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SECRETARY OF THE AIR FORCE**

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Acquisition

**MANUFACTURING AND QUALITY
MANAGEMENT**

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This publication implements Air Force Policy Directive (AFPD) 63-1/20-1, *Integrated Life Cycle Management*. It complements the manufacturing and quality directive guidance in Air Force Instruction (AFI) 63-101/20-101, *Integrated Life Cycle Management*, by providing direction for program offices and implementing commands to execute manufacturing and quality management activities during the development, acquisition, production, modification, and sustainment of Air Force weapon systems. This instruction applies to all civilian employees, uniformed members of the Regular Air Force, and other individuals as required by binding agreements or obligation to the Department of the Air Force. It does not apply to the Air National Guard or the Air Force Reserve. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with AFI 33-322, *Records Management and Information Governance Program*, and disposed of in accordance with the Air Force Records Disposition Schedule located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. This publication may be supplemented at any level, but to ensure standardization, any organization supplementing this instruction must send the implementing publication to the Engineering & Force Management Division, office of the Deputy Assistant Secretary for Science, Technology and Engineering (SAF/AQRE) for review and coordination before publishing. The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0," "T-1," "T-2," "T-3") number following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately,

to the requestor's commander for non-tiered compliance items. Waivers are further addressed in [paragraph 1.4 Attachment 2](#) and [Attachment 3](#) are not mandatory.

SUMMARY OF CHANGES

This publication has been substantially revised and needs to be completely reviewed. This revision reflects changes to Department of Defense (DoD) 5000 series instructions that comprise the Defense Acquisition System, and AFI 63-101/20-101. It converts [Attachment 2](#) and [Attachment 3](#) to checklists. It provides clearer waiver authority for Program Manager compliance requirements. This revision introduces preliminary guidance on advanced manufacturing and additive manufacturing. It also implements Secretary of the Air Force publication reduction and streamlining direction.

1. Overview.

1.1. Applicability. This instruction contains the directive processes required for execution of lifecycle manufacturing and quality management activities. It is applicable to all programs covered by DoD Instruction (DoDI) 5000.85, *Major Capability Acquisition*, and AFI 63-101/20-101. It is adaptable, with the tailoring described in [paragraph 1.4.2](#), to acquisition programs using other pathways in the adaptive acquisition framework defined in DoDI 5000.02, *Operation of the Adaptive Acquisition Framework*. Air Force Policy series 20, 21, and 23 cover logistics readiness, maintenance, and materiel management quality assurance. The Federal Acquisition Regulation (FAR) and its supplements cover contracting quality assurance policy.

1.2. Scope. The Air Force program execution chain, consisting of the Service Acquisition Executive (SAF/AQ), Program Executive Officers, Milestone Decision Authorities, and Program Managers, is responsible for assuring the manufacturability and quality of assigned products. Program Managers are primarily responsible for the execution of the manufacturing and quality management tasks in this instruction. The Program Manager relies on the Product Support Manager, the Lead Systems Engineer, contracting, and quality assurance personnel to accomplish manufacturing and quality management tasks.

1.3. Publication Organization. This instruction identifies:

1.3.1. The core manufacturing and quality management planning, contract implementation, and manufacturing assessment activities that Program Managers apply repeatedly throughout the program life cycle (See [paragraph 3](#) and subparagraphs).

1.3.2. The specific tasks that Program Managers execute during each life cycle phase (See [paragraph 4](#) and subparagraphs).

1.4. Waivers and Tailoring.

1.4.1. Waivers. Waivers for compliance requirements that this instruction places on the acquisition execution chain are not elevated through the Major Command (MAJCOM)-wing-unit organizational chain of authority. The acquisition execution chain is defined in AFI 63-101/20-101. It includes the Service Acquisition Executive, Program Executive Officer, Milestone Decision Authority, the Program Manager, or other program office members. Therefore, tiering in accordance with the standard organizational terminology of AFI 33-360 cannot be applied. Instead, the waiver authority for each compliance

requirement applied to the acquisition execution chain by this instruction is specified in the text.

