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# NASA Procedural Requirements

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**Subject: Facilities Maintenance Management w/ Change 1 (4/21/04)****Responsible Office: Facilities Engineering and Real Property Division**

[| TOC](#) | [Change](#) | [Preface](#) | [Chp1](#) | [Chp2](#) | [Chp3](#) | [Chp4](#) | [Chp5](#) | [Chp6](#) | [Chp7](#) | [Chp8](#) | [Chp9](#) | [Chp10](#) | [Chp11](#) | [Chp12](#) | [AppdxA](#) | [AppdxB](#) | [AppdxC](#) | [AppdxD](#) | [AppdxE](#) | [AppdxF](#) | [AppdxG](#) | [AppdxH](#) | [AppdxI](#) | [Fig12-2](#) | [FigC-6](#) | [FigC-7](#) | [FigC-8](#) | [FigD-1](#) | [FigD-2](#) | [FigD-3](#) | [FigD-4](#) | [FigD-5](#) | [FigD-6](#) | [FigD-7](#) | [FigD-8](#) | [FigD-9](#) | [FigD-10](#) | [FigD-11](#) | [FigD-12](#) | [ALL](#) |

**APPENDIX A. Acronyms and Definitions****Acronyms**

A&E	Architect and Engineer
A/C	Air Conditioning
APQC	American Productivity and Quality Council
ASQ	American Society for Quality
AWP	Annual Work Plan
BCI	Building Cost Index
BMAR	Backlog of Maintenance and Repair
CADD	Computer Aided Design and Drafting
CFC	Chlorofluorocarbons
CFO	Chief Financial Officer
CMMS	Computerized Maintenance Management System
CoF	Construction of Facilities
COSS	Center Operations Support Services
COTR	Contracting Officer's Technical Representative
CRV	Current Replacement Value
DESC	Defense Energy Support Center

EMCS	Energy Monitoring & Control System
ENR	Engineering News Record
EPA	Environmental Protection Agency
EPS	Engineered Performance Standards
FAR	Federal Acquisition Regulation
FCA	Facility (Facilities) Condition Assessment
FEJE	Facilities Engineering Job Estimating
FM	Facility Management
FMM	Financial Management Manual
FMS	Functional Management System
FY	Fiscal Year
GIS	Geographic Information System
GSA	General Services Administration
HVAC	Heating, Ventilating, and Air Conditioning
IDIQ	Indefinite Delivery/Indefinite Quantity
IPO	Institutional Program Office
IRT	Infrared Thermography
JSC	Johnson Space Center
LCD	Liquid Crystal Display(s)
LOE	Level of Effort
M&R	Maintenance and Repair
MADR	Maximum Allowable Defect Rate
MCA	Motor Circuit Analysis
MCE	Motor Circuit Evaluation
MIL-STD	Military Standard
MOA	Memorandum of Agreement
MSDS	Material Safety Data Sheet
MSI	Maintenance Support Information

NASA	National Aeronautics and Space Administration
NPD	NASA Policy Directive
NPDES	National Pollutant Discharge Elimination System
NPG	NASA Procedures and Guidelines
NRC	National Research Council
NSN	National Stock Number
O&M	Operations and Maintenance
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
P&E	Planner and Estimator
PBC	Performance-based Contract(ing)
PEC	Performance Evaluation Committee
PGM	Programmed Maintenance
PM	Preventive Maintenance
POC	Point of Contact
POP	Program Operating Plan
PRS	Performance Requirements Summary
PT&I	Predictive Testing & Inspection
PUC	Public Utility Commissions
PWS	Performance Work Statement
QA	Quality Assurance
QAE	Quality Assurance Evaluator
R&D	Research and Development
RCFA	Root-Cause Failure Analysis
RCM	Reliability Centered Maintenance
ROI	Replacement of Obsolete Items
RTP	Real-time Pricing
SOP	Standard Operating Procedures
SOW	Statement of Work
SR	Service Request
TC	Trouble Call(s)

WBS	Work Breakdown Structure
WCC	Work Control Center

## Definitions

**Addition.** A physical increase to a real property facility that adds to the overall dimensions of the facility.

**Allocation.** (1) As used by the Office of Management and Budget and the Department of the Treasury, an amount set aside by an agency in a separate appropriation or fund account for the use of another agency in carrying out the purpose of an appropriation. This term applies to amounts set aside in transfer appropriation accounts and allocated working funds. (2) The authoritative assignment of a specific amount of funds or quantity of a resource to a specified agency or for a designated use, usually for a given period of time. (3) The portion of joint or indirect cost assigned to a specific objective such as a program, function, project, job, or service.

