Standard Operating Procedure

SOFTWARE PROGRAMMING

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CIMCON Software

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SIGNATURES

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REVISION HISTORY

Version	Effective Date	Description of Changes
A	23-Sep-1998	New Document
B	09-Feb-2000	Added a section for periodic code reviews.
C	19-Aug-2003	Added Microsoft .Net programming standards.
D	01-Jan-2005	Added monthly code review responsibilities for Module Leaders and review ranking.
E	09-May-2005	Added code review checklist and modified code review time to before unit testing. Added unit test case writing and unit testing at the development stage. Added role of product manager for approval.
F	01-Dec-2005	Added 6.1.5 for improvement in unit test cases. Changed the Document Number in section 2, Inputs for the Process for Project Plan.
G	11-Oct-2006	Code Review sampling plan has been added, Unit test case format (CSI-FRM-610) has been added. Reference for GUI Guidelines has been added.
H	11-Nov-2006	Revised SOP due to deletion of Internal Code review (CSI-FRM-040).
I	24-May-2007	Added responsibilities of Module leader / Sr. software engineer.
J	06-Sep-2012	Add reference 5.16,6.1.11,6.1.12

1. PURPOSE

The purpose of this document is to specify the procedures to be followed for programming and unit testing of all software developed for commercial release.

2. SCOPE

The scope of this document includes all software developed for commercial release.

3. DEFINITIONS

3.1.	Software	Software for Commercial Release
3.2.	Code	Code written to develop Software for Commercial Release
3.3.	QA	Quality Assurance
3.4.	Unit Test Specification	Contains unit test cases derived from structure of the code and the expected result derived from the functional behavior.

4. RESPONSIBILITIES

4.1. **Managers / Module Leaders / Developers:** It is their responsibility to follow this procedure in the development of all code, in writing Unit test specification and to perform the unit testing for the software intended for commercial release.

4.2. **Module Leaders:** It is their responsibility to ensure that this procedure is followed in the development of all software developed for commercial release, conduct reviews after programming to perform a structural verification of code, verify conformance to programming standards and review the unit test specifications written by the developer.

4.3. **Product Manager:** It is their responsibility to monitor & if required approve the unit test specification and have it reviewed by the respective managers.

5. REFERENCES

5.1. Programming Standard, Visual Basic Applications, CSI-STD-020

5.2. Programming Standards, C/C++, CSI-STD-030

5.3. Programming Standards, Java, CSI-STD-040

5.4. Programming Standards, Microsoft .NET Applications, CSI-STD-050

5.5. GUI Guideline Standards, CSI-STD-060

5.6. Training SOP, CSI-SOP-070

5.7. Code Review Checklist Form, CSI-FRM-500

5.8. Unit Test Specification Form, CSI-FRM-610

5.9. Software Requirement Specification, CSI-FRM-260

5.10. High Level Design Specification, CSI-FRM-270

5.11. Database Design Specification, CSI-FRM-280

5.12. Technical Software Design Specification, CSI-FRM-300

5.13. Master Project Plan, CSI-FRM-320

5.14. Project Plan – Bug, CSI-FRM-660

5.15. Project Plan – Enhancement / New Feature, CSI-FRM-670

5.16. Installable Checklist- CSI-FRM-640

6. PROCEDURE

6.1. Software Engineer

6.1.1. Determine the technical platform and programming environment for the software being developed.

6.1.2. Contact your Module Leader and obtain the appropriate CIMCON programming standards for the programming environment in which the software is being developed.

6.1.3. Follow the programming standards in the development of all code for the entire duration of the project. Contact the Module Leader in case of any questions. Programming standards can include, but will not be restricted to the following examples:

6.1.3.1. Naming Conventions

6.1.3.2. Variable Declarations

6.1.3.3. Named Constants

6.1.3.4. Annotation

6.1.3.5. Code Formatting

6.1.3.6. Coding Conventions

6.1.3.7. Message Boxes

6.1.3.8. Error Handling

6.1.4. Follow the GUI Guidelines as per CSI-STD-060 in Design and Development.

6.1.5. Developer shall perform code review of the developed code in Code Review Checklist CSI-FRM-500. After completion of the Code review, the same shall be given to Mangers / Module leaders.

6.1.6. Write the unit test specification as per Unit Test Specification (CSI-FRM-610) for each developed module. The Unit test specification shall be derived using the code and it shall cover all the possible paths of the code.

6.1.7. The Unit test specification shall also cover all possible functional and GUI related test cases.

6.1.8. After completion of the Unit test specification, it shall be reviewed or approved by the developer / module leader / manager and product manager.

6.1.9. After approval of the Unit test specification, the developer must create a copy of the same as the Unit test log. The Developer shall test all the modules according to test cases and write the result in the test log. In case any test case fails, all the related details shall be logged in the bug sheet of the test log.

6.1.10. Once the unit testing is completed, the developer shall discuss the bugs and its impact with the Managers/Module Leaders prior to fixing them. Once all the bugs are fixed, second iteration of unit testing shall be performed for all affected areas of the code as per the impact discussed.

6.1.11. Once the unit testing is completed, a draft installation procedure and installation checklist shall be created prior to releasing it to the testing team.

6.1.12. Update the master project plan for actual start and end date.

6.2. Module Leader

6.2.1. Obtain a copy of the programming standard corresponding to the technical platform and programming environment in which the code is being developed. Ensure that all software engineers on the project have easy access to the programming standard.

6.2.2. Ensure that all members of the development team have been trained on the programming standard, and that they have been assessed for their skills as well as understanding of the standard as per Training SOP, CSI-SOP-070. If not, schedule their training and/or assessment with the QA Team.

6.2.3. Ensure that the programming standard is being followed by all software engineers through direct interviews and periodic code reviews. Code review shall be done against code review checklist (CSI-FRM-500). Code review must be done before starting the unit testing. Conduct code reviews to ensure that the programming standards are being followed. New team members shall be monitored closely until they have gained proficiency with the standards.

6.2.4. Sampling shall be done for the Code Review based on the following criteria.

6.2.4.1. Functionality with higher impact shall be covered in sampling.

6.2.4.2. Client reported bugs should be covered in sampling.

6.2.4.3. Functionality developed from the developer with lower competency or with less product knowledge shall be covered in sampling.

6.2.4.4. Past records of the developer can be considered for sampling.

6.2.5. Review the Unit test specification developed by the developer and get it approved by the module leaders / managers / product manager. Make sure that the Unit test specification is appropriate and that expected results are correct as per the functional requirements.

6.2.6. Discuss the bugs and its impact after unit testing is completed. Also repeat the code review for the affected area of code by bug fixing.

6.2.7. Review the unit test log generated by developer and get it approved by module leaders / managers / product manager.

6.3. Product Manager

6.3.1. Approve the Unit test specification developed by the developer and reviewed by the Module Leaders / Managers.

6.3.2. Approve the Unit test log filled by the developer and reviewed by Module Leaders / Managers.

6.3.3. Ensure that on product release, the documentation and deliverables from VSS server Development work folder are moved to CIMCON Repository and Releaseserver respectively.

7. POLICY

7.1. Programming standards must be followed in the development of all the software.

7.2. Unit testing must be performed for all the software.

7.3. GUI Guidelines must be followed for all the software.