National Aeronautics and Space Administration

NAC

Program Management and Acquisition Priority Focus Area

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PROGRAM MANAGEMENT AND ACQUISITION PFA CHARTER

- Per letter from Administrator Nelson dated February 14, 2022, the NAC workplan for 2022 "reflects the priorities of both the Biden-Harris Administration and our Agency leadership. It is my hope to receive the Council's advice on the challenges and opportunities before the Agency in these five areas:
  - Climate change
  - Commercial and industry partnerships
  - Diversity, equity, inclusion, and accessibility
  - International collaboration
  - Program management and acquisition
- Identify strengths and challenges for delivering quality programs on schedule and within budget
- Offer recommendations and other observations for further investigation

PROGRAM MANAGEMENT AND ACQUISITION PFA
REVIEW FOCUS AREAS

1. Training, Development and Organizing for Success
    - Review and compare NASA acquisition training & development protocols to other Federal Agency and industry best practices
    - Review and compare NASA acquisition and PM authorities and consider how acquisition decisions are impacted by organizational structures and alignment
2. Acquisition Strategies
    - Review NASA acquisition strategy decisions and consider/compare to emerging practices across the federal government and industry. Consideration will be given to the following:
        - Contract Types
        - Commercial contracts
        - Outreach to small business and non-traditional sources
        - Unique authorities such as Other Transaction Authority
3. Program Performance and Risk Mitigation
    - Review and consider NASA program results in cost, schedule and performance to include NASAs approach to program risk mitigation

REVIEW METHODOLOGY

- Review Team Membership:
  - Charlie Williams, Chair
  - Krista Paquin
  - Elisabeth Pate'-Cornell
- Review Framework
  - Examine existing NASA practices/processes
  - Review GAO, IG reports and other study reports
  - Seek industry input on NASA practices
  - Benchmark best practices across industry and DOD
  - Engagements were arranged to ensure anonymity if desired
  - Identify improvements that should be considered by NASA
- Conducted 23+ interviews from May 26th through October 27th
- Next Steps
  - Review preliminary recommendations with NASA stakeholders (OP/CPMO, etc)
  - Identify priority recommendations

WHO WE SPOKE TO

Industry

- Lockheed martin
- Axiom Space
- Sierra Nevada
- Northrop Grumman
- GDIT
- Quantum Space
- Blue Origin

NASA

- Pam Melroy, Dep Administrator, CAO
- Dave Mitchell, OCPMO
- Karla Jackson, OP
- Julia Wise, OP
- Marvin Horne, OP
- Jim Free, ESD AA
- Catherine Koerner, ESMD DAA
- Thomas Zurbuchen, SMD AA
- Sandra Connelly, SMD DAA (Acting AA)
- Mary Skow, OCPMO
- Tiffany Smith, Chief Knowledge Officer
- Jeff Grambling, SMD MSR Program Director
- Bill McNally (OP retired)

DoD

- Defense Acquisition University
- Defense Pricing and Contracting, OSD
- Defense Innovation Unit, DOD

TRAINING, DEVELOPMENT AND ORGANIZING FOR SUCCESS - ***FINDINGS***

Strengths

- Elevation of CAO role to the Deputy Administrator and reporting of the Dep CAO/Procurement Executive to the CAO
- Establishment of OPMO with focus on building the community of practice through collaboration across OPMO, CKO, OCFO, OP and OHCM
- Established contracting workforce certification levels
- Conversations with CDs on growing talent

TRAINING, DEVELOPMENT AND ORGANIZING FOR SUCCESS - *FINDINGS (cont'd)*

Challenges

- Training and development of the program management workforce has been allowed to atrophy and is inconsistent across the NASA eco-system. Need for a complete single integrated workforce development strategy across procurement, finance and PM that includes experiential learning with colleagues. Stove piped learning is more prevalent than training as a team.
- Inadequate understanding of commercial business practice and incentive structures. "Skillset for supporting commercial contracting is being relearned with each new initiative".
- Lacking a common language across the acquisition workforce and who is responsible for what.
- Inadequate incentives to stay on the PM career path. Some centers have SES line managers but not PMs.
- "NASA is losing Program Manager capabilities". Project managers can be taught, Program Management is more complex and learned through experience (can't stay in one place too long).
- "Lack of competition for SES procurement roles". Need a succession plan.

