

Science, Innovation and the FY 2009 R&D Budget

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for the House Research and Development Caucus

AAAS R&D Budget and Policy Program

<http://www.aaas.org/spp/rd>

See the “What’s New” section for the latest updates; see the “Seminars and Presentations” section for copies of this presentation.

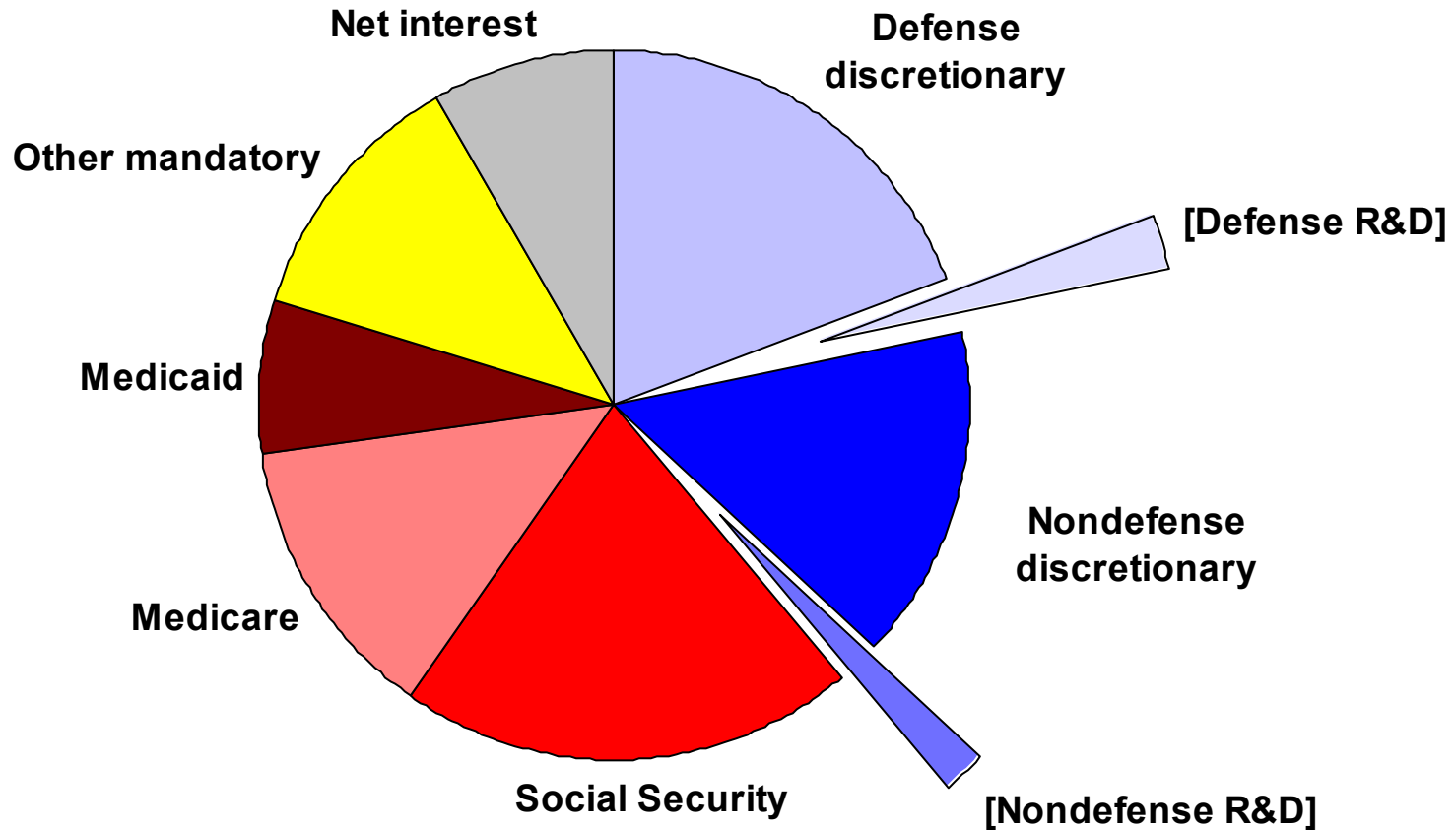


THE 2009 BUDGET

- The President has proposed a \$3.1 trillion budget for FY 2009.
- To help control the deficit, the President proposes to keep domestic appropriations flat, and leaves most 2009 war funding out of the budget.
- The President's budget proposes steep cuts in many domestic programs and several program eliminations.

Composition of the Proposed FY 2009 Budget

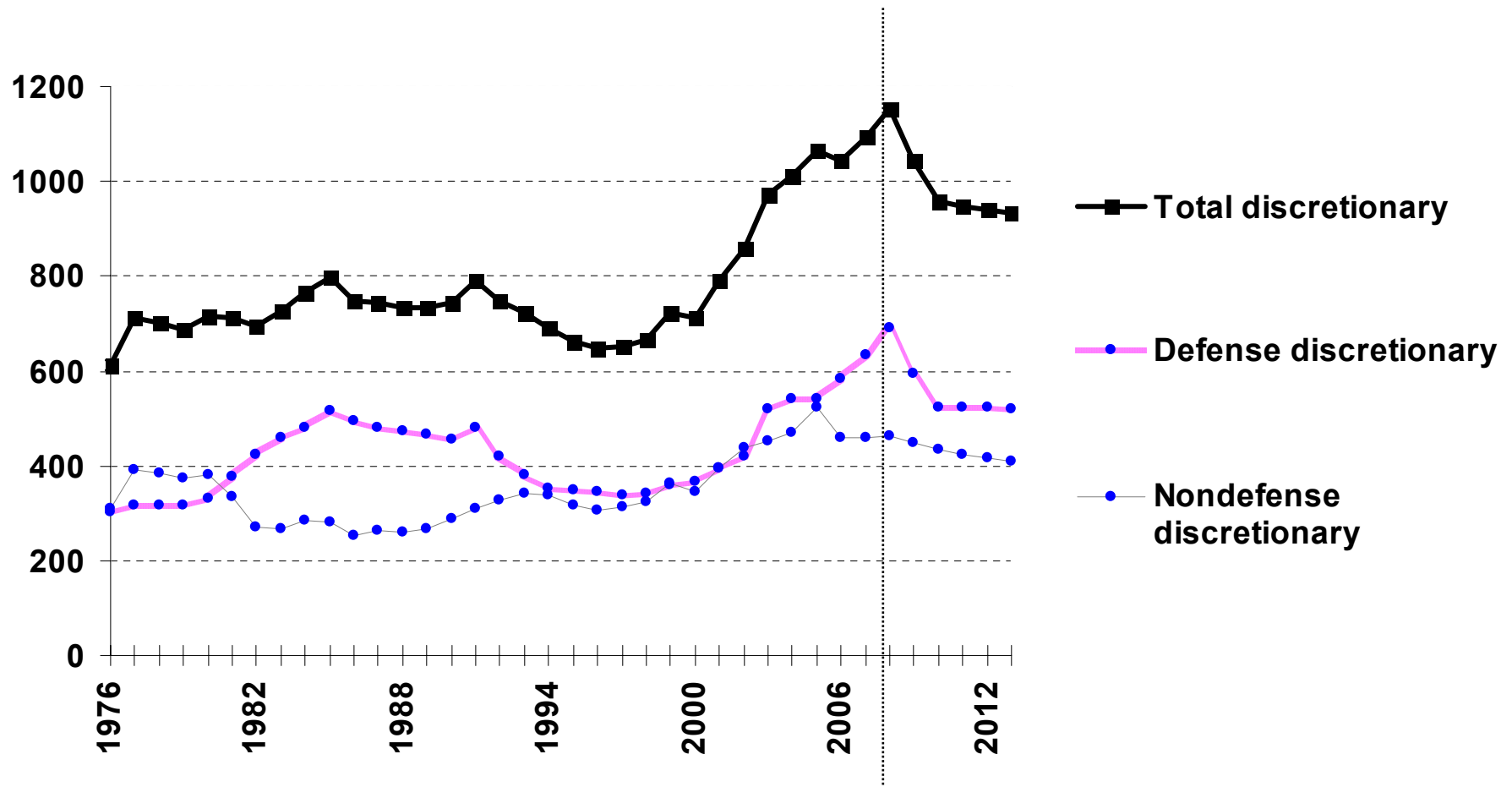
Total Outlays = \$3.1 trillion



Note: Projected Unified deficit is \$407 billion.
Figures exclude most Iraq and Afghanistan military costs.
Source: AAAS, based on *Budget of the United States Government FY 2009*.
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Trends in Discretionary Spending, FY 1976-2013

in billions of constant FY 2008 dollars



Data in fiscal years. Source: *Budget of the United States Government, FY 2009*.
FY 2008 data are estimates. FY 2009-2013 data are budget projections. FY 2009-2013 figures exclude Iraq and Afghanistan military costs.
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INNOVATION: MAKING PHYSICAL SCIENCES A PRIORITY

