

ECIL delivers Integrated Security System for Commonwealth Games 2010, Delhi

Adding one more feather to its cap Electronics Corporation Of India Ltd. successfully delivered the Integrated Security System (ISS) to the recently concluded Commonwealth games CWG-2010, Delhi. This was a prestigious and demanding project by any measure. The sheer size of the system,



Figure 1: ECIL's Integrated Security System encompassed 33 venues

geographical spread, looming deadline, multiplicity of agencies, late availability of work fronts, technical glitches, security threats and constraints, truant weather - all added to create an extremely challenging situation. 'Team ECIL' rose to the occasion handsomely, working with professionalism and commitment and ensured that systems are installed and commissioned in time for the games. More than 300 engineers worked round the clock to provide operational support to the security personnel to ensure very high availability of the system throughout the mega event. This success once again demonstrated that ECIL is nation's premier security system integrator and solution architect.

Government Of India entrusted this responsibility on ECIL in September 2009. After around 12 months of hectic efforts of hundreds of workmen, engineers, security experts and Government departments, the system was brought in to operation well in time. We can assert with pride that the company redeemed the trust.

Conquering Complexity

The Integrated Security System for CWG-2010 Delhi was complex and mammoth incorporating state-of-the-art security devices and technology. Months of intense consultations with security agencies and



Figure 2: More than 300 Flap-barriers were installed for Personnel Access Control

experts went in to crafting an optimum and effective solution. Primarily ISS has three major subsystems- Video surveillance & recording system, Vehicle access control systems (VACS) and Personnel access control systems (PACS)- in 33 venues spread all over Delhi integrated over high speed networks. A high performance, secure IT infrastructure provided necessary computation power and bandwidth with flexibility and



Figure 3: Bollards with Tyre killer and road blocker in the background

dependability.

At the core of ISS is the central repository located at ITPO which managed the access rights of all vehicles and persons



Figure 4: Large LCD monitors with tiled display of indoor and outdoor scene

(accreditations & tickets) for all the venues – specific data was transferred via WAN to servers located at individual venues on demand. The VACS and PACS servers



Figure 5: Each venue was monitored from the Venue Security Control Centre



Figure 6: An outdoor dome camera

located at venues managed field located access control devices to provide access to vehicles and people by controlling boom-barriers or flap barriers at entry gates. Bar coded spectator tickets and accreditation cards permitted access through flap barriers, as photo of the person is captured and stored in the repository. All authorized vehicles were RFID tagged and RFID readers installed at gates permitted automatic opening of boom barriers for authorized vehicles. Under vehicle surveillance systems (UVSS) captured photo image of the vehicle's underbelly along with license plate and driver. In the event of a forced entry by vehicles, the boom barriers senses the same and the anti-terrorist gadgets such as tyre killers, road blockers, bollards & Wedge barriers rise-up in a moment of seconds. All transactions were logged providing a comprehensive audit trail. ECIL



Figure 8: Boom barrier in the fore ground

also supplied CBRN protection systems including Radiation Detectors for vehicles, hand-held chemical and biological agent detectors.

The Video surveillance system with around 3300 IP cameras kept an eye on the entire event which included fixed and PTZ cameras in indoor and outdoors with advanced video analytics on selected cameras. Around 450 high performance servers and 300 work stations chugged along 24X7 to display real-time video on 250 LCD monitors and stream them to Police HQ on demand. Nearly 2000 Tera bytes of video is recorded in this process.

More than 1.8 million entries (spectators and accredited personnel) were taken through our flap barriers during the 12 day event with peak rate exceeding 13 person / minute/ FB. More than 300 engineers worked round-the-



Figure 9: Servers and storage in TER room

clock during the event to provide operational support to security agencies and assure availability of equipment during the events.