**Allotment.** An authorization, stated on a Form 504, Allotment Authorization, to incur commitments, obligations, and outlays within a specific amount pursuant to an appropriation or other statutory authority. The allotment constitutes a legal limitation on the total amount of funds stated thereon, in accordance with procedures governing the administrative control of appropriations and funds, as implemented by NPD 9050.3, Administrative Control of Appropriations and Funds.

**Alterations.** Work that changes the configuration of a facility (not maintenance or repairs) but that does not increase the value of the facility; for example, moving a door or electrical outlet.

**Annual Work Plan (AWP).** A plan prepared on an annual basis prior to the start of the applicable fiscal year that systematically lays out the maintenance and repair work to be accomplished within the budget constraints of the Center. The AWP is based on the 5-year Maintenance Plan and the mission of the Center.

**Apportionment.** The allocation of the appropriation made in writing by an official of the Office of Management and Budget of amounts available for obligation and outlay in an appropriation or fund account. OMB may specify that amounts apportioned may be available only for specified time periods, activities, functions, projects, objects, or combinations thereof. The amounts so apportioned limit the obligation to be incurred or, when so specified, outlays to be accrued.

**Appropriation.** Authority by an act of Congress to make payments out of the Treasury for specified purposes.

- a. **Annual Appropriation.** An appropriation that is available for incurring obligations only during the one fiscal year specified in the appropriation Act.
- b. **Current Appropriation.** An appropriation that is available for obligation during the current fiscal year.
- c. **Multiple-Year Appropriation.** An appropriation that is available for incurring obligations for a definite period in excess of one fiscal year (e.g., Construction of Facilities (CoF)).

**Appropriation Year.** In the case of an annual appropriation, that fiscal year in which obligations were authorized to be incurred.

**Assets** - Any item of economic value owned by NASA. The item may be physical in nature (tangible) or a right to ownership (intangible) that is expressed in terms of cost or some other value. (From NASA FMM)

**Authorization.** A separate Act that authorizes appropriations to be made.

**Availability.** The ratio of the actual run time of a machine or system divided by the scheduled time for the machine or system. Usually expressed as a percentage. For example, if an air handler is scheduled to run from 6 a.m. to 6 p.m., 5 days a week and in fact does run during those times, its Availability was 100 percent. If the air handler was stopped 1 day during the week for 1 hour, its Availability for that week was 98.3 percent (59 hours divided by 60 hours).

**Backlog of Maintenance and Repair (BMAR).** Also known as "Deferred Maintenance". The NASA unfunded facilities maintenance required to bring facilities and collateral equipment to a condition that meets acceptable facilities maintenance standards. See also Facilities Maintenance.

**Bar Code.** A series of parallel lines whose width and spacing represent a number when scanned by a laser reader.

**Benchmark.** A standard against which something is measured.

**Benchmarking.** To seek out the best examples of methods, processes, procedures, and products in order to establish a standard and assess one's own performance in terms of quality, productivity, or cost.

**Book Value.** The original capitalized value of an asset, adjusted for modifications where appropriate, as stated in the Agency 's accounting records. (From NASA FMM)

**Breakdown Maintenance.** See Repair.

**Budget.** A formal estimate of future revenues, obligations to be incurred, and outlays to be made during a definite period of time and, when determined to be appropriate, upon the basis of accrued expenditures and costs to be incurred.

**Budget Cycle.** The period of time that elapses from the initiation of the budget process to the completion thereof for a particular fiscal year.

