAN) will reinforce this training. The IT Department at the centre is investing in SWAN in a major way covering all the states and Union Territories across the country.

Hence the availability of EDUSAT together with the SWAN is a grand opportunity for boosting quality and variety of continuing education services across all sectors and all segments of society. However to benefit from this opportunity the EDUSAT services deployment strategy in must bring about the synergy across the different sectors of education, continuing education and training.

### **1.7. EDUCATION AND KNOWLEDGE EMPOWERMENT**

There are two major complementary areas that every university, premier academic and R&D institution have to perform. The first is education – imparting scholarship in the young and those who seek. Students have to be equipped with concepts taught rigorously in ways that relate to real-world needs and problems. The other is making their expertise available to the economy and welfare of the society at large. This second aspect constitutes the public citizenship and social responsibility functions of higher education and research institutions. We refer to this latter aspect as the ‘Knowledge Empowerment’ duties of higher education and research institutions. These may come in diverse forms. In Agriculture and Health they may be extension services, it may be consulting, IP development and technology transfer in Science and Technology. All premier institutions must perform teacher training as a standing extension service. Our goal is to strengthen the postgraduate academic and R&D institutions along these lines to contribute to economic development and knowledge empowerment of the society.

In this proposal formulating the EDUSAT programs for Kerala we present an integrated and holistic approach to EDUSAT applications in the diverse fields stated above. In the next section we briefly review several of the ongoing programs and initiatives in Kerala that will help launch EDUSAT services in the diverse sector quickly.

### **1.8 POSTGRADUATE, R&D INSTITUTIONS AND INDUSTRY**

Till date, the postgraduate and R&D institutions are working in isolation. There are a large number of study and research areas that need constantly current valid data. Maintaining trustworthy valid current data and making it available for those who can interpret and provide consulting services are important in a wide variety of situations. For example interpretation of weather data in the context of local agro-climatic conditions to providing seasonal advisories and crop forecast will be of great value to farmers and agriculture in general. Availability molecular data will be of great value in teaching and research in Chemistry, drug design and pharmaceutical processes. Public Health, E-Governance, Law are sample areas that will benefit from valid current data. However there are hardly any data centres that provide trustworthy validated data that will help decision making in the respective areas. Such interpreted data and information services will lead to large-scale employment among educated youth and for Knowledge Empowerment services in the rural areas. With the Farmers Commission and the newly announced National Knowledge Commission, the Knowledge Empowerment services will have to play increasingly central role in our country's development. Every Postgraduate and R&D Institution will have to build systems for maintaining quality data centres in their respective subject area. We also have to provide associated continuing education services and generate new cadre of extension workers or consultants in large numbers. These services in turn have to be linked to the kind of Virtual academy fellowship programs being initiated under the Farmers Commission and Mission-2007.

## **2. REVIEW OF ONGOING EDUCATION AND KNOWLEDGE EMPOWERMENT PROGRAMS**

In each of the areas stated in Section 1, Kerala has launched or about to initiate specific programs. These are summarized below.

### **2.1. School Education**

The IT@School project and SCERT are the principal players in taking IT facilitated education and training to schools. IT@School is actively involved in promoting IT related education in the state's schools. It is working to establish an Education Portal and content development for the

state's schools. It has launched a mobile bus for taking IT education to schools in remote places that are not adequately equipped. Plans are afoot to launch extensive teacher-training across all the schools. The central education portal will run several services including publications management, group collaboration facilities, databases of relevance for schools administration, digital library, e-learning services and open discussion boards for teachers and students. IT@School is also in charge of computerization and IT related education and training in the schools of the state.

With the help of EDUSAT services and the school education portal services, both IT@School and SCERT will be poised to provide quality universal school education in the state a reality.

## **2.2. Kerala Education Grid**

Kerala Education Project is a path breaking initiative undertaken by the Kerala Government to provide quality education to all the students of higher education in the state. This is planned to be done in phases. A body of eminent academicians, concerned officials and experts from industry/R&D constituting the Project's Apex Project Coordination Unit (APCU) are guiding its plan, implementation and the programmes. The project takes a holistic view of using the power and potential of ICT and convergence in education to assist (i) the teachers in teaching better, (ii) students to learn better and (iii) the academic administrations to manage better.

### **2.2.1. What is Education Grid?**

Education Grid is much more than linking the colleges and universities of Kerala over the Internet. It aims to establish subject specific collaboration spaces and knowledge networks across the colleges. The Grid helps to put in place such information and course-specific content development and collaboration over the LAN and Internet through which the services of experts, and resources relevant for the respective courses from wherever available is made accessible to the colleges, the teacher and students who are in need of the same. The project will include such orientation, programmes and facilities for teachers that help them to conduct classes in pedagogically effective manner. It will strive to provide such web-enabled content, interaction and collaboration facilities that help students learn better.

As the project progresses, all courses in the universities – theoretical, practical, fieldwork or simulation oriented – will be supported by quality assured web-enabled content and processes.

***The Project's vision is, "Quality Education to all independent of Geography".***

### **2.2.2. How is the Grid established and run?**

- (i) Establish statewide backbone network for Higher Education and Research using the services of major networks such as BSNL, Asianet Dataline Services, Reliance Infocom and ERNET India.
- (ii) Set up Education Servers – one in each college connected to its LAN with access systems and linked to the backbone network.
- (iii) Establish Education Grid Resource Centres [EGRC] in premier institutions such as the National Institute of Technology Calicut (NITC), Cochin University of Science and Technology (CUSAT), College of Engineering, and others as and when found needed.
- (iv) The overall set of project activities will be coordinated by the Education Grid Operations Centre [EGOC] at IIITM-K in Thiruvananthapuram. EGOC will address the total project coordination, infrastructure and technology related issues.
- (v) Develop pedagogically sound, quality assured web-assisted courseware and authored under guidance by Course Expert Groups in different subjects and supply them to the colleges.
- (vi) Conduct teachers' training. Assist students, teachers and content development teams through the Education Grid Portal and the Resource Centres.
- (vii) Help colleges with Digital Library, access to online technical and scientific journals and to modernize the course curricula in tune with emerging areas and interdisciplinary era.

