



Meeting of the Board of Directors/Membership

November 2, 2017

1020 Nineteenth St. NW Suite 375
Washington, D.C. 20036





Federal Budget Status

- FY 17 Omnibus package passed on May 5, seven months late.
 - ❖ \$1.07 trillion discretionary spending, consistent with budget caps.
 - ❖ \$90 billion in emergency spending
- Congress followed its own path on final FY 17 package.
 - ❖ President Trump requested \$25 billion increase to defense, \$3 billion for Border Wall, and \$18 billion in cuts to offset proposed increases.
 - ❖ Congress provided \$15 billion extra for defense, plus \$1.5 billion for border security efforts including new technology and repair of existing infrastructure.
 - ❖ Additional funding for disaster relief, coal miner benefits, and other items.



FY 18 Federal Budget

- President's FY 18 Budget Blueprint released on March 16 and detailed budget released on May 22
 - ❖ \$1.065 trillion discretionary spending, consistent with Budget Control Act caps
 - ❖ Proposes \$54 billion increase to defense spending offset by \$54 billion in cuts to non defense
 - ❖ Defense = \$574 billion (current law capped at \$549)
 - ❖ Non Defense = \$462 billion (capped at \$516)
 - ❖ Overseas Contingency Operations = \$77 billion (includes \$12 billion for State/USAID)
- Congress working quickly to pass FY 18 appropriations bills
 - ❖ House completed committee work on all 12 prior to August recess and passed first minibus package off the floor (Defense, Energy and Water, MilCon VA, Leg Branch)
 - ❖ Senate completed committee work on six appropriations bills prior to August recess. Progress stalled on remaining bills including Defense.
 - ❖ Funding levels closer to FY 17 omnibus than to FY 18 President's request for most agencies.
- Short term CR to December 8. We expect final FY 18 budget package to pass by Christmas
 - Repeal of sequestration?



FY 19 Federal Budget

- FY 19 will be first real Trump budget
- Expect budget to be released in February 2018
- OMB Guidance memo released on July 7 -- More of the same...

“Unless otherwise directed by OMB, your initial discretionary FY 2019 budget submission to OMB should continue the proposals included in the FY 2018 Budget, and should reflect a level no higher than the net total provided for your agency in the FY 2019 column of the FY 2018 Budget.”
- Some wiggle room for new programs?

“The above notwithstanding, agencies are requested to identify additional investments in effective programs that further support their mission and fill a clear Federal role. Overall, these investments should reflect no more than a 5 percent increase above your submission level. These additional investments should be separately identified in your budget submission and ranked in priority order. OMB will closely scrutinize these requests, and, working with your Department or Agency, may accommodate a limited number of them within the FY 2019 Budget.”

FY 18 Defense

- Proposes to repeal defense sequestration from 2011 Budget Control Act.
- \$54 billion proposed increase... “exceeds the entire defense budget of most countries, and would be one of the largest one-year DOD increases in American history.”
- Emphasis on readiness



FY '18 Air Force PBR Highlights

- ❖ Level funding for 6.2 and 6.3 Materials Lines that focus on ceramics. Includes continued work on CMCs
 - ❖ “Transition 2700-degree Fahrenheit ceramic matrix composites for turbine hot section components to industry.”
- ❖ Level funding for Air Force ManTech, which includes activity on CMCs, transparent ceramics, and hypersonics.
- ❖ Level funding for most hypersonic programs under S&T
 - \$12 million for hypersonics structures 6.2 program
 - \$28 million for 6.2 Scramjet + \$29 million for 6.3 Scramjet
 - \$79 million for 6.3 work on Hypersonic Air-breathing Weapon Concept and Tactical Boost Glide, including ground and flight demos (down from \$92 million in FY 17)
- ❖ \$7 million for Adaptive Turbine Engine Technologies program to support tech transition to a potential 6.4 program. \$5 million for Adaptive Turbine Engine Core Technologies program to complete ground testing.



