National Aeronautics and Space Administration

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The Next Generation of Explorers

Assessing the Impact of NASA's STEM Engagement Investments: Development of External & Internal Performance Measures

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Performance Assessment Strategy, Framework, & Measures Development Process

Assessing the Impact of NASA's STEM Engagement Investments: Performance Assessment & Evaluation Overview

Strategy Performance Framework

- Broad strategic goals designed to advance NASA's mission and address relevant national problems, needs, challenges and opportunities.
- Timeframe: **2018 - 2022**

Performance Assessment

- Ongoing monitoring and reporting of program accomplishments, particularly progress toward pre-established goals.
- Includes *outputs* such as: demographics, course development, paper/presentation; and *outcomes* such as building research capacity of higher education institutions.
- Timeframe: **Short term (Annual)**

Evaluation

- Systematic study using research methods to collect and analyze data to assess how well a program is working and why.
- Includes *outcomes* such as: science identity, scientific literacy, STEM graduate program matriculation/career outcomes.
- Timeframe: **Long term**

Performance Assessment

Evaluation

External and Internal Performance Measures Development Process

STEP ONE	STEP TWO	STEP THREE
Review Past Performance	Benchmark Other Federal Agencies, Literature Review, & Stakeholder Discussions	Finalized Candidate Performance Measures
A brief history of NASA's Office of Education performance measures, data collection processes and tools, and performance results • FY 2014 – FY 2017 Performance Goals, Annual Performance Indicators, Results • Strategic Object Annual Reviews (SOAR) • OMB and BSA guidance and recommendations: Concerns, need for change/reformed measures, processes, and tools	**Summary of guidance from literature and practice (BSA priorities, literature review, benchmarking, internal and external stakeholder discussions)** • BSA priorities • Literature review findings • Benchmarking findings • **Internal stakeholder discussions** • **Mission Directorate discussions** • Expert Review Panel - External stakeholder discussions	**Recommended External and Internal Performance Measures, Data Collection Sources, Processes, and Tools to Capture and Report Performance Data** • Recommended external and internal performance measures • Data collection sources • Data collection processes • Data collection tools • Assessing and analyzing performance data (including ERP procedure and scorecards) • Reporting performance data

External and Internal Performance Measures Development Schedule

1. Internal Assess of the Office of Education's Evaluation & Performance Measurement including pervious APR's, SOAR assessments, & OMB guidance (October 2017).

2. Review of relevant literature (evidence-based practices & current trends in STEM education and evaluation) & Benchmarking of Federal Agencies' STEM education performance measurement strategies and tools (November 2017 – March 2018).