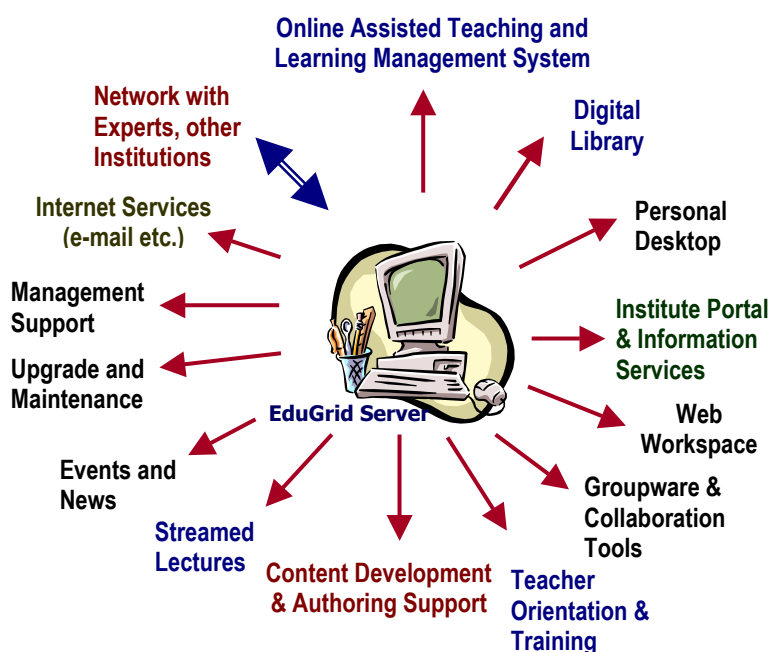
### **2.2.3. Who funds the project and how is it managed?**

This is a project of the Department of Higher Education, Kerala Government under the plan. A Project Governing Council chaired by the Principal Secretary Higher Education, with Vice Chancellors, Director of Technical Education, Director of Collegiate Education, IT Secretary, Finance Secretary, and some eminent academicians as its members look after the project monitoring, funding and policy issues.

The Apex Project Coordination Unit of eminent academicians, experts and relevant officials identify the project activities, set up necessary task forces, guide the component activities and make necessary recommendations to the Governing Council for appropriate policies and funds requirements. The Director of IIITM-K is the overall Project Coordinator.

The project execution will be done through Resource Centres in Thiruvananthapuram, Kochi and Calicut. The Education Grid Operations Centre at IIITM-K provides the management, technology and coordination.

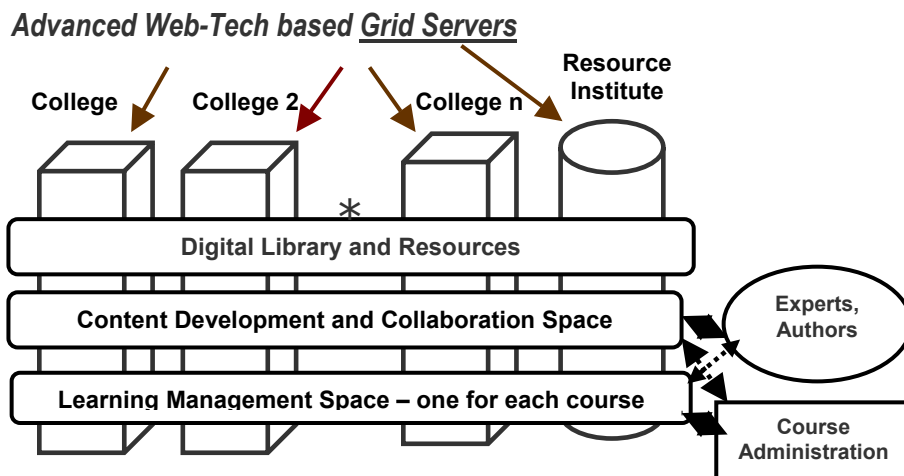
The efforts in establishing the Education Grid have already achieved several milestones. As a byproduct of this effort, a new class of Education Servers [Fig. 1] have been developed and now deployed in many leading institutions and industries in the country.



**Fig.1: Education Server and its Services**

The technology of these servers have already been transferred to industry. Leading institutions like the IITs, IISc, IIMs, Indian School of Business, Amity Business School, R&D organizations like the Aeronautical Development Agency, National Aerospace Lab, ISRO, Vikram Sarabhai Space Centre, industries like TCS, Wipro, Ashok Leyland and many others are now using the kind of servers that originated from the IIT Kanpur – IIITM-K development and technology incubation effort. In a significant way, this development has already helped cross a major technology hurdle in the development, configuration, management and maintenance of complex information systems of tomorrow. Based upon this experience, the Education Grid project has commenced the technology assisted collaborative education services as shown in Fig. 2.

The approach is to have at least one good institution service each subject area, maintain the e-learning and web-resources for the courses in the area. The referral institute will conduct teacher training, academic support services for the colleges and continuing education in the subject area.



**Fig. 2: Course Knowledge and Collaboration Spaces in each subject area over Education Grid**

The Education Grid project is working in tandem with the National Program on Technology Enhanced Learning (NPTEL) funded by the MHRD and executed by the IITs and IISc. Through it E-learning facilities have been introduced in CUSAT, NIT-Calicut, College of Engineering – Trivandrum and IIITM-K. Teachers training and orientation in different subjects to use technology enhanced learning are going on. The UGC Infonet supported e-journals access to the libraries of the major universities is now fully commissioned by the project.

The project runs the portal [www.edugrid.ac.in](http://www.edugrid.ac.in) for the teachers in the colleges. Recently the Education Grid project and IIITM-K have submitted a project report on the establishing a Virtual University, or, Virtual Institute of Science, Technology and Arts (VISTA) as it is now referred to. VISTA will include several programs like establishing advanced services for education and research that include scientific and computational portals and open learning programs. This is briefly stated later. Under VISTA, the project will be enhanced to include EDUSAT services supported continuing education for teachers, collaborative open learning programs by the Universities and premier institutions and network accessed digital library, e-courseware, asynchronous discussions and web-resources in a large number of subject areas.

### **2.3. KISSAN – Kerala Project**

The Karshaka Information Systems, Services and Networking (or KISSAN –Kerala Project) was proposed by IIITM-K under applications of IT in Agriculture. The Dept. of Agriculture, IIITM-K and the Kerala Agricultural University now jointly run the project. The vision of this project is to provide the farmers with the, ***“right information at the right time in the right places to the***

***right persons and in the right context.***” To achieve this, the project optimally mixes communication and feedback using the following four systems.

i) An advanced central anchoring knowledge management and collaboration portal **www.kissankerala.net** provides the following services.

- Statewide market information system with analysis and daily updates
- Facility for daily weather forecast
- Crop Information
- Online Query-Answering system
- Farmers discussion forum
- Geography specific Agri Information Systems
- Database on statewide availability of planting materials, fertilizers and plant protection controllers.
- E-publications, news, TV serial episodes and summary, etc.

ii) **KISSAN Krishideepam TV Serial**

The project produces the weekly Krishideepam TV serial and broadcasts it over popular commercial TV Channel. It is also the first example in India of an academic institute producing such TV serial. Over 66 episodes have been completed and enjoys popular viewership. The serial provides

- Farm News
- Market Information and Analysis
- Farm advisories based on weather
- Farmers discussion forum
- Replies to queries from farmers
- Typical innovations by farmers, agricultural institutions and agro-industries
- Success stories
- Method demonstration of Technology
- Indigenous findings
- Opinions of experts on specific issues and concerns in agriculture

Each episode evokes responses from large number of viewers. These are studied and followed upon wherever such responses have value.

### **iii) Agriculture Call Centre**

KISSAN-Kerala operates a call centre and answers daily a fair number of queries of agriculture related concerns from anyone in the state. This is being promoted to become the primary call centre for Kerala agriculture.

