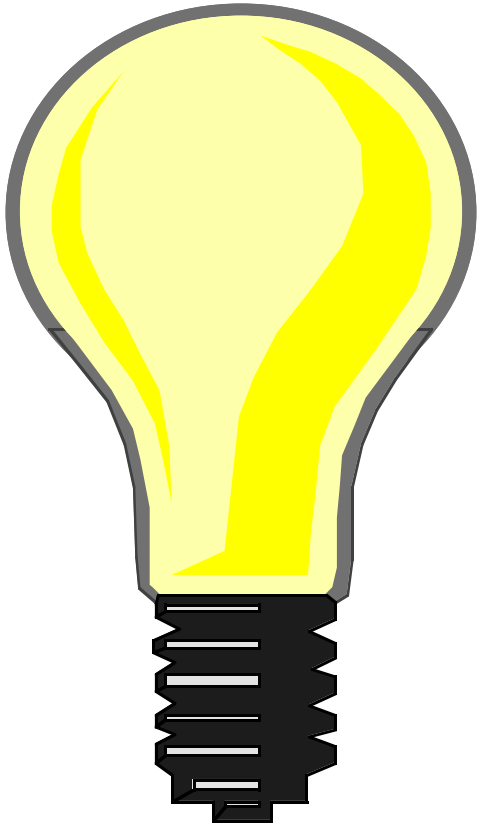
**STeP**
Strategic Test Partners

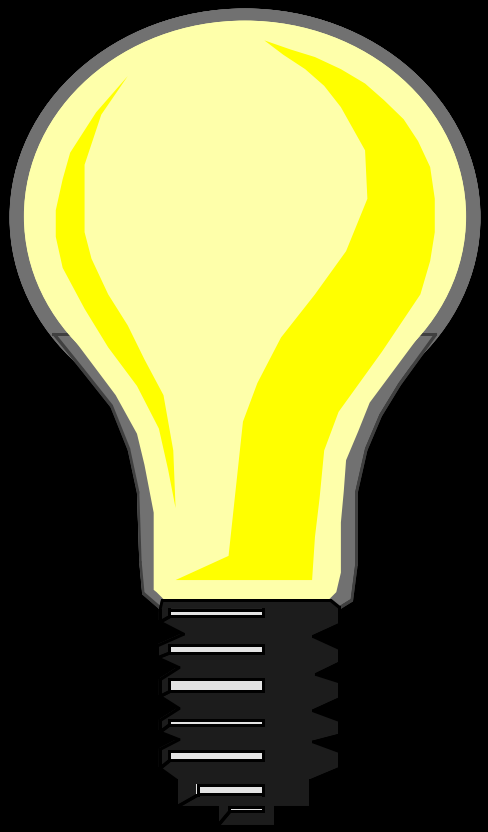
# When can we turn out the lights at Probe?

*Ron Leckie*

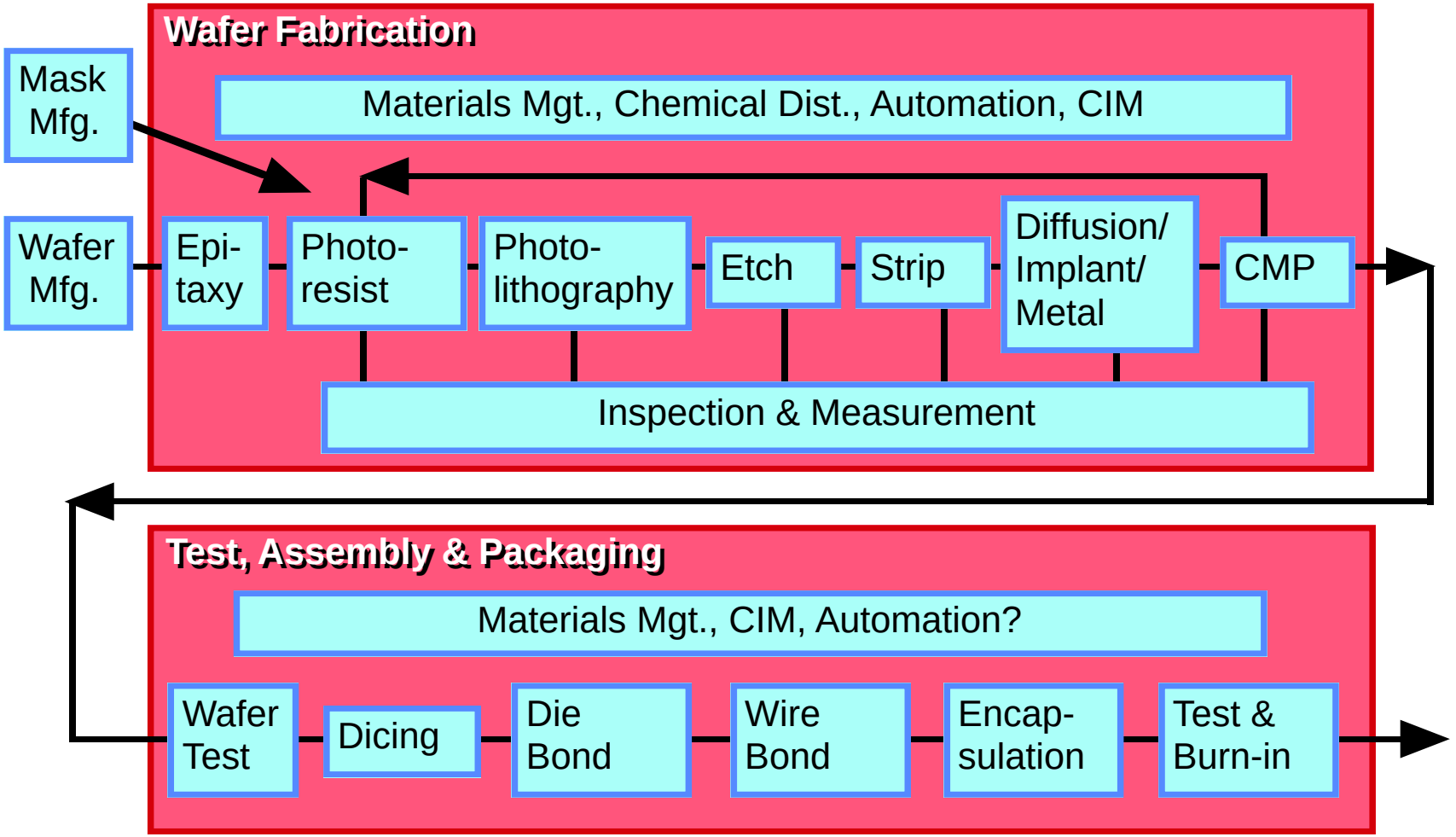


## Agenda:

- Processes
- People
- Software
- Financial
- Equipment
- A Pro-Active Step
- Outlook



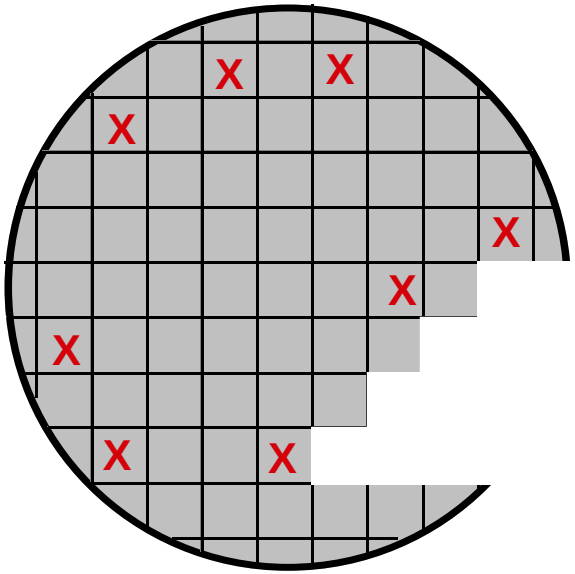
# Semiconductor Manufacturing

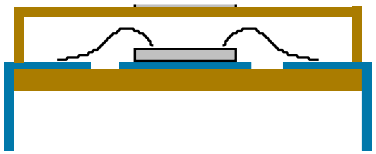


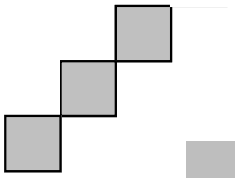
# The Flow

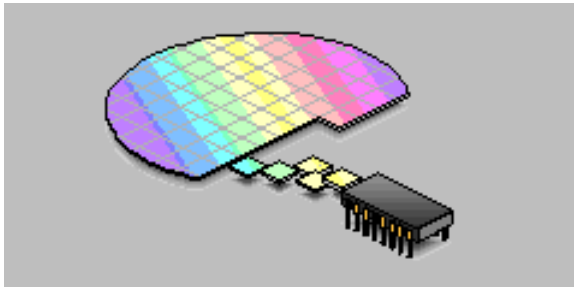
| Material | Mfg. Step | Treated as... |
|---|---|---|
| Wafer | Wafer Fab | Process |
| Wafer | Wafer probe | Product |
| Wafer | Laser Repair | Product |
| Wafer | Mount & Scribe | Process |
| Wafer / Die | Dicing | Process |
| Frame | Die / Wire Bond | Process |
| Device | Packaging | Process |
| Device | Package Test / Burn-in | Product |
| Device | Finishing & Pack | Process |

