

# Where is the Money Going? The 2008-2009 Federal R&D Budget

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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.

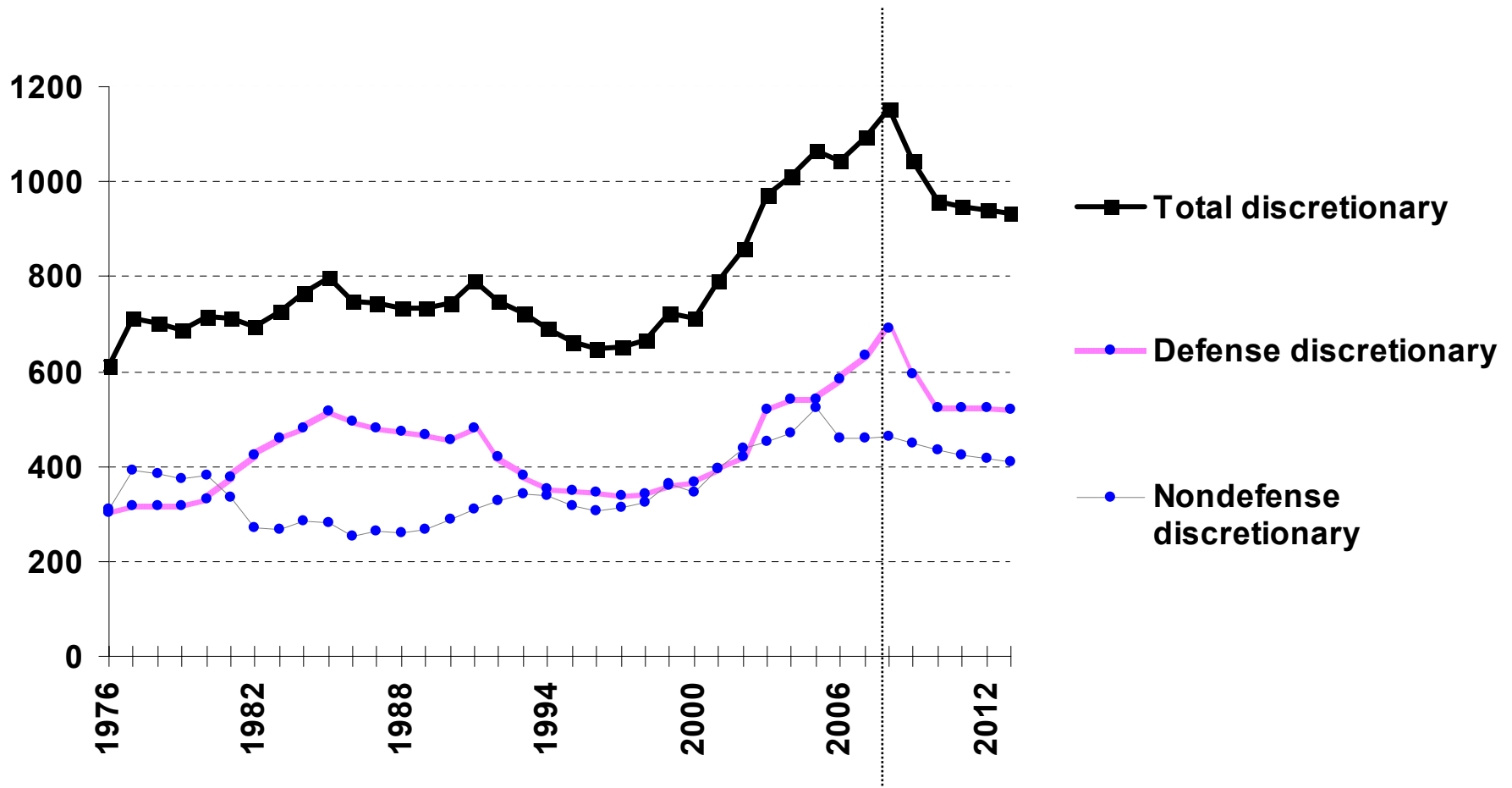


## THE FY 2009 BUDGET

- In February, President Bush proposed a \$3.1 trillion budget for FY 2009.
- To help control the deficit, the President proposes to keep domestic appropriations flat.
- Domestic appropriations barely kept pace with inflation in 2006, 2007, and 2008.
- Federal R&D investments come from the discretionary (appropriated) budget.
- The President's budget proposes steep cuts in many domestic programs and several program eliminations; in comparison, R&D programs do very well.

# 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.

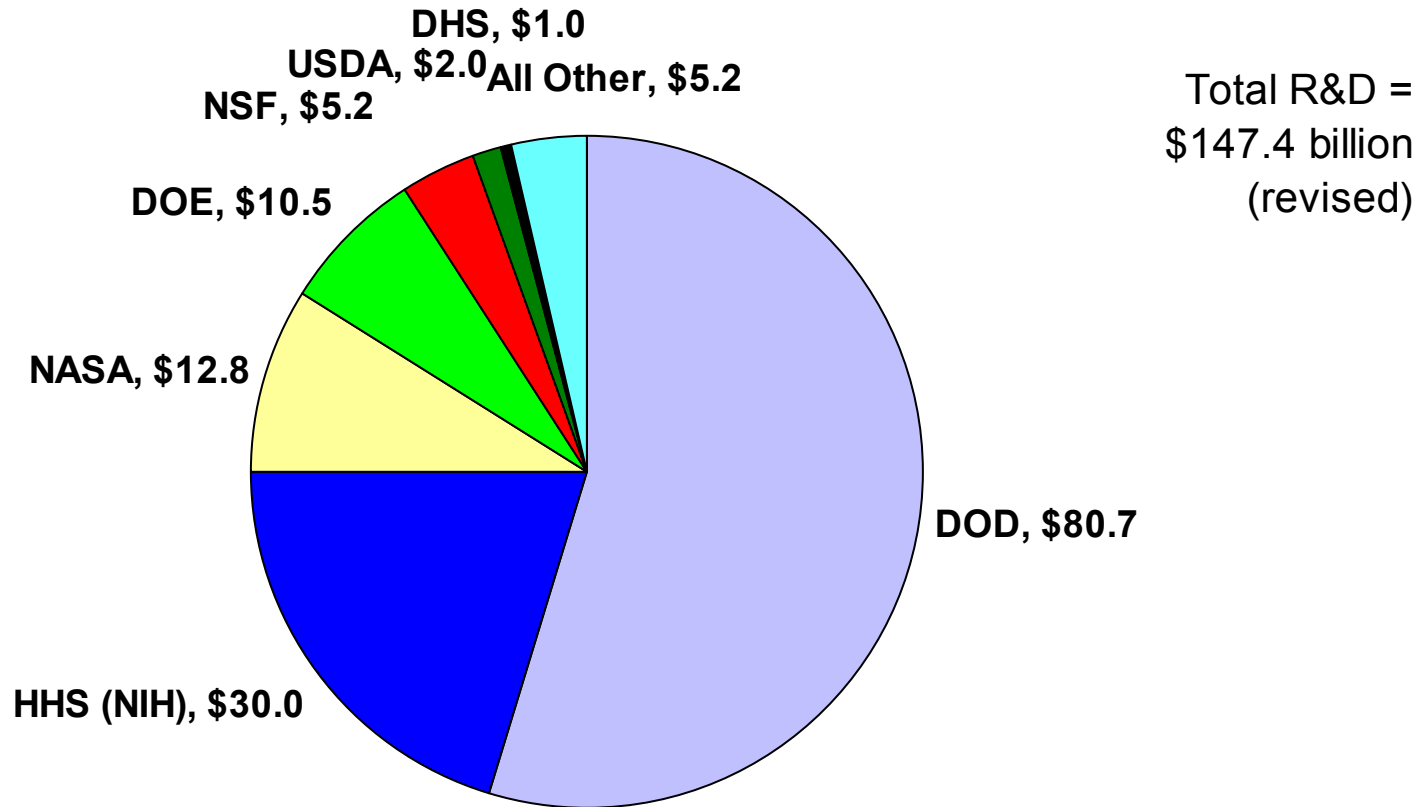
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## R&D IN THE FEDERAL BUDGET

- There is no “R&D budget.” Federal R&D funding is scattered among 24 departments and independent agencies.
- In our mission-oriented system, each department funds only the R&D necessary to carry out its mission, and integrates R&D programs with other programs.
- Only the National Science Foundation (NSF) and DOE’s Office of Science have science missions.
- Because of mission requirements, some agencies invest heavily in “D” (DOD), others almost exclusively “R” (NSF), and others a mix (NASA).

