



**Integrated Measurement Association Meeting
Sept 12, 2002**

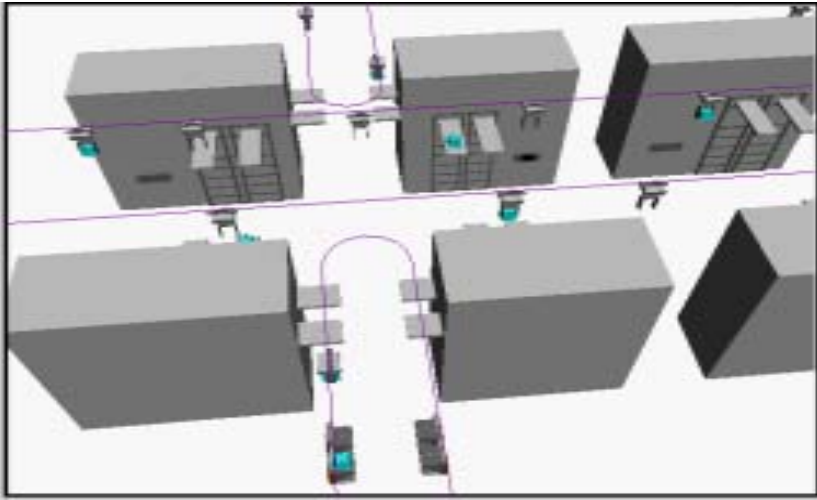
A Virtual Fab for Integrated Measurement Evaluation

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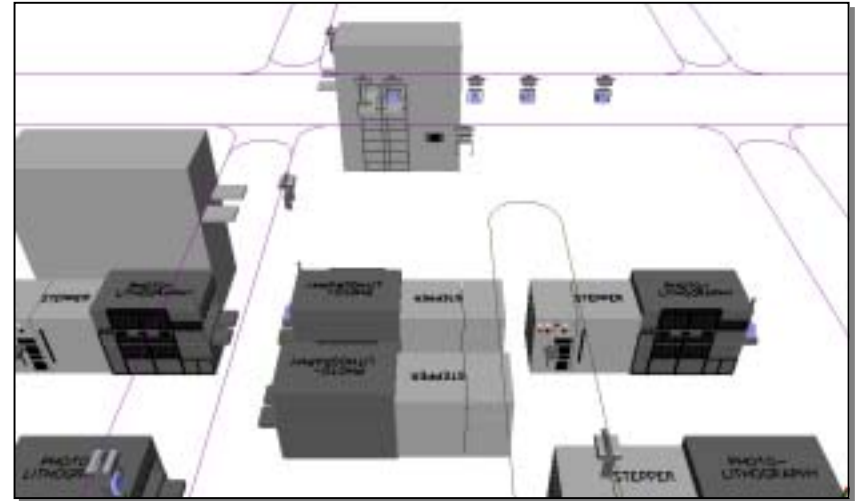
Outline

- Dynamic Fab Simulation
- Experiment Examples
- Modeling tool development
- Modeling tool demonstration