# Assembly & Packaging



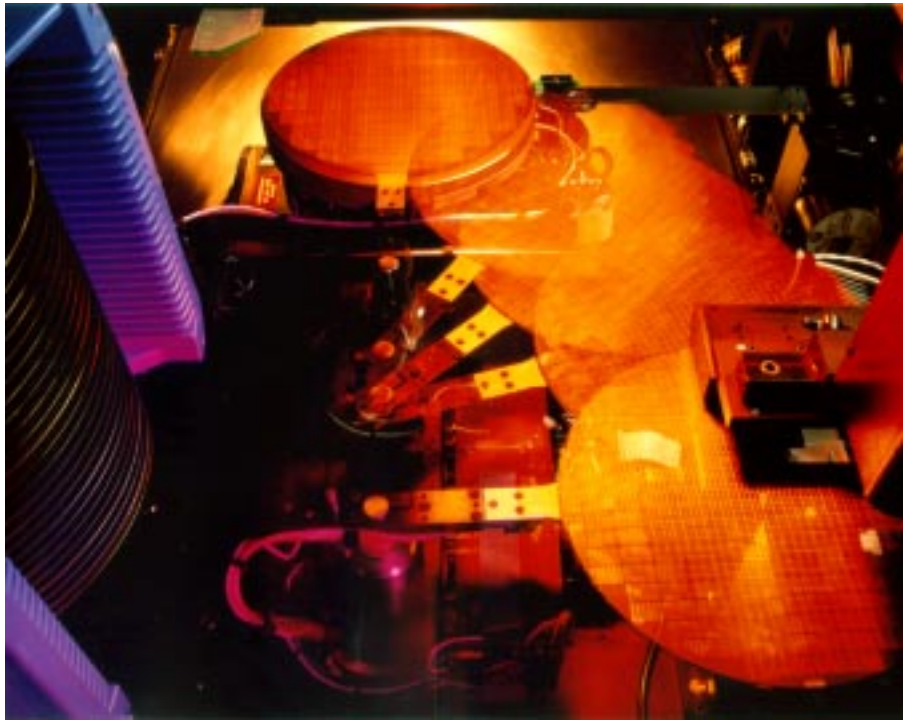






# Process issues:

- Flow
- Location
- Cluster
- Inking
- Multiple Fab sources
- OCR / Wafer ID
- Probe Cleaning

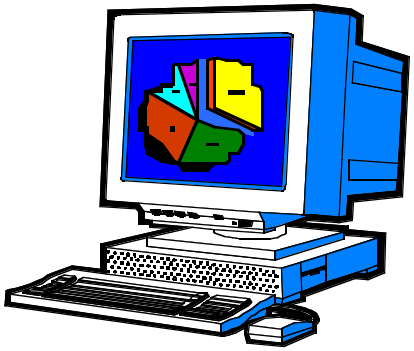


# Human Factors / Management

- Batch Process vs. “Job Shop”
- Interrupt driven
- Strategic Vision?
- Industrial Engineering?
- Metrics
- ROI Analysis

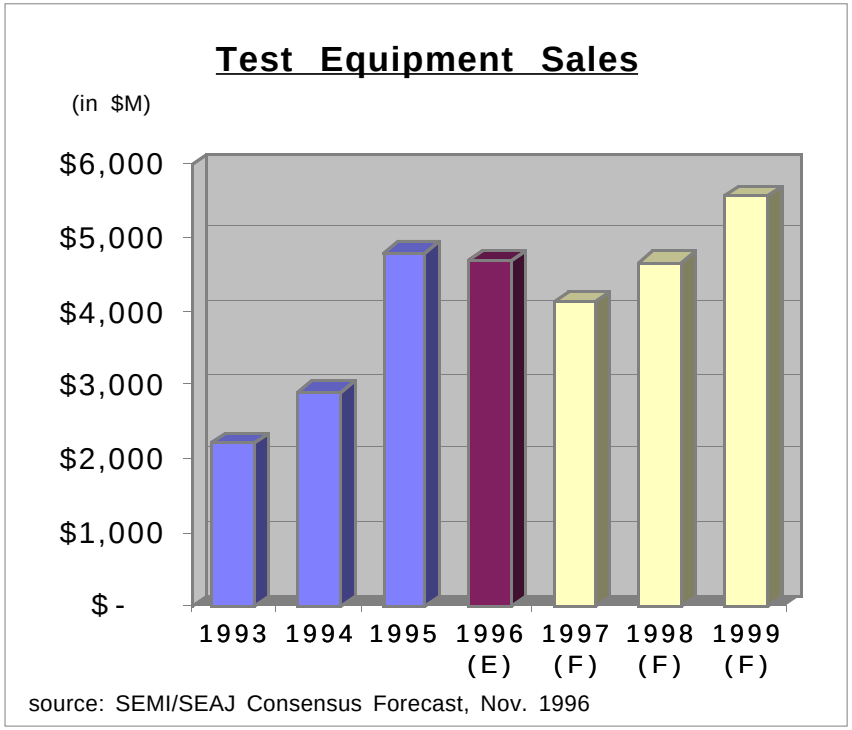
# Software

- **The Tasks:**
  - **Equipment programming & set-up**
  - **Wafer Maps**
  - **Lot Data**
  - **Device Data**
- **Not a major barrier!**
- **Technology is available!**
- **Takes attention to details!**



# Test Capital Spending

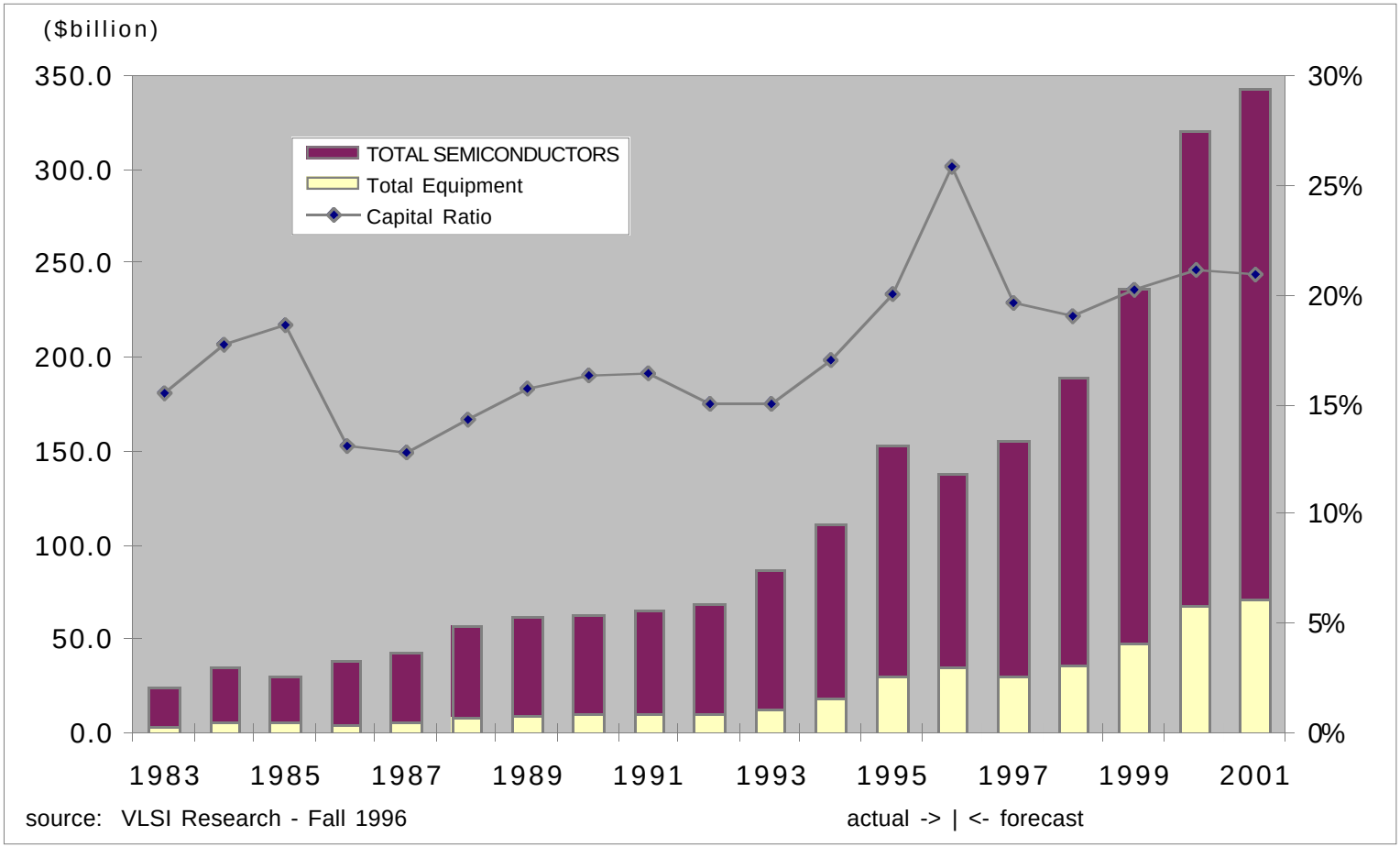
- Growth
- Over-Capacity
- Correction
- Recovery to Growth
- Driven by Unit Demand
- Short Equipment Leadtimes