# 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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## THEMES IN THE BUDGET: INNOVATION AND COMPETITIVENESS

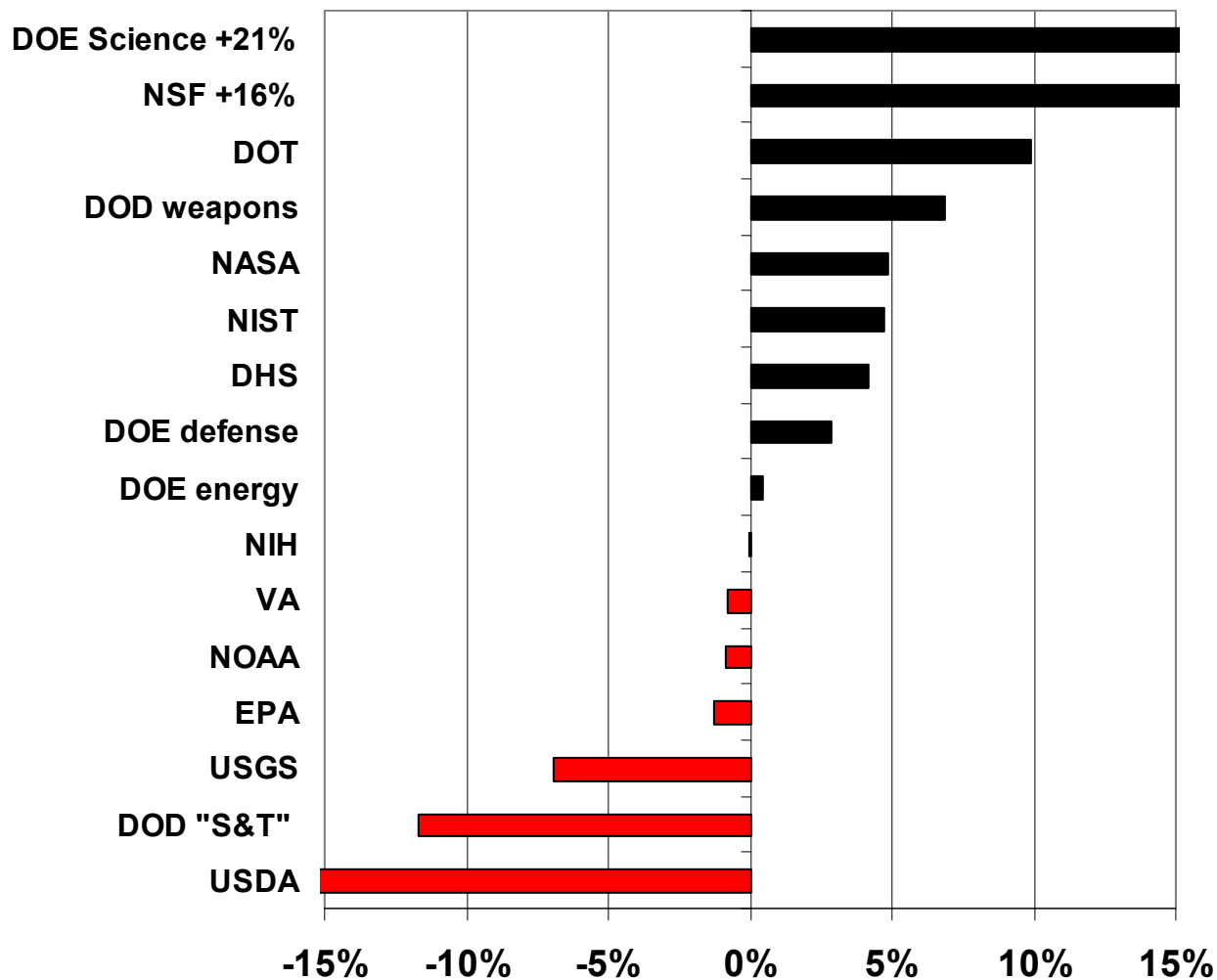
- In response to the “Gathering Storm” report and others, President Bush announced the American Competitiveness Initiative (ACI) in his 2006 State of the Union address.
- There are also several congressional responses, culminating in the America COMPETES Act of August 2007.
- For R&D investments, the 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. But 2007 and 2008 appropriations leave the plan off track.

## 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.

# 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.

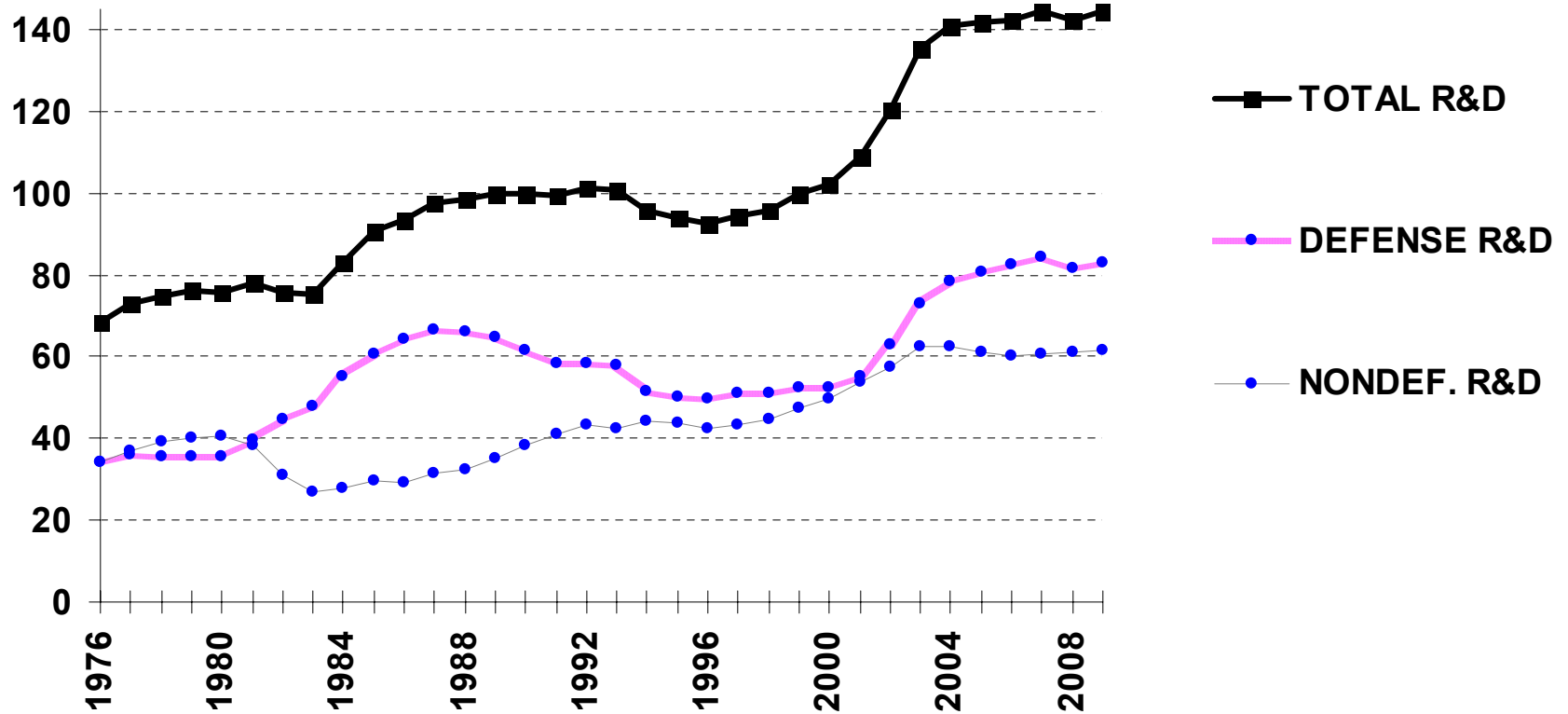
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# Trends in Federal R&D, FY 1976-2009 \*

in billions of constant FY 2008 dollars



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

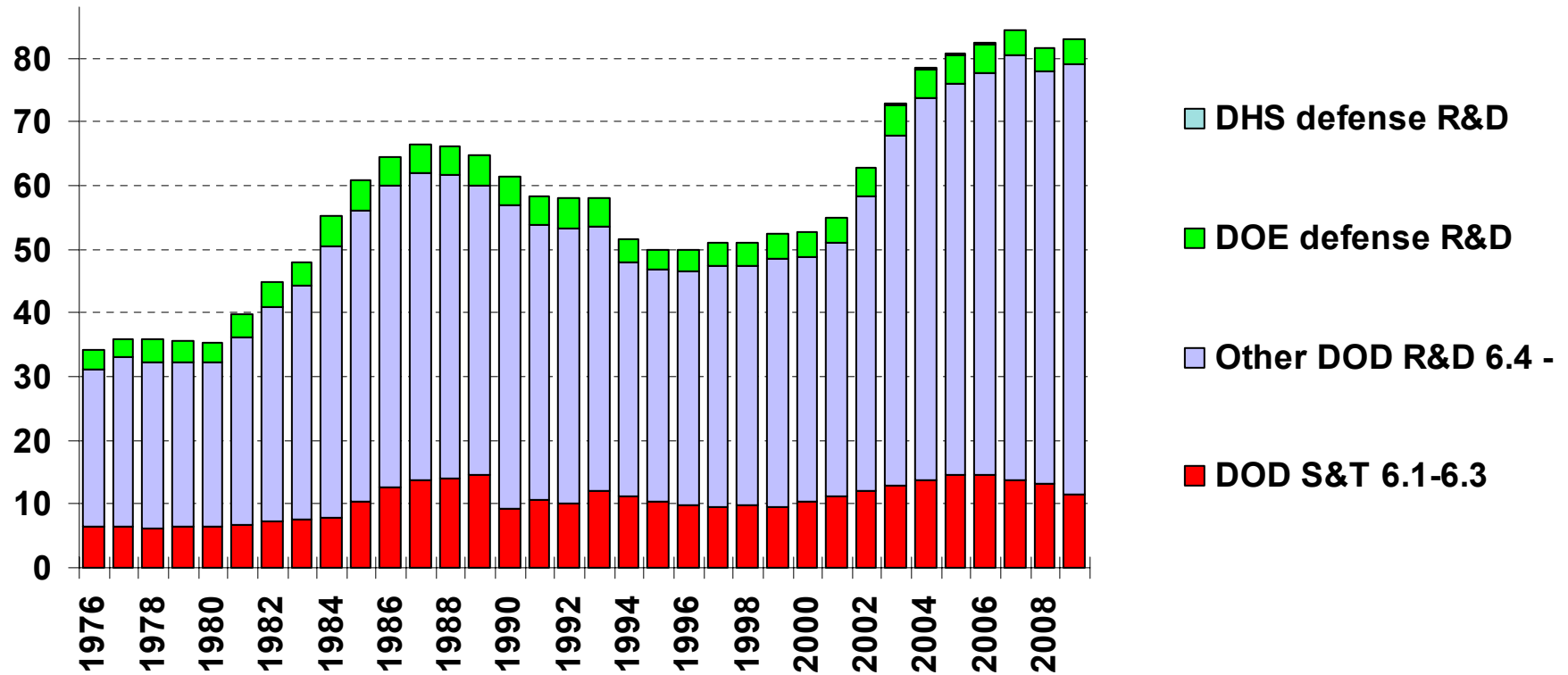
R&D includes conduct of R&D and R&D facilities.

