

EUV Mask Layout and Handling Areas

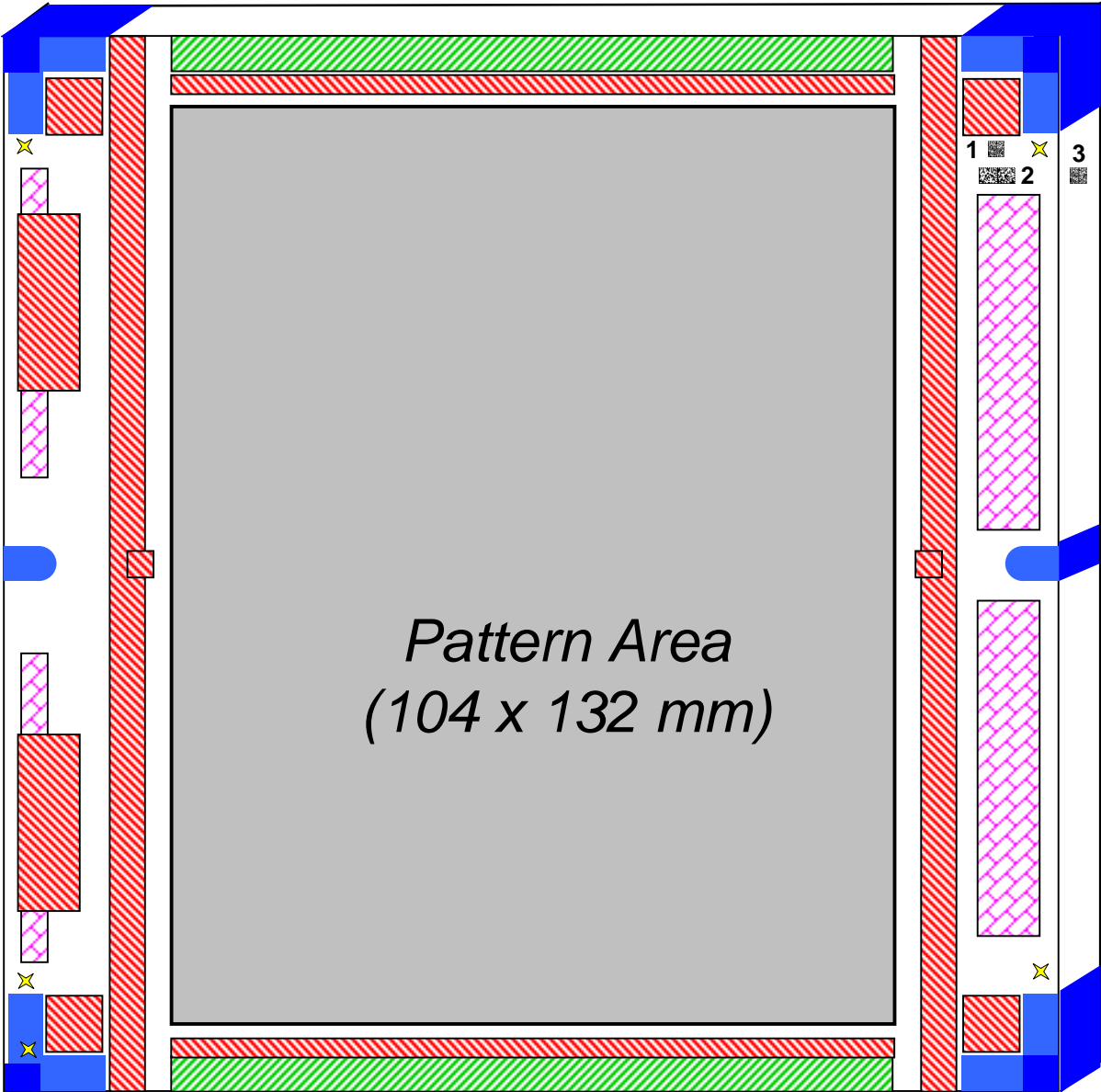
Thomas White
International SEMATECH

February 22, 2004

Background

- **The layout map presented in Antwerp (10/03) has only minimal changes.**
- **Survey of mask shops provided little information; EUV is immature for the equipment sets, and quality tools are undetermined.**
- **Permanent fiducial marks: four, near the corners.**