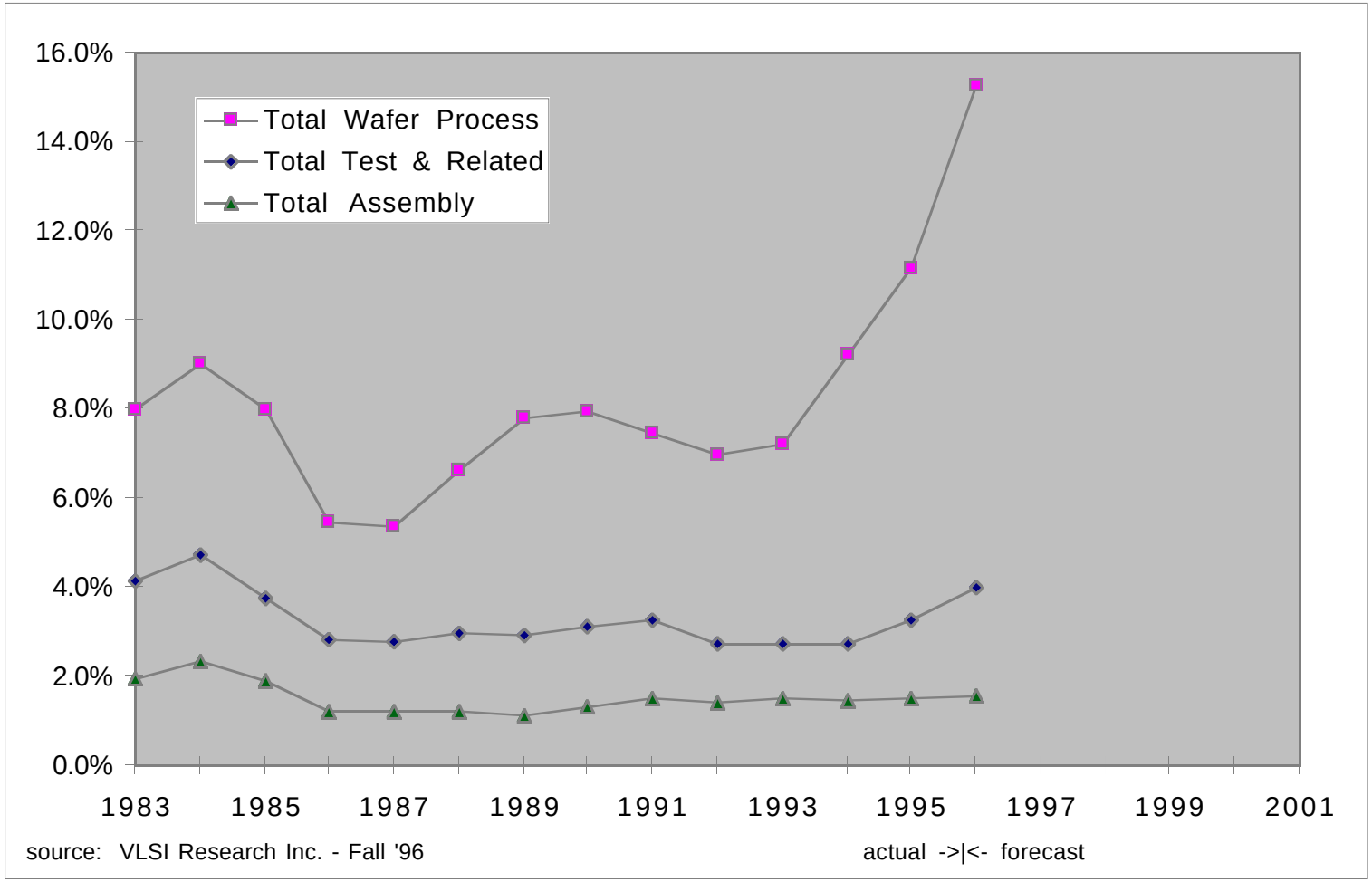

| ISS Forecasts: | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|
| SEMI | -12% | 13% | 19% | - | - |
| VLSI Res. Inc. | -12% | 16% | 27% | 39% | 4% |