**Budget Execution.** The processes involved at every level in budgetary administration subsequent to passage of an appropriation act. This includes preparation of operating budgets, apportionment's, funding actions, review and approval of operating budgets, fund reporting, and report reviews.

**Budget Formulation.** The processes in preparation, review, and establishment of the annual budget presented to the Congress as a basis for appropriations.

**Budget Guidelines.** Both general and specific instructions furnished by a higher level of management as a basis for budget formulation and execution.

**Budget Process.** The process embracing all the stages through which the budget passes, namely, the formulation stage, the review and enactment stage, and the execution stage.

**Budget Year.** The Fiscal Year (FY) for which estimates are submitted. Budget submissions generally contain data concerning the Prior Year (the FY immediately preceding the current year), the Current Year (the FY immediately preceding the budget year), the Budget Year (the FY for which estimates are submitted) and 4 subsequent years. (From NASA Financial Management Manual)

**Buildings.** The classification "buildings" includes the cost of buildings, capital improvements of buildings, and fixed equipment that is normally required for the functional use of the building and becomes permanently attached to and made a part of the building and that cannot be removed without cutting into the walls, ceilings, or floors, such as plumbing, heating, and lighting equipment; elevators; central air-conditioning systems; and built-in safes and vaults. Also included is all equipment of any type built in, affixed to, or installed in real property in such manner that the installation cost, including special foundations or unique utilities or services, or the facility restoration cost after removal is substantial.

**Capitalized Equipment.** Individual items of Property, Plant, and Equipment (PP&E) that has an acquisition cost of \$100,000 or more, an estimated useful life of two years or more, is not intended for sale in the ordinary course of operations, and is acquired or constructed with the intention of being used or available for use by the Agency. If an item, when originally installed, consists of "severable components," each component should be individually subjected to the capitalization criteria. Maintenance costs involving collateral equipment valued between \$5,000 and \$100,000 shall be tracked as an expense versus a capitalization. These criteria are retroactive to October 1, 1997.

**Center Support.** A building, area, or system which supports the overall operation of the Center/Facility but does not meet the Mission Critical or Mission Support criteria.

**Central Utility Plant Operations and Maintenance.** This category is unique in that it includes the cost of operations in addition to maintenance costs. It should be used only to capture the costs of operating and maintaining institutional central utility plants such as a central heating or steam plant, wastewater treatment plant, or a central air conditioning (chiller) plant. The concept is that operators are assigned full-time to operate the plant, but they perform maintenance between various operating tasks, making it almost impossible to segregate operational and maintenance costs; therefore, the costs of the full-time operators (and their materials) are shown here.

**Collateral Equipment.** Encompasses building-type equipment, built-in equipment, and large, substantially affixed equipment/property and is normally acquired and installed as part of a facility project as described below (also see Noncollateral Equipment):

a. **Building-Type Equipment.** A term used in connection with facility projects to connote that equipment normally required to make a facility useful and operable. It is built in or affixed to the facility in such a manner that removal would impair the usefulness, safety, or environment of the facility. Such equipment includes elevators; heating, ventilating and air conditioning systems; transformers; compressors; and other like items generally accepted as being an inherent part of a building or structure and essential to its utility. It also includes general building systems and subsystems such as electrical, plumbing, pneumatic, fire protection, and control and monitoring systems.

b. **Built-in or Large, Substantially Affixed Equipment.** A term used in connection with facility projects of any type other than building-type equipment that is to be built in, affixed to, or installed in real property in such a manner that the installation cost, including special foundations or unique utilities service, or the facility restoration work required after its removal is substantial.

