LOCKHEED MARTIN
Aeronautics Company

Advanced Development Programs

0004395 00
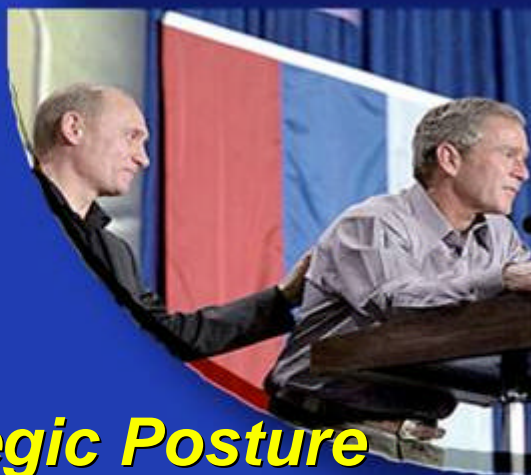
War on Terrorism

- Make it Proactive -
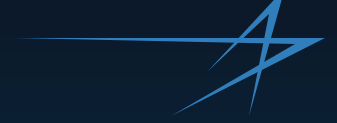
Transformational Forces

- Make it Relevant -

New Strategic Posture

- Make it Flexible -

Homeland Security

- Make it Effective -

To Address The Growing Threat To Our Way Of Life And Maintain a Leadership Role

The Defense Industry Must Proactively Engage and Provide Direction to The "Education System" to Produce " Engineers & Scientists"

- **What is the Current Workforce Situation**

- **What is the Future Workforce Assessment**

- **What is the Composition of Future Workforce**
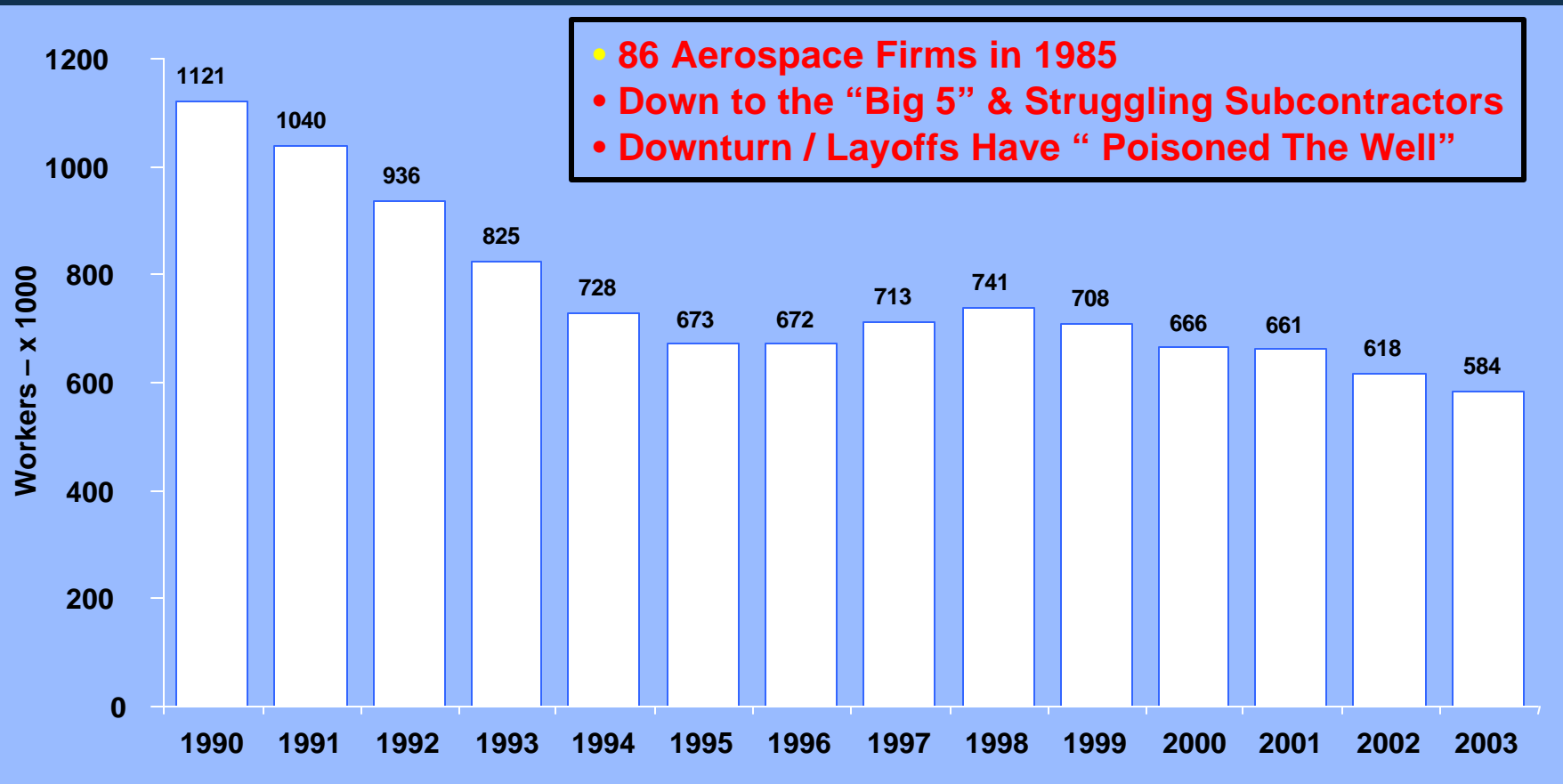
- **What Might be Away Forward**

- **The Industry No Longer Has the Long Lines of Technical People, Engineers and Scientists Pounding Down Our Doors …**

- **The Industry Is Not as Appealing as It Used To Be . . .**

- **The Industry is Not Viewed as "Friendly and Inviting" Work Environments …**

- **The Industry is Facing Both a Aging Work Force and Diverse Work Force Composition …..**

It is Our Problems to Work . . .

