

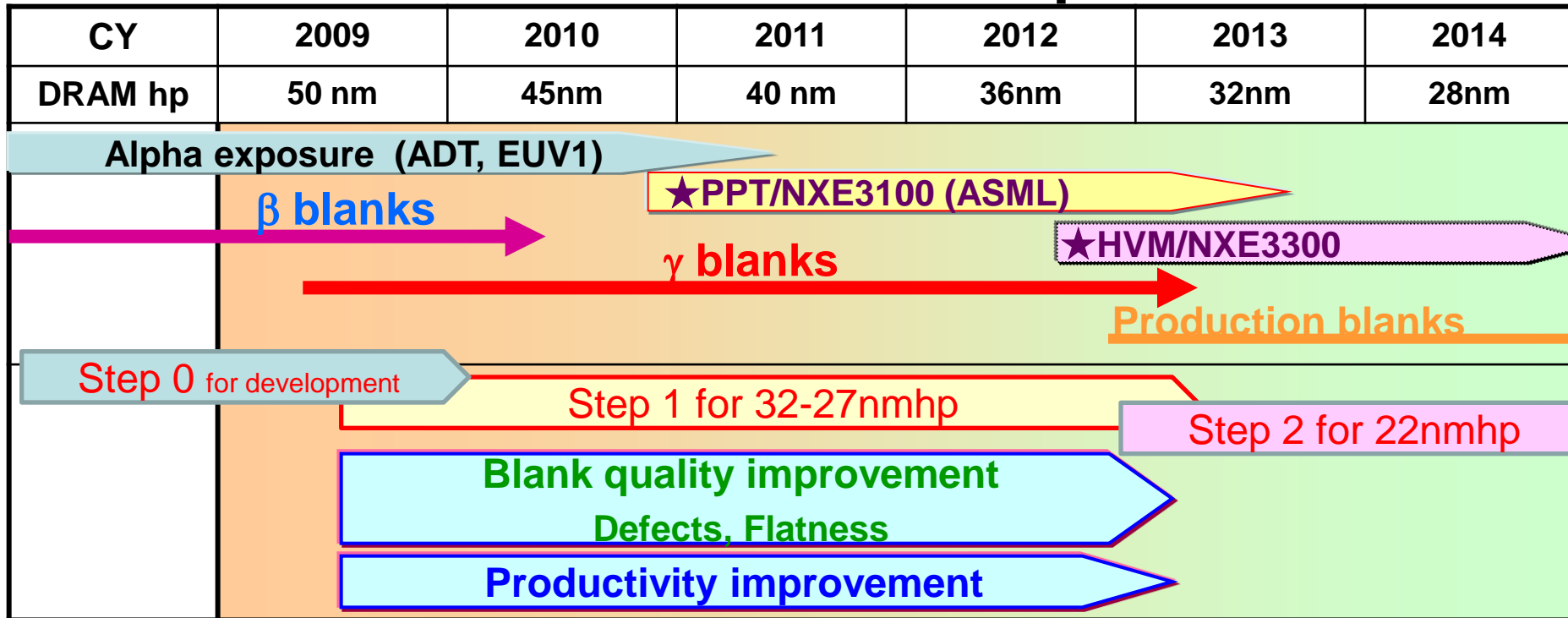
Fiducial mark development

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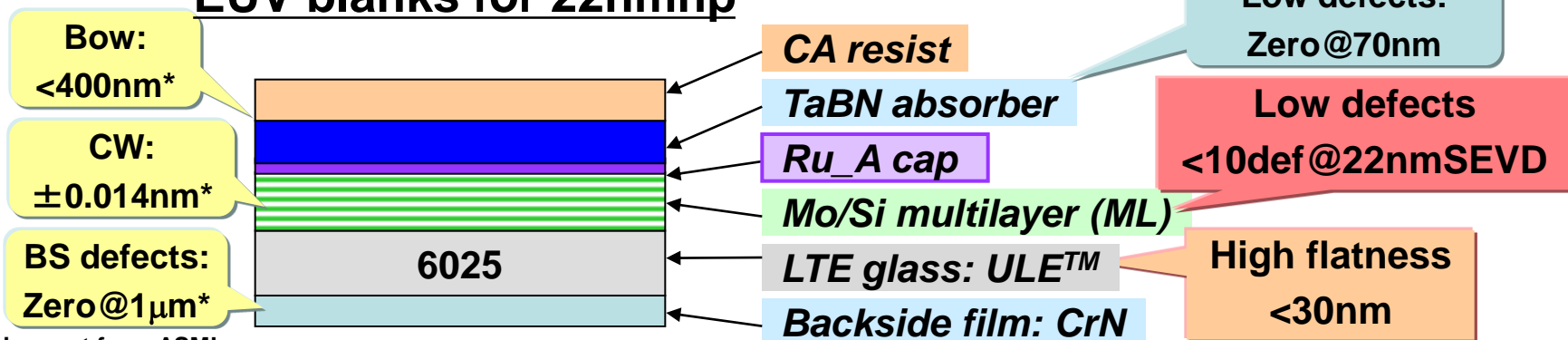
HOYA Corporation, Blanks Division

