**CSA MATLAB Function Requirements**

Each CSA MATLAB function shall…

1. Be self contained within 1 MATLAB .m file and
   1. Have a header section with
      1. A short, one line description

Rationale: Required for generating an ‘at-a-glance’ contents list.

* + 1. Proper distribution markings stating the function is unclassified, ITAR controlled, and Northrop Grumman Proprietary Level I
    2. A full function description
    3. A ‘Syntax’ section that shows all possible methods for calling function
    4. An ‘Inputs’ section that describes each function’s input
       1. Each input shall have its size/dimensions clearly stated
       2. Each input shall have its units clearly stated
       3. Each input shall have a short description
       4. If the input is option (e.g. there is a set default if it not defined), that default value must be stated
    5. An ‘Outputs’ section that describes each function’s output
       1. Each output shall have its size/dimensions clearly stated
       2. Each output shall have its units clearly stated
       3. Each output shall have a short description
    6. A ‘Notes’ section that allows room for any additional function information, such as equations of interest, internal functions utilized, assumptions, and/or further breakdowns and descriptions of select inputs or outputs.
    7. An ‘Examples’ section that provides at least one example use of the function with expected results
    8. A ‘Source Documentation’ section with the full citation of any books, journals, and/or websites utilized in developing the function
    9. A ‘Hyperlinks’ section with MATLAB links to the function itself, the function’s standalone test driver script, and the function’s standalone documentation.
    10. A ‘See also’ section for quick hyperlinks to any other related function
    11. A TortoiseSVN keywords section to show where this function is version controlled and who has last edited it.
  1. Have a footer section with the following fields
     1. A revision history breakdown with a list of the file’s changes as a function of date and person
     2. A full ITAR distribution paragraph
     3. A copy of the proper distribution markings stating the function is unclassified, ITAR controlled, and Northrop Grumman Proprietary Level I
  2. Use the CSA function ‘CreateNewFunc’ to generate a blank function template with all necessary documentation fields listed above

1. Have an associated verification MATLAB .m script called ‘Driver\_<Function>.m’ that
   1. Has a header section with
      1. Proper distribution markings stating the function is unclassified, ITAR controlled, and Northrop Grumman Proprietary Level I
      2. A short description of the function being fully tested
      3. A TortoiseSVN keywords section to show where this function is version controlled and who has last edited it.
   2. Has a main body with multiple examples of sample function calls, including
      1. At least one example showing simple usage of the function
      2. At least one example that sweeps the function for a variety of inputs such as angles or vectors
      3. If the function has a couplet (e.g. eul2dcm and dcm2eul), at least one example that verifies the function’s inputs can be recovered by going from A to B and then back to A
   3. Use the CSA function ‘CreateNewScript’ to generate the a blank verification driver script with all necessary documentation fields listed above
2. Have standalone documentation that
   1. Contains
      1. A screen shot of the function’s header with internal documentation
      2. A breakdown of all files associated with the creation, verification, and documentation of the function
      3. A full description of any reference data associated with the function such as coordinate systems, equation derivations and/or initialization and build-up scripts
      4. A short description of what the ‘Driver’ verification script is and how to use it
      5. The results of each ‘Driver’ verification test case including checks with hand calculations (when applicable)
      6. Screenshots of error messages created when the function is called incorrectly
   2. Uses a documentation template like ‘MATLAB Function Documentation Template.pptx’ to help ensure that the required documentation fields are addressed