• 86 Aerospace Firms in 1985
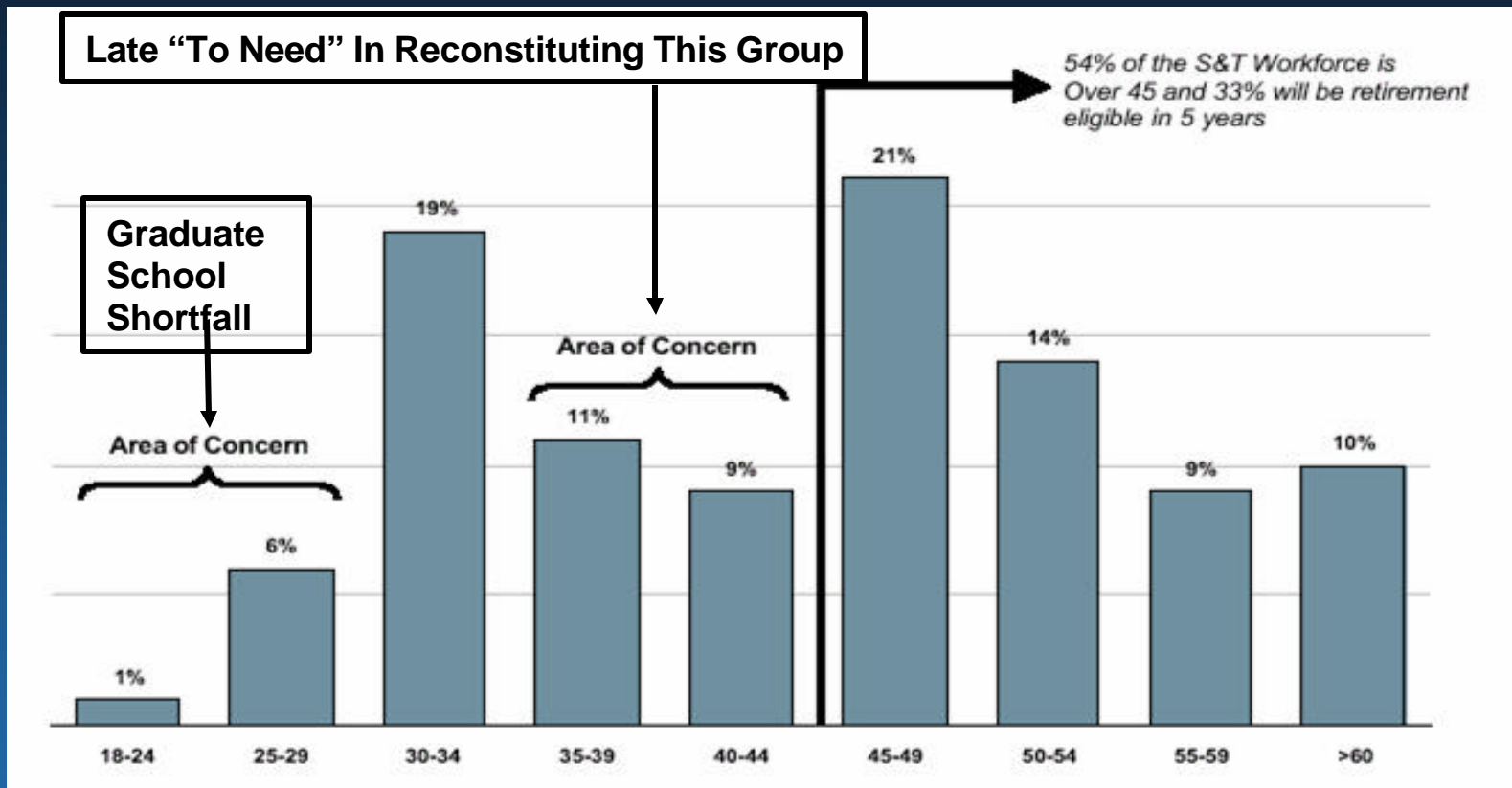**• Down to the "Big 5" & Struggling Subcontractors**
• Downturn / Layoffs Have " Poisoned The Well"

Chart: Workers – x 1000

Year	Workers (x 1000)
1990	1121
1991	1040
1992	936
1993	825
1994	728
1995	673
1996	672
1997	713
1998	741
1999	708
2000	666
2001	661
2002	618
2003	584

Consolidation in the Industry Has Taken its Toll

Late "To Need" In Reconstituting This Group

Graduate School Shortfall

54% of the S&T Workforce is Over 45 and 33% will be retirement eligible in 5 years