FY '18 Air Force PBR Highlights

- ❖ \$216 million for Ground Based Strategic Deterrent (up from \$114 million in FY '17). Technology Maturation and Risk Reduction contracts awarded to Boeing (\$349.2 million) and Northrop Grumman (\$328.6 million). Engineering and Manufacturing Development contract to be awarded in FY '20.
- ❖ \$2 billion for Long Range Strike Bomber design/development (up from \$1.3 billion in FY '17)
- ❖ Level funding (\$297 million) requested for a Next Generation Launch Systems Investment program. Builds on \$220 million FY '15 appropriation to mitigate reliance on Russian RD-180 engines.



FY 18 Air Force Congressional

- ❖ Full funding in House for S&T programs that include ceramics.
- ❖ Slight \$20 million reduction in House to Long Range Strike Bomber.
- ❖ Senate Armed Services Support for Hypersonics
 - ❖ **Sense of the Congress on hypersonic weapons (sec. 235)** -- The committee recommends a provision that would express the sense of Congress that the Department of Defense should expedite testing, evaluation, and acquisition of hypersonic weapon systems to meet the stated needs of the warfighter; that the United States cannot afford to lose its advantage over foreign countries in developing hypersonic weapons; and that the Department of Defense should focus on the next generation of weapon systems such as hypersonics. The recommended provision would also make a number of findings regarding the status of hypersonic technology in the Department of Defense and the potential for such weapons to change warfare and provide solutions to strategic problems.



FY 18 Navy S&T PBR Highlights

- ❖ Funding to complete gas turbine corrosion materials down select under Gas Turbine Upgrades FNC.
 - ❖ In FY19, this FNC Product will be realigned within this PE to SW-FY15-01 under a new Surface Warfare R-2 Activity
- ❖ Continued funding for Variable Cycle Advanced Technology propulsion program that includes work on ceramics.
- ❖ \$57 million for ONR Materials basic research that includes work on CMC durability (up from \$53 million in FY '17).
- ❖ \$5.6 million for work on T700 for Navy helicopters, which includes CMC shroud (slight increase from FY '17).



FY 18 Navy S&T Congressional

- ❖ Full funding in House and Senate for Navy S&T lines that include work on CMCs
- ❖ \$10 million increase to DURIP in House Appropriations
- ❖ House Defense Authorization report language calling for study on chevron attachment for F/A 18E/F engine noise reduction.



FY 18 Army S&T PBR Highlights

- ❖ \$3.4 million for new basic research initiative on propulsion, including work on tailored gradient ceramic coating concepts for high-temperature, low thermal conductivity, sand resistance, and low particulate adherence for Army turboshaft engine hot section component performance and debris tolerance
- ❖ \$2.3 million to continue 6.1 research initiative to study electromagnetic fields on armor ceramics during processing (up from \$2.1 million in FY 17)
- ❖ \$9 million (slight increase from FY '17) for the Multi-Scale Materials Modeling Centers including the Materials in Extreme Dynamic Environments Center.
- ❖ \$4 million for structural armor research (down from \$5.3 million in FY '17) including work on transparent materials. \$7 million for soldier-borne armor materials (slight increase from FY '17).
- ❖ \$9.7 million for multifunctional armor materials research (slight increase from FY '17). Includes work on EM fields during ceramic processing.



FY 18 Army S&T PBR Highlights

- ❖ \$1.5 million for Air Vehicle Propulsion to include work on CMC turbine blades (down from \$2.7 million in FY 17). \$1.3 million RFP anticipated in FY 18 via Detroit Arsenal Automotive (DA2) Other Transaction Agreement (OTA) on Ceramic Additive Manufacturing Cores for Gas Turbine Engines Blades and Airfoils
- ❖ \$18.8 million for Multi-threat Armor Formulations including research on ceramic laminates (down from \$ 21.6 million in FY '17)
- ❖ \$60.9 million for Army ManTech (down from \$62.3 million in FY '17).
- ❖ \$204 million to continue the Improved Turbine Engine Program for the Black Hawk helicopter to replace the T700 engine (up from \$116 million in FY '17). Increase fully funds dual vendor Technology Maturation/Risk Reduction contracts.
- ❖ \$6.1 million for Alternative Concept Engine (ACE) (up from \$4.9 million in FY 17).