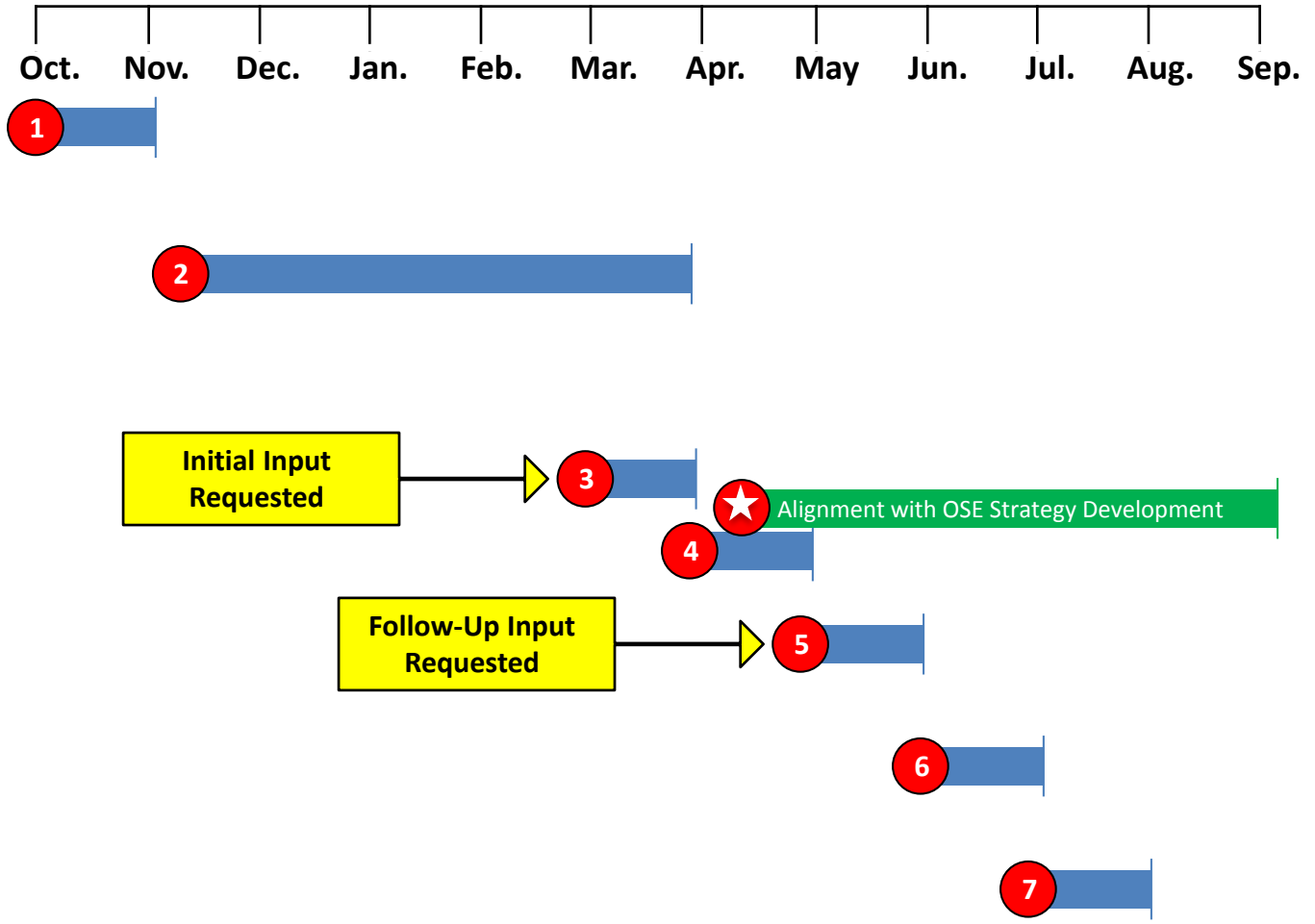
3. Internal NASA Stakeholder Discussions (March 2018).

4. Expert Panel Review (April 2018).

5. Draft External and Internal Performance Measures Document, including data collection tools and processes (May 2018).

6. Final External and Internal Performance Measures Document, including data collection tools and processes (June 2018).

7. (anticipated) Candidate FY19 & FY20 Performance Goals and Annual Performance Indicators due to OCFO-SID (July 2018).



Gathering Input from Internal Stakeholders and External Experts

Internal Stakeholder Discussions

Feb. 27 – Mar. 5

- Kris Brown
- Joeletta Patrick (MUREP)
- Chris Fitzsimonds (OCFO-SID)
- Carolyn Knowles (NIFS)
- Jeppie Compton/Crystal Bassett (EPSCoR)
- Joeletta Patrick/Erica Alston (Space Grant)
- Diane Detroye (SEAP/NGS)
- Roosevelt Johnson (Education Senior Advisor)
- Bev Girten (Informal)
- Holly Degn (Budget)
- Tammy Rowan (IT Infrastructure)
- HQ Strategy Meeting Attendees
- National Space Grant Directors' Meeting - Flip Session Discussions

Mar. 12 – 23

- Center Education Directors & Deputy Directors
- Mission Directorates Education Leads
- MIRO PIs
- EPSCoR PIs
- Selected Activity Managers and Third-Party Evaluators with demonstrated success in evaluation and performance assessment
- SME's (Mission - Technical People with a History of working with Education)