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

in billions of constant FY 2008 dollars



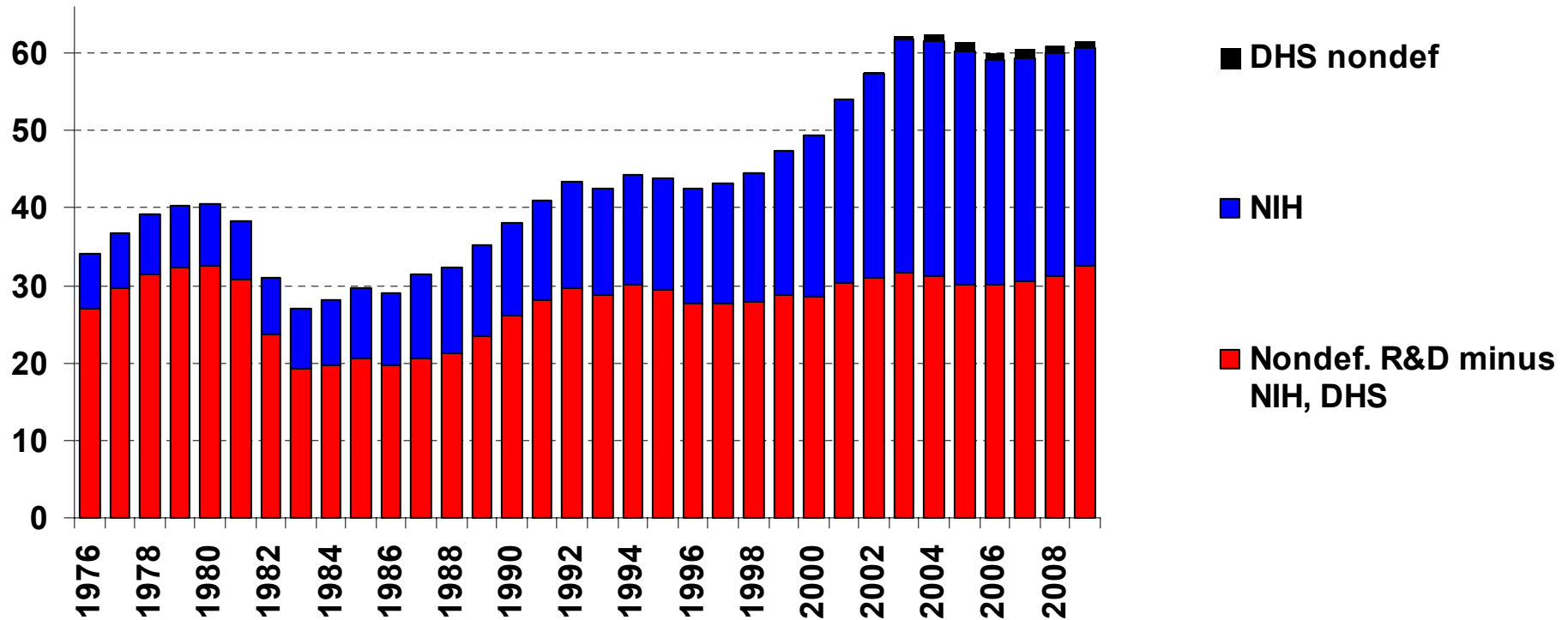
Source: AAAS analyses of R&D in annual R&D reports. \* - FY 2009 figures are latest AAAS estimates of FY 2009 request. FY 2008 figures exclude pending supplementals. R&D includes conduct of R&D and R&D facilities. DOD S&T figures are not comparable for all years because of changing definitions.

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# Selected Trends in Nondefense R&D, FY 1976-2009\*

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.

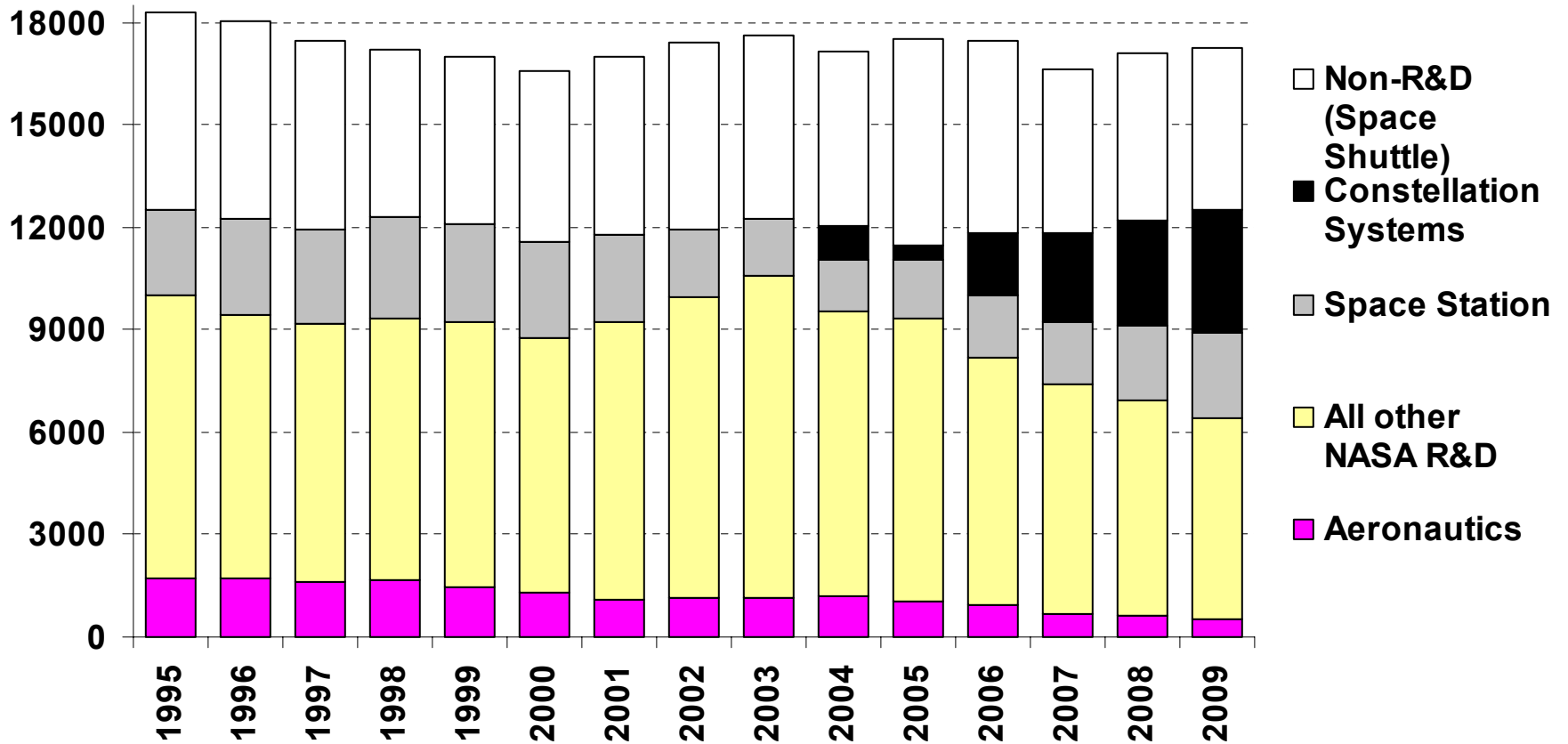
R&D includes conduct of R&D and R&D facilities.

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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.

