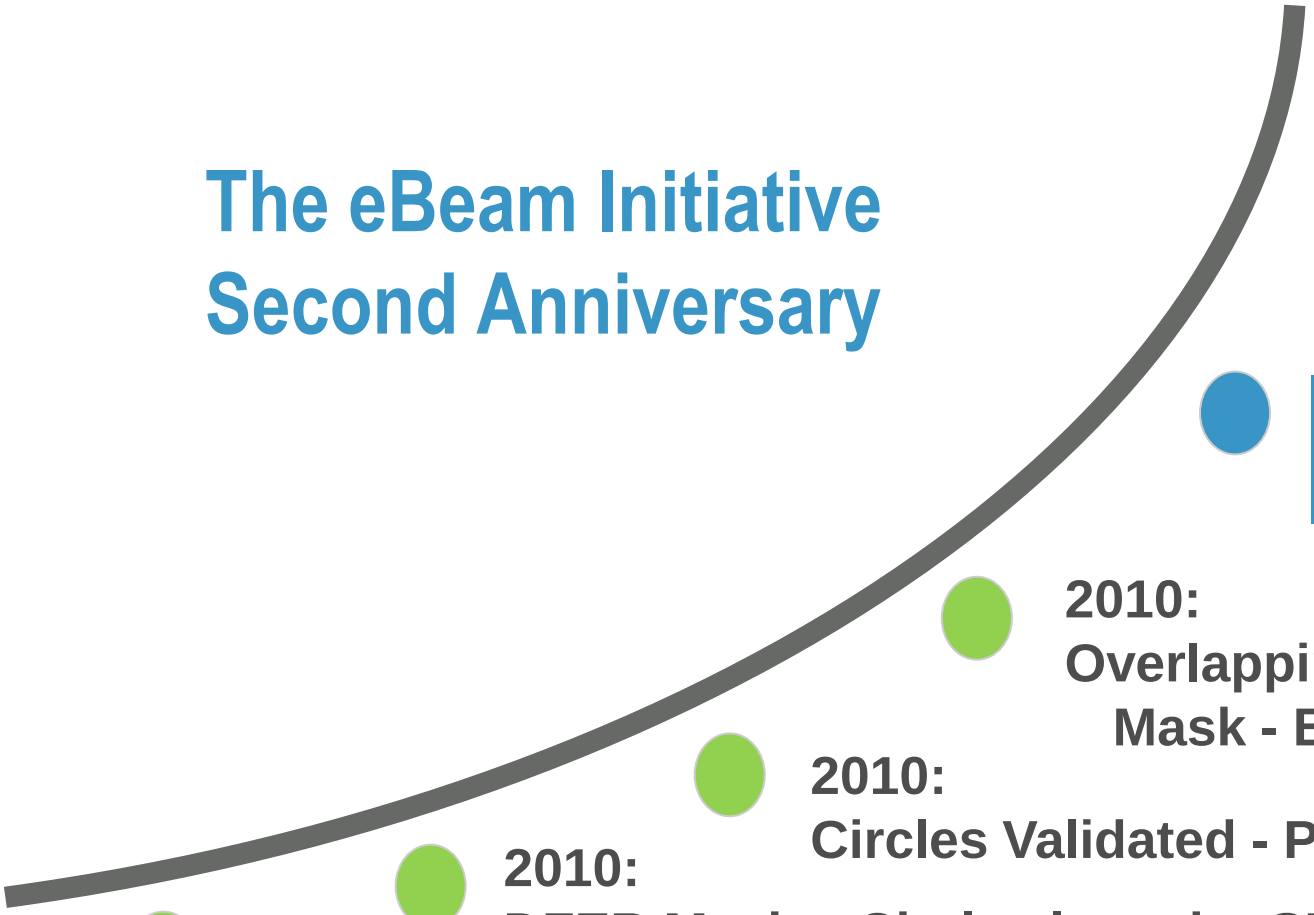

eBeam
Initiative

eBeam Initiative Luncheon

SPIE - March 1, 2011

Aki Fujimura
CEO – D2S, Inc.
Managing Sponsor – eBeam Initiative

The eBeam Initiative Second Anniversary



2009:
eBeam Initiative & DFEB Direct Write launch - SPIE

2010:
DFEB Mask + Circles launch - SPIE

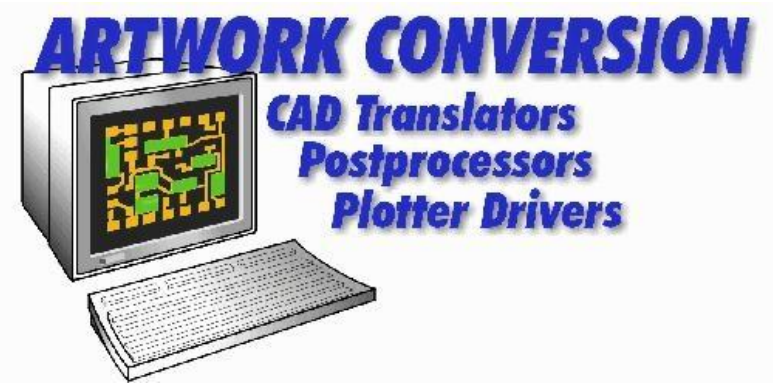
2010:
Circles Validated - PMJ

2010:
Overlapping shots + DFEB Mask - BACUS

2011: DFEB Mask Proof Points

2012: Multiple Supply Chains "DFEB ready"