The 33 venues comprised of 13 Competition venues, Games Village, Accreditation & Logistics Centre at ITPO, 15 Training venues and 4 Vehicle Parking venues. The ISS equipment at each venue were integrated over a dedicated Security Data Network (SDN), isolated from rest of the networks. SDN integrates video cameras, VACS and PACS with Server farm located at Technical Equipment Room (TER). TER room also houses UPS, switches and storage bay. Work stations and LCD monitors were located at Venue Security Control Centre (VSCC) on ergonomically designed control desks manned by security personnel round-the-clock. Hundreds of Porta cabins were located at various vehicle entry points and served as Local Control Stations. Many Porta cabins were lined-up along the Noida express way-venue of the cycling event.

The main features of ISS are :

- Vehicle Identification through RFID Tags
- Vehicle access control through boom barriers and RFID

- Anti terrorist Gadgets like Road Blocker, Tyre Killer, Wedge Barrier and Bollards with collision detection and safety loops.
- VIP, manual and automatic modes of operation
- Under Vehicle Scanning System with License plate & driver's photo capture.
- IP camera based Video surveillance with analytics
- Video display and storage for 30 days period amounting to ~ 4000 Tera bytes of storage.
- High performance Servers and work stations
- Feeding of streaming video from all venues to C4I Monitoring Centre at Police HQ
- Personnel Access system through Bar-coded Accredited passes & Spectators tickets
- Central Data base consisting of accreditation data, spectator tickets data synchronized to venue specific data bases at periodic intervals.
- Data and Event logs including spectator's photo capture.
- Venue Security Control Centre at each venue and Local Control Centres housed in Porta cabins located adjacent to vehicle access points.

Myriad Challenges

It was race to the finish from the word go. With decades of experience in engineering such systems for high security premises around the country, ECIL had the necessary expertise and capacity to handle such a large project. The multi-disciplinary core competencies of the company was brought to bear on the project. While the technical complexity was formidable, the project posed unprecedented demands on the project

management and organizational skills of the company.

A project Directorate was established in Delhi early on and high level Project Monitoring and Implementation Committee regularly monitored the progress. Drawing upon expert manpower from all around the country, ECIL could mobilize venue specific project teams and domain specific technical teams largely from in-house human resources. Delhi was the nerve centre of activity right from September 2009 onwards and zonal office was suitably expanded to support the logistics.

Experts from various national laboratories such as BARC and DRDO were roped in for peer review of technical solutions. Proof-of-concept system was setup in Hyderabad. Project specific independent safety and quality teams and systems were established in Delhi. Training teams were organized to train thousands of security personnel.

The overall security architecture, lay-out and Bill-of-quantities for each venue were finalized in consultation with the security agencies and Venue owners after intense discussions lasting many months. This involved detailed survey of venues.

ISS would require a variety of equipment from manufacturers all around the world. Quality and timeliness were the driving concerns. A robust procurement process was set up early on with close monitoring by the top management resulting in timely receipt of materials.

Site related works posed unique challenges. There were many dependencies and interfaces with a host of organizations. Early advantages were lost and crisis built-up as promised dates for the availability of stadia, roads, control rooms, power, cabling, networks etc slipped away. The untimely, unusually intense rains in Delhi further upset schedules. Effective intervention by the government helped to resolve these issues and saved the day. However, with installations completing

in the nick of time, there was hardly any time left for testing and validating such a large system. It is a matter of some satisfaction that the systems worked together as planned in spite of these handicaps. There were a few panic moments though during the days preceding the inauguration day- but these were sorted out effectively.

The system performed largely as designed through-out the game period. There were of course few equipment failures in the initial days. The maintenance teams worked 24 X 7 to ensure availability of equipment. The operational support teams worked hand-in-hand with security agencies at VSCC and Porta cabins. The data base teams ensured integrity and timeliness of the data base even in the face of dynamically changing requirements, ill-informed criticism and intense pressures. A control room was setup at ECIL, North Zone Office premises for monitoring and coordinating the activities on 24 X 7 basis through out the game period.

Acknowledgments

The success of an endeavour of this magnitude would not have been possible without untiring efforts of large number of women and men. They hail from many organizations and diverse disciplines- government officials, security agencies, venue owners, suppliers, contractors, scientists, engineers, managers technicians and workmen. The success of this project is a testimony to the competency and collective strength of our people.