TRAINING, DEVELOPMENT AND ORGANIZING FOR SUCCESS - ***PRELIMINARY RECOMMENDATIONS***

- Execute an integrated experiential training curriculum that brings together the Resources, Contracting and Program Management professionals collectively working through real project scenarios.
- Consider more fully leveraging the capabilities of the Defense Acquisition University as a schoolhouse for meeting the training needs of the community rather than building it organically.
- Establish a DoD like Industry/Government Exchange Program to broaden understanding of commercial business practice and incentive structures.
- Advance the commercial contracting skillset by modeling a best practice at DIU who invested in specialized OTA skills and created a group with this capability.
- Establish a Contracting Officer warrant board to improve the rigor of Contracting Officer warrants and placements.

TRAINING, DEVELOPMENT AND ORGANIZING FOR SUCCESS - ***PRELIMINARY RECOMMENDATIONS (cont'd)***

- Reinvigorate the PM Challenge as a means for the PM&A workforce to be exposed to the full scope of community practices and expertise.
- Develop a succession plan for executive roles in each of the three areas of PM&A.
- Examine organizational constructs that facilitate collaboration across PM&A functions and reduce barriers across the PM&A workforce development architecture.
- Provide resources to expand the work of the Chief Knowledge Officer to identify and share lessons learned.
- Develop Command Media to share the vision and expectation for Program Management and Acquisition, including acquisition strategies and forecasted benefits.

ACQUISITION STRATEGY - ***FINDINGS***

Strengths

- Acquisition Strategy Council Two-Step process that includes: 1) Early strategy formulation, and; 2) Decision meeting with a decision memo.
- Recent creation of templates helps with completeness and provides proper insight to influence decisions. Added requirement for high dollar acquisitions to have a formal Acquisition Plan.
- Opportunity to apply learning from the Commercial Cargo Transportation experiences across the PM&A workforce.
- Enterprise contracts such as NEST support standardization of critical security protections and optimize resource utilization across the enterprise.

ACQUISITION STRATEGY – *FINDINGS cont'd*

Challenges

- Contract Type
  - FP contracts for first time development are unrealistic, high risk and not indicated based on federal acquisition practice and policy.
    - "Contractors and NASA engineers are less concerned about the starting point because they know they can do mods".
    - "When working at the edge of technology, it is impossible to plan every contingency".
  - Pressure to expand use of FP contracts without allowing room for negotiation and time for considered analysis to tailor acquisition strategies to unique requirements. "Cold chill when hearing we should go to all fixed price".
  - Need to build reliability. Learn exponentially after each build – optimum is 3-5 builds before moving to FP. Ex. Cignus resupply vehicle.

ACQUISITION STRATEGY – *FINDINGS (cont'd)*

Challenges (Cont.)

- Communications
  - Inconsistent communications with industry
  - "Discussion blackout starts earlier than what the FAR allows"
  - It is not clear to industry who at NASA to have strategic discussions with. Is it Pam, Bob, Karla, or Dave?
- Business Acumen
  - Indemnification: "Artemis took 2 ½ years. Contractor had to work this inside NASA from the bottoms up and top town. Need to anticipate complex contractual issues and get a running start on those.".
  - "Inconsistency in application of commercial contracts (HLS). New group of people making it up each time. Nobody has written down how it should work".
  - Low cost technically acceptable contracts with inadequate consideration of contractor responsibility (financial viability & past performance)
  - "NASA is terrible at understanding industry financials and scar tissue. Need to find flexibility in contract financing. Ex. movement between CLINS is very constrained despite this being an allowable practice. Goal is to get a product out that works"

ACQUISITION STRATEGY – *FINDINGS (cont'd)*

Challenges (Cont.)