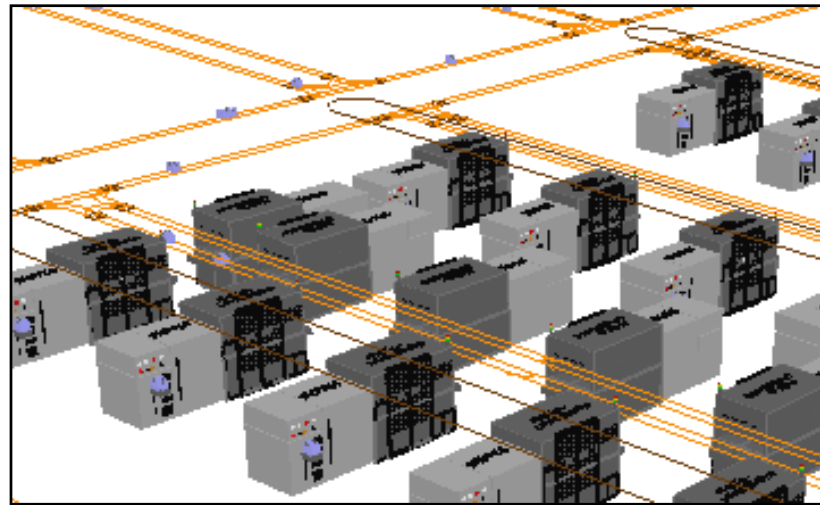
AMHS Options



Through Stocker

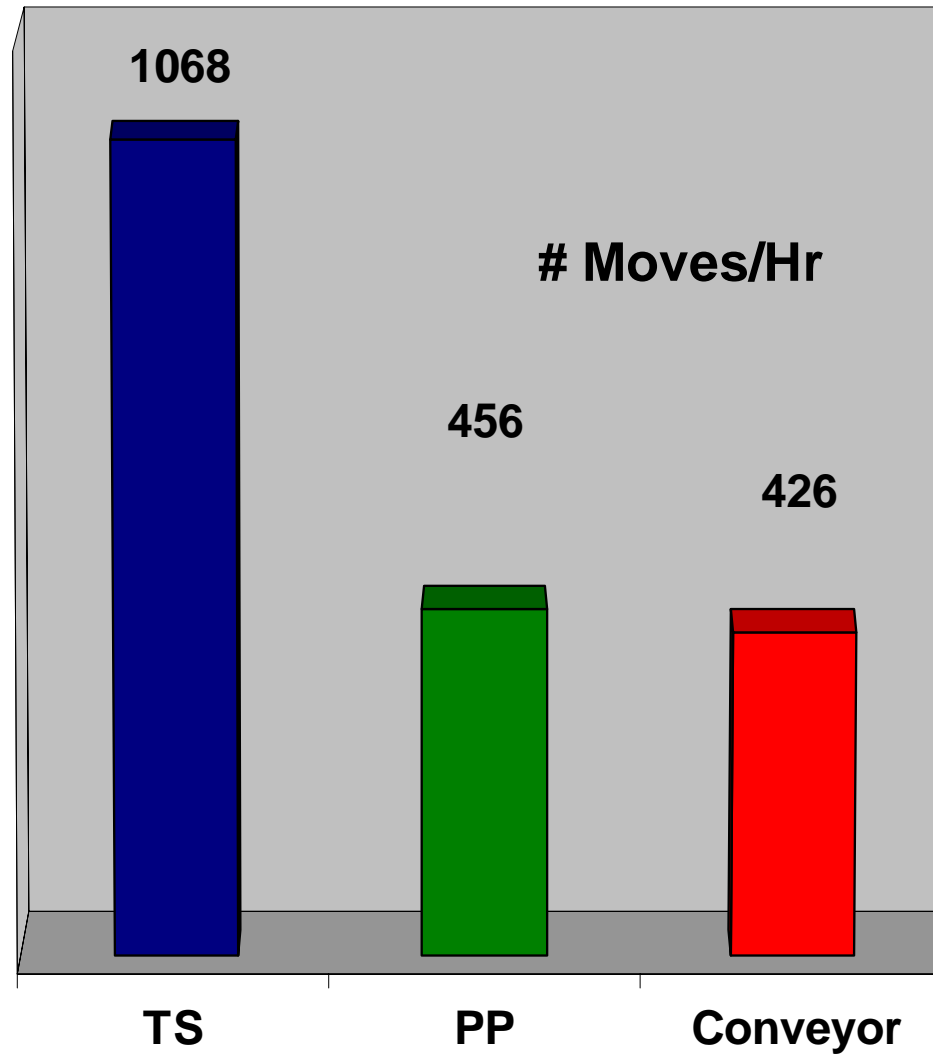


Point to Point

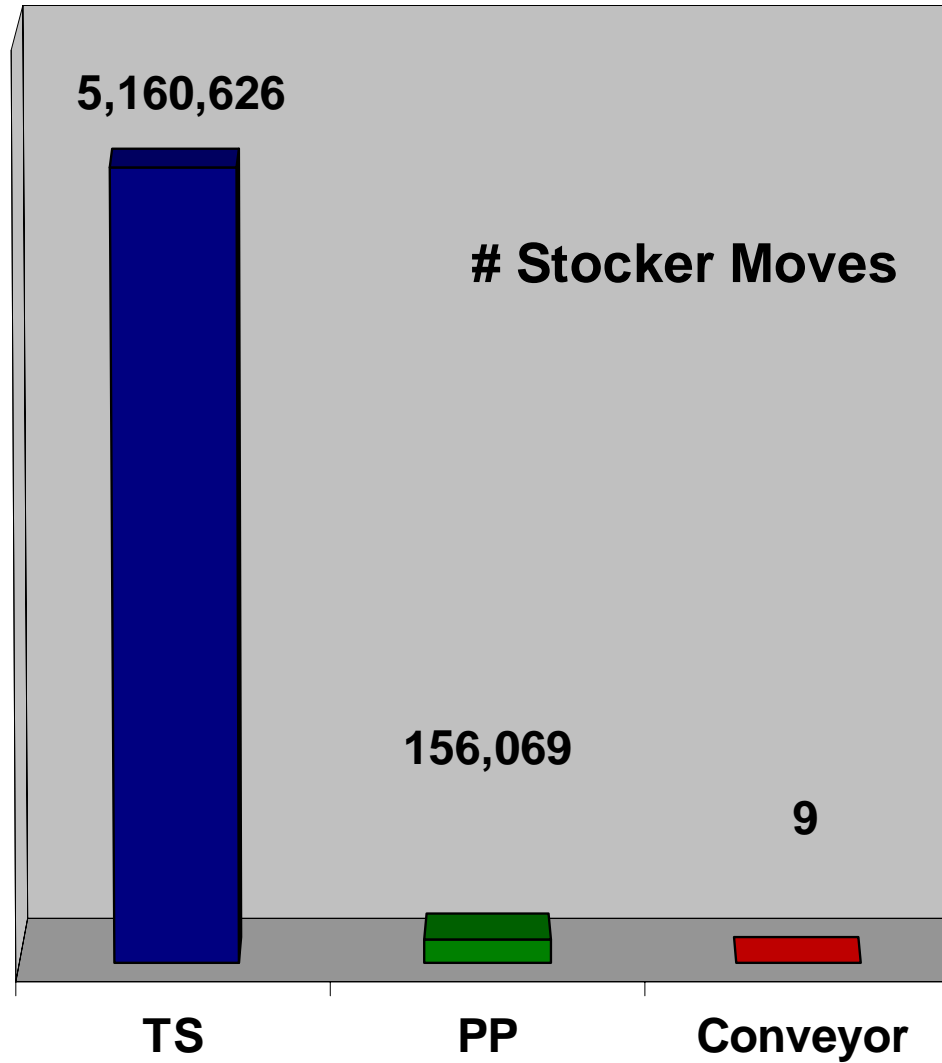


