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**Closed Circuit Television System Commissioning  
Standard  
CCTV and Lighting Upgrade  
University of Wollongong**

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V2

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## 1. Closed circuit television

(CCTV) systems form part of the overall security strategy at the University of Wollongong (UOW). CCTV systems are used in conjunction with physical and operational security measures to protect people, property and processes.

The CCTV systems provide the following key functions:

- a. Real time surveillance;
- b. Recording of events and historical video data for video evidence of a security incident;
- c. Deterrent to criminal and unruly behaviour.

To obtain optimum performance the CCTV systems may be interfaced with other building services, in particular intruder alarm monitoring and access control.

The CCTV system installed at the UOW is an Internet Protocol (IP) CCTV system. The system utilises digital technology for recording and for transmitting video images via the University's Local Area Network (LAN). The IP CCTV system allows the flexibility for additional cameras to be added to the system at anytime and be viewed on any workstation on the campus with a network connection and software licence.

All future CCTV installations at UOW shall conform with the prescribed CCTV design standards.

System monitoring and programming is performed from the operator workstation. As a minimum, three access levels are provided. These being operator, system administrator and technician.

## 2. Overview

The quality control process for IP CCTV equipment involves the following stages:

Stage 1: Unit Testing - Performed by the manufacturer at a component level;

Stage 2: Installation Inspections - Performed by the project manager during the installation process. The objective is to identify poorly installed equipment or areas of the installation that do not comply with the provisions of the design specifications. Provided the defect is identified at an early stage, the cost of remedial work and delays to the project program can be minimised;

Stage 3: Final Commissioning - Performed by the installation contractor and witnessed by the project manager.

Final commissioning is the most important part of the quality control process. It is at this stage of the project that the project manager will determine whether the system is ready to be approved for Practical Completion.

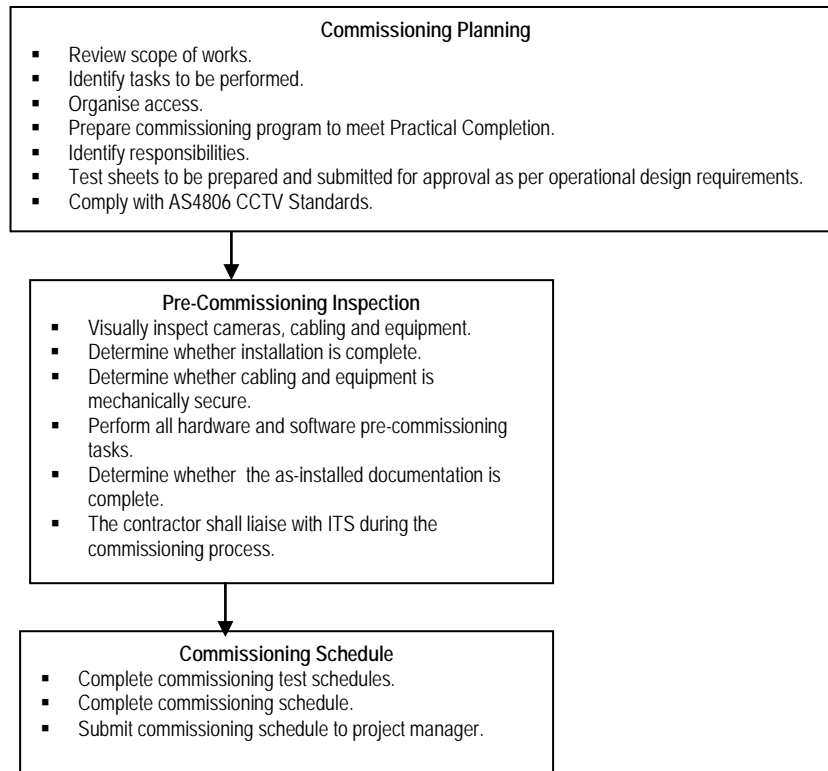
All commissioning tests are critical and shall be performed to ensure that all CCTV equipment will operate correctly. It is UOW's objective to complete the commissioning tests with zero defects remaining in the system.

**Note:** The contractor shall ensure that all works have been completed prior to performing commissioning tests or state what is not complete to the project manager.