- Culture
  - Ingrained NASA culture based on mission failures to use cost-plus contracts to enable oversight and control as well as reduce risk.
  - "General Counsel risk aversion" is a barrier to innovative contracting practices.
  - Projects/programs do not always commit to the requirements for the required products and processes of the Acquisition Strategy Council.

ACQUISITION STRATEGY – ***PRELIMINARY RECOMMENDATIONS***

- Ensure Fixed price procurements that incorporate appropriate selection criteria; financial viability, technical workforce availability, and past performance are a win for both NASA and the space industrial base.
- To increase competition and reduce risk, NASA should consider funding new developments via Cost Plus for the trials and testing phase (through to Critical Design Review) then use Fixed Price for development.
- Consistently reduce the risk of Fixed Price commercial development contracts with dual awards.
- On FP contracts, transfer NASA knowledge to commercial providers and enable them to own the technical baseline rather than providing detailed oversight and burdensome reporting.
- Share best practices across NASA for commercial contracting.

ACQUISITION STRATEGY – ***PRELIMINARY RECOMMENDATIONS (cont'd)***

- Use SAA's to invest early in low-cost items to help new entrants such as with SpaceX in 2005.
- Explore expanded Other Transaction Authorities like DoDs authority to move from prototype to production.
- Expand use of grants and SAA's for technology development. Allow for profit on grants to increase competition.
- "With an emerging commercial market, the government must get smarter on what cost data it really needs".
- Within the "Change Leadership" Executive Core Competency (ECQ), hold senior leaders accountable for timely and comprehensive commitment to the acquisition strategy process requirements and measurement of outcomes.
- Share best practices across NASA for commercial contracting.

PROGRAM PERFORMANCE AND RISK MANAGEMENT - *FINDINGS*

Strengths

- Top leadership support and oversight for mission performance via CAO and OPMO
- Science AA implementing and overseeing earlier Independent Review Boards to scrub missions before setting the baseline.
- Joint Confidence Level (JCL) for projects over $1B has enabled more realistic lifecycle cost estimating.
- Implementation of EVM for in-house projects enables objective measurement and forecasting of future performance.
- Cost caps and definitive launch dates done in Planetary Science missions remove subjectivity and encourages NASA and companies to work trades and drive towards a go no-go.

PROGRAM PERFORMANCE AND RISK MANAGEMENT – *FINDINGS (cont'd)*

Challenges

- Characteristics of programs/projects that don't perform to the baseline successfully:
  - Funding Instability, phasing and variability. "Factor of Pi – sending budget cuts to the contractor will cost you 3.14 times the original cost".
  - Requirements creep and fluctuation: Large missions are often influenced by external drivers.
  - "Optimism bias": overly ambitious cost and schedule assumptions and overly optimistic technology readiness dependencies.
  - Insufficient and untimely vertical and horizontal communications at the leadership and line management level, especially relating to bad news.
- Program office resources and maturity: either too many or too few people
  - "For every NASA person, there is a multiplier impact on contractor overhead". NASA workforce outnumber the contractors by a factor of 8 and not a recipe for efficiency".

PROGRAM PERFORMANCE AND RISK MANAGEMENT – *FINDINGS (cont'd)*

Challenges (cont'd)

- Larger, more traditional industry partners struggle to obtain private funding and corporate support in the same way that new space is able which impacts performance and potential competition (Ex. Boeing vs. Space X on Commercial Crew).
- Culture to hold on to reporting requirements that drive costs. Ex. Class D missions should accept more risk, enable innovation, and lower costs yet despite leadership encouragement, there is a lack of program tailoring allowed in 7120.5.

PROGRAM PERFORMANCE AND RISK MANAGEMENT – ***PRELIMINARY RECOMMENDATIONS***

- Formalize a requirement for Quarterly meetings of senior leaders between NASA and industry executives to focus on program performance and risk.
- Consider a NASA/Industry Council chaired by the CAO to share plans and exchange ideas to inform and communicate NASA's acquisition strategies.
- In formulation, identify technical, cost and schedule risks and their interdependencies all the way through launch and build a Monte Carlo simulation around that. Ensure that external drivers and funding risks are tracked through the risk-informed decision making (RIDM) process.
- Within programs, ensure contractors are assessing and communicating system technical risk and the impact of those to budget and schedule.
- Continue to implement early Independent Review Boards (IRB's) to scrub missions prior to proceeding to the design and development phases.