# Capital Spending Ratio

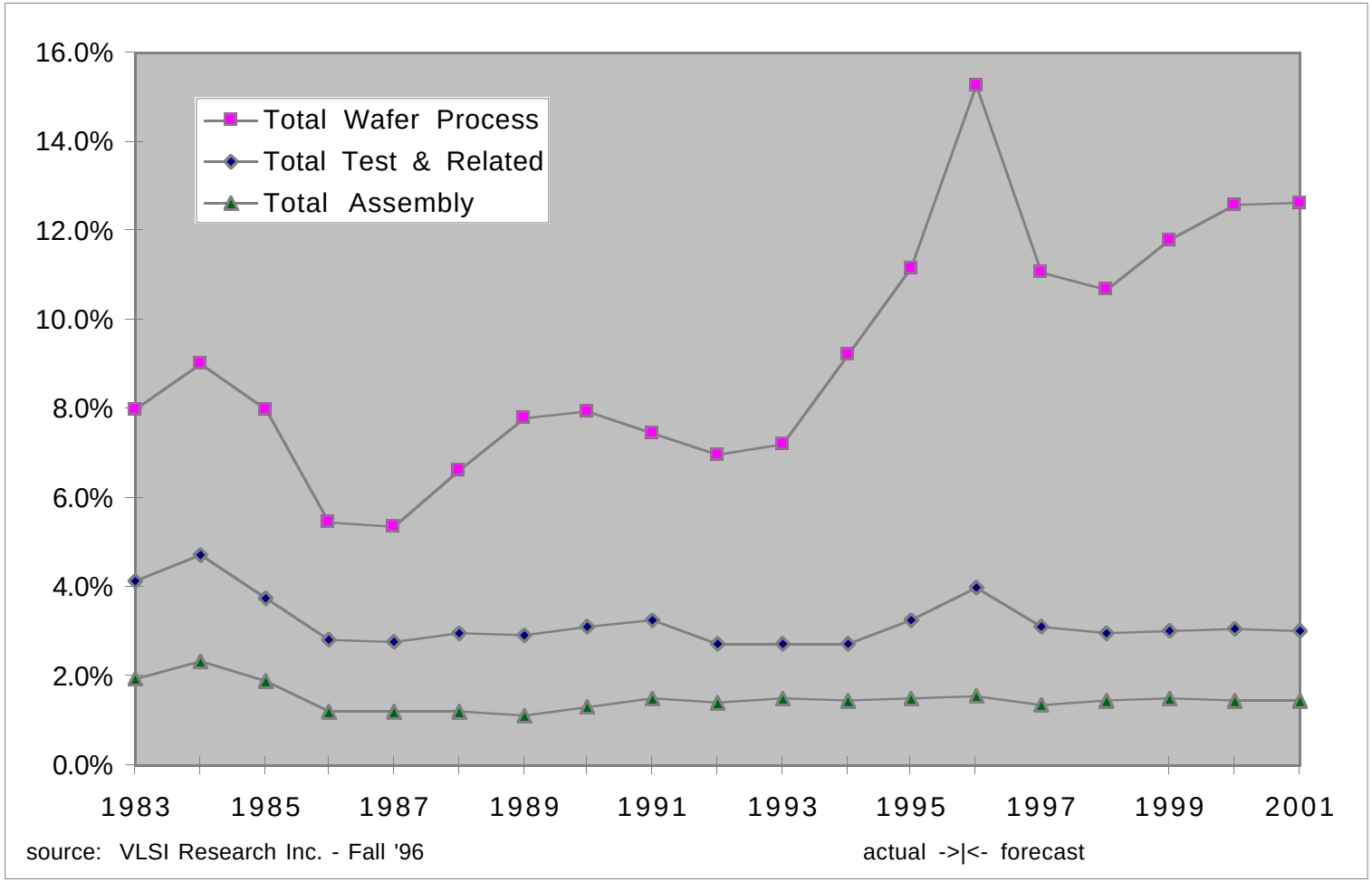
## *All Semiconductor Equipment*



# Capital Spending Ratio



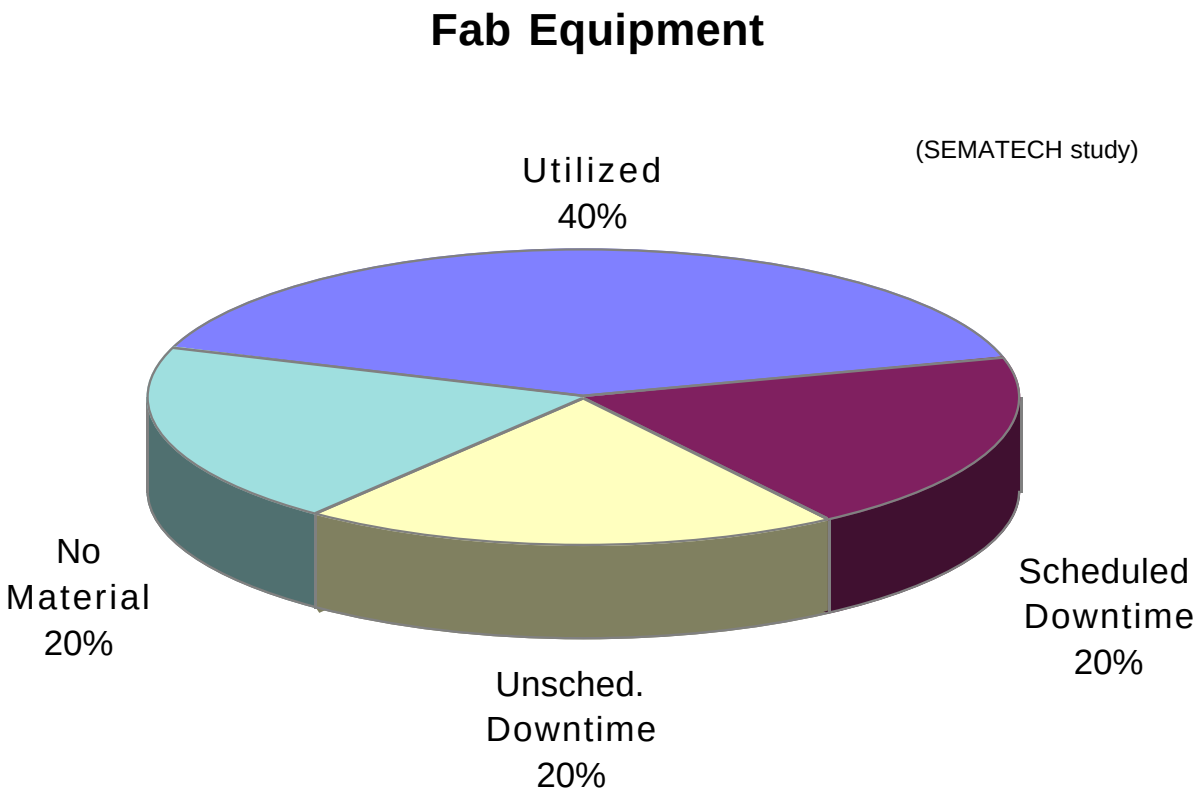
# Capital Spending Ratio



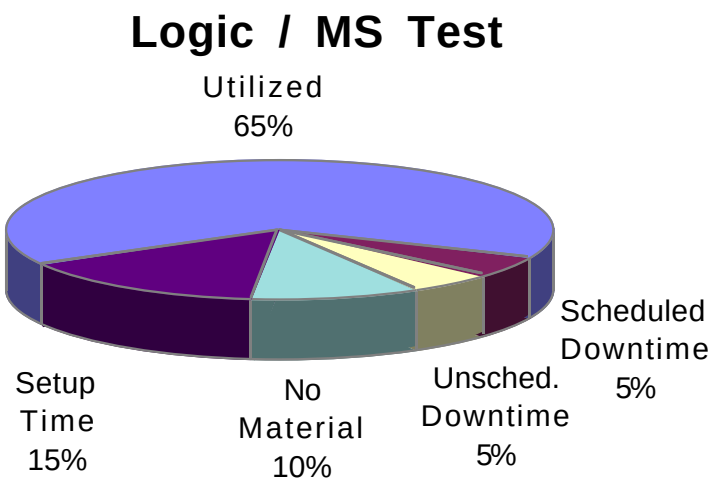
# Automation ROI:

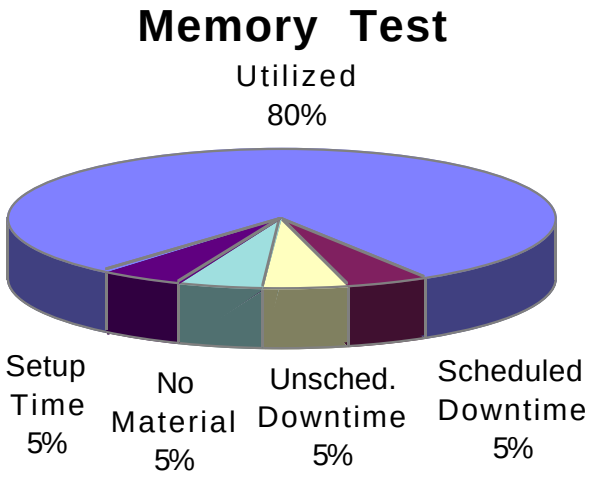
- Utilization
- Cycle Time
- Yield Improvement
- Human Errors
- Safety