Area of Concern

Area of Concern

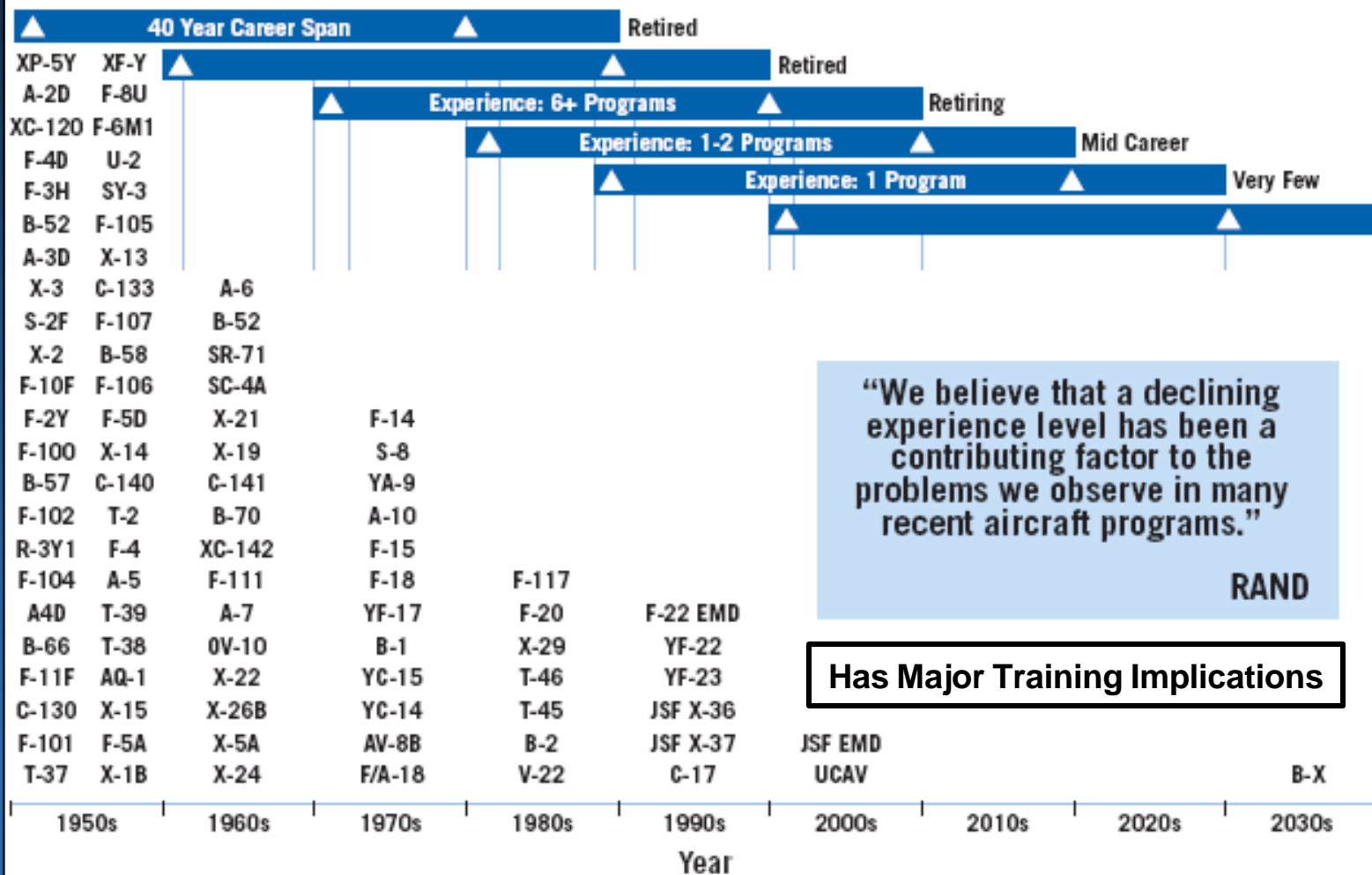| Age	%
18-24	1%
25-29	6%
30-34	19%
35-39	11%
40-44	9%
45-49	21%
50-54	14%
55-59	9%
>60	10%

Average Space Industry S&E Workforce Age Distribution

Fewer New Starts and Program Uncertainty Make it Difficult to Both Attract and Retain Essential Talent

Figure 4-3 Declining Experience Levels in Military Aircraft Programs
(Vertical Bars: Military Aircraft Program Starts, Horizontal Bars: Typical 40 Year Career Span)

"We believe that a declining experience level has been a contributing factor to the problems we observe in many recent aircraft programs."

RAND

Has Major Training Implications

Source: RAND Study (Chart by Northrop Grumman, Aerospace Industries Association)

- **60 % 0f College Freshman in California Education System need Remedial Assistance in Math**
- **" Schools Are Doing as Good or Even a Better Job Now, Given the Diversity of Their Students**
- **Cost of Remediation at Colleges and University ~ $ 1.0 Billion per year**

Source: David Spence, Cal State's Chief Academic Officer

BOTTOM LINE : To keep a leadership position in military aerospace, we must then find ways to encourage US population to pursue careers in Defense Industry focused Engineering degree programs.

US Students Science and Math Performance Relative to Other Countries
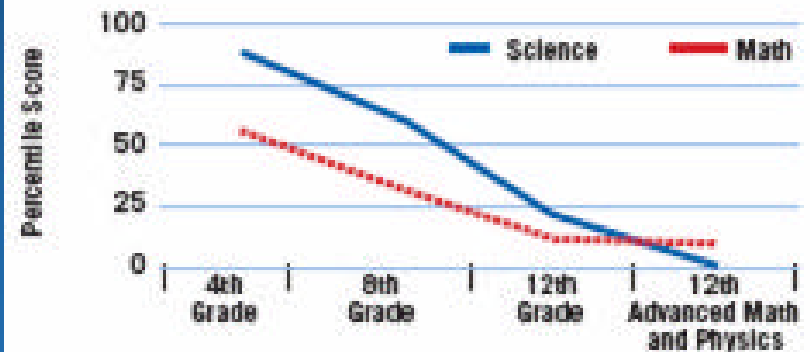
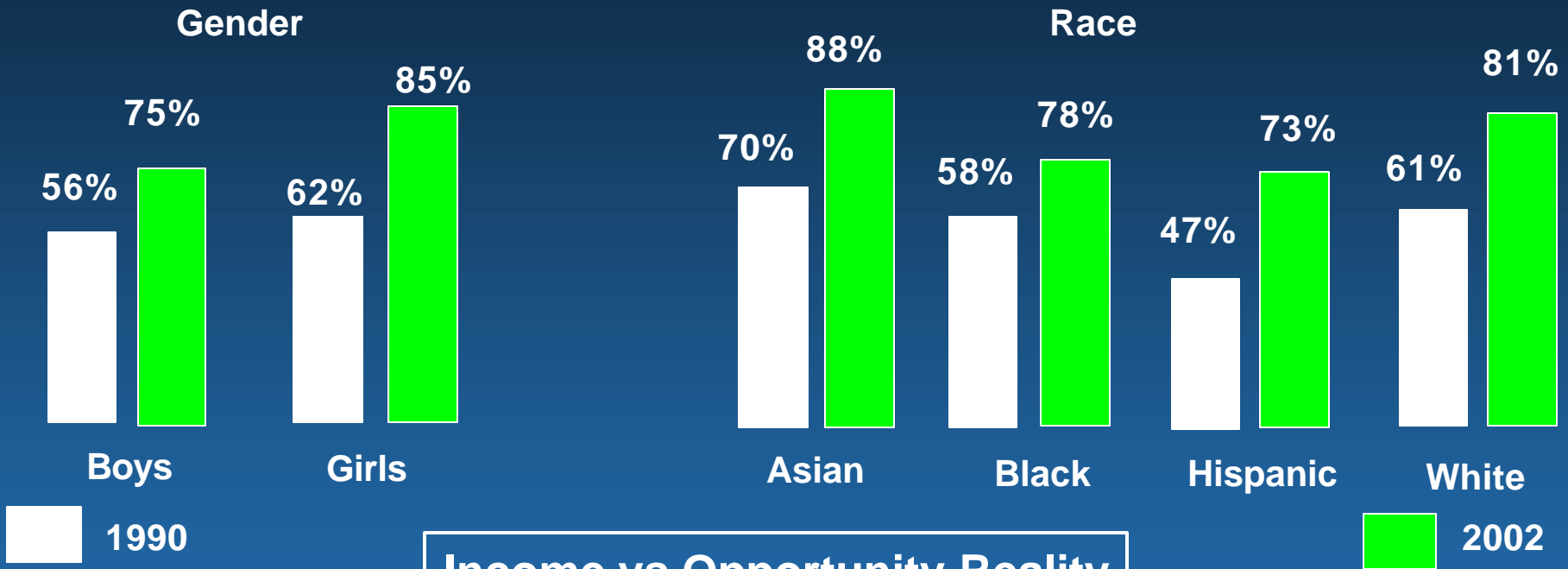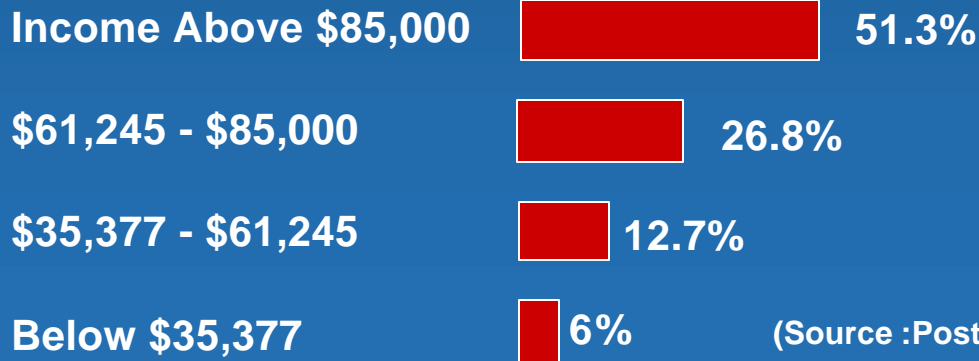Source: Council on Competitiveness, U.S. Competitiveness 2001