FY 18 Army S&T Congressional

- ❖ Full funding in House Approps for Army S&T lines that include ceramics.
- ❖ \$5 million increase in House Approps for Extreme Dynamic Environments Center.
- ❖ \$10 million increase to Army basic research in Senate Defense Authorization, and \$5 million increase to university and industry research centers. (Senate appropriation TBD, but funds were added in FY 17)
- ❖ Full funding in House Approps for Improved Turbine Engine Program. House and Senate Defense Authorization report language supporting the program, and the House encouraged the Army to pursue opportunities to accelerate the program.



FY 18 DoD S&T PBR Highlights

- DARPA
 - ❖ \$3.1 billion (slight increase from FY '17)
 - ❖ \$30 million for Hypersonic Air-breathing Weapon Concept (down from \$49 million in FY '17). "Begin assembly, integration, and test of the air-breathing missile flight demonstration vehicle."
 - ❖ \$37 million for Tactical Boost Glide (up from \$23 in FY '17). "Complete Critical Design Review."
 - ❖ \$35 million for Advanced Full Range Engine (AFRE) program for subsonic to hypersonic propulsion (up from \$12 million in FY '17)
 - ❖ \$60 million for Experimental Spaceplane One (XS-1) (up from \$40 million in FY '17).

- \$37.4 million for Defense Production Act Title III (down from \$64.1 million in FY '17).
- \$23.4 million for Manufacturing Science and Technology program, which includes work on nanocomposite optical ceramics.
- No funding requested for Rapid Innovation Fund.
- \$100 million requested for Rapid Prototyping Program launched by Congress in FY 17.



FY '18 OSD Congressional Highlights

- Mostly full funding for DARPA programs, except for a \$100 million general undistributed reduction in House Approps.
- \$30 million increase in House Approps for Defense Production Act Title III.
- House Defense Authorization language asking DOD to plan for early operational capability of Conventional Prompt Global Strike Weapon System by September 2022. Language limits funding until DOD delivers plan to Congress. No corresponding language in Senate bill.
- \$250 million for Rapid Innovation Fund in House Approps.
- \$40 million in House Approps for new Rapid Prototyping Program (down from \$100 million in FY 17)



FY '18 PBR Manufacturing

- \$137 million requested in FY '18 for Defense Wide Manufacturing Science and Technology program (down from \$158 million in FY '17). Supports eight DOD centers and provides \$23 million for DMS&T.
 - ❖ Nothing budgeted in FY '18 for additional centers.
 - ❖ Outyear budget projections for manufacturing institutes start declining in FY 18 and drop to \$34 million by FY '21.
- No funds requested by DOE for Clean Energy Manufacturing Institutes (down from \$70 million in FY 17).
- \$15 million requested by NIST for Manufacturing USA. Funds biopharmaceuticals institute and coordination of NNMI network (down from \$25 million in FY 17).
- \$6 million for NIST Hollings Manufacturing Extension Program to terminate and wind down program.



FY '18 Congressional Manufacturing

- Senate Defense Authorization report language directing “the Comptroller General of the United States to prepare a report examining the extent to which largescale outsourcing of manufacturing activities to China, Chinese investments in manufacturing capabilities, and Chinese investments in emerging technologies are leading to the hollowing out of the U.S. defense industrial and technology base. This report should also detail the national security implications of a diminished domestic industrial base, including assessing any impact on U.S. military readiness, compromised U.S. military supply chains, and reduced capability to manufacture and develop new state-of-the-art military systems and equipment.”
- House Defense Authorization added \$5 million to fund an IT system designed to improve monitoring and analysis of foreign investments in the Defense industrial base. No corresponding increase or report language in Senate authorization or House Appropriation.