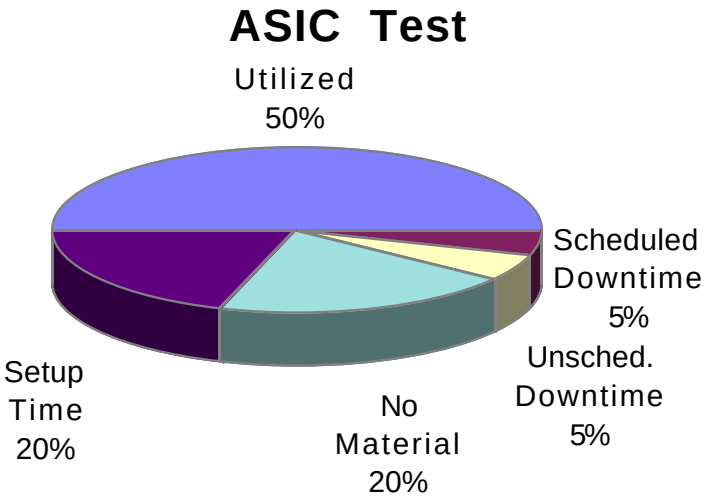
# Equipment Utilization



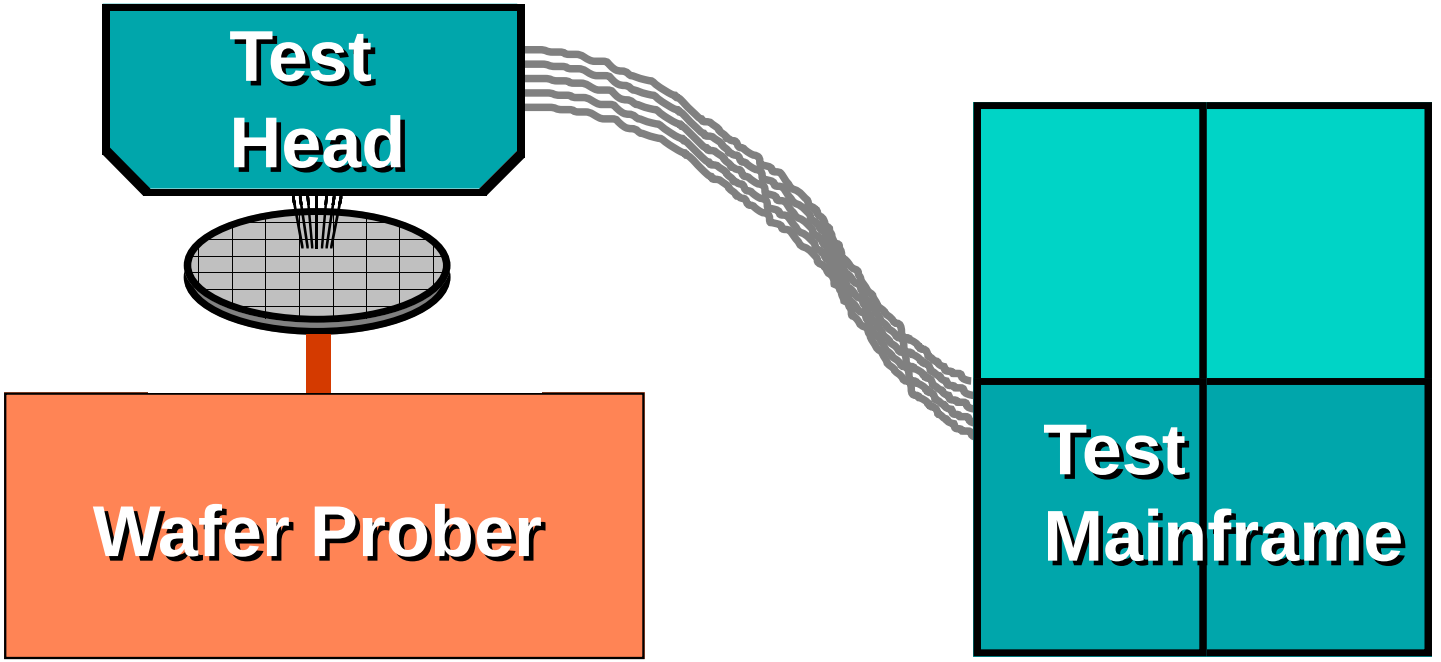
# Equipment Utilization



# Wafer Probe




Electroglas
Tokyo Electron Ltd.
Tokyo Seimitsu Co.

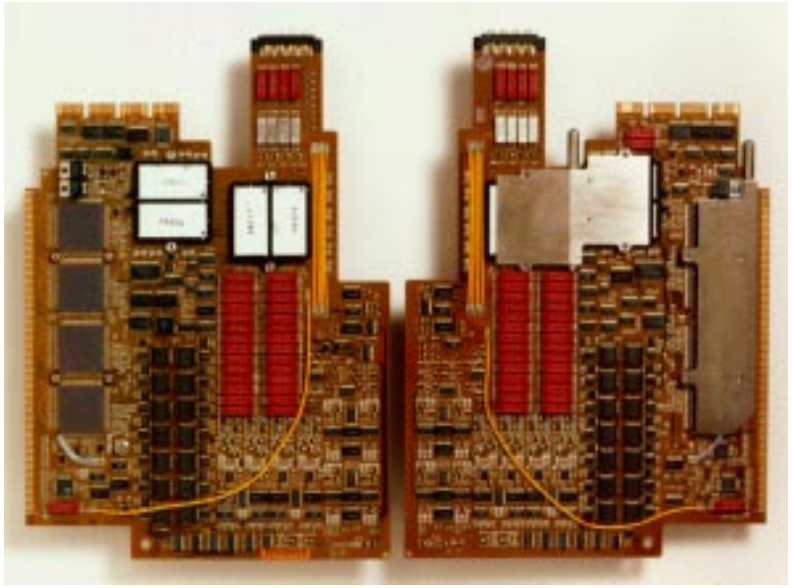
Advantest
Credence
Hewlett Packard
LTX Corp.
Schlumberger
Teradyne

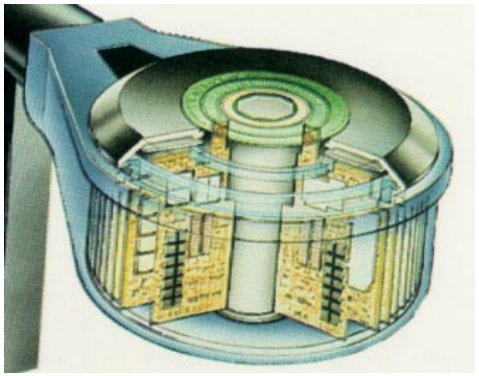
# Fixturing - The Real Issue

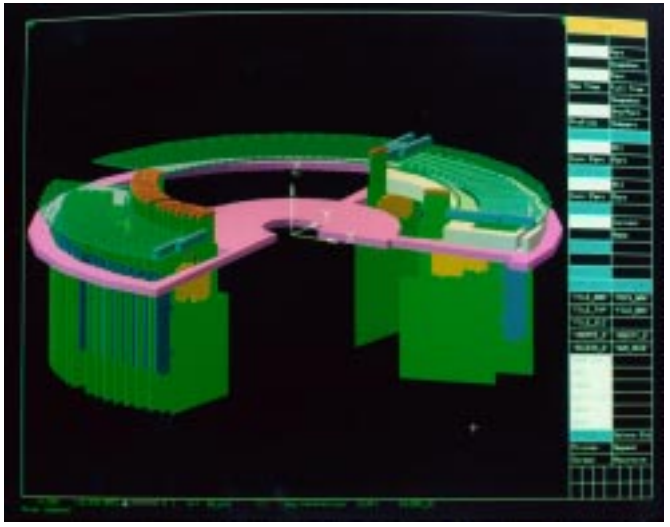
- Tool Automation
- Setup Time is significant
- Multiple Prober Configurations
  - Loading
  - Alignment
  - Probe Card
- Tester Form Factors