### **iv) Virtual University for Agriculture Trade [VUAT]**

Based upon the services and infrastructure provided by the KISSAN-Kerala and IIITM-K, the Kerala Agricultural University is soon launching the initiating the VUAT. This follows the recommendations of the M.S. Swaminathan Committee. VUAT will provide such education to farmers, small and medium agri-enterprises, extension workers and others need based and strategy related education towards achieving trade security for the largely plantation dependent agriculture of Kerala.

This entire spectrum of integrated KISSAN services will be amplified by the EDUSAT services proposed in this document.

## **2.4. Health Sector**

The Department of Health has already submitted the proposal for a statewide Telemedicine Network linking the referral hospitals, medical colleges, and the community and other health centres. Independently Amrita Institute of Medical Sciences (AIMS) is regularly conducting the telemedicine services from Ladakh to Lakshadweep. ISRO is already working with the Health authorities to commission the telemedicine consultation services. This service will be augmented by the Continuing Medical Education (CME) needs of the medical profession. The proposed EDUSAT facilities will enable both telemedicine and CME programs.

In addition, we propose to add Public Health information and awareness programs to be added using the VISTA and EDUSAT network. The details of this are being worked out.

## **2.5. Modernization of Government Programmes (MGP)**

The Kerala Government has been keen to promote the efficiency of government services through training of its employees and officials extensively in various government and extension services related programs. The Institute of Management in Government (IMG) has done extensive studies on Training Needs Analysis. MGP is charged with the responsibility of both modernizing the IMG and oversee the task of this extensive training program needs of government employees. A State Training Policy document has been brought forth detailing the

diverse kinds of training and methods to be adopted to achieve the same. IMG as the nodal agency is now in the process of carrying out this task.

We propose to equip the IMG and the different government related training establishments with appropriate EDUSAT based remote classroom services and augment the same through web-accessed content and relevant Digital Library facilities.

### **3. VISTA AS EDUSAT SERVICES COORDINATION CENTRE**

The Virtual Institute of Science, Technology and Arts [VISTA] has been submitted as the Kerala Virtual University Project Report for implementation by the Govt. of Kerala. VISTA combines the Education Grid, KISSAN-Kerala, the Virtual University for Agricultural Trade, IIITM-K, the State Wide Area Network (SWAN), emerging broadband and EDUSAT services into one coherent knowledge services institution. **VISTA also anticipates the needs of information and knowledge driven management of education, agriculture, health, governance and industry sectors.** Under VISTA, IIITM-K will be enhanced to be an inter-institutional centre of excellence that provides advanced postgraduate education R&D and Knowledge Empowerment programs institute. The organizational structure, the different functions and management of ISTA are given in the Kerala Virtual University Project Report.

VISTA is driven by the vision,

***“Enable, Educate and Empower Every Citizen and Community Through Knowledge.”***

The aims of VISTA are

- (i) Provide quality education to all independent of geography.
- (ii) Equip institutions of higher education to offer knowledge intensive products and services to society.

At its core, VISTA is driven by the IIITM-K. The institute will be a meeting ground for academicians, researchers, industry experts and government officials to brainstorm over new directions of research, develop solutions and products for information systems and knowledge management in diverse sectors. VISTA will have the following four broad functions.

- a) Advanced postgraduate study and research programs in the area of Informatics under the National School of Advanced Informatics.
- b) Enabling Role: Build the Virtual Learning Campus involving broadband and educational satellite connectivity across institutions, universities and colleges. Establish advanced computational portals, information systems and learning centres in te different institutions and colleges across the state.

- c) Educational Role: Conduct Open University, Open Learning Programs and Continuing Education Programs across the state in diverse fields.
- d) Empowerment Role: Equip leading institutions and experts in the state to install and manage Knowledge Resource Centres in different fields. These centres will offer dynamic and strategic information services support for diverse development and economic activities in different areas like Agriculture, Agriculture, Health, Education, and such socially important areas.

VISTA will establish the Virtual Learning Campus – a broadband and EDUSAT based hybrid network linking all relevant institutions along with systems and processes to offer knowledge intensive products and services.

The approach of VISTA is aligned well to support the “Mission 2007 – Every Village a Knowledge Centre”, and the PURA (Provision of Urban Amenities in the Rural Areas) programs.

Kerala Government proposes to launch the VISTA soon. The vision, objectives and approach of VISTA are elaborated in the appendix. It is based upon the Kerala Virtual University project report submitted to the Government earlier [1]. VISTA is the outcome of the considerable work already done with several new concepts and initiatives undertaken in the Kerala Education Grid Project. The ongoing Kerala Education Grid project will itself be absorbed as part of the Virtual Learning Campus infrastructure of VISTA. VISTA will be launched as per the following steps.

- i) Enhance Education Grid to provide the terrestrial broadband Wide Area Network across at least 100 colleges by Dec. 2005. In 2004-05, the proposal is to bring at least 30 colleges under this scheme.
- ii) Upgrade the IIITM-K in Technopark to become the National School of Advanced Informatics [IIITM-K]. IIITM-K will be a premier postgraduate, R&D and services institute that is at the core of VISTA’s development, programs and services.
- iii) Establish EDUSAT main teaching centre for VISTA with satellite uplink facilities at IIITM-K in Technopark. The ongoing projects of Education Grid, KISSAN-Kerala and others that are currently under IIITM-K will be merged with the proposed IIITM-K to commence the programs under the VISTA.
- iv) Establish interactive EDUSAT remote classroom facilities in about 300 colleges by June, 2005. Start regular interactive lectures in Engineering and Technology areas by April 2005 for the colleges.

- v) With assistance from the NPTEL project of the IITs and IISc, the web-based e-course content and video recorded lectures are to be readied in about 100 subjects by June 2005 for use by the teachers and students in the Engineering Colleges under VISTA. Regular distant learning classes over EDUSAT facilities for teachers in the colleges on the various subjects and in using Technology Enhanced Learning [TEL] methods in their respective courses are to be commenced at the earliest.
- vi) Integrate the VISTA Virtual Campus with the parallel initiatives of Telehealth / Continuing Medical Education, KISSAN / Virtual University for Agriculture Trade and the continuing education and training needs for industry, government and relevant organizations.
- vii) IIITM-K will be equipped with advanced informatics labs for developing and testing diverse systems and software that have to go into the different institutions and facilities that are needed to service the programs of VISTA.
- viii) The EDUSAT and Virtual Learning Campus facilities will also service knowledge empowerment programs for Agriculture, Education, Healthcare and such other socially important sectors.
- ix) VISTA's network will have both terrestrial broadband across the colleges and EDUSAT services with appropriate and seamless integration of services between both the networks.