**Component Facility.** Applies to organizations that are geographically separated from the NASA Center to which assigned. (From NASA FMM)

**Computerized Maintenance Management System (CMMS).** A set of computer software modules and equipment databases containing facility data with the capability to process the data for facilities maintenance management functions. They provide historical data, report writing capabilities, job analysis, and more. The data describe equipment, parts, jobs, crafts, costs, step-by-step instructions, and other information involved in the maintenance effort. This information may be stored, viewed, analyzed, reproduced and updated with just a few keystrokes. The maintenance-related functions typically include the following:

- a. Facility/Equipment Inventory
- b. Facility/Equipment History
- c. Work Input Control
- d. Job Estimating
- e. Work Scheduling and Tracking
- f. Preventive and Predictive Maintenance
- g. Facility Inspection and Assessment
- h. Material Management
- i. Utilities Management

**Condition Assessment.** It is the inspection and documentation of the material condition of facilities and equipment, as measured against the applicable maintenance standard. It provides the basis for long-range maintenance planning as well as annual work plans and budgets.

**Condition-Based Maintenance (CBM).** Facility and equipment maintenance scheduled only when the condition of the facility or equipment requires it. CBM replaces maintenance scheduled at arbitrary time or usage intervals. It usually involves the application of advanced technology to detect and assess the actual condition. See PT&I and RCM.

**Condition Monitoring.** Also known as Predictive Maintenance is the continuous or periodic monitoring and diagnosis of systems and equipment in order to forecast failure. Also see Predictive Testing and Inspection (PT&I).

**Construction.** The erection, installation, or assembly of: (1) a new or replacement facility, or (2) an addition in area, volume, or both to an existing facility.

**Construction Project.** A facility project relating to the erection, installation, or assembly of a new facility, replacement facility, or an addition in area, volume, or both to an existing facility.

**Continuous Inspection.** A program of periodic, scheduled inspections of facilities and equipment to determine their condition with respect to specified standards (including safety).

**Contracting Officer.** Any person who, by appointment in accordance with procedures prescribed by the Acquisition Regulation (see Appendix B, resource 4, Part 1, Subpart 4), has the authority to enter into and administer contracts and make determinations and findings with respect thereto, or has any part of such authority.

**Contractor.** The supplier of the end item and associated support items to the Government under the terms of a specific contract.

**Contracts.** All types of agreements and orders for the procurement of supplies or services. Includes awards and notices of award; contracts of a fixed-price, cost, cost-plus-a-fixed-fee, or incentive type; contracts providing for the issuance of job orders, task orders, or task letters thereunder; letter contracts; and purchase orders. It also includes supplemental agreements with respect to any of the foregoing.

**Corrective Maintenance.** See Repair.

**Current Replacement Value.** Approximate cost to replace an existing facility in its present form. NASA calculates CRV by escalating facility and collateral equipment acquisition cost, and any incremental book value changes of \$5,000 or more to present-year dollars using the Engineering News Record (ENR) Building Cost Index (BCI). The NASA Real Property Data System program or NASA Headquarters-approved equivalent is used in performing the required calculations.

**Current Year.** The fiscal year immediately preceding the budget year.

**Descriptor.** A description of the relationship of the work units used in a metric.

**Design.** This term is used to encompass both preliminary design and final design for facility projects. Design costs are normally funded under the Construction of Facilities appropriation. Design costs of facility projects proposed for

funding under appropriations other than CoF are normally funded under the same appropriation from which the facility project is to be funded with such costs being identified separately from the facility project cost estimate.

**Drawings.** Graphic data, including drawings as defined in MIL-STD 100A and prepared in accordance with MIL-STD-1000, Category D; aperture cards in accordance with MIL-C-9877; and graphs or diagrams in accordance with industry standards and industry specifications on which details are represented with sufficient information to define completely, directly, or by reference the end result for use in the selection, procurement, and manufacture of the item required.

**Emergency Repair.** The restoration of an existing facility or the components thereof when such facilities or components have been made inoperative by major breakdown, accident, or other circumstances that could not be anticipated in normal operations and the repair thereof is of such urgency that it cannot await programming and accomplishment in the normal budget cycle. In the process of emergency repair, the replacement of components or materials will be of the size or character currently required to meet firm demands or needs.

**Estimated Cost.** A calculated anticipated amount, as distinguished from an actual outlay, based upon related cost experience, prevailing wages and prices, or anticipated future conditions, usually for the purposes of contract negotiation, budgetary control, or reimbursement.

