worldskills

Technical Description

Intelligent Security Technology

Skill 03

WorldSkills International, by a resolution of the Competitions Committee and in accordance with the Constitution, the Standing Orders, and the Competition Rules, has adopted the following minimum requirements for this skill for the WorldSkills Competition.

The Technical Description consists of the following:

1 Introduction

1.1 Name and description of the skill competition

1.1.1 The name of the skill competition is

Intelligent Security Technology

1.1.2 Description of the associated work role(s) or occupation(s)

Modern society requires increasingly sophisticated security systems for the protection of its indoor and outdoor spaces, facilities, and buildings. These are to safeguard people, property, facilities, and infrastructure from theft, harm, intrusion, disruption, attack, and other dangers. As the perpetrators of security breaches become increasingly sophisticated, so intelligent security systems need to be planned, installed, and maintained to remove or minimise risk, and to aid detection and recovery if need arises.

Intelligent Security Technology integrates various advanced technologies, including but not limited to high-definition video surveillance, AI-powered image analysis, big data processing, intelligent sensor networks, and automated warning and response mechanisms. The primary goal is to establish a comprehensive, multi-layered, and intelligent security framework that enables precise perception, real-time analysis, and rapid response to elements such as people, vehicles, and environments within the monitored area. This effectively prevents various safety incidents and illegal activities.

The Intelligent Security Technician is responsible for the following tasks.

- Consult with clients to assess risks and determine security requirements according to the assets in need of protection
- Inspect installation sites to
  - Assess the risks and review the safeguarding options while enabling their proper functions to continue
  - Appraise the implications for construction and installation
- Create or contribute to specifications or blueprints for costing and pricing
- Negotiate with clients for the installation, maintenance, servicing, and/or repair of the agreed security measures and systems
- Install a range of systems, sub-systems, and devices, according to the nature of the risks and agreed solutions
- Test, modify, and commission the systems and devices
- Explain and demonstrate to clients the proper uses of the security systems and devices
- Provide documentation and reports to support the continuing viability of associated safeguards such as insurance and emergency measures
- Maintain and repair security systems and devices to ensure their effective functioning.

The Intelligent Security Technician uses the capabilities of modern technology to optimise prevention, detection, and response to security breaches. These generally, but are not limited to, include intrusion and emergency alarms, video surveillance, entrance and exit control, building intercoms, comprehensive security management platforms, environmental monitoring alarms, and other systems. Artificial intelligence also has a part to play in risk analysis.

The outstanding Intelligent Security Technician will master the complexities and nuances of client needs and find clever solutions that enhance security without intruding on the normal uses and activities of property, facilities and other assets. This is achieved by outstanding service from intelligent design through to efficient maintenance, repair and updating. In this way they will ensure

that security is a recognised friend to authorised users as well as a strong deterrent to those who seek to breach it.

1.1.3 Number of Competitors per team

Intelligent Security Technology is a single Competitor skill competition.

1.1.4 Age limit of Competitors

The Competitors must not be older than 22 years in the year of the Competition.

1.2 The relevance and significance of this document

This document contains information about the standards required to compete in this skill competition, and the assessment principles, methods, and procedures that govern the competition.

Every Expert and Competitor must know and understand this Technical Description.

In the event of any conflict within the different languages of the Technical Descriptions, the English version takes precedence.

1.3 Associated documents

Since this Technical Description contains only skill-specific information it must be used in association with the following:

- WSI – Code of Ethics and Conduct
- WSI – Competition Rules
- WSI – WorldSkills Occupational Standards framework
- WSI – WorldSkills Assessment Strategy
- WSI online resources as indicated in this document
- WorldSkills Health, Safety, and Environment Policy and Regulations
- WorldSkills Standards and Assessment Guide (skill-specific)

2 The WorldSkills Occupational Standards (WSOS)

2.1 General notes on the WSOS

The WSOS specifies the knowledge, understanding, skills, and capabilities that underpin international best practice in technical and vocational performance. These are both specific to an occupational role and also transversal. Together they should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, to the extent that it can. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills and capabilities that are set out in the WorldSkills Occupational Standards. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, if this does not distort the weightings assigned by the Standards.

2.2 WorldSkills Occupational Standards

Section		Relative importance (%)
1	**Work organization and management**	**5**
	The individual needs to know and understand: • Health and safety regulations, obligations, documents, and procedures, including the use of personal protective equipment (PPE) • First aid principles and practices • International, national, and proprietary standards, regulations and guidelines for constructing security and protection systems • Official approval processes for constructing security and protection systems, according to their types and purposes • The applications, scope and functions of security and protection systems • Key project criteria, including cost, quality, and completion	

Section		Relative importance (%)
	• Principles and applications for power grounding and lightning protection • Principles and applications of electrical safety measures during construction • The importance of keeping records of progress and changes in implementation for the operation and maintenance of the system • The importance of protecting the integrity and security of data when processing information • Sustainability measures for handling waste for recycling safely • The importance of accuracy, inspections and attention to detail • The importance of methodical working • The quality assurance process • The impacts of new technology • How to continuously maintain and develop professional and technical knowledge relating to security and protection.	
	The individual shall be able to: • Follow health and safety standards, rules and regulations at all times • Maintain safe working environments and personal protection • Create and interpret engineering drawings • Plan projects to achieve optimal efficiency in progress and completion • Assess whether configuration plans fit the on-site environments • Safely and consistently select, use, clean, maintain and store tools and equipment • Regularly schedule tasks and re-prioritize multiple tasks according to changing situations and demands • Manage the stocks and flows of construction materials and equipment • Meet personal, company, and industry standards, including up-to-date certification • Keep up to date with new regulations, systems, products, and methods of work • Share new ideas and possibilities with others for the benefit of colleagues, clients and organizations	
2	**Communication and interpersonal skills**	**5**
	The individual needs to know and understand: • The importance of listening in effective communication. • The job roles and responsibilities of colleagues and the most effective methods for communicating with them • The importance of establishing and maintaining effective working relationships with colleagues and managers • Principles and techniques for efficient and effective teamwork • Principles and techniques for resolving misunderstandings and conflicts.	