VISTA is intended to cover all institutions under the Higher Education, Agriculture, Health, and R&D organizations under Science and Technology. VISTA will also serve the continuing education needs of industries, government and other organizations. The integration of EDUSAT and terrestrial broadband and the services under the different areas of VISTA are to be managed by the IIITM-K at its centre. A detailed presentation of the VISTA and the role of its central IIITM-K are given in the appendix to this proposal. In the next section we review briefly the facilities provided by the Kerala Education Grid project in the next section.

#### **4. CURRENT STATUS OF EDUCATION GRID**

The Kerala Education Grid Project is a collaborative effort of IIITM-K, CUSAT, CET and NIT-C. By Oct. 2004, the project has accomplished the following.

- i) The Education Grid Resource Centres have been established at CUSAT, CET, NIT-C and IIITM-K. They are equipped with (a) advanced Education Servers to develop and host e-learning materials for different courses; (b) web-studio facilities with advanced software systems and tools for content creation and technology enhanced learning.

- ii) The project is conducting regular short-courses and workshops for teachers from the colleges and universities. Over 16 short-courses, workshops and e-learning awareness events in Trivandrum, Cochin, Calicut and other places in Kerala have been conducted over the past 18 months.
- iii) Established the basic Education Grid Operations Centre [EGOC] facilities at IIITMK in Technopark. EGOC runs both software and content development facilities for the several systems and tasks needed in the project. Teachers from several colleges regularly use the EGOC facilities over the web.
- iv) EGOC and IIITM-K have developed quality supplementary content in about 9 courses. These are accessible to teachers and students from the colleges.
- v) Many teachers from the colleges have been trained in different subjects of IT and Computer Sciences on the effective use of technology enhanced learning methodologies.
- vi) Effective collaboration with MHRD's NPTEL Project that is run by all the IITs and IISc has been established. This allows for e-content and recorded video lectures in more than 100 courses by the best faculty from the IITs/IISc being made available to all the Engineering Colleges in the state. The first version of this vast material is expected to be available by mid-2005.
- vii) Through understanding with ERNET India, the UGC Infonet connectivity for accessing e-journals has been provided to all the four large universities in Kerala. The usage of e-journals in these universities has significantly gone up.
- viii) The EGOC at IIITM-K has well-equipped data centre, TV studio facilities and software development and test-bed for servicing future Education Grid programs.
- ix) Thanks to the KISSAN Project initiatives, the Department of Agriculture has approved commencing the Virtual University for Agriculture Trade jointly by the Kerala Agricultural University and the Education Grid of IIITM-K.
- x) NIT-C, CET and CUSAT have begun initiatives to introduce e-learning in their regular courses.
- xi) The efforts in the Education Grid have led to deeper understanding of the issues in content management, instructional management and their implications in content design and maintenance. The issue of quality content is being addressed holistically and

reoriented around effective instructional delivery. A content quality metric approach is being implemented to serve as the guideline for developing and maintaining content in the different courses.

The Education Grid project is now ready to become the base infrastructure for VISTA. The EDUSAT programs for Higher Education will need addition of the master teacher-end facilities to be set up at IIITM-K. Building the infrastructure for VISTA requires several advanced information systems, networks and educational satellite services. The proper integration and management of the diverse advanced technologies, systems and management will be executed in the NSA.I

## **5. EDUSAT SERVICES FOR VISTA**

Kerala Higher Education Department is working to upgrade the Education Grid project into the VISTA. VISTA is a Kerala statewide networking institution driven at its core by the IIITM-K. IIITM-K itself is proposed as an inter-university postgraduate and research institution to be built by expanding the scope of the present IIITM-K. This school will be hosted in its own campus in or around the Technopark area. It will form the hub of VISTA's programs and services. An apex expert body with eminent academicians and experts from premier institutions and industry will drive VISTA. The details are outlined in the Kerala Virtual University Project Document [1].

One immediate objective of VISTA is to enhance the quality of education provided in the engineering colleges. Kerala has nearly 85 engineering colleges, the majority of them coming up in the last few years. Most of them lack experience, resources and suffer from acute shortage of quality teachers and capacity to sustain effective instruction. Secondly, the syllabi and curricula in all the colleges need to keep pace with changes in technology. By themselves, they don't have the capacity to attract quality teachers or sustain quality learning environment.

Karnataka, facing similar problems, has taken the initiative in association with ISRO of conducting regular satellite based live distant learning classes through satellite for engineering colleges that wish to use them. This is done from the from the Visveswarayya technical University [VTU] teaching centre in Bangalore. In a similar way, VISTA also proposes to establish a head-end teaching centre and use it for conducting classes at its IIITM-K in Technopark. Concurrently VISTA also plans to conduct extensive teacher training programs and generate quality teachers for the colleges. In these efforts, VISTA plans to use the services of the IITs and IISc through their NPTEL project.

## 6. UNIFIED APPROACH FOR EDUSAT SERVICES

The unified EDUSAT services for different sectors will be coordinated under the VISTA programs in IIITM-K. Concurrent to addressing the quality of education in the engineering colleges, VISTA will also cater to the IT infrastructure and technology enhanced learning needs of the nearly 300 Science and Arts colleges also. Advanced e-learning, digital library, computational and scientific portals servicing backend databases will be set up in the universities, postgraduate and research institutions. They will be linked by the terrestrial broadband and EDUSAT services integrated network. The different programs of VISTA will be run jointly by the premier institutions over this network.

The following steps are proposed under the ISRO-Kerala joint VISTA initiative for effective use of EDUSAT in enhancing the quality of education in the engineering colleges. The steps also include how other EDUSAT applications in school education, vocational training, agriculture, health and e-governance are integrated in the larger context.

- i) Establish the master, or primary EDUSAT teaching centre at the proposed IIITM-K in Technopark.
- ii) IIITM-K will have the primary data centre and master information systems that host the e-learning course materials, digital library for supporting different learning programs and computational services needed for some of the courses. This will support the educational programs conducted over the EDUSAT.
- iii) Equip the present Resource Centres at CE-T, CUSAT, NIT-C and the major universities with secondary teaching centre facilities under VISTA. Lectures in the secondary teaching centers will be streamed over the terrestrial broadband network.
- iv) Equip each engineering college with one interactive remote classroom each to receive the EDUSAT lectures. Science and Arts colleges will also be supported to have one remote classroom each.
- v) Link the mature institutions that have experienced teachers like the CET, TKM College, NIT-C, CUSAT, the universities and others over a terrestrial broadband network.
- vi) At the IIITM-K end, the lecture streams from the secondary facilities will be converted and broadcast over the EDUSAT for use by all the desiring colleges.

