NATIONAL DEFENSE INDUSTRIAL ASSOCIATION

STRENGTH THROUGH INDUSTRY & TECHNOLOGY

Space Policy and Architecture Conference Space Industrial Base Panel

Edward Swallow

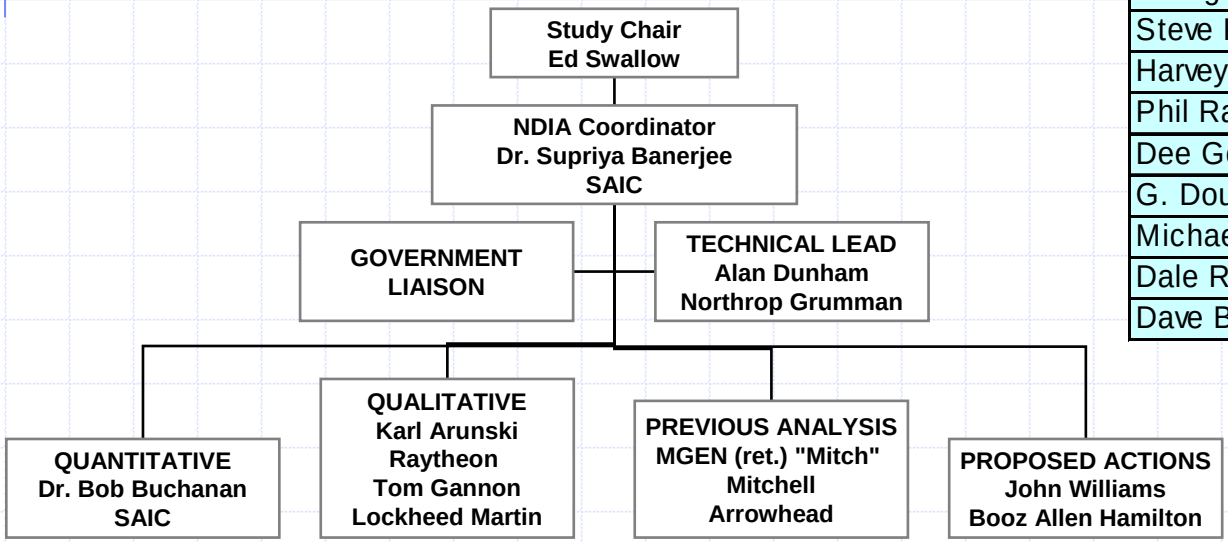
Chair, NDIA Space Division &

Chair, Industry Study on Critical Workforce Issues, supporting Dr. Ron Sega, Director of Defense Research and Engineering