Section		Relative importance (%)
	The individual shall be able to: • Listen carefully to others and ask questions to deepen understanding of complex situations • Communicate with colleagues verbally and in writing. • Adapt to the changing needs of colleagues • Lead and/or support the development of strong and effective teams • Communicate with external organisations to gain project approval or consent, as required • Share professional knowledge and skills with colleagues, and give support or coach others as required or helpful • Deal professionally with tension and conflict to support their positive resolution • Follow problem solving processes and apply techniques to generate options and potential solutions • Maintain concentration, focus, and demeanour in complex multisystem working environments.	
3	**Project initiation and holistic planning**	**5**
	The individual needs to know and understand: • Each organization's structure and procedures for generating, negotiating, and securing sales • The range of roles that contribute to the sales process • The range of information required to create viable sales contracts • The scope and limits of one's own professional role in engaging with clients and their requirements • The need to define, analyze, and record clients' needs accurately • The available options for meeting clients' needs, and their relative strengths and limitations technically and financially • The need to interpret and check clients' needs by close inspection of the asset (such as a building, infrastructure, or environment) that requires security • The feasibility and practical implications of implementing the potential security solutions, together with feasible and suitable alternatives • Principles and methods of costing and pricing in detail, and overall • Principles and methods for designing and producing specifications and blueprints, using appropriate software.	
	The individual shall be able to: • Prepare for their role in the sales process by reading research and consultation with colleagues • Use close questioning and analysis with clients and/or colleagues to understand both the clients' needs and their technical and practical implications	

Section		Relative importance (%)
	• Formulate potential options to meet clients' needs, in liaison with experts, professionals, and suppliers • Manage clients' requirements and expectations positively and ethically • Inspect the asset (such as building, infrastructure, or environment) requiring security solutions to test, confirm, or modify, initial thinking • Use standard or bespoke methods to cost the installation of the security system and its components, adding alternatives and their financial implications as appropriate • Create and/or interpret specifications and blueprints for constructing and installing the infrastructure and security components. • Liaise with relevant colleagues and check one's work throughout the design process.	
4	**Planning and design of security systems**	**20**
	The individual needs to know and understand: • Communication methods and approaches for understanding user needs • Planning and design methodologies for security systems • Standards governing the use of infrastructure and auxiliary components • Recognized industry standards and regulations for technical drawings and implementation • Design specifications for security management system diagrams • Safety standards for the planning and design phases of security systems • Good practice in the use of security system drawing tools • Fundamental concepts of security system terminals • Methods for reading and interpreting the structure and function identification of security systems.	
	The individual shall be able to: • Read, interpret, and analyze technical drawings and specifications • Design scientifically sound and practical security system solutions tailored to the characteristics of security technologies and products • Create system architecture diagrams for various security systems • Evaluate project environments to enhance safety and reliability • Plan and apply security technology systems effectively • Analyze project plans and specifications for intelligent security systems • Develop design plans in compliance with international standards.	

Section		Relative importance (%)
5	**Installation and implementation of security systems**	**10**
	The individual needs to know and understand: • The nature and functionality of security devices • Fundamentals of security and electronics • Core concepts of security applications • Applicable environments for security systems and applications • Engineering documentation, including drawings, wiring diagrams schematics, technical manuals, and specifications • Components and composition of security applications • Requirements and standards for security applications • Methods for analysing the needs and specifications of security applications • Techniques for selecting appropriate solutions for security applications.	
	The individual shall be able to: • Analyze client requirements effectively for the installation and implementation of security system applications • Evaluate construction environments and prepare appropriately for project execution • Select optimal security design solutions tailored to specific application requirements • Read and interpret engineering drawings, wiring diagrams, schematics, technical manuals, and related specifications • Assess functionality and identify key parameter requirements for system components • Choose suitable components based on the specific characteristics of security applications • Use specialized instruments and meters to facilitate installation and ensure proper implementation • Adopt scientifically sound, energy-efficient, and environmentally sustainable installation methods • Adhere strictly to safety regulations and implement necessary safety measures • Complete system installations accurately in accordance with construction drawings.	
6	**Debugging and optimization of security systems**	**30**
	The individual needs to know and understand: • Fundamental theories of the overall architecture of security systems • Connection methods, data flow, and communication protocols between subsystems in security systems • Industry standards and specifications for the debugging and optimization of security systems • Fundamental principles of debugging security products	

Section		Relative importance (%)
	• Knowledge and techniques for optimizing security application systems • Principles of energy efficiency management within security application systems • Control principles and mechanisms in security application systems.	
	The individual shall be able to: • Select and optimize application solutions for security systems • Achieve energy efficiency while meeting system requirements and operational parameters • Enhance and optimize the hardware performance of security products • Improve the user experience of security products • Calibrate hardware devices within security systems • Utilize software debugging tools to commission and fine-tune security systems • Debug and optimize performance metrics and indicators of security systems.	
7	**Application of artificial intelligence and digital technologies**	**10**
	The individual needs to know and understand: • Fundamental theories of artificial intelligence (AI) technologies • Concepts of application scenarios for digital technologies • Basic algorithms of artificial intelligence • Foundational knowledge of digital technologies • Knowledge of the application of intelligent technologies across systems • Concepts of cloud computing and edge computing.	
	The individual shall be able to: • Integrate AI-related data and systems effectively • Apply digital technologies to foundational application scenarios • Master data processing and algorithm adaptation for AI algorithms • Construct intelligent security network architectures • Coordinate and utilise edge computing and cloud computing collaboratively.	
8	**Maintenance and repair**	**15**
	The individual needs to know and understand: • How circumstances may change in the type of risk and client need • Principles and procedures for routine maintenance and servicing • How to judge between repair or replacement • The risks to clients of malfunctions and delay	