1.4.2. Tailoring. Acquisition Program Managers, with Milestone Decision Authority approval, retain the ability to tailor and streamline strategies, oversight, reviews, phases, decision levels, documentation, regulatory requirements and information consistent with the tailoring guidance in AFI 63-101/20-101 and DoDI 5000.02. Tailoring is especially appropriate for programs that are rapidly fielding capabilities, for instance, in accordance with DoDI 5000.80, *Operation of the Middle Tier of Acquisition (MTA)*, or programs that have a reduced level of developmental effort (for example the acquisition of commercial off-the-shelf systems).

2. Roles and Responsibilities.

2.1. Assistant Secretary of the Air Force for Acquisition, Technology and Logistics (SAF/AQ), who serves as the Service Acquisition Executive in accordance with AFPD 63-1/20-1, shall:

2.1.1. Function as the Headquarters Air Force lead for manufacturing and quality management.

2.1.2. Establish policy and guidance for manufacturing and quality management activities conducted as a part of the integrated life cycle management of systems.

2.1.3. Provide advocacy through the federal acquisition system for the appropriate inclusion of manufacturing and quality management requirements in contracts.

2.2. MAJCOM Commanders. shall provide feedback on product quality deficiencies through the designated deficiency reporting system for the product (for example the Joint Deficiency Reporting System).

2.3. Commander of Air Force Materiel Command shall:

2.3.1. Comply with the responsibilities in [paragraph 2.2](#)

2.3.2. Provide manufacturing and quality management technical advice and subject matter expertise, including expertise on advanced manufacturing and additive manufacturing, to program offices.

2.3.3. Cross-feed manufacturing and quality management lessons learned and best practices, to include transition and implementation of advanced manufacturing and additive manufacturing technologies and techniques, among programs and across centers.

2.3.4. Establish and maintain standard Air Force product deficiency reporting capabilities (for example Technical Order (TO) 00-35D-54, *USAF Deficiency Reporting, Investigation, and Resolution*) that can channel feedback from product testers, users and maintainers to program offices and allow programs to track quality conditions during operations and support. (T-2).

2.4. Program Executive Officers, who are chartered by the Service Acquisition Executive and organized outside the Wing, Field Operating Agency (FOA), Direct Reporting Unit (DRU) standard organizational structure directed by AFI 38-101, *Manpower and Organization*, establish processes for their assigned programs to accomplish manufacturing and quality management objectives across the portfolio.

2.5. Program Managers report to assigned Program Executive Officers and the Service Acquisition Executive. Unless specifically waived by their Program Executive Officer, Program Managers:

2.5.1. Assign manufacturing and quality management responsibilities to specific personnel within the program office.

2.5.2. Integrate manufacturing and quality management across the integrated product team structure. **Note:** This does not necessarily require the establishment of specific manufacturing or quality management teams.

2.5.3. Include quality and manufacturing requirements in contracts and in appropriate agreements with other agencies, for example the Defense Contract Management Agency.

2.5.4. Assess manufacturing readiness as part of program milestone decision points and major design reviews.

2.5.5. Establish manufacturing and quality metrics for the program's products and review metrics at a frequency that enables effective risk and opportunity handling by the program's manufacturing and quality efforts.

3. Manufacturing and Quality Management Core Activities.

3.1. Life Cycle Activities. Program Managers apply the following manufacturing and quality management planning, contract implementation, and assessment and reporting activities iteratively throughout the life cycle.

3.1.1. Planning for Manufacturing and Quality Management. Unless waived by the Program Executive Officer, Program Managers shall include manufacturing and quality management planning in program documentation (for example, the Acquisition Strategy and the Systems Engineering Plan). The checklist at [Attachment 2](#) provides considerations on tailoring and integrating manufacturing and quality management planning into program documentation. Program Managers should update this planning as the program manufacturing and quality risks and opportunities evolve throughout the life cycle.