College Aspirations by Gender & Race (10th Graders)

(Source : National Education Longitudinal Study 1988& 2002)

Gender

Race

Boys: 56% (1990), 75% (2002)
Girls: 62% (1990), 85% (2002)

Asian: 70% (1990), 88% (2002)
Black: 58% (1990), 78% (2002)
Hispanic: 47% (1990), 73% (2002)
White: 61% (1990), 81% (2002)

☐ 1990

☐ 2002

Income vs Opportunity Reality

Income Above $85,000 — 51.3%

$61,245 - $85,000 — 26.8%

$35,377 - $61,245 — 12.7%

Below $35,377 — 6%

US 18 to 24 years olds from Higher Income families are more like to earn a bachelors degree but this is not a growing population….

(Source :Post Education Opportunity Analysis 2002 Census data)

Full-Time BS Engineering Enrollments

Graduate Stats

• **1991 Total 60,798**

• **2002 Total 62,377**

• **US is Ranked 17th Worldwide in Producing Scientists & Engineers**

Source: Engineering Workforce Commission

Engineering enrollments reflect growth in college-age population but lag the historical high & percentage has been decreasing

Engineering Graduates' Selected Disciplines

Includes B.S., M.S., Ph.D.

Discipline	1991	2002
Aerospace	4,072	2,665
Electrical	29,024	21,376
Mechanical	19,443	17,948
Computer	8,259	20,388
Total	60,798	62,377

Source: Engineering Workforce Commission

Terms of Reference
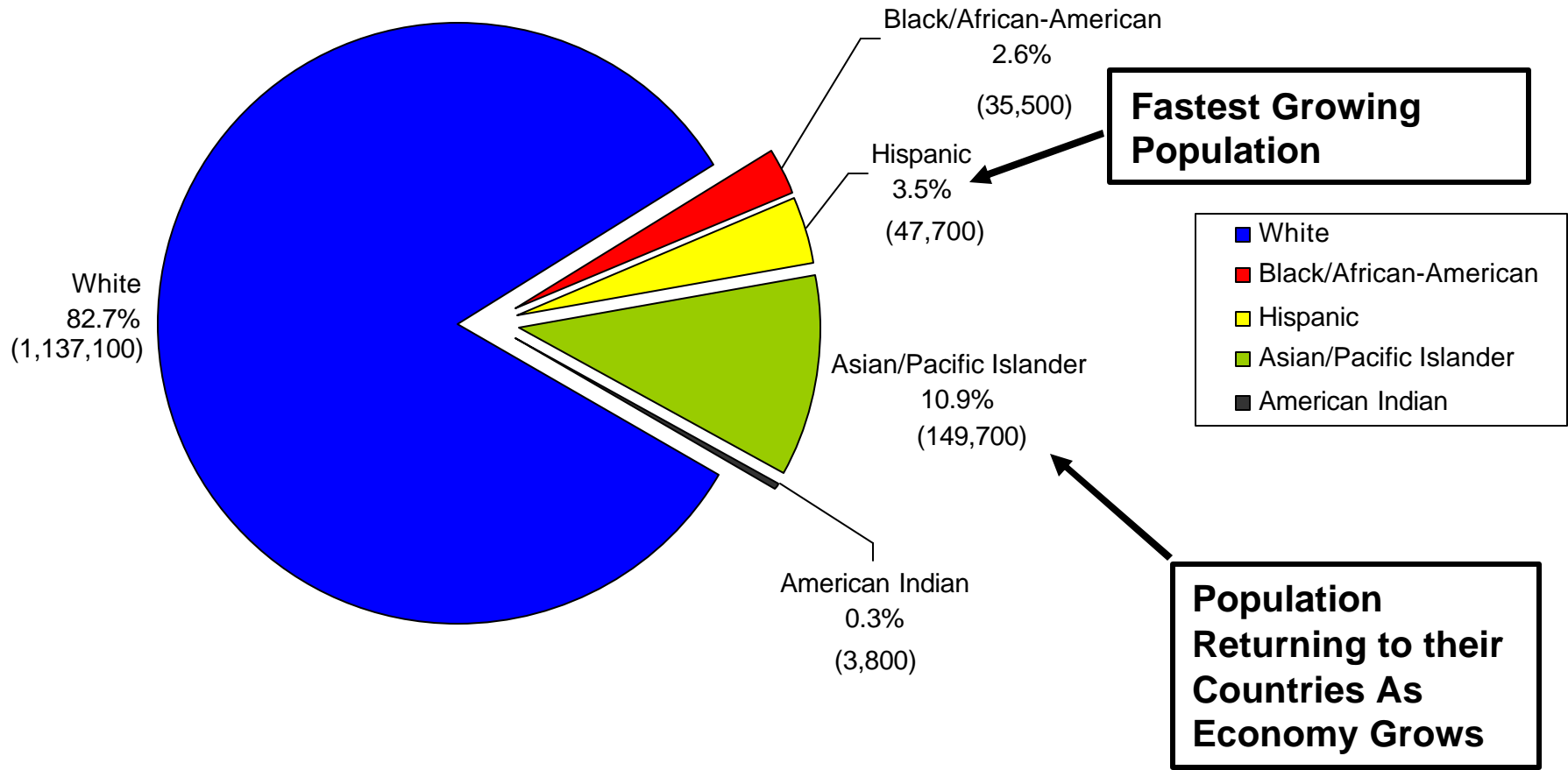
- China ~ 300,000 Graduates
- India ~ 150,000 Graduates