Section		Relative importance (%)
	• The importance of retaining and/or restoring the confidence of clients in the event of malfunction or ineffectiveness • Construction drawings and technical documentation for security systems applications • Maintenance standards in the security industry • Management protocols for the operational documentation of security systems.	
	The individual shall be able to: • Perform routine maintenance • Perform software unit testing and ICT troubleshooting • Test sub-systems to ensure proper functioning or diagnose malfunctions • Examine systems to locate problems such as loose or broken connections and/or equipment failure • Repair or replace faulty connections or equipment • Verify that the existing systems continue to meet current standards • Advise clients on new equipment, regulations, and areas or functions requiring upgrading • Recycle replaced equipment and material in a sustainable way • Offer backup and disaster recovery support • Complete and share reports and documentation to users and others who require it • Coordinate multi-system operational maintenance.	
	Total	**100**

3 The Assessment Strategy and Specification

3.1 General guidance

Assessment is governed by the WorldSkills Assessment Strategy. The Strategy establishes the principles and techniques to which WorldSkills assessment and marking must conform.

Expert assessment practice lies at the heart of the WorldSkills Competition. For this reason, it is the subject of continuing professional development and scrutiny. The growth of expertise in assessment will inform the future use and direction of the main assessment instruments used by the WorldSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the WorldSkills Competition falls into two broad types: Measurement and Judgement. For both types of assessment, the use of explicit benchmarks against which to assess each Aspect is essential to guarantee quality.

The Marking Scheme must follow the weightings within the Standards. The Test Project is the assessment vehicle for the skill competition, and therefore also follows the Standards. The CIS enables the timely and accurate recording of marks; its capacity for scrutiny, support, and feedback is continuously expanding.

The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed, developed, and verified through an iterative process, to ensure that both together optimize their relationship with the Standards and the Assessment Strategy. They will be agreed by the Experts and submitted to WSI for approval together, to demonstrate their quality and conformity with the Standards.

Prior to submission for approval to WSI, the Marking Scheme and Test Project will liaise with the WSI Skill Advisors for quality assurance and to benefit from the capabilities of the CIS.

4 Assessment Design and Practice

4.1 General guidance

This section describes the role and place of the Marking Scheme, how the Experts will assess Competitors' work as demonstrated through the Test Project, and the procedures and requirements for marking.

The Marking Scheme is the pivotal instrument of the WorldSkills Competition, in that it ties assessment to the standard that represents each skill competition, which itself represents a global occupation. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards.

By reflecting the weightings in the Standards, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill competition and its assessment needs, it may initially be appropriate to develop the Marking Scheme in more detail as a guide for Test Project design. Alternatively, initial Test Project design can be based on the outline Marking Scheme. From this point onwards the Marking Scheme and Test Project should be developed together.

Section 2.1 above indicates the extent to which the Marking Scheme and Test Project may diverge from the weightings given in the Standards, if there is no practicable alternative.

For integrity and fairness, the Marking Scheme and Test Project are increasingly designed and developed by one or more Independent Test Project Designer(s) with relevant expertise. In these instances, the Marking Scheme and Test Project are unseen by Experts until immediately before the start of the skill competition, or competition module. Where the detailed and final Marking Scheme and Test Project are designed by Experts, they must be approved by the whole Expert group prior to submission for independent validation and quality assurance. Please see the Competition Rules for further details.

Experts and Independent Test Project Designers are required to submit their Marking Schemes and Test Projects for review, verification, and validation well in advance of completion. They are also expected to work with their Skill Advisor, reviewers, and verifiers, throughout the design and development process, for quality assurance and in order to take full advantage of the CIS's features.

In all cases a draft Marking Scheme must be entered into the CIS at least eight weeks prior to the Competition. Skill Advisors actively facilitate this process.

4.2 Assessment Criteria

The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived before, or in conjunction with, the Test Project. In some skill competitions the Assessment Criteria may be similar to the section headings in the Standards; in others they may be different. There will normally be between five and nine Assessment Criteria. Whether or not the headings match, the Marking Scheme as a whole must reflect the weightings in the Standards.

Assessment Criteria are created by the person or people developing the Marking Scheme, who are free to define the Criteria that they consider most suited to the assessment and marking of the Test Project. Each Assessment Criterion is defined by a letter (A-I). **The Assessment Criteria, the allocation of marks, and the assessment methods, should not be set out within this Technical Description. This is because the Criteria, allocation of marks, and assessment**

methods all depend on the nature of the Marking Scheme and Test Project, which is decided after this Technical Description is published.

The Mark Summary Form generated by the CIS will comprise a list of the Assessment Criteria and Sub Criteria.

The marks allocated to each Criterion will be calculated by the CIS. These will be the cumulative sum of marks given to each Aspect within that Assessment Criterion.

4.3 Sub Criteria

Each Assessment Criterion is divided into one or more Sub Criteria. Each Sub Criterion becomes the heading for a WorldSkills marking form. Each marking form (Sub Criterion) contains Aspects to be assessed and marked by Measurement or Judgement, or both Measurement and Judgement.