3.1.2. Use Military Handbook (MIL-HDBK) 896A, *Manufacturing Management Program Guide*, as a best-practice guide in developing the program's approach to manufacturing and quality. The *Defense Manufacturing Management Guide for Program Managers* provides additional non-mandatory manufacturing guidance. The Program Manager also:

3.1.2.1. Incorporates continuous process improvement into program manufacturing and quality planning.

3.1.2.2. Evaluates contractor planning documents, developed in response to the manufacturing and quality management system requirements in [paragraph 3.2](#), to ensure that government and contractor planning evolve in tandem throughout the life cycle.

3.2. Manufacturing and Quality Management Requirements in Contracts and Contract Monitoring. Program Managers shall include contract quality assurance requirements in

accordance with FAR, Part 46, *Quality Assurance*, and Defense Federal Acquisition Regulation Supplement (DFARS), Part 246, *Quality Assurance*. (T-0).

3.2.1. In addition, unless waived by the Program Executive Officer, the Program Manager shall ensure that either the manufacturing and quality management requirements are appropriately included in contract documents, or the Systems Engineering Plan includes an equivalent approach for meeting the requirements or a justification for why the requirements do not apply to the program. The checklist at [Attachment 3](#) provides manufacturing and quality contract planning considerations.

3.2.2. Manufacturing and quality assurance criteria and requirements are reflected in the program's quality assurance surveillance planning. This planning describes how the government evaluates contractor results to determine whether the contractor has met the required standards for each inspectable item in the contract. (Also see FAR, Subpart 37.6 *Performance-Based Acquisition*, and DFARS, Part 237, *Service Contracting*.)

3.3. Assessing and Reporting Manufacturing Readiness.

3.3.1. For all Air Force programs (with exception of systems developed under DoDI 5000.75, *Business Systems Requirements and Acquisition*), to include modifications, Program Managers assess manufacturing readiness prior to the Preliminary Design Review, the Critical Design Review, Milestone C, and the full-rate production decision point. Programs with high manufacturing risk should monitor and assess manufacturing readiness more frequently. If system production has stopped for more than one year or if production is restarted under another manufacturer, Program Managers assess manufacturing readiness prior to the production restart decision. Assessments should also evaluate the readiness of contractor, Department of Defense (DoD) depot, and Air Force organic organizations to execute manufacturing activities during system operations and support.

3.3.1.1. The standardized DoD manufacturing readiness levels provide efficient and objective measures of manufacturing maturity. Programs use manufacturing readiness levels in their assessments of manufacturing readiness (for additional information, see the *DoD Manufacturing Readiness Level Deskbook* at <http://www.dodmrl.com/>).

3.3.1.2. The program's industrial base assessments (required by DoDI 5000.60, *Defense Industrial Base Assessments*, and AFI 63-101/20-101) provide data that can inform manufacturing readiness assessments and can be influenced by the program manufacturing management approach.

3.3.2. The Program Manager summarizes the results of manufacturing readiness assessments in the "Industrial Capability and Manufacturing Readiness" section of the Acquisition Strategy. Manufacturing risks are incorporated into the program's risk management matrix that is required by AFI 63-101/20-101 to be presented at all program reviews, to include technical reviews and milestone decision points. The program presents a chart that summarizes the results of manufacturing readiness assessments at reviews for the Milestone C and the full-rate production decision points. For space vehicle systems, this chart is required at Critical Design Review.

4. Manufacturing and Quality Management Life Cycle Phase Tasks. In addition to the core activities in [paragraph 3](#) that Program Managers apply iteratively throughout the life cycle, the following tasks and emphasis areas are required in specific life cycle phases.

