# Software Requirements

**Objectives**: Prepare the OpenETran program for release under an open-source license, archived in a public source code repository. Update OpenETran and interface it with IEEE Flash, so that other developers may contribute and anyone may use the program.

1. The OpenETran software shall run in both 32-bit and 64-bit versions on Windows XP or later.
2. The OpenETran software shall not use any commercial third-party components.
3. Microsoft Visual Studio 2010 shall be used for development.
4. The open source license type shall be GPL version 3.
5. The open source GNU Scientific Library (GSL) version 1.15 shall be used for linear matrix solutions and eigensystem solutions.
6. The software shall write waveforms in comma-delimited text, tab-delimited text, and the existing binary ELT formats.
7. The software shall support a text-based console execution mode.
8. The software shall support execution from Microsoft Excel Visual Basic for Applications, version 2007 or later. In particular, IEEE Flash shall be modified to invoke OpenETran simulations.
9. IEEE Flash shall be modified to produce OpenETran models from user inputs on pole/tower, surge arrester, grounding, conductor, span, and environment worksheets in Excel.
10. IEEE Flash shall be modified to accept critical current, arrester duty, phases flashing over, and other numerical outputs from OpenETran.
11. The OpenETran software shall be tested and verified to produce matching outputs in console mode, for 27 existing test cases from the EPRI LPDW project.
12. The OpenETran / IEEE Flash package shall be tested on 3 cases:
    1. 15-kV wood crossarm line, from IEEE Std. 1410
    2. 35-kV wood pole structure with overhead shield wire, from IEEE Std. 1410
    3. 13.8-kV line with line arresters, from Chapter 14 of “Insulation Coordination for Power Systems” by A. R. Hileman, which contains both analytical results and ATP simulation results.
13. OpenETran shall be incorporated into the IEEE Flash installer.
14. A separate installer shall be provided for a standalone version of OpenETran.
15. The software documentation shall include:
    1. Updated software requirements
    2. Design documentation with UML package diagram, UML class diagrams, a UML sequence diagram for critical current estimates, and supporting narrative
    3. Build instructions and make files
    4. Change log, which is derived from Subversion file check-in comments
    5. Updated license file, release notes, and OpenETran user manual as needed
    6. Test case document, including instructions to run the test cases and expected results