

**Lean  
Aerospace  
Initiative**



***Growing the  
Lean Community***  
*LAI Executive Board Meeting*

***Building The 21<sup>st</sup> Century  
Aerospace Workforce***

May 9, 2001

*Presented By:*  
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Steve Sleight, IAM  
and Thomas Kochan, MIT

Research Sponsored Jointly with Labor Aerospace  
Research Agenda



## ***Aim for this Session***

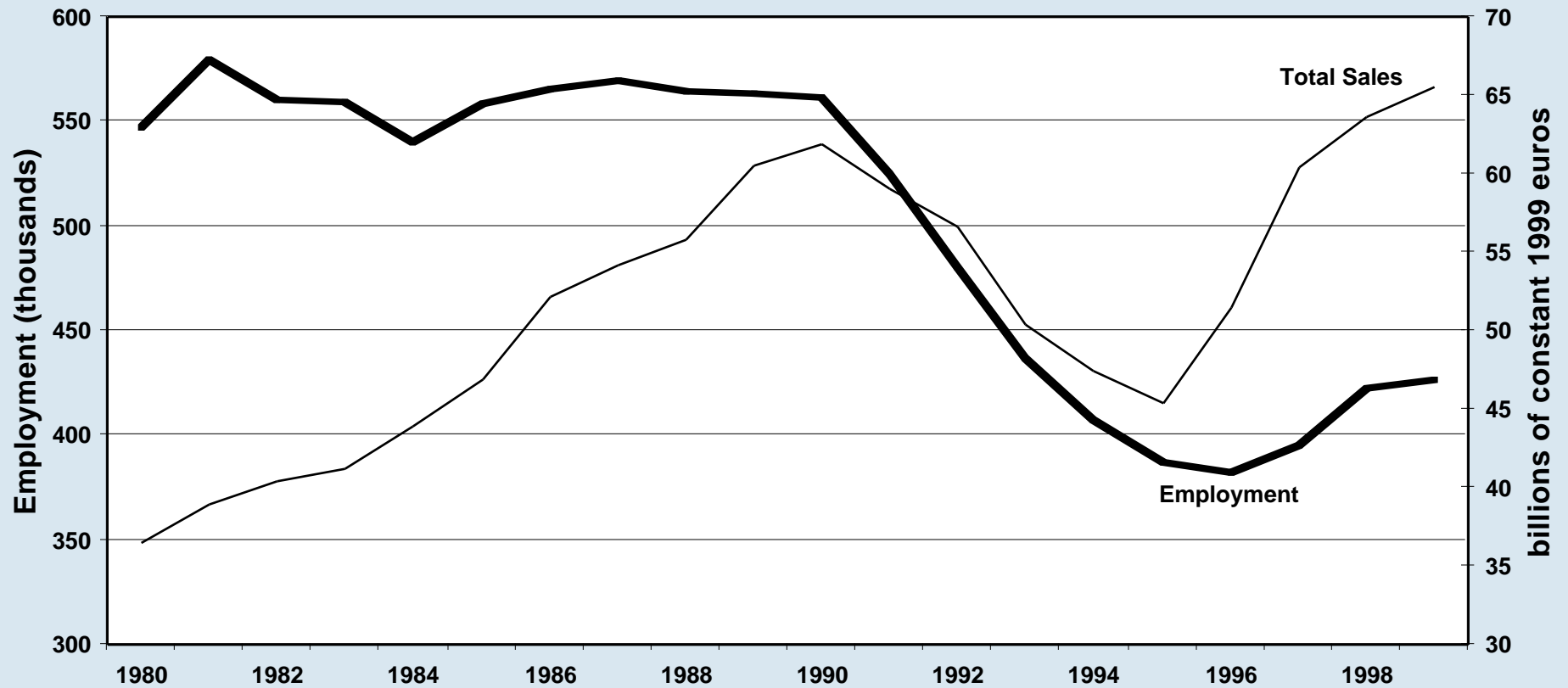
- **Begin with a call to action**
  - **Present evidence on the dimensions of an employment crisis in the Aerospace Industry**
  - **Understand the links to issues of instability and lean**
- **Focus dialogue on high leverage, mutual gains options for all stakeholders in the industry**
- **Identify specific next steps**
  - **Under the auspices of LAI**
  - **In other forums as appropriate**



- **Dimensions of an employment crisis in Aerospace:**
  - **Increasing skill shortages**
    - Changing skill mix in a post-cold war era
    - Reduced investment in training and development
  - **Divisive and immobilizing concerns over job security**
    - Industry has lost over 500,000 jobs since 1990
  - **Demographic “cliff”**
    - Average age of IAM members is 44 in the Commercial Sector and 53 in Defense – with over 20% eligible to retire in next 3 years
  - **Global competitive dynamics**
    - Projected loss of jobs and revenue due to increased global competition, as well as complex issues around projected increase in foreign content
    - Projected job growth in European Aerospace Industry
- **Inability to attract and retain a 21<sup>st</sup> Century workforce**