### 3. Commissioning Process

The following flow diagram depicts the commissioning process:



## 4. Pre-Commissioning Hardware Inspection

At the completion of the installation and prior to the commencement of the commissioning tests, the contractor shall inspect all hardware and verify that the following tasks have been completed in accordance with the design specifications:

- a. All IP CCTV cameras have been installed at the locations specified in the design documentation;
- b. Cameras of the specified type (e.g. colour, black and white, fixed, pan tilt zoom) have been installed;
- c. Electrical and communications cables have been appropriately sized and selected to ensure that they will support currently installed and future equipment;
- d. Cabling has been concealed where possible in ceiling spaces, wall cavities or risers;
- e. Mechanical protection has been provided to minimise the likelihood of physical damage to cabling;
- f. Ducting, conduit and cable trays have been effectively secured to ensure that they can support currently installed and future cabling;
- g. Cameras have been correctly secured to protect against operational damage and ensure stability for continuous use;
- h. Connections have been correctly terminated and insulated to ensure satisfactory connectivity and protection against faults and interference;
- i. External cameras have been provided with adequate protection against moisture and other environmental conditions;
- j. Operator workstation CPU, LCD screen and peripheral devices have been installed at the specified location. Interconnecting cables have been protected from mechanical damage and have been permanently connected;
- k. Cameras and operator workstation have been identified with equipment labels that are in accordance with UOW's asset register convention;
- l. Associated equipment such as power supplies and switches have been connected correctly and secured appropriately.

All equipment must be installed and must pass the pre-commissioning inspection before commencing the commissioning tests.

## 5. Pre-Commissioning Software Inspection

Prior to the commencement of the commissioning tests, the contractor shall verify that the correct application software has been installed and configured on the IP CCTV control equipment.

As a minimum the contractor shall confirm the following:

- a. All software modules specified in the design documentation or the modules required to perform all specified operation functions have been installed and configured to meet UOW's system requirements;
- b. The latest release version of all software modules including patches and upgrades have been provided;
- c. The control equipment hardware has sufficient capacity to support the software routines and functions under worst case demand conditions;
- d. All cameras, system reports, screens and menus have been correctly configured;
- e. Software has been registered to UOW.

If any of the above has not been completed, the commissioning tests shall be abandoned and re-scheduled.

## 6. Documentation

The contractor shall submit a complete set of documentation to the client and project manager for approval no later than one (1) week prior to the planned commissioning date. As a minimum the documentation shall comprise:

- As-installed drawings;
- Test plan and test report sheets
- Hardware and software technical manuals;
- Operator and maintenance manuals
- Programming schedules;

The contractor shall obtain written approval of the documentation from UOW before commencing the commissioning tests.

## 7. Commissioning Time and Date

The contractor shall submit a program to the project manager containing the proposed time and date for each commissioning test at least two (2) weeks prior to the planned commissioning date. The program must contain allowances for defect rectification and remedial works.

The contractor shall obtain written approval of the program from the project manager and UOW before commencing the commissioning tests.

## 8. Commissioning Tests

Commissioning tests shall be performed to assess the overall functionality of the IP CCTV system as per the standards and design specifications. Each camera must be individually tested to ensure that it transmits the correct signal or data to the operator workstation.

The commissioning tests require at least two qualified and approved testers. One tester shall be located at the operator workstation and the other at the camera location. Portable communication devices, such as handheld radios, shall be used for communication between the two testers.

As each commissioning test is performed, the results shall be recorded on the appropriate commissioning test schedule. Each test performed shall be marked as a pass or fail. Any comments regarding abnormal operation in particular to failed tests shall be recorded in the comments section of the commissioning schedule.

### 8.1 Cameras

The following tests shall be performed for each CCTV camera:

- Verify that the camera produces a clear picture with a resolution no less than that specified;
- Verify that the camera maintains a clear picture and automatically compensates for changing light conditions including day/night change;
- Verify that cameras have wide dynamic range installed where specified and operate to prevent camera blinding;
- Verify that cameras provide complete and correct coverage of the area specified;
- Verify that pan, tilt and zoom (PTZ) cameras are fully controllable and function correctly including camera presets;
- Verify that pan, tilt and zoom (PTZ) cameras are able to perform camera call preset positions by simulating an event alarm;
- Verify that areas of the camera view may be masked to prevent unwanted alarm activation;
- Verify that cameras have been fitted with anti-tamper devices;
- Simulate a tamper alarm and verify that the correct signal is transmitted to the operator workstation;
- Simulate a video feed fault and verify that the correct signal is transmitted to the operator workstation;



## 8.2 Operator Workstation

Where cameras are alarm activated and have been interfaced with a security operator workstation, verify the following functions:

- Alarm activation;
- Manual control of cameras;
- Automatic sequencing and control of cameras;
- Reporting;
- Verify that historical data reports may be generated in less than five (5) seconds;
- Site plans showing all relevant features.