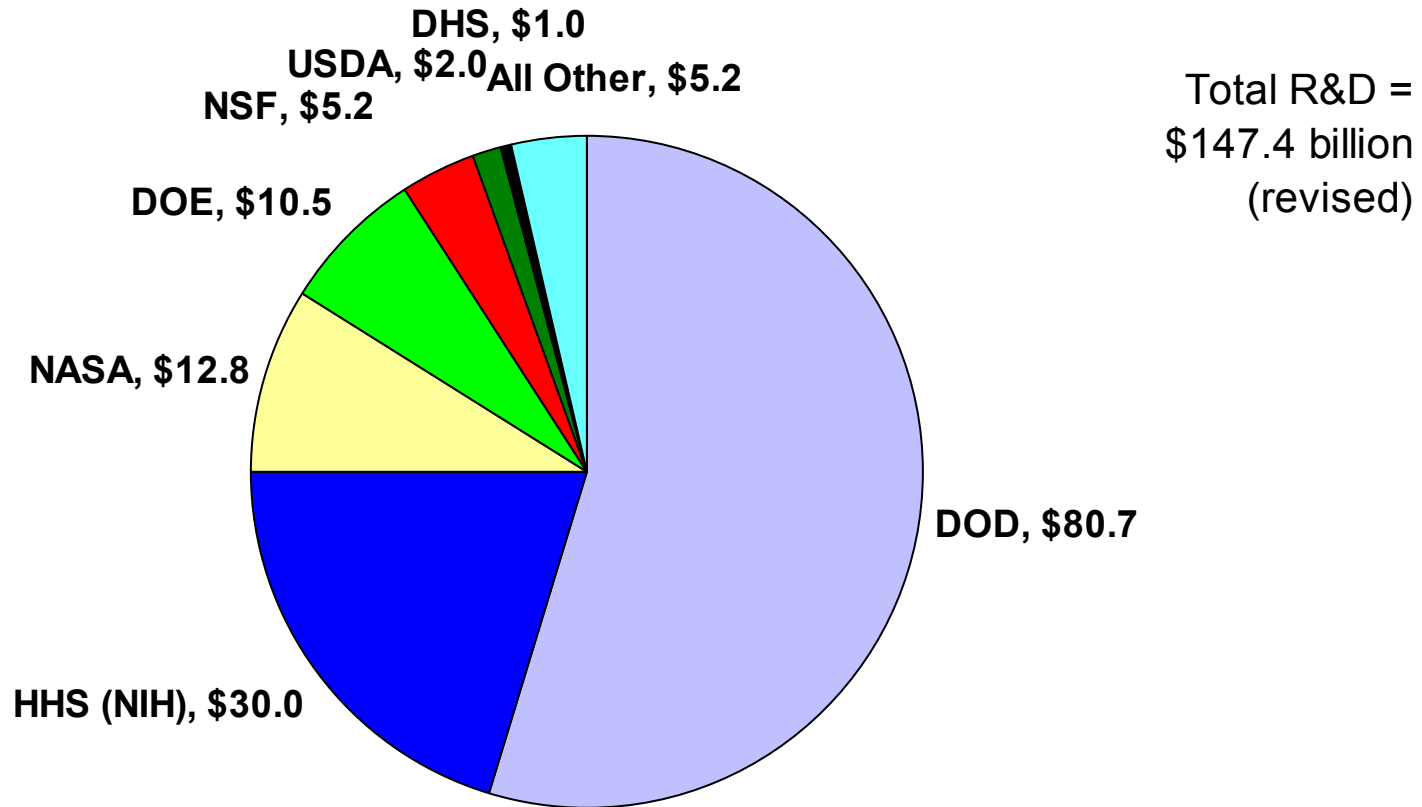
- President Bush announced the American Competitiveness (ACI) in his 2006 State of the Union address.
- The ACI is one of many responses to recent reports calling for a major government effort to address the innovation challenge. There are several congressional responses, culminating in the America COMPETES Act of August 2007.
- For R&D investments, the theme is boosting federal support for basic research in the physical sciences (broadly defined).
- The plan: Doubling the budgets of NSF, DOE Office of Science, and the NIST laboratories over 7 to 10 years.
- Federal R&D supports numerous federal missions such as defense, health, environment, and energy, in addition to boosting U.S. innovative capacity.

THE 2009 BUDGET FOR R&D

- The ACI continues for a third year, with large increases for NSF, DOE Science, and the NIST labs to catch up to a 10-year doubling track.
- Again, there would be large increases for DOD weapons and NASA spacecraft development, but also increases for most R&D programs.
- The NIH budget would be flat, agricultural and environmental R&D agencies would decline.

Total R&D by Agency: FY 2009 Proposed

Budget Authority in billions of dollars

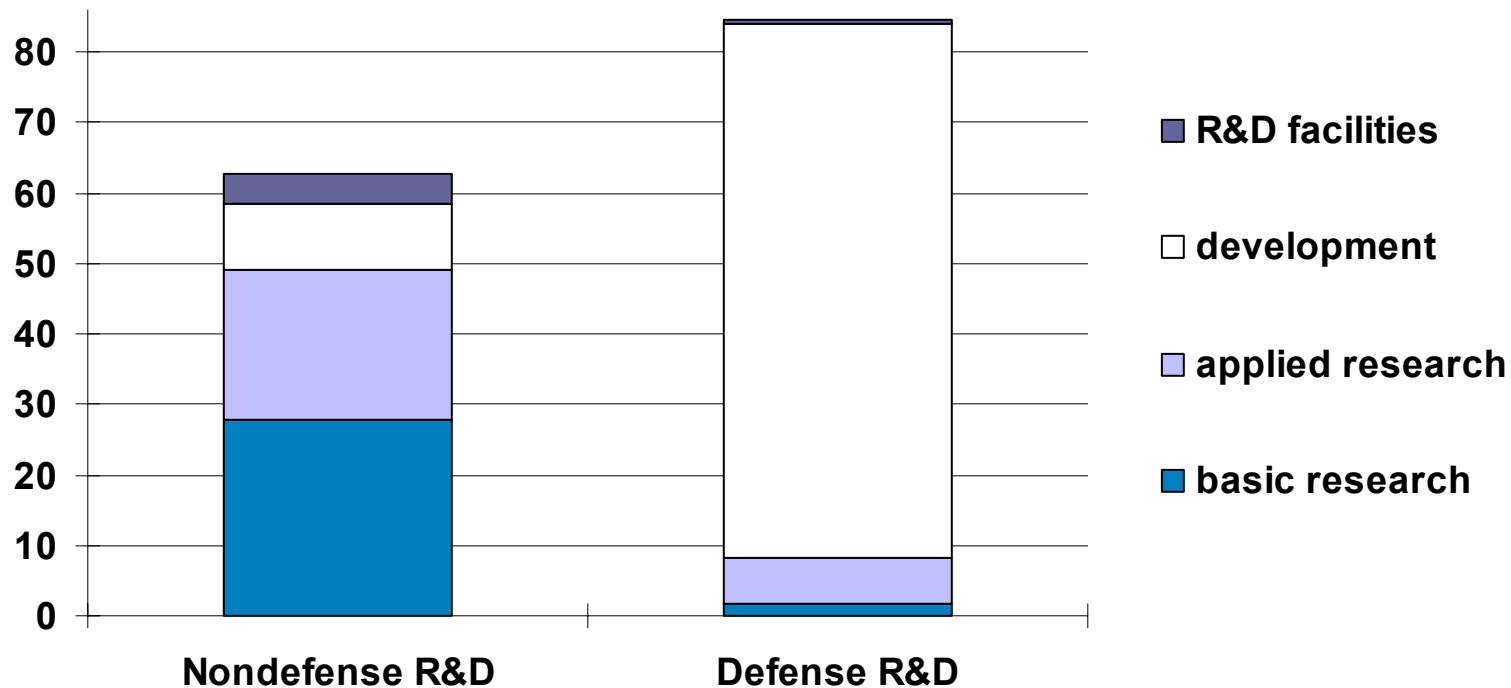


Source: AAAS, based on OMB R&D Budget Data and agency estimates for FY 2009.

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Character of Defense and Nondefense R&D FY 2009 Budget, Budget Authority in Billions

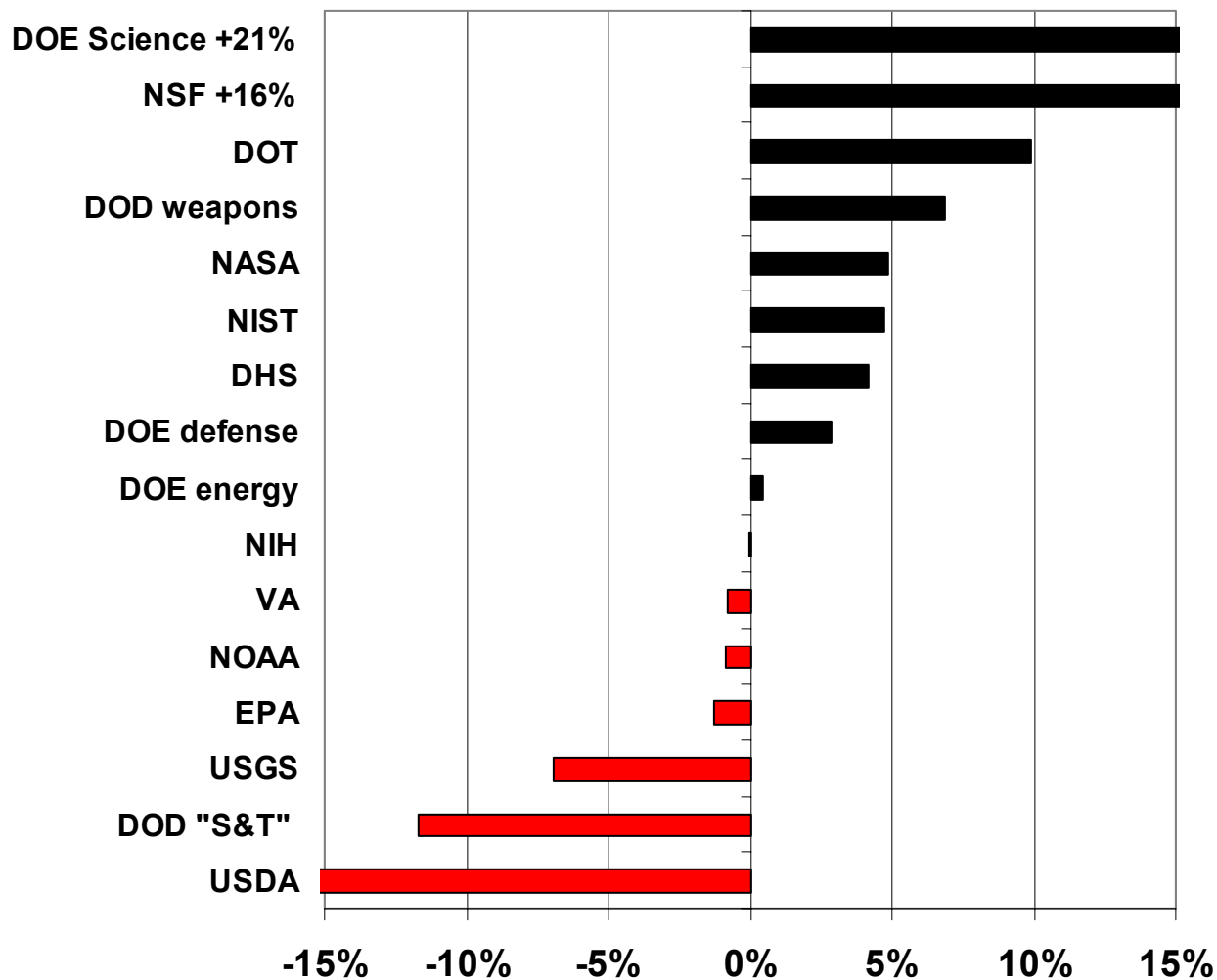


Source: AAAS, based on OMB R&D budget data for FY 2009 and agency budget justifications. Defense R&D = DOD + DOE defense + DHS defense programs.

