U.S. National Science Foundation

RESEARCH INFRASTRUCTURE GUIDE (RIG)

Facility Condition Assessment Guidance

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Presented at NSF Research Infrastructure Workshop,
Tucson AZ, March 28th, 2024

Overview of Facilities and Operations Track

8:50 am	***Coffee Break***
9:05 am MST	New Sub-section of RIG Section 3 that Relates to Annual Operations Planning *Charlotte Roehm, Program Director, Division of Biological Infrastructure (BIO/ DBI), NSF* *Chris Davis, Program Director, Division of Astronomical Sciences, Directorate of Mathematical and Physical Sciences (AST/MPS), NSF*
9:55 am	***Refreshment Break***
10:15 am MST	Facility Condition Assessment of Major Facilities – RIG Section 3.6.3 *Richard Oram, Research Infrastructure Office, NSF*
11:05 am	***Coffee Break***
11:20 am MST	Overview of Recent Facility Condition Assessment Process of National High Magnetic Field Laboratory *Uzair Irfan, Senior Project Engineer, Enterprise and Technology Assessments, The Aerospace Corp* *John Kynoch, Head of Facilities at NHMFL, FSU*
12:10 pm MST	**Lunch**

Outline for this Session

Discuss DRAFT RIG language in Section 3.6.3

Elicit feedback from the Session Attendees

Questions for Session Participants

What in this new section is not clear?

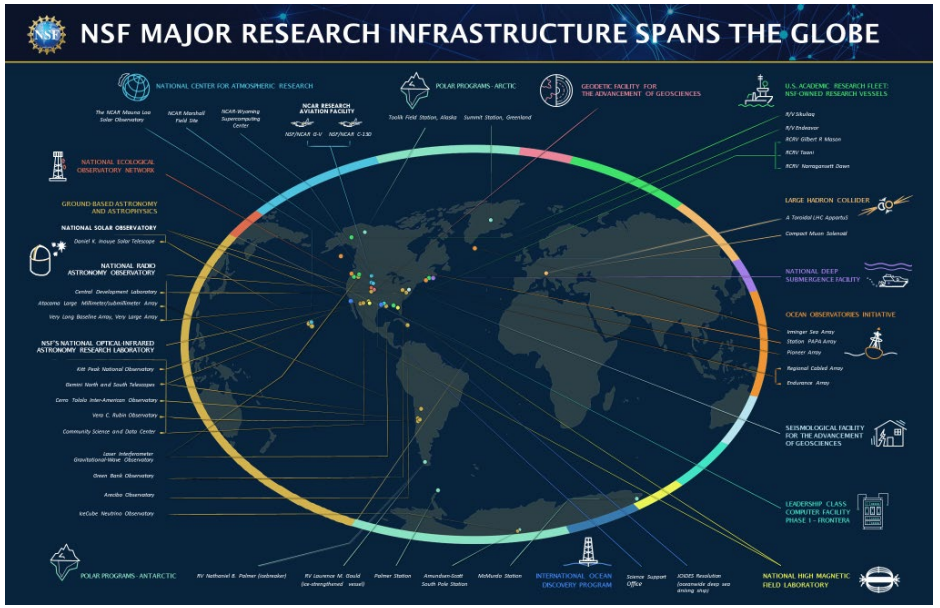
What key elements of this guidance are missing?

What are your concerns with this new guidance?

Specific questions about the 2-part FCA process?

Considerations

- Major Facility FCAs should have some degree of consistency
- No single ‘cookie-cutter’ approach
- New RIG Section aimed at providing more complete guidance on conducting FCAs and deliverables to NSF
- Sharing good practices will produce more effective outcomes on recapitalization planning



Current FCA Language 2021 RIG

The current RIG includes a provision for an FCA to be requested by the PO during the Operations Stage

2.5.1 Operations Management and Oversight : *A Program Officer (PO)* ***may*** *also request a periodic formal* ***Condition Assessment*** *report (an evaluation of capital assets requiring significant expenditures for periodic replacement or refurbishment and having a lifetime longer than the usual five-year award cycle), accompanied by an* ***Asset Management Plan*** *(a strategic plan for dealing with these issues), to inform NSF and the facility management of anticipated major and infrequent maintenance expenses that cause a significant departure from the routine funding profile.*

DRAFT FCA Language 2025 RIG

Facility Condition Assessments (FCAs) shall be conducted in accordance with the terms and conditions of the award:

FY2024 Major Facility and FFRDC Supplemental Terms and Conditions

Article 85. Facility Condition Assessments and Planned Maintenance: Unless otherwise conducted by NSF or another entity, the Recipient shall conduct a facility condition assessment once every five (5) years that includes the capital assets necessary to support activities under the award…

The scope of the condition assessment and the timing of the submittal, including submittal of any assessments conducted by other entities, will be determined in collaboration with the NSF Program Officer to support agency oversight of the award. The condition assessments shall use industry standard practices, where appropriate, but should be tailored to the technical nature of the facility…