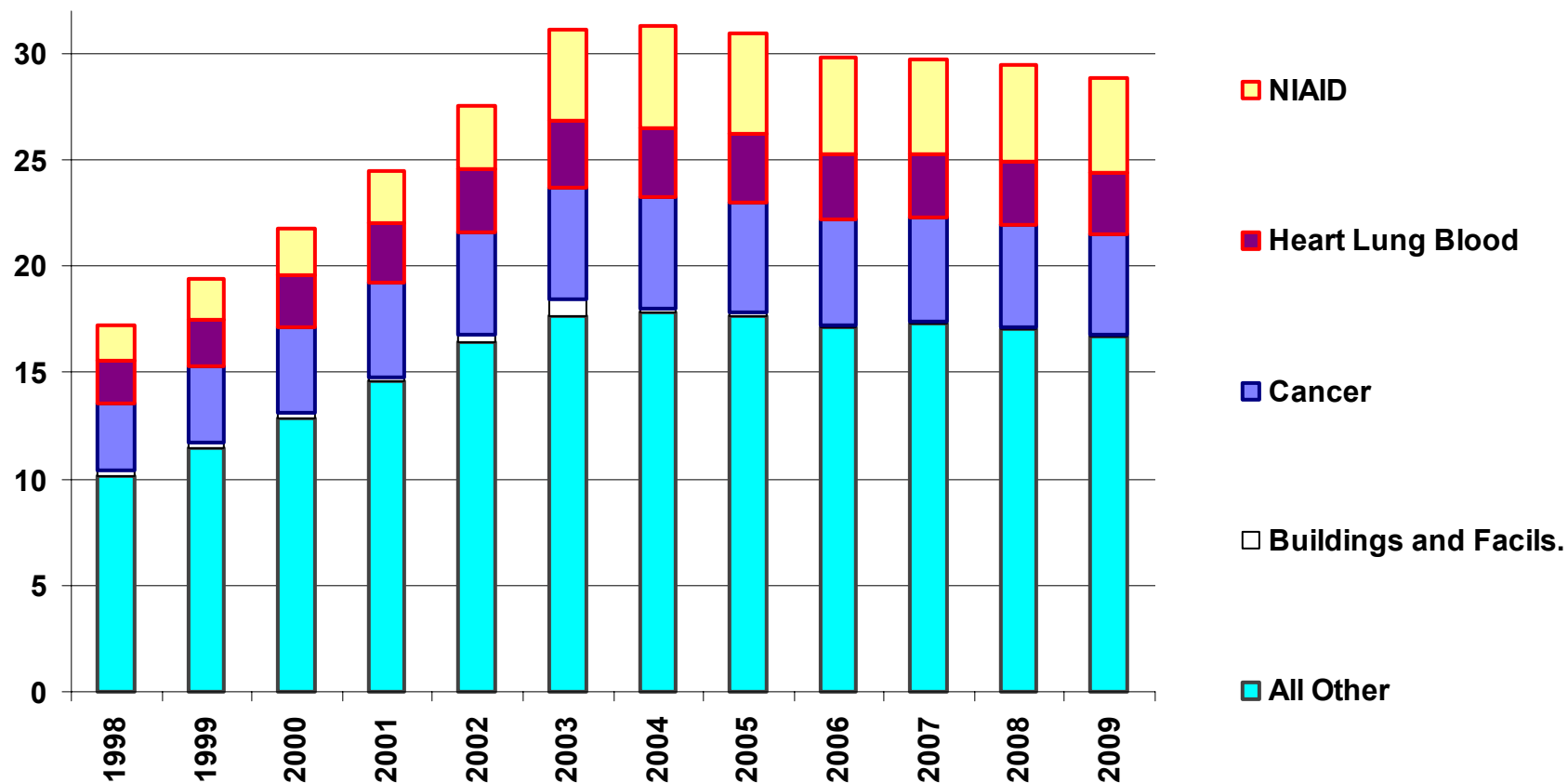
R&D includes conduct of R&D and R&D facilities.

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

(budget authority in billions of constant FY 2008 dollars)



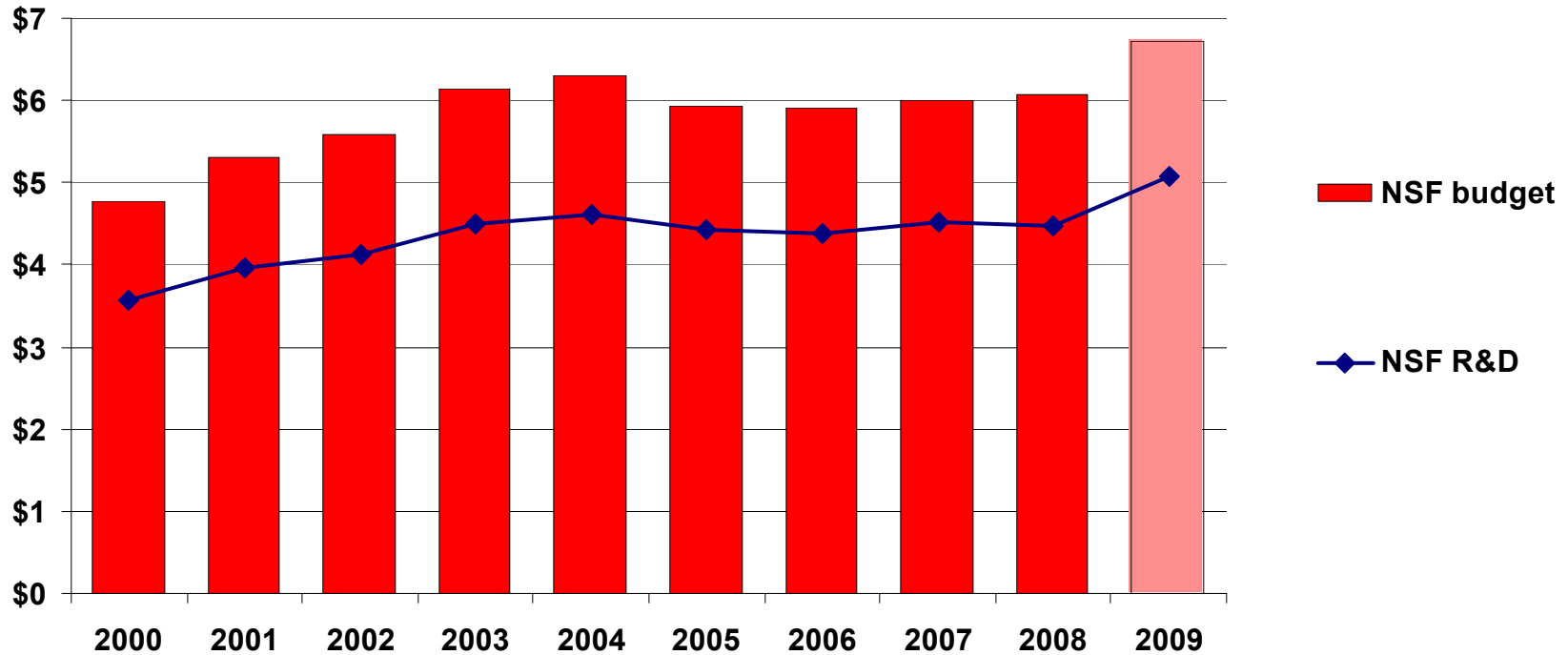
Source: AAAS R&D reports from NIH budget documents 1998-2009. \* 2009 is latest AAAS estimates of FY 2009 request. Adjusted for inflation using OMB's GDP deflators.

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# National Science Foundation Budget, FY 2000-2009

(budget authority in billions of constant FY 2008 dollars)