# Tester Design

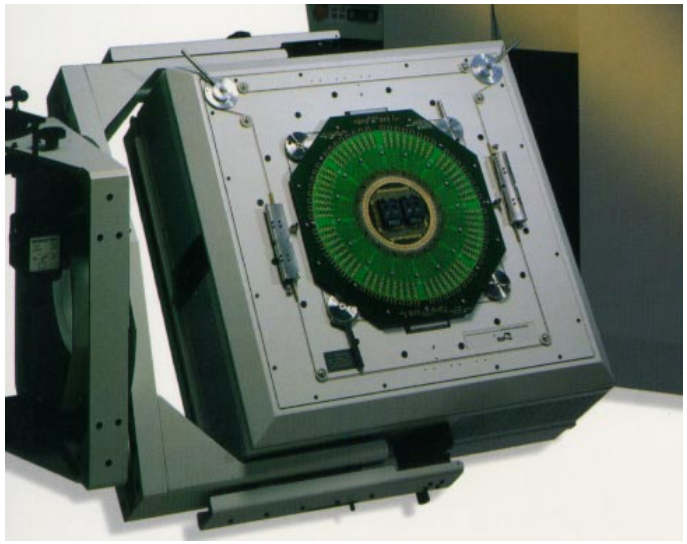
## *From the Inside -> Out*

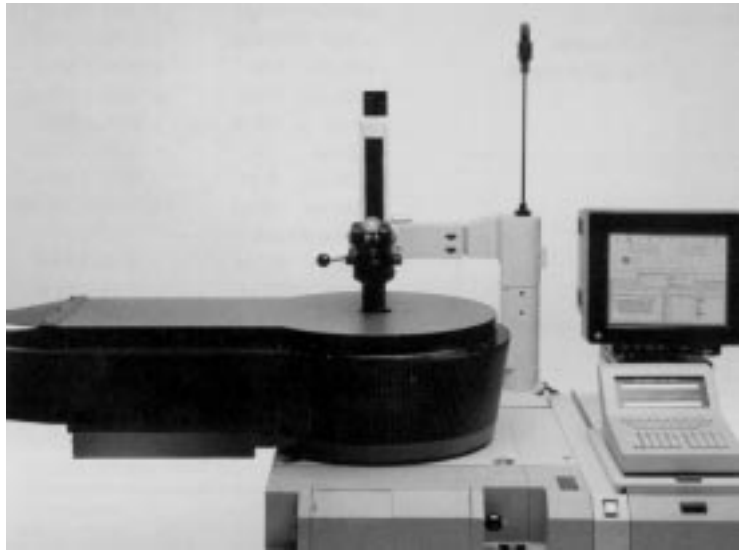




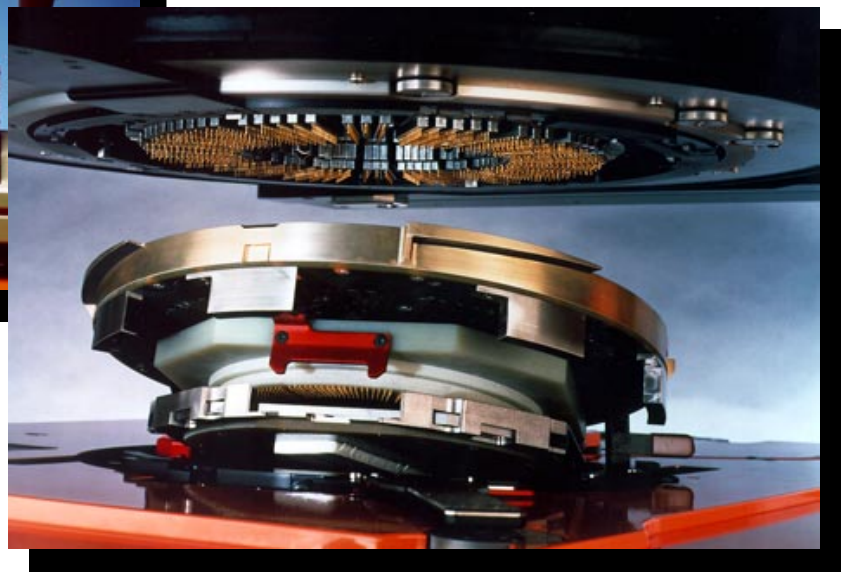


# Tester Form Factors

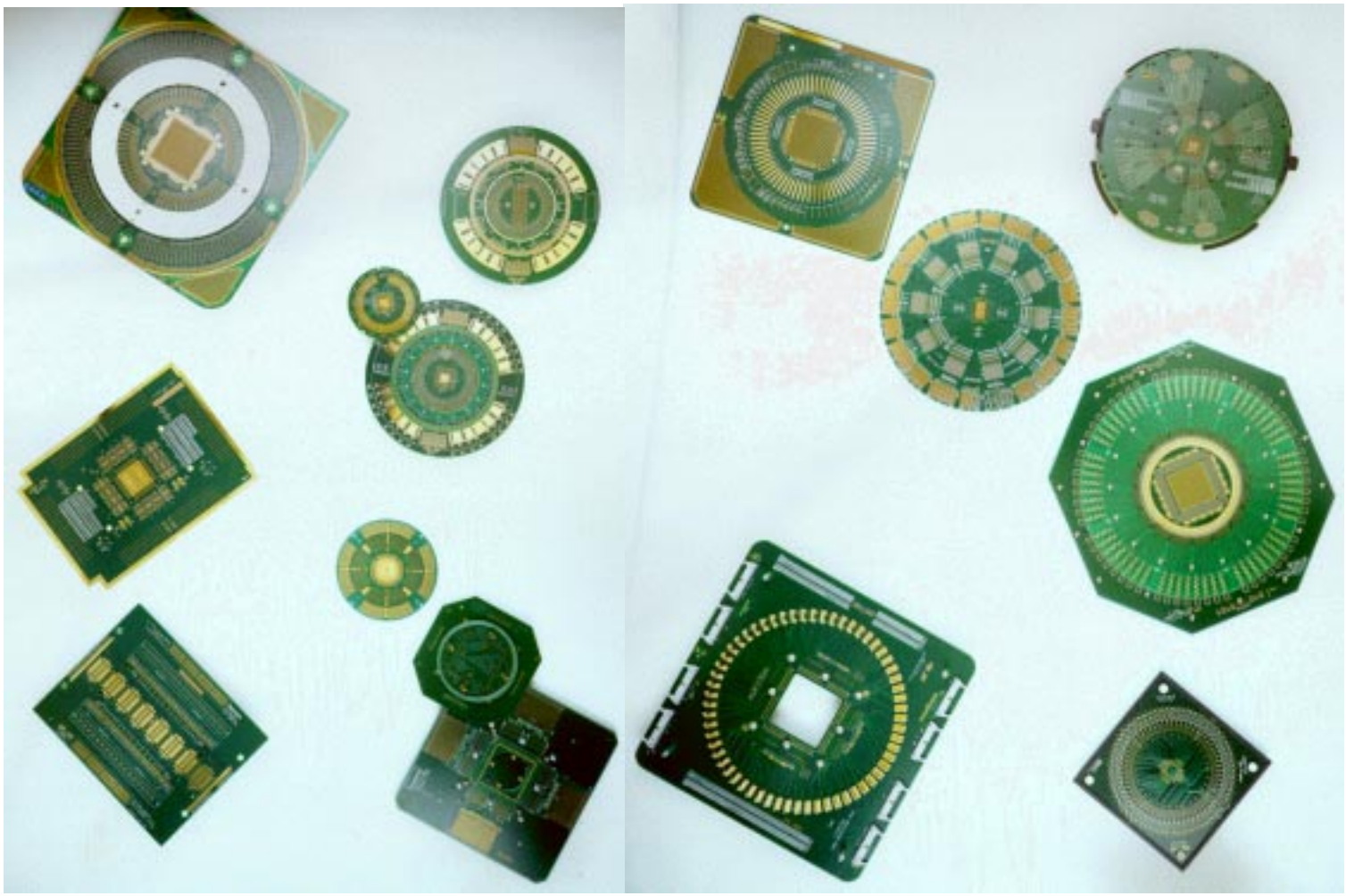




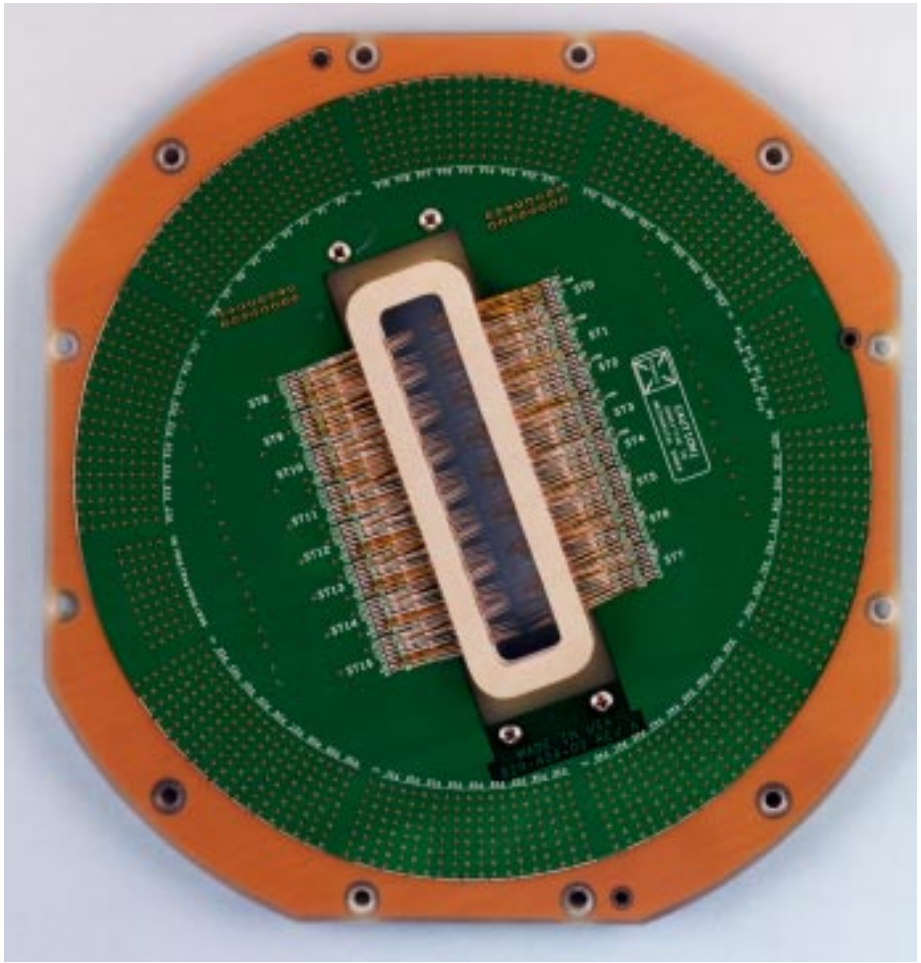
# Interface Variations

# Interface Proliferation



# Probe Card Complexity



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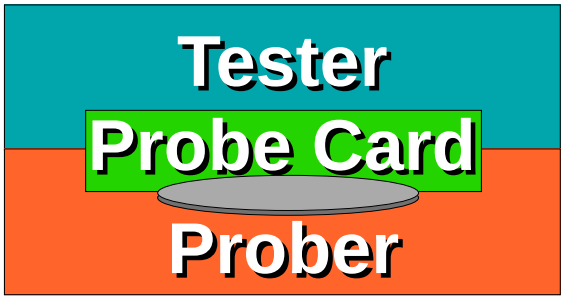
# Electroglas Probing Integration Center

EPICenter




# The Vision

***"To be the center of excellence for integration of the prober, probe card and tester technologies."***

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# What is the EPI Center?