DRAFT FCA Language 2025 RIG

RIG Text: *In general, they are conducted every five (5) years, except for the first five (5) year period following construction and should encompass both critical support infrastructure and scientific components, including risks and mitigations associated with resilience to climate change and the resulting natural hazards. FCAs can be conducted more frequently based on risk and NSF's oversight needs.*

Summary of FCA Section 2025 RIG

1) **Benefits to Major Facilities and NSF**
2) **Two main components:**
   a) Facility Condition Assessment Report (FCAR)
   b) Asset Management Plan (AMP)
3) **Scope and timing determined in collaboration with the NSF PO**
4) **FCAR Steps:**
   a) Develop list of capital assets
   b) Establish process to determine asset condition
5) **Asset Management Plan (AMP) Prioritized:**
   a) Health and Safety of personnel
   b) Sustainment of operations
   c) Enhancement of the scientific mission

Benefits to Major Facilities and NSF

- Long-term maintenance provides measurable improvements in operational performance criteria, uptime, reliability, availability, and downtime due to corrective maintenance.
- Renewals deliver facility energy efficiency improvements and associated reduction in annual operating costs and carbon footprint.
- Contribute to the health and safety of employees and the public from hazards and minimize danger to life and property, including resilience to natural hazards.

Two Main Components

Facility Condition Assessment Report (FCAR): An evaluation of the condition of all capital assets requiring significant expenditures for periodic replacement or refurbishment. Capital assets include land, structures, equipment (including mobile equipment such as vehicles, ships, and aircraft), and intellectual property (including software) that have an estimated useful life of two years or more which exceeds the typical O&M award duration.

Asset Management Plan (AMP): Elaboration of the proposed strategy for addressing the issues identified in the FCAR specifying the corresponding timeline and resources needed.

Scope and Timing of the FCA

- The specific scope of the FCA and the timing of the submittal, including submittal of any assessments conducted by other entities, will be determined in collaboration with the NSF Program Officer to support agency oversight of the award.
- The FCA shall use industry-standard practices but, should be tailored to the specialized technical nature of the Major Facility and cover the supporting infrastructure (substructure, shell, interiors, HVAC, electrical, plumbing, site) and, if not addressed separately, the major scientific instrumentation.

FCAR - Step 1

List of Capital Assets: For most Major Facilities these can be separated in three main categories:

I. Science support equipment and systems (e.g., instrumentation, associated specialized cooling, vacuum, ventilation or power systems)
II. Infrastructure (e.g., fixed overhead cranes and lifting equipment, HVAC, standard power, control and communication systems)
III. Buildings and grounds (e.g., roofing, windows, grounds, roads, fences, flood control)

Once negotiated with the PO, the list will serve as a baseline for the FCA.

FCAR - Step 2

Establish a Process to determine Asset Condition: The process to compile information for the Facility Condition Assessment Report (FCAR) and Asset Management Plan (AMP) will be established by the awardee and agreed by the Program Officer. This process by which the Major Facility will conduct the FCA on the agreed list of capital assets could include:

I. Gather information
II. Conduct independent/external inspections and evaluations
III. Conduct internal inspections and evaluations
IV. Independent evaluation before submittal to NSF

Assessment Management Plan (AMP)

The Asset Management Plan (AMP) elaborates the strategy for addressing the issues identified in the FCAR by specifying the timeline and resources needed. The Awardee can use data from the FCAR for future maintenance management, capital planning, budgeting and report generation.

1. **Analyze and Prioritize**
2. **Weight and Rank**
3. **Project Strategy**
4. **Funding needs**
5. **Deferred maintenance**

5) Steps to Creating the Assessment Management Plan

The Asset Management Plan (AMP) is the elaboration of a strategy for addressing the issues identified in the FCAR by specifying the corresponding timeline and resources needed. The Awardee can use data from the FCAR for future maintenance management, capital planning, budgeting and report generation.

1) **Analyze and Prioritize:** The baseline FCAR assumes all requirements are equally important with equal weight, further refinement is needed to develop a meaningful plan. The items should be prioritized based on urgency and the need to be completed within certain timescales (in 1 year, 2-3 yrs, 5 yrs)
2) **Weight and Rank:** Further refine a model that weights and ranks requirements to be adjusted in alignment with the scientific mission of the Major Facility. Safety, impact on science mission, and sustainment of essential operational activities should have the highest weightings.
3) **Project Strategy:** Facility Management Team will develop and mature a strategy for addressing the ranked requirements specifying the corresponding timeline and resources needed and, by design, be managed to de-conflict with science mission and essential operations.
4) **Funding needs**: Identify the annual cost of executing the AMP projecting over the expected life of the Major Facility a covering the next 5, 10 and 15-year intervals.
5) **Deferred maintenance.** The Facility Management Team will keep an updated list of deferred maintenance. These are considered FCA requirements that are not yet projectized and scheduled.