Conveyor

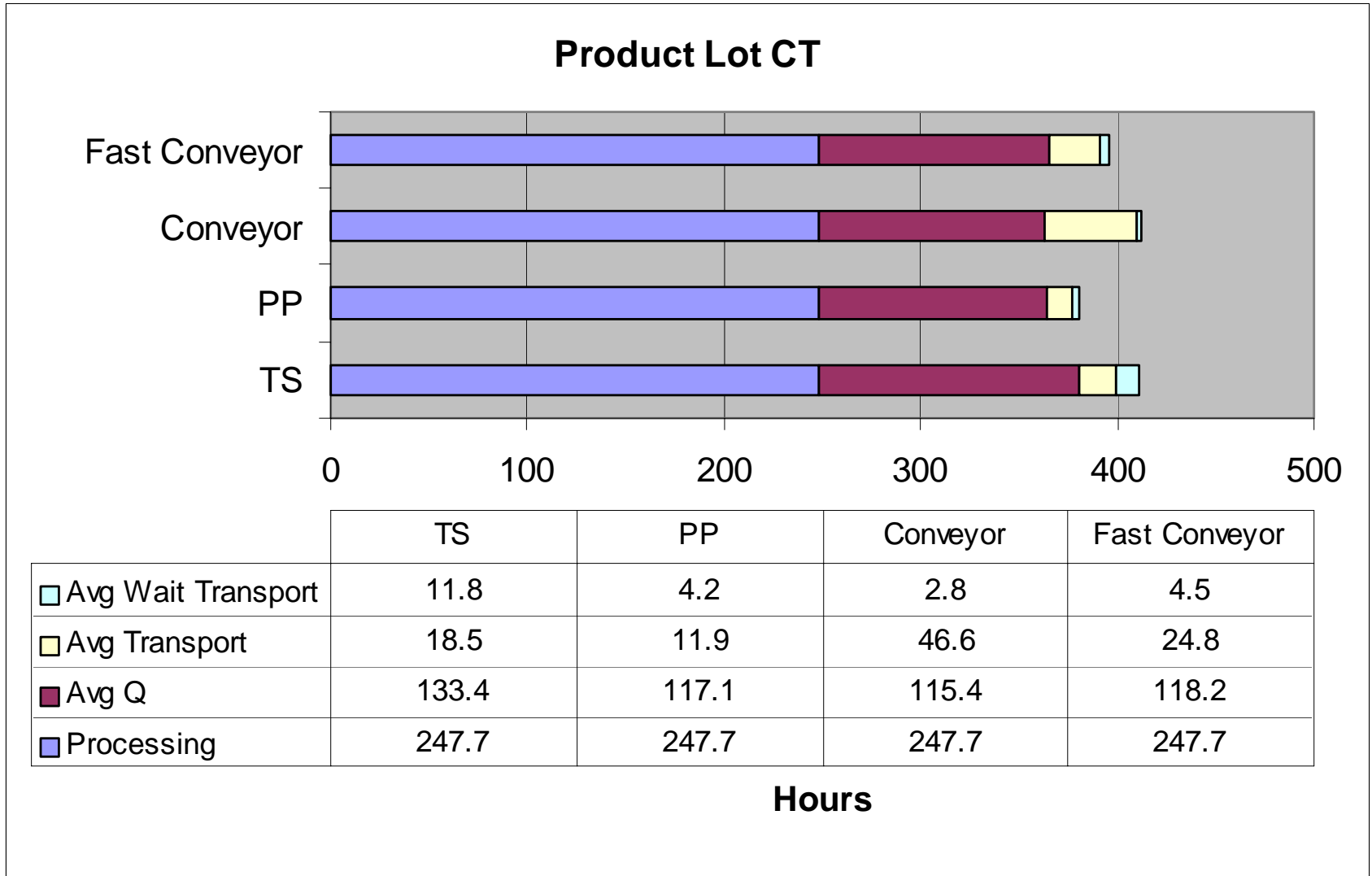
Comparing the Results- Movements



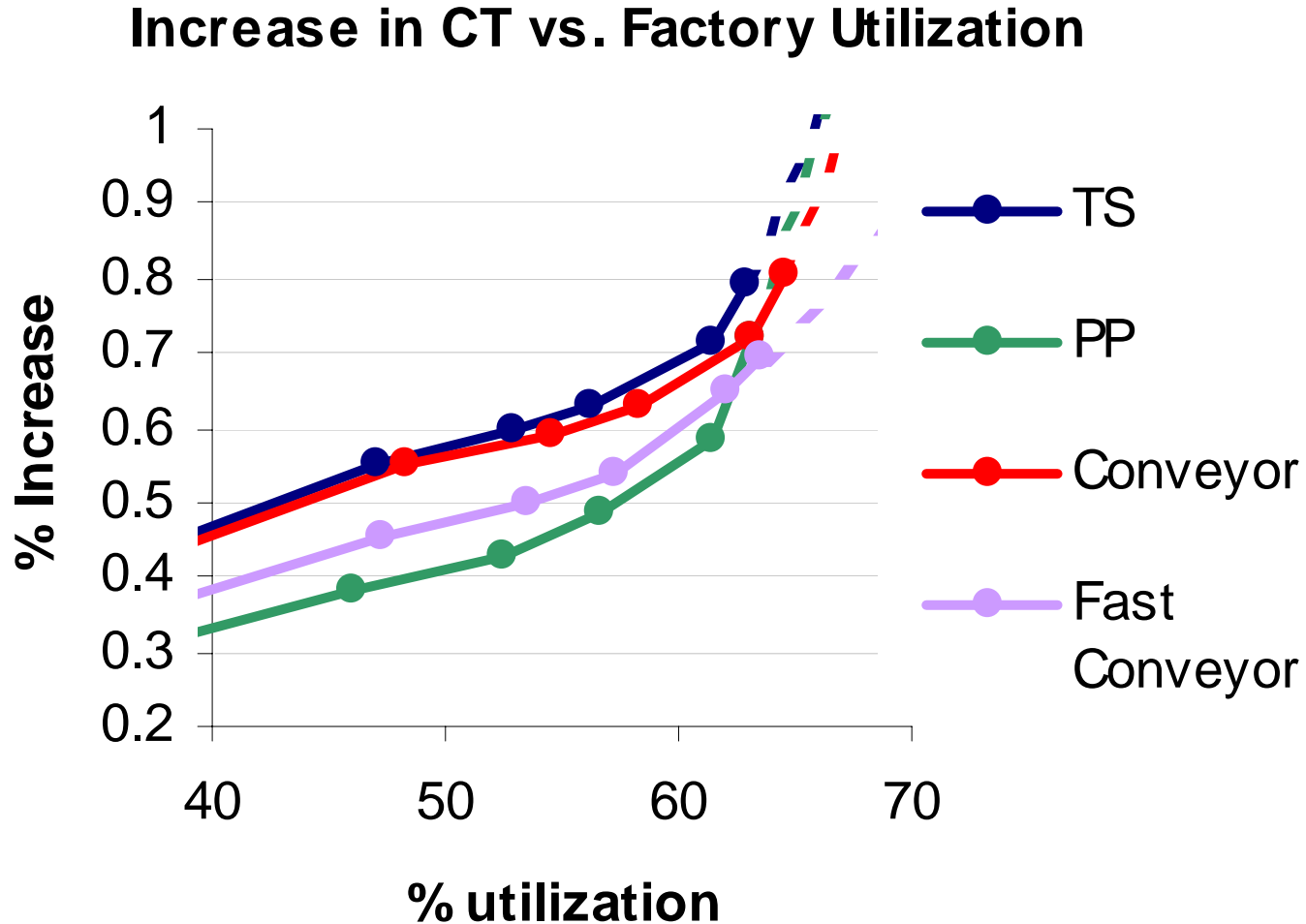
Comparing the Results- Stockers