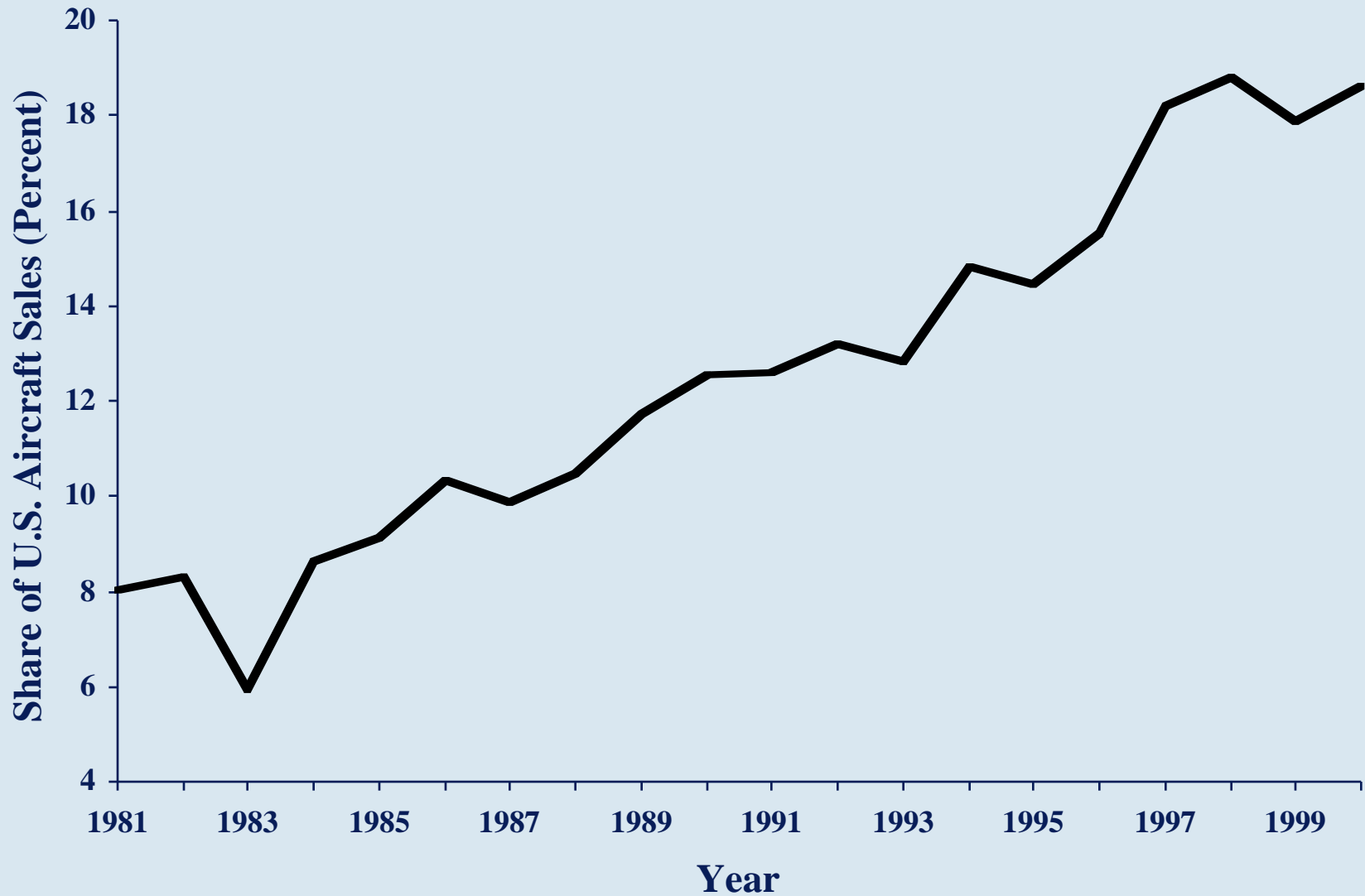


# U.S. Aerospace Employment and Sales 1987-2000





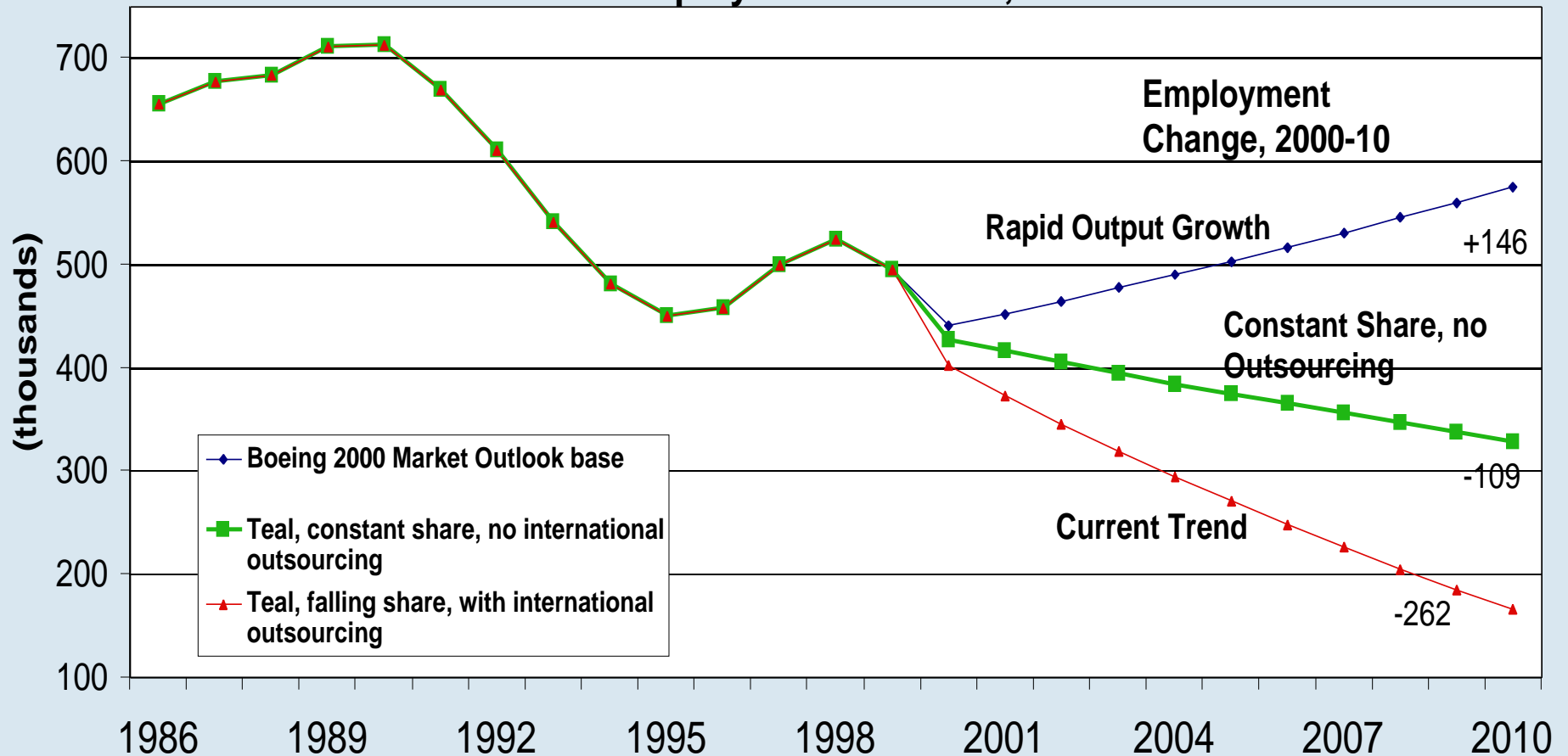
## U.S. Engines and Parts Imports as a Share of Total Aircraft Sales, 1981-2000





