

EUV Reticle Handling – Removable Bracket

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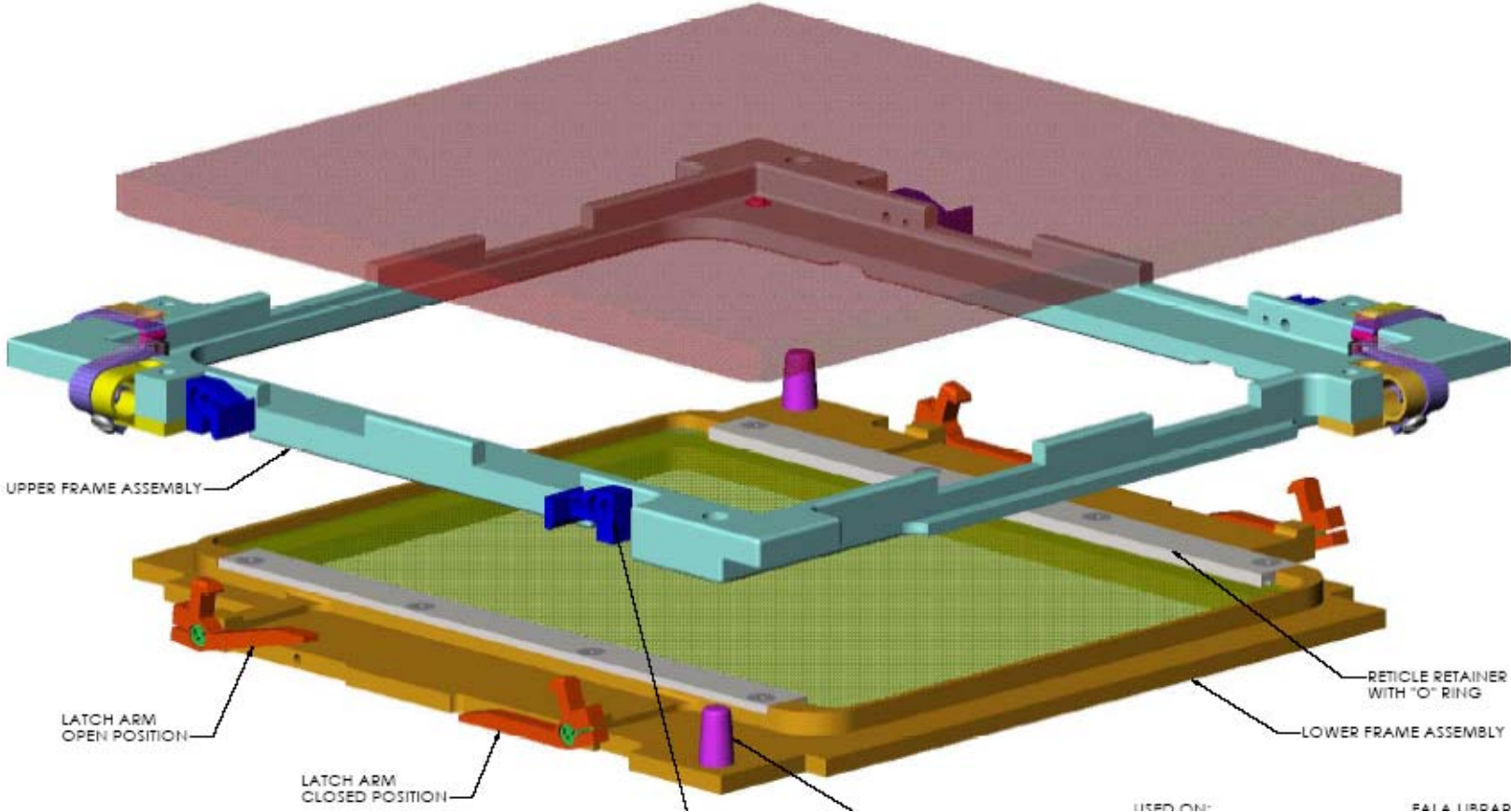
- ❑ Defect Control has become one of the top risks for EUV

10/2003 Sematech Ranking of Critical EUVL Issues

1. Source power and lifetime including condenser optics lifetime
2. Availability of defect free masks
3. Reticle protection during storage, handling, and use
4. Projection and illuminator optics lifetime and contamination
5. Resist resolution, sensitivity, and LWR
6. Optics quality for 32nm node

- ❑ Defects are perceived as a potential showstopper for EUV
 - ❖ Simulations and experiments have shown the need for some form of protection
- ❑ Intel has developed a removable bracket that will be used to show proof of concept in the integrated demonstration
 - ❖ Removable bracket will protect the mask during shipping and handling and vacuum pumpdown.
 - ❖ Current reticle carriers have been modified to accommodate the bracket.