FY '18 Congressional Manufacturing

- Senate Defense Authorization provided \$55 million increase to Defense Wide MS&T line and included language supporting Manufacturing USA Institutes. No corresponding increase or report language in House Authorization or appropriation.
 - ❖ Allocated \$20 million to “to extend the support of the MEP to improve the productivity of the Defense Industrial Base, and \$15.0 million would be to establish partnerships between MEP centers and the Manufacturing USA Institutes to enhance participation by small manufacturers...”
 - ❖ Added \$20 million for DOD contracts with Manufacturing USA institutes to address specific defense manufacturing challenges and opportunities.
- Senate appropriated \$70 million to restore funding for five DOE Clean Energy Manufacturing Institutes. No funding for Institutes in House Appropriation, but House allocated up to \$15 million for competitive awards for activities similar to those underway at institutes and HUBS.
- Senate appropriated \$15 million for NIST Manufacturing USA (full funding). House Appropriated \$5 million.
- Senate appropriated \$130 million to restore the Hollings Manufacturing Extension Partnership program. House appropriated \$100 million.

FY 18 NASA

- \$19.1 billion request for FY 18 vs. \$19.65 in FY 17 omnibus.
- \$624 million for aeronautics and expresses support for over-land supersonic flight. FY 17 = \$660 million
- \$3.7 billion for Orion, SLS, and associated ground systems. About level funding from FY 17.
- Astronauts for Orion test flight around the moon?

FY '18 NASA

- \$624 million for Aeronautics (down from \$660 million in FY '17).
 - ❖ Senate appropriated \$650 million and House appropriated \$660 million
- NASA launched a new Hypersonics Technology Project in FY 17 under the Transformative Aero Concepts Program. Focus areas for the project include high-speed propulsion systems, re-usable vehicle technologies, high-temperature materials, and systems analysis.
- \$79 million requested for Low-Boom Flight Demonstrator (75 PLdB or less at Mach 1.4 cruise). Design, build, test, and flight validation contract award planned for FY 18. First flight in 2021.

FY '18 NASA

- \$678 million for Space Technology (down from \$686 million in FY '17).
 - ❖ Senate appropriated \$700 million. House appropriated \$686 million.
 - ❖ Senate provided \$75 million for nuclear thermal propulsion. House provided \$35 million.
- \$1.9 billion for SLS (down from \$2.1 billion in FY '17).
 - ❖ Senate and House appropriated \$2.1 billion.
- \$1.2 billion for Orion Multipurpose Crew Vehicle (down from \$1.3 billion in FY '17).
 - ❖ Senate and House appropriated \$1.3 billion
- \$732 million for Commercial Crew (down from \$1.2 billion in FY '17). Senate and House appropriated \$732 million.



FY '18 Energy Budget Request

- \$636 million for EERE. Down from \$2.1 billion in FY 17.
- \$4.5 billion for DOE Basic Science. Down from \$5.4 billion in FY 17.
- \$0 for ARPA-E. Down from \$306 million in FY 17.
- \$82 million for Advanced Manufacturing. Down from \$257 million in FY 17.
- \$69.7 million for Solar Energy. Down from \$207.6 million in FY 17.
- \$12.5 million for Geothermal. Down from \$69.5 million in FY17.
- \$2 million for solid oxide fuels cells. Down from \$30 million in FY '17.
- \$3 million for Advanced Turbine program. Down from \$15(\$19) million in FY '17.



FY '18 Energy Appropriation

- House appropriated \$1.1 billion for EERE. Senate provided \$1.9 billion.
- \$5.4 billion in House and \$5.5 billion in Senate for DOE Basic Science.
- \$0 in House and \$330 million in Senate for ARPA-E.
- \$102 million from House for Advanced Manufacturing. Senate provided \$252 million.
- Senate provided \$48 million for concentrating solar power. No specific allocation for concentrating solar from the House. \$55 million appropriated in FY '17.
- House appropriated \$15 million for Geothermal. Senate provided \$67.5 million.
- House and Senate Appropriated \$30 million for solid oxide fuel cells.



Advanced Turbines Program Request

- USACA agreed in January to partner with Gas Turbine Association to support FY 18 funding increase for DOE Advanced Turbine program.
- \$50 million/yr for Advanced Turbine program including \$10 million/yr for advanced high temperature materials development, including ceramic matrix composites.
- **Advocacy Activities**
 - ✓ Generated a white paper requesting \$10 million for FY 18
 - ✓ Conducted congressional visits in April and May in coordination with Gas Turbine Association and USACA meeting.
 - ❖ Still need to meet with DOE about the request. Steve Winberg nominated for Fossil Energy, but not yet confirmed.