- **One-third of 2002 degrees were graduate degrees.**

- **2002 degrees earned by Foreign Nationals**   **B.S.   8.0%**

                                                    M.S.   49.5%
                                                    Ph.D.   58.9%

- **Percentage of Foreign Students Return Home on the Increase**
- **Of Those Who Stay Clearances are Taking an Average of 375 Days**

Mandate the Industry "Reach Out" to US Population

ADP

Black/African-American
2.6%
(35,500)

Fastest Growing Population

Hispanic
3.5%
(47,700)

White
82.7%
(1,137,100)

	White
	Black/African-American
	Hispanic
	Asian/Pacific Islander
	American Indian

Asian/Pacific Islander
10.9%
(149,700)

American Indian
0.3%
(3,800)

Population Returning to their Countries As Economy Grows

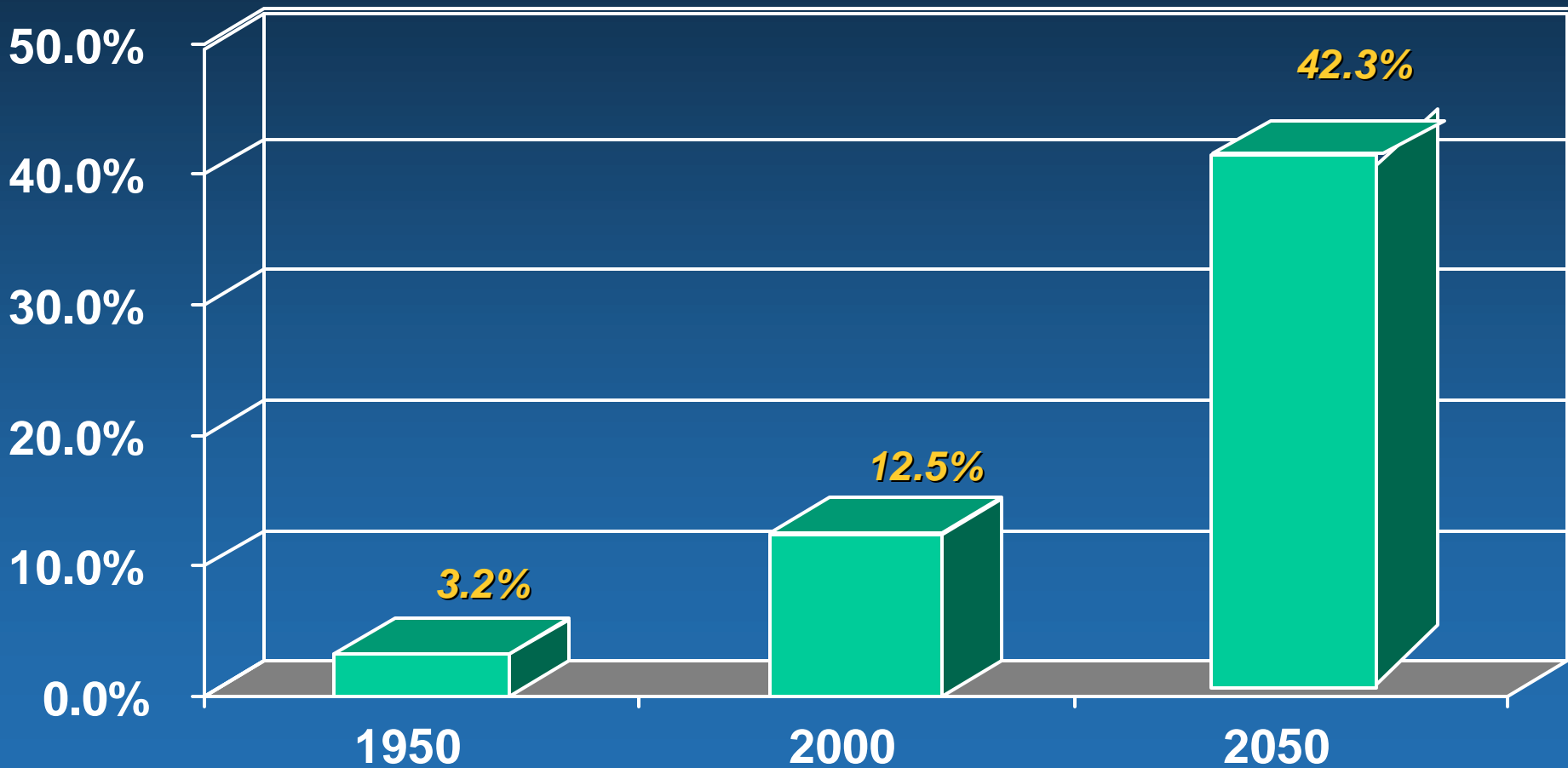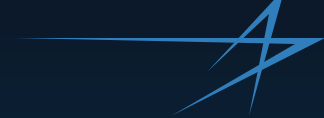Total Number of Engineers in the U.S. Labor Force in 1997: 1,374,200