Welcome to New Members at SPIE 2011



NCS

Grenon Consulting

XILINX®

36 Member Companies & Advisors

eBeam Initiative

www.ebeam.org

aBeam technologies

ADVANTEST

ADVANCED MASK TECHNOLOGY CENTER

Altos Design Automation

Calchip

ARTWORK CONVERSION
CAD Translators
Postprocessors
Plotter Drivers

cadence

D2S

DNP Dai Nippon Printing

EQUIcon

eShuttle

eSilicon

FASTRACK DESIGN

Jack Harding
eSilicon

Fraunhofer CNT

FUJITSU

GenISys

GLOBALFOUNDRIES

Grenon Consulting

HOYA

JEOL

Colin Harris
PMC-Sierra

KLA-Tencor
Accelerating Yield

cea leti

MAGMA

NCS

NuFlare

PETERSEN ADVANCED LITHOGRAPHY INC.

SAMSUNG

SYNOPSYS

Riko Radojcic
Qualcomm

Tela Innovations

TOOL

Jean-Pierre Geronimi
ST

TOPPAN

Vistec

XILINX

Today's Speakers

- **Impact of Mask Writer Throughput on Optical Lithography for 22 nm and 14 nm**
  - Thomas Faure, Mask Process Development Engineering – IBM
- **Using MB-MDP, a DFEB Approach, Enhances Mask Accuracy**
  - Aki Fujimura, CEO – D2S, Inc.
- **NuFlare EBM-7000 Support for MB-MDP**
  - Takashi Kamikubo, Mask Lithography Engineering – NuFlare
- **Q&A**

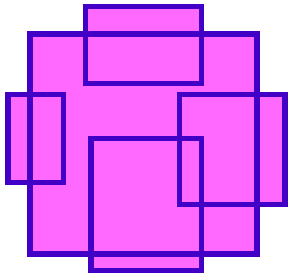
Using MB-MDP, a DFEB Approach, Enhances Mask Accuracy

Aki Fujimura
CEO - D2S, Inc.

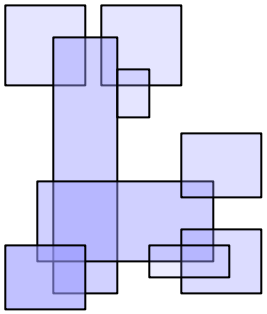
MB-MDP Uses Three Unique Techniques

Delivers Improved Shot Count, Process Window and Built-In MPC

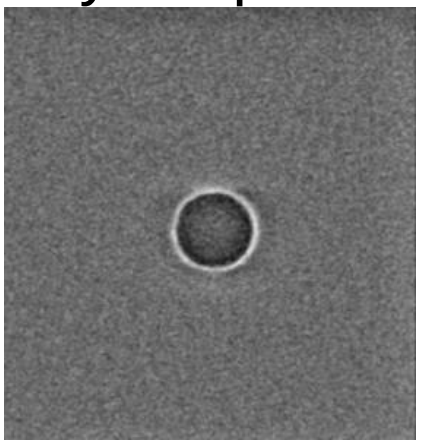
Overlap Shots



Assign Dose for Each Shot

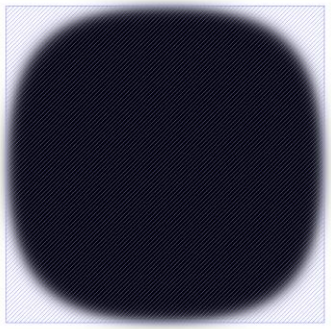
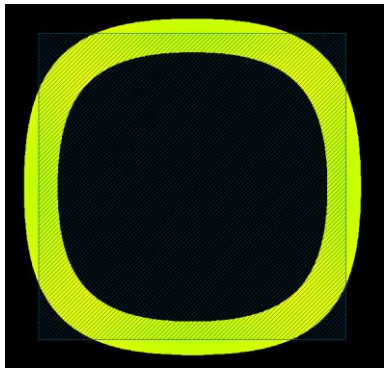
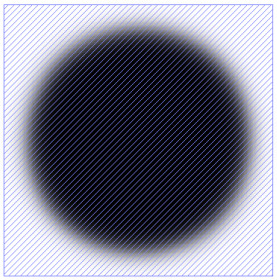
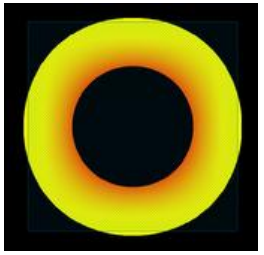


Circle Shots (or any shape shots)