External Expert Review Panel Discussions

1. **Expert Review Panel to be held in Washington, D.C. late April or early May**

2. **Process for Identifying Candidates for Expert Review Panel (ERP)**
   - Representatives from the NAC and NSF along with evaluation experts were provided
   - Nationally Recognized Experts with publication records and experience in our needed areas of expertise
     - Program Structure and Evaluation
     - Higher Education Diversity
     - Building Technical Research Capacity
     - IT Systems / Social Media & Emerging Technologies
     - Science Literacy / Large-scale Public Engagement Campaigns
   - Experience in developing national policy, strategies, work with federal-funded programs

Office of STEM Engagement
Performance Assessment Framework

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Proposed Office of STEM Engagement Performance Assessment Strategy Framework

Traditional Performance Assessment Strategy

2018 NASA Strategic Plan

- Strategic Goals
- Strategic Objectives
- Agency Priority Goals
- Cross-Agency Priority Goals
- Mission Directorates/Mission Support Offices
- Multi-year Performance Goals
- Annual Performance Indicators

Enhanced Performance Assessment Strategy

2018 NASA Strategic Plan

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- Strategic Goal 3: Address National Challenges & Catalyze Economic Growth
- Strategic Objective 3.3: Inspire & Engage the Public in Aeronautics, Space, & Science
- Office of STEM Engagement
- External Multi-year Performance Goals
- Internal Multi-year Performance Goals
- External Annual Performance Indicators
- Internal Annual Performance Indicators
- Enhancement Based on NSF Performance Assessment Model
- Strategic Performance Assessment Questions
- Success Criteria
- Strategic Performance Assessment Questions
- Success Criteria

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Proposed Office of STEM Engagement Performance Assessment Strategy Alignment to the NASA Public & STEM Engagement Focus Areas

NASA Public & STEM Engagement Focus Area 1

Create unique opportunities for students and the public to contribute to NASA's work in exploration and discovery

1. Enhance student experiences through NASA unique projects and challenges.
2. Enable public participation in and contributions to NASA's work.
3. Provide opportunities for students and the public to share ideas and engage with NASA in addressing real-world problems.

NASA Public & STEM Engagement Focus Area 2

Build a diverse future STEM workforce by engaging students in authentic learning experiences with NASA's people, content, and facilities.

1. Provide learning opportunities to attract and engage all students in STEM, including those historically underrepresented and underserved.
2. Enhance capabilities of institutions and support educators to position them to better serve students, including those historically underrepresented and underserved.
3. Cultivate strategic partnerships with state-based regional and federal public, academic and private institutions to magnify NASA's efforts and investments.

NASA Public & STEM Engagement Focus Area 3

Strengthen public understanding by enabling powerful connections to NASA's mission and work.

1. Provide a broad spectrum of opportunities to attract and engage the public.
2. Target a diverse set of audiences to increase public understanding of NASA's work and to enhance appreciation of STEM.
3. Provide direct public access to NASA missions and discoveries in an array of settings, capitalizing on technology to extend our reach and impact.