- **America's Population is Increasingly becoming Hispanic, if we Permit This Group to be Less Educated our Literacy Level will Fall to that of a Third Work Nation by 2025**

- **As the Predominate Source of Future Labor, Scientific Education of this Element of our Society at the Mid School Level is Mandatory**

- **Insufficient Hispanic Leadership is Only Aggravating the "reach-out" Efforts within Defense Industry Coupled With a Weak Pipeline of Talent**

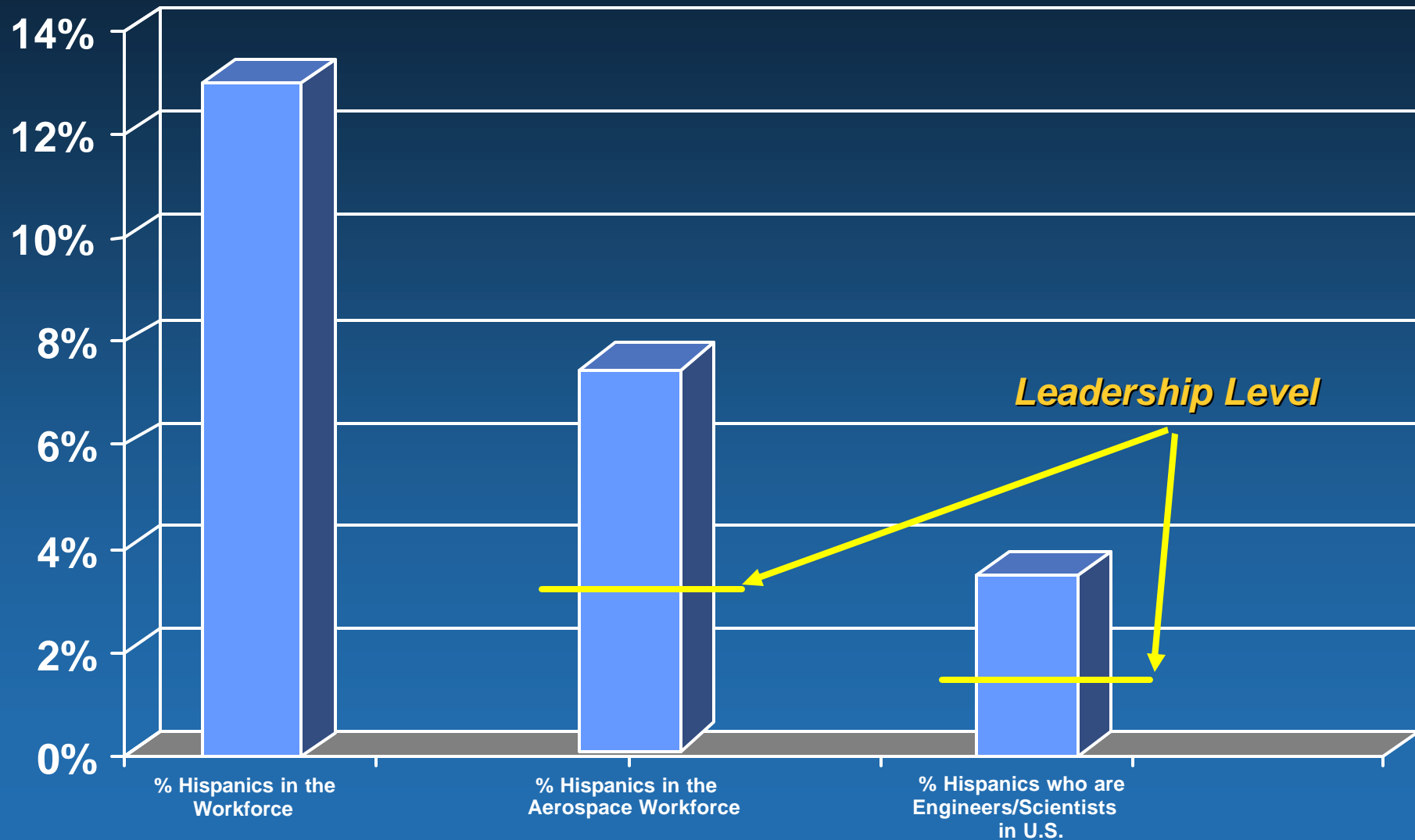**Weak Pipeline of Talent , Will Degrade the Defense Industry's Mission Success**

