



At the National Gallery of Australia a digital CCTV system has been installed by integrator Intravision to protect an art collection worth \$A3 billion. The solution combines IP cameras and fully distributed network architecture

EVEN waist deep in road work and unbalanced by the paraphernalia of major construction, Canberra's National Gallery of Australia is a thrilling structure. The strength and subtlety of the exterior is matched by an interior combining bush hammered concrete and honeycomb-delicate ceilings. At NGA, space leads into space, ceilings soar 20 and 30 metres and voids pour sound and light though three levels. This building is a work of art and its design and role as Australia's pre-eminent art gallery make NGA one of the nation's more challenging sites. Manager for security at NGA, Craig O'Sullivan, is ex-Australian Army and given his service record includes time in Iraq it's hard to imagine too much would phase the quietly spoken Queenslander. But in spite of his experiences O'Sullivan says he's found NGA to be anything but a tranquil location.

Instead he says the engine room of the security operation is busy, with a large team of permanent and part time security officers and control room operators managing a number of electronic security systems including the brand new surveillance solution incorporating more than 100 IP cameras, currently being expanded to over 160.

With a floor space of more than 20,500 square metres and landscaped gardens including carparks, NGA is a big site with plenty going on. There's only one day a year when NGA shuts its doors and that's Christmas. As O'Sullivan explains, NGA is also a fluid site with constant changes demanding shifting responses from security officers and the video surveillance system. "We have new shows constantly coming and going with significant changes made to the interiors of the galleries to accommodate them," O'Sullivan says. "There's also a major building extension being undertaken at the moment and that has definitely increased our workload." O'Sullivan says the key to understanding NGA is recognizing the fact priorities are different in a cultural environment like NGA compared to those in a commercial site like an office building or airport.

"This is a unique environment and that's something I've had to come to terms with – protective security is protective security but in an environment like this the approach has to be more subtle – it's a delicate balance to manage," O'Sullivan explains. "We're charged with protecting an art collection that has to be accessible to the Australian public and finding a balance between positive visitor experience and protective security is tricky." According to O'Sullivan, this need for a subtle approach to security means NGA is best served by a flexible CCTV system with a 24-hour control room supporting a capable team of security officers.



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The Installation

According to O'Sullivan, integrator Intravision was responsible for the installation of the primary data cabling and power cabling as well as the field clusters and cameras. Importantly, Intravision had worked at the High Court of Australia, and that experience helped the installation team when they got to work at NGA.

"They did an awesome job here," says O'Sullivan. "Their work in the High Court stood them in good stead because of the similarities between the sites - the high ceilings and concrete walls as well as the demands of working in a public venue. "Intravision was faultless – they were very, very good and were accommodating to all our needs. They handled the primary data cabling and power cabling as well as other parts of the system and did a fantastic job."

O'Sullivan says a key challenge was incredibly high ceilings combined with the fact that like all galleries, this site is driven by aesthetics. "In some cases it would be better from a security perspective to wall mount cameras but there's a need to keep the walls clean so cameras must be high," O'Sullivan says. "And because the cameras are high they need to be PTZs to give us the ability to get the scenes we want."

He says the fact the building is reinforced concrete meant there were the usual issues associated with cabling through concrete – accentuated by the challenges relating to the fact building design meant drilling noise, dust and vibration would pass through architectural voids in the structure. "Dust is an enemy of artwork," he explains. "Obviously vibration can also affect works of art while noise impacts on the fact this is a public building specifically designed to share an art collection with the public." O'Sullivan said all these issues meant contractors had to work before and after opening hours at extreme heights so there are dangers related to that as well as risks

of tools being dropped onto art works below. "That issue meant artworks had to be moved and that's time consuming - You have to negotiate to get gallery spaces closed and the public have an expectation that those spaces will be open when they come to the NGA. As a result of all these fundamentals we had very tight time constraints put on us in gallery spaces. "D gallery closures we'd start about 6 in the morning and work for 4 hours till the gallery opened at 10am and during that time we did the heavy drilling," O'Sullivan says another challenge was getting a pair of cameras installed in the NGA's gardens supported by IR lighting. "That garden is heritage-listed as well, so we had to get approval from the National Capital Authority in terms of the look of the poles. As part of this element of the installation we had an arborist report on the impact of trenching that needed to be done for power and comms outside, as we couldn't upset trees or gardens." O'Sullivan says the entire installation took a number of months with each gallery having around a week devoted to its setup.