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FY 2009 R&D Request

Percent Change from FY 2008

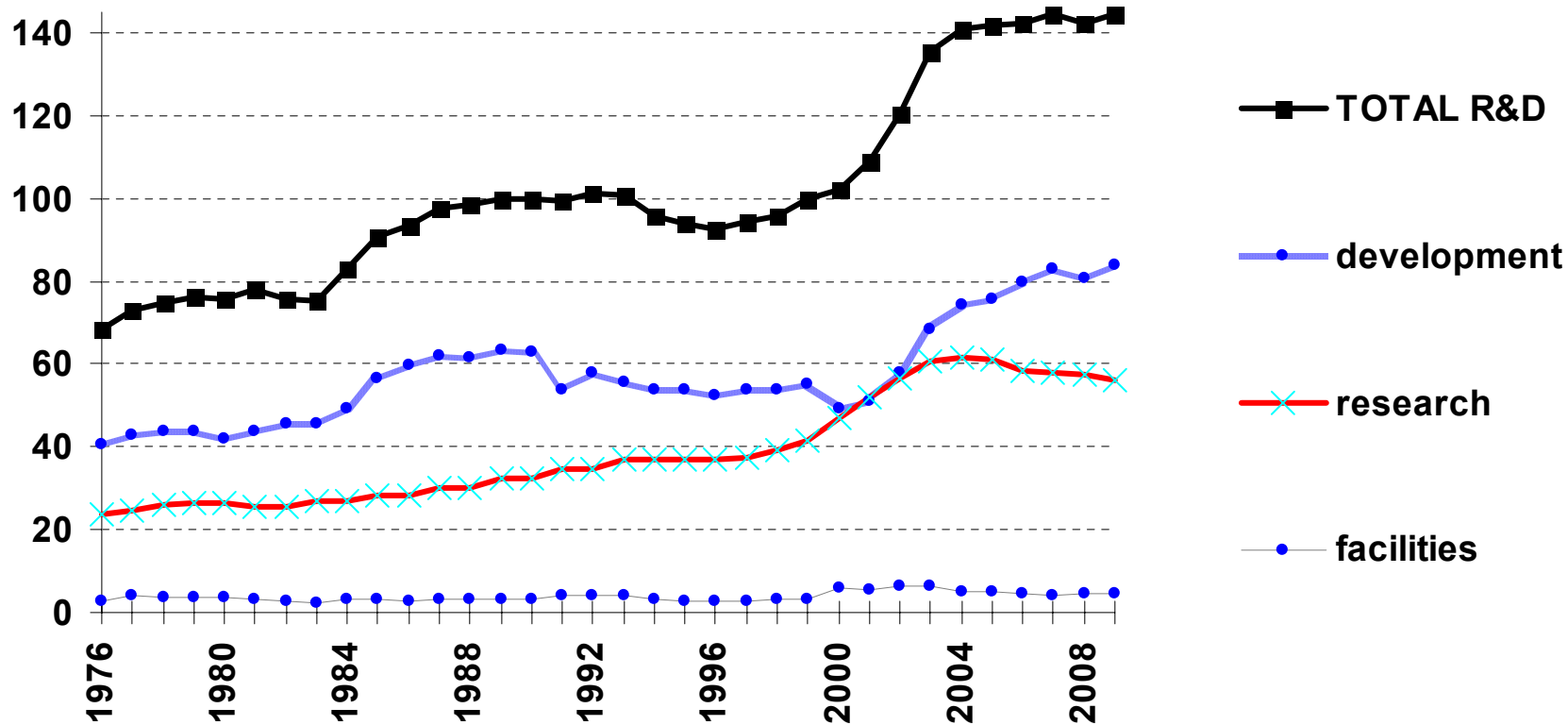


Source: AAAS, based on OMB R&D data and agency estimates for FY 2009.
 DOD "S&T" = DOD R&D in "6.1" through "6.3" categories plus medical research.
 DOD weapons = DOD R&D in "6.4" and higher categories.
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Trends in Federal R&D, FY 1976-2009 *

in billions of constant FY 2008 dollars



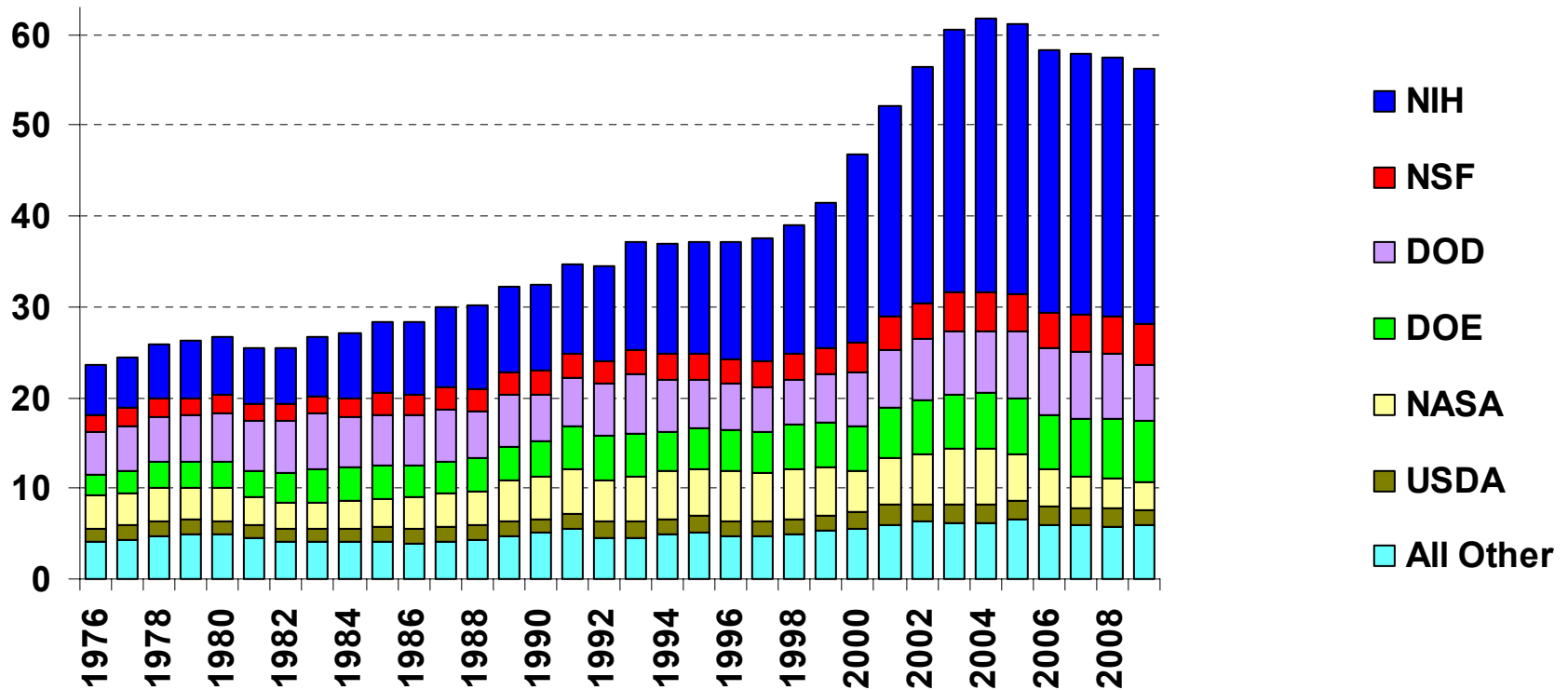
Source: AAAS analyses of R&D in annual AAAS R&D reports. * FY 2009 figures are latest AAAS estimates of FY 2009 request. R&D includes conduct of R&D and R&D facilities. Data to 1984 are obligations from the NSF Federal Funds survey. GDP figures are from OMB, Budget of the U.S. Government FY 2009.

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Trends in Research by Agency, FY 1976-2009 *

in billions of constant FY 2008 dollars



Source: AAAS analyses of R&D in annual AAAS R&D reports.

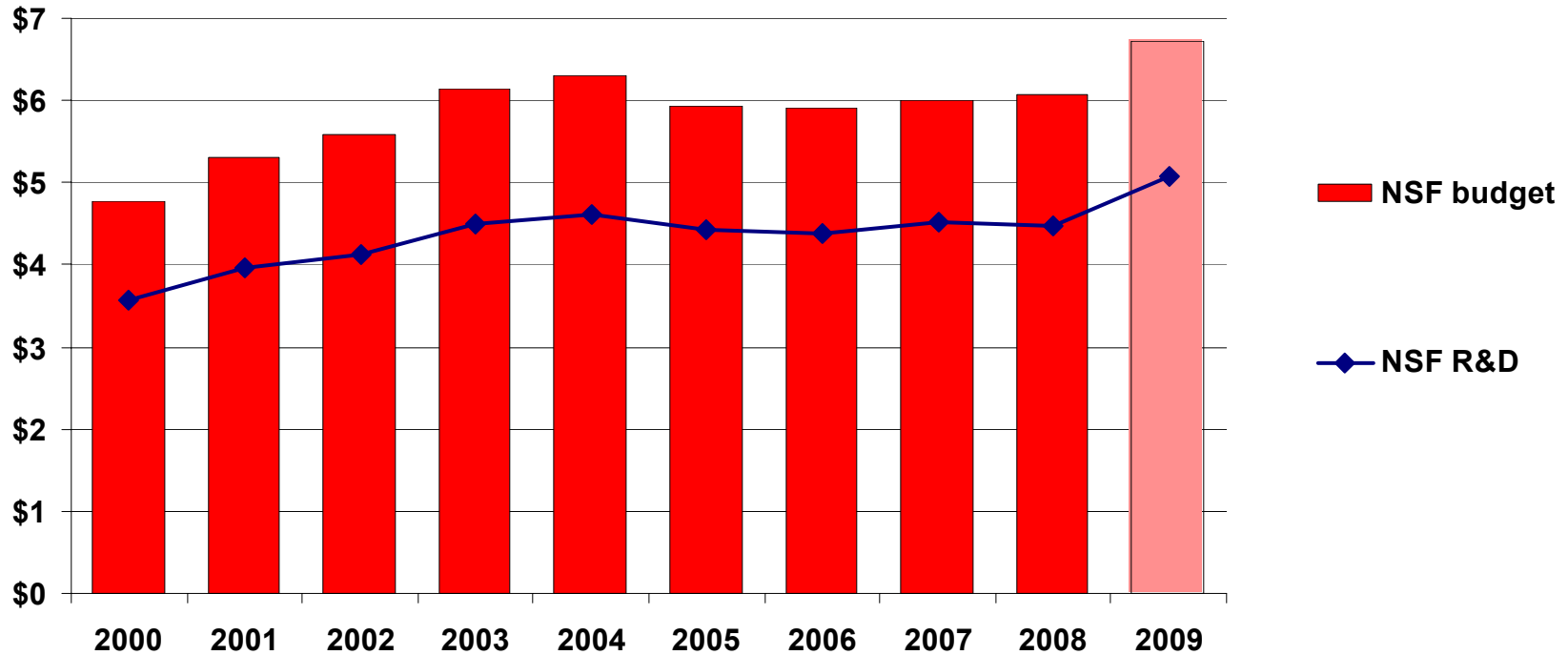
* FY 2009 figures are latest AAAS estimates of FY 2009 request. Research includes basic research and applied research. 1976-1994 figures are NSF data on obligations in the Federal Funds survey.