Each marking form (Sub Criterion) specifies both the day on which it will be marked, and the identity of the marking team.

4.4 Aspects

Each Aspect defines, in detail, a single item to be assessed and marked, together with the marks, and detailed descriptors or instructions as a guide to marking. Each Aspect is assessed either by Measurement or by Judgement.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it. The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of the Standards. This will be displayed in the Mark Allocation Table of the CIS, in the following format, when the Marking Scheme is reviewed from C-8 weeks. (Section 4.1 refers.)

		CRITERIA								TOTAL MARKS PER SECTION	WSSS MARKS PER SECTION	VARIANCE
		A	B	C	D	E	F	G	H			
STANDARDS SPECIFICATION SECTION	1	5.00								5.00	5.00	0.00
	2		2.00					7.50		9.50	10.00	0.50
	3								11.00	11.00	10.00	1.00
	4			5.00						5.00	5.00	0.00
	5				10.00	10.00	10.00			30.00	30.00	0.00
	6		8.00	5.00				2.50	9.00	24.50	25.00	0.50
	7			10.00				5.00		15.00	15.00	0.00
TOTAL MARKS		5.00	10.00	20.00	10.00	10.00	10.00	15.00	20.00	100.00	100.00	2.00

4.5 Assessment and marking

There is to be one marking team for each Sub Criterion, whether it is assessed and marked by Judgement, Measurement, or both. The same marking team must assess and mark all Competitors. Where this is impracticable (for example where an action must be done by every Competitor simultaneously, and must be observed doing so), a second tier of assessment and marking will be put in place, with the approval of the Competitions Committee Management Team. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances. (Section 4.6 refers.)

4.6 Assessment and marking using Judgement

Judgement uses a scale of 0-3. To apply the scale with rigour and consistency, Judgement must be conducted using:

- benchmarks (criteria) for detailed guidance for each Aspect (in words, images, artefacts, or separate guidance notes). This is documented in the Standards and Assessment Guide.
- the 0-3 scale to indicate:
  - 0: performance below industry standard
  - 1: performance meets industry standard
  - 2: performance meets and, in specific respects, exceeds industry standard
  - 3: performance wholly exceeds industry standard and is judged as excellent

Three Experts will judge each Aspect, normally simultaneously, and record their scores. A fourth Expert coordinates and supervises the scoring, and checks their validity. They also act as a judge when required to prevent compatriot marking.

4.7 Assessment and marking using Measurement

Normally three Experts will be used to assess each Aspect, with a fourth Expert supervising. In some circumstances the team may organize itself as two pairs, for dual marking. Unless otherwise stated, only the maximum mark or zero will be awarded. Where they are used, the benchmarks for awarding partial marks will be clearly defined within the Aspect. To avoid errors in calculation or transmission, the CIS provides a large number of automated calculation options, the use of which is mandated.

4.8 The use of Measurement and Judgement

Decisions regarding the choice of criteria and assessment methods will be made during the design of the competition through the Marking Scheme and Test Project.

4.9 Skill assessment strategy and procedures

WorldSkills is committed to continuous improvement including reviewing past limitations and building on good practice. The following skill assessment strategy and procedures for this skill competition take this into account and explain how the marking process will be managed.

- Experts use Standards and Assessment Guide throughout the marking process
- Groups of Experts are formed for each of the six (6) modules to be assessed
- Chief Expert allocates four (4) Experts for each sub criteria to assess
- Chief Expert nominates an assessment team leader for each sub criteria. The assessment team leader is responsible for the recording of results
- The team leader of each marking group needs to be fluent in English
- Assessment is completed each day (if possible)
- Only the Expert marking group for a specific sub criterion assesses the sub criteria. All other Experts must leave the assessment area if they are not involved in assessment

5 The Test Project

5.1 General notes

Sections 3 and 4 govern the development of the Test Project. These notes are supplementary.

Whether it is a single entity, or a series of stand-alone or connected modules, the Test Project will enable the assessment of the applied knowledge, skills, and behaviours set out in each section of the WSOS.

The purpose of the Test Project is to provide full, balanced, and authentic opportunities for assessment and marking across the Standards, in conjunction with the Marking Scheme. The relationship between the Test Project, Marking Scheme, and Standards will be a key indicator of quality, as will be its relationship with actual work performance.

The Test Project will not cover areas outside the Standards or affect the balance of marks within the Standards other than in the circumstances indicated by Section 2. This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standards. Section 2.1 refers.

The Test Project will enable knowledge and understanding to be assessed solely through their applications within practical work. The Test Project will not assess knowledge of WorldSkills rules and regulations.

Most Test Projects and Marking Schemes are now designed and developed independently of the Experts. They are designed and developed either by the Skill Competition Manager, or an Independent Test Project Designer, normally from C-12 months. They are subject to independent review, verification, and validation. (Section 4.1 refers.)

The information provided below will be subject to what is known at the time of completing this Technical Description, and the requirement for confidentiality.

Please refer to the current version of the Competition Rules for further details.

5.2 Format/structure of the Test Project

The Test Project is a series of six (6) standalone modules.

5.3 Test Project design requirements

Test Projects should reflect the purposes, structures, processes, and outcomes of the occupational role they are based on. They should aim to be a small-scale version of that role. Before focusing on practicalities, SMTs should show how the Test Project design will provide full, balanced, and authentic opportunities for assessment and marking across the Standards, as set out in Section 5.1.

According to the content of the occupations related to security prevention, combined with the characteristics of the skills competition and the norms of WSOS, this competition item sets up six (6) competition modules. Each module includes planning and installation tasks, as well as other key aspects mentioned for each one.

