Software Product Specification

for the

General Purpose Automatic Test System (GPATS)

Common Instrument Controller (CIC)

GPATS-CIC System Software

B973049

Revision 02

September 12, 2019

Contract No.: W15QKN-14-D-0075

CDRL No. K002

Security Classification: Unclassified

Prepared for:

ARMY CONTRACTING COMMAND – NJ

PICATINNY ARSENAL, NJ 07806-5000

Prepared by:

Astronics Test Systems

12889 Ingenuity Dr.

Orlando, FL 32826

DISTRIBUTION STATEMENT C: DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTORS: OPERATIONAL USE, (1 April 2015), OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO PRODUCT MANAGER TMDE, CODE PMM-115.3.

Approvals

The following individuals approve this release.

|  |  |  |
| --- | --- | --- |
| Responsibility |  | Reviewer |
| Originator/Software Lead |  | Josselyn Webb |
| Project Officer-Software |  | Wallace Daniel |
| Eng and Dev Branch Supervisor |  | Alan Butterworth |

List of Revisions

|  |  |  |
| --- | --- | --- |
| **Revision** | **Reason for update** | **Release Date** |
|  |  |  |
| Rev 01 | Initial Release | 10 August 2017 |
|  |  |  |

Tailoring

This document is written in accordance with the Data Item Description (DID) DI-IPSC-81441A. The DID is tailored as follows:

1. Title page or identifier: Because this is a word processing document, there is no signature block on the cover sheet. The signers are listed on the Approvals page and the actual signatures are kept on file.

Table of Contents

[1 Scope 6](#_Toc490057848)

[1.1 Identification 6](#_Toc490057849)

[1.2 System Overview 6](#_Toc490057850)

[1.3 Document Overview 8](#_Toc490057851)

[2 Referenced documents 9](#_Toc490057852)

[3 Requirements 10](#_Toc490057853)

[3.1 Docs Folder 10](#_Toc490057854)

[3.2 Source Folder 10](#_Toc490057855)

[3.3 Target Folder 11](#_Toc490057856)

[3.4 Packaging Requirements 11](#_Toc490057857)

[4 Qualification provisions 12](#_Toc490057858)

[5 Software support information 13](#_Toc490057859)

[5.1 “As Built” software design 13](#_Toc490057860)

[5.2 Compilation/build procedures 13](#_Toc490057861)

[5.3 Modification procedures 13](#_Toc490057862)

[5.4 Computer hardware resource utilization 13](#_Toc490057863)

[6 Requirements traceability 14](#_Toc490057864)

[7 Notes 15](#_Toc490057865)

[7.1 Acronyms 15](#_Toc490057866)

# Scope

## Identification

This document applies to the computer software known as the **GPATS-CIC System Software**. It is identified with the following information.

Contract Number: W15QKN-14-D-0075

Program Name: GPATS-CIC

Supported Systems: AN/USM-657B(V)2

AN/USM-717(V)2

AN/USM-717(V)3

Source Code Media: 93006H0027

Version Number: (current)

## System Overview

The VIPER/T and TETS test systems are portable testers designed to detect and diagnose faults for a wide variety of line-replaceable units (LRU) and circuit card assemblies (CCA). The GPATS CIC is meant to replace the system controller laptop and docking station used on both of these test systems; specifically included are the TETS RF (AN/USM-657B(V)2), VIPER/T RF (AN/USM-717(V)2)and VIPER/T EO (AN/USM-717(V)3) systems. The GPATS CIC replaces the legacy system controller laptop and docking station, and the test asset circuit card assemblies contained in the legacy docking station have been newly selected for inclusion in the CIC computer. The specific hardware components of the system controller being replaced are: the Instrument Controller computer, the video capture CCA, the 1553 CCA, and the serial interface CCA. A new CAN bus interface CCA and a Quad port Ethernet CCA are being added. The MXI-2 interface and GPIB-488 circuit card assemblies will also continue to reside in the controller and will remain identical to those used in the legacy system controller. The following chart lists the specific manufacturers and part numbers for the assets:

|  |  |  |
| --- | --- | --- |
| **Asset** | **Common Interface Controller** | **VIPER/T Legacy Controller** |
| **Instrument Controller Computer** | PICMG 1.3 SBC with i7 processor in a “Lunchbox” style computer | Pentium M processor in a Laptop computer |
| **Gigabit Ethernet CCA** | Intel  i350-T4V2 | SBS Technologies  PMC-Gigabit-DT2 |
| **Serial CCA (232, 422, 485)** | Sea Level Systems  7404-2268-ET | Sea Level Systems  5102 |
| **CAN CCA** | TEWS Technology  TPMC806-10 | N/A (was in the VXI Carrier) |
| **1553 CCA** | Ballard  Lx1553-5/1MT | Data Device Corporation  BU-65569i1-300 |
| **Video Capture CCA** | Epix  PIXCI-A310 | Dalsa  PC2-Vision |
| **GPIB-488 CCA** | National Instruments  778032-01 | National Instruments  778032-01 |
| **MXI-2 CCA** | National Instruments  777185-01 | National Instruments  777185-01 |

Figure 1 – Controller Asset Comparison

Note that the operating system software used with the legacy controller was Windows XP. This software is now obsolete, and the GPATS CIC contract specifies Windows 7 – 64 bit as the required OS.