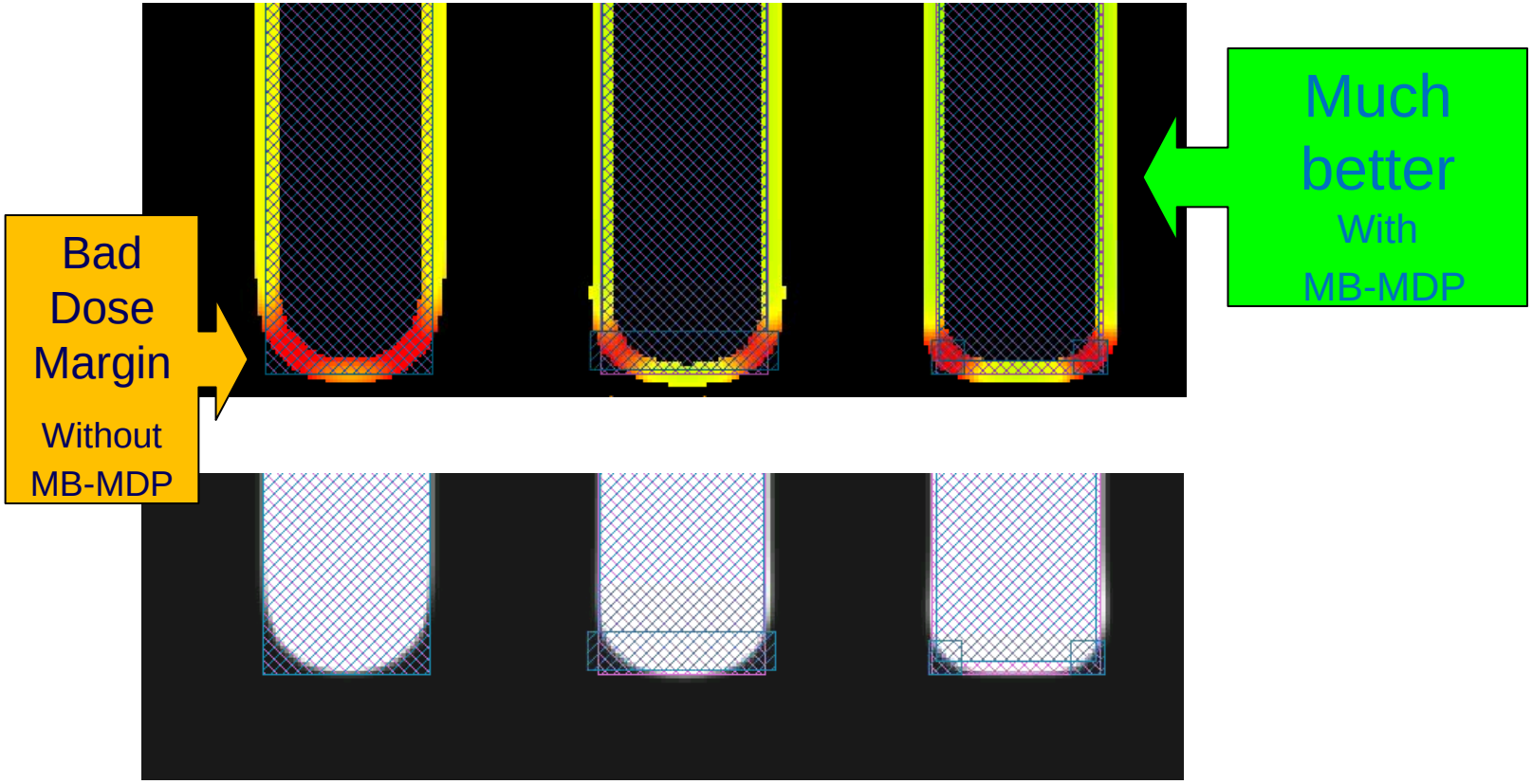


U.S. Patent 7,579,606; 7,747,997; 7,754,401; 7,759,026; 7,759,027, and other patents pending***, D2S, Inc***.

E-Beam Writing is No Longer “Faithful”

Shot Size	Exposed Resist	Edge Slope
100 nm		
60 nm		 Bad Edge Slope

Example: MB-MDP Enhances 80-nm L:S



Members Collaborate on Proof Points

- **Refer to conference papers at www.ebeam.org for other proof points:**
  - MB-MDP is effective with overlapping VSB shots *without* dose modulation
  - Overlapped shots work with PEC, LEC, FEC
- **Questions answered at SPIE 2011 with NuFlare and D2S:**
  - Is heating effect an issue with overlapping shots?
  - Can MB-MDP be deployed on the EBM-7000?

Thank You to Members for Your Contributions

- Membership in the eBeam Initiative grows to 36
  - Artwork Conversion, NCS, Grenon Consulting, Xilinx
- D2S MB-MDP improves mask accuracy
- NuFlare Technology e-beam writer EBM-7000 supports MB-MDP with extra option; No outstanding production issues
- SPIE papers presented by eBeam Initiative members
  - Advantest, D2S, EQUIcon, Fraunhofer-CNT, NuFlare, Vistec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