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National Science Foundation Budget, FY 2000-2009

(budget authority in billions of constant FY 2008 dollars)

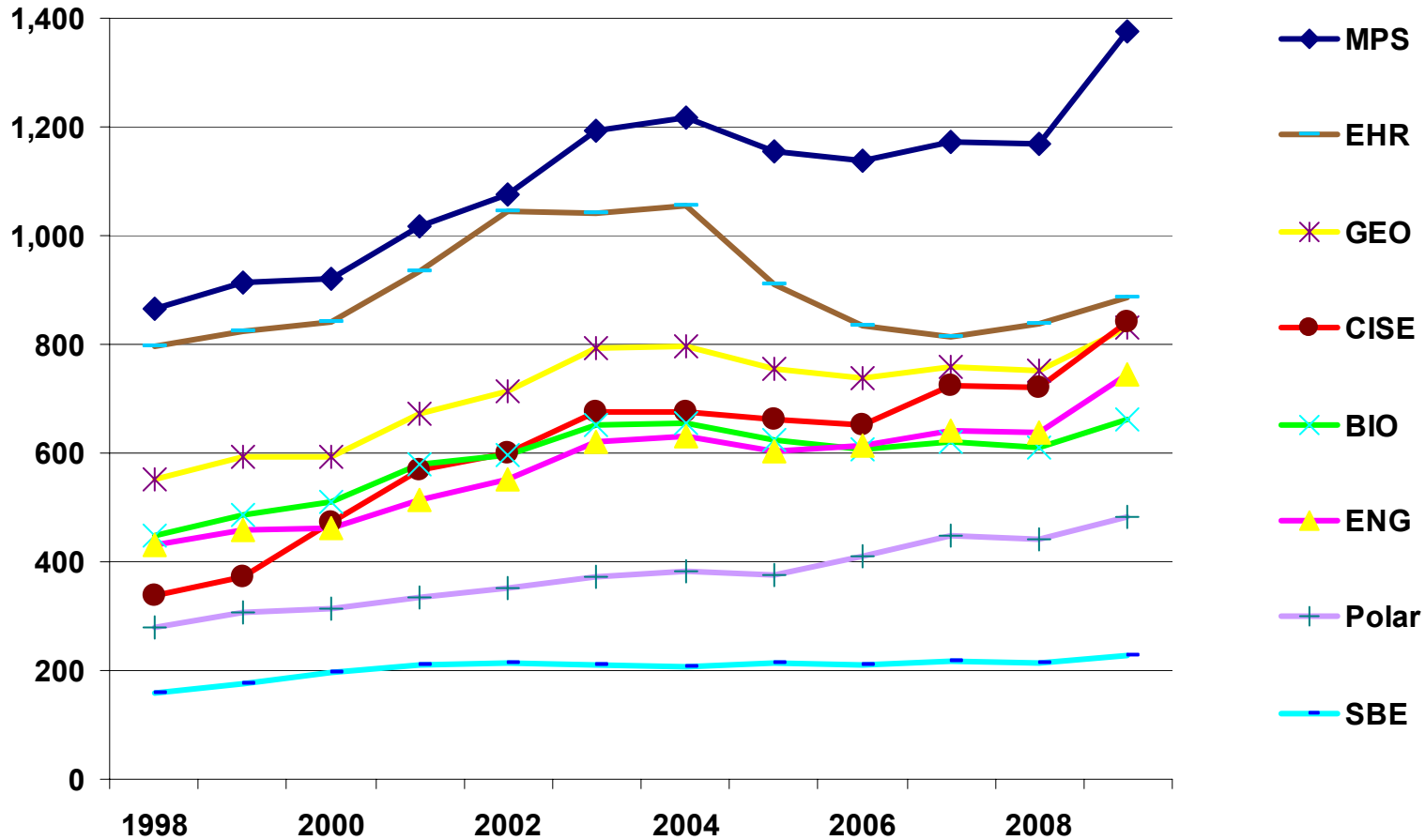


Source: National Science Foundation, and latest AAAS estimates of FY 2009 budget. FY 2009 is budget request.
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NSF Budget by Directorate, FY 1998-2009

(budget authority in millions of constant FY 2008 dollars)



Source: National Science Foundation data. FY 2009 figures are President's request.

CISE includes new Office of Cyberinfrastructure.

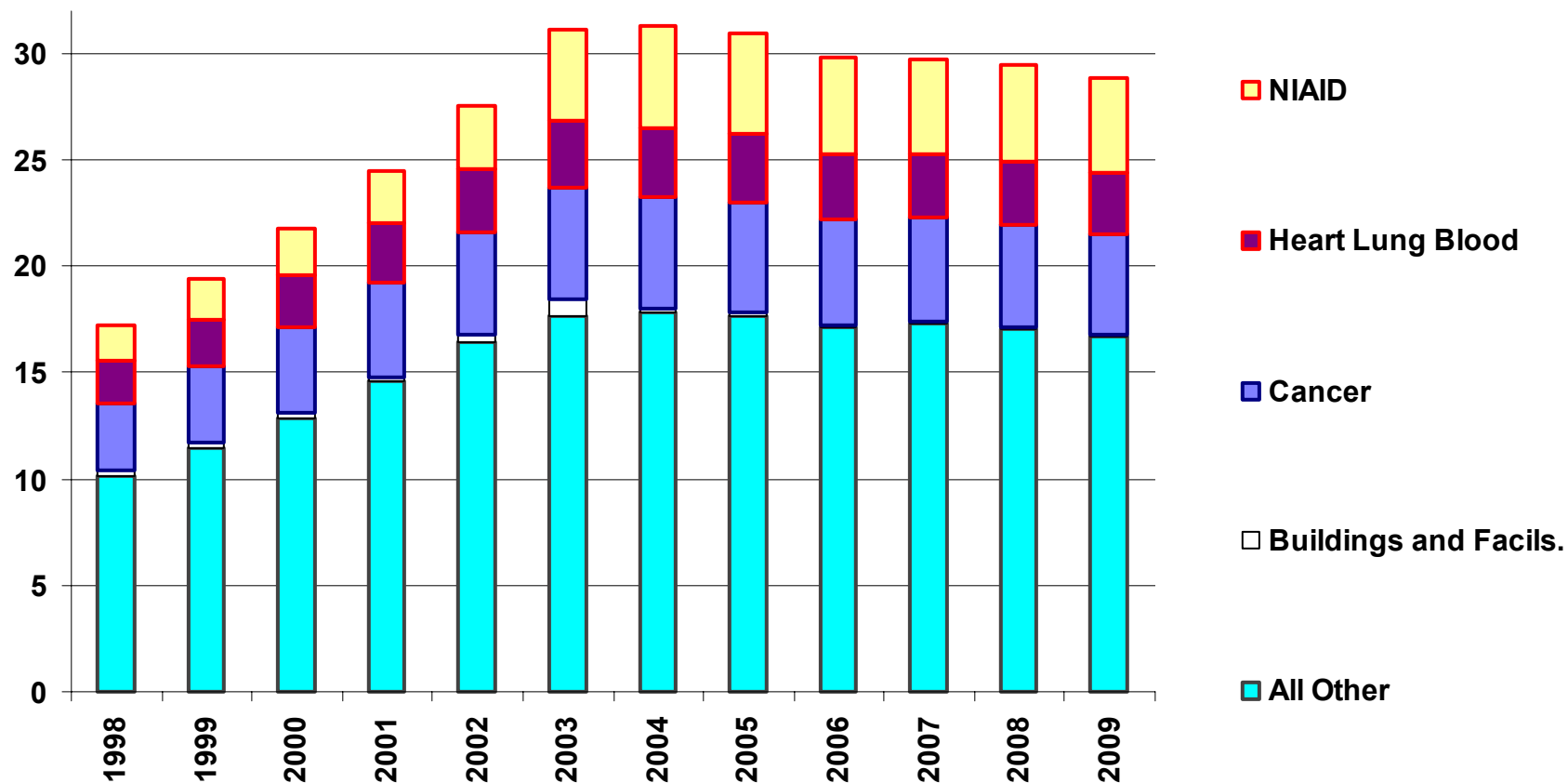
R&D and non-R&D components included in directorate budgets.