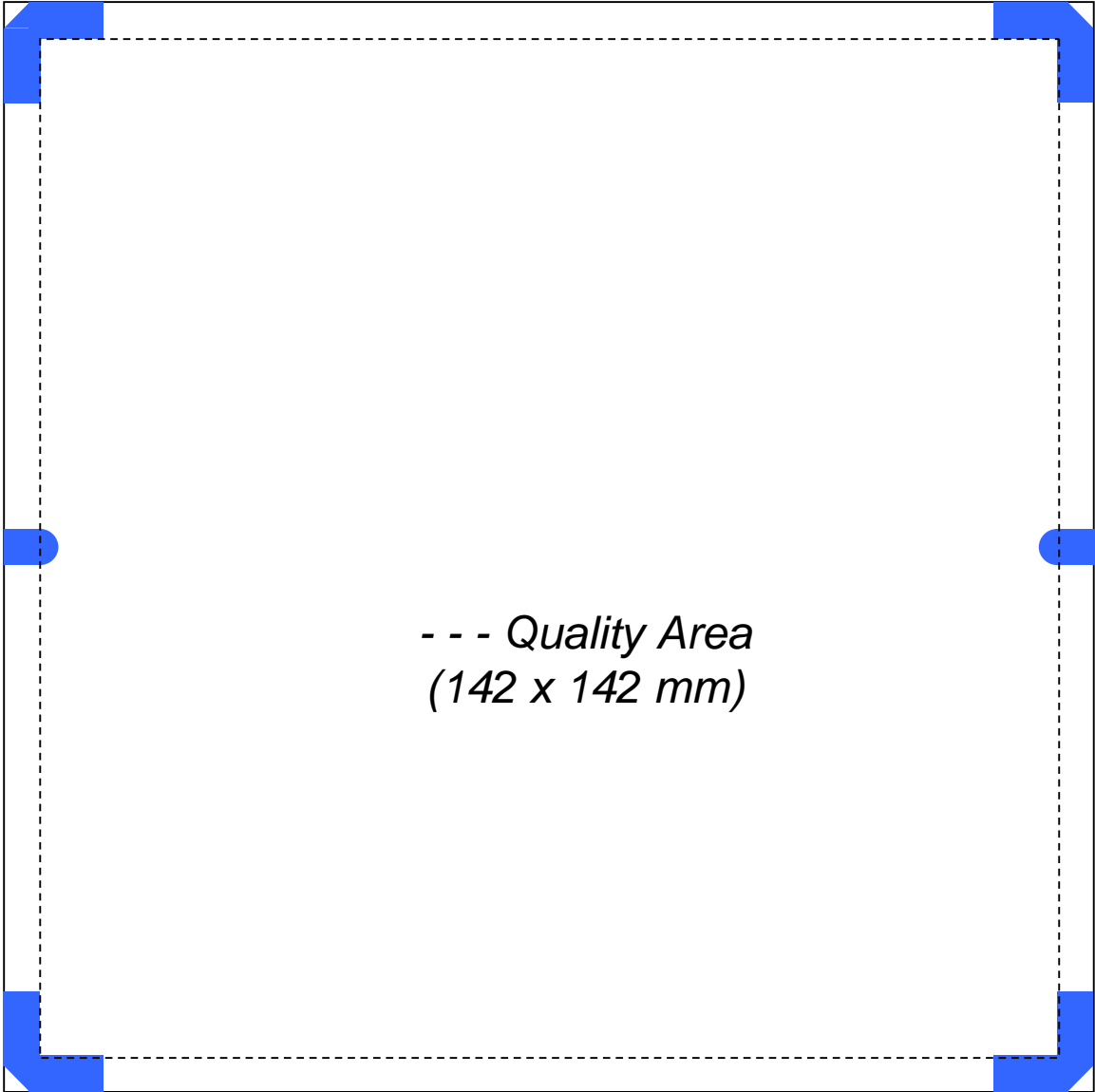
Mask Layout (pattern side)



- 1 – Mask ID (square)
- 2 – Blank ID (rectangle, to distinguish)
- 3 – Substrate (on sidewall)
- ✕ Fiducial marks (approximate positions, not to scale)
- ▨ Barcodes which could be eliminated
- ASML Proposed Handling Areas (6)

Or maybe inside the handling area?

