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To: The AGMA Foundation

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Subj: *Second Progress Report on the Project "Documentation of Technology to Enable Accurate Determination and Diagnosis of Gear Vibration/Noise Generation Caused by Gear Manufacturing Errors"*

Performance Period: 26 February 2009 – 26 May 2009

During the first reporting period a detailed overall plan for the book was developed, and briefly described in the progress report for that period. The book chapter titled "Parallel-Axis Involute Gears" also was completed during the first reporting period.

During the current reporting period, the chapter titled "Mathematical Representation and Measurement of Working-Surface Deviations" (from equispaced involute surfaces) was written. Topics in this chapter include the additive nature of transmission error contributions, the tooth-working-surface coordinate system, description of dedicated gear measurement capabilities, working-surface representation obtained from line-scanning measurements, examples of such working-surface representations, a general method for estimating the required number of line-scanning measurements for transmission error predictions, and a method for estimating the required number of line-scanning measurements for cases of known ghost-tone rotational-harmonic numbers.

The above-described chapter is the gear-metrology foundation for the remainder of the book. It describes how parallel-axis helical and spur gears can be measured using currently-available computer-numerically-controlled (CNC) gear measurement equipment, and how these measurements need to be mathematically represented to enable computation of transmission error contributions.

The next chapter to be written will describe how the rotational-harmonic spectra caused by gear manufacturing deviations are computed from the above-mentioned gear-tooth working-surface measurements.

I want to emphasize that completion of this book is my number-one interest.