# Three Scenarios for U.S. Aerospace Employment

U.S. Aircraft Employment Forecast, 2000-10



Source: Rob Scott, EPI and LARA



# Assumptions and Ten-Year Forecast Results

- **Low Growth Scenario: 262,000 jobs lost**
- **U.S. Share of World Market: -41.5%**
- **Productivity Growth: +34.6%**
- **Falling Demand: -12.4%**
- **Rising Share of Imported Parts and Engines:  
+11.5%**

- Key Assumptions and Sources:
- Teal Group, "World Aircraft Overview, 1999", *World Military & Civil Aircraft Briefing*. Charts: "Aircraft Production, Civil and Military" and "The Big Aircraft Builders"
- Boeing, "World demand for commercial airplanes," *Current Market Outlook, 2000*.
- All demand forecasts scaled up to equal total Aircraft, Engines and Parts Sales, as reported in Aerospace Industries Association, *2000 Year-End Review and Forecast*.
- Direct employment losses estimated using the Bureau of Labor Statistics "Employment Requirements Table, 1998." Two percent annual productivity growth from 1999 through 2010 assumed in all scenarios. Source: Rob Scott, EPI and LARA



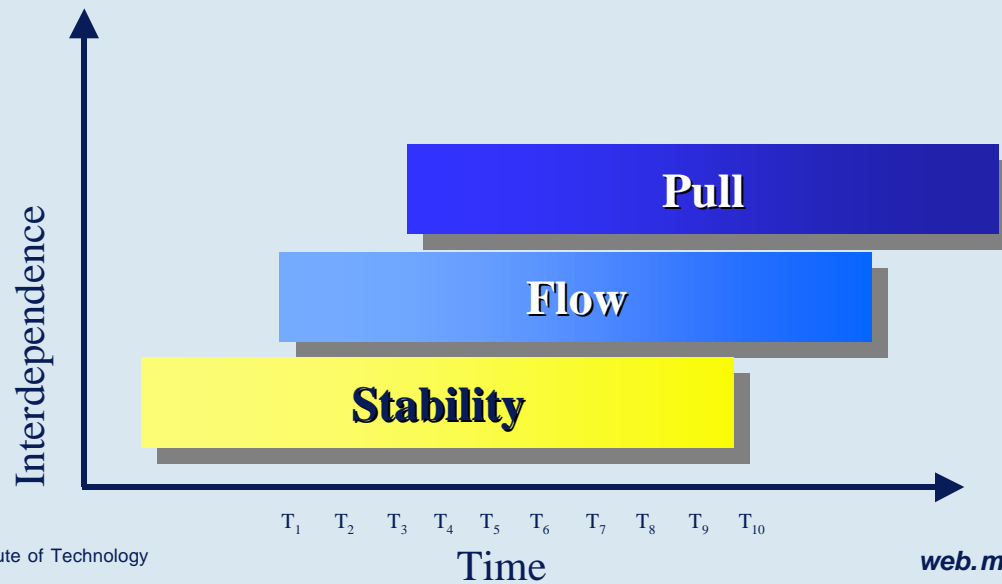
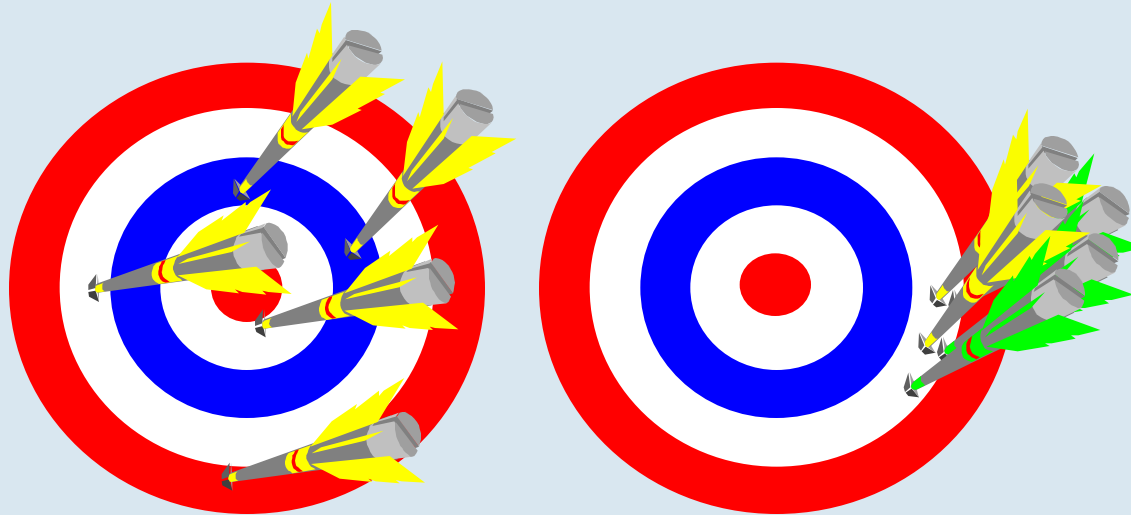
**A projected skills gap in the overall  
workforce:**