PROGRAM PERFORMANCE AND RISK MANAGEMENT – ***PRELIMINARY RECOMMENDATIONS (cont'd)***

- Leverage the recommendations and actions taken in response to the Psyche IRB to ensure vertical and horizontal, open, credible and responsive communications for proper insight at the leadership and line management level of programs and projects.
- Explore expanded use of cost caps and definitive launch dates as done in Planetary Science missions.
- For Commercial Contracts, ensure stability of requirements throughout the design and development process and commit to an upfront understanding and agreement that industry owns the technical baseline.
- For all programs/projects, PM's to ensure all centers commit to agreement on how much engineering and programmatic oversight is needed based on the structure of the acquisition and center roles and responsibilities.
- For directed missions, focus NASA talent on technology development and allow industry to do the development.

SUMMARY

- Training, Development and Organizing for Success
  - Establishment of the CPMO is positive and consistent with best practice across Agencies and in line with the NDAA 2017 Program Management Improvement Accountability Act (PMIAA)
  - Experienced program management leadership and an available workforce make all the difference in the world to program success
  - NASAs institutional development model for the PM&A community is inadequate and needs revitalization
  - Integration of experiential training and development across functional lines is critical to success
- Acquisition Strategies
  - "When working at the edge of technology, it is impossible to plan every contingency"
  - Pressure to use specified contract types, i.e., fixed price development, doesn't allow deliberate and fact-based contract strategy decisions
  - Enterprise capture and sharing of acquisition strategy best practices can be beneficial to spreading corporate knowledge and experience

SUMMARY (cont'd)

- Program Performance and Risk Mitigation
  - Renewed enterprise focus on program management tools (JCL, EVM, robust IRBS, etc) via CPMO and elevation of the CAO role to the Deputy Administrator demonstrates key leadership support and focus for program success.
  - Funding instability and aggressive stakeholder involvement leads to low confidence levels
  - Further exploration of the link between schedule, budget and technical failure risk starting with the acquisition process is essential to ensure maximum reliability given the resource constraints

Back Up

REFERENCES

- GAO Assessment of Major Projects:. https://www.gao.gov/products/gao-21-306
- GAO High Risk List: NASA Acquisition Management - https://www.gao.gov/highrisk/nasa-acquisition-management
- NASA Inspector General Reports: NASA'S MANAGEMENT OF THE ARTEMIS MISSIONS: https://oig.nasa.gov/docs/IG-22-003.pdf
- SMD Large Mission Study
- Office of Procurement Annual report
- Acquisition Roadshow - Promoting Innovation and Rigor in NASA's Acquisition of Major Projects
- Psyche Independent Review Board Report : November 4, 2022:

Acronym List for the Program Management and Acquisition Report	
CAO	Chief Acquisition Officer
CDs	Center Directors
CKO	Chief Knowledge Officer
CLIN	Contract Line Item Number
CPMO	Chief Program Management Officer
DIU	Defense Innovation Unit
DOD	Department of Defense
ESD AA	Exploration Systems Directorate Associate Administrator
EVM	Earned Value Management
FAR	Federal Acquisition Regulation
FP	Fixed Price
GAO	General Accounting Office
GDIT	General Dynamics Information Technology
HLS	Human Landing System
IG	Inspector General
NEST	NASA End-user Services & Technologies
OCFO	Office of the Chief Financial Officer
OCPMO	Office of the Chief Program Management Officer
OHCM	Office of Human Capital Management
OP	Office of Procurement
OSD	Office of the Secretary of Defense
OTA	Other Transaction Authority
PFA	Priority Focus Area
PM	Program Manager
SAA	Space Act Agreement
SES	Senior Executive Service
SMD AA	Science Mission Directorate Mars Sample Return
SMD MSR	Science Mission Directorate Associate Administrator