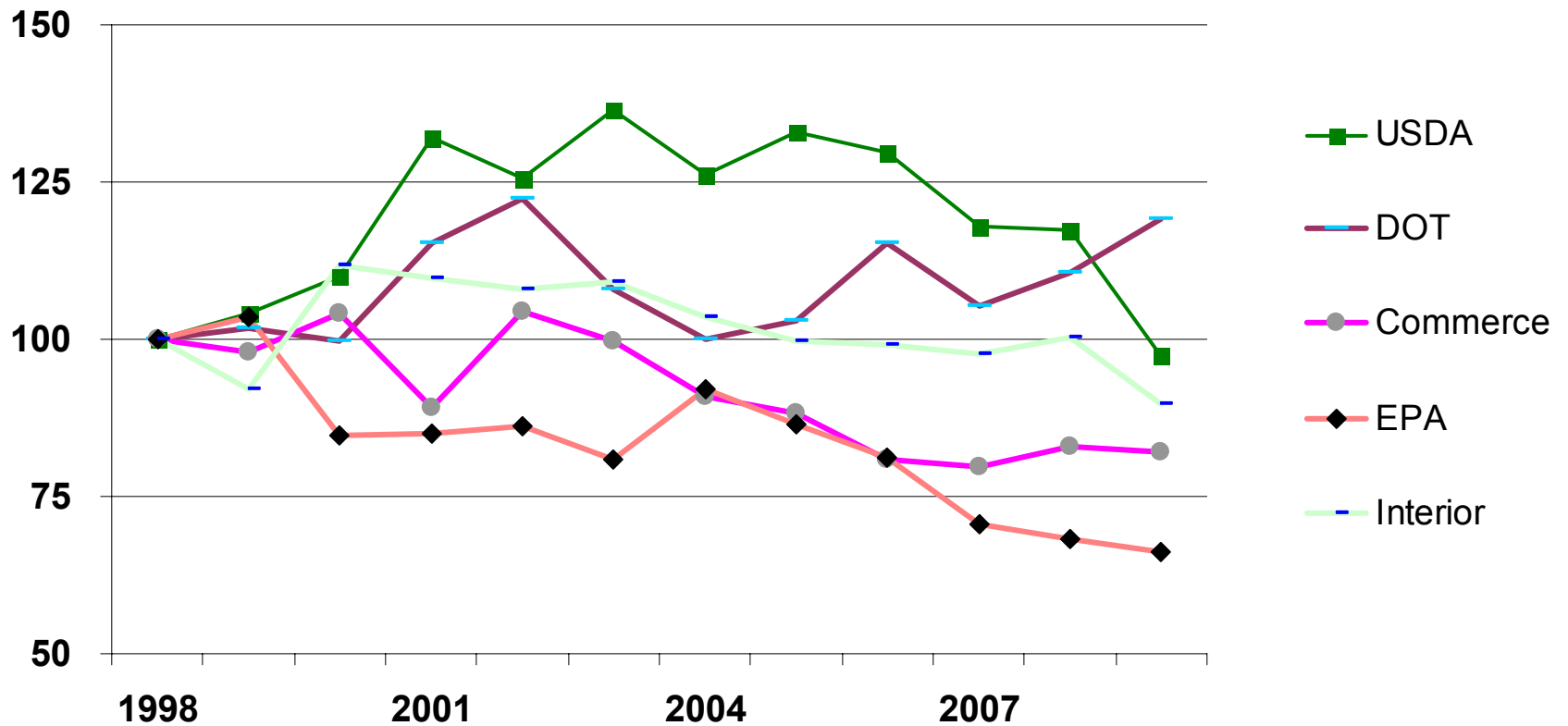


Source: National Science Foundation, and latest AAAS estimates of FY 2009 budget. FY 2009 is budget request.  
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# Trends in Federal R&D, FY 1998-2009 \*

selected agencies in constant dollars, FY 1998=100



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

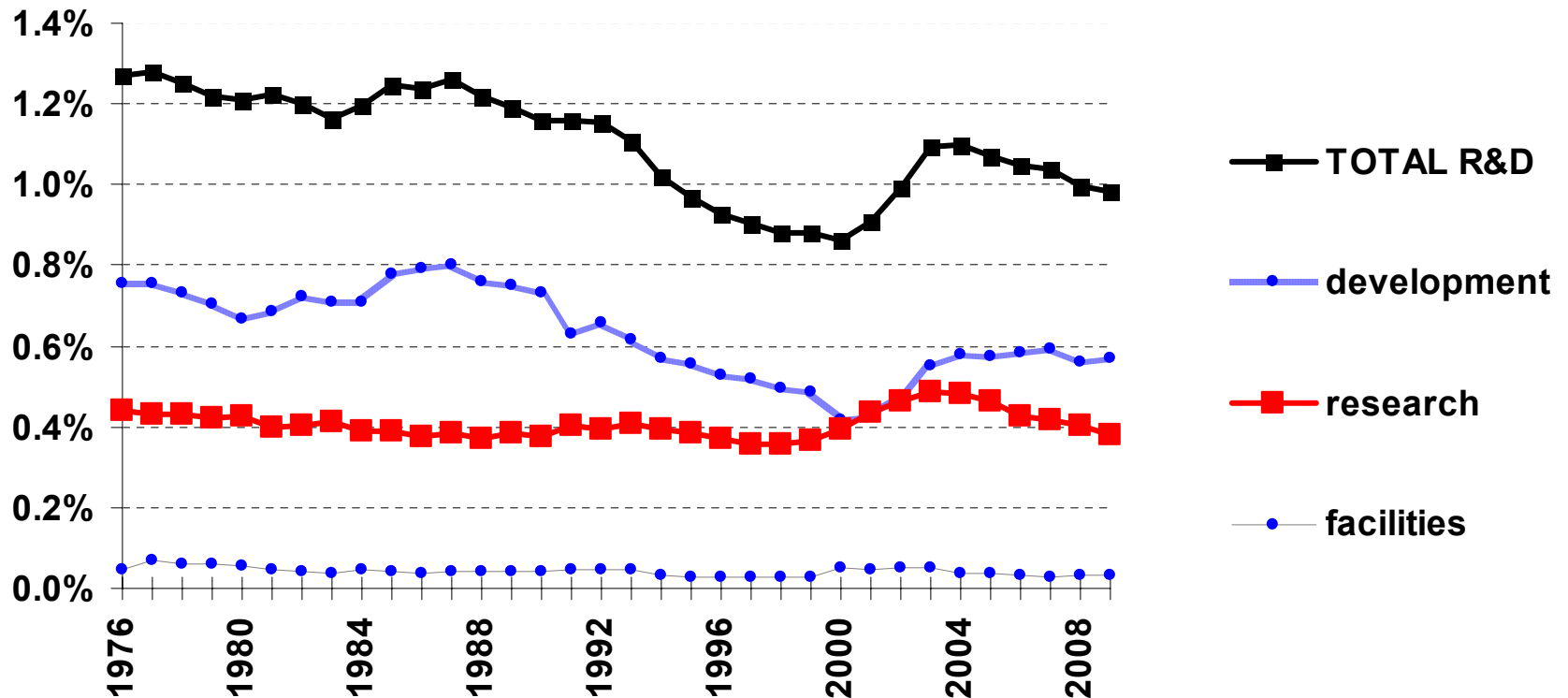
\* FY 2009 figures are latest AAAS estimates of Fthe Y 2009 request.

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

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# 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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## R&D IN THE BUDGET PROCESS (1)

Federal R&D is funded through 10 of the 12 appropriations bills that fund all discretionary programs.

- FEBRUARY – The President’s budget is released and goes to Congress.
- FEBRUARY - JUNE Congressional appropriations and authorizing committees (like House S&T Committee) hold public hearings and gather testimony on the budget.
- FEBRUARY - ?? Authorizing committees try to write and pass authorization bills to guide spending decisions (like the NASA authorization).
- SPRING – Budget committees write a budget resolution to set overall budget targets (FY 2009 budget resolution finalized last week), including a total for discretionary appropriations.

## R&D IN THE BUDGET PROCESS (2)

- JUNE - ?? The House and Senate work on 2009 appropriations bills. Deadline: October 1 (rarely met, and certainly not this year).
- Program-by-program funding levels will be decided in appropriations bills. 4 bills handle 95 percent of the federal R&D portfolio, but DOD, NIH, NSF/NASA/NOAA, and DOE are considered separately.
- Many interagency efforts such as climate change R&D, and environmental research are appropriated in several bills. To help coordinate, there are formal initiatives in IT, nano, and climate change R&D with national coordinating offices and regular interagency dialogue.
- October 1 – FY 2009 starts; if appropriations bills aren't done, then CRs (continuing resolution) providing temporary funding at previous year's funding levels are needed.

## THIS WEEK IN CONGRESS

- Congress tries to finalize a \$180+ billion supplemental bill primarily for war costs through the end of the year. There could be science funding in it (DOE Science, NIH, and NSF); House and Senate passed separate versions before Memorial Day.
- There is now a FY 2009 budget resolution, which could boost domestic appropriations by \$21 billion over the President's request. With \$1.013 trillion as a ceiling, appropriations can now start writing '09 bills. But the President has threatened to veto any appropriations that exceed his request.
- If Congress is forced to stay with the President's total, then ACI and other increases will be trimmed to shore up funding for other domestic programs, as in 2008. 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.

