Growing the Lean Community
LAI Executive Board Meeting

Building The 21st Century Aerospace Workforce

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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
A Call to Action

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 21st Century workforce

Employment (thousands)


Total Sales

Employment

billion of constant 1999 euros

300 350 400 450 500 550 600

330 350 370 390 410 430 450

30 35 40 45 50 55 60

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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

- **Boeing 2000 Market Outlook base**
- **Teal, constant share, no international outsourcing**
- **Teal, falling share, with international outsourcing**

**Employment Change, 2000-10**
- **Rapid Output Growth** +146
- **Constant Share, no Outsourcing** -109
- **Current Trend** -262

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:

- 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.

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”

Why Worry About Instability?

Interdependence

Pull

Flow

Stability

Time
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

Organization:

- 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
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

Focus on Four Categories of Instability

Budget and Market Instability
- Changes in Product Demand, Changes in Government Budgets, Changes in Company Budgets, Changes in Government Acquisition

Technology Instability
- Changes in Customer Requirements/Technical Design, Changes in Equipment/Technology, Problems from Technical Challenges,

Organizational Instability
- Mergers/Acquisitions, Changes in Leadership Vision, Re-Engineering/Re-Structuring, Voluntary Staff Turnover

Supply-Chain Instability
- Changes in Supplier Performance, Problems of Cooperation with Customers/Partners/Suppliers, Subcontracting of Work, Reducing the Number of Suppliers

% of Facilities Selecting Item as Most Significant

- Changes in product demand
- Changes in customer requirements
- Changes in government budgets
- Mergers/acquisitions
- Changes in leadership vision
Remedies to Instability Have to Be Sensitive to Facility Size
Impact of Instability on Retention of Critical Skills

- Funding & Market Instability
- Less Technology Instability
- Less Organizational Instability
- Less Supply Chain Instability
- More Technology Instability
- More Organizational Instability
- More Supply Chain Instability

% Reporting increased loss of people with critical skills
Facility Survey: Reported Use of Mitigation Practices – Five Most Extensively Used Practices (past 3 yrs)

- Cross-training
- Employee training/skills development
- Long-term supplier agreements
- Computer-aided manufacturing
- Increased employee control

Legend:
- Red: Never
- Yellow: Limited
- Blue: Extensive
Facility Survey: Reported Use of Mitigation Practices – Five Least Extensively Used Practices (past 3 yrs)

- Formal employment security
- Early retirement
- Work in from other facilities
- Sending people to other facilities
- Work sharing

The graph shows the percentage of reported use of mitigation practices over the past three years, with categories ranging from Never, Limited, to Extensive.
“I would highly recommend that my children work in this industry”
(Agree or Strongly Agree, n=482)
Conclusions

- 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
Institutional Approaches

- 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
Next Steps

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