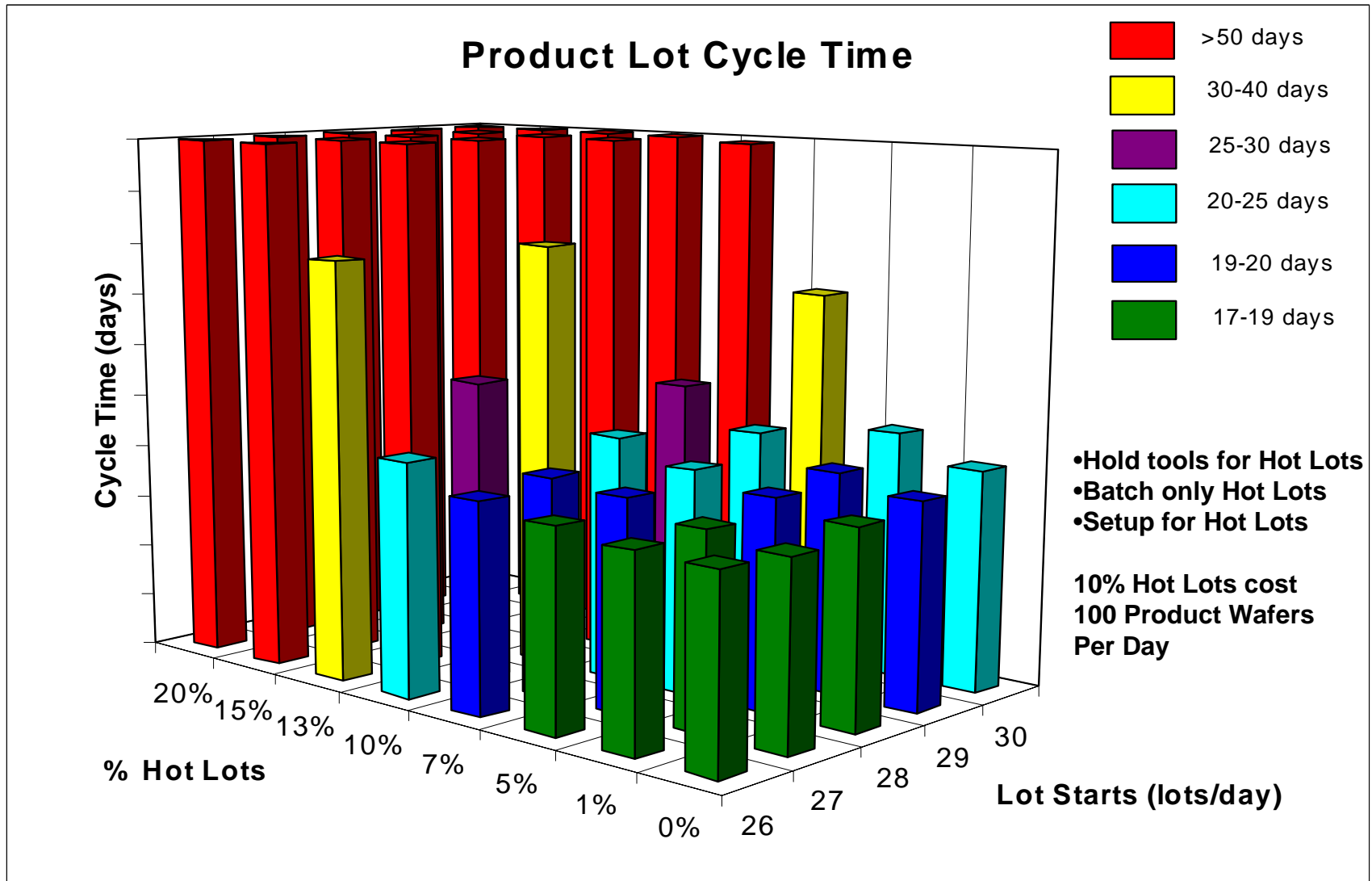
Comparing the Results- Lot CT



Comparing the Results- Utilization

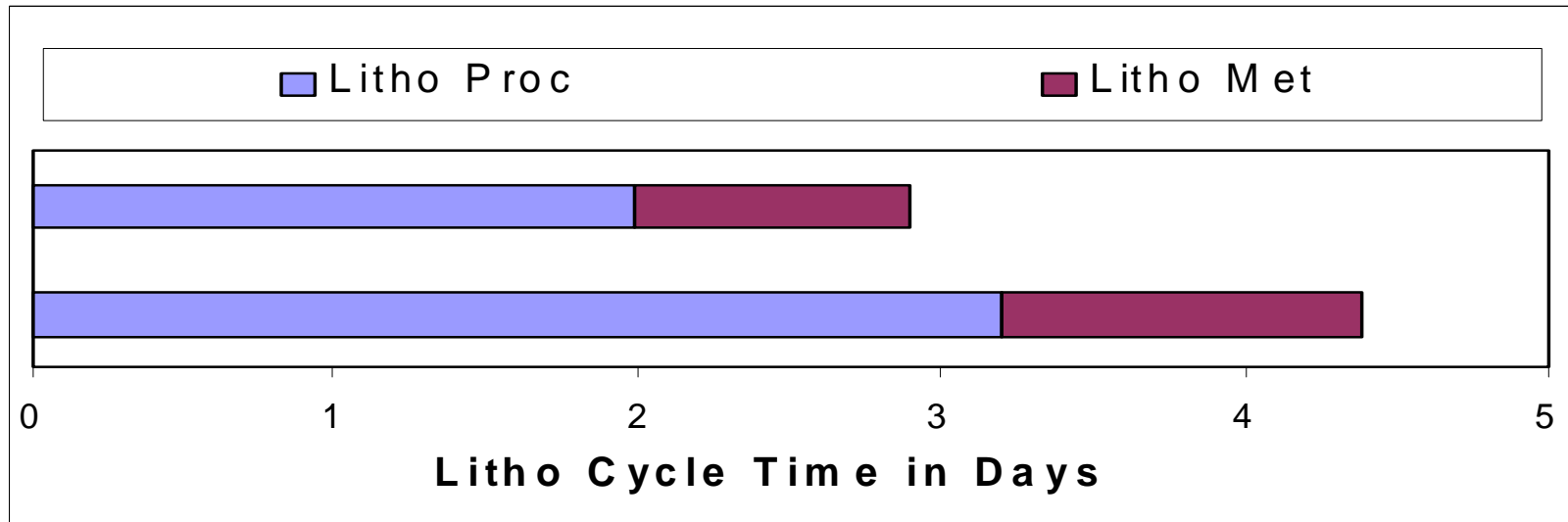


Impact of Increasing Hot Lots



Simulation run time: 1000 days

Modeling of Integrated Litho Metrology



Assumptions

- Overlay and CD are replaced with integrated scatterometry 80% of the time
- 20% of time standard Overlay and CD measurements are also made
- Litho system cost and size increased, also slight Litho throughput loss
- No send ahead wafers
- Reduced rework wafers

Results

- Overall product cycle time improvement (9%)
- Reduction in stand-alone metrology tools (CD and Overlay)
- Dramatic improvement in litho cycle time