Removable Bracket



Removable Bracket

□ Features

❖ Provides side protection

- Simulations indicate that with a line source of particles at the edges, small particles driven by diffusion could end up on the quality area
- Experiments at U of Minnesota have proved that a side protection is needed
- *POSTER “Design and Preliminary results of an atmospheric chamber to evaluate protection schemes for an EUVL Carrier System”*

❖ Centration capability

- Mask is centered in the bracket
- Enables better automation

❖ Mask is secured

- Prevents mask displacement during shipping.

❖ Transparent hard pellicle

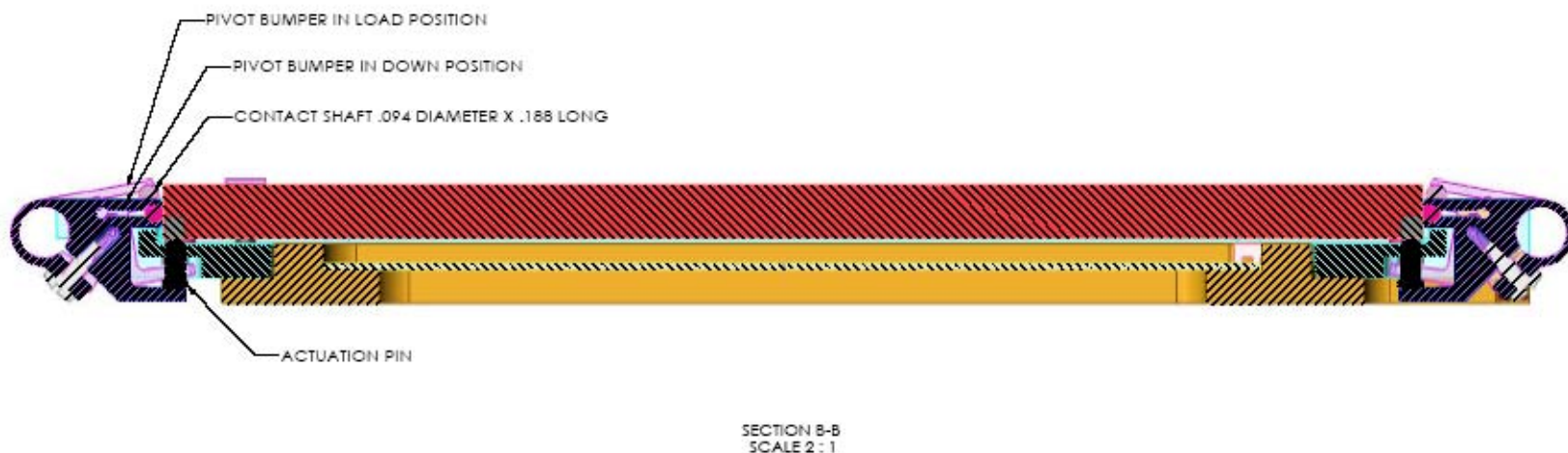
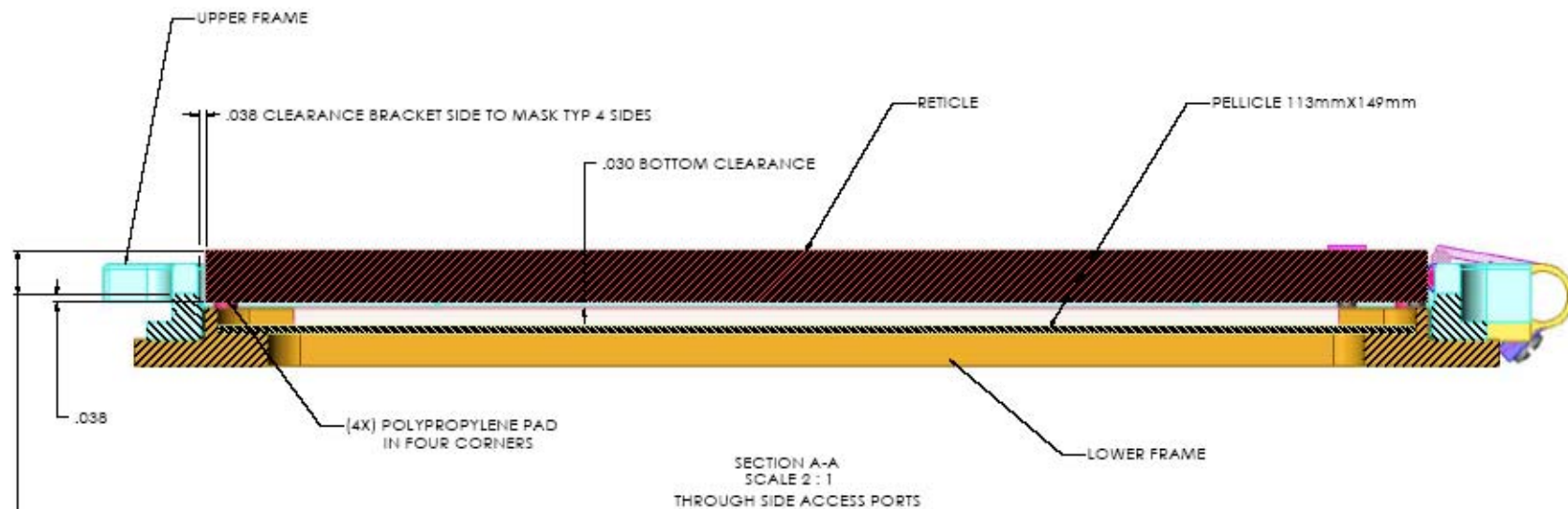
❖ Removable bracket assembly fits into a modified RSP200 carrier