## 8.3 Control Unit

The following tests shall be performed for the control unit:

- Verify that control strategies have been correctly configured;
- Verify that data is correctly transmitted to all equipment;
- Verify the control unit activates an alarm when abnormal environmental conditions occur (where programmed);
- Verify that real time video data analysis functions (such as movement detection) are performed in real time and the corresponding view displayed on the monitor;
- Verify the IP CCTV system interfaces with the electronic monitoring and access control system and/or the intercom system to display the correct camera view on the monitor when the corresponding signal is received.

### 8.3.1 Digital Recording and Playback Functions

The following tests shall be performed for the digital IP CCTV system software:

- Verify that adequate data storage capacity has been installed on the workstation as specified;
- Verify the system hardware supplied meets the minimum specifications;
- Verify the following functions for the digital IP CCTV system software:
  - Record;
  - Stop;
  - Play;
  - Pause;
  - Rewind;
  - Fast forward;
  - Frame by frame.
- Activate an alarm area then verify that the correct video data is recorded by the system.

## 9. Minor Defects

As minor defects are identified during the commissioning tests, each defect shall be rectified before proceeding to the next test. The camera, associated cabling, control equipment or software that was found to be defective will be recorded in the commissioning report and rectified.

Once rectification is complete, the equipment shall be retested and the results recorded in the commissioning schedules.

## 10. Commissioning Schedules

The commissioning schedules shall be completed in accordance with this standard. Where equipment needs to be retested, the retest results shall be recorded. At the completion of the commissioning tests, UOW shall have one complete set of commissioning schedules containing all field devices that are free of defects.

Commissioning Schedule – IP CCTV Cameras

Building Number: \_\_\_\_\_ Building Name: \_\_\_\_\_

Test	Commissioning Results		Test Reference Notes	Defect Details
	Pass	Fail		
Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Coverage	<input type="checkbox"/>	<input type="checkbox"/>		
Cables & Connections	<input type="checkbox"/>	<input type="checkbox"/>		
Mechanical Protection	<input type="checkbox"/>	<input type="checkbox"/>		
Environmental Protection	<input type="checkbox"/>	<input type="checkbox"/>		
Labelling	<input type="checkbox"/>	<input type="checkbox"/>		
Picture Reproduction	<input type="checkbox"/>	<input type="checkbox"/>		
Highlight Suppression	<input type="checkbox"/>	<input type="checkbox"/>		
Controllable (PTZ)	<input type="checkbox"/>	<input type="checkbox"/>		
Masking	<input type="checkbox"/>	<input type="checkbox"/>		
Anti-Tamper Devices	<input type="checkbox"/>	<input type="checkbox"/>		
Tamper Alarm	<input type="checkbox"/>	<input type="checkbox"/>		
Fault Alarm	<input type="checkbox"/>	<input type="checkbox"/>		

Camera Number: \_\_\_\_\_ Camera Location: \_\_\_\_\_ Camera Type: \_\_\_\_\_ Camera Rating: \_\_\_\_\_  
 Commissioning Date: \_\_/\_\_/\_\_

Commissioning Contractor Name: \_\_\_\_\_ Project Manager Name: \_\_\_\_\_

Commissioning Contractor Representative: \_\_\_\_\_

Project Manager Reference: \_\_\_\_\_

5.9.2 Commissioning Schedule - Operator Workstation

Building Number: \_\_\_\_\_ Building Name: \_\_\_\_\_

Test	Commissioning Results		Test Reference Notes	Defect Details
	Pass	Fail		
Hardware Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Software Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Cables & Connections	<input type="checkbox"/>	<input type="checkbox"/>		
Labelling	<input type="checkbox"/>	<input type="checkbox"/>		
Operator Profiles	<input type="checkbox"/>	<input type="checkbox"/>		
Reporting	<input type="checkbox"/>	<input type="checkbox"/>		
Alarm Activation	<input type="checkbox"/>	<input type="checkbox"/>		
Manual Camera Control	<input type="checkbox"/>	<input type="checkbox"/>		
Automatic Sequencing/Control	<input type="checkbox"/>	<input type="checkbox"/>		
Site Plans				

Equipment Number: \_\_\_\_\_ Equipment Location: \_\_\_\_\_ Equipment Type: \_\_\_\_\_ Equipment Rating: \_\_\_\_\_  
 Commissioning Date: \_\_/\_\_/\_\_