***“The ability to read, write, and compute with competence, think analytically, adapt to change, to work in teams and use technology”***

Source: *A Nation of Opportunity*. Report of the 21st Century Workforce Commission, 2000.



# Why Worry About Instability?





## ➤ Types of instability:

### ➤ Funding/orders

- Shift from R&D to production funds
- Fluctuations in demand for primary product in facility

### ➤ Technology

- Changes in customer requirements
- Shifts in materials
- Rapid pace of change in computer capabilities)
- Environmental constraints

### ➤ Organizational

- Acquisition/layoffs
- Mergers/restructuring
- Relocation of products among facilities
- Two-tier relationship between sister facilities
- Demographics -- retirements/gaps in past hiring, skill shortages
- Turnover -- management, engineering, and hourly



### ➤ Observed mitigation strategies:

#### ➤ *Business Strategy*

- Increase proportion of commercial business sought
- Shift in product mix to increase focus on space

#### ➤ *Human Resource Management/Industrial Relations*

- Cross-training/flexible utilization/teams
- Informal no-layoff practice
- Labor-management partnership
- Employee involvement
- Intensified training of hourly and salaried employees
- Co-location of engineers, teams
- Two-tier wage system
- Multi-facility transfer agreements

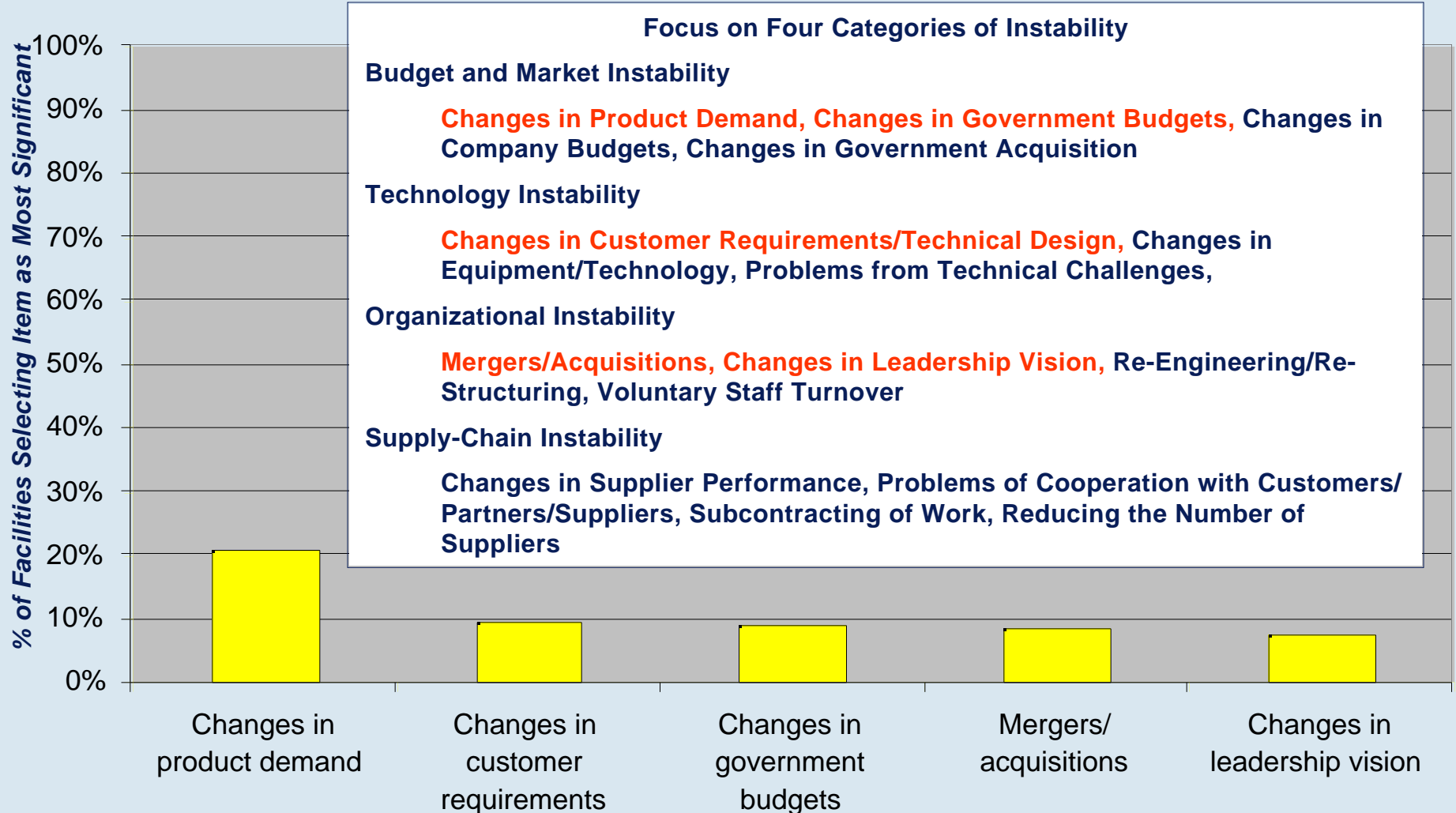


## ***Facility Survey: Survey Response Rate, Facility and Respondent Profile***

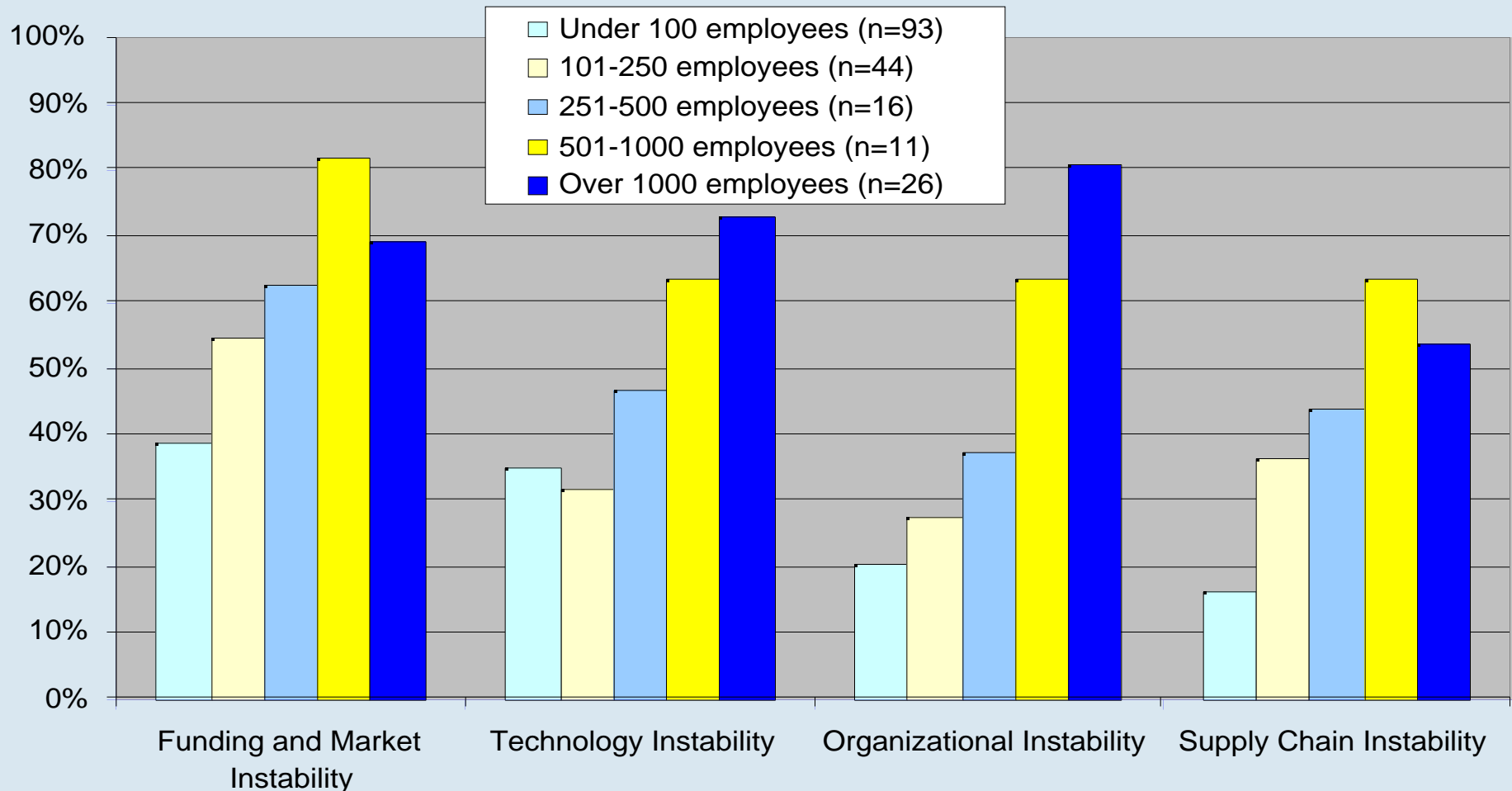
- **Survey focused on issues of instability, employment and innovation at the facility level**
- **198 aerospace facilities**
  - **Responses from Presidents, CEOs, Senior Facility Managers with an average of over 20 years in the industry**
- **Survey conducted in Summer/Fall 1999**