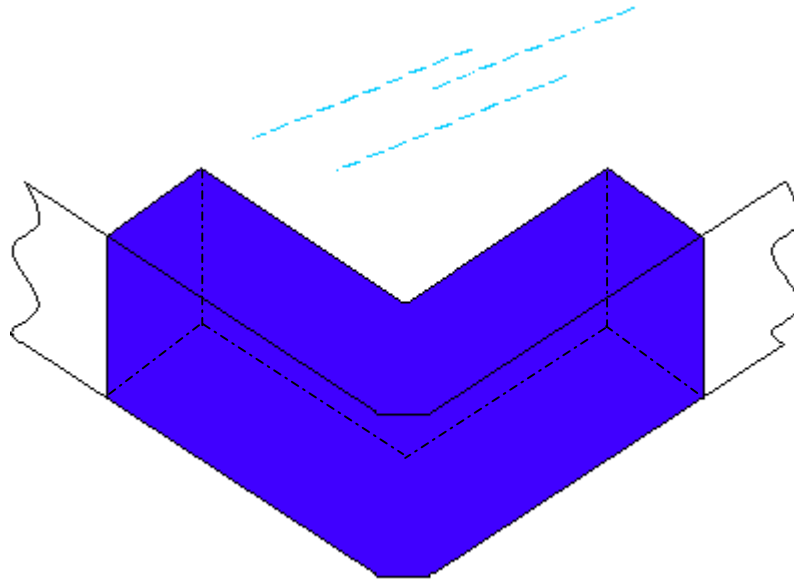
Mask Layout (backside)



ASML Proposed Handling Areas (6)

--- Quality Area
(142 x 142 mm)

Corner Handling Area



■ Corner handling area – top, sidewalls, back (not shown)
Not to proportion, edge chamfers not drawn

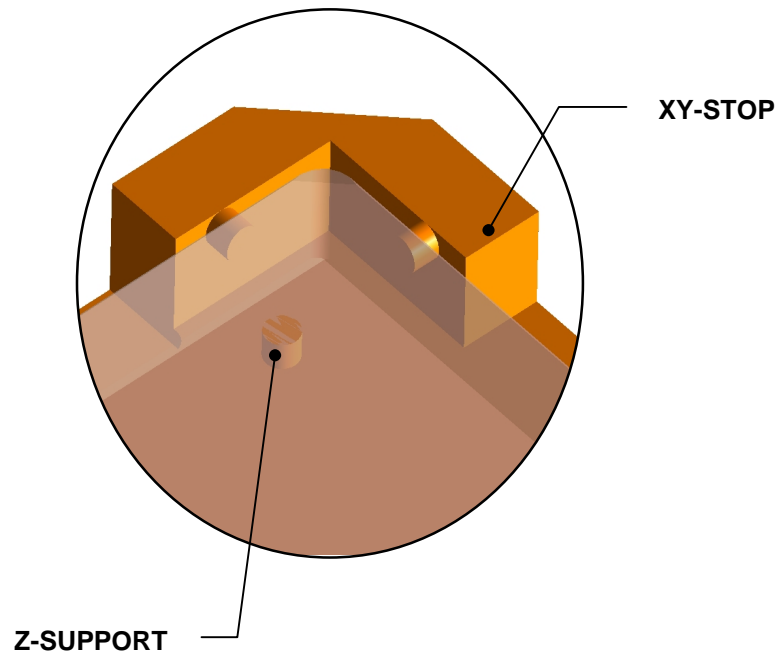
Proposed items for standardization:

- Number of contact areas/zones: 6
- Locations of areas: corners, side centers of non-scan axis
- Shapes of areas: as drawn; top, backside, sidewalls inclusive
- **NOT proposed**: surface finish or film in the areas.

Questions:

- What material should sidewall be – pattern film, backside film, third film, glass?
- If conductivity in these areas is important (conduction may take place elsewhere), is there sufficient electrical conductivity?