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National Institutes of Health Budget by Institute, 1998-2009 *

(budget authority in billions of constant FY 2008 dollars)



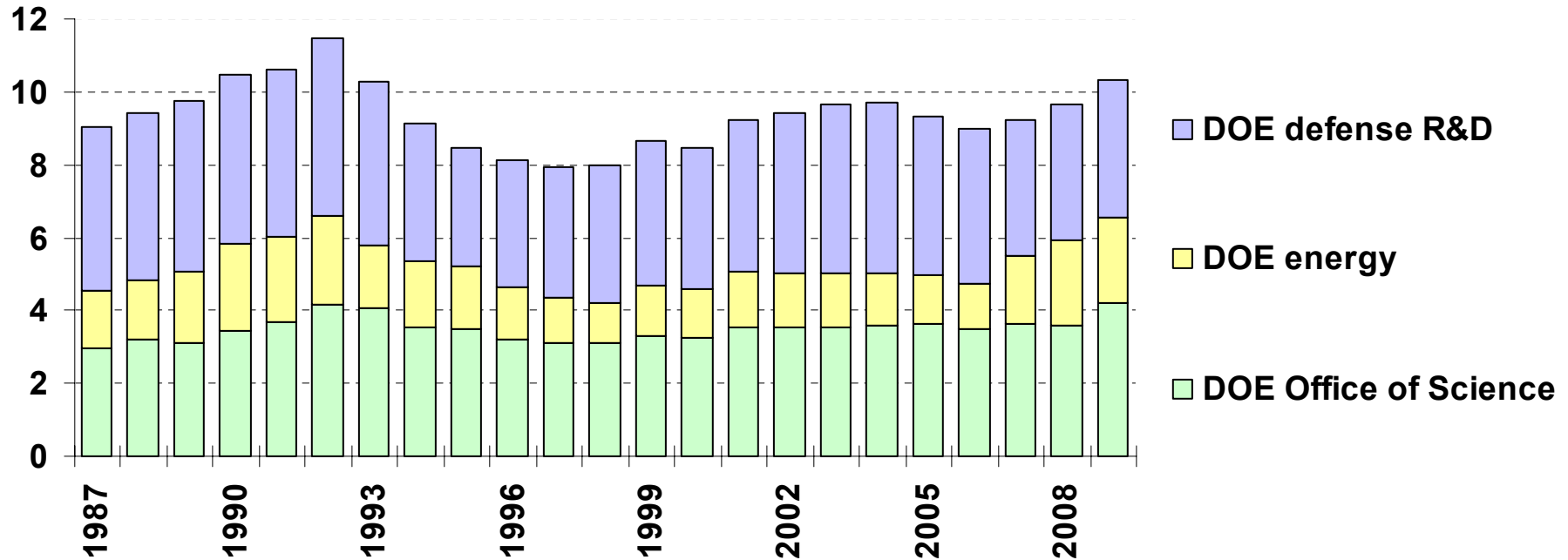
Source: AAAS R&D reports from NIH budget documents 1998-2009. * 2009 is latest AAAS estimates of FY 2009 request. Adjusted for inflation using OMB's GDP deflators.

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Trends in DOE R&D, FY 1987- 2009 *

in billions of constant FY 2008 dollars



Source: AAAS analyses of R&D in AAAS Reports VIII-XXXIII. * FY 2009 figures are latest AAAS estimates of FY 2009 request.

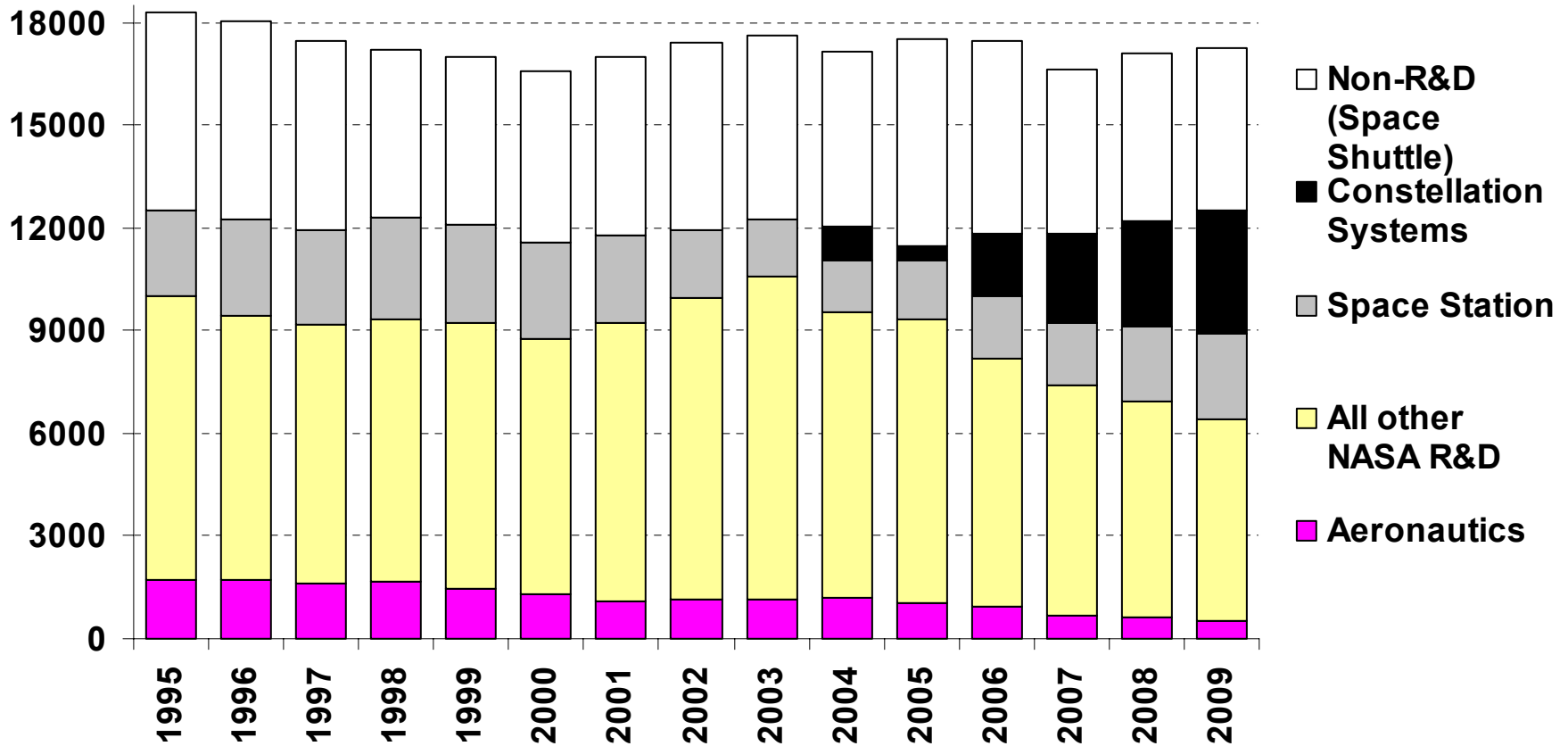
R&D includes conduct of R&D and R&D facilities.

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Trends in NASA R&D, FY 1995-2009 *

in millions of constant FY 2008 dollars



Source: AAAS analyses of R&D in AAAS Reports VIII-XXXIII. * FY 2009 figures are latest AAAS estimates of FY 2009 request. Program budgets include associated support costs.

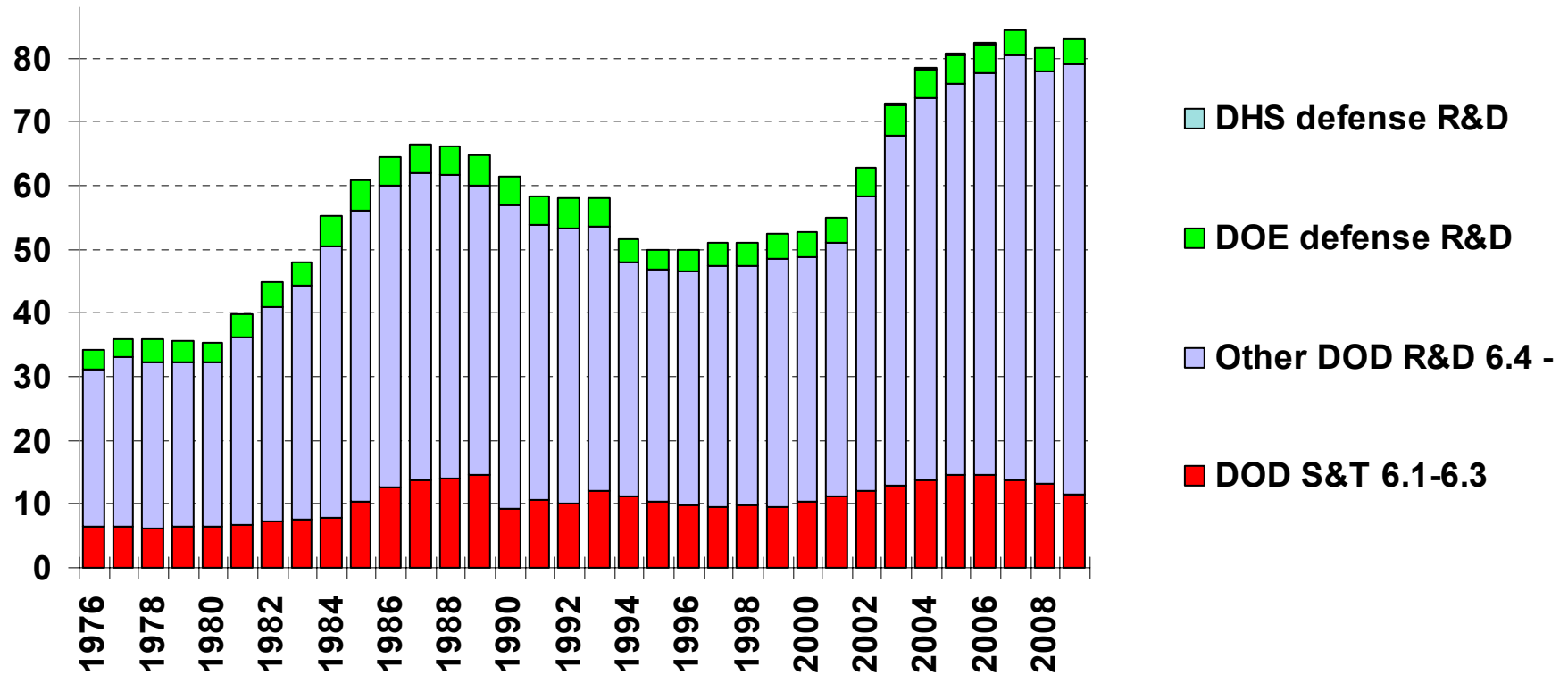
R&D includes conduct of R&D and R&D facilities.