ADP

50.0%

42.3%

40.0%

30.0%

20.0%

12.5%

10.0%

3.2%

0.0%

1950   **2000**   **2050**

Source : LMC Diversity Study

Leadership Level

14%

12%

10%

8%

6%

4%

2%

0%

% Hispanics in the
Workforce

% Hispanics in the
Aerospace Workforce

% Hispanics who are
Engineers/Scientists
in U.S.
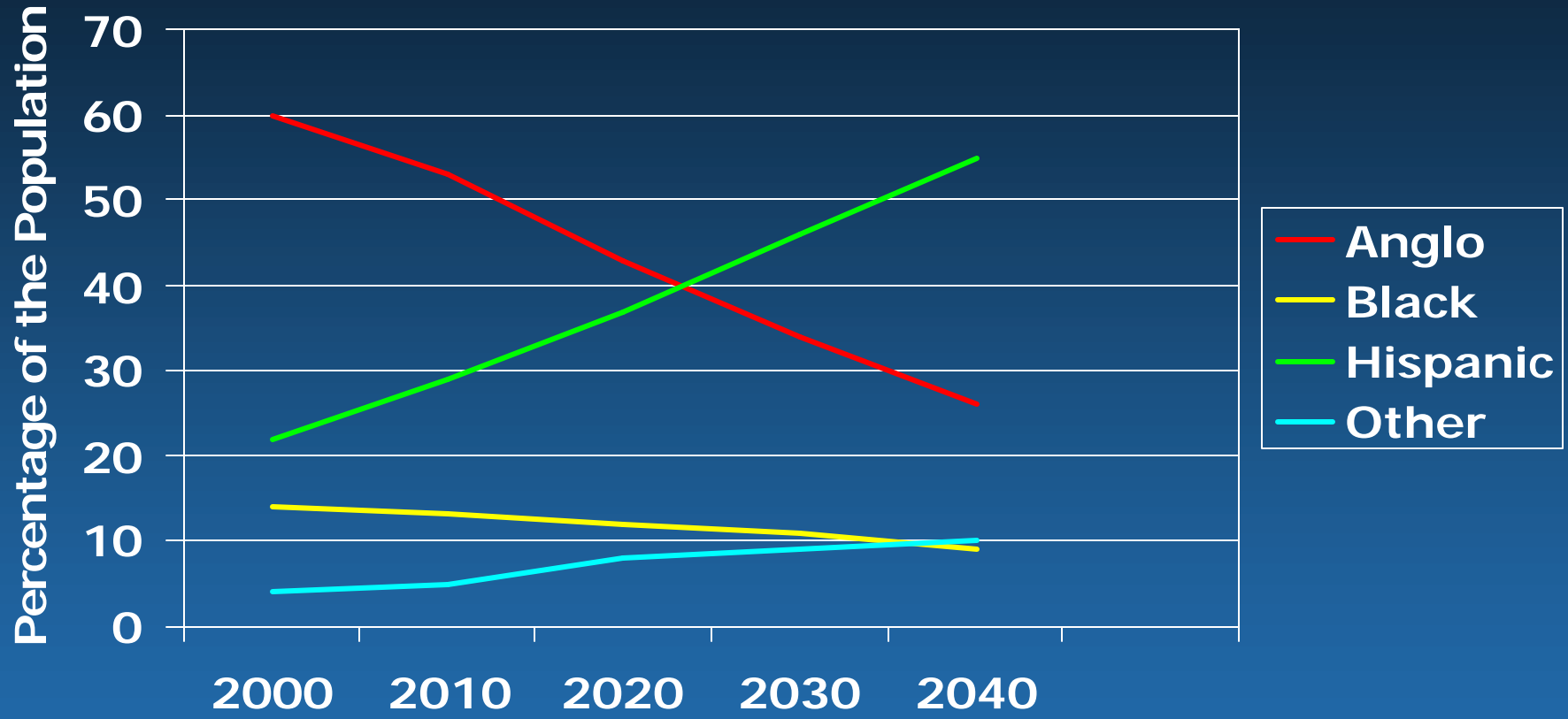
- **SAE , AAII, AIA, IEEE etc must Come Together and Form a Consortium To Develop a Hispanic / Black Scientific Education Roadmap**

- **Leverage the NASA Mid School " Explorer" Program**

- **The Consortium Must Team With and Participate on Key Hispanic Education Advocacy Agencies**

- **Industry Must Step Up and Hire / Train**

- **Industry Must Assign Mentors To Increase Hispanic Leadership Pipeline**

- **Increase Must Highlight Hispanics in Succession Planning**

BACK UP

*Generational Differences
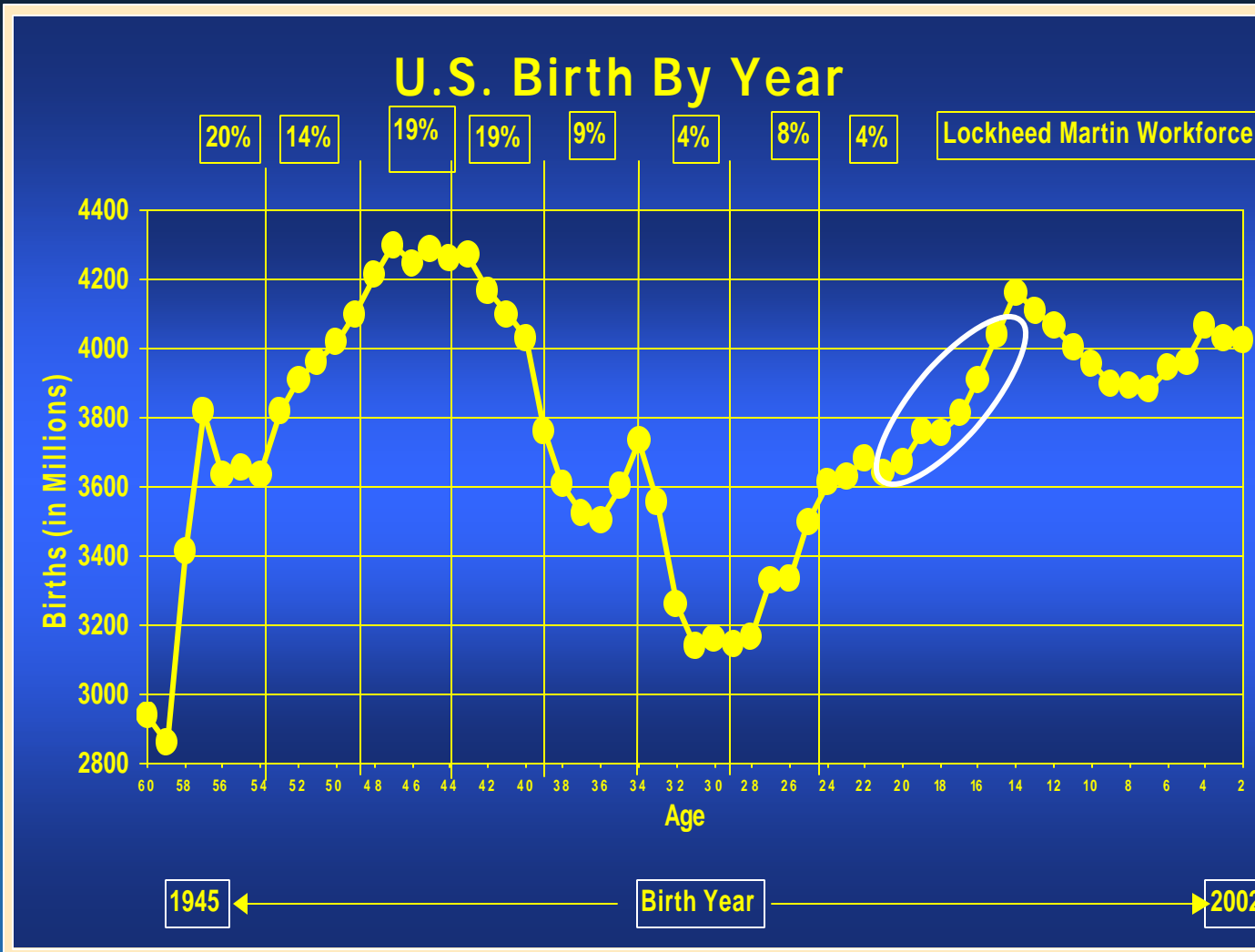in the Workplace*

