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**PLENARY MEETING**

## **VITA**

### **A SATELLITE EMAIL NETWORK FOR DEVELOPING COUNTRIES**

#### **A PROPOSAL CONCEPT**

Volunteers in Technical Assistance (VITA) proposes the creation of an Internet-related communications network that will provide more reliable and cheaper access to critical health, education, disaster, and other information for people in the rural areas of developing countries. This network will include a coalition of low-Earth orbiting (LEO) satellite owners in addition to VITA, as well as a coalition of non-government organization (NGO) users with counterpart NGOs in developing countries. VITA will work with the ITU Telecommunication Development Bureau in this effort.

The network will build on and considerably expand the time and space capacities of the VITAsat low-Earth orbiting satellite system that has already been tested by NGOs in 15 countries. Other systems similar to VITAsat have been used for communications in 14 additional countries. Many NGOs, therefore, and the licensing authorities of these countries are already familiar with LEOs like VITAsat.

These and other satellite owners are committed to the use of their systems in developing countries and will join in ensuring enough satellite capacity for regular and speedy communications.

#### **Background**

VITA began to experiment with low-Earth orbiting (LEO) satellites in 1984, for which it received the Federal Communications Commission "Pioneers" Award in 1994. In 1993, VITA linked its satellite system to the Internet. The FCC granted VITA an operational licence in 1995.

VITAsat has been used by NGOs and other agencies in Antarctica, Australia, Congo (Zaire), Djibouti, Ghana, Indonesia, Ireland, Kenya, Pakistan, Philippines, Somalia, Tanzania, Thailand, Sierra Leone, and the United States. Other NGOs and universities in Angola, Bosnia, Canada, China, Eritrea, Gabon, Ghana, Mozambique, Myanmar, Nigeria, Sudan, Tanzania, and Zaire have used satellites similar to VITAsat.

The satellites have been used for a range of communications including medical information during the Ebola Crisis in Zaire, administrative communications in Tanzania, child care programmes in Sierra Leone, agricultural research exchange in the Philippines, refugee logistics in Pakistan, power generation station management in Indonesia, and health information in several other countries.

On 23 September 1997 a low-Earth orbiting (LEO) satellite was launched from Plesetsk, Russia. The satellite circles the Earth in near-polar orbit bringing it over every point on Earth at least four times a day for about ten minutes each pass. VITA owns a transponder in the satellite that can be used for two-way transmission with ground terminals when it is overhead.

VITA plans to make the communications capacity of VITAsat-1 available at no fee to NGOs around the world engaged in humanitarian and developmental activities. The other satellite owners in the network will also provide their excess capacity to NGO users without fee.

### **Need**

In a recent monograph, *Leadership and the Information Revolution*, Harlan Cleveland, President of the World Academy of Art and Science, asserts, "Information - processed by human brainwork into knowledge, integrated and intuited into wisdom - has quite suddenly become the world's most important resource." This echoes Vice-President Gore's observation that "The strategic resource in the 1990s and the 21st century is knowledge."

Far more people today have access to information than they ever had to land, labour and capital, the traditional means to achieve wealth and power. Information is now the key resource in gaining wealth or power. Cleveland states:

... the growing importance of information in creating wealth has to be good news for countries less endowed with geological riches and arable farmland than were the early arrivers of the industrial age. Around the developing world, the startling paradox is that the most successful countries are precisely those not blessed with wealth-creating natural resources.

There are many places in the world where access to information is neither reliable nor inexpensive. The Leland Initiative, also known as the African Gateway to the Global Information Infrastructure Project, is a United States Government effort designed to assist up to 20 African nations to connect to the Internet to promote sustainable development activities. The Initiative's September 1996 report, *Best Practices for Policy Accommodation, Technology Transfer, and End-User Applications of the Internet in the Developing World* states:

The principle impediment to implementing Internet applications in Africa is the currently undeveloped state of telecommunications on the continent. Phone lines are scarce (there are more phone lines in Manhattan than in all of Africa), and even when they are available, they are generally of poor quality and priced beyond the means of most citizens ... The absence of widespread, high-quality phone lines in Africa means that Internet service cannot be brought cheaply and quickly upon demand to most homes and small businesses ... In order to bring the benefits of Internet access to as many citizens as possible, national governments may need to concentrate on supporting rural/remote connectivity schemes or plans to partially subsidize service for poorer citizens.