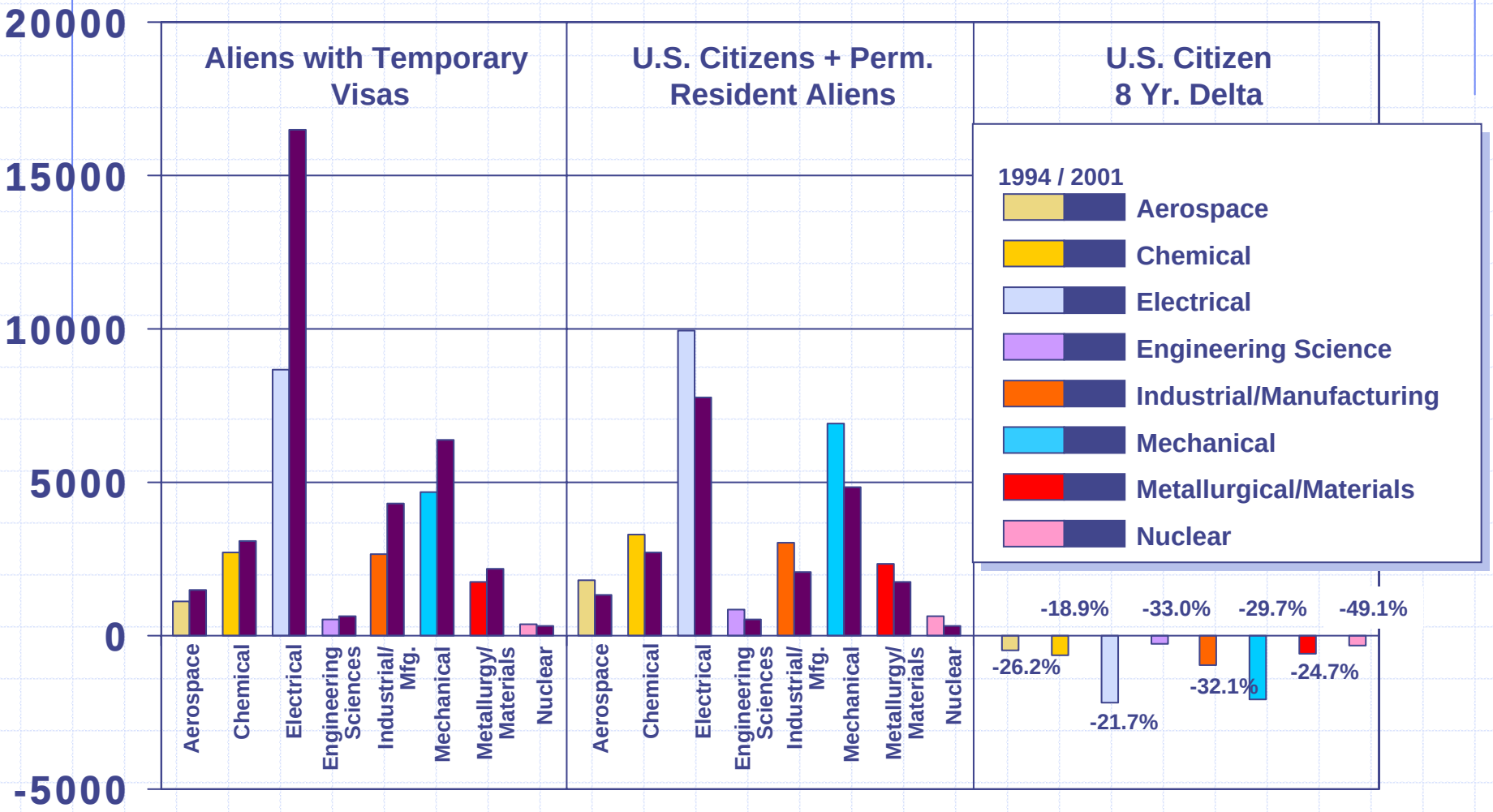
Industry Study Members

- Broad range of companies participating in study analysis
  - 14 Companies represented on panels
- Broader range of companies providing data and anecdotal evidence
  - 30 of 1130 NDIA member companies responded to survey – Representative sample

Name	Company
Wes Clark, MajGen.(ret)	SAIC
Bob Buchanan	SAIC
William Ayen	UCCS
Gayle White	CSC
Sue Woida	AF/ret
Chris Andrews	BAH
George Ullrich	SAIC
Steve Kimmel	AlionSCi
Harvey Dahljelm	ITT
Phil Ramos	P. Int'l
Dee Goodwyn	AlionSCi
G. Douglass, MajGen.(ret)	IUT
Michael Stewart	Kodak
Dale Ramezani	Boeing
Dave Broden	ATK



U.S. University Trends in Defense-Engineering Disciplines Graduate Student Enrollment (1994-2001)