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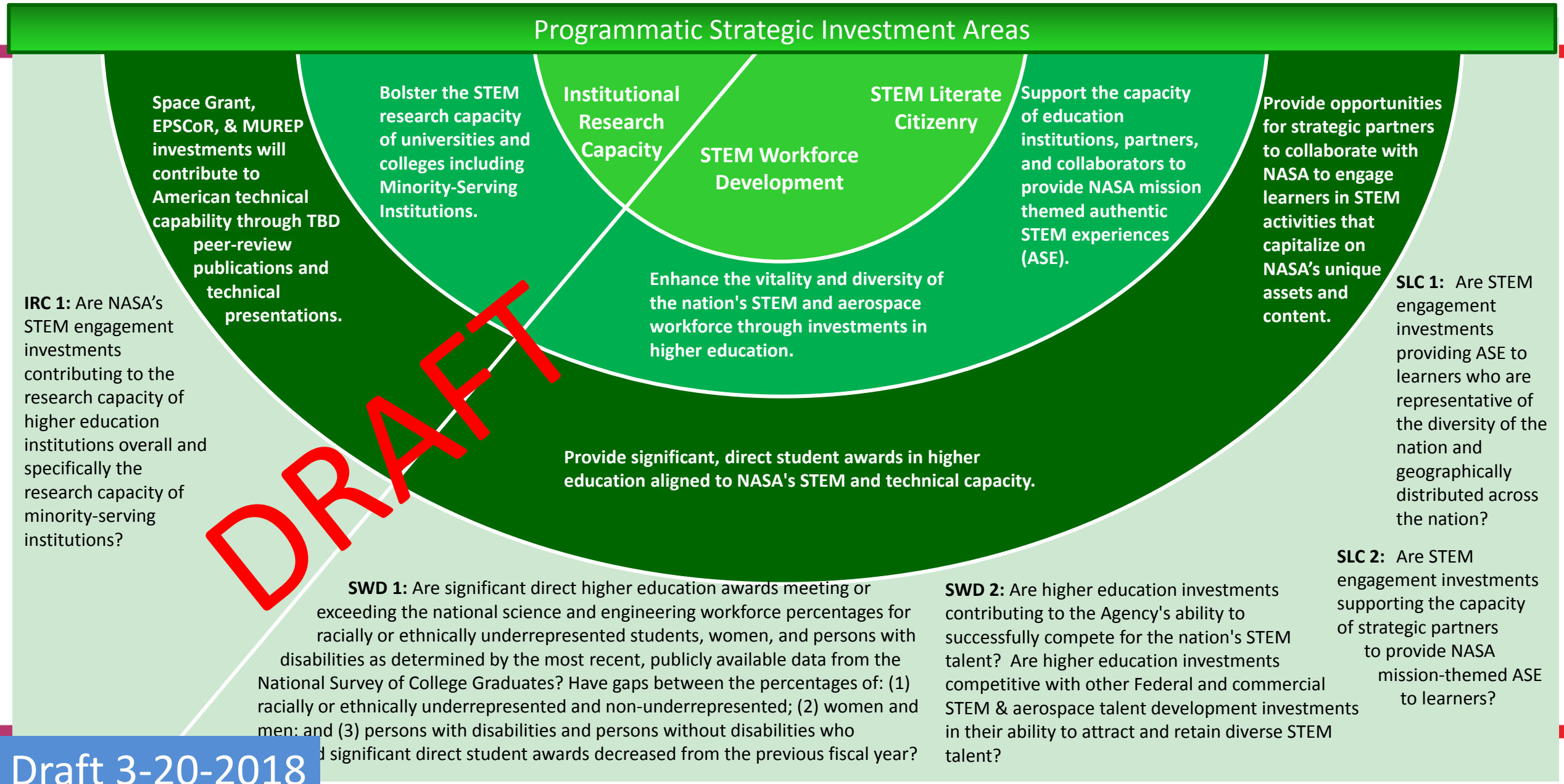
Strategic Assessment Questions	Annual Performance Indicators	Performance Goals	Strategic Investment Themes	Performance Goals	Annual Performance Indicators	Strategic Assessment Questions



IRC 1: Are NASA's STEM engagement investments contributing to the research capacity of higher education institutions overall and specifically the research capacity of minority-serving institutions?

SWD 1: Are significant direct higher education awards meeting or exceeding the national science and engineering workforce percentages for racially or ethnically underrepresented students, women, and persons with disabilities as determined by the most recent, publicly available data from the National Survey of College Graduates? Have gaps between the percentages of: (1) racially or ethnically underrepresented and non-underrepresented; (2) women and men; and (3) persons with disabilities and persons without disabilities who d significant direct student awards decreased from the previous fiscal year?

