



# Project Test Plan

## Secure Wireless Campuses IT071001

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Approval of the Project Plan indicates an understanding of the purpose and content described in this document.

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## **Section 1. Overview**

This test plan will attempt to describe the general objectives, scope and approach for testing to be conducted on the Secure Wireless Campuses Project. Testing will be accomplished in six separate phases. These phases coincide with the installation at each college (SPC, NVC, PAC, SAC, and SWC) and then a final as built test. The first, five phases of testing will consist of verifying the operational status the college environment. The sixth phase will consist of verifying the entire environment.

### **1.1 Test objectives**

The objects of this test directly relate to functionality being provided by phase. They are described in the subsections below.

#### **1.1.1 Phase 1 through 5 objectives**

Phase one through five have identical objectives. The differences are in the number of components installed at each college. To be specific, the objectives are to install cabling, controllers, and wireless access points. Testing will be accomplished in two steps. First to verify individual components are functioning correctly and second that a complete path is operating correctly. For example, once a cable is installed it needs to be tested to verify that no wires were connected to the wrong terminating pins. After the component is verified operational the path is tested to verify functionality. This is tested by verifying that a remote device can communicate over the infrastructure. This type of testing is pass/fail and continues until each path passes. This is a no paperwork test, at the end of the college installation, it either operates or the installation process continues until it is complete.

#### **1.1.2 Phase six objectives**

The infrastructure is a remotely monitored environment. The phase six objective is to verify that 100 percent of the devices can be monitored with the tool established for that purpose. Specific attention will be to verify that all devices are displayed in an operational status. A secondary objective is that all devices will have the appropriate configuration information displayed when selected.

### **1.2 Test scope and approach**

For the first, five phases, the scope will be to verify that the hardware was installed and 100 percent of the infrastructure is operational. This testing is accomplished by reviewing the remote monitoring tool and verifying operational status. Once installed students, faculty, and employees will start using the operational environment immediately. In this environment, it either works or it does not.

For the sixth phase, the scope will be to formally verify that the new functionality is operational to the entire user base.

## **Section 2. Test Methodology**

In the following subsections, this plan will describes the test methodology that addresses both the types of tests to be performed, and the phases of testing.

This test plan will create the framework to ensure that each feature or functionality in the work product is correct. Testing will require both a standard for correctness and a means of determining correctness. To be specific, each project Goal and Objective will be verified through testing.

### **2.1 Elements of Testing**

According to accepted best practices, four specific elements of testing are used to determine correctness: inspection, analysis, demonstrations, and test. This test plan will use inspection and demonstrations, as its primary methods of testing.

Inspection is the direct perception of the correctness of the item under test. Examples include viewing a graphical user interface-based entry form to ensure that the field data elements are correct, viewing a printed report to ensure that the content is correct, or other examples where the immediate perception of the item under test will reveal whether it is correct.

Demonstration is the simple execution of a function in the item under test. In demonstration, the item under test initially resides in one state and is triggered to perform some function that either results in an output and/or causes the item under test to move to a new state. Examples of demonstration include accepting a form, generating a report, posting to an account, saving a file, or other actions that are the direct result of triggering an event. Like inspection, the correctness of a demonstration can be immediately perceived; but unlike inspection, an event must occur to cause the item under test to perform its function.

### **2.2 Types of Testing**

#### **2.2.1 Functional Testing**

Functional testing ensures that the system or system component correctly performs its intended function. In addition to a description of the function to be performed, functional requirements may include requirements for allowable or unallowable inputs and outputs and specific operations to be performed in satisfying the function.

It is important to note that within the functional testing we are not testing the OmniAccess application. We are accepting its functionality and verifying through its functionality that key functionality is available within the delivered environment. The following project “Goals and Objectives” will be verified through Functional Testing:

- Public internet access for private mobile computing devices
- Public internet access for ACCD mobile computing devices
- Authenticated, encrypted, access to the intranet

### **2.2.2 Data Testing**

Testing of data includes both the testing of the data contained within the system and the testing of the data used by the system.

Internal data may be in the form of constants, rules, or other data that is either static or seldom changes during the production use of the system (e.g., an IP address for a web-based application).

External data includes both data that is accepted by the system and data that is generated by the system, such as user input, communications with other applications, database sources, constructed data, and reports.

Testing of data ensures that the item under test accepts or delivers all and only the data intended for that item, in the form, format, and frequency that is correct for that item.

It is important to note that within the functional testing we are not testing the OmniAccess application. We are accepting its functionality and verifying through its functionality that key functionality is available within the delivered environment. The following project “Goals and Objectives” will be verified through Data Testing:

- Install infrastructure to support access (Controllers, Wiring, Switches, Access Points, management appliance)
- Continuous coverage within the primary interior College Campus areas and appropriate exterior student gathering areas
- Create security controls to allow rapid response to react to wireless security threats
- Create policies and procedures for ACCD mobile computing devices

### **2.2.3 User Testing**

User testing ensures that the item under test meets usability, accessibility, and user documentation requirements.