The GPATS CIC will be operated in conjunction with the legacy VIPER/T and TETS VXI hardware, ancillary equipment, and the power supplies in their current configuration. The GPATS CIC will control the hardware in a manner that is functionally identical to the legacy controller. The GPATS CIC system software will continue to allow operation of the test assets in both manual and automated modes. The system software will also continue to incorporate startup sequencing, runtime system monitors, confidence and self tests, system logs and a fault history database. The CICL communication layer will be implemented in the GPATS CIC system software for those same test assets as were implemented in the VIPER/T system software. The system source code for both the TETS and VIPER/T systems will be merged into a single software source tree, and a software program will be developed to determine and install the appropriate software items when creating an operational system.

The test station hardware is operated via the GPATS CIC, which is a ruggedized lunchbox style chassis having a PICMG 1.3 specification single board computer. All of the GPATS CIC system software executes on this computer. The computer uses a Microsoft Windows 10 – 64 bit operating system. The menus, stand-alone instrument software, and system utility programs are written and compiled using the Microsoft Visual Basic.NET and Visual C/C++ languages. Automated Test Program Set (TPS) software is written and compiled using TYX PAWS Developer’s Studio and the Abbreviated Test Language for All Systems (ATLAS) language. The ATLAS code may also call Non-ATLAS Modules (NAMs) that are written with Visual C. The TPSs will run on the CIC under the PAWS Run-Time System. As the original Visual Studio 6 Integrated Development Environment (IDE) used to develop and maintain the legacy software is now obsolete, all of the system software will be transferred to and compiled with Visual Studio 2012.

GPATS-CIC is produced for the Marine Corps Systems Command, Combat Equipment Support Systems, Test, Measurement, Diagnostic Equipment (TMDE) organization.

## Document Overview

This document describes the GPATS-CIC System Software deliverable through definition and reference. **Note that this document provides a general description of the software deliverable. A Software Version Description document, B973051, is written to provide the details on each particular release**.

Section 2 provides a list of the referenced documents. These documents provide additional details on requirements, design, plans, procedures, etc.

Section 3 describes the requirements for the software deliverable. This includes a reference to the list of executable and source files and a definition of the media on which they are delivered.

Section 4 describes, through references, the checksum method and other evidence used to establish the validity of a given release.

Section 5 describes, through references, how to re-build and maintain the software.

Section 6 describes, through reference, how the requirements map to the software.

This document and the GPATS-CIC System Software are UNCLASSIFIED.

# Referenced documents

The following documents are referenced elsewhere in this specification.

**Customer Documents**

|  |  |  |
| --- | --- | --- |
| Contract W15QKN-14-D-0075 |  | Contract Document |
|  |  |  |

**Government Documents**

|  |  |  |
| --- | --- | --- |
| DI-IPSC-81441A  December 15, 1999 |  | Data Item Description, Software Product Specification |

**Astronics Test Systems Documents**

|  |  |  |
| --- | --- | --- |
| B973051  Latest Revision |  | Software Version Description for the GPATS-CIC System Software (K003) |
|  |  |  |
| B973048  Latest Revision |  | Software Transition Plan (STrP) for the GPATS-CIC System Software (K004) |
|  |  |  |
| B973063  Latest Revision |  | System/Subsystem Design Description (SSDD) for VIPER/T (N003) |
|  |  |  |

Copies of the Astronics Test Systems Documents are available from the Astronics Test Systems Data Management Department, 12889 Ingenuity Drive, Orlando, FL 32826.

# Requirements

The GPATS-CIC System Software is written in accordance with the requirements established in the GPATS – Common Instrument Controller Performance Work Statement, and the Performance Specification for the Common Instrument Controller. As a general goal, the ATLAS RTS and Soft Front Panel implementation is intended to mirror the functionality of the VIPER/T version 1.2.1.0 for each of the supported system configurations.

The GPATS-CIC System Software Source Code is released on a single DVD. The DVD contains only the Source code. The DVD is organized into the following directory structure:

Docs

ATS\_SVD

Source

Core

ISS

RFMS

Software Build

TETS\_RF

Target

RootDrive

## Docs Folder

The “Docs” folder found on the system software source DVD will contain the appropriate SVD document for that release. Also, this folder will contain text files documenting the checksums for each file on each of the deliverable DVDs (System Source Code DVD, COTS Installation Programs DVD, and Emergency Software Recovery DVD). An installed programs comma separated variable file will be included which will document version information for programs installed on a fully configured Instrument Controller. Problem/Change Reports (PCRs) that remain open and those that have been closed will be included in appropriately named pdf documents. These various files and the methods for their creation will be described in the SVD document.