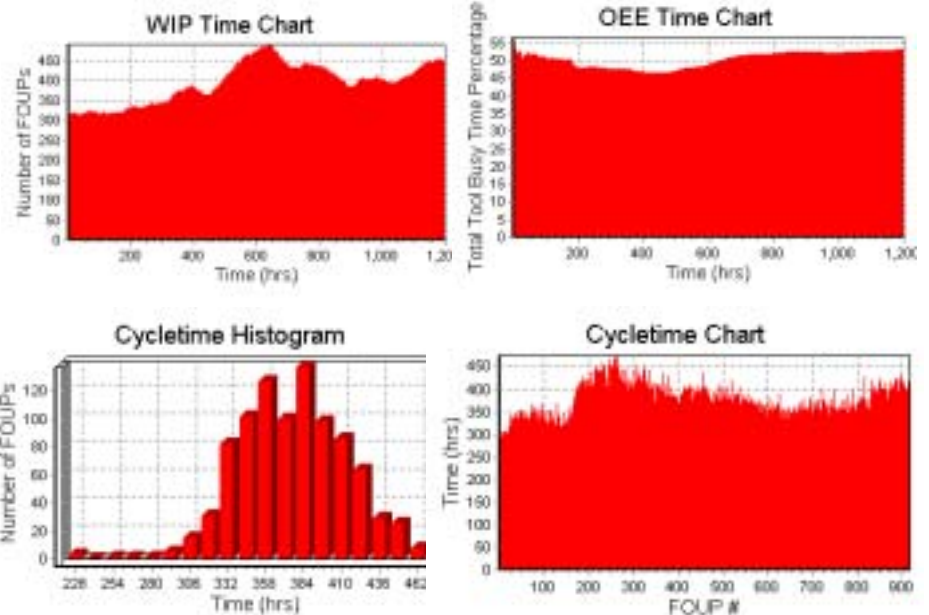
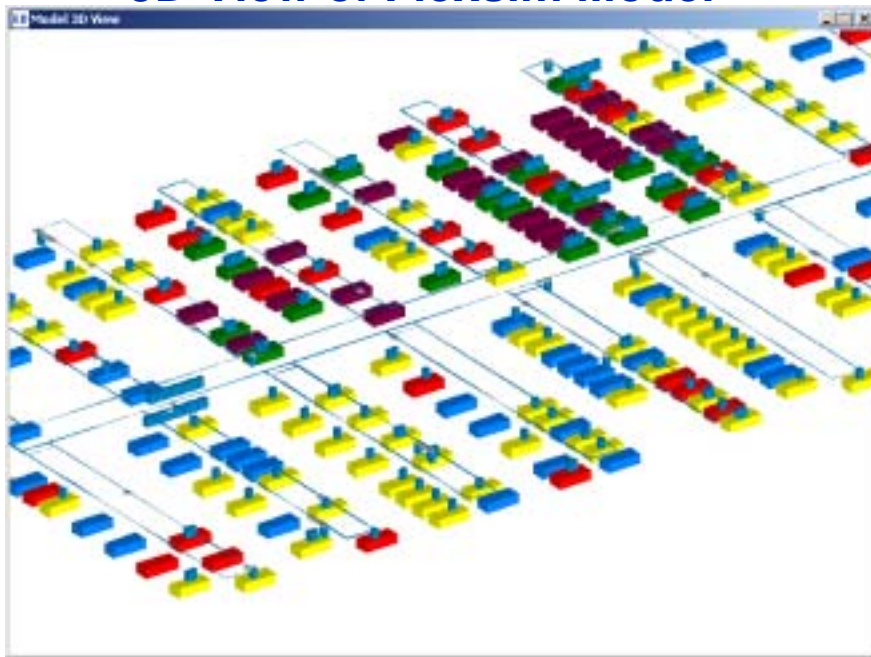
FlexSim Simulation Modeling Tool

- **Members requested an alternate simulation source**
- **Started FlexSim project with a small contract in Dec 2001**
 - Delivered a license and models in April 2002
 - Refined models and made demonstration available to members in May
 - Simulation execution speed is 2 to 10 times faster with AMHS
- **Expect to make a simulation tool usable by semiconductor manufacturers over the next year**
 - Adding layout flexibility, Dispatching rules, WIP loading
- **Current tool useful for Integrated Modeling Studies**
- For more information log on to www.flexsim.com

Flexsim Simulation Model Demonstration

- Builds model from an easy to understand Excel work book with flows (180nm AI logic), AMHS characteristics
- Generates layouts, Load ports, stockers ...
- Pictures below show some of the outputs

3D View of Flexsim Model



Conclusions

- A low cost fab simulation tool is available
- Useful for studies of equipment impact on fab logistics
- Includes single wafer and batch tools, load ports, stockers
- Includes direct tool-to-tool AMHS (Automated Material Handling Systems) with conveyors or vehicles
- Has been used for a drop time safety study, and ion implant system configuration studies
- Could be used for Integrated metrology studies, AMHS configuration studies, Factory OEE studies