Preparing a Design for Finite Element (FE) Analysis

The following document has been prepared for product managers, entrepreneurs and inventors with technical backgrounds, and product designers. The checklist assumes that a 3D CAD model has been created.

Information Required by the Analyst

Does each part and/or assembly have a unique identifier? (e.g. a part number, or name)	
Is the CAD model current? If Applicable, does it match what is to be built/tested?	
If the CAD model has been modified, has the analyst been notified?	
Have materials been specified (e.g. 6061-T6 aluminum)	
Is hardware such as screws/nuts/washers in the load path included in the model?	
Are material thicknesses up-to-date?	
Is there joinery not captured in the CAD model that should be conveyed? (welds, etc)	
What are the load requirements? (e.g. magnitude and type (shock, vibration, static, etc)	
What safety factor is required and what is considered a failure? (e.g. yielding, deflection, etc)	
What type of abuse loads should be considered?	
What are the boundary conditions? (e.g. how does it interface with other components and/or the environment?	
If applicable, what regulations must be met?	
Should the materials' mechanical properties be degraded to account for environmental factors (e.g. due to heat/cold, sun (UV degredation), salt (corrosion))	

Questions to Ask the Analyst

What assumptions have been made that could affect the analysis results?	
Are you missing any information from me?	
Does any component-level testing need to be performed in order to calibrate the FE model?	
At what level of detail has COTS hardware been modeled? (e.g. latches, screws/bolts, etc.)	
If COTS hardware is modeled rigid, is this reasonable? Do we need to capture deformation?	
Does the analyst's FE model match our current design?	
If testing, does the FE model match what is being tested?	
If testing, does the test specimen match our internal CAD model?	
If testing, if the FE model does not match the test specimen, how will this affect FE results?	
Have worst case tolerances that may affect the design's strength or function been considered? (e.g. mat'l thicknesses, mechanical properties, etc)	
Has fatigue (cyclic) type loading been considered?	
Are there areas of the design that show localized stress that may lead to cracks?	