- Same external carrier dimensions – only internal modifications
- Standard RSP200 loadports can be used

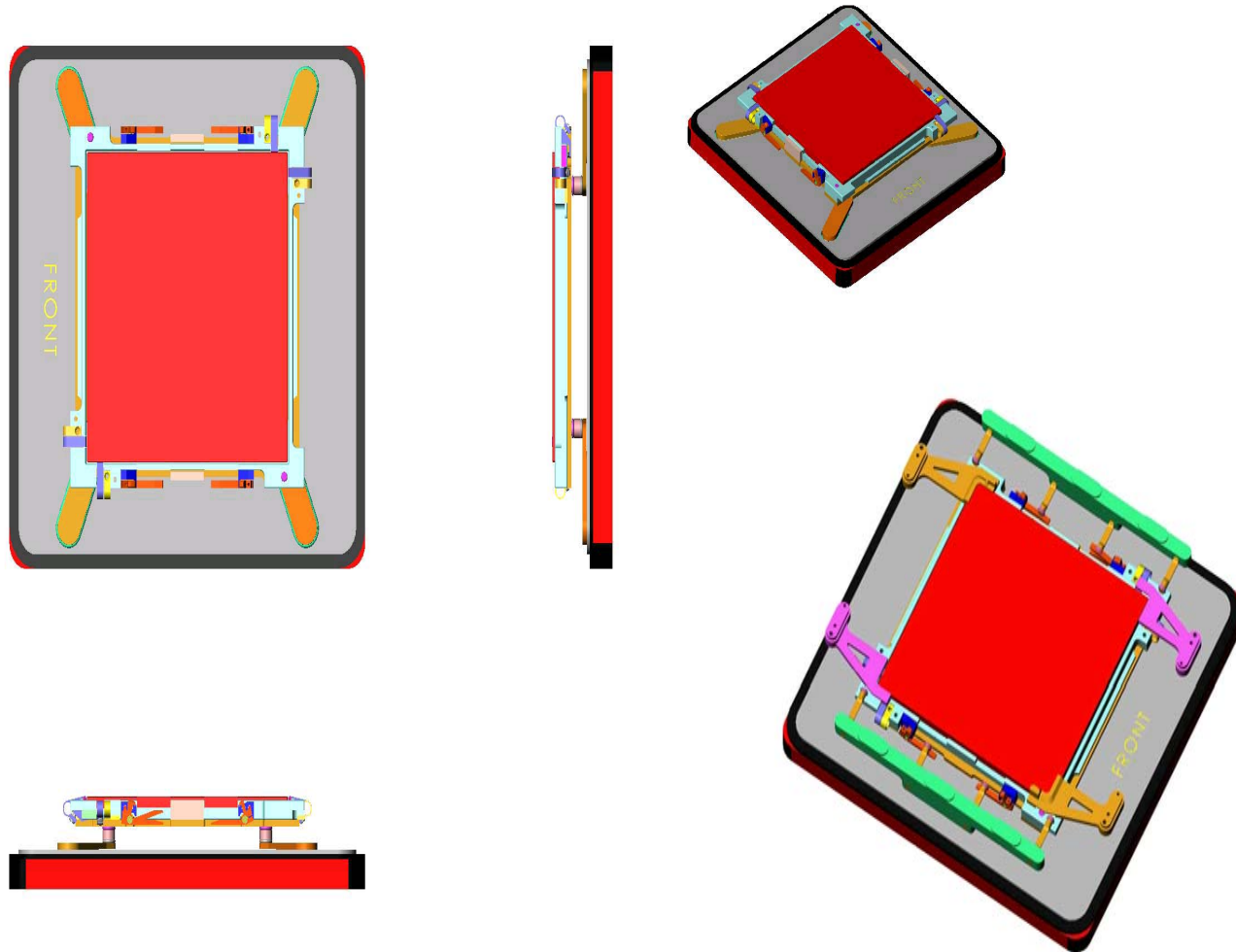
□ Risks

❖ Particle generation during mask insertion and centration

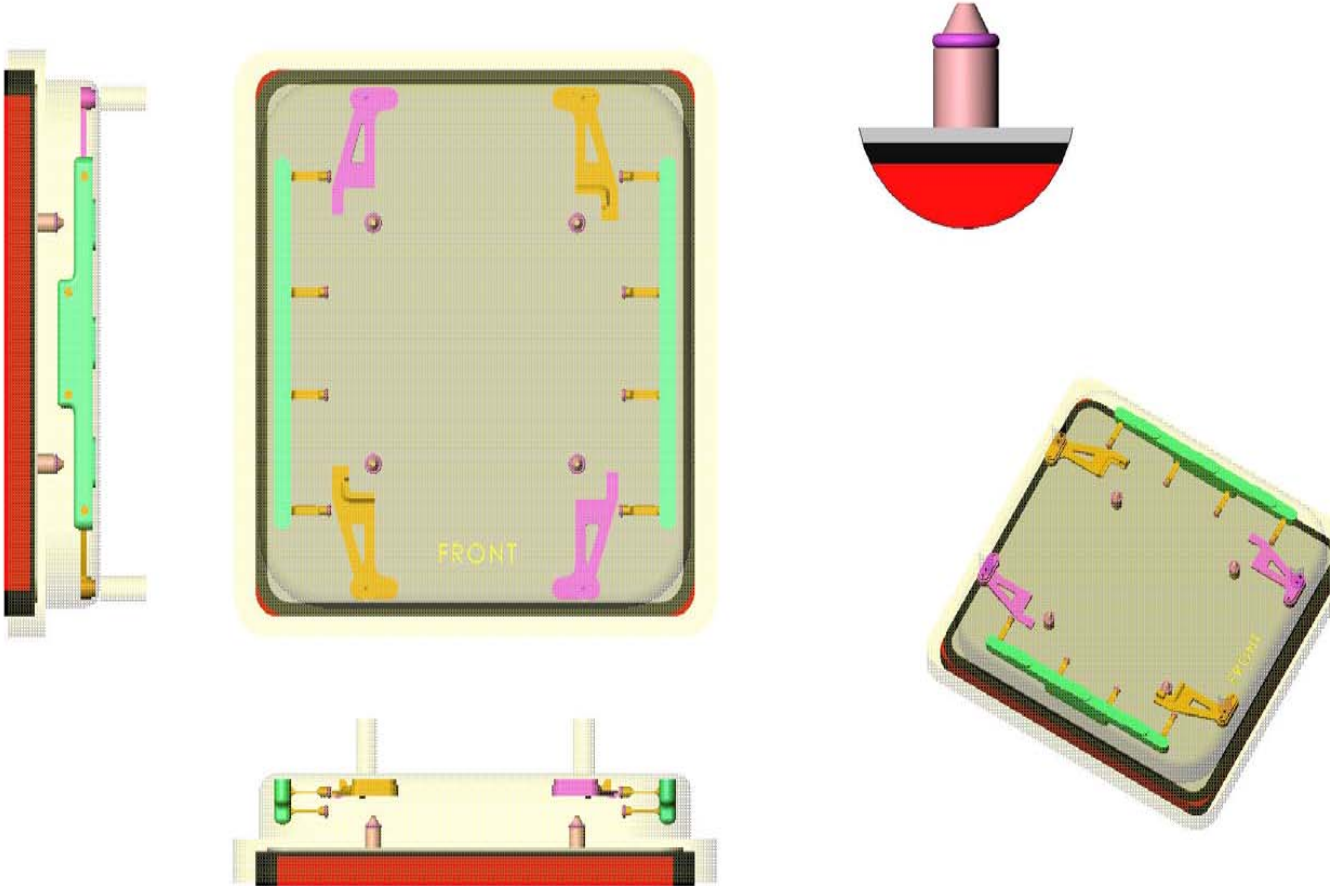
Removable Bracket – side view



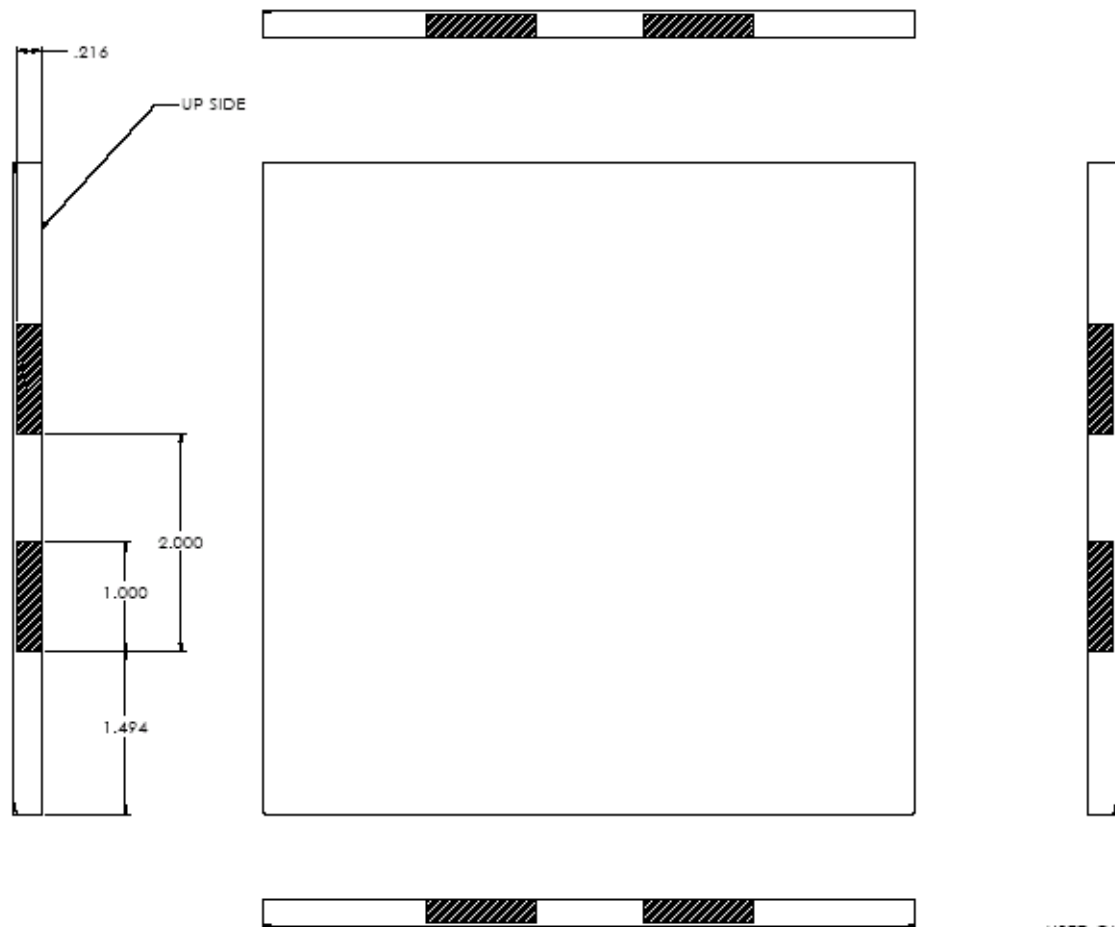
RSP 200 Modification for Bracket



RSP 200 Modification for Bracket



End-Effector contact points



Summary

- ❑ Intel has developed a removable bracket that will be used for the Intel-Sematech integrated demonstration in mid-2005
 - ❖ The main purpose is for demonstrating the protection concept
 - ❖ Early prototypes will be available later this month and testing will begin
 - Shipping tests, robotic handling tests, tests in the defect control tool
 - ❖ *Oral Presentation- An Integrated Demonstration of EUVL Defect Control on Wednesday, November 3rd*
- ❑ Industry needs to move towards a single solution soon
 - ❖ Standards needed for contact points, carrier, interface and protective enclosure
 - ❖ Protracted standards development process could delay EUV
- ❑ Intel plans to enable the standards process by making the removable bracket available royalty free.
 - ❖ None of the existing solutions appear to meet the requirements for defect control
 - ❖ Intel is willing to discuss combining multiple options into a single solution