Corner Contact



General Concept

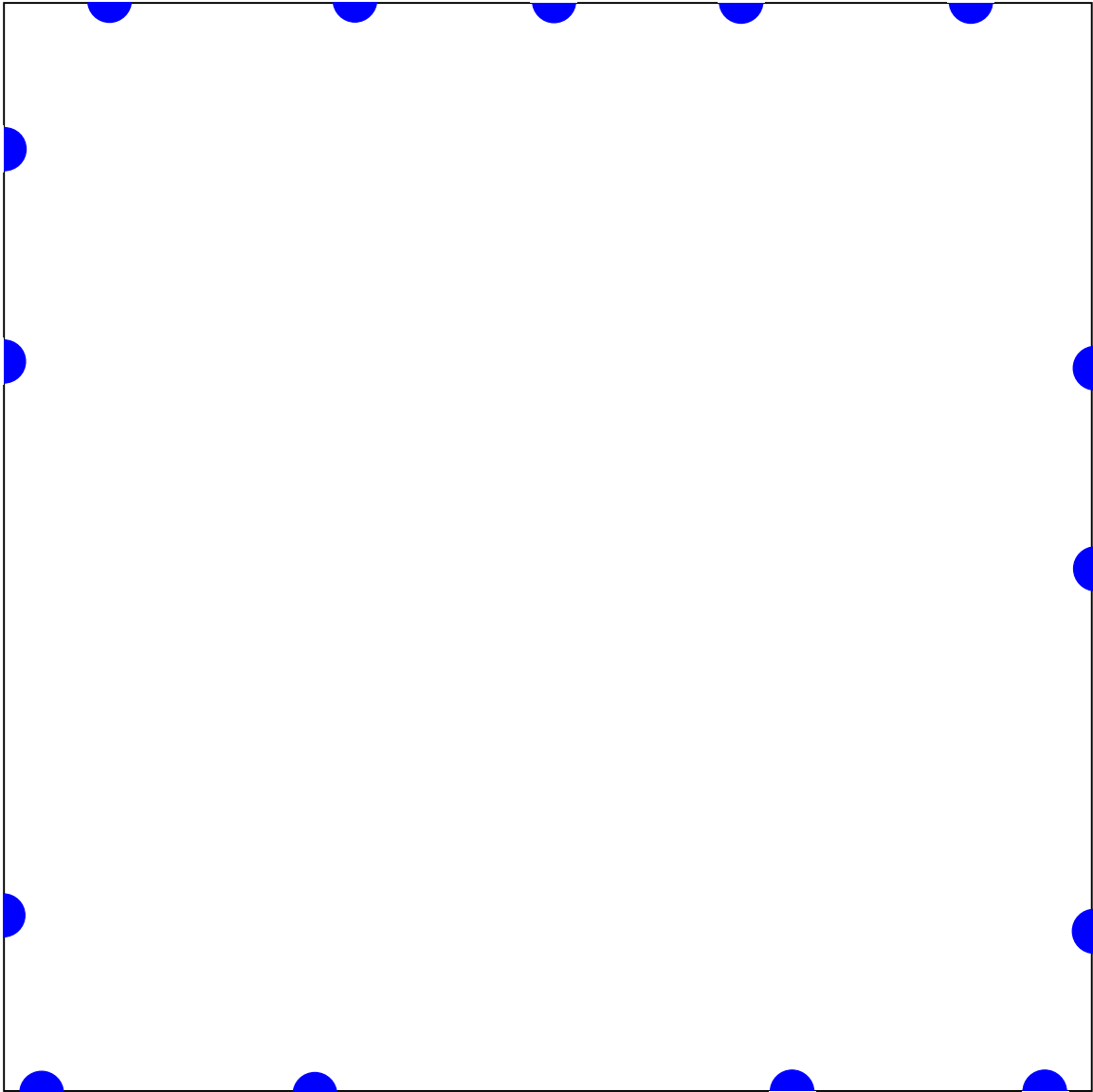
Standardize on these areas?

- **Reaching agreement on contact handling areas will allow designs to be set.**
- **Surface film/finish, end effectors not defined.**
- **Survey seeking preliminary endorsements was distributed.**
 - First to exposure tool suppliers: ASML, one other have agreed. Third is discussing.
 - Other suppliers and stakeholders: one ISMT member has agreed, one tool supplier has a different design.

Endorsement Responses

- **Survey asked for responses:**
 - A. unconditional endorsement
 - B. conditional endorsement; agree in general but see need for minor changes
 - C. not prepared to endorse, but see no obvious objections
 - D. reject the proposed areas
 - E. no opinion
- **Replies:**
 - A. – none (ASML, Nikon, Intel endorsed before survey)
 - B. – 2 (Schott Lithotec, Canon)
 - C. – none
 - D. – 1 (Lasertec)
 - E. – 1 (Microtome)
- **Comments:**
 - “...there is no way to coat in a clean process only parts of the mask sidewalls. Probably special coating tools or coating tool modifications will be needed...”
 - “...not totally rejected, we want more contact area...”

One Alternative



Next Steps

- **Conclude and evaluate survey. If more defined areas are needed, can a standard be reached?**
- **Perhaps the entire perimeter of the mask?**
- **Handling area surfaces? Materials, cleanability, conductivity.**
- **End effectors.**