Module A: Intrusion and emergency alarm system installation (3 hours

Competitors must implement an intelligent intrusion and emergency alarm system based on construction blueprints. The system offers comprehensive protection for perimeters, spaces, and key targets while integrating video surveillance and access control.

Key aspects: Blueprint interpretation, system parameter configuration and programming, fault diagnosis and function verification and smart management

Module B: Video surveillance system installation (4 hours)

Competitors will efficiently deploy and configure a video surveillance system, integrating video detection, real-time monitoring, AI analytics, and multi-system linkage, to meet image quality, storage compliance, and false alarm prevention requirements in high-risk areas.

Key aspects: network configuration and commissioning, AI edge integration, function and linkage testing and system optimization.

Module C: Access control system (3 hours)

Competitors will deploy and debug access control systems to manage personnel/vehicle authorization, track access logs, and enable abnormal alarm functions, ensuring both system security and operational usability.

Key aspects: Permission configuration and logic debugging, abnormal alarm, data management and maintenance analysis.

Module D: Smart Fire protection and intercom system (4 hours)

Competitors shall focus on integrating smart intercom systems with fire alarm systems, enabling visitor management, emergency communication, fire linkage, and equipment status monitoring for standardized operation and timely emergency response.

Key aspects: Intercom function debugging and alarm linkage integration

Module E: Data centre power and environmental monitoring system (3 hours)

Competitors will deploy and configure power and environmental monitoring systems to monitor temperature/humidity, detect equipment status, trigger abnormal alarms, and support system linkages, ensuring a safe and stable data centre environment.

Key aspects: System design and sensor layout, system parameter configuration and linkage logic, fault diagnosis and emergency response, data visualization and O&M management.

Module F: Security system operation and maintenance (2 hours)

As security system maintenance engineers, candidates will perform system verification, routine inspections, fault diagnosis, and repairs for various subsystems (intrusion alarms, video surveillance, access control), ensuring stable operation and process optimization.

Key aspects: System function verification, routine inspection and preventive maintenance; fault diagnosis and emergency repair, O&M optimization and user support.

5.4 Test Project coordination and development

The Test Project MUST be submitted using the templates provided by WorldSkills International (www.worldskills.org/expertcentre). Use the Word template for text documents and DWG template for drawings.

5.4.1 Test Project coordination (preparation for Competition)

Coordination of the Test Project/modules will be undertaken by the Skill Competition Manager.

5.4.2 Who develops the Test Project/modules

The Test Project/modules are developed by an Independent Test Project Designer (ITPD) in collaboration with the Skill Competition Manager

5.4.3 When is the Test Project developed

The Test Project/modules are developed according to the following timeline:

Time	Action
Fifteen (15) months prior to the Competition	The ITPD is identified and a Confidentiality Agreement between WSI and the ITPD is organized.
No later than two (2) months prior to the Competition	The Test Project documents are sent to the WorldSkills International Skills Competitions Administration Manager.
At the Competition on C-4	The Test Project/modules are presented to the Experts.
At the Competition on C-2	The Test Project/modules are presented to the Competitors.

5.5 Test Project initial review and verification

The purpose of a Test Project is to create a challenge for Competitors which authentically represents working life for an outstanding practitioner in an identified occupation. By doing this, the Test Project will apply the Marking Scheme and fully represent the WSOS. In this way it is unique in its context, purpose, activities, and expectations.

To support Test Project design and development, a rigorous quality assurance and design process is in place (Competition Rules sections 10.6-10.7 refer.) Once approved by WorldSkills, the Independent Test Project Designer (ITPD) is expected to identify one or more independent expert(s), and trusted individuals initially to review the Independent Test Project Designer's ideas and plans, and subsequently to verify the Test Project, prior to validation.

A Skill Advisor will ensure and coordinate this arrangement, to guarantee the timeliness and thoroughness of both initial review, and verification, based on the risk analysis that underpins Section 10.7 of the Competition Rules.

5.6 Test Project validation

The Skill Competition Manager coordinates the validation of the Test Project/modules and will ensure that it can be completed within the material, equipment, knowledge, and time constraints of Competitors.

5.7 Test Project circulation

The Test Project/modules are not circulated prior to the Competition. The Test Project/modules are presented to Experts on C-4 and to Competitors on C-2.

5.8 Test Project change

Due to the Test Project being developed by an Independent Test Project Designer (ITPD), there is no change required to be made to the Test Project/modules at the Competition. Exceptions are amendments to technical errors in the Test Project documents and according to infrastructure limitations.

5.9 Material or manufacturer specifications

Specific material and/or manufacturer specifications required to allow the Competitor to complete the Test Project will be supplied by the Competition Organizer and are available from www.worldskills.org/infrastructure located in the Expert Centre. However, note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These items may include those for fault finding modules or modules not circulated.

6 Skill management and communication

6.1 Discussion Forum

Prior to the Competition, all discussion, communication, collaboration, and decision making regarding the skill competition must take place on the WorldSkills skill-specific Discussion Forum. (http://forums.worldskills.org). Skill related decisions and communication are only valid if they take place on the WorldSkills Discussion Forum. The Chief Expert (or an Expert Lead appointed by the Skill Management Team) will be the moderator for this Discussion Forum. Refer to the Competition Rules for the timeline of communication and competition development requirements.

6.2 Competitor information

All information for registered Competitors is available from the Competitor Centre (www.worldskills.org/competitorcentre).