"Once the installers got into their rhythm and got a handle on the site and its demands they worked fast," O'Sullivan says. "What took longer was back of the house cabling and commissioning of the security cameras.

"During the installation the solution was tailored to suit the nature of the NGA building – with the centrally located head end connected to the surveillance system and then on to up to 16 cameras per cluster," O'Sullivan says. "We wanted clusters close to cameras but they also had to be out of the public view because while it's a nice cabinet you don't want it sitting in an art gallery. O'Sullivan says the system also has a cooling fan so the clusters need to be far

"There was some customization and as we've become more aware of the system's capability we've thought of other ways to leverage it," he explains. "Intravision has also got an increasing handle on the nature and needs of our site including some of the variables they need to think about that are unique to a cultural institution when compared to commercial sites." O'Sullivan says phase 1 of the new CCTV system is the biggest project he's had to manage since he started at NGA. "Now the first phase is completed we've got an awesome new capability that has put us so far in front compared to what we had," O'Sullivan says. "In terms of the installation, Intravision was fantastic and we're very happy with the system."

"This building was constructed in the 1970s and the old surveillance system was a mish-mash of cameras, DVRS, VHS VCRs and cabling, much of it as old as the building. It was difficult trying to trawl through footage from the old system. "With this upgrade we have gone from the Stone Age to a state-of-the-art digital surveillance system and that's what this site should have given the value of what we're protecting."



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Operational considerations at NGA

O'Sullivan says the most commonly occurring threat to works of art at NGA is accidental damage. "It's not that people will deliberately set out to damage the art but accidental touches do happen. "The answer in some cases is mobile bollards, floor alarms, glazing – but some works can't be glazed – the curator doesn't want glazing as it may detract from the look of the artwork. Effective security here relies on teamwork between staff on the floor and operators in the control room using the CCTV system," O'Sullivan says.

A very big issue in an art gallery is the changing nature of spaces. "One day a particular gallery might be one big space with perfect lines of sight coverable with only 2 cameras," O'Sullivan says. "The next day a show will come in and the space will be redesigned with new walls and displays and we lose our lines of sight. This is a challenge we have to manage day to day." O'Sullivan says that to a degree it's possible to move the cameras around at NGA. "Because the cameras are on lighting tracks we do have an additional degree of flexibility," O'Sullivan says. "We can move cameras from left to right on the light tracks. Also important is the fact that when the cameras were installed they went in with service loops so there is a degree of flexibility there, too.

"If a temporary wall is built in front of a camera we can pick the camera up and move it a metre. There are also a number of future points with cabling already in place so in future years we can increase our coverage as required," he explains. "In fact, one of the main reasons we chose to use the system is so we could pan and zoom to get around the restrictions imposed on us by the high ceilings and our changing environment," O'Sullivan says. "We needed to be able to move fields of view without getting up and adjusting fixed cameras – we just switch presets – it's much easier and given the changing nature of the site far less expensive in terms of system maintenance. We also have plenty of cameras in each space and that's deliberate – it means we can cover all works of art as well as people moving through the gallery even if a show has elements that spoil one camera's field of view."

O'Sullivan says some cameras are dedicated to tracking points of entry and pedestrian flow, others look at particular works of art all the time. "With all our cameras we want to know we have footage all the time so we can reconstruct what has happened should we ever need to," he says. "The management system is also very flexible – it gives us the ability to get cameras talking to each other and working together on tasks. "For example on our front door we have a box on the map representing area around the main entrance and in the event of an incident if an operator clicks on that box on the GUI, all the cameras in that area spin around and cover the entry. We cover all key areas in this way – it makes things easier for the operators." O'Sullivan says NGA's 24-hour control room staffed by a capable team all trained in the use of the CCTV system. "We are also working with the installation team to add additional intelligence to the system allowing things like audible alarms in the event motion detection zones on cameras are breached – this makes it easier for operators who may be busy monitoring other cameras to manage the site."



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