**Facilities Condition Assessment.** See Condition Assessment

**Facilities Contract.** A contract type under which Government facilities and equipment are provided to a contractor by the Government for use in connection with the performance of separate, related procurement or support services contract(s) for supplies or services. The term includes facilities acquisition contracts, facilities use contracts, and consolidated facilities contracts.

**Facilities Management.** The planning, prioritizing, organizing, controlling, reporting, evaluating, and adjusting of facility use to support NASA activities based upon customers' facility needs and Center mission requirements. See also Facilities Maintenance Management.

**Facilities Maintenance.** The recurring day-to-day work required to preserve facilities (buildings, structures, grounds, utility systems, and collateral equipment) in such a condition that they may be used for their designated purpose over an intended service life. It includes the cost of labor, materials, and parts. Maintenance minimizes or corrects wear and tear and thereby forestalls major repairs. Facilities maintenance includes Preventative Maintenance, Predictive Testing & Inspection, Grounds Care, Programmed Maintenance, repair, Trouble Calls, Replacement of Obsolete Items, and Service Request (Not a maintenance item but work performed by maintenance organizations). Facilities Maintenance does not include new work or work on noncollateral equipment.

**Facilities Maintenance Management.** The planning, prioritizing, organizing, controlling, reporting, evaluating, and adjusting of facilities maintenance operations to support NASA activities with quality facilities based upon customers' facility needs and predetermined maintenance goals at minimum cost.

**Facility.** A term used to encompass land, buildings, other structures, and other real property improvements, including utilities and collateral equipment. The term does not include operating materials, supplies, special tooling, special test equipment, and noncapitalized equipment. (See FMM 9250-32 for criteria for capitalized equipment.) The term facility is used in connection with land, buildings (facilities having the basic function to enclose usable space), structures (facilities having the basic function of a research or operational activity), and other real property improvement.

**Facility Improvement.** That construction necessary to replace obsolete facilities or to expand a facility in order to improve the operating efficiency of an installation.

**Facility Project.** The consolidation of applicable specific individual types of facility work, including related collateral equipment, which is required to fully reflect all of the needs, generally relating to one facility, which have been or may be generated by the same set of events or circumstances that are required to be accomplished at one time in order to provide for the planned initial operational use of the facility or a discrete portion thereof.

**Find.** Discovery utilizing PT&I of an impending failure or degrading condition of a facility, system or equipment that indicates an action is required to prevent failure.

**Fiscal Year.** In the Federal Government, it is the 12-month period from October 1 of 1 calendar year through September 30 of the following year.

**5-year Maintenance Plan.** The plan of maintenance work anticipated for the 5-year period beginning with the budget year. It comprises the maintenance (planned, level of effort, and anticipated unknowns) required to support the Center mission needs and to correct the deficiencies identified by the current assessment of facilities.

**Funding.** The issuance of allotments (Form 504) that provides authority to incur commitments and obligations and make payments within appropriations made by the Congress, within the apportionment limitations established by the Office of Management and Budget, and within the approved resources authorization (Form 506), Resources

Authority.

**Funding Availability.** The amount of obligating authority provided by appropriations, contract authorizations, actual transfers to or from other appropriations, and anticipated reimbursements.

**Grounds Care.** Grounds Care is the maintenance of all grassy areas, shrubs, trees, sprinklers, right-of-ways and open fields, drainage ditches, swamps and water holding areas (lakes, ponds, lagoons, canals), fences, walls, grates, and other similar improvements to land that are included in the NASA Real Property Accountability System, and exterior pest and weed control. The maintenance tasks include mowing, spreading fertilizer, trimming hedges and shrubs, clearing ditches, snow removal, and related work. Included in this category is the cost of maintaining Grounds Care equipment such as mowers and tractors.

**Improvements.** An addition to land, buildings, other structures, and other attachments or annexations to land that are intended to remain so attached or annexed such as sidewalks, drives, tunnels, utilities, and installed collateral equipment.