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Trends in Defense R&D, FY 1976-2009 *

in billions of constant FY 2008 dollars



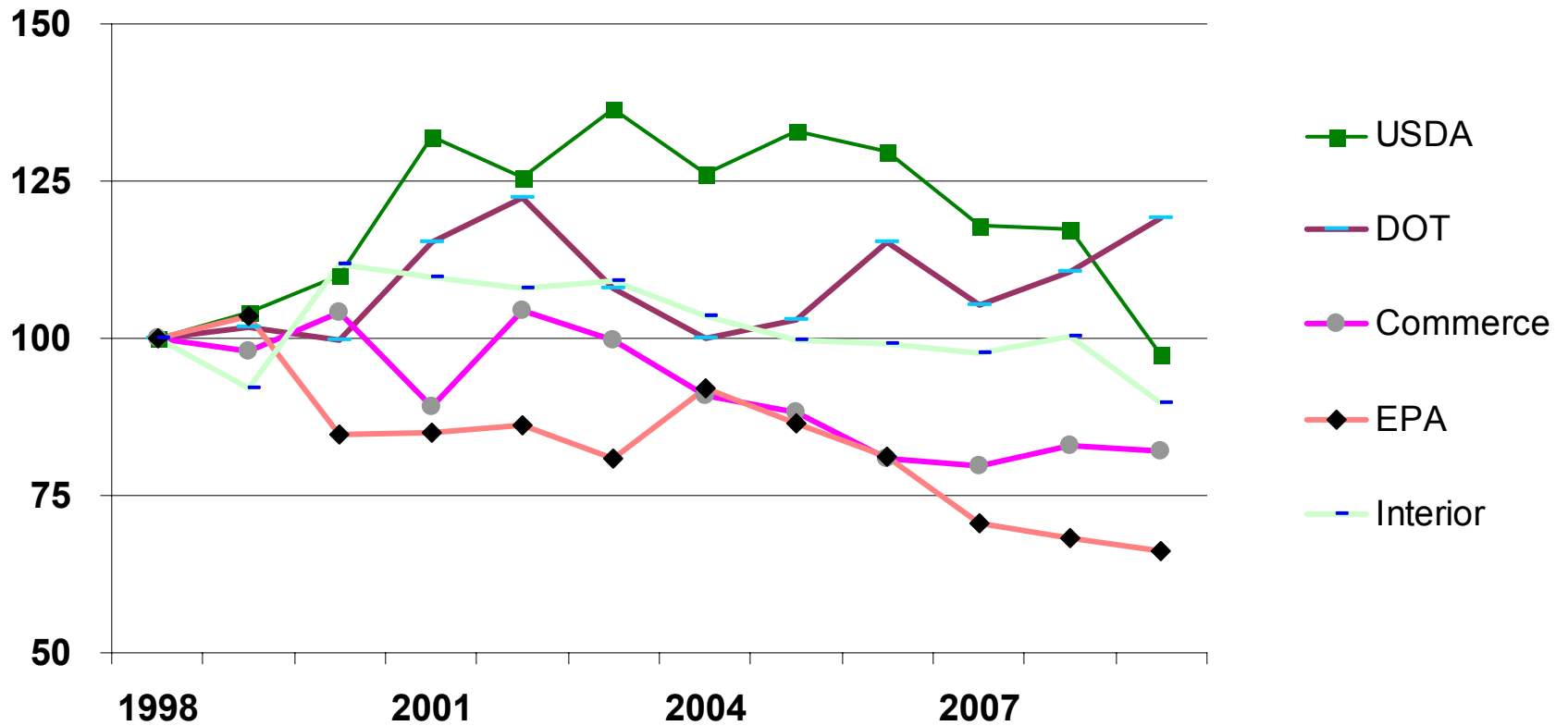
Source: AAAS analyses of R&D in annual R&D reports. * - FY 2009 figures are latest AAAS estimates of FY 2009 request. FY 2008 figures exclude pending supplementals. R&D includes conduct of R&D and R&D facilities. DOD S&T figures are not comparable for all years because of changing definitions.

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Trends in Federal R&D, FY 1998-2009 *

selected agencies in constant dollars, FY 1998=100



Source: AAAS analyses of R&D in *AAAS Reports VIII- XXXIII*

* FY 2009 figures are latest AAAS estimates of Fthe Y 2009 request.

R&D includes conduct of R&D and R&D facilities.

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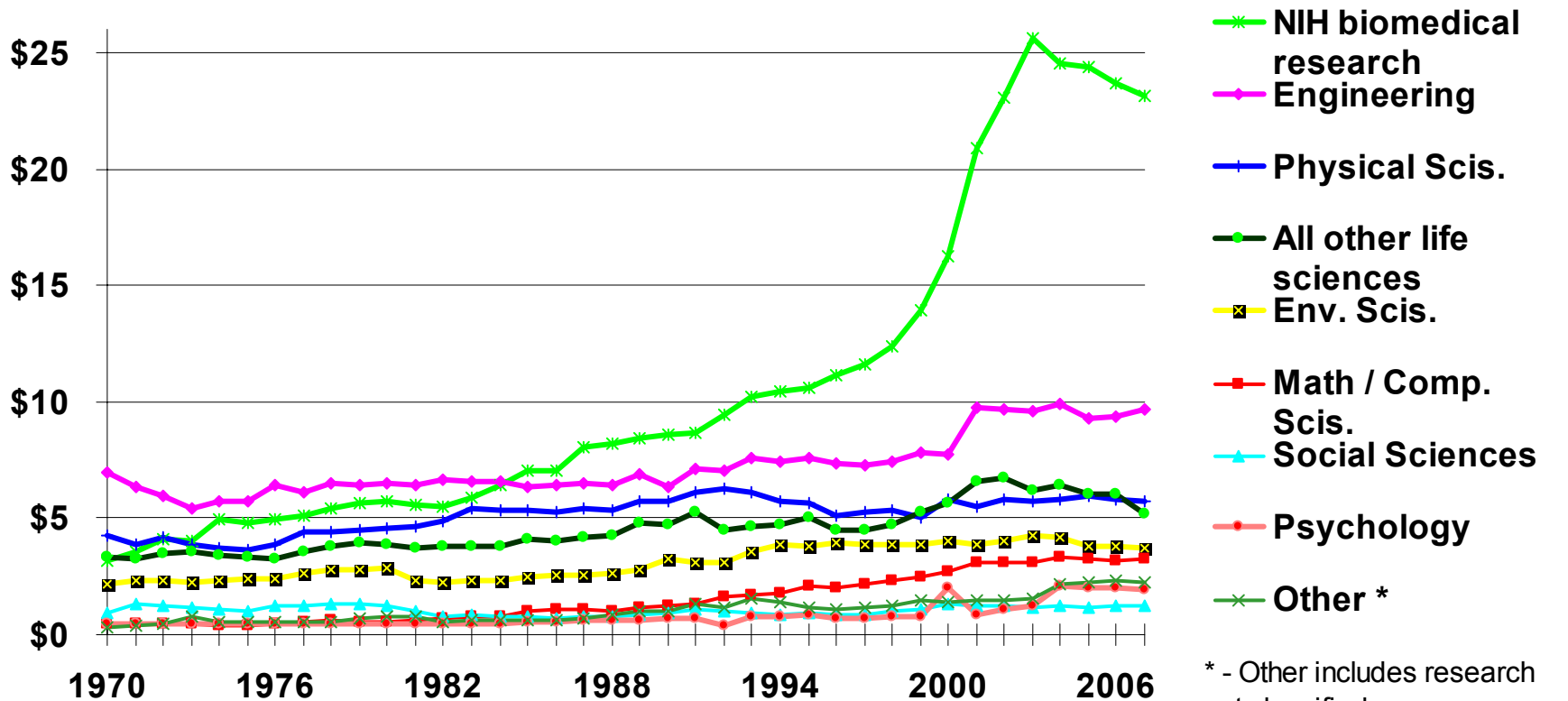


THE FY 2009 BUDGET AND HISTORICAL TRENDS: STILL FALLING

- The 2009 proposed increases do not change the overall trends of declining federal support for research.
- Federal research in support of many national missions is in decline, including health. Funding for other areas such as homeland security and climate change science appear to be increasing again.
- Federal research investments would fall in real terms for the fifth year in a row in the 2009 budget, and are shrinking as a share of the U.S. economy.

Trends in Federal Research by Discipline, FY 1970-2007

obligations in billions of constant FY 2008 dollars



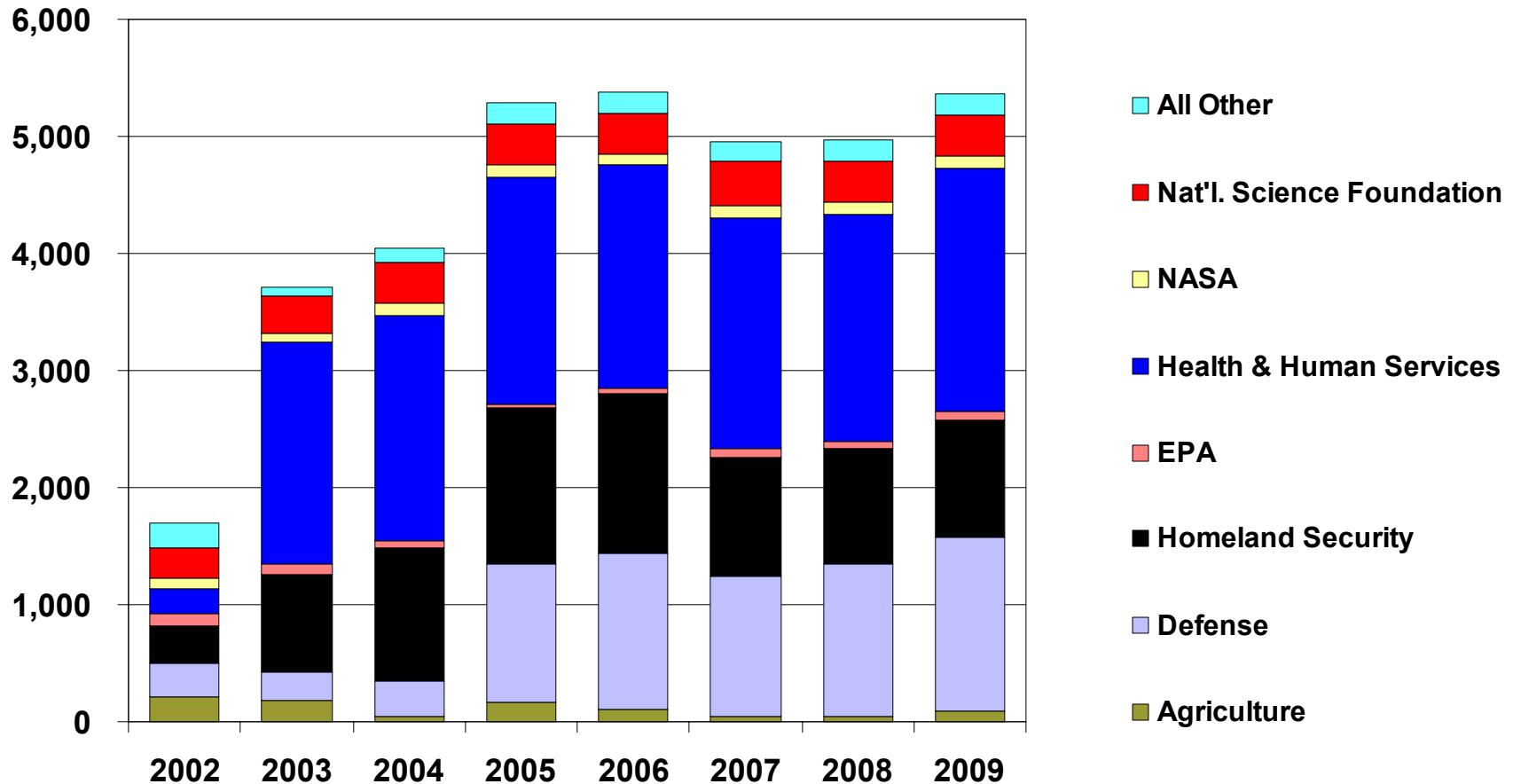
* - Other includes research not classified (includes basic research and applied research; excludes development and R&D facilities)