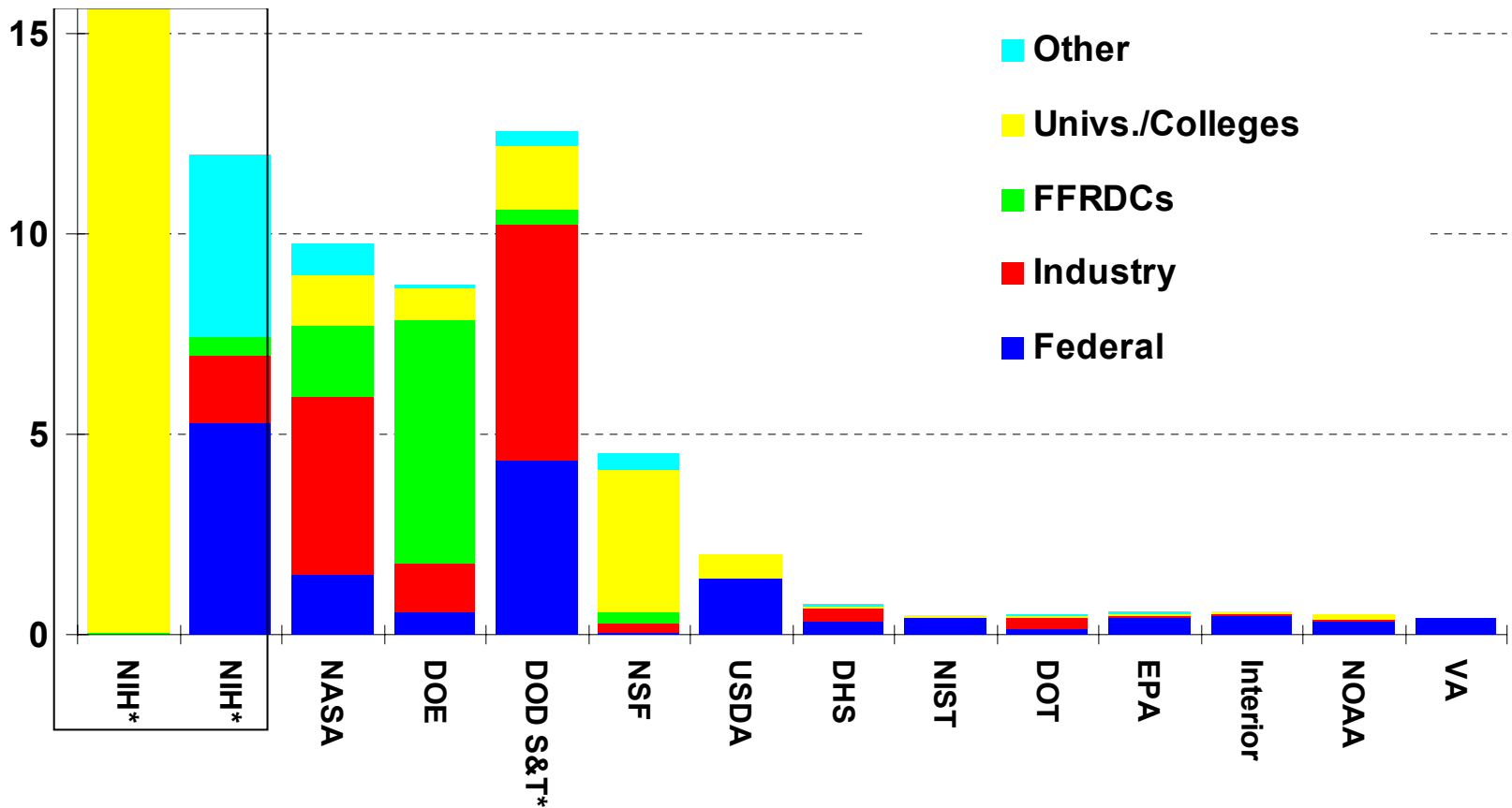
## IMPACTS OF THE BUDGET PROCESS

- Our fragmented, decentralized, mission-oriented system makes it difficult if not impossible to have a coherent federal R&D spending policy.
- Many trends are the unplanned impacts of numerous federal agency decisions, and congressional and presidential budget decisions. All are affected by the broader budget environment.

# Federal R&D by Performer at Selected Agencies

billions of FY 2007 obligations (preliminary)

\* NIH R&D - \$27.8 billion.  
Shown as two bars.



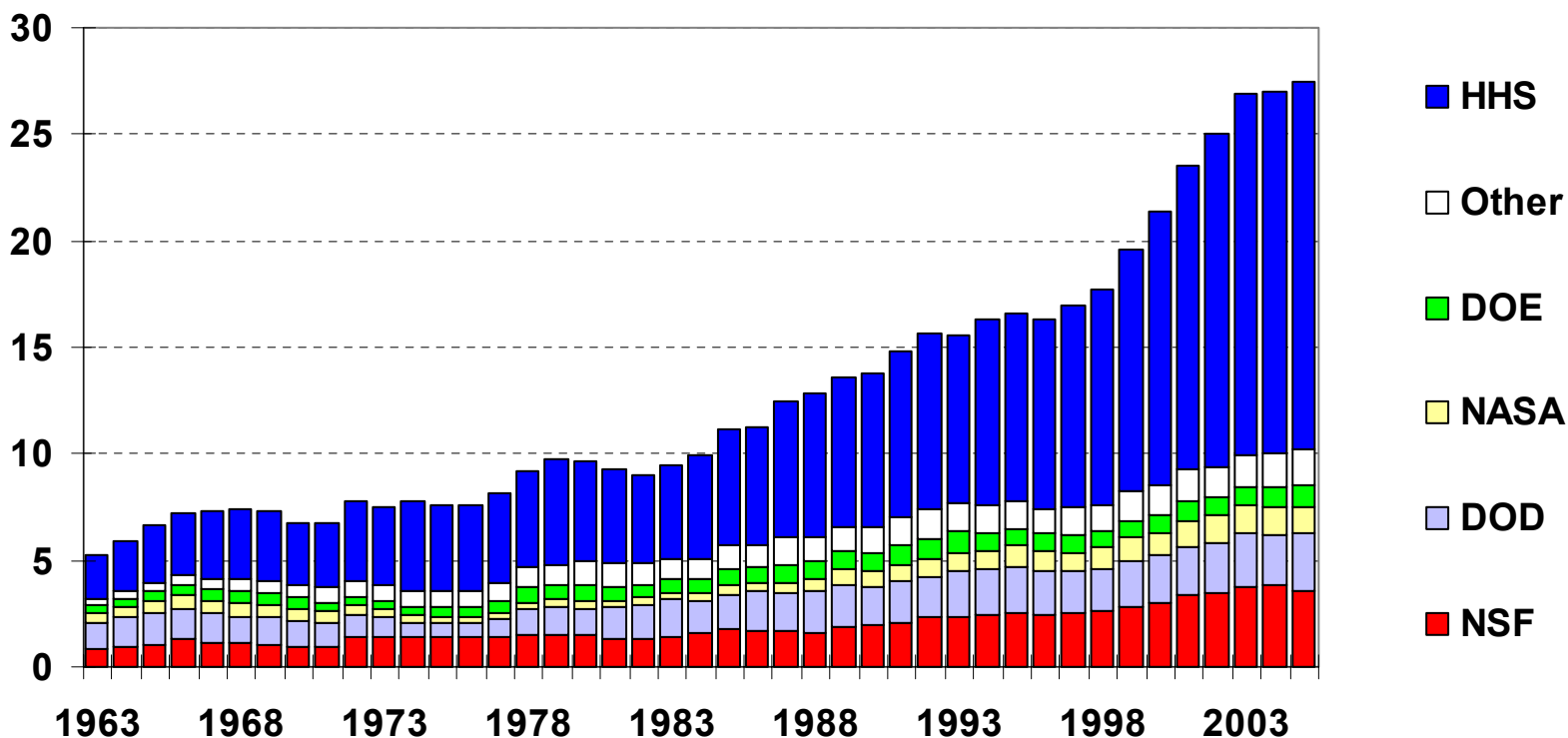
Source: AAAS, based on NSF, Federal Funds for Research and Development, Fiscal Years 2005, 2006, and 2007, 2008. R&D includes research, development, and R&D facilities. \* - DOD R&D in "6.1" through "6.3" categories.

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# Federal R&D Funding to Colleges and Universities FY 1963-2005

Obligations by agency in billions of constant FY 2008 \$



Source: AAAS, based on NSF, *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, FY 2005, 2007.*

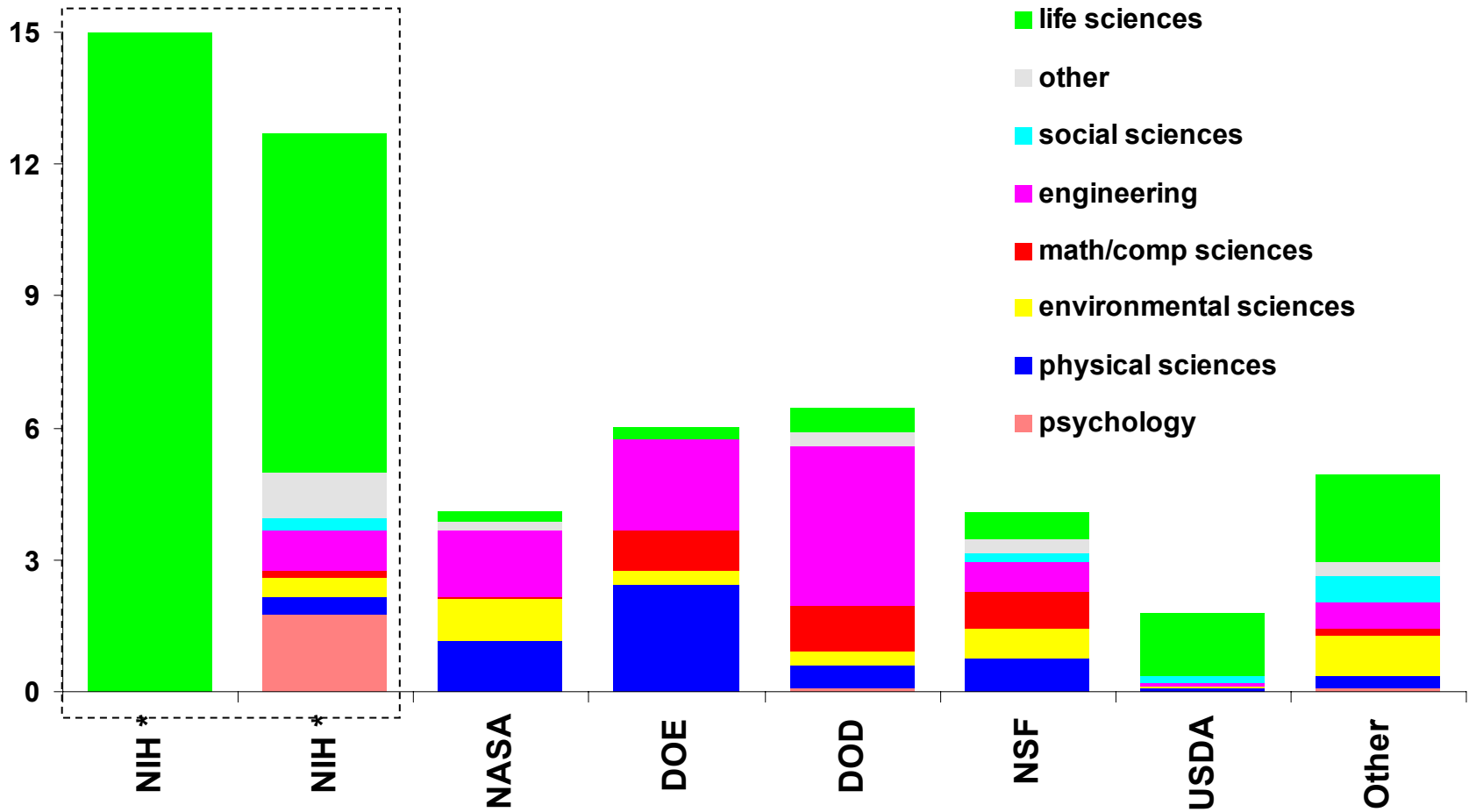
R&D includes research, development, and R&D facilities support. Constant-dollar conversions based on OMB's GDP deflators.