The consequences of this lack of access are considered in an August 1996 report to the Food and Agriculture Organization of the United Nations prepared by Dr. Don Richardson of the University of Guelph, *The Internet and Rural Development*:

Today we truly live in a global village, but it is a village with elite "information haves" and many "information have-nots." Adopting a proactive strategy, and acting to bring the Internet to rural and agricultural communities in developing countries will help enable rural people to face the

unprecedented challenges brought on by the changing global economy, dynamic political contexts, environmental degradation and demographic pressures. To deal with these challenges, and to make critical decisions, people at all levels of society, and especially the food-insecure and the organizations that serve and represent them, must be able to access critical information and communicate. Improved communication and information access is directly related to social and economic development (World Bank). Participatory development is fully dependent upon communication and information sharing processes.

The problems this proposal is designed to address are succinctly stated in the Leland Initiative report cited above:

... for most in the developing world the means to access the Internet are unavailable or unaffordable, the skills needed to utilize it effectively are underdeveloped or non-existent, and an appreciation of how it can be used to advance society has yet to be grasped by all but a minority of visionaries.

### **Proposed solution**

#### **NGO "user" coalition**

VITA is organizing a coalition of NGOs in the northern hemisphere that are willing to work with NGOs in the southern hemisphere to encourage access to information in rural areas of developing countries. This would include: providing training in information searching and management skills; obtaining licences; outreach to individuals, schools, businesses and government agencies in rural communities; promoting policies to encourage the spread of information technology; and assisting in raising money with their counterparts for local programme support.

#### **Satellite "provider" coalition**

A Fortune Magazine article by Erick Schonfeld, "The Space Business Heats Up" (24 November 1997) quotes an estimate by consulting firm Futron that as many as 2 000 satellites will be launched in the next decade. Almost all of them will be commercial, but a few are planned for scientific, educational, military or humanitarian purposes. At the present time there are about a dozen non-commercial LEOs in orbit; few of them are being used at maximum capacity.

VITA will organize a coalition of satellite owners that will permit the proposed NGO coalition to access the unused capacity of satellites for humanitarian and developmental purposes. Capacity that is not used is lost, so there would be no cost to the owner.

The organization of these coalitions will inevitably face considerable technical, regulatory and financial challenges. These are considered briefly below.

### **Programme goals**

The proposed programme is designed to begin the process of developing an information culture in rural areas of developing countries through the practical demonstration of the benefits to be derived from access to information.

- The creation of a global network of organizations from both the developed and the developing world that are dedicated to improving the lives of people in rural areas of developing countries.
- To provide this network with a satellite communications system designed to meet their needs to help accomplish their mission.
- To provide training and develop skills necessary to search for information and its organization and management.

- To promote the free flow of information and the availability of equipment to make this possible.
- To encourage policies that nurture the information culture.
- To explore sources of financial and in kind support to bring rural areas of developing countries into the mainstream of development through communications and easy access to information.
- To empower developing country organizations through access to information that will permit them to enhance the services they provide to people in rural areas.

### **Programme objectives**

VITA and a "partner NGO" propose a three-phase programme:

Phase I (Six months) - The "partner NGO" will have the primary responsibility of coordinating the organization of the user coalition. This will include a conference of NGOs, prospective funders, and other appropriate parties to discuss the structure of the user coalition and its governance.

VITA will simultaneously promote the creation of the satellite owners' coalition. This will include plans for the development of a ground terminal able to communicate with satellites with different protocols and frequencies. It will also include negotiations with the individual companies.

Both organizations will seek resources separately or together to support the programme.

Phase II (Six months) - The "partner NGO" in collaboration with northern NGOs will recruit developing country NGOs to participate in the programme.

VITA will seek the general agreement of at least ten developing country governments to issue ground terminal licences to qualified requesters to link to the satellites for humanitarian and developmental purposes so that specific licence applications will be routinely granted.

Phase III (One year) - The programme will become operational and both additional NGOs and new countries will be added as interest is generated. After ten months an evaluation will be performed in which the impact of access to and communications will be measured.