## *Electroglas Probing Integration Center*

- **Is an Industry resource sponsored by Electroglas and Partners where:**
  - **Partners can fully integrate, optimize and test combined probe solutions prior to delivery to customers.**
  - **New Probe technologies can be characterized.**
  - **Customers can see & evaluate standard state-of-the-art wafer probe systems.**
  - **Public domain information can be shared on probe technology.**
- **Is not:**
  - **A way to gain or lose proprietary intellectual property.**
  - **Customer specific problem solving**

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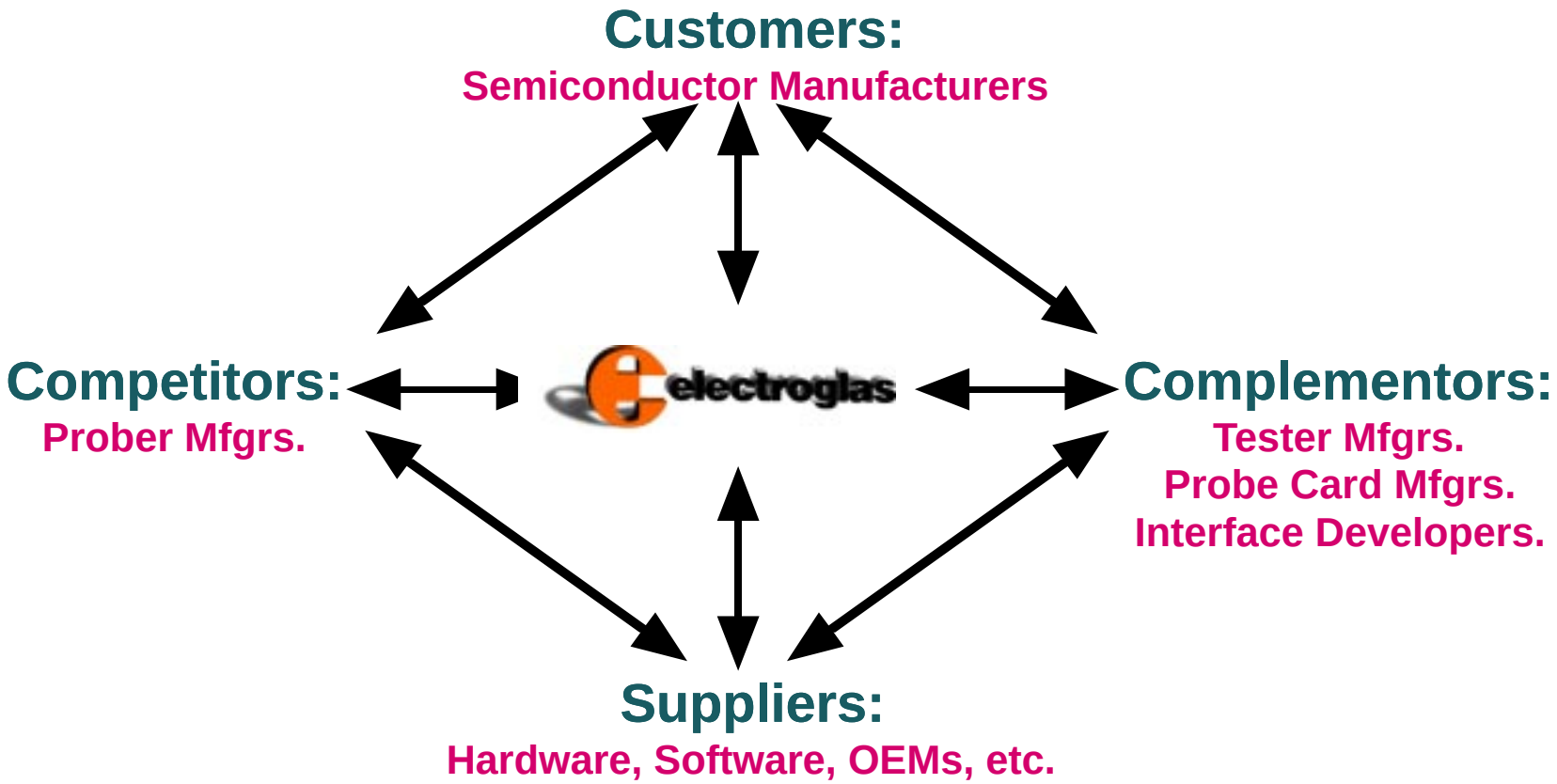
# The Concept




source: "Co-opetition" - Brandenburger & Nalebuff

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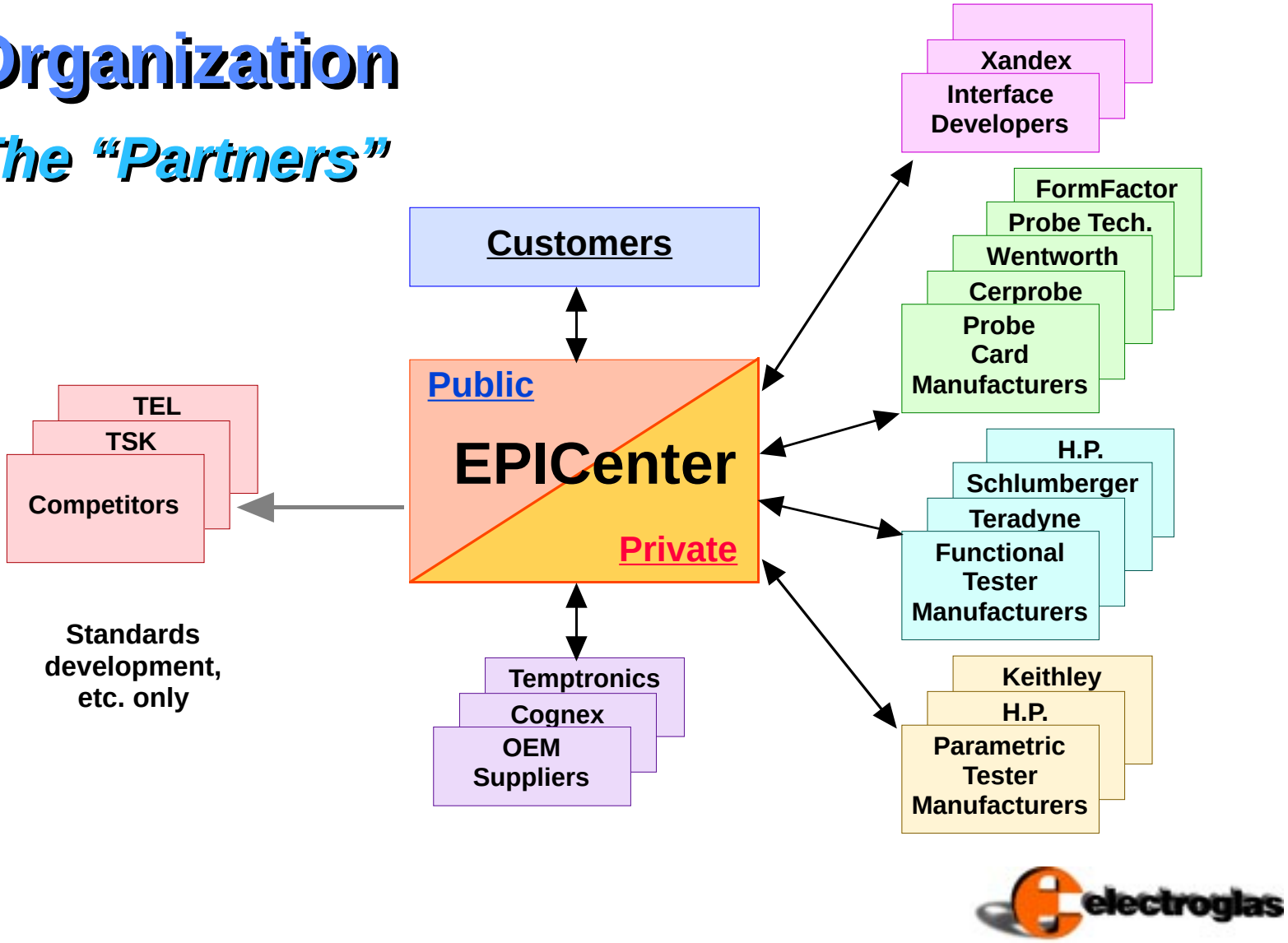
## Organization