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# Federal Research by Discipline at Selected Agencies, FY 2007 (preliminary obligations in billions of dollars)

\* NIH research - \$27.7 billion.  
Shown as two bars.

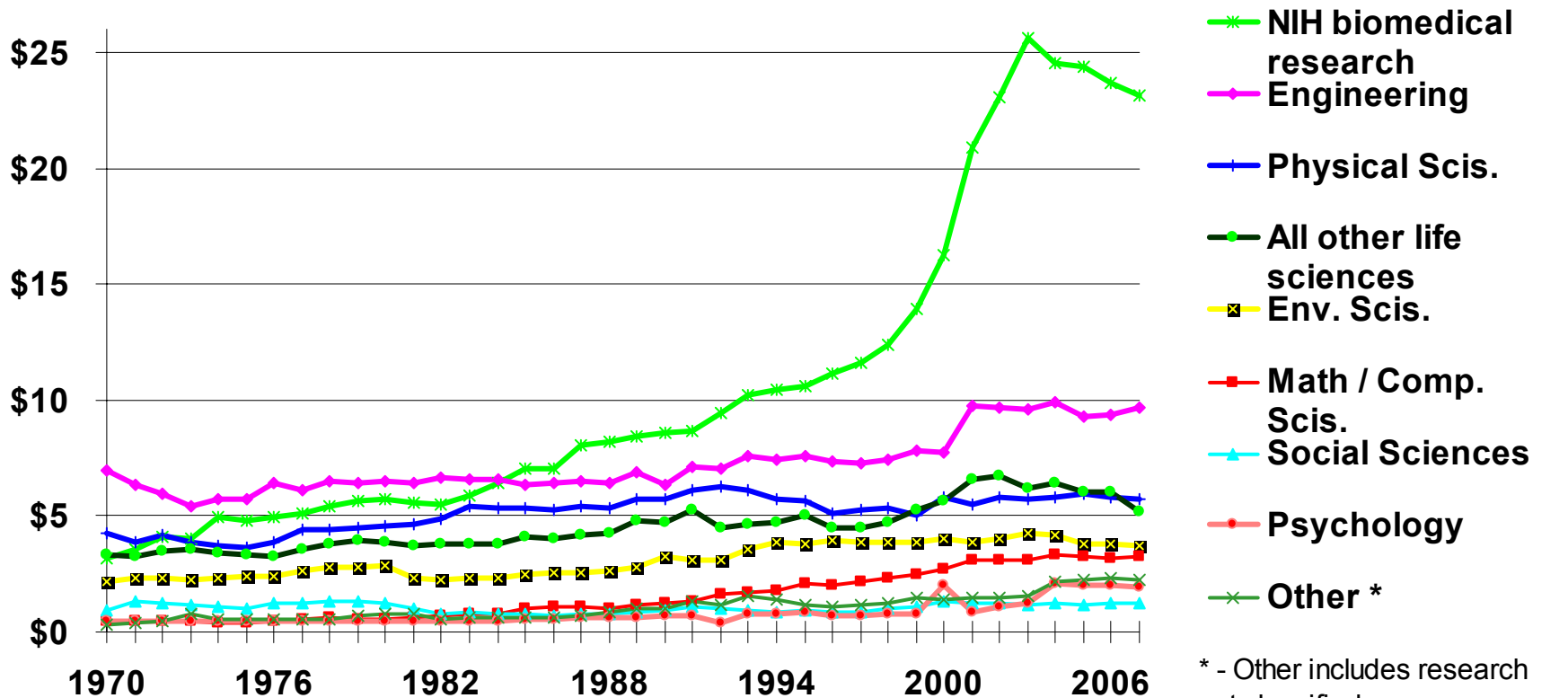


Source: National Science Foundation, *Federal Funds for Research and Development Fiscal Years 2005, 2006 and 2007, 2008*. Development and R&D facilities excluded. FY 2007 data are preliminary.  
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# Trends in Federal Research by Discipline, FY 1970-2007

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)

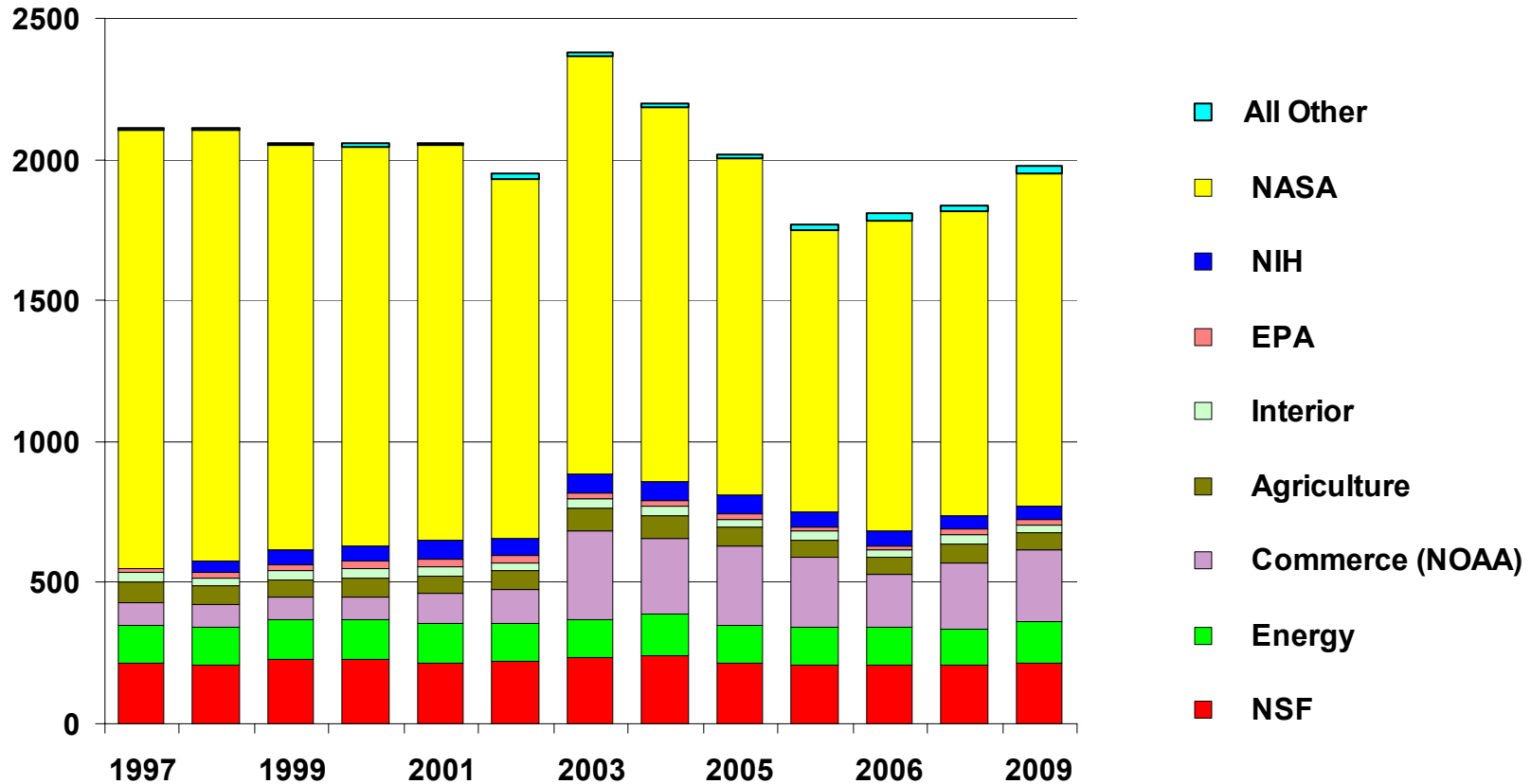
Life sciences - split into NIH support for biomedical research and all other agencies' support for life sciences.  
 Source: National Science Foundation, *Federal Funds for Research and Development FY 2005, 2006, 2007, 2008*. FY 2006 and 2007 data are preliminary. Constant-dollar conversions based on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