Questions for Session Participants

What in this new section is not clear?

What key elements of this guidance are missing?

What are your concerns with this new guidance?

Specific questions about the 2-part FCA process?

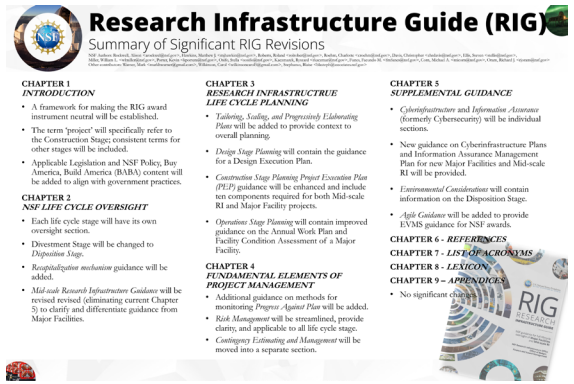
Providing Feedback

NSF would like to hear from the RI community offering their perspective on the RIG Changes

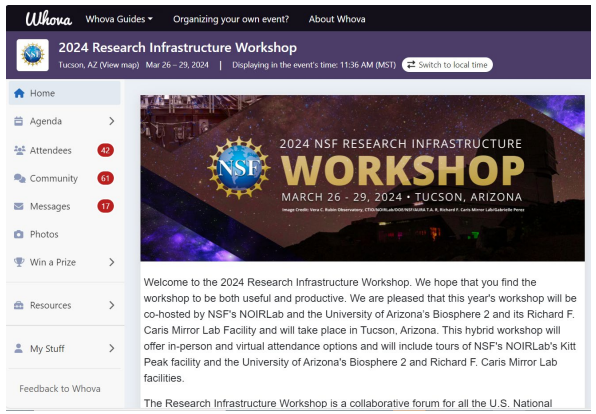
A few ways to communicate

In-Person
RIG Table top

In Person- Poster Session X2



Message Presenters on the Whova app



COI Portal - NSF Research Infrastructure Outreach

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BACKUP SLIDES

ASTM Standard E2018-15, Standard Guide for Property Condition Assessments:

- ASTM standard (E2018-15) Uniformat II Classification for Building Elements- classifying building specifications, cost estimating, and cost analysis. The elements are major components common to most buildings.
- Uniformat estimating applies unit-cost data to building-system and component site elements. This “systems” approach uses a hierarchical structure of cost elements, beginning at Level 1 with basic systems, such as Substructure, Exterior Enclosure, and Interior Construction, and proceeding to successively more detailed subdivisions of these systems at Levels 2-5. See GSA.gov.- Uniformat.

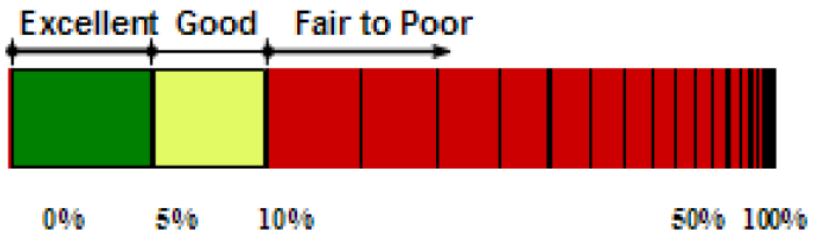
The Facility Condition Index (FCI)

- The Facility Condition Index (FCI), a standard used to indicate the condition of an asset or assets, is the ratio of the cost of requirements divided by the current replacement value (CRV) of the asset. The CRV is the total value of all systems that make up a particular asset. The lower the FCI value the better the condition of the building or asset.
- The FCI is calculated as:

$$FCI = \frac{\text{Total FCI Requirements}}{\text{Current Replacement Value}}$$

- FCI calculations result in the determination that each asset or assets fall into the qualitative description of excellent, good, fair or poor. The lower the FCI value the better the condition of the building.

FCI	
Excellent	0.00 to 0.05
Good	0.05 to 0.10
Fair	0.10 to 0.15
Poor	Greater than 0.15



Facility Condition Assessment of a Major Facility

- The Operations Stage for a Major Facility typically lasts 20-40 years.
- NSF expects that upgrades, refurbishment, and renewals of various assets will be necessary over time to support the evolving scientific mission.
- The **FCA** assists with planning these activities, including replacing obsolete instruments, refurbishment, or renewal of structural components, electrical and cooling systems, upgrading cyber-infrastructure and data storage/distribution networks.
- In general, these routine upgrades, refurbishments and renewals will be funded as part of the Operations Stage award, either from a portion of the operating funds intended for routine maintenance purposes or from separate equipment and instrumentation budget lines