- vii) All participating colleges will also have terrestrial broadband connectivity. Where this is infeasible, relevant EDUSAT IP connectivity to the master data centre facility at IIITM-K will be provided.
- viii) To begin with, remote classes will be conducted using EDUSAT support for the engineering colleges from the IIITM-K or the present Resource Centres. The streamed lectures (using DVB-RCS format) from the Resource Centres will be broadcast from the Resource Centres through the terrestrial broadband to the IIITM-K for uplinking to EDUSAT to be received by the colleges.
- ix) The Kerala Agricultural University and other Agriculture Research Institutions/ Organizations will be linked over the EDUSAT/ terrestrial broadband network and their programs will be conducted in parallel. They will be separately funded to service the Virtual University for Agriculture Trade and other Knowledge Empowerment programs.
- x) The IT@ School project and the SCERT will also be supported to conduct their teacher-training and other related school programs over the EDUSAT using the same master teaching centre facility at the IIITM-K. They will have a secondary teaching centre in Trivandrum at a suitable place of their choice connected over the broadband to the IIITM-K data centre and EDUSAT uplink services.
- xi) Government will identify an appropriate body to develop e-courseware and web-resources for vocational training programs offered by the ITIs and the polytechnics. The same will be given access to use EDUSAT services under the VISTA or the centre to be created under the IT@School/SCERT.
- xii) The present Education Grid data centre facilities at its operations centre in Technopark will be augmented to host and archive e-courseware, Digital Library, E-Publications facilities and streaming video lectures.
- xiii) Under the VISTA, IIITM-K at its centre will coordinate with the MHRD's NPTEL executed by the IITs and IISc. VISTA with assistance from NPTEL will conduct online teacher-training and TEL orientation programs for the teachers in the engineering colleges.
- xiv) The ongoing Telemedicine and CME services will also be given full access to VISTA facilities and services. The additional program of Public Health will be supported over this combined VISTA network services.

- xv) Government training programs will be equipped with both EDUSAT facilities and the web-resources facilities under the IMG and associated training organizations.

All the above fifteen activities will be serviced by a terrestrial SWAN integrated with a few EDUSAT uplink stations. The unified approach herein will permit strengthening each program by the resources provided by related departments. For example, students of Economics may do courses in Agriculture Economics offered by the Agricultural University. To conduct all the above, considerable ground segment investment for EDUSAT services at different places is required. These are spelt out in the next section.

## **7. EDUSAT INFRASTRUCTURE FOR VISTA AND RELATED PROGRAMS**

The following provides the itemized infrastructure for effective use of EDUSAT in the different programs and services proposed under the VISTA. Details and budget support needed under EDUSAT and by the Kerala Government are given in the subsections later.

- i) Establishment of the primary EDUSAT Teaching Centre at the Education Grid Operations centre (to become the proposed IIITM-K) in Technopark. This will have full-fledged interactive master or primary classroom facilities with EDUSAT Earth Station. The station should support up to four remote interactive classroom uplinks.
- ii) Set up Interactive secondary teaching centres with links to terrestrial broadband WAN – one each at CET, CUSAT, NIT-C and another six places in the universities, colleges and one for school education. These will be linked to the VISTA master earth station at the primary teaching centre via terrestrial broadband links.
- iii) Interactive remote classrooms in about 300 colleges. All the Engineering Colleges will be included in the first phase.
- iv) Initially one secondary teaching centre facility will be set up at the Kerala Agricultural University, Thrissur. Later this will be upgraded to a primary earth station and master classroom facility. This will be covered under support from Agriculture Department and by agencies like the ICAR.
- v) One secondary teaching centre for the IT@School and SCERT. All schools are proposed to be covered by receive only EDUSAT terminals and by medium bandwidth terrestrial VISTA network facilities. Master portal of IT@School will be hosted at the VISTA main server end for the school education segment. In addition, one interactive remote

classroom will be set up in each district for the training of teachers and school management.

- vi) VISTA terrestrial broadband network integration with the EDUSAT DVB-RCS and IP-VSAT services will be carried out at the IIITM-K. The technology integration and related training will be conducted at the Advanced Informatics Lab to be set up at the VISTA Operations Centre in IIITM-K.
- vii) The VISTA programs and services under this proposal will be integrated with the proposed Continuing Medical education / Telehealth EDUSAT facilities and the Government training network under the Institute of Management in Government.

ISRO/EDUSAT group and the Department of Health have finalized the working arrangements for telehealth consultation and continuing medical education services. VISTA proposes to take up the development of Health Informatics and IT facilitated Public Health services. Detailed component activities for each of the above are given next.

### **7.1. EDUSAT Master Facility At IIITM-K**

The Department of Higher Education has already invested considerably under the Education Grid project to the tune of Rs. 400 lakh in its Operations and Resource Centres at IIITM-K, CE-T, CUSAT and NIT-C. Additional investment of Rs. 400 lakh in the VISTA facilities are proposed to be spent in networking, content development, teacher training and commencing technology enhanced learning programs in the colleges. This facility will be augmented and made available for content development and web-support for the programs under the EDUSAT. This facility will be augmented by EDUSAT master teaching and studio facilities at the IIITM-K/IIITM-K in Technopark.

### **7.2. Secondary Teacher End Infrastructure In 9 Locations**

VISTA will have classes conducted from different premier institutions. These will be universities, NIT-C and CE-T. Besides, the Agriculture related programs will be conducted from the KAU at Thrissur, or from the master facility in IIITM-K. IT@School project proposes to take care of teacher training programs under school education. Together these constitute 9 additional remote classroom facilities across the state. Under the VISTA, we propose to link classrooms by terrestrial broadband network to the master teaching facility at IIITM-K for uplinking.

### **7.3. Remote Interactive EDUSAT Classrooms In Colleges And Other Locations**

About 300 colleges will have interactive receive only classrooms. They will be linked to both the Master Teaching facility at IIITM-K and the secondary teaching facilities under the premier institutions and universities. Besides the terrestrial VISTA network will provide the Virtual Learning Campus environment that supports scientific, computational and e-learning portals. Similar facilities will be provided to one location in each district for school education and twenty locations under Agriculture.

### **7.4. EDUSAT Facilities for School Education**

We propose that the EDUSAT infrastructure planned under the VISTA is also effectively shared by the schools for their educational needs. The IT@School project plans to cover all the schools (about 12,000 schools) with minimal IT infrastructure. We propose that about 1000 schools are equipped with receive only classrooms. As already stated, about 14 district level locations are given one interactive remote classroom dedicated for teacher-training. One central secondary teaching facility will be dedicated for school education. VISTA master earth station will serve to uplink the teacher-training and other programs for the schools. VISTA will support the network connection and master web-portal services for school education. The Education Department is preparing to launch extensive school teacher-training programs under the IT@School scheme.

### **7.5. EDUSAT and Virtual University for Agriculture Trade [VUAT] Programs**

The EDUSAT facilities of VISTA will be shared with the VUAT for conducting its programs. The Kerala Agricultural University will be equipped to host the master or secondary teaching centre facilities. About 20 locations across the state will have interactive remote classrooms. Another 50 locations will have receive-only stations for imparting farmer and agriculture related training.