## Source Folder

The Source folder contains the entire system software source required to build the executables specific to the GPATS-CIC software. The Core folder contains all the source code associated with the system “Core” CSCI (e.g. System Monitor, Confidence Test, Self Test, System Menu, SAIS Toolbar, etc). The ISS folder contains all the source code associated with the system “ISS” CSCI (e.g. All of the SAIS panels (except the RF for both TETS and VIPER/T configurations), ATLAS WCEMs, etc). The RFMS folder contains all the source code associated with the RF SAIS panels and the RFMS server used with the VIPER/T RF hardware configuration. The Software Build folder contains the overall project file used to load and build the GPATS-CIC software project in the Visual Studio development environment. The TETS\_RF folder contains all the source code associated with the RF SAIS panels and the associated instrumentation for the TETS RF hardware configuration.

## Target Folder

The “Target” folder contains static files and folders that are required by the system software. These files are populated as-is on the target hard drive by the installer that is built when compiling the “Release” version of the System Software build.

## Packaging Requirements

The GPATS-CIC System Software Source Code is delivered on a DVD. The DVD label will contain the following information:

Program Name: GPATS-CIC

Test Station: AN/USM-657B(V)2

AN/USM-717(V)2

AN/USM-717(V)3

Part Number: 93006H0027

Contract Number: W15QKN-14-D-0075

Product Name: System Software Release - SSC

Version: (latest version)

Date: (date of latest version)

# Qualification provisions

The Software Version Description (SVD) document, B973051, will reference various text and pdf files located on the GPATS-CIC System Software Source Code DVD that will provide for full qualification of the released software. These files will lists a checksum and file names for each of the DVD media delivered for each specific release version. These files will also document any known or perceived documented software deficiencies (open PCRs) or implemented software corrections/improvements (closed PCRs). These various files and the methods for their creation will be described in the SVD document.

# Software support information

## “As Built” software design

The design of the GPATS-CIC System Software is given in the System/Subsystem Design Description document, B973063.

## Compilation/build procedures

The Software Transition Plan (STrP) document, B973048, describes how to install and use the System Source Code DVD, as well as how to convert the source code into new executable code. It also describes how to incorporate the executable files into a “Gold System” field installation image, known as GPATS-CIC System Software Release Emergency Software Recovery DVD.

## Modification procedures

The Software Transition Plan (STrP) document, B973048, describes how to install and use the System Source Code DVD, as well as how to convert the source code into new executable code. It also describes how to incorporate the executable files into a “Gold System” field installation image, known as GPATS-CIC System Software Release Emergency Software Recovery DVD.

## Computer hardware resource utilization

The initial GPATS-CIC software version (v2.0.0.0), computer hard drive and DVD space utilization is as shown. It is unlikely that future software releases would have considerable impact on the % utilization calculations below unless major software changes are made to this baseline. Note also that although various log files and databases may grow as the system is utilized, these files will have negligible effect on the % utilization of the GPATS-CIC hard drive.

For the GPATS-CIC system hard drive and its partitions:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Drive Letter | Drive Label | Used Space | Total Space | % Utilization |
| C | ATS\_SYS | 28.6 GB | 55.0 GB | 52% |
| D | ATS\_DATA | 0 GB | 17.5 GB | 0% |
| E | APS\_DATA | 0 GB | 39.1 GB | 0% |

For the GPATS-CIC System Source Code DVD:

|  |  |  |
| --- | --- | --- |
| Used Space | Total Space | % Utilization |
| 968 MB | 8.5 GB | 11.4% |

# Requirements traceability

A detailed requirement traceability matrix is provided in the First Article Test Procedures document, B973041.

# Notes

## Acronyms

|  |  |
| --- | --- |
| ASCII | American Standard Code for Information Interchange |
| ATLAS  ATS | Abbreviated Test Language for All Systems  Astronics Test Systems |
| CCA | Circuit Card Assembly |
| CDR | Critical Design Review |
| CDRL | Contract Data Requirements List |
| CIC | Common Instrument Controller |
| COM | Computer Operator’s Manual |
| COTS | Commercial-Off-The-Shelf |
| CPM | Computer Programmer’s Manual |
| DID | Data Item Description |
| DVD | Digital Versatile Disk |
| ESR | Emergency Software Recovery |
| FAT | Final Acceptance Test |
| GPATS | General Purpose Automatic Test Systems |
| IC | Instrument Controller |
| IDE | Integrated Development Environment |
| LRU | Line Replaceable Unit |
| N/A | Not Applicable |
| NAM | Non-ATLAS Module |
| OSDS | Operational Software Development Station |
| PAWS | Personal ATLAS Work Station |
| PDR | Preliminary Design Review |
| PS | Performance Specification |
| RF | Radio-Frequency |
| RTS | Run Time System |
| SDD | System Design Description |
| STrP | Software Transition Plan |
| SUM | Software User’s Manual |
| SVD | Software Version Description |
| TETS | Third Echelon Test System |
| TMDE | Test, Measurement, and Diagnostic Equipment |
| TPS | Test Program Set |
| TPSDS | Test Program Set Development Station |
| VS2012 | Visual Studio 2012 IDE |
| WCEM | Windows CIIL Emulation process |