SWD 2: Are higher education investments contributing to the Agency's ability to successfully compete for the nation's STEM talent? Are higher education investments competitive with other Federal and commercial STEM & aerospace talent development investments in their ability to attract and retain diverse STEM talent?

SLC 1: Are STEM engagement investments providing ASE to learners who are representative of the diversity of the nation and geographically distributed across the nation?

SLC 2: Are STEM engagement investments supporting the capacity of strategic partners to provide NASA mission-themed ASE to learners?

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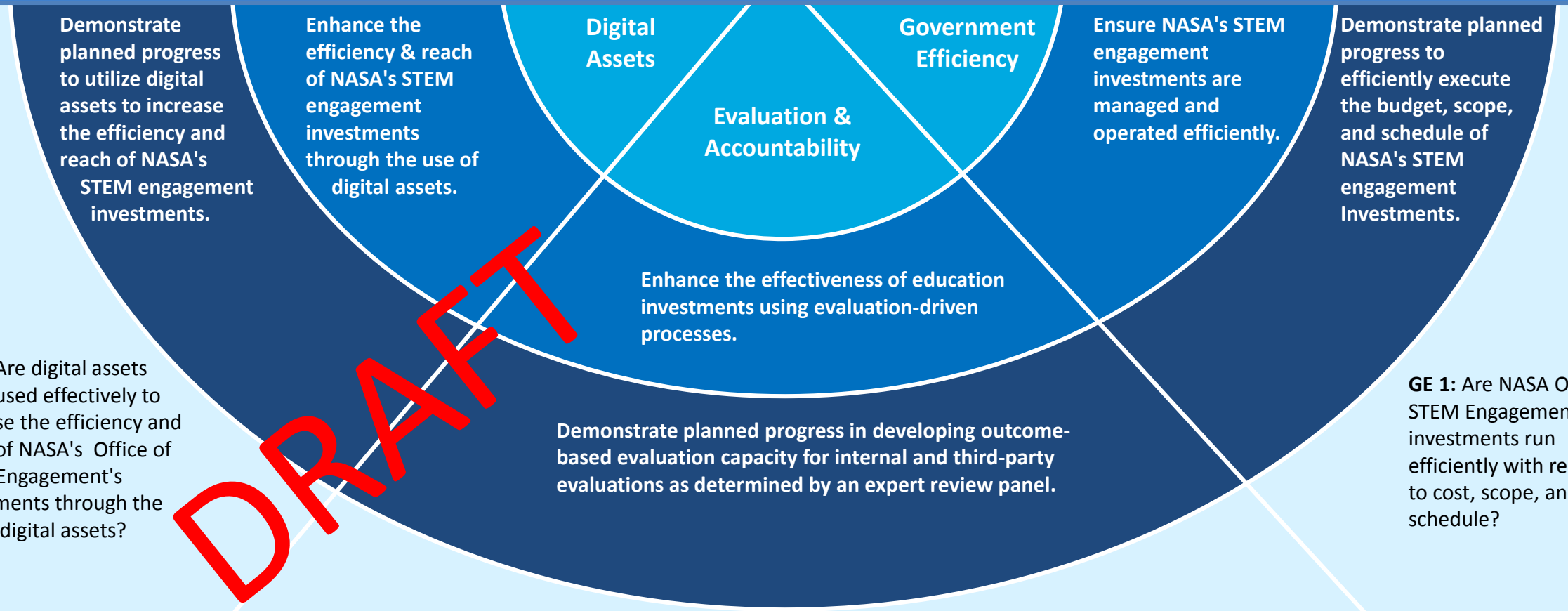
Strategic Assessment Questions	Annual Performance Indicators	Performance Goals	Strategic Investment Themes	Performance Goals	Annual Performance Indicators	Strategic Assessment Questions

Cross-Cutting Operational Support Areas



DA 1: Are digital assets being used effectively to increase the efficiency and reach of NASA's Office of STEM Engagement's investments through the use of digital assets?

EA 1: Are NASA's Office of STEM engagement investments demonstrating planned progress in developing outcome-based evaluation capacity for internal and third-party evaluations?