## **8. BUDGET REQUIREMENTS FOR EDUSAT SERVICES**

The budget requirement is based upon the entire gamut of integrated VISTA services for Higher Education, Agriculture and School Education. The services will be run over the combined EDUSAT and terrestrial broadband network connecting all the concerned colleges, universities,

Sl. No.	ITEM, Or ACTIVITY	EDUSAT/ISRO CONTRIBUTION		Kerala Higher Education		School Education		Agriculture Department (c)	
		NR	R	NR	R	NR	R	NR	R
1	Master Teaching Centre at VISTA/IIITMK, Technopark	150	-	200	200	-	-	50	50
2	Secondary Teaching Centres – 9 Locations *	90	-	80	100	20	100	50	100
3	Space Segment Rental	-	200/Year	-	-	-	-	-	-
4	Interactive Remote Classrooms	500	-	3,000	1,000	100	50	100	100
5	Non-interactive Remote Classrooms	500	-	-	-	1,000	500	50	20
6	Mobile Education Bus	10	-	-	-	-	-	40	20
7	Content Development and management	-	-	-	500	-	200	-	200
8	Television serials on education and empowerment	-	-	-	20	-	20	-	100
9	Open Learning/University Programs	-	-	-	500	-	-	-	100
10	Advanced Informatics and Integration Lab at IIITM-K	50	20	100	30	-	-	-	-
11	Subtotals	1,300	220/yr.	3,380	2,170/yr	1,120	870/Yr	290	690/Yr
<b>Total</b>		<b>Non-Recurring (NR) = 5,950; Recurring (R) = 200/Yr for ISRO + 2,870 /Yr. for Kerala *</b>							

\* All amounts are shown in lakh rupees as the unit. Both ISRO and Kerala Government will commit to the plan for initial period of 3 year and will work together further after due review.

The justifications for the budget under the different heads and different organizations are given in subsection 5.1.

**TABLE 1: EDUSAT SERVICES – SUMMARY OF BUDGET REQUIREMENTS FROM DIFFERENT SOURCES**

institutions, schools and organizations. The budget estimates are given against the contributions to be made by the ISRO/EDUSAT and the concerned government departments for core EDUSAT services. The budget estimates are given under the different heads in TABLE – 1.

### **8.1. JUSTIFICATION FOR THE BUDGET PROPOSALS UNDER DIFFERENT HEADS**

The bases for justification are (i) ISRO / EDUSAT will contribute to the space segment and for such interfaces at the ground (like antenna, VSAT equipments) in the various colleges and schools; (ii) concerned departments will bear infrastructure and recurring heads for the systems and programs for their corresponding education related activities; and (iii) exploit the synergy in the common resources that are best shared across the different programs.

**Item 1: Master Teaching Facility under VISTA:** This will be located as part of the present Education Grid Operations Centre currently located in Technopark. This centre is shortly to be upgraded as the coordination centre and IIITM-K. The space segment related earth station, and a classroom equipped with three video cameras, one PC, projectors, video mixer and editing facility is estimated at Rs. 150 Lakh. This is to be supported by EDUSAT/ISRO. This will be similar to the one established at the VTU, Karnataka. The Department of Higher Education will incur a non-recurring expense of Rs. 200 lakh for the site development, master education server with data centre support and web-studio related establishment costs.

The site will be augmented by video recording, editing and production facilities. A fair number of content developers, program managers, academicians, visitors, and others will be deployed for content development and programs management. Their salaries and site maintenance will need Rs. 200 lakh/year (recurring). This will be supported by the Higher Education Department. The Agriculture Department has already invested in minimal TV studio and TV serials in Agriculture area are being produced under the KISSAN project. The same will be augmented for additional facilities.

**Item 2: Secondary Teaching Centres – 9 Locations:** It is proposed that secondary teaching centres are located at the College of Engineering – Trivandrum, NIT-C, CUSAT, the four major Universities, Kerala Agricultural University and one for the school education. Each secondary teaching centre will be equipped with basic teaching end facility without TV production equipment. This will cater to their teachers conducting remote classes from their respective institutions. A sum of Rs. 10 Lakh per node (NR) is estimated for the equipments associated with the DVB-RCS over IP streaming. The sum of Rs. 90 Lakh for the nine locations is expected

to be borne by EDUSAT/ISRO. All concerned departments will invest in the necessary site cost, and augment content development facilities in these locations. The estimated total for this is Rs. 150 Lakh, the breakup of which is indicated in Table –1. The departments will incur recurring cost of Rs. 300 lakh towards programs and content maintenance.

**Item – 3: Space Segment Rental:** It is estimated that we need two full operational channel for a good part of the time over EDUSAT. It is possible to reduce this to one if the channel allocated to telehealth and continuing medical education can be shared. At Rs. 100/lakh/yr per channel, we have indicated a sum of Rs. 200 Lakh/Year as contribution by ISRO for the space segment bandwidth.

**Item – 4: Interactive Remote Classrooms:** Out of about 400 higher education institutions, we propose to cover the Engineering and Science Colleges numbering about 300 under the EDUSAT/ISRO services. Each college will be equipped with one VSAT like earth station equipment with one interactive classroom facility. The space segment equipment cost is estimated at Rs. 1.50 Lakh per location. For 300 colleges, 14 school centers and a few agriculture locations comes to Rs. 500 lakh. In addition, considerable investment amounting to at least Rs. 10 lakh per location will be made for the site, related network connectivity, and augmenting the LAN and computer systems for the teachers. This amount of Rs. 3000 lakh will be mobilized by the Higher Education Department through technology services fee and other measures for computational and web-accessed interaction and content in the colleges.

The annual recurring expenditure for communication and maintenance is estimated at Rs. 3 Lakh per college. This will be charged to the colleges. The school education will have 14 district level interactive remote classrooms that are also networked to the terrestrial broadband. The IT@School will invest Rs. 100 lakh (NR) and Rs. 50 Lakh (R) respectively. The cost of these is estimated at Rs. For institutions and programs in Agriculture, the concerned department will invest Rs. 100 Lakh (NR) and Rs. 100 Lakh (R) in a few selected locations for the Virtual University courses and extension officers' and workers' training.

**Item – 5: Non-interactive Remote Classrooms:** These are intended for the schools. The space segment investment needed @ Rs. 0.50 Lakh per location for 1000 schools proposed in the first phase. This amount of Rs. 500 Lakh will be supported by ISRO. In addition, the Education Department will invest additionally Rs. 1.00 Lakh per school and provide for some programs/maintenance charges. They come to Rs. 1000 Lakh (NR) and Rs. 500 Lakh per year

respectively. A small sum is also earmarked for Agriculture Department to equip a few locations with non-interactive classroom facilities.

**Item – 6: Mobile Education Bus:** It is proposed to introduce one Mobile Education Bus (like an OB Van) under Agriculture Department for conducting need based training and education in rural areas is built. It shall have all the facilities to set up ad hoc classrooms with complete interaction facilities with the Virtual University programs and also double as field video production unit for agriculture related activities. ISRO will contribute Rs. 10 Lakh towards this and the Agriculture Department will mobilize through projects the funds for its building and recurring programs head-of-expenditure. This facility may be booked for other rural development programs also. Based on its success, more such units may be built.