This information includes:

- Competition Rules
- Technical Descriptions
- Mark Summary Form (where applicable)
- Test Projects (where applicable)
- Infrastructure List
- WorldSkills Health, Safety, and Environment Policy and Regulations
- Other Competition-related information

6.3 Test Projects and Marking Schemes

Circulated Test Projects will be available from www.worldskills.org/testprojects and the Competitor Centre (www.worldskills.org/competitorcentre).

6.4 Day-to-day management

The day-to-day management of the skill competition during the Competition is defined in the Skill Management Plan that is created by the Skill Management Team. The Skill Management Team comprises the Skill Competition Manager, Chief Expert, and the Expert Leads. The Skill Management Plan is progressively developed in the six (6) months prior to the Competition and finalized at the Competition. The Skill Management Plan can be viewed in the Expert Centre (www.worldskills.org/expertcentre).

6.5 General best practice procedures

General best practice procedures clearly delineate the difference between what is a best practice procedure and skill-specific rules (section 9). General best practice procedures are those where Experts and Competitors CANNOT be held accountable as a breach to the Competition Rules or skill-specific rules which would have a penalty applied as part of the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System. In some cases, general best practice procedures for Competitors may be reflected in the Marking Scheme.

Topic/task	Best practice procedure
Competitors and Experts	• Experts must not enter their compatriot competitor's workstation alone at any time. • During the competition, Experts must not speak to their compatriot Competitor alone. If communication is necessary another Expert must be present and a language understood by both Experts must be used. • All competitor questions must be documented. If there are errors or ambiguities in the competition documents the Skill Competition Manager (SCM) and Chief Expert (CE) must present the issue and answer to all Competitors and explain the relevant content in the subsequent competition.
Process and schedule for releasing modules in closed Test Projects	• In modules of the non-public Test Project will be released to Experts and Interpreters on C-4. • Once all translations are complete, the modules will be released to all Experts simultaneously on C-2. • The CE will preview the Test Project before other Experts and prepare to present it on C-4, form scoring groups, and prepare materials and equipment immediately after publication on C-3.
Process and schedule for translating Test Projects	• Interpreters may begin translating the Test Projects from C-4 to C-3 at times designated by the Skill Competition Manager. • If translation is not completed on time, extensions may be granted, but priority must be given to activities described in the Skill Management Plan. (Extensions are allowed only after all other activities are complete)
Tools Interpreters may use during translation	• Interpreters may use personal computers that have been checked and approved by the SCM and CE. • Required translation software may be used (e.g. Word, Excel, dictionaries, translation tools). Internet access is permitted only if needed by the software. • Email software and web browsers may not be used or installed.
Marking process by the marking team	• Before marking begins, marking team leaders (appointed by the SCM and CE) must coordinate and confirm with each other to ensure marking consistency, quality, and shared understanding of the criteria. • During marking, any questions must be immediately verified with the SCM and CE. • After marking, each team must report to the SCM and CE using the correct forms if handwritten or using the tablet. Any issues should be discussed with the SCM and CE. • If required by the SCM and CE, marking team leaders must discuss the marking details with them (e.g. complaints).
Contestations during the marking process	• If there are any requests regarding marking issues (e.g. whether something should or shouldn't be marked,

Topic/task	Best practice procedure
	infractions), all Experts must describe them in the prescribed in the appropriate form and submit them to the Skill Competition Manager. Verbal complaints are not accepted. • After reviewing and discussing the written request with the Chief Expert, the Skill Competition Manager will respond in writing. • Any complaints about the marking results must be submitted in writing by Experts within the designated time.

7 Skill-specific safety requirements

7.1 Personal Protective Equipment

Refer to WorldSkills Safety Policy and Regulations for Host country or region regulations.

Task	Safety glasses with side protection	Leather gloves	Insulated gloves	Tight fitting work clothes (long trousers)	Insulated safety shoes with protective cap	Safety helmet
General PPE for safe areas				√	√	
General work	√			√	√	
Equipment installation	√	√		√	√	√
Electrical measurements	√		√	√	√	
Use of manual or electrical tools	√	√		√	√	
Commissioning	√		√	√	√	
Maintenance	√		√	√	√	√

8 Materials and equipment

8.1 Infrastructure List

The Infrastructure List details all equipment, materials, and facilities provided by the Competition Organizer.

The Infrastructure List is available at www.worldskills.org/infrastructure.

The Infrastructure List specifies the items and quantities requested by the Skill Management Team for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These items may include those for fault finding modules or modules not circulated.

At each Competition, the Skill Management Team must review and update the Infrastructure List in preparation for the next Competition. The Skill Competition Manager must advise the Director of Skills Competitions of any increases in space and/or equipment.

At each Competition, the Technical Observer must audit the Infrastructure List that was used at that Competition for the upcoming WorldSkills Competition.

The Infrastructure List does not include items that Competitors and/or Experts are required to bring and items that Competitors are not allowed to bring – they are specified below.

8.2 Competitors toolbox

Competitors are not allowed to send a toolbox to the Competition. All tools are provided by the Competition Organizer.

8.3 Materials, equipment, and tools supplied by Competitors

It is not applicable for Competitors to bring materials, equipment, and tools to the Competition.

8.4 Materials, equipment, and tools supplied by Experts

Experts are required to supply their own Personal Protective Equipment as specified in section 7 skill-specific safety requirements.

Experts are responsible that Interpreters bring their own PPE.