Commissioning Contractor Name: \_\_\_\_\_

Project Manager Name: \_\_\_\_\_

Commissioning Contractor Representative: \_\_\_\_\_

Project Manager Reference: \_\_\_\_\_

5.9.3 Commissioning Schedule - Matrix Switcher

Building Number: \_\_\_\_\_ Building Name: \_\_\_\_\_

Test	Commissioning Results		Test Reference Notes	Defect Details
	Pass	Fail		
Hardware Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Software Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Cables & Connections	<input type="checkbox"/>	<input type="checkbox"/>		
Labelling	<input type="checkbox"/>	<input type="checkbox"/>		
Configuration	<input type="checkbox"/>	<input type="checkbox"/>		
Switching Strategies	<input type="checkbox"/>	<input type="checkbox"/>		
Switch Between Views	<input type="checkbox"/>	<input type="checkbox"/>		

Equipment Number: \_\_\_\_\_ Equipment Location: \_\_\_\_\_ Equipment Type: \_\_\_\_\_ Equipment Rating: \_\_\_\_\_  
 Commissioning Date: \_\_/\_\_/\_\_

Commissioning Contractor Name: \_\_\_\_\_ Project Manager Name: \_\_\_\_\_

Commissioning Contractor Representative: \_\_\_\_\_

Project Manager Reference: \_\_\_\_\_

**5.9.2 Commissioning Schedule - Control Unit**

Test	Commissioning Results		Test Reference Notes	Defect Details
	Pass	Fail		
Hardware Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Software Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Cables & Connections	<input type="checkbox"/>	<input type="checkbox"/>		
Labelling	<input type="checkbox"/>	<input type="checkbox"/>		
Control Strategies	<input type="checkbox"/>	<input type="checkbox"/>		
Data Transmission	<input type="checkbox"/>	<input type="checkbox"/>		
Alarm Activation	<input type="checkbox"/>	<input type="checkbox"/>		
Video Data Analysis	<input type="checkbox"/>	<input type="checkbox"/>		
Interface with EMAC/Intercom	<input type="checkbox"/>	<input type="checkbox"/>		

Building Number: \_\_\_\_\_

Building Name: \_\_\_\_\_

Equipment Number: \_\_\_\_\_

Equipment Location: \_\_\_\_\_

Equipment Type: \_\_\_\_\_

Equipment Rating: \_\_\_\_\_

Commissioning Date: \_\_/\_\_/\_\_



Commissioning Contractor Name: \_\_\_\_\_  
Commissioning Contractor Representative: \_\_\_\_\_

Project Manager Name: \_\_\_\_\_  
Project Manager Reference: \_\_\_\_\_

5.9.2 Commissioning Schedule - Digital Recording and Playback Functions

Building Number: \_\_\_\_\_ Building Name: \_\_\_\_\_

Test	Commissioning Results		Test Reference Notes	Defect Details
	Pass	Fail		
Hardware Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Software Installation	<input type="checkbox"/>	<input type="checkbox"/>		
Cables & Connections	<input type="checkbox"/>	<input type="checkbox"/>		
Labelling	<input type="checkbox"/>	<input type="checkbox"/>		
Data Storage Capacity	<input type="checkbox"/>	<input type="checkbox"/>		
Memory	<input type="checkbox"/>	<input type="checkbox"/>		
Record	<input type="checkbox"/>	<input type="checkbox"/>		
Stop	<input type="checkbox"/>	<input type="checkbox"/>		
Play	<input type="checkbox"/>	<input type="checkbox"/>		
Pause	<input type="checkbox"/>	<input type="checkbox"/>		
Rewind	<input type="checkbox"/>	<input type="checkbox"/>		
Fast Forward	<input type="checkbox"/>	<input type="checkbox"/>		
Frame by Frame	<input type="checkbox"/>	<input type="checkbox"/>		
Alarm Recording	<input type="checkbox"/>	<input type="checkbox"/>		

Equipment Number: \_\_\_\_\_ Equipment Location: \_\_\_\_\_ Equipment Type: \_\_\_\_\_ Equipment Rating: \_\_\_\_\_  
 Commissioning Date: \_\_/\_\_/\_\_

Commissioning Contractor Name: \_\_\_\_\_

Project Manager Name: \_\_\_\_\_

Commissioning Contractor Representative: \_\_\_\_\_

Project Manager Reference: \_\_\_\_\_