Closing the loop in IC Design for Manufacture; the missing link.
TEA *Systems* Announces the first toolset employing
Precise Process **Behavioral Models**^{TM} of reticles
for wafer fab-specific perturbations in sub-65 nm node lithography

Web Version
see also: **The Predictive Metrology Market**
Technical discussion: **OPC Behavior Models**

Allentown, PA (USA). November 1, 2006 -- A new and revolutionary capability for quickly achieving and maintaining high performance device yields was introduced today when TEA Systems Corporation announced the development of the industry's first toolset for the precise optimization of photomasks and reticles tuned for robustness to fab-specific processes. **Precise Process Behavioral Models™** are functional for all Inverse Lithographic and Optical Proximity Correction (OPC) structures.

Rather than simply looking for "hot spots" where defects may occur, Process Behavioral Models extend the functional yield capabilities of simulation assisted design to enable the selection of process tolerant alternatives that result in improved production stability and greater yields of high-performance devices. In addition to providing the missing performance characteristics needed for advanced OPC optimization, the results can be used for "what-if" scenario investigations to bridge the gap between the OPC physical model and the physical resist model. Behavioral Models can also be employed within the process for control, tuning and optimization.

Profitable introduction of each new device requires the wafer fab to minimize the development ramp-time and then to maintain high yields of high-performance parts during volume production. The greatest challenge in achieving this goal in an advanced technology node is the increase in process variability encountered with each new generation and the enhanced sensitivity of the design to the unique production characteristics specific to the end-user's process.

For the previous two decades engineers have relied upon classic process-window analysis methods for exposure setup. The poor accuracy of this method for design characterization has driven the development of software-based simulations of the aerial image. Recent full-chip, hardware enhanced and inverse-lithographic design simulations now recognize the need for calibration of the simulation to simple focus and dose process variations. However the current state of simulation technology cannot anticipate the extensive range of perturbation signatures present in the final chip image that characterizes the unique process and toolset of each wafer fab.

Fab-specific variances are significant and can contribute 40% or more of the systematic error-budget embedded into the final photoresist image. Unlike simulations that may only employ a simple process-window analysis for calibration, **Precise Process Behavioral Models™** incorporate the variance of the process, bake, scan-mechanical and optical perturbations of the user's unique lithographic environment.

The analysis can be performed using existing product reticles or specialized test vehicles that characterize the full range of process image perturbations. Results from the analysis not only characterize the behavior of each structure-design but breakdown it's sensitivity to each fab-specific and generic perturbation. The mask-design can therefore be tuned with greater accuracy for either general industry release or to enhance yields for the user's specific process.

The Weir Software Suite is a family of windows-based tools that provide a powerful interface for empirical modeling of lithographic process perturbation signatures. **Precise Process Behavioral Models™** models recently added to the software allow alternative device feature design iterations to be comparatively modeled and evaluated for their response to all variance encountered in the target lithographic process.

Terrence Zavecz, president of TEA Systems, commented, "Maintaining profit levels for advanced node chip designs requires more than functional device fabrication. Like every person, each wafer fab is unique. Unlike human characteristics, the idiosyncrasies of each fab can be quantified with TEA Systems tools. OPC designs that are aware of and tuned to the full spectrum of the wafer fab's unique characteristics result in higher, more stable production yields and greater profits from high performance parts. Our introduction of the Precise Process Behavioral Models™ models provides a critical link between simulation and the real-world manufacturing process that allows current production to cope with the reduced margins the industry will encounter in the next decade."

About TEA Systems

TEA Systems, a privately held corporation since 1988, specializes in advanced, intelligent and adaptive modeling of the photomask, semiconductor process and it's toolsets. Products from TEA allow the user to decouple process, tool and random perturbations for enhanced process setup & control.

TEA Systems products include:

Weir PSFM: Full-wafer/field/scan analysis tool for FOCUS derived from proprietary defocus sensitive features.

Weir PW: Reticle/Full-wafer/field/scan/process data modeling for any metrology with advanced process window capabilities. Product is capable of addressing both wafer and photomask process control.

Weir DMA: Macro Automation interface for Weir PSFM and Weir PW for external calling, automated data gathering or one-button analysis of commonly used sequences. Includes data trending.

See us at http://www.TEAsystems.com for a free demonstration or evaluation.

News and Information: http://www.TEAsystems.com/NewsReleases.htm

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