EA 2: Assess the feasibility of evaluation of major grant programs and develop an implementation schedule.

GE 1: Are NASA Office of STEM Engagement's investments run efficiently with respect to cost, scope, and schedule?

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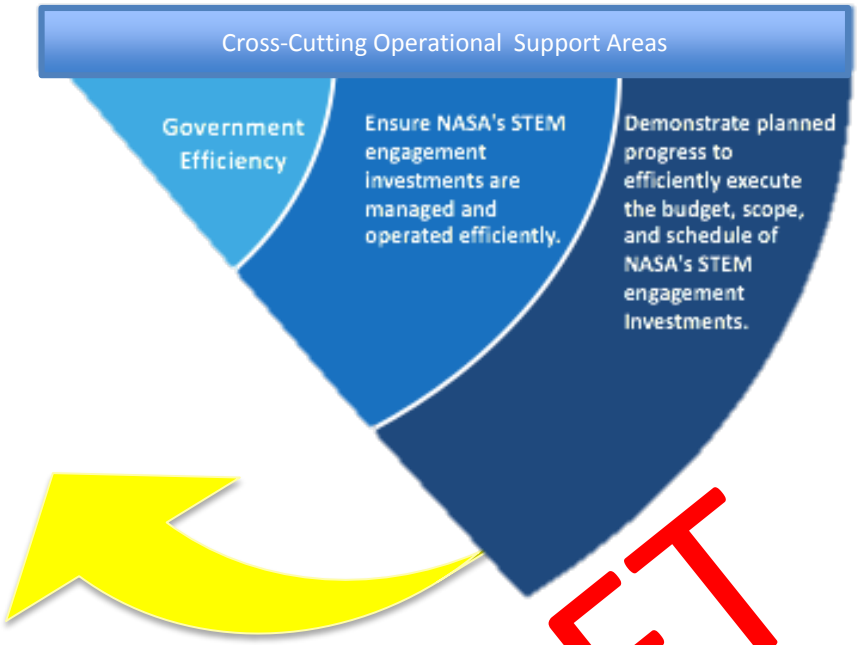
Proposed Office of STEM Engagement Performance Assessment Strategy: Institutional Research Capacity (IRC)

Programmatic Strategic Investment Area: Institutional Research Capacity (IRC)	
Strategic Investment Area:	Institutional STEM Research Capacity (IRC)
Performance Goal:	Bolster the STEM research capacity of universities and colleges including Minority-Serving Institutions.
Annual Performance Indicator:	Space Grant, EPSCoR, & MUREP investments will contribute to American technical capability through TBD peer-review publications and technical presentations.
Strategic Assessment Question:	Are NASA's STEM engagement investments contributing to the research capacity of higher education institutions overall and specifically the research capacity of minority-serving institutions?
Success Criteria:	• Dissemination of TBD research (e.g., peer-reviewed research publications, technical paper presentations…) • Development of institutional research capacity (e.g., research facility development, new course development, providing research experiences) at TBD higher education institutions.
Contributing Investments:	EPSCoR, MUREP, & Space Grant

Proposed Office of STEM Engagement Performance Assessment Strategy Framework: Government Efficiency (GE)

Cross-Cutting Operational Support Area: Government Efficiency (GE)	
Cross-Cutting Operational Focus Area	Government Efficiency (GE)
Performance Goal:	Ensure NASA's STEM engagement investments are managed and operated efficiently.
Annual Performance Indicator:	Demonstrate planned progress to efficiently execute the budget, scope, and schedule of NASA's STEM engagement Investments.
Strategic Assessment Question:	**GE 1:** Are NASA Office of STEM Engagement's investments run efficiently with respect to cost, scope, and schedule?
Success Criteria:	• Meet or exceed the budget execute schedule. • Investments meet or exceed their scope. • Investments meet or exceed their schedule.
Contributing Investments:	EPSCoR, MUREP, Next Generation STEM, & Space Grant



Questions