# Facility Survey: Sources of Instability



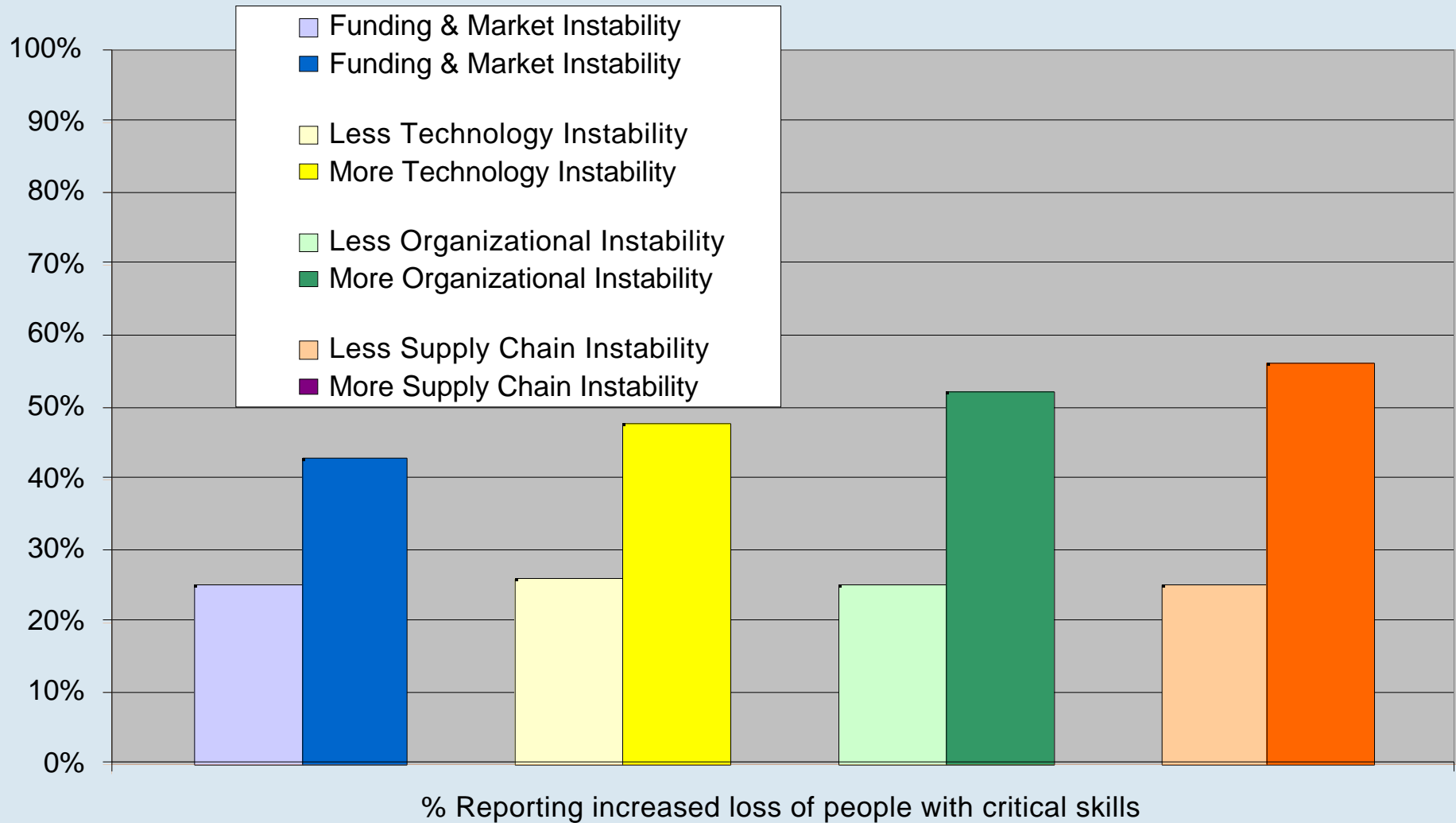
# High Levels of Instability and Facility Size



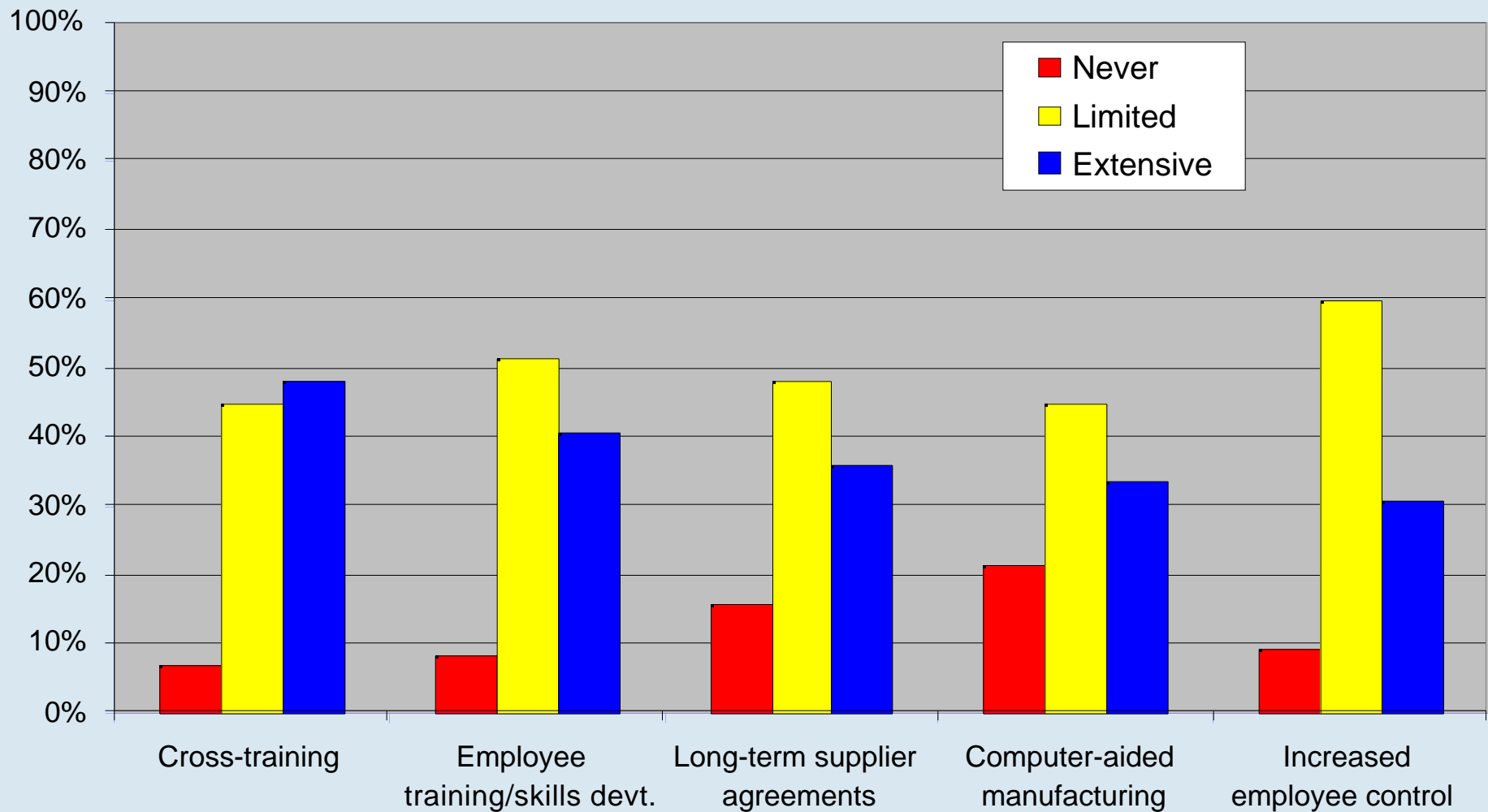
**Remedies to Instability Have to Be Sensitive to Facility Size**



