

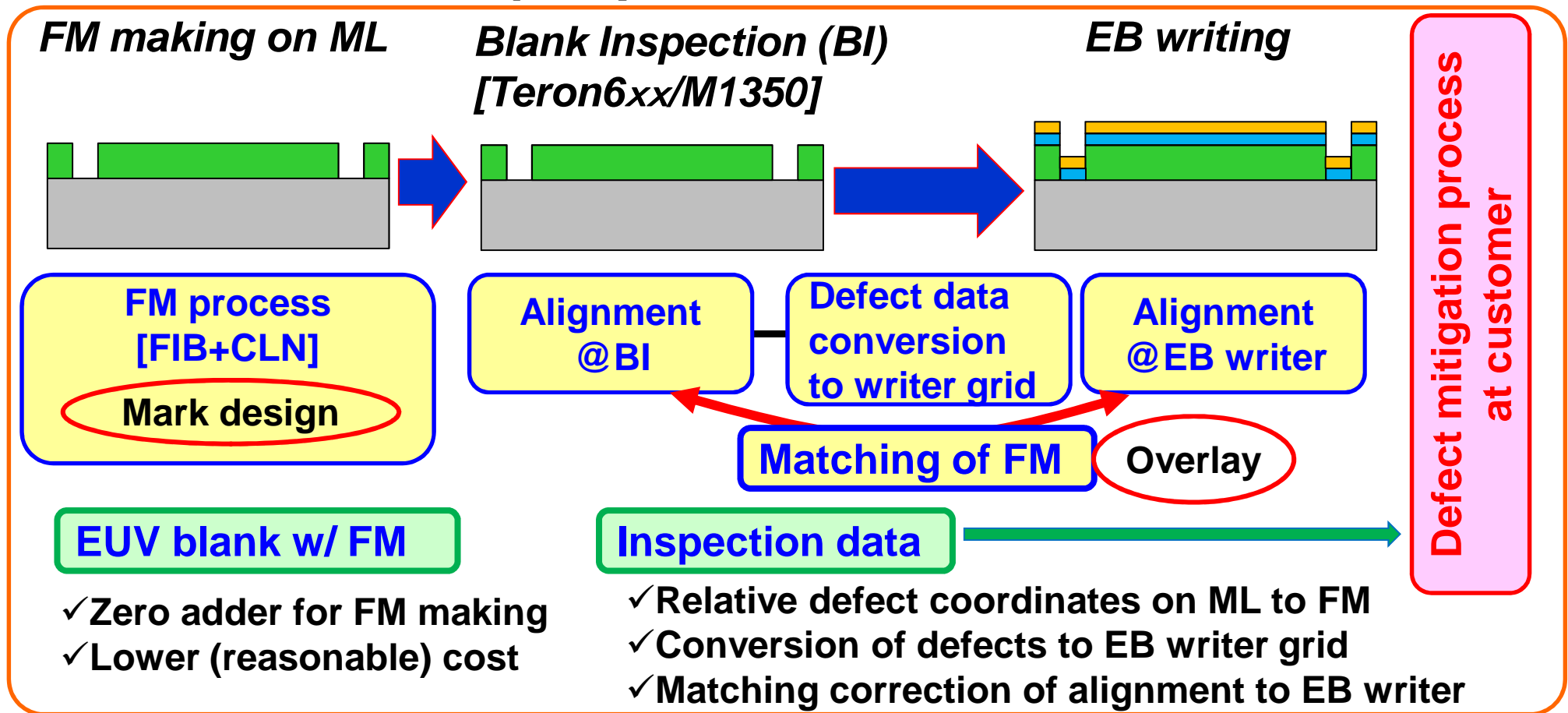
Fiducial Development Status at HOYA

Tsutomu Shoki

Blanks Division, HOYA Corporation

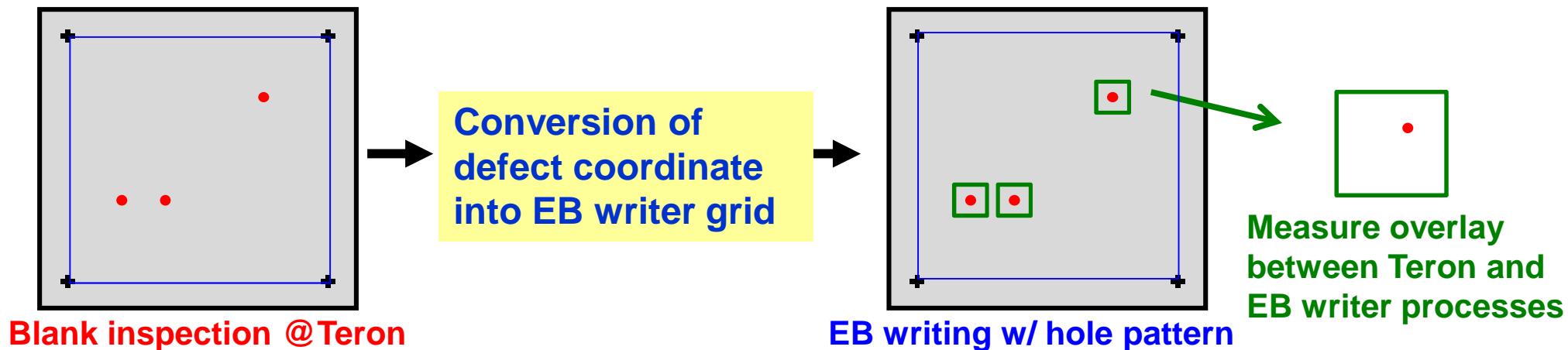
- ◆ **Fiducial mark development work**
- ◆ **Status of overlay test and Plan**
- ◆ **Summary**

Fiducial mark (FM) process development work

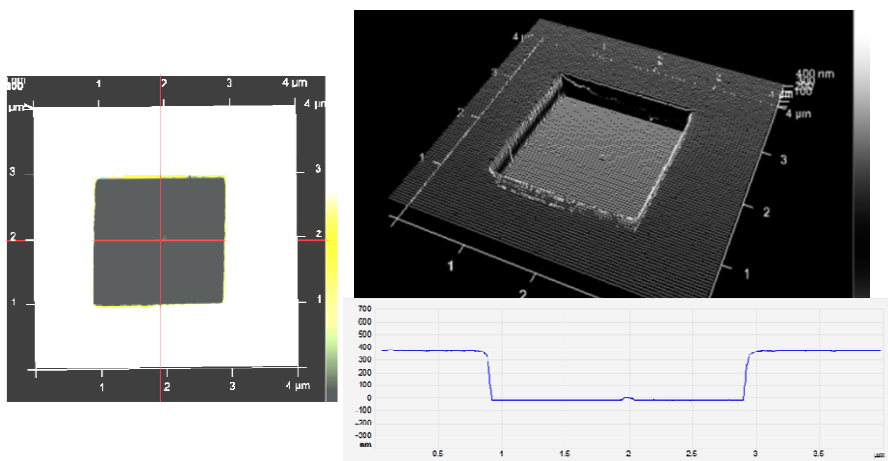


- HOYA demonstrated total FM process using HOYA's original FM
 - The details will be presented on Feb. 26th at SPIE2013
- There are three issues toward volume production
 - Position accuracy (Overlay), Blank cost and Mark design

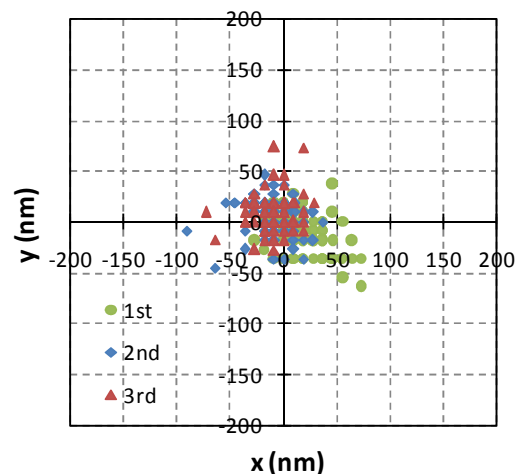
Demonstrated overlay of defects between Teron and EB writer