**Inventory.** The facilities and equipment inventory is the foundation of an effective facilities maintenance management program. It is the baseline for what is to be maintained. The inventory should permit identifying maintainable items, including those subject to preventive maintenance or operator maintenance.

**Life-Cycle Costs (LCC).** A form of economic analysis that considers the total cost of owning, operating, and maintaining a building over its useful life. Life-cycle costs are the sum of the present value of the following:

- a. Investment costs, less salvage values, at the end of the study period;
- b. Nonfuel operation and maintenance costs;
- c. Replacement costs, less salvage costs, of replaced building systems; and
- d. Energy costs.

**Major Facility Work.** Construction and revitalization work in excess of \$1,500,000 and Land Acquisition and Emergency Repair approved under the provisions of Section 308(b) of the National Aeronautics and Space Act of 1958 (as amended) at any cost.

**Metrics.** Meaningful measures. For a measure to be meaningful, it must present data that encompasses the right action. In the context of this procedures guide, metrics refers to management and performance measures.

**Minor Facility Work.** Construction and revitalization work in excess of \$500,000 but not exceeding \$1,500,000.

**Mission Critical.** A building, area, or system that is critical to the Center mission or essential for Center of Excellence performance.

**Mission Support.** A building, area, or system that provides support to the Center primary mission or Center of Excellence assignment.

**Modification.** See Rehabilitation and Modification.

**Noncollateral Equipment.** All equipment other than collateral equipment. Such equipment, when acquired and used in a facility or a test apparatus, can be severed and removed after erection or installation without substantial loss of value or damage thereto or to the premises where installed. Noncollateral equipment imparts to the facility or test apparatus its particular character at the time, e.g., furniture in an office building, laboratory equipment in a laboratory, test equipment in a test stand, machine tools in a shop facility, computers in a computer facility, and it is not required to make the facility useful or operable as a structure or building. (see also Collateral Equipment.)

**Obligation.** An obligation is incurred when an order is placed, a contract awarded, a service received, or other similar transactions occur requiring disbursement of money. Obligations are the sum of undelivered orders, liabilities, and disbursements.

**Operating Plan.** A budget plan, when approved, that is the basis for funding and financial control of obligations, costs, and disbursements.

**Operator Maintenance.** The examination, lubrication, minor repair (usually no larger than Trouble Call scope) and adjustment of equipment and systems in the assigned plant.

**Outage.** The planned or unintentional interruption or termination of a utility service such as electricity, water, steam, chilled water, or communication.

**Past Year.** The fiscal year immediately preceding the current year.

**Payback.** The amortization period, in years, calculated by dividing the budget estimate by the total expected annual savings.

**Planned Repair.** Repair performed prior to failure. Material condition degradation, usually identified through PM, PT&I, or other inspection, is repaired to prevent catastrophic failure. Also see Repair.

**Predictive Testing & Inspection (PT&I).** The use of advanced technology to assess machinery condition. The PT&I data obtained allows for planning and scheduling preventive maintenance or repairs in advance of failure. Also see Condition Monitoring and Condition-Based Maintenance.

**Preventive Maintenance (PM).** Also called time-based maintenance or interval-based maintenance. PM is the planned, scheduled periodic inspection (including safety), adjustment, cleaning, lubrication, parts replacement, and minor (no larger than Trouble Call scope) repair of equipment and systems for which a specific operator is not assigned. PM consists of many checkpoint activities on items that, if disabled, would interfere with an essential Center operation, endanger life or property, or involve high cost or long lead time for replacement. In a shift away from reactive maintenance, PM schedules periodic inspection and maintenance at predefined time or usage intervals in an attempt to reduce equipment failures. Depending on the intervals set, PM can result in a significant increase in inspection and routine maintenance; however, a weak or nonexistent PM program can result in safety and/or health risks to employees, much more emergency work, and costly repairs.

**Proactive Maintenance.** The collection of efforts to identify, monitor and control future failure with an emphasis on the understanding and elimination of the cause of failure. Proactive maintenance activities include the development of design specifications to incorporate maintenance lessons learned and to ensure future maintainability and supportability, the development of repair specifications to eliminate underlying causes of failure, and performing Root Cause Failure Analysis (RCFA) to understand why in-service systems failed.