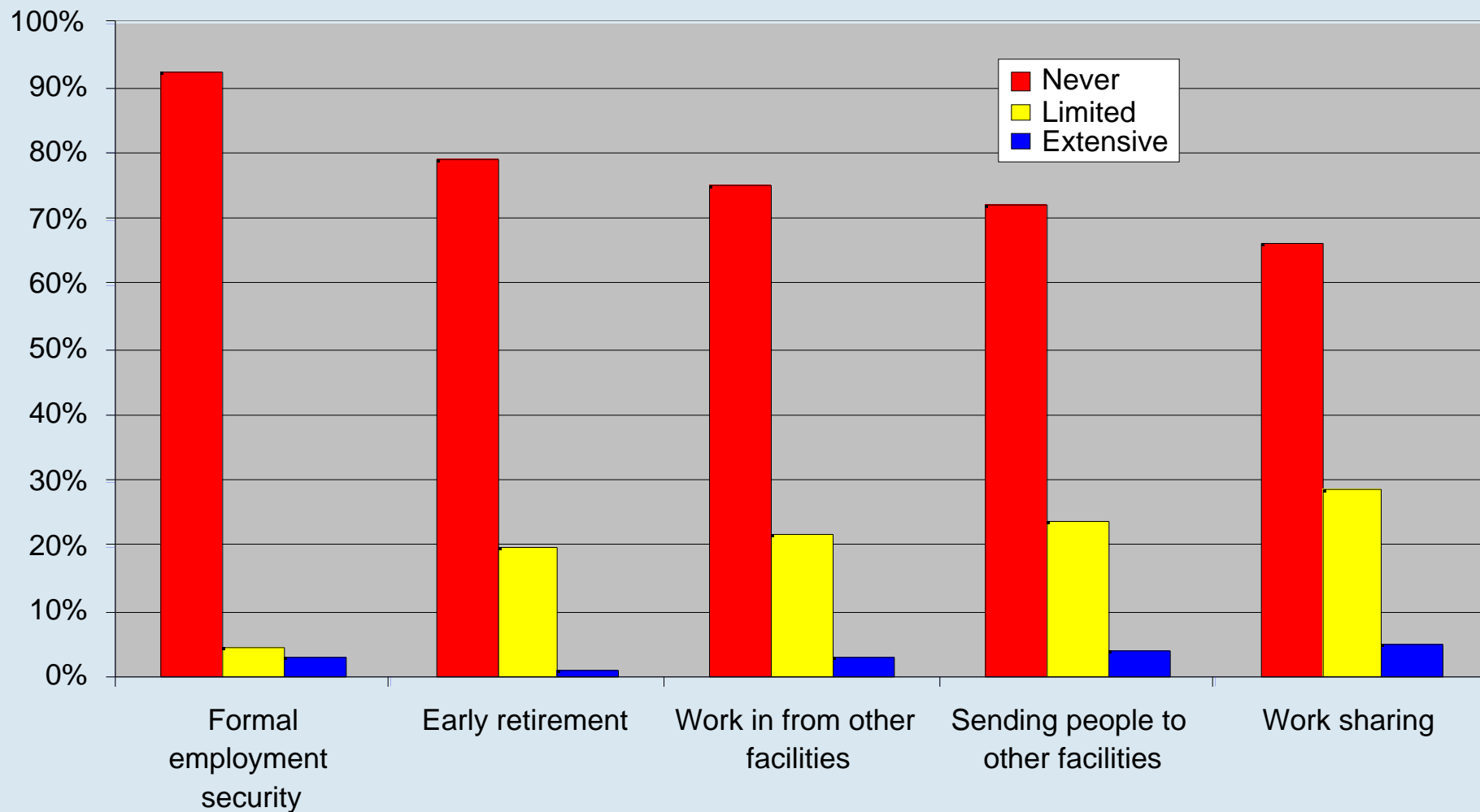
# Impact of Instability on Retention of Critical Skills