Life sciences - split into NIH support for biomedical research and all other agencies' support for life sciences.
 Source: National Science Foundation, *Federal Funds for Research and Development FY 2005, 2006, 2007, 2008*. FY 2006 and 2007 data are preliminary. Constant-dollar conversions based on OMB's GDP deflators. FEB. '08 © 2008 AAAS



Federal Homeland Security R&D, by Agency

(budget authority in millions of constant FY 2008 dollars, FY 2002-2009)



Source: AAAS, based on Office of Management and Budget data. Includes conduct of R&D and R&D facilities.

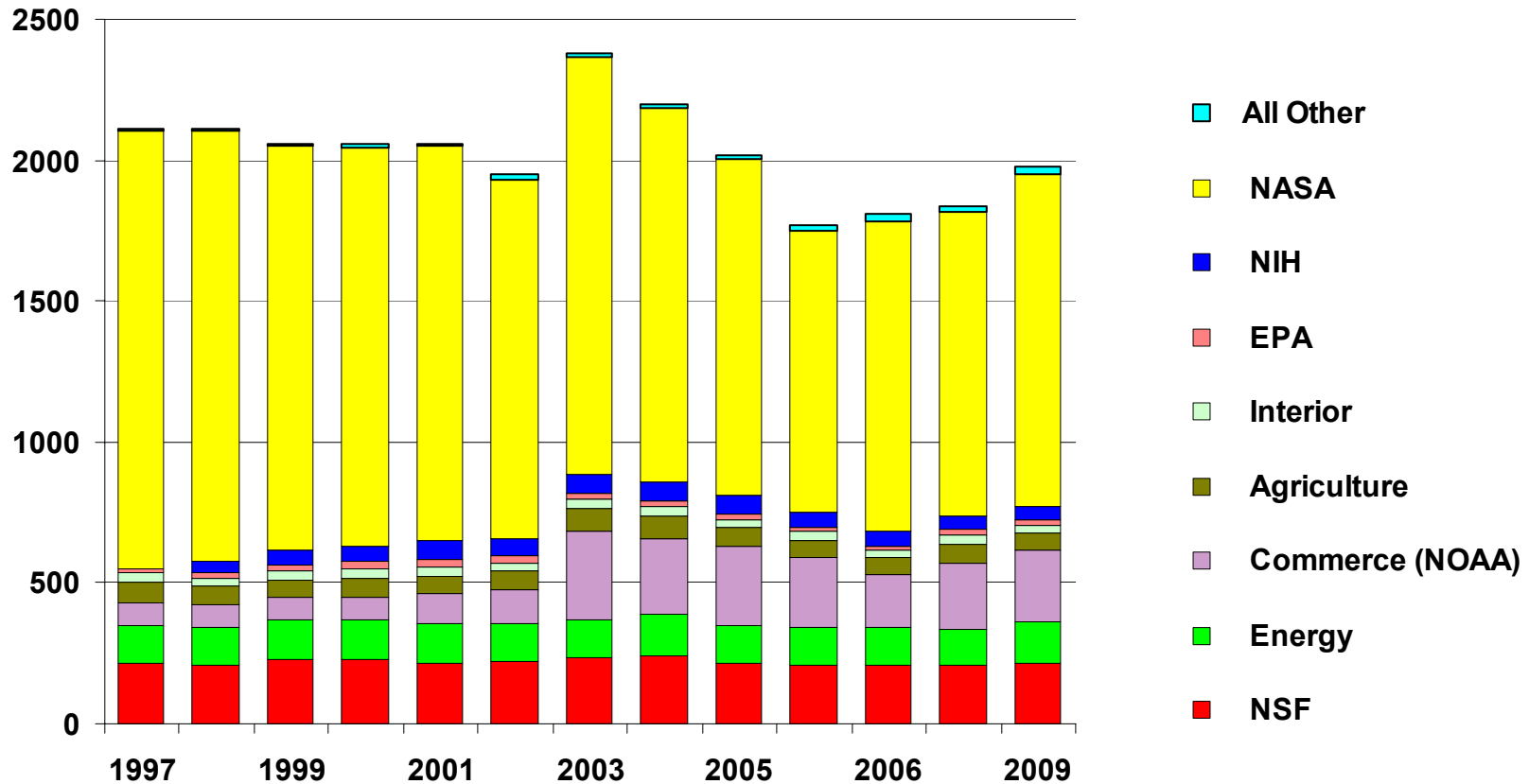
Note: DOD expanded its reporting of HS spending beginning in 2005.

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Climate Change Science Program, by Agency

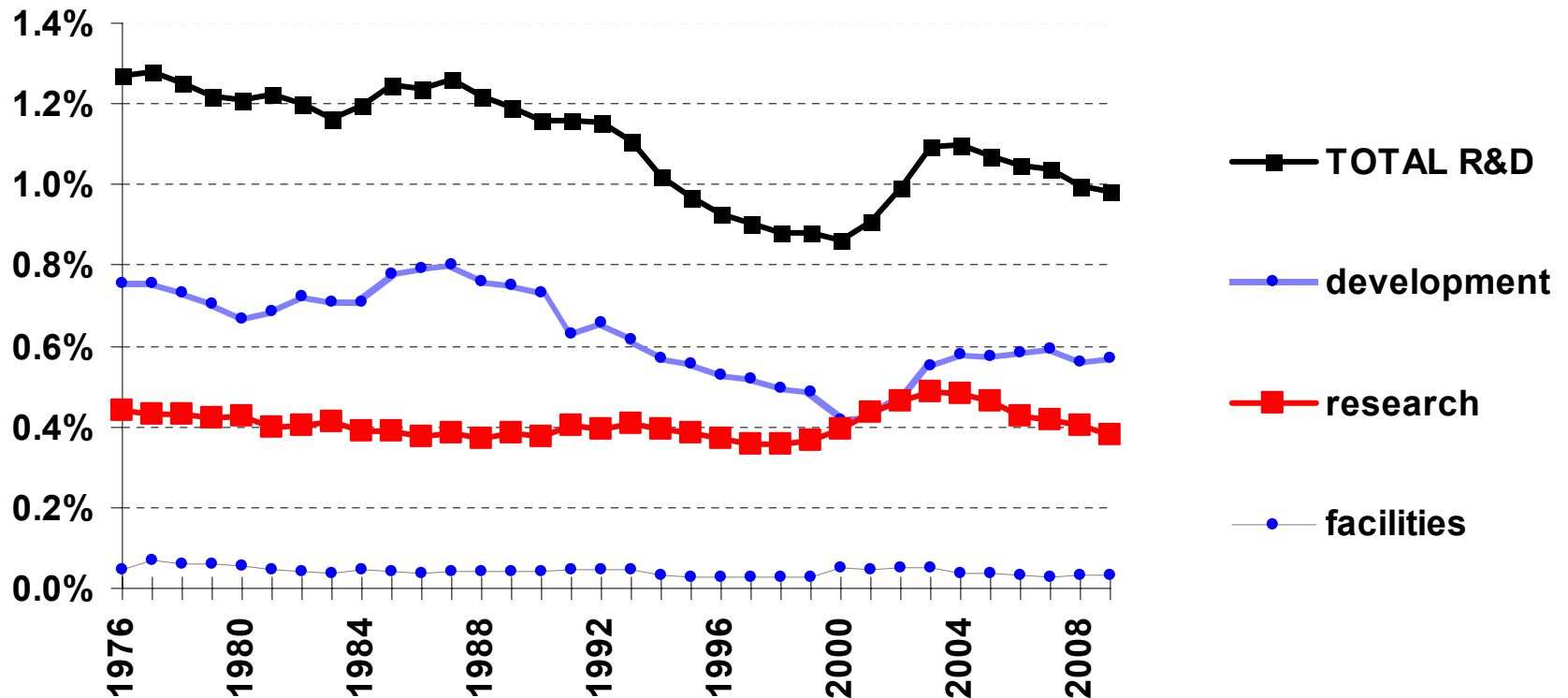
(budget authority in millions of constant FY 2008 dollars, FY 1997-2009)



Source: Office of Management and Budget and U.S. Global Change Research Program reports. FY 2009 figures represent President's request. NOAA and NASA figures back to 2003 have been recently revised to reflect program changes. Previous years' figures represent U.S. Global Change Research Program investments. FEB. '08 © 2008 AAAS