FY '18 Advanced Turbine Program

- Favorable report language, but no specific allocation in House Senate for Advanced Turbine program.

House language:

"The Committee urges the Department to fund research and development activities to improve the efficiency of gas turbines used in power generation systems, working cooperatively with industry, universities, and other appropriate parties."

Senate language:

"The Committee encourages the Department to support research and development efforts for new, higher efficiency gas turbines used in power generation systems to upgrade and increase the resiliency of the Nation's electrical grid system, while reducing the cost of electricity and emissions. This should include partnerships with industry, small businesses, universities, and other appropriate parties."



Tonko-McKinley Gas Turbine R&D Bill

- Tonko-McKinley Gas Turbine R&D bill introduced in April and referred to Energy Committee.
 - ❖ Requires Office of Fossil Energy to carry out a research program to improve efficiency of gas turbine engines used in power generation.
 - ❖ Calls for combined cycle efficiency of 67% and simple cycle efficiency of 50%.
 - ❖ No funds specifically authorized to avoid offset requirement.
- USACA visits in May resulted in Rep. Napolitano cosponsorship.
- Bill nearly passed in December 2016 as part of larger Energy bill. It will need to catch a ride again in this Congress on a larger legislative vehicle.



FY `17 Final ATF Congressional Language

- *Fuel Cycle Research and Development.*-The agreement provides \$68,000,000 for the Advanced Fuels program, of which not less than \$21,800,000 is to initiate Phase 2 of the industry-led, appropriately cost-shared basic research program on Accident Tolerant Fuels; \$3,000,000 is for continuation of the previously competitively awarded Small Business projects to develop ceramic cladding for Accident Tolerant Fuels; and \$15,000,000 is for additional support of capability development of transient testing, including test design, modeling, and simulation. Within available funds, \$12,000,000 is for Systems Analysis and Integration, of which funding above the request is to assess advanced nuclear energy deployment scenarios.
- This language is operative under the current CR (12/08/17) until replaced with language from a final FY `18 E&W conference report.



FY '18 DOE Nuclear Energy PBR

- \$20 million for Light Water Reactor Sustainability (down from \$40 million in FY '17).
- \$94 million for Reactor Concepts Research, Development & Demonstration (down from \$132 million in FY '17)
- \$88.5 million for Fuel Cycle Research and Development (down from \$207.5 million in FY '17).
 - ❖ \$60 million for Advanced Fuels program (down from \$68 million in FY '17), which includes work on ceramic cladding.



FY '18 DOE Nuclear Appropriation

- \$40 million from House and Senate for Light Water Reactor Sustainability.
- \$219 million from House and \$132 million from Senate for Reactor Concepts Research, Development & Demonstration.
- \$71 million from House and \$85 million from Senate for Advanced Fuels program.



FY18 ATF Congressional Language

Senate Report Language:

The Committee continues to place a high priority on the development of nuclear fuels with enhanced accident-tolerant characteristics in order to significantly mitigate the potential consequences of a nuclear accident. The Committee urges the Secretary to maintain focus and priority on achieving results in these efforts. The Committee recommends \$85,000,000 for the Advanced Fuels program. The Department is directed to continue implementation of the accident tolerant fuels development program, the goal of which remains development of accident tolerant nuclear fuels leading to commercial reactor fuel assembly testing by 2022. Within this amount not less than \$55,600,000 is recommended to continue the participation of three industry-led teams in Phase 2 of the costshared research and development program. Further the Committee recommends not less than \$20,000,000 to support accident tolerant fuels development at the national laboratories and other facilities, including at the Advanced Test Reactor, the Transient Reactor Test Facility, and the Halden reactor. In addition to amounts awarded through the Small Business Innovation Research and Small Business Technology Transfer programs, \$3,000,000 is to continue of the previously awarded small business projects to develop ceramic cladding for accident tolerant fuels.

House Report Language:

Within available funds, the recommendation provides \$71,000,000 for the Advanced Fuels Program, of which not less than \$35,000,000 is for the accident tolerant fuels activity and \$8,000,000 is for additional support of capability development of transient testing, including test design, modeling, and simulation;