**Item – 7: Content Development and Management:** This forms the core in all the programs related to EDUSAT services. Sums of Rs. 500, Rs. 200 and Rs. 200 Lakh respectively are earmarked under Higher, School and Agriculture Education respectively. Government will enact necessary policies for collecting fees under the open learning/open university programs, and technology services fee for students in higher education to cover the recurring cost. School education may nominally levy up to Rs. 50 per month for students to cover the recurring services cost. A fee of Rs. 5,000 to Rs. 20,000 per course, (amount being depending on the nature of the course) will meet the recurring program costs in these areas. The technology services fee for higher education may be Rs. 100 p.m. for arts and sciences and Rs. 200 p.m. for professional courses. These recommendations are being provided for necessary government follow up.

**Item - 8: Television Serials on Education and Empowerment:** Experience in the KISSAN project shows that a combination of television serial, a call centre approach for feedback interaction and backing by an interactive knowledge management portal increases the popularity and effectiveness of the learning programs and services. Accordingly, a notional sum of Rs. 140 lakh gainst all the three departments is indicated. Agriculture Department is already incurring this kind of expenditure for the KISSAN Krishideepam program. We may expect to mobilize additional resources through advertisements and grants for specific programs.

**Item – 9: Open Learning and Open University Programs:** Under VISTA, the state proposes to conduct regular open learning programs leading to degrees along the lines of IGNOU in different subject areas. Such programs will also be provided for small and medium enterprises, continuing education for industry and other sectors. A budget of Rs. 500 Lakh is indicated for this. It is likely this will be financing through fees collected against the programs.

**Item – 10: Advanced Informatics And Integration Lab:** A major challenge in launching EDUSAT services will be to set up the terrestrial broadband network, develop, test and integrate different advanced information systems like digital libraries, university portals, scientific portals, computational portals, digital archives management, etc. the Integration and management of satellite and terrestrial networks, streaming services across network domains and various systems management need a new breed of IT engineers to be trained and man the services. We propose to set up an Advanced Informatics Lab in the IIITM-K for addressing these requirements. There are considerable research components in this area that will aid in build excellent postgraduate research and education programs. A brief proposal on this was already submitted to ISRO earlier. The same is enclosed as Appendix – 2 to this proposal. ISRO with the Department of Higher Education will jointly set up this facility in the IIITM-K/IIITM-K. A budget of Rs. 50 Lakh from ISRO and Rs. 100 Lakh from Higher Education is earmarked for this lab. Recurring Head of Rs. 20 Lakh from ISRO and Rs. 30 Lakh from Higher Education is kept for the advanced research quality faculty and manpower needed for this facility.

## 9. SUMMARY AND SPIRIT OF THE BUDGET PROPOSAL

In summary the budget commitments by the different parties needed to initiate VISTA and the part of IIITM-K/IIITM-K at its centre that is needed to drive the same is given below.

i) ISRO	- Rs. 1,300 Lakh (NR);	Rs. 220 Lakh (R)
ii) Depts. of Higher Edu. & IT (for VISTA)-	Rs. 3,380 Lakh (NR);	Rs. 2,170 Lakh (R)
iii) School Education	- Rs. 1,120 Lakh (NR);	Rs. 870 Lakh (R)
iv) Department of Agriculture	- <u>Rs. 290 Lakh (NR);</u>	<u>Rs. 690 Lakh (R)</u>
Total Project Outlay*		- Rs. 6,090 Lakh (NR); Rs. 3,950 Lakh (R)

\* Although the project outlay appears large, it is important to note that much of the recurring expenses are to come from (i) reallocation of some heads of expenditures (like changing from telecom to network services, and (ii) collection from fees for new programs like open degrees, technology services fee, and similar others. In the case of School Education, the number of students is very large – at least 10 Lakh students getting benefited. Also teacher training, repositioning of QIP allocations and activities in the different universities, agriculture extension services modernization, necessity for introducing computational facilities, revenue accrual from Knowledge Consulting services from major institutions – all together will make up for much of the recurring expenses.

EDUSAT services for Kerala aims at transforming Kerala's economy into the emerging Knowledge driven economy. The seeds for the success of such transformation has to be planted in the Education System itself. With 300 colleges, and 4 Lakh students, if we collect Rs. 1000 /student / year, we have a revenue of Rs. 40 Crore to sustain the total activities in higher education. At least 10 Lakh school students will be directly or indirectly benefited under this proposal.

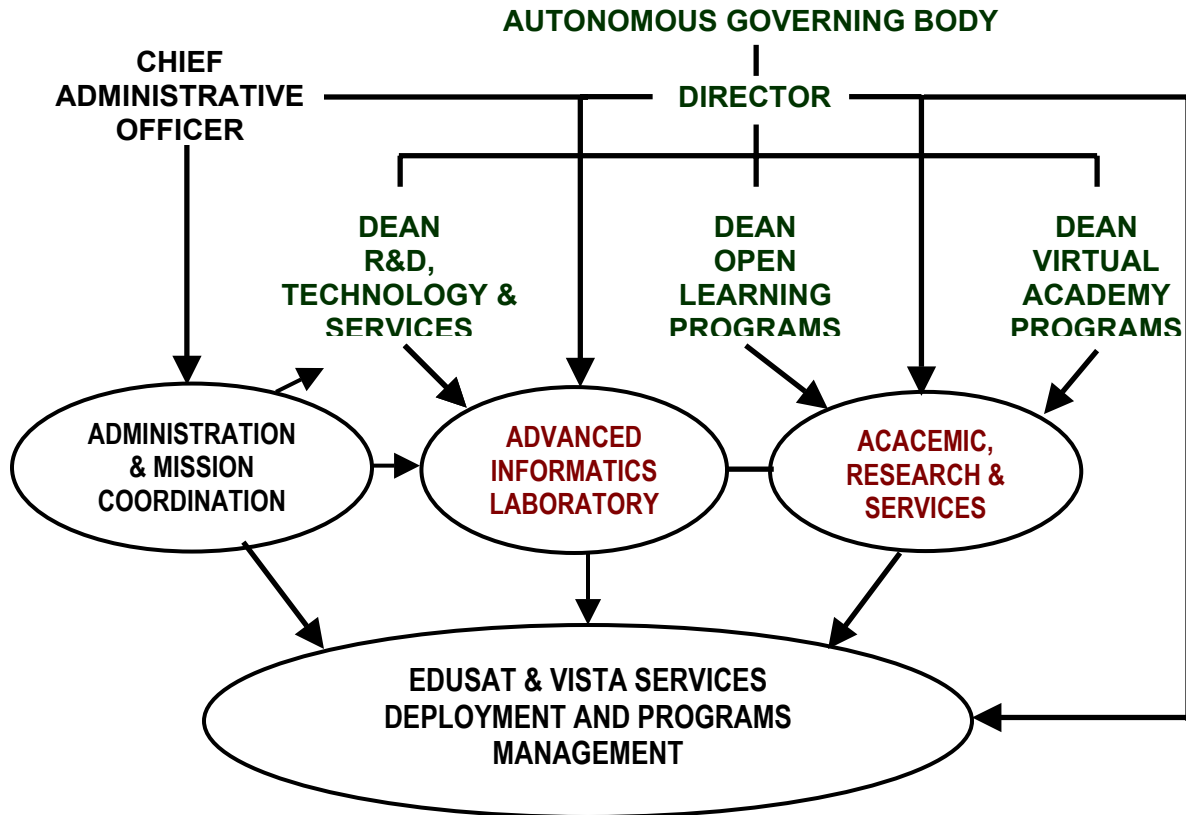
Part of the non-recurring heads of expenditures like terrestrial network and related infrastructure may come partly from the State Wide Area Network (SWAN) initiative of the Govt. of India, or, the Infogrid project proposed by CDAC. ICAR's extension services network, M.S. Swaminathan Research Foundation's Agenda-2007, "Every Village a Knowledge Centre" initiative, imaginatively integrated with the KISSAN and Education Grid projects, upcoming Virtual University for Agricultural Trade and state's plan activities in the different departments will enable us to cover the non-recurring and some of the recurring heads of expenses under this proposal.