# 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

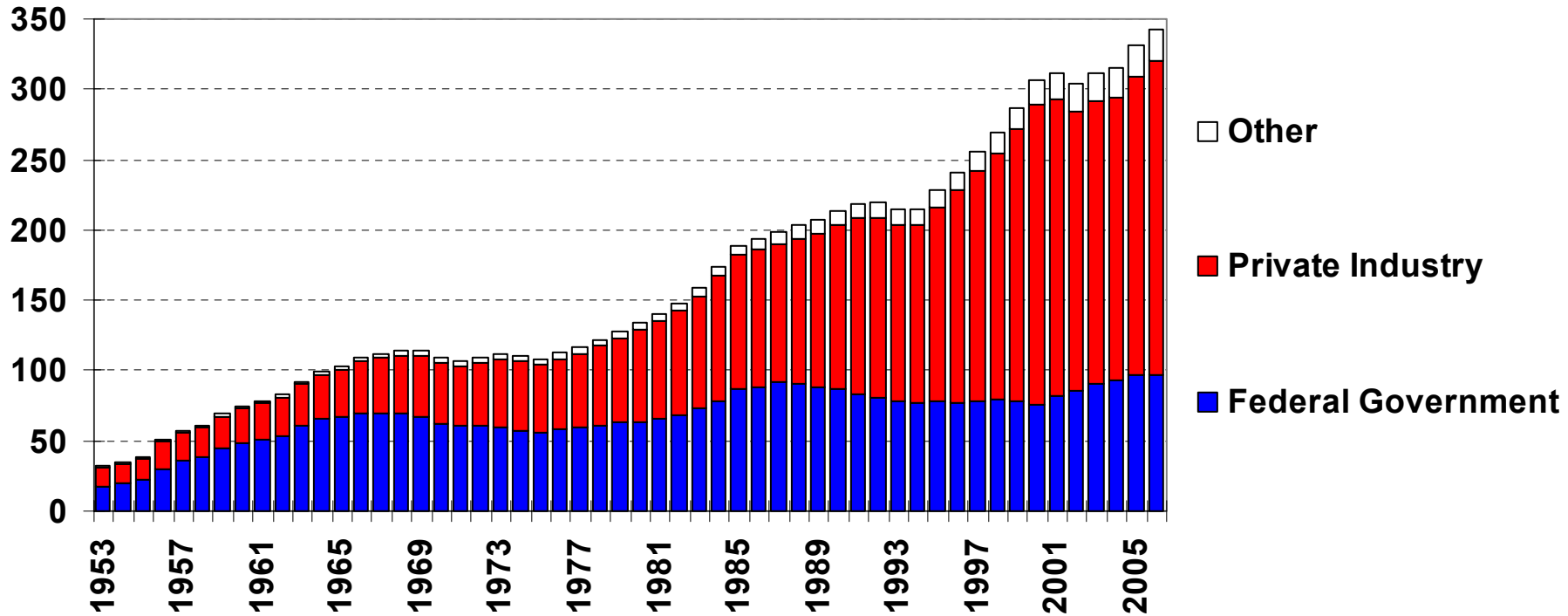


## FEDERAL R&D IN CONTEXT: INDUSTRY AND THE WORLD

- 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

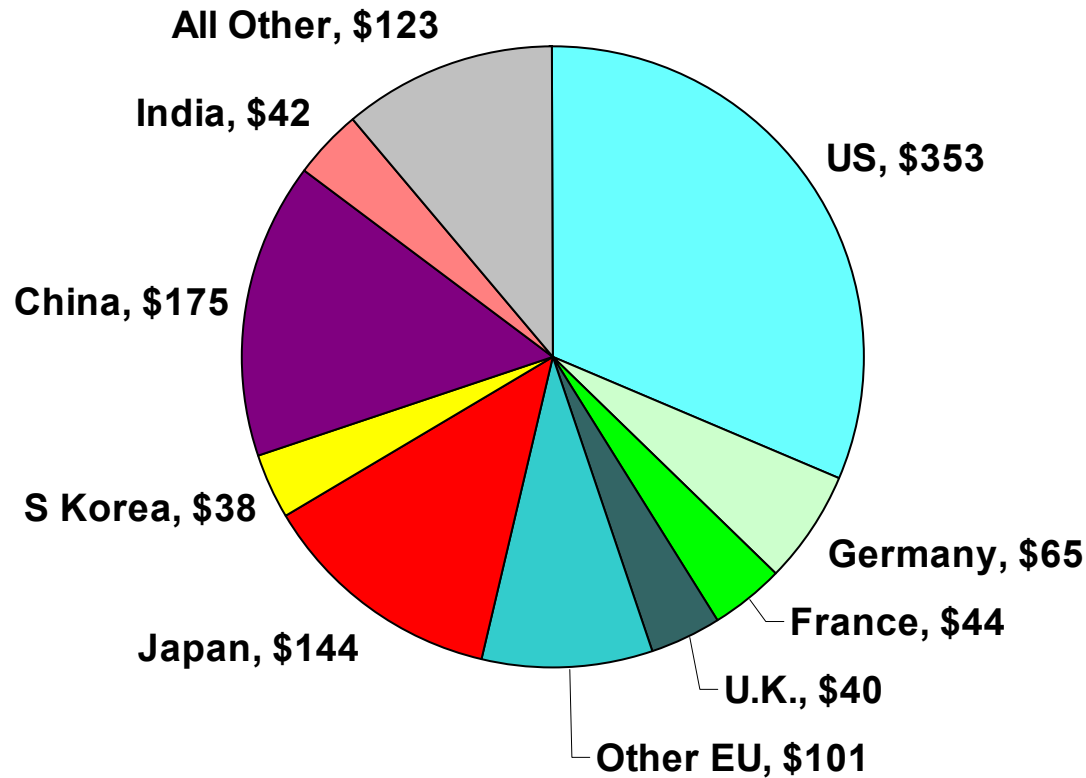
expenditures in billions of constant 2006 dollars



Source: NSF, Division of Science Resources Statistics. (Data for 2005 and 2006 are preliminary.)  
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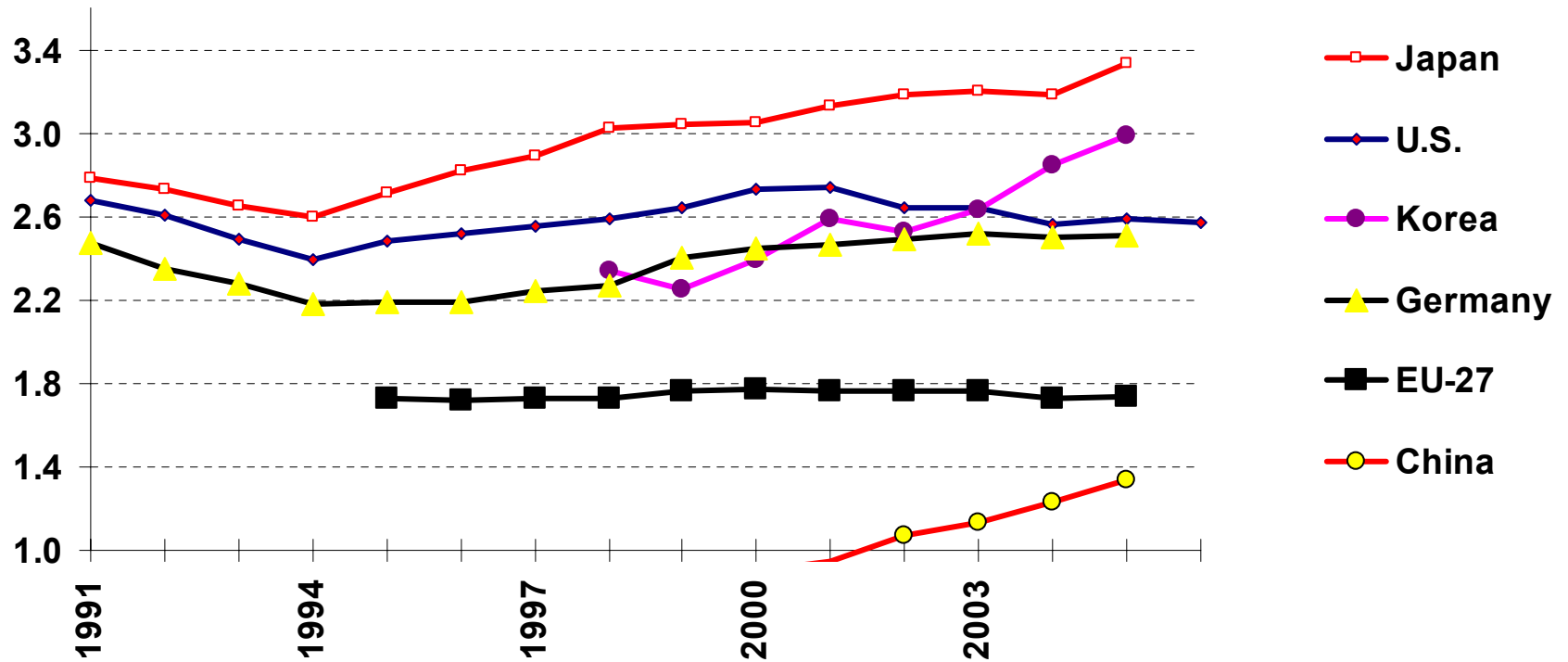
# Shares of Total World R&D, 2007



**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.  
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## 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

## FOR MORE INFORMATION...

The AAAS R&D web site is  
[www.aaas.org/spp/rd](http://www.aaas.org/spp/rd)

# AAAS REPORT XXXIII

Research & Development FY 2009

Intersociety Working Group

