

What is Aurinoco Systems?

Aurinoco Systems is a unit under Auroville Foundation.

To fulfil a need for a campus wide communication infrastructure, L'avenir d'Auroville setup a project called Integrated Communication and Information Technology Infrastructure (ICITI)

JV Avadhanulu began the definition and concept design of the ICITI project as a member of Avenir starting in 2008/2009.

His initial writeup on the project is shared below.

Chandresh Patel joined the endeavor very soon and together with JV the two of them over next few years pursued various avenues for funding, support, team formation and traction from within Auroville and outside with Department of Education, Department of Science and Technology, Ministry of Telecom of Government of India as well as many of Auroville International Centers and Friends of Auroville. In early 2014, JV and Chandresh together along with Manu as the third member jointly started the unit Aurinoco Systems to rollout the ICITI project initiated by JV during the years at L'avenir d'Auroville. Aurinoco Systems was registered in 2014 and has been slowly setting up community wide campus area network to connect the various sections of the very dispersed clusters of residential, commercial, educational, cultural mix of dwellings, buildings etc. Over the years, more Aurovilians and engineers from the bio-region joined the project, got trained and are contributing as professional technical team members to rollout, maintain, augment and bring in new technologies to bear for a robust communication and IT infrastructure for a Smart City.

Fiber to premises is the overarching rollout plan so that the adverse effects of lightening will not destroy equipment at premises as used to happen earlier when copper based ADSL communication network setup was used. Also, the whole copper based ADSL technology was not easy to maintain, not possible to scale and augment. The whole technology for the ADSL was intended for a telephony and dispersed point-2-point communication setup. With modern packet based networks that were used for voice, data, video needed a much more robust, scalable, maintainable and especially with an easy ability to expand and grow as the data volumes, speeds and number of users added to the network grew.

Today, in 2021, Aurinoco Systems is in its sixth year and 80% of the community in the central Master Plan area of the City are covered with a fiber to premises setup. Another 20% of dense clusters remain to be connected. There are still farther settlements of Auroville which are more widely spaced and in very rural/forest settings that require more technical and financial resources to bring in. That work will be taken up subsequently.

Data, VoIP, remote monitoring of municipal services for power, solar, security, sewage other services are being slowly integrated over the base communication platform. Community meeting platforms are streamed over the campus wide network. Archival of data is in a mix of on-cloud, some local combinations. Other communication platform applications are always experimented on by various other residents, units or services of Auroville.

Technology and Auroville: A Non-Technical Summary

Written by JV Avadhanulu, 2009

I first visited Auroville in 2005. I am amazed at the rapid growth of broadband, mobile phones and computers in all aspects of life at Auroville. For the past year, I have been working on Integrated Communication and Information Technology Infrastructure (ICITI), mainly on aspects like functions, concepts, design and plans. I am writing this article to share the features and benefits of ICITI to get your views/feedback. I am hoping that this article is readable; at the least, would not put-off the determined reader from understanding what ICITI can do for the City that the Earth needs.

Overview: ICITI integrates Auroville as if it is one network and provides data, fixed/mobile voice & video services with centralized servers and storage. ICITI is secure, highly reliable, and tolerant to equipment failures. The features and benefits provided by ICITI are briefly described in this article, with minimal technical terminology.

Voice Communications: You could continue using whatever land line/mobile phones you are using now. You can make a voice call from a land/mobile phone or computer to any other phone within Auroville. Such calls will not use any resources outside ICITI and hence could be offered free for unlimited usage. ICITI incorporates the intelligence to 'look' where you are and connect you wherever you are. If you get an incoming call, ICITI will try your work phone, mobile phone and home phone. If you are not available on any one of these, you could have an option of a voice message being stored. ICITI could also provide unlimited voice and video conferencing within Auroville.

Broadcast: ICITI features high quality, live broadcast of multiple audio-video/music and speech programs. You can watch these programs from anywhere within Auroville, using a computer or videophone or even a mobile phone (in the future). You can ask questions and remotely participate in events. It eliminates the need for us to build larger auditoria and the need for you to be physically present in meetings.

Computer Services: ICITI provides fast E-Mail and Intranet (AVnet). It will also give you more reliable and faster Internet. Now, we are keeping files on our computer and sharing them via e-mail or Google/Yahoo. ICITI provides central file server to facilitate much closer and effective sharing of information, knowledge and collaboration. You can put your document on the file server and it can be seen (and edited, if permitted) by any one. You can back-track to earlier versions, if required. The file server provides automatic back-up and recovery. When we start using it widely, you will have more and more data, information and knowledge available on-line.

You can search, access, use, edit and add to the information and knowledge. This would have far-reaching benefits in facilitating a higher level of collaboration. We could also host other servers; making the access reliable, faster and no broadband charges. As time goes by, we will add more and more collaborative tools and user-friendly services that serve our special needs.

All these facilities can be securely accessed from outside Auroville as well. This enables you to participate and contribute even when you are outside Auroville. Furthermore, remote access makes it possible for friends of Auroville to participate without physically being present in Auroville. Remote access has the potential to reduce seasonal dependence and reduce carbon foot-print.

Community Centers: ICITI proposes community facilities in new buildings, public places and existing communities/guest houses etc. Community Center caters to common communication and computer needs by providing phones/computers/printers that can be used by any one to the extent that they are authorised. We could also have a few discussion rooms with phones (voice/video) and reasonable-size conference rooms with projection or large display. This approach aggregates equipment needs, reducing cost and promoting community-hubs.