Trends in Federal R&D as % of GDP, FY 1976-2009 *



Source: AAAS analyses of R&D in annual AAAS R&D reports. * FY 2009 figures are latest AAAS estimates of FY 2009 request. R&D includes conduct of R&D and R&D facilities. Data to 1984 are obligations from the NSF Federal Funds survey. GDP figures are from OMB, Budget of the U.S. Government FY 2009.
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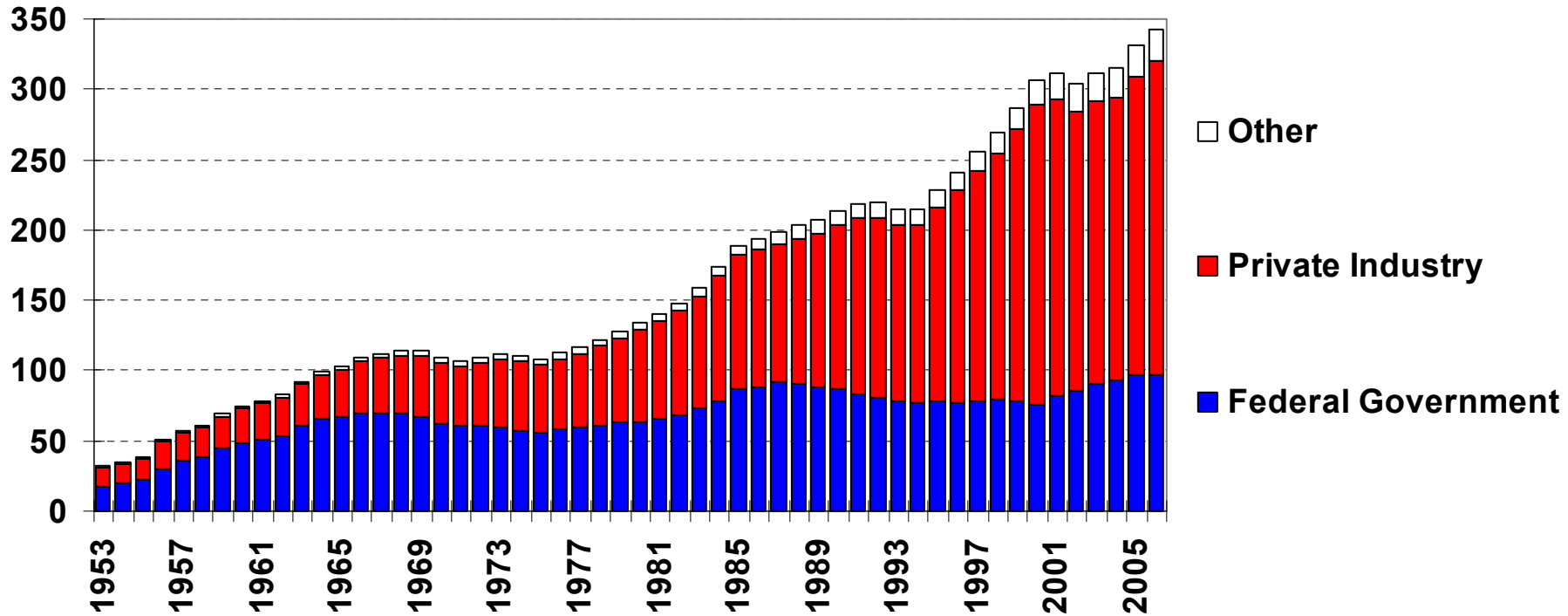


FEDERAL R&D IN CONTEXT: INDUSTRY AND THE WORLD

- 2/3 of all U.S. R&D is funded by industry, but industry focuses heavily on development; the majority of U.S. research is funded by the federal government.
- The U.S. compares favorably with other nations in R&D spending, but many Asian nations are dramatically increasing their R&D

U.S. R&D Funding by Source, 1953-2006

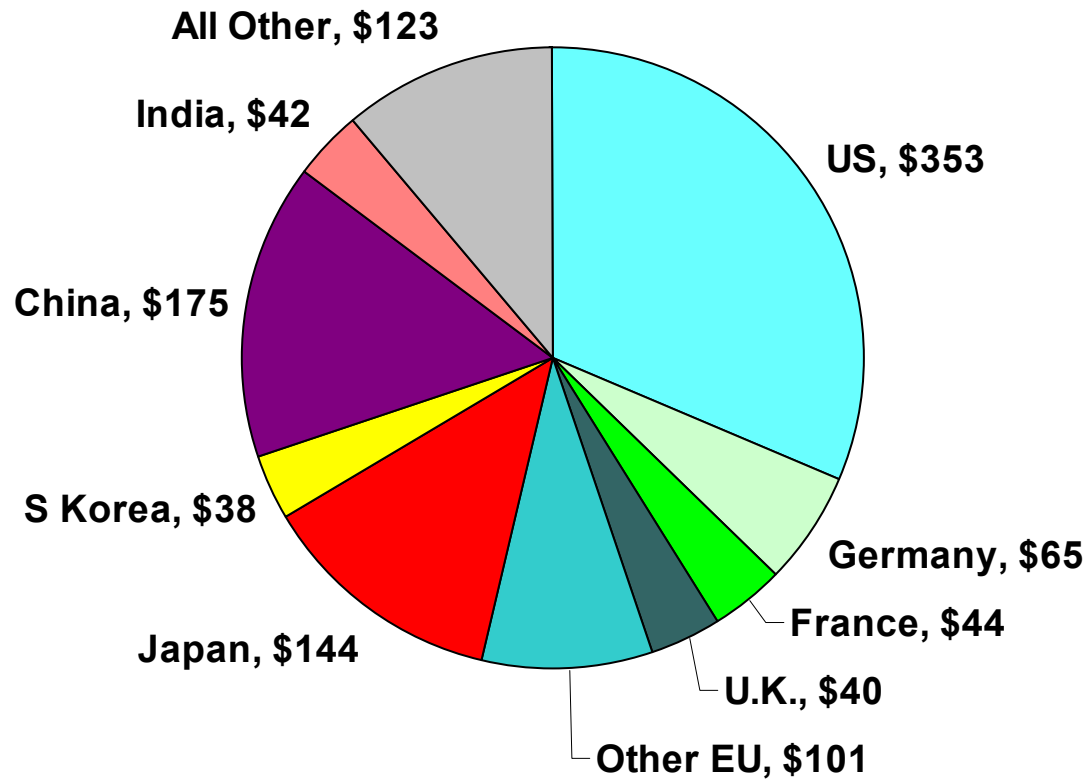
expenditures in billions of constant 2006 dollars



Source: NSF, Division of Science Resources Statistics. (Data for 2005 and 2006 are preliminary.)
APRIL '07 © 2007 AAAS



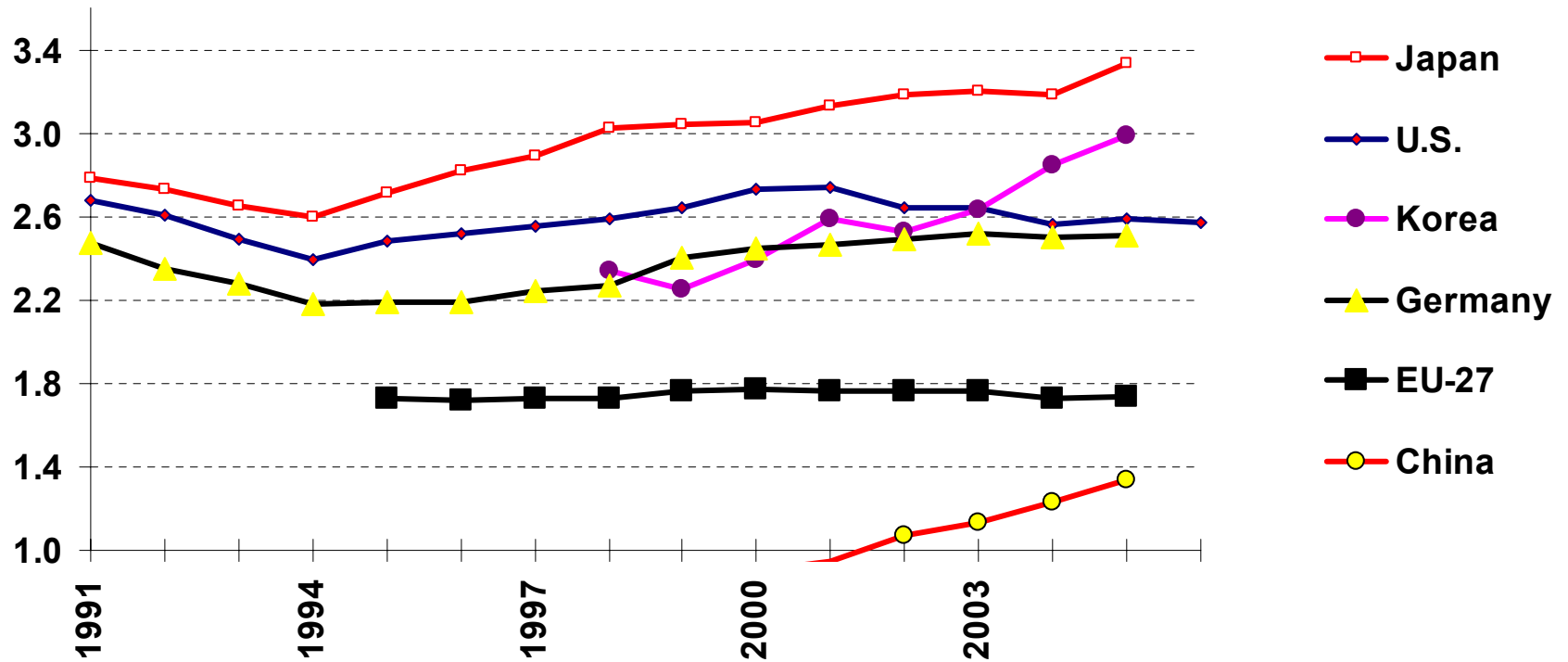
Shares of Total World R&D, 2007



**Total World R&D =
U.S. \$1,124 billion****

Source: Battelle, Global R&D Report, 2007, from Battelle, OECD, and R&D Magazine data. Projections for 2007, by performer nation. * *- calculated using purchasing power parities, in millions of dollars.
DECEMBER '07 © 2007 AAAS

Total National R&D as % of GDP, 1991-2006



Source: National Science Foundation, National Patterns of R&D Resources and OECD, Main Science and Technology Indicators. Data not available for all nations for all years. DECEMBER '07 © 2007 AAAS

WHAT'S NEXT?

- Congress is considering the FY 2009 budget resolution, which could boost domestic appropriations by up to \$24 billion over the President's request. But the President has threatened to veto any appropriations that exceed his request.
- Many of these proposed R&D increases are authorized in the America COMPETES Act and other legislation, but the problem is in finding the resources.
- The Appropriations Committees will try to write and pass 12 2009 appropriations bills.

FOR MORE INFORMATION...

The AAAS R&D web site is
www.aaas.org/spp/rd

The AAAS Forum on
Science and Technology
Policy is 8-9 May 2008
in Washington, DC

AAAS REPORT XXXII

Research & Development FY 2008

Intersociety Working Group