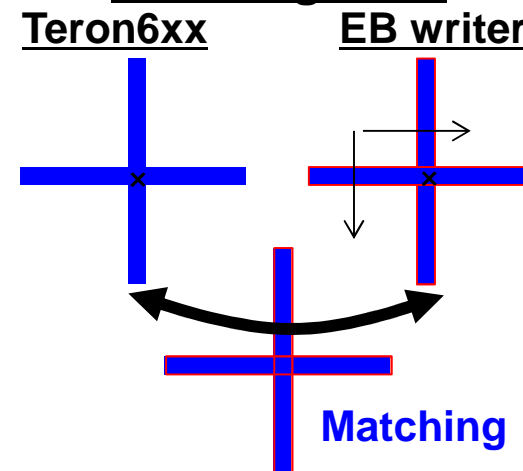
Overlay of defect



Position accuracy



Matching error

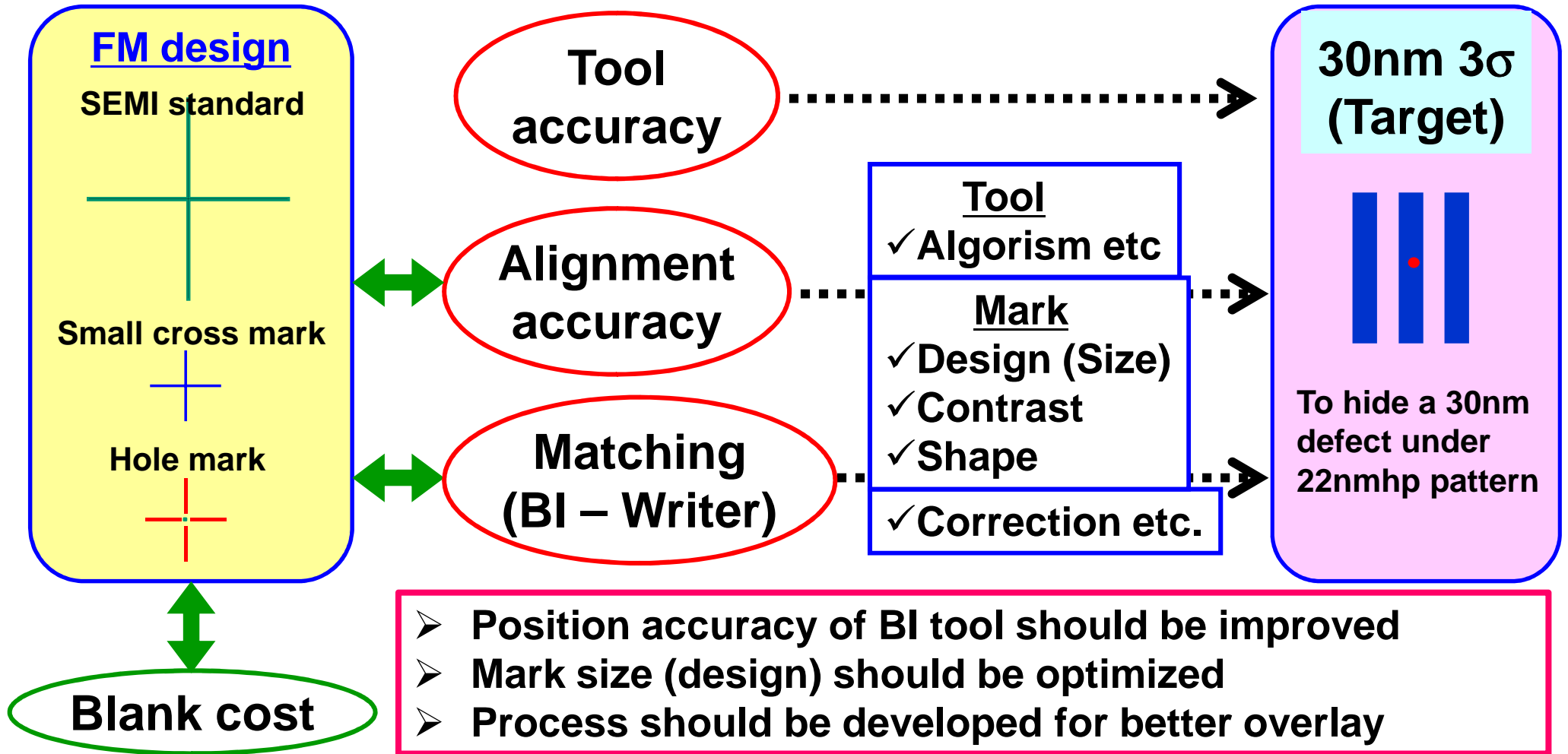


Overlay error = Position accuracy + Alignment accuracy + Matching error

Needs more development toward 30nm accuracy

Current status: * * nm

Optimization/Improvement



Summary

- **HOYA has demonstrated fiducial mark (FM) process through Teron inspection and EB writing processes**
 - **We have started to supply an EUV blank with FM for defect mitigation process at customer**

- **More development and optimization are needed for achieving total position accuracy of 30nm**
 - **We will optimize mark size and alignment process achieving 30nm position accuracy toward production**
 - **Collaboration work with tool suppliers and mask makers is very important**

- **We have no proposal to change current SEMI standard at present stage**
 - **We are evaluating several kinds of marks in development phase**