U.S. Workforce Projections

U.S. Labor Force By Age
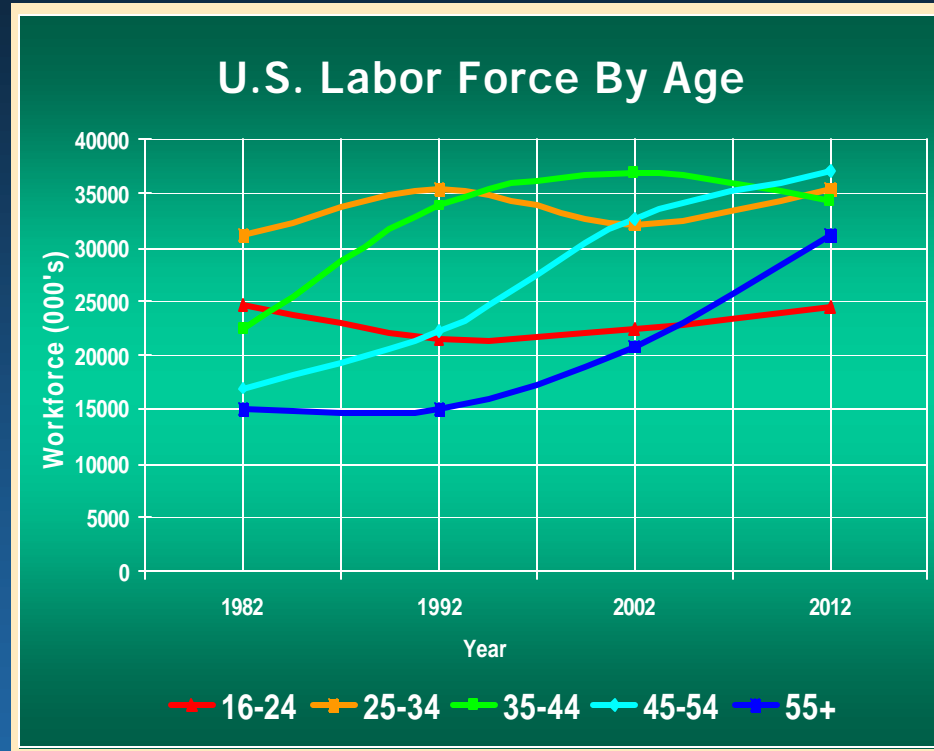
Source: Bureau of Labor Statistics

- **Fastest growing population segments: 45-54 & 55+**
- **In 2012, age of baby boomers: 48-66**
- **Segment of population declining: 35-44**

U.S. Birth By Year

- **Next 20-yrs' labor force already born**
- **Births not sufficient to replace baby boomers**
- **New Immigrants Must Fill the Gap**

Source: Centers for Disease Control National Vital Statistics Report

Born (+ or -)

- **Matures (Traditionalists)**   **1933 – 45**

- **Boomers**   **1946 – 64**

- **Generation X**   **1965 – 76**

- **Gen Y (New Hires)**   **1977 – 94**

Different Value Systems Making Co-Existents "Tough"

- **Growing Up Influences**
  - *Depression / WWII*
  - *Strong Family and Religion*
  - *Education a Dream*
  - *Leisure a Reward for Hard Work*

- **Core Values**
  - *Dedication To the Company*
  - *Sacrifice For the Company*
  - *Hard Work An Expectation*
  - *Respect For Authority*
  - *Duty Before Pleasure*
  - *Adherence to Rules*
  - *Desire for Company Provided Security*

Boomers
(Born: 1946- 1964; 45% of Workforce)

- **Growing Up Influences**
  - *1950s – 1960s Time of Prosperity*
  - *Start of Transition in Family Structure*
  - *Education a Birthright*
  - *Period of Short-Term Sacrifices Hoping for "Long-Term Gain"*

- **Core Values**
  - *Dedication to Personal Convictions*
  - *Sacrifice To Make a Difference*
  - *Duty & Pleasure Balanced*
  - *Change the Rules*
  - *Desire for Personal Provide Security*

- **Growing Up Influences**
  - *Grew Up in 80's and 90's*
  - *Experienced Downsizing And Impact to Family*
  - *Latch-Key Kids; Divorced Parents*
  - *Forced Independence*
  - *Distrust Institutions*
- **Core Values**
  - *Dedication to Short Term Personal Goals*
  - *Company Means to an End & not the Main Event*
  - *Questionable Regard for Authority*
  - *Comfortable with " High Tech" Stuff*
  - *Pleasure Before Duty*
  - *Personal Security Can Wait*

- **Growing Up Influences**
  - *Grew Up Surrounded by Technology (Email, PCs, Internet)*
  - *Connected Globally Around the Clock*
  - *Leisure Is Interwoven With Work*
  - *Want More, Better, Faster*
  - *Short Attention Spans*

- **Core Values**
  - *Dedicated to Self*
  - *No Company Loyalty*
  - *Self Confidence*
  - *Socially Conscious*
  - *Street Smart*
  - *Diversity Comes Natural*