### **Technology considerations**

The "store and forward" LEO satellites follow a polar orbit around the Earth at about 1 000 km (600 miles) in space. A complete orbit takes about 105 minutes. The satellite footprint - the ground area that can communicate with the satellite - covers about 4 800 km (2 800 miles). About 250 pages of text can be transmitted (uploaded or downloaded) in a single footprint.

In order to speed the delivery of messages VITA is establishing five special gateway stations to the Internet at the extreme ends of continental land masses including Norway, South Africa, Chile, Australia and Canada. This means that instead of the satellite "storing and forwarding" the message from one user terminal to another, the data is downloaded at the nearest special gateway and sent out by the Internet to other user terminals; greatly reducing delays. Similarly, messages or files are stored at the special gateway station to the Internet until the satellite passes over.

LEO satellites can also operate in a "bent pipe" mode in which user terminals within the same footprint can communicate directly with each other. Additional gateways may also be established wherever there is an Internet link.

In addition to the satellite launched on 23 September, VITA will be licensed by the United States Federal Communications Commission (FCC) to launch a second satellite. But even the capacity of two satellites remains limited. However, a coalition of satellites will provide more frequent passes

and greater capacity. Six satellites would result in 24 passes a day at the equator and many more above and below that line. Discussions have taken place with owners of four existing or planned satellites and active interest has been expressed. Other satellite owners are being consulted to explore their willingness to participate.

Much more research and development has been focused on the LEO satellites than on the ground terminals needed to communicate with them. This may have been because the narrow and specialized use for which they were launched permitted the expense of off-the-shelf components that worked well enough. A large market for terminals was not considered so this was felt to be adequate. However, current ground terminals will clearly not be appropriate for the uses projected in this proposal.

The terminal needed to communicate with multiple satellites having different protocols and using different frequencies will have to be a more sophisticated bit of technology and cost less than the present customized terminals. The research and development done on terminals by various parties to date will be integrated into an effort to design a terminal that will meet the needs of the programme as well as include additional features such as terrestrial packet radio capability that will permit ground networks as well as the satellite network.

A ground user terminal uses only one satellite at a time, even though there are several satellites in the system; but, a message could be sent by one satellite and a response could be returned by another satellite. While the initial network would include only ground terminals, satellites and Internet gateways, an expanded network might include terrestrial networks linked to "hub" ground terminals or to "hub" Internet gateways. A network control centre may be necessary in the expanded system. Access to databases and even the WWW by email is already facilitated by several software packages.

### **Regulatory considerations**

While regulatory hurdles appear to be a major constraint, in reality they have not been so in the past. VITA and SatelLife, a Cambridge, Massachusetts health organization have worked with local organizations in the developing countries for some time. Such groups have obtained licences for ground terminals in some 28 countries. The applications for these licences were based on assurances that the services would be non-commercial and that they would not compete with the PTT. The entire basis for the present programme is to serve humanitarian and developmental needs through a no-fee service.

VITA will work through international and local NGOs, and intergovernmental organizations such as the World Bank and the United Nations to encourage the developing country governments and their telecommunications authorities to grant licences to local NGOs as a matter of routine. In fact, the use of communications will only increase the demand for more service and will enhance the commercial market possibilities for telecommunications.

### **Financial considerations**

The proposed programme is neither a complete nor a permanent answer to the communications needs of the developing countries. Its purpose is to put in place a rural communications infrastructure that can be very useful in the short term in a wide variety of ways, and also develop the skills and knowledge to effectively use more advanced technology if and when it becomes available.

The "partner NGO" and VITA will seek financial support to develop the user and the provider coalitions.

VITA will work with the satellite providers to identify their needs and explore sources of support. Northern NGOs will work with their southern counterparts to develop information-based programmes to be presented to potential funders.

### **Conclusion**

Development should not be viewed as a zero sum game in which there have to be winners and losers. The concept advanced herein is one in which there are only winners. The users have access to no-fee communications they may use to obtain information or send messages to each other as well as to third parties; the satellite owners are able to provide surplus capacity to the users at no additional cost to themselves; the rural areas of developing countries begin the process of building an information culture and gain skills necessary to take advantage of its benefits; the commercial telecommunications interests increase market potential as users demand better technology and have the skills to use it; the society gains through the increase in wealth that occurs virtually any time communications capacity is increased.

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