User testing for usability and accessibility addresses the required behavior of the user interfaces. These should be documented in a set of specific requirements that ensure the testability of the user interface. The ultimate success of systems that are heavily dependent upon user interfaces often rest upon the clarity of the requirements for the user interface and the success of the system in meeting those user interface requirements.

User interface testing should ensure that the user interface meets the quantified and specific look and feel requirements, including any performance or ease-of-use requirements that are documented in specific, testable terms (e.g., requiring a system to be easy to use is a highly subjective and therefore less testable requirement than requiring a system to provide a display response time of less than or equal to one second).

Testing of user documentation includes testing of online documentation, help, and other support text to ensure it is correct and adequately supports the needs of the typical users. User documentation testing also includes testing of the system according to any written documentation to ensure that the documentation correctly describes the component or system functionality (e.g., installation instructions for the system should be tested by performing an installation according to the instructions).

The following functional testing will verify key functionality is available within the delivered environment. The following project “Goals and Objectives” will be verified through User Testing:

- Public internet access for private mobile computing devices
- Public internet access for ACCD mobile computing devices

#### **2.2.4 Non-Functional (Systems Requirements) Testing**

In the following subsections, non-functional or systems requirements testing will be described.

Non-functional or systems requirements testing validates required quantities or properties of the system that address how well some behavioral or structural aspect of the system should be accomplished. Non-functions test include: performance testing, quality testing, and interface testing, among others.

##### **2.2.4.1 Performance Testing**

Performance testing ensures that the item under test meets specified requirements for throughput, number of users, response times, maximum workloads, and other performance characteristics of the item.

Performance testing may include load, stress, and availability testing. Load testing determines the ability of the item under test to support the performance requirements while under increased use up to the stated bounds of its capability. Stress testing determines the ability of the item under test to deal with situations when load exceed the bounds of the stated capability (e.g., whether the item locks up, fails, processes in a degraded fashion, or otherwise changes performance). Availability testing determines whether the item under test is available according to its stated availability requirements (e.g., 24x7 ability to log in to the application).

Load and stress typically have a direct impact on availability and performance testing and typically addresses each individually as well as in combination.

The following Non-Functional (Systems Requirements) Testing will verify key functionality is available within the delivered environment. The following project Goals and Objectives will be verified through Performance Testing:

- All ACCD building areas
- Appropriate exterior areas
- Contiguous coverage within the primary interior Collage Campus areas and appropriate exterior student gathering areas

#### **2.2.4.2 Quality Testing**

Quality validation includes the following subcategories:

- Correctness – Correctness is the extent to which specifications are satisfied and mission objectives are fulfilled.
- Efficiency – Efficiency is the relationship between the level of performance of the product and the amount of resources used, under stated conditions.
- Flexibility – Flexibility is the effort required to modify operation product.
- Integrity/Security – Integrity/Security is the extent to which access to the system or data by authorized personnel can be controlled
- Interoperability – Interoperability is the effort needed to couple one system with another.
- Maintainability – Maintainability is the effort required to locate and correct an error during operation.
- Portability – Portability is the effort needed to transfer from one hardware to software environment to another
- Reliability – Reliability is the extent to which the system performs with required precision and robustly responds to reliability challenges (e.g., through fail over or degraded operation)
- Reusability – Reusability is the extent to which the system and associated artifacts can be reused in another application.
- Testability – Testability is the effort needed to test to ensure software performs as intended
- Usability – Usability is the effort required to learn, operate, prepare input for, and interpret output from the system.

The following Non-Functional (Systems Requirements) Testing will verify key functionality is available within the delivered environment. The following project Goals and Objectives will be verified through Quality Testing:

- Create an infrastructure base to expand upon

### 2.2.4.3 Interface Testing

This paragraph will address interface testing for the project. Interface testing determines the correctness of the defined interfaces for the system. These interfaces may be internal to the system or with interfaces with other systems. The interfaces may be between software and hardware components or software and software components. The interface typically has a specific format, message set, and protocol. Testing the interface according to the requirement will necessitate testing the interface features and any performance and error detection/recovery mechanisms for the interface.

The following Non-Functional (Systems Requirements) Testing will verify key functionality is available within the delivered environment. The following project Goals and Objectives will be verified through Performance Testing:

- 802.11 a/b/g access

### 2.3 Phases of Testing

Testing for phase one through five is not documented. As stated earlier, a path either works or it does not. Once working it is immediately put to use by the client base. Phase six is a formal test of the operational environment. The tables below provide an overview of testing within phase six.