### *The "Partners"*

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# The Partners

- Keithley Instruments (Parametric Testers)
- Hewlett Packard (Para. and Functional Testers)
- Teradyne (Functional Testers)
- Schlumberger (Functional Testers)
- Cerprobe (Probe Cards)
- Wentworth (Probe Cards)
- Probe Technology (Probe Cards)
- FormFactor (Probe Cards)
- Xandex (Probe Products)
- Temptronic (Thermal Systems)

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# The Benefits

## *The Customer*

- Turnkey solutions upon delivery.
- Reduced integration costs.
- Reduced time to volume.
- Optimized performance:
  - Mechanical Setup
  - Electrical Setup
  - Probing Process
  - Throughput / Productivity

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# Status

## *Phase 1 - Completed*

- Confirm EGLS Commitment
- Sign up Initial Partners
- Press Release Announcement

## *Phase 2 - Started*

- Commence Staffing
- Set-up Facility
- Establish Website
- Initiate First Integration Project

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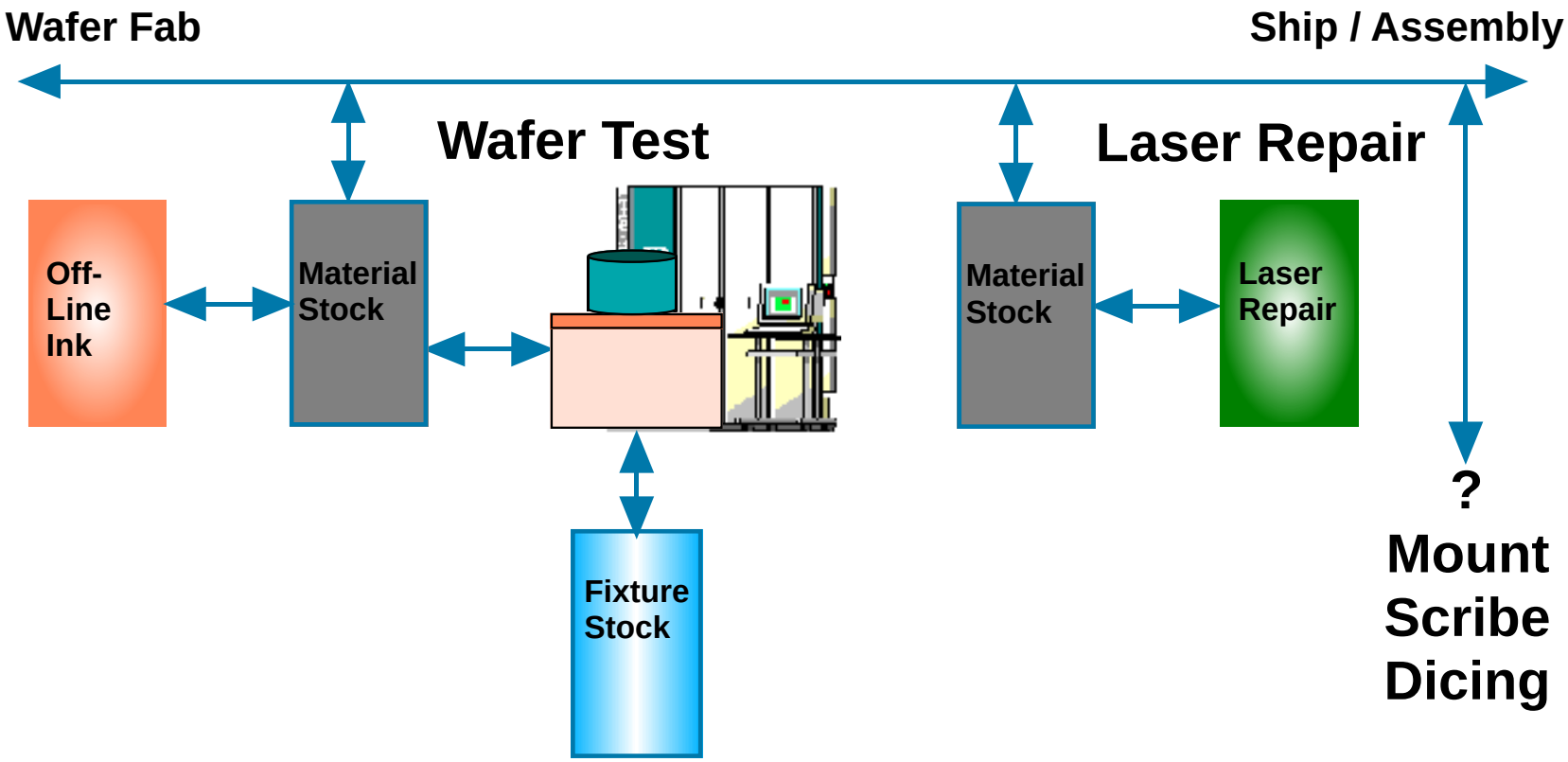
# Automation Responsibilities

- “Inter-Bay”
  Any Automation Company
- “Intra-Bay”
  Any Automation Company
- “Tool Automation”
  - Material Handling - Prober Companies
  - Fixturing setup - Prober / Tester / Probe Card Companies

# Wafer Probe

## *A Look Forward....*



**STeP**
Strategic Test Partners

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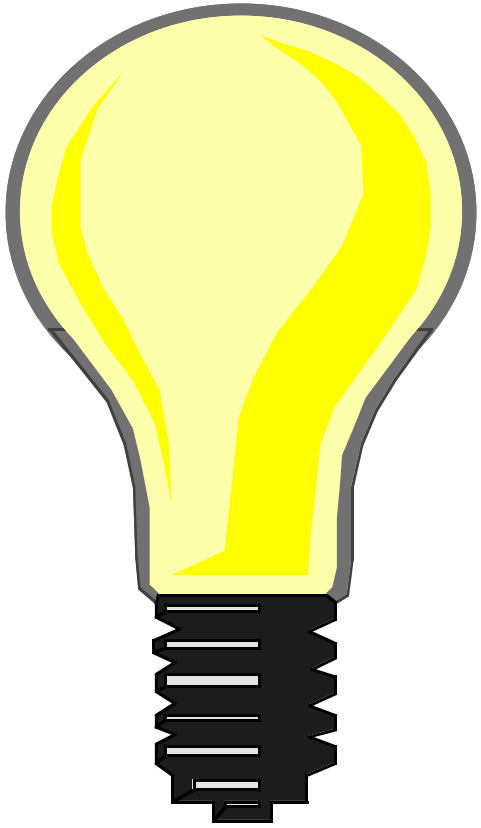

*Ron Leckie*