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to: John Q. Customer

CC: Prof. R. M. Brannon

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subject: "FEM analysis of the meaning of life with generalized boundary conditions"
(Progress on time-line tasks)

Promised tasks and their due dates are summarized in **attachment #1**. Accomplishments since the last memo are summarized below:

PAST

- The compiler settings recommended by the Cade lab (see Jan. 28 status memo) have now been applied.

- As you requested last week, continually updated draft versions of the final report and presentation slides are now available upon request.

- The earlier noted failure of the model to reproduce analytical results for inelastic compression of a helix (see Feb. 19 status memo) has been resolved. As detailed in **attachment #2**, running a much simpler single-element test has revealed that the model must have the "zeta" parameter set to a nonzero value. Correcting this oversight in the helix simulation led to agreement with theory with an L_2 error at machine precision.

PRESENT

- A literature review has been completed to determine a realistic (nonzero) value of the "zeta" parameter. The value recommended by the manufacturer (see **attachment #3**) will be used.

- For the final simulation of thermal cycling of the computer motherboard, two kinds of meshes have been created (see **attachment #4**). The mesh generator for quadrilateral mesh produced several elements with unacceptably large aspect ratios, so we are currently developing a Matlab code to regularize the mesh. A triangular element mesh has been created as a fall-back option.

FUTURE

The project is currently on schedule. However, our software vendor recently filed for bankruptcy, which will cause delays in producing graphics for the final presentation. Also, our graduate research assistants have been spending considerable time on their Advanced Finite Elements assignments (which could ultimately accelerate our progress, but is currently delaying Ansys results). Strategies for dealing with these potential setbacks will be discussed in the next status memo.

Attachments:
(1) Project timetable and checklist of accomplishments to date
(2) Single element verification test methodology and results
(3) Material property data sheet from the XYZ solder manufacturer.
(4) Quadrilateral and tetrahedral meshes for simulation of thermal cycling of solder connections in the "Deep Thought" computer motherboard.