8.5 Materials and equipment prohibited in the skill area

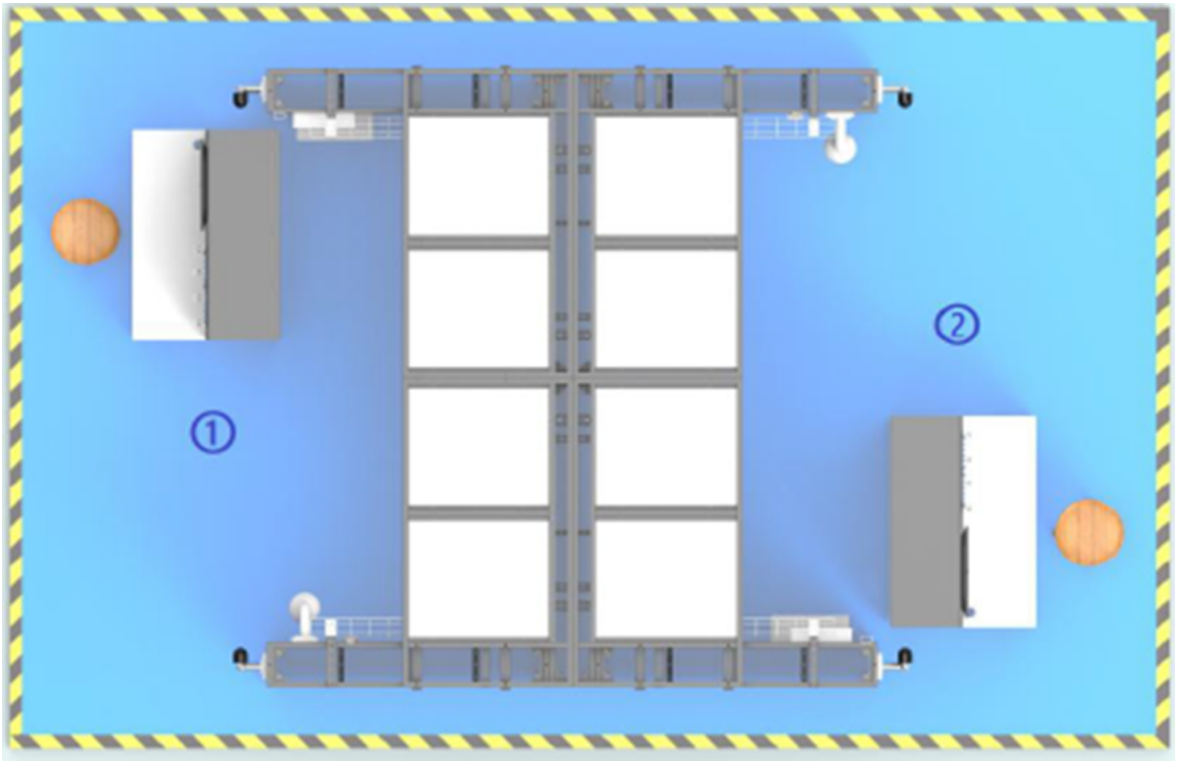
Competitors and Experts are prohibited to bring any materials or equipment not listed in section 8.3 and section 8.4.

8.6 Proposed workshop and workstation layouts

Workshop layouts from previous competitions are available at www.worldskills.org/sitelayout.

Example workshop layout

Note that this is an example of a layout and is not definitive. The work area for Competitors is approximately 5m x 4m.



9 Skill-specific rules

9.1 General notes

Skill-specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from skill competition to skill competition. This includes but is not limited to personal IT equipment, data storage devices, Internet access, procedures and workflow, and documentation management and distribution. Breaches of these rules will be solved according to the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System.

9.2 Skill-specific rules

Topic/task	Skill-specific rule
Use of technology – USB, memory sticks	• Competitors are only allowed to use memory sticks provided by the Competition Organizer. No other memory sticks are to be inserted into the Competitor computers. • Memory sticks or any other portable memory devices cannot be taken outside the workshop. • Memory sticks or other portable memory devices are to be submitted to the Chief Expert at the end of each day for safe keeping and must not be taken out of the workshop. • Only Competitors and Technical Support Team are allowed to work with the computers in Competitors workstation unless special permission is given by the SMT. No Expert can be given such permission to their compatriot Competitor.
Use of technology – personal laptops, tablets, and mobile phones	• Competitors are not allowed to bring personal laptops, tablets, or mobile phones into the workshop on C-2, C1 to C4. If Competitors do bring these items into the workshop they must place them in their locker. They can use them at break times and take at the end of each day. Experts, Chief Expert, Skill Competition Manager and Interpreters are exempt from this rule. • Competitors, Chief Experts, Skill Competition Manager, Experts, and Interpreters are allowed to use personal photo and video taking devices in the workshop, however no photos can be taken of details of the Test Project documents and material or any marking forms. • Skill Competition Manager and Workshop Manager are able to take photos to support technical matters. • Competitors may bring a wired mouse and wired keyboard in a language of their choice into the competition site, A wired QWERTY keyboard and mouse will be provided.

Topic/task	Skill-specific rule
Drawings, recording information	• Competitors may make drawings, document instructions, or take notes whilst in the workshop however they cannot be taken out of the workshop at any time. • Chief Expert, Experts, and Interpreters may make notes to support the marking process.

10 Expert knowledge and experience

10.1 Requirements

Experts appointed for this skill competition must have the following knowledge and experience for the appropriate occupation or work role as documented in **section 1.1.2**.

1. Profile objective

To train and empower technicians, engineers and professionals in the design, implementation and maintenance of Intelligent Security Technologies, integrating technical, regulatory and pedagogical knowledge to ensure safe, efficient and ethically responsible environments.