Eco-friendliness: ICITI uses fiber optic network to the premises. Apart from many other advantages, Fiber is the lowest-power technology. ICITI gives the flexibility to participate and contribute whenever you can and wherever you are. This time and location freedom makes travelling and meeting face-to-face optional; saving time, energy and reducing emissions (not to mention cost savings). It could also significantly decrease paper usage.

Electromagnetic Radiation: This is emerging as another major concern. While ‘No-Towers-in-Auroville’ serves the purpose of beauty, as the city grows it could actually increase the total radiation into Auroville. Given the convenience of mobile phones and their wide-spread usage, we need a long term strategy to minimise radiation. A potential strategy is to use new technology, ultra-low power home base stations. The radiation from these base stations could be even less than Wi-Fi and hence very safe. Another strategy is to prefer SMS and ‘call-notification’. These services require much less radiation. Call-notification allows you to use fixed phone or low-power base station to return the call. You could have the option to make or receive calls at higher radiation levels (as now), but such talk-time could be ‘rationed’ or made a premium service. Minimal radiation combined with eco-friendly features could make Auroville a new kind of ‘Model City’.

New Services: ICITI is a platform that offers the scope for many new services with little or incremental costs. For Example: Digital library, school-network, information and knowledge management framework, collaborative tools, voice/web based maintenance management systems for utilities and reservation system for events, discussions rooms, conference rooms etc. We can also consider ‘Enterprise Resource Management’ systems to make best use of resources.

Tele-medicine, tele-education are other services that become feasible. The real benefits start showing up when the bright young generation comes up with innovative services!

Reliability and Maintainability: These aspects are often considered (mistakenly) to be technical. If a service or a feature is serving a purpose, you would be only happy if you can count on it to be available when you need it. ICITI is designed to be highly reliable and maintainable. All systems and sub-systems are chosen with reliability as a major criterion. At the infrastructure level, redundancy is incorporated. The core network has a self-healing feature that allows it to reconfigure itself without any noticeable effects. The central servers are designed for high availability. If a server fails, other servers take the load. Storage is fail-proof. ICITI will be connected with the Internet through multiple links so that failure of a link leads only to less speed and not an outage. Security is an integral part of reliability and ICITI defends itself against virus/malware and unauthorised access. ICITI is designed to work even during power black-outs. High maintainability is achieved with state-of-art tools and technologies. Monitoring, trouble shooting, configuration etc can be done remotely. Coupled with the fault tolerant architecture of the design, the remote maintainability feature reduces the need for large maintenance teams and hence the costs. It also reduces the stress and human induced failures. Finally, if an issue is escalated, intervention can happen immediately.

Other Highlights: To protect our investment from obsolescence, all the equipment chosen is state-of-art. In fact, some of the equipment / technologies are currently undergoing final stages of successful trials and would be released in 2010/2011. Most of the equipment is being sourced from companies with R&D and manufacturing facilities in India for better price and support/service. Open Source Software components have been identified for most of the needs of infrastructure to reduce cost and vendor dependence. The fiber cable layout adapts a strategy akin to structured cabling to reduce the overall effort and cost. The architecture of ICITI is very flexible with margins to allow it to grow with Auroville and is scalable to 50,000 people. We will be spending a lot on 'customer premises equipment' such as computing hardware/software, audio/video phones, printers, projectors etc. It would be advantageous to have a common window to choose vendors and negotiate for better prices and service/support.

Economics: The design and technical feasibility/approach are worked out. Apart from sharing it internally, some external experts also reviewed it. Capital expenditure would be less than what we would be paying out (for much less services/features) in two to three years. This is extremely attractive for an infrastructure project. Assuming that we take about 2-3 years to commission, you are likely to pay less than what you are paying now. The model would become more and more attractive with increase in number of users as we grow and people use ICITI more and more. Let's not forget the benefits of eco-friendliness.

Challenges: There are challenges to be addressed such as obtaining status of educational campus to save capital and recurring costs; license for spectrum; raise funds for capital expenditure; new partnerships with service providers, vendors and system integrators; Resources, Training and Organization for ICITI etc.

Why not let it go on as it is going on now? Growth of communications and IT is inevitable. We can't build more physical spaces for meetings and even if we do so, it is unlikely to improve consensus building /decision making/ governance etc. So, ICITI assumes great importance for us. The current model, apart from not being scalable, does not leverage the fact that we are a sizable, growing community. We are all individual retail customers now. Together, if we become ONE and aggregate the needs, things start becoming cheaper and cheaper. Most importantly, the outflow of money from Auroville reduces. The capital and revenue expenses (per capita) keep coming down as Auroville grows!

Summary: ICITI is a flexible, cost-effective platform to

- Participate, collaborate and cooperate wherever you are and whenever you can. And, extend such collaboration and participation beyond the geographical boundaries of Auroville.
- Share information, knowledge and wisdom.
- Facilitate faster/better decision making and more effective/participative/transparent self-Governance.
- Simplify living, promote eco-friendliness and minimise electromagnetic radiation.
- Explore new linkages and possibilities as an Integrated WebCity.

It is a collaboration project, not a technology project.

JV Avadhanulu

jv@auroville.org.in

+91-9443797563