**Program Operating Plan (POP).** A time-phased projection of resource requirements in terms of planned rates of obligations (and in the case of major cost-reimbursement contracts, of planned rates of cost incurred), submitted periodically by Centers to Strategic Enterprises, and by Enterprise officials to the NASA CFO. These estimates serve as a guide for resources and allotment authorizations, and provide a baseline for measuring performance and future budget planning.

**Program Year.** A concept of accounting for funds, obligations, and outlays under a no-year appropriation by the identification of transactions in fiscal-year segments identified by the fiscal year in which the individual items were obligated.

**Programmed Maintenance (PGM).** Those maintenance tasks whose cycle exceeds one year, such as painting a building every fifth year. (This category is different from PM in that if a planned cycle is missed the original planned work still remains to be accomplished, whereas in PM only the next planned cycle is accomplished instead of doing the work twice, such as two lubrications, two adjustments, or two inspections.)

**Project.** Within a program, an undertaking with a scheduled beginning and ending that normally involves one of the following primary purposes: (1) the design, development, and demonstration of major advanced hardware items; (2) the design, construction, and operation of a new launch vehicle (and associated ground support) during its research and development phase; and (3) the construction and operation of one or more aeronautical or space vehicles and the necessary ground support in order to accomplish a scientific or technical objective.

**Reactive Maintenance.** See Repair.

**Real Property.** Land, buildings, structures, utility systems, and improvements and appurtenances thereto permanently annexed to land. Also includes collateral equipment (i.e., building-type equipment, built-in equipment and large substantially affixed equipment).

**Recurring Maintenance.** Maintenance performed on an item of equipment that is planned and performed on a set work schedule. The work and work schedules are based upon established standards.

**Rehabilitation and Modification.** That facility work required to restore and enhance, alter, or adjust a facility or component thereof, including collateral equipment, to such a condition that it may be more effectively used for its presently designated purpose or to increase its functional capability. For simplification in facility project titles, work may be properly identified as rehabilitation provided the primary reason for accomplishment is that the basic restoration work must be done in any event. It is deemed prudent to accomplish any related enhancement, alteration, or adjustment work at the same time. If the pressing requirement is for the alteration and adjustment work to achieve an increase in functional capability, then this may be simply classified as "Modification" even though restoration is also involved.

**Reimbursement Source Code.** A section of the Agencywide Coding Structure (AWCS) that provides information on the source of reimbursements.

**Reimbursements.** Amounts collected or to be collected for commodities, work, or services furnished or to be furnished to another appropriation or fund or to an individual, firm, or corporation that by law may be credited to an appropriation or fund account. Amounts to be collected include accounts receivable, reimbursements earned but not billed, and amounts anticipated for the remainder of the year. They may also include interagency orders accepted and on hand for which delivery has not been made, to the extent that the order is a valid obligation of the ordering

agency and the collection will be credited to the appropriation being reported.

Reliability Centered Maintenance (RCM). The process that is used to determine the most effective approach to maintenance. It involves identifying actions that, when taken, will reduce the probability of failure and which are the most cost effective. It seeks the optimal mix of Condition-Based Actions, other Time- or Cycle-Based actions, or a Run-to-Failure approach. (see also Condition-Based Maintenance, Predictive Testing & Inspection.)

Repair. That facility work required to restore a facility or component thereof, including collateral equipment, to a condition substantially equivalent to its originally intended and designed capacity, efficiency, or capability. It includes the substantially equivalent replacements of utility systems and collateral equipment necessitated by incipient or actual breakdown. Also, restoration of function, usually after failure. Also see Planned Repair.

Replacement of Obsolete Items (ROI). There are many components of a facility that should be programmed for replacement as a result of becoming obsolescent (no longer parts-supportable), not meeting electrical or building codes, or being unsafe; the components, however, are still operational and would not be construed as a repair; for example--

- a. Electric switchgear, breakers, and motor starters.
- b. Elevators.
- c. Control systems.
- d. Boiler and central HVAC systems and controls.
- e. Fire detection systems.
- f. Cranes and hoists.
- g. A/C systems using CFC refrigerants.