NSF Data

Table III

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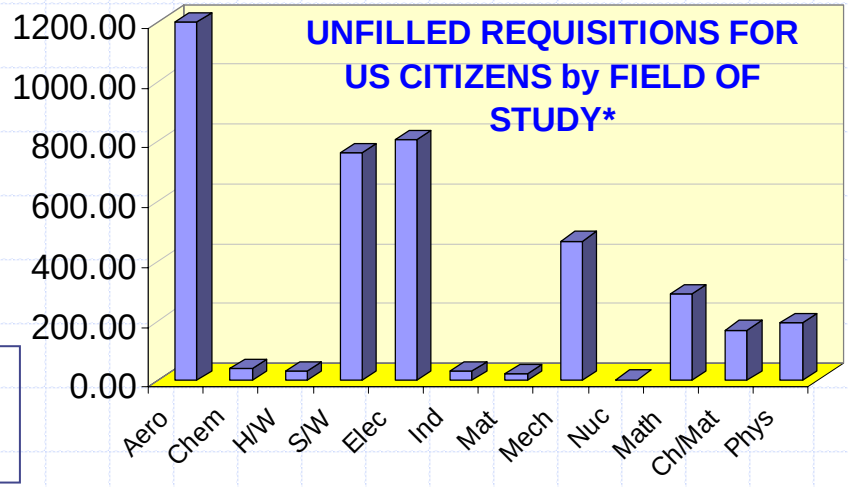
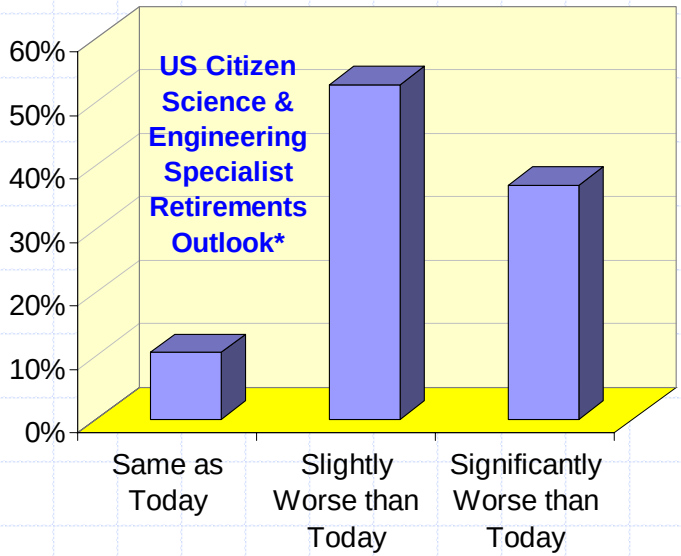
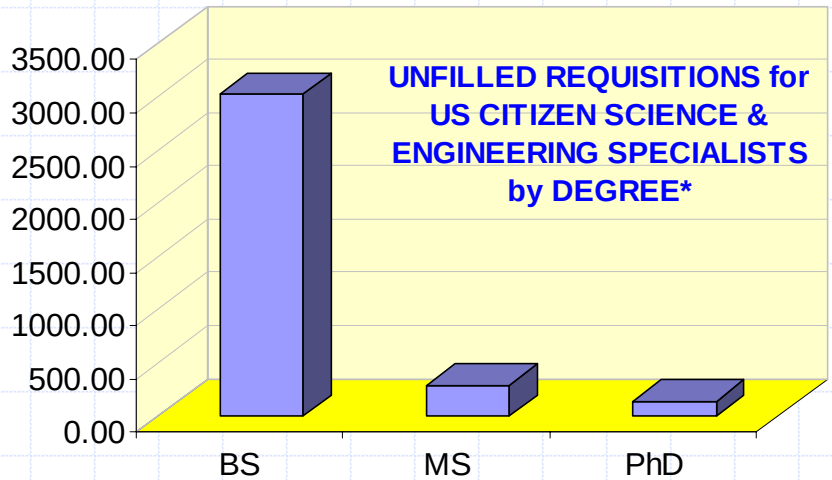
Industry Demand Data

- Overwhelming consensus
- Thousands of unfilled science & engineering positions for US citizens
- Getting worse

*-NDIA Quick Look Survey
-Small random sample
-Spring 2004 data only







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Demand Drivers

- SEE – Significant Emotional Event (or Significant Technological Event) for change in demand is mismatched with supply
  - Sputnik – NDEA 58
  - Invention of the integrated circuit – Led by DARPA investments
  - Personal (Distributed) Computing explosion -- System integration capabilities drawn from DOD experience
  - Internet – ARPANET
  - "Space Transformation" ????
- Weather prediction – Perfect Storm[1] appears to be forming from unprecedented conjunction of trends
  - Retirement of the post-Sputnik generation
  - Decline in clearance-eligible S&E workforce
  - Diminishing U.S. technological dominance due to globalization of R&D
- Need to ensure the internal S&E capability to maintain technological advantage for next/follow-on generation operational capabilities

[1] From Speech "The Perfect Storm" presented by Dr. Shirley Ann Jackson, Ph.D, .President, Rensselaer Polytechnic Institute, to the National Society of Black Engineers, Dallas, Texas, Wednesday, March 17, 2004