- EUV blank roadmap
- Fiducial mark process development
 - Introduction
 - Status and plan

EUV blanks roadmap

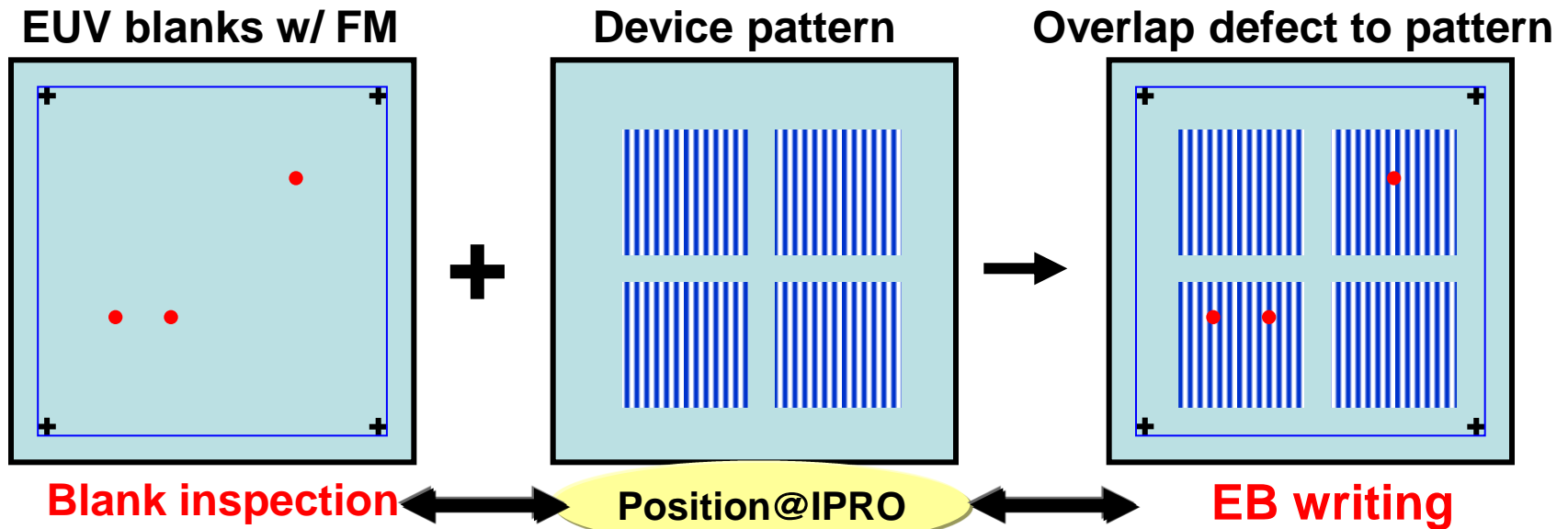


EUV blanks for 22nmhp



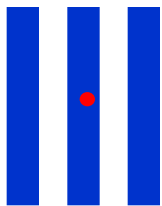
* Requirement from ASML

Defect mitigation process w/ Fiducial mark



Position accuracy required in defect mitigation

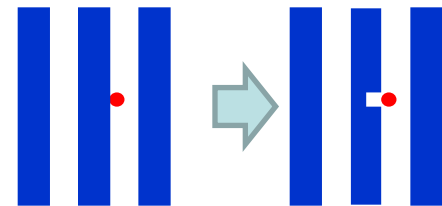
Acceptable max position shift to completely hide a defect



hp	Acceptable max shift (nm)	
	50nm defect	30nm defect
32nm	78	98
22nm	38	58
16nm	14	34

Defect repair process

Needs high contrast on FM in repair tool and EUV-AIMS



➤ Needs high overlay accuracy of <38nm for 50nm defects at 22nmhp

Fiducial mark process development

EUV blank w/ FM

1) Sub-FM

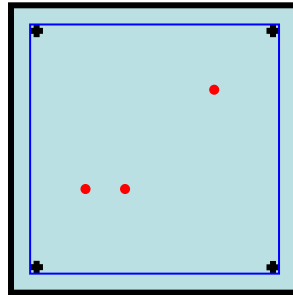


2) ML-FM



- ✓ High mark contrast
- ✓ Nearly zero defects
- ✓ Process easiness (High productivity)

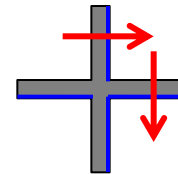
***Blank inspection
[M1350, Teron610]***



***Position repeatability
to FM
Position accuracy
to IPRO***

High position accuracy

***EB writer
[EBM, JBX]***





***Position repeatability
in EB scan***

High position accuracy

Optimize mark size (width and depth)

➤ Needs optimum FM process for future volume production

Fiducial mark process status and plan

	Substrate-FM 	ML-FM 
Process easiness	Details will be presented at poster session on Feb. 15th Please visit poster presentation [8322-115]	
Defect		
Mark contrast		

- **HOYA has two kinds of FM processes**
 - **Will optimize FM process for volume production in 2012**
- **Position repeatability in Teron is less than 100nm**
 - **Position accuracy in BI and in EB writer should be improved**
- **Target would be overlap accuracy within 30nm**
 - **Collaboration work with tool suppliers is progressing**