Resources. The actual assets of a governmental unit such as cash, human resources, and material.

Root-cause Failure Analysis (RCFA). The process of exploring, in increasing detail, all possible causes related to a machine failure. Failure causes are grouped into general categories for further analysis. For example, causes can be related to machinery, people, methods, materials, policies, environment, and measurements.

Service Requests. Service requests are not maintenance items, but are so often performed by facilities maintenance organizations they become a part of the baseline. Service requests are requests for facilities-related work that is new in nature and as such should be funded by the requesting organization. They are requests initiated by anybody on the Center, are usually submitted on a form, often require approval by someone before any action is taken, and usually are planned and estimated, materials procured, and shop personnel discretely scheduled to accomplish the work.

Specifications. A document that stipulates methods, materials, performance, testing, limitations, or other criteria that must be adhered to during the construction of a facility.

Standard. Maintenance standards are defined as the expected condition or degree of usefulness of a facility or equipment item. A maintenance standard may be stated as both a desired condition and a minimum acceptable condition beyond which the facility or equipment is deemed unsatisfactory.

Time-based Maintenance. See Preventive Maintenance.

Trouble Calls. Trouble Calls are generally called in by telephone or submitted electronically by occupants of a facility (or facility managers or maintenance workers). This category is composed of two types of work.

- a. Routine calls are minor facility problems that are too small to be estimated (usually less than about 20 workhours or \$2,000) and generally are responded to by grouping Trouble Calls by craft and location.
- b. Emergency calls, which normally start as a Trouble Call, require immediate action to eliminate hazards to personnel or equipment, to prevent loss of, or damage to Center property; or to restore essential services that have been disrupted. Emergency work is usually a response-type work effort, often initially worked by Trouble Call technicians. Due to its nature, emergency work is not restricted to a level of effort such as Trouble Calls.

Unconstrained Maintenance and Repair (M&R). The maintenance and repair work that a reasonable manager would estimate is needed to maintain a facility inventory in a "good commercial" level of condition without funding restraints. The estimate would not allow BMAR to grow and would provide a level of reliability that the supported programs would find acceptable for their missions.

Work Control Center. The central organizational point for receipt, tracking, and management of work generated from all sources.

Work Generation. The process of identifying and documenting maintenance deficiencies and requirements.

Work Order. The document directing the shops to perform certain items of maintenance work. It includes the specific maintenance task requirements (usually by craft), labor, material, and equipment estimates, coordinating instructions, and administrative and financial information.

Work Request. A written or oral request from a customer or internal maintenance person who has observed a deficiency and perceives a need for maintenance or repair work or who has a request for new work. The work request is evaluated by management and, if approved, converted into a work order for accomplishment.

Work year Equivalents. Computed by dividing the total hours compensated (includes regular hours, annual leave, sick leave, compensatory time used, and overtime, and excludes leave without pay) by 2,087 hours. (From NASA FMM)

[TOC](#)	[Change](#)	[Preface](#)	[Chp1](#)	[Chp2](#)	[Chp3](#)	[Chp4](#)	[Chp5](#)	[Chp6](#)	[Chp7](#)	[Chp8](#)
[Chp9](#)	[Chp10](#)	[Chp11](#)	[Chp12](#)	[AppdxA](#)	[AppdxB](#)	[AppdxC](#)	[AppdxD](#)	[AppdxE](#)		
[AppdxF](#)	[AppdxG](#)	[AppdxH](#)	[AppdxI](#)	[Fig12-2](#)	[FigC-6](#)	[FigC-7](#)	[FigC-8](#)	[FigD-1](#)		
[FigD-2](#)	[FigD-3](#)	[FigD-4](#)	[FigD-5](#)	[FigD-6](#)	[FigD-7](#)	[FigD-8](#)	[FigD-9](#)	[FigD-10](#)		
[FigD-11](#)	[FigD-12](#)	[ALL](#)								

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