Functional Testing	Inspection	Analysis	Demonstration
<ul style="list-style-type: none"> <li>• Functional Testing</li> </ul>	<ul style="list-style-type: none"> <li>• Private Devices</li> <li>• ACCD Devices</li> <li>• Authenticated, encrypted access</li> </ul>		
<ul style="list-style-type: none"> <li>• Data Testing</li> </ul>	<ul style="list-style-type: none"> <li>• Security controls</li> <li>• Policies and procedures</li> </ul>		<ul style="list-style-type: none"> <li>• Continuous coverage</li> <li>• Install Infrastructure</li> </ul>
<ul style="list-style-type: none"> <li>• User Testing</li> </ul>			<ul style="list-style-type: none"> <li>• Access for private mobile computing devices</li> <li>• Access for ACCD mobile computing devices</li> </ul>

Non-Functional Testing	Inspection	Analysis	Demonstration
<ul style="list-style-type: none"><li>• Performance Testing</li></ul>		<ul style="list-style-type: none"><li>• All ACCD building areas</li><li>• Appropriate exterior areas</li><li>• Contiguous coverage</li></ul>	
<ul style="list-style-type: none"><li>• Quality Testing</li></ul>			<ul style="list-style-type: none"><li>• Infrastructure base to expand upon</li></ul>
<ul style="list-style-type: none"><li>• Interface Testing</li></ul>	<ul style="list-style-type: none"><li>• 802.11 a/b/g access</li></ul>		

### Section 3. Test Schedule

The following table provides a reference to the project test schedule information. The table includes target dates and resources for each milestone.

Requirement	Target Date	Resources
<b>Phase One - SPC</b>		
<ul style="list-style-type: none"> <li>Verify correct installation of controllers</li> </ul>	7/14/06	RX Technologies, ACCD Installation Team
<ul style="list-style-type: none"> <li>Verify correct installation of access points</li> </ul>	7/14/06	RX Technologies, ACCD Installation Team
<b>Phase Two - NVC</b>		
<ul style="list-style-type: none"> <li>Verify correct installation of controllers</li> </ul>	7/28/06	RX Technologies, ACCD Installation Team
<ul style="list-style-type: none"> <li>Verify correct installation of access points</li> </ul>	7/28/06	RX Technologies, ACCD Installation Team
<b>Phase Three - PAC</b>		
<ul style="list-style-type: none"> <li>Verify correct installation of controllers</li> </ul>	8/1/06	RX Technologies, ACCD Installation Team
<ul style="list-style-type: none"> <li>Verify correct installation of access points</li> </ul>	8/1/06	RX Technologies, ACCD Installation Team
<b>Phase Four - SAC</b>		
<ul style="list-style-type: none"> <li>Verify correct installation of controllers</li> </ul>	8/24/06	RX Technologies, ACCD Installation Team
<ul style="list-style-type: none"> <li>Verify correct installation of access points</li> </ul>		RX Technologies, ACCD Installation Team
<b>Phase Five - SWC</b>		
<ul style="list-style-type: none"> <li>Verify correct installation of controllers</li> </ul>	11/10/06	RX Technologies, ACCD Installation Team
<ul style="list-style-type: none"> <li>Verify correct installation of access points</li> </ul>	11/10/06	RX Technologies, ACCD Installation Team
<b>Phase Six – Monitoring Tool</b>		
<ul style="list-style-type: none"> <li>Verify correct operation of controllers</li> </ul>	TBD	ACCD Installation Team
<ul style="list-style-type: none"> <li>Verify correct operation of access points</li> </ul>	TBD	ACCD Installation Team

## **Section 4. Test Monitoring and Reporting**

### ***4.1 Monitoring***

This paragraph describes the monitoring activities that will be used to evaluate actual progress to plan. It is understood that execution of the test plan must be monitored to recognize deviation from plan. It is further understood that success depends on realistic, detailed test planning and frequent, interim milestones at which actual progress can be compared with the plan to identify deviations

This test will be accomplished in one setting without break or periods of none performance. It will be accomplished from zero percent to 100 percent completion. All components will be graded either pass or fail. No test should not be executed.

### ***4.2 Reporting***

This section details the reports used during testing. Phase six will have one test. It will be entitled “Secure Wireless Campuses (IT071001) Project Test Steps and Procedures. The status reporting will be a single document summarizing the test results recorded within this document.

## Section 5. Glossary

The following terms have been used within this document:

Term	Definition
ACCD	Alamo Community College District
CIO	Chief Information Officer
IP	Internet Protocol
IT	Information Technology
NVC	Northwest Vista College
PAC	Palo Alto College
SAC	San Antonio College
SPC	St Philip's College
SWC	South West Campus – St Philip's College

## Section 7. Revision History

The following document changes have been identified:

Version	Date	Name	Description
0.5	Nov 27, 2006	W Mosher	Initial Template Release
1.0	Feb 6, 2007	W Mosher	Final Test Plan