The investments and programs of EDUSAT, VISTA and associated services will (i) modernize the educational institutions at all levels, (ii) enable creation of new job opportunities through knowledge intensive products and services, (iii) bring quality assurance methods implemented in the different educational programs and services, (iv) new enterprises and (v) project the state at the forefront of the emerging knowledge society and economy.

## **10. COORDINATION, DELIVERABLES AND TIMELINE FOR IMPLEMENTATION**

A program of the magnitude and complexity as given in this proposal needs effective and dynamic mission mode coordination. We suggest that the VISTA Operations Centre headed by the Director IIITM-K is assisted by a Chief Administrative Officer of the Secretary level rank to implement both this EDUSAT proposal, VISTA and associated services.

The Kerala Government may set up an apex coordination body with experts involved in the execution of the different systems and programs under the EDUSAT and VISTA. They may be from Higher Education, Health, School Education, Agriculture, IT, S&T and e-governance. The whole project will come up with appropriate mission mode implementation and allocate responsibilities to different groups with competencies in their respective projects/programs areas. The current Education Grid and IIITM-K will be integrated to form the VISTA's IIITM-K. The projects will be executed, monitored and managed from the IIITM-K. The following figure shows the governance structure for EDUSAT /VISTA services for the state.



**Fig.3: EDUSAT SERVICES DEPLOYMENT UNDER VISTA/IITM-K**

### 10.1. COORDINATION AND ADMINISTRATION ISSUES

This proposal envisages that the integrated EDUSAT Services deployment in Kerala is carried out in mission mode. It will be coordinated as part of the VISTA. Since it involves multiple government departments and institutions, we recommend that a Chief Administrative officer of the Secretary rank is posted to look after the mission mode coordination issues efficiently. This will ensure speedy development and deployment, which in turn will result in achieving the objectives effectively. The management structure is shown in Fig. 3. The proposed approach gets boosted by and the advantage the entire investment being made in VISTA/IITM-K.

The manpower needs at the VISTA/IITM-K end will be met from VISTA itself. At other institutions or organizations, the existing workforce will be reoriented to service the EDUSAT related programs. IITM-K has rich experience in managing a combination of collaboration through interactive portals, TV serials, Call Centre and linked educational programs. This combined experience makes VISTA as the effective forum for developing, deploying and managing EDUSAT services in all the relevant organizations. Without such a vision-driven high

technology support, establishing only the ground segment in the different organizations will not add significant value to either education or knowledge empowerment.

## **10.2. DELIVERABLES AND THEIR SCHEDULE**

The immediate benefits of commencing the EDUSAT services are several as given below.

- i) School teachers' training and continuing education will be done through EDUSAT remote classrooms. All teachers will also get web-based discussions and support content for their classes. To be launched by Sept. 2005.
- ii) IT@School Education Portal for schools to be commissioned by July 2005. It will be upgraded for providing administrative services for school education administration. To commence from Oct. 2005.
- iii) Remote Classroom services in several Engineering Courses based on NPTEL lectures supplied by the IITs and IISc will commence from Sept. 2005. The lectures will be beamed from VISTA Operations Centre at IIITM-K.
- iv) Web-course materials in Engineering subjects with interactive support for teachers to be made available in at least 20 courses by Oct. 2005.
- v) Digital Library and E-Journals support to supplement Edusat remote classroom services. To commence from Aug. 2005.
- vi) Linking of the first 50 colleges over SWAN and Educational programs for the students in the desiring Engineering colleges of the state that do not have requisite teachers in core Engineering and Sciences subjects. To commence from Aug. 2005.
- vii) Teacher-training programs in the colleges teacher support services using the Education Grid approach. To commence from July. 2005
- viii) Training of Educational administrators, college/university management, Librarians in modern IT facilitated tools for effective administration, office automation, Digital Library and educational web-resources management. To commence from Oct. 2005.
- ix) Support for students in different subjects through discussion forums where they can ask doubts and have them answered by experts both live via interactive Edusat classrooms and via the VISTA/Education Grid Portal. To commence from July 2005.
- x) Industry-oriented elective IT courses from VISTA master teaching-facility to colleges To commence from Aug. 2005.

The Edusat facilities for other departments like Agriculture, MGP and others will be synergised with the VISTA and Dept. of Higher Education programs as per the following outline.

- a) The SWAN and VISTA facilities become available to extension services in Agriculture, Health and diverse projects related to state's development.
- b) The Virtual University for Agriculture will have a lot more capability in reaching out need based and demand driven learning programs for farmers and extension staff.
- c) The plan and implementation of Government officials training is being worked out by the under the IMG and other training bodies in consultation with the MGP. The methodology of Government Training under MGP will be totally modernized making demand based training a reality. The programs will also get strengthened by rich web-resources.
- d) We may expect creation of large scale information and knowledge services related employment in the thousands with valid hot information

We expect to register at least 10,000 Course Registrants under continuing education and open learning programs from different institutions supported by Edusat and VISTA. This number may grow to at least 50,000 or more over time. To achieve this, VISTA will build the competence and capacity in the universities and premier institutions and follow the guidelines given by UGC. The proposed approach Institutions and universities will gain rich experience in managing remote classrooms based education programs. This, together with the Edusat and Education Grid methodologies will equip Kerala Institutions to take educational services to nearby countries and abroad.

For speedy execution of Edusat related services, the Government will undertake urgent steps for establish VISTA as proposed in the Kerala Virtual University Report. We also recommend that the present IITM-K and its associated infrastructure is merged as the core of VISTA so that there is complete synergy between technology capabilities, education and training programs together with the competency and capacity building in offering knowledge intensive products and services. This will help achieve the vision, "**Enable, Educate and Empower Every Citizen and Community Through Knowledge**". This approach is in total alignment with the PURA and Mission 2007 concepts and related programs being launched across the country. The Knowledge Empowerment model backed by the Edusat programs is one that the proposed National Knowledge Commission may study and roll-out as a national knowledge services model.

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