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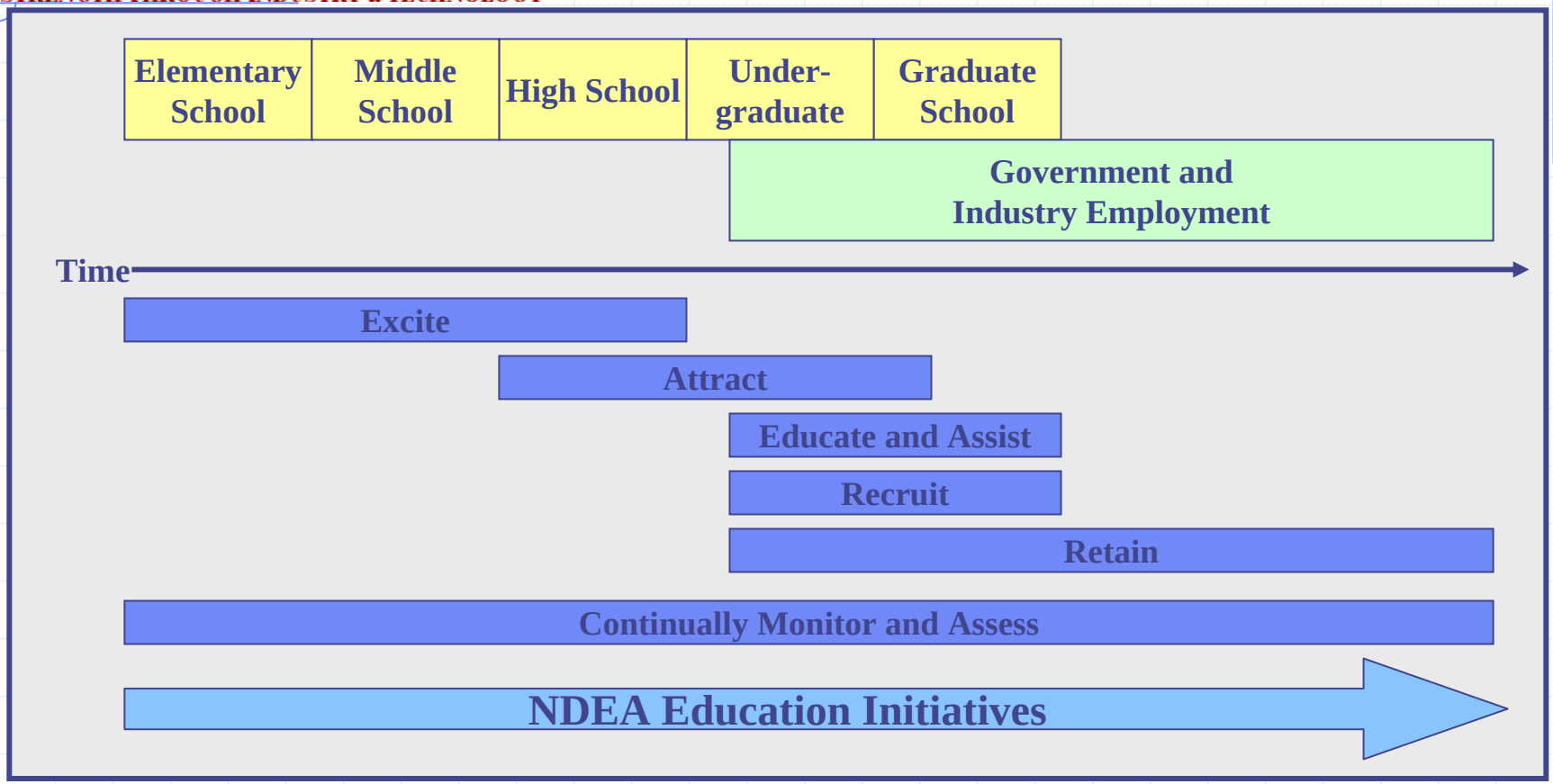
Notional NDEA 2006 Strategy



NDEA 2006 recommendations reflect a strategy which sets preconditions for an adequate S&E workforce pipeline based upon providing S&E-related educational opportunities

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Recommendations

- Overall solution(s) are complex and multifaceted:
  - Better use of existing workforce
    - Retraining, mentoring, work/life balance, increase diversity, etc.
  - Financial support for knowledge transfer
  - Increased government support for R&D – robust and balanced 6.1 through 6.4 program
- On supply side, DoD/USG must recognize that the market itself is not sufficient to ensure the ready supply of technologically trained workers
  - We must constantly be aware of current attitudes and propensity towards engineering by measuring youth attitudes
    - Allow us to counter negatives; reinforce positives
    - Military equivalent is Youth Attitude Tracking Survey
  - To attract and retain sufficient engineers, we must adopt some aspects of the military recruiting model
    - We cannot count on a volunteer force, but rather a recruited force
    - Recruited in the sense that the concept of becoming an engineer is introduced at an early age, reinforced by compelling media and mentorship, and properly incentivized by educational scholarships
    - Necessary to counter other social messages
- This will require a national effort to fund, monitor and influence on a sustained basis
  - Should be a part of NDEA 2006

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How Can Industry Help?

- Take a “systems view” of the problem
- Support NDEA 2006
  - Link to elementary, middle and secondary education
    - Excite, Attract, Stimulate
  - Strengthen partnerships with universities and other academics—joint activity in key technologies
    - Nanotechnolgy initiatives seem to be working
- NDIA work with DOD to establish technology excellence awards
- Integrate efforts across government and industry to recruit and retain high value S&T workers
  - Continuing industry association involvement
  - Expand corporate and industry association educational outreach programs
- Identify ways to focus IRAD development across industry within competitive limits
  - Make the dollars we have go farther
  - Increase emphasis on Industrial Base Issues