# Facility Survey: Reported Use of Mitigation Practices – Five Most Extensively Used Practices (past 3 yrs)



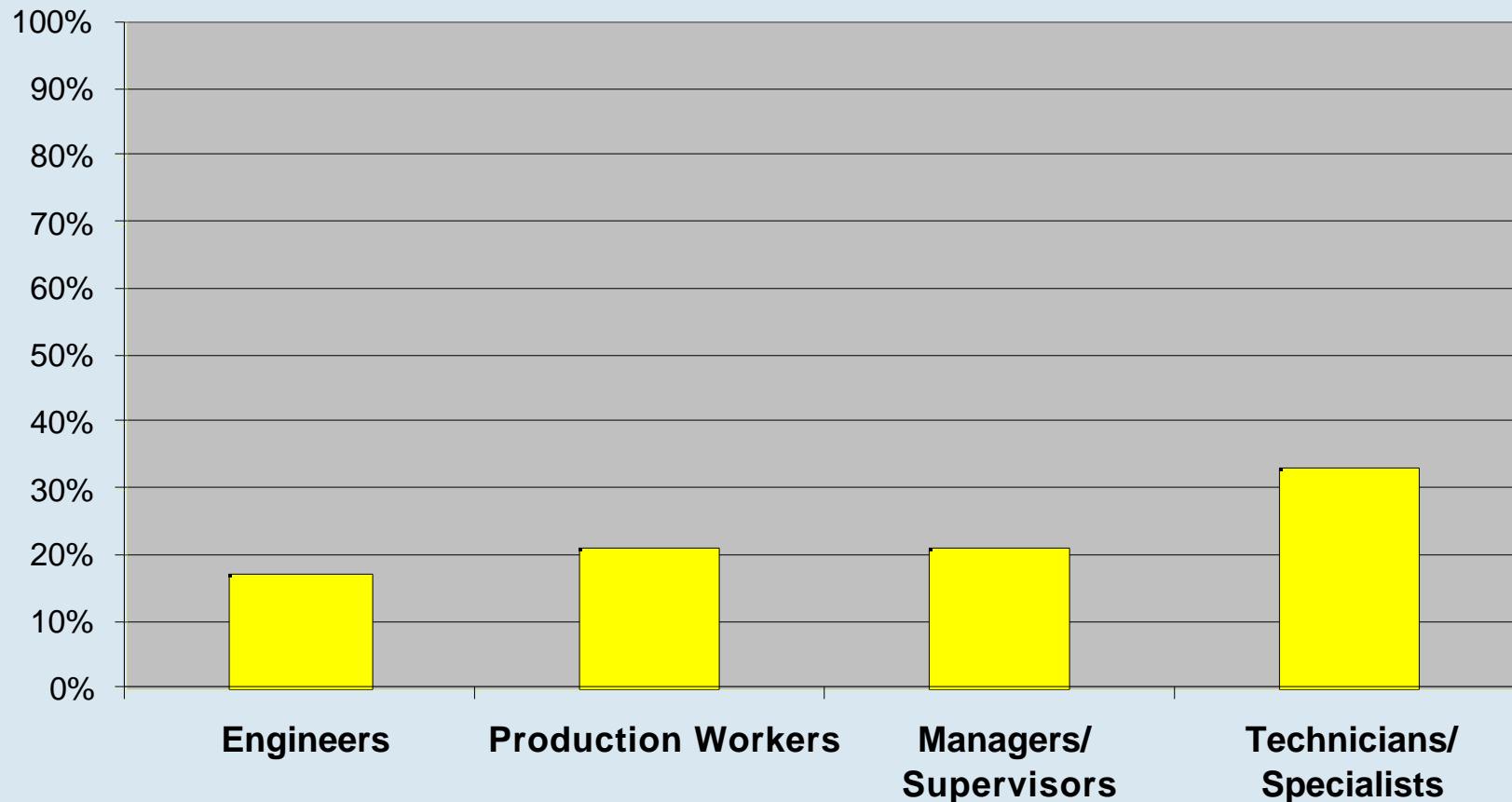
**Facility Survey: Reported Use of Mitigation Practices – Five Least Extensively Used Practices (past 3 yrs)**





# Future Prospects for the U.S. Aerospace Enterprise

***“I would highly recommend that my children work in this industry”  
(Agree or Strongly Agree, n=482)***





- **Attraction & retention of skilled workforce is a crucial challenge**
- **Existing remedies do not seem to be working**
- **Labor markets and product markets are interdependent**
- **Therefore—**
- **Need action to select and implement a coordinated set of remedies**
  - **Industrial actions**
  - **National policies**



# Potential Elements of an Action Agenda

- **Several possible industry-wide initiatives:**
  - Aerospace industry skill/capability requirements
  - Effective enterprise knowledge management systems
  - Aerospace industry apprenticeship/training systems
  - Regional workforce sharing
  - Training and curriculum initiatives
  - Government as an employer
  - Next generation aerospace industry workforce
  - Implications of increasing globalization in the industry
- **Government policies play a role**
  - *For example:* Clear and explicit consideration of workforce/skills implications in acquisition processes



- **Entities to define and enable industry remedies and Government policy:**
  - **Special internal group jointly sponsored by LAI and LARA**
  - **Initiative adjunct to LAI**
    - **LARA is a prototype**
  - **Independent tri-partite initiative**
  - **Sub-group within AIAA or other professional associations**
  - **Sub-group within AIA or other industry association**
  - **A cross-industry, cross-institutional cooperative group**



- **Recommendation**
  - **Establish a special Executive Board subcommittee on the 21st Century Aerospace Workforce**
- **Subcommittee charter**
  - **Prioritize remedial actions**
  - **Recommend practical implementation actions**
    - **With appropriate institutional arrangements**
  - **Provide ongoing executive leadership and guidance**