2. Technical competencies

The Expert possesses advanced mastery of technologies applied to electronic security and automation:

- Video surveillance systems (CCTV): Analog, IP, PTZ, dome and bullet cameras, DVR/NVR configuration, system design including storage and bandwidth calculations.
- Access control: RFID, biometrics, proximity cards, integration with access management software.
- Intrusion detection systems: High voltage fences, Motion, vibration, glass-break and contact sensors; zone configuration and automated AI powered response protocols.
- Environmental monitoring: Temperature and humidity Sensors, toxic gases and air quality, real time data logging and intelligent alerts.
- Fire detection and prevention: Smoke, heat and flame detectors, integration with evacuation protocols and automatic extinguishing systems.
- Structured cabling and IP networks: Installation of UTP, FTP, coaxial and optic fiber cables; IP addressing, DHCP, DNS, switches and routers.
- Smart security and home automation: Application of IoT, automation and communication protocols such as Z-wave, Zigbee, WI-FI and bluetooth.
- Regulation and legislation: Knowledge of privacy laws, data protection, electrical and safety standards and Installation codes.

3. Pedagogical competencies

The Epert profile includes the ability to educate and mentor future professionals in technical and vocational environments.

- Instructional design. Development of modules, guides, simulations and question banks.
- Competency-based assessment: Use of formative and summative methods including case studies and problem solving.
- Technical and ethical mentorship: Support for learners in both technical mastery and professional integrity.
- Multicultural and bilingual adaptation: Effective communication in both native language and English with technical translation capabilities.

4. Cross-cutting skills

Area	Skill
Critical thinking	Fault diagnosis, decision making under pressure
Communication	Technical writing, effective presentations, clear documentation
Professional ethics	Confidentiality, responsibility, customer service
Project management	Planning, documentation, deployment and maintenance

5. Strategic vision

This professional not only installs and configures systems but also leads projects, innovates solutions and promotes a culture of responsible security. Their profile blends technical precision, ethical awareness and educational commitment, driving the development of the next generation of Intelligent Security Technology Experts.

6. Suitable engineering profiles

Engineering discipline	Why it fits
Electronic engineering	Core foundation for circuits, sensors, CCTV, alarms and embedded systems. Ideal for hardware integration and diagnosis.
Mechatronics engineering	Combines electronics, mechanics and control systems. Perfect for automation, access control and smart actuators.
Telecommunications engineer	Expert in IP networks, structured cabling, remote access and bandwidth optimization for video surveillance.
Computer engineering	Excellent for software integration, IoT platforms, AI-based monitoring and cybersecurity in smart systems
Systems engineering	Focuses on holistic designs, interoperability and lifecycle management, key for large scale security deployments.
Industrial engineering	Strong in project planning, risk analysis and optimizing resource use in complex installations.
Electrical engineering	Essential for power systems, fire prevention circuits and compliance with electrical safety standards

11 Visitor and media engagement

11.1 Engagement methods

Following is a list of possible ways to maximize visitor and media engagement:

Promotion through international security exhibitions

The security industry is an industry with a complete industrial chain internationally, with a large number of enterprises and practitioners. Every year, there are several exhibitions with international influence in the world. After the competition items are determined, invitations can be sent in the name of the organizing committee of the WorldSkills Competition to major international exhibitions, adding the information of the security prevention technology competition item of the WorldSkills Competition to their platforms, allowing numerous industry enterprises from all over the world to understand and establishing communication channels. The following are information on large-scale international security exhibitions.

Organize invitation tournaments

In the name of the industry partners of the WorldSkills Competition, invite qualified countries/ regions to organize practitioners of intelligent security prevention technology to participate in the invitation tournaments, and improve the process, competition content, operation specifications, etc. during the competition and in the post-competition summary.

Test Project display

Through the WorldSkills Competition display project, the teams of each participating country/ region and visitors from various countries/regions first understand this competition item. During the competition, relevant personnel from various countries are organized and invited to participate in seminars to discuss and optimize the technical specifications, processes and details of the competition item.

12 Sustainability

12.1 Sustainable practices

This skill competition will focus on the sustainable practices below:

Analysis of equipment and materials required

The equipment and facilities of the competition event include: engineering environment simulation devices, central control consoles and their equipment, front-end equipment of security subsystems, auxiliary materials (cables, pipes and troughs, labels), installation and testing tools, etc. Among them, except for some connection cables and connectors, all are recyclable and reusable. The non-recyclable materials such as wires and cables account for less than 3% of the total cost of the entire competition event's equipment and software. In addition, the installation and testing tools do not require special high-precision tools, and the investment cost for training and competition is relatively low.

The Competition Organizer can obtain the support of equipment sponsors through invitation and bidding to provide all facilities, installation materials and tools for the complete competition workstations. After the competition is completed, the equipment and facility sponsors can recycle or donate the competition's equipment and materials. The recycled equipment can reset and restore its equipment configuration parameters for actual engineering use or be reserved for the next competition.

13 References for industry consultation

13.1 General notes

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (http://www.ilo.org/public/english/bureau/stat/isco/isco08/)
- ESCO: (https://ec.europa.eu/esco/portal/home)
- O*NET OnLine (www.onetonline.org/)

13.2 References

This WSOS appears most closely to relate to ISCO-08 unit group 3513: Computer Network and Systems Technicians. (pp. 226-7).

In greater detail it is a more advanced version of O*NET 49-2098: Security and Fire Alarm Systems Installers: https://www.onetonline.org/link/summary/49-2098.00

It is also a more advanced version of ESCO 7422.5: Security Alarm Technician: http://data.europa.eu/esco/occupation/c0c1364d-f784-4e76-8d3f-1e998dc6545d

Unfortunately no feedback was received from business and industry for WorldSkills Shanghai 2026.

14 Appendix

14.1 Appendix information

Not applicable.