4.1. Manufacturing and Quality Management during Material Solution Analysis. The Program Manager ensures that the initial Acquisition Strategy and Systems Engineering Plan prepared for the next life cycle phase reflect manufacturing and quality risks and opportunities identified in the Analysis of Alternatives or Concept Characterization and Technical Description, and include the minimum required content at [Attachment 2](#). The Program Manager should incorporate assessments of manufacturing capabilities and risks and opportunities, if appropriate and available, to support initial technical reviews and the alternative systems reviews.

4.2. Manufacturing and Quality Management during Technology Maturation and Risk Reduction.

4.2.1. Manufacturing Management. During Technology Maturation and Risk Reduction, the program initiates manufacturing technology development efforts to address identified manufacturing risks and opportunities. Unless waived by the Program Executive Officer, the Program Manager accomplishes the following phase-specific activities:

4.2.1.1. Evaluate the contractor's initial manufacturing plan, developed in accordance with the contract's manufacturing management system requirement. In particular, evaluate how the contractor plans to utilize advanced manufacturing methods and technologies to meet program objectives. Adjust program office manufacturing management activities, as required.

4.2.1.2. Perform an initial assessment of the producibility and manufacturability of key technologies and components prior to Preliminary Design Review (see [paragraph 3.3](#)). The assessment at this stage should be focused, at a minimum, on understanding critical manufacturing processes, qualification and approval of new manufacturing methods and technologies, the status of production scale-up efforts, and awareness of potential supply chain issues.

4.2.1.3. Evaluate the pre-Milestone B industrial base assessment for industrial base risks and opportunities, and adjust manufacturing management activities, as required.

4.2.2. Quality Management. During Technology Maturation and Risk Reduction, the program initiates the assessment of quality assurance program risks and the development of quality metrics. Unless waived by the Program Executive Officer, the Program Manager accomplishes the appropriate core activities required by [paragraph 3](#), with an emphasis on evaluating the contractor's initial program-specific Quality Plan developed in accordance with the contract Quality Management System requirements, and adjusting program office quality management activities, as required.

4.3. Manufacturing and Quality Management during Engineering and Manufacturing Development.

4.3.1. Manufacturing Management. During Engineering and Manufacturing Development, the program matures manufacturing capabilities in preparation for low rate initial production. Unless waived by the Program Executive Officer, the Program

Manager accomplishes the following phase-specific manufacturing readiness assessment activities in support of Critical Design Review and Milestone C.

4.3.1.1. Review contractor manufacturing management plans, metrics, identified manufacturing risks and their associated handling plans, and other data required by contract. Confirm that manufacturing processes have been demonstrated in an appropriate environment. Assess industrial base capability to support production, confirming that the supply chain (including sole/single/foreign sources and obsolescence issues) is stable, adheres to security requirements, and that viable alternative sources are identified. The program office should include any identified issue(s) with critical components in the Program Protection Plan. **Note:** Consult the industrial base assessment, when available, for information on industrial base risks and opportunities.

4.3.1.2. For space vehicle systems, assessments consist of a review of contractor manufacturing management plans, metrics, and other data required by contract. They should also confirm that manufacturing processes are demonstrated to verify that process capability data meets targets. They should validate that an effective production control system is in place, and that known producibility issues are resolved and pose no significant risk for production.

4.3.2. Quality Management. During Engineering and Manufacturing Development, the Program Manager accomplishes the appropriate core activities identified in [paragraph 3](#). As a special emphasis in those activities, Program Managers should:

4.3.2.1. Review available contractor data (for example audit results, trend data, problem/deficiency resolution, scrap/rework/repair status and cost, sub-tier/supplier management, updates to manufacturing risk handling efforts) to evaluate the contractor's quality program in preparation for production.

4.3.2.2. Implement contract quality assurance monitoring and surveillance, to include the execution of Memorandums of Understanding with outside organizations (for example Defense Contract Management Agency or air logistics complexes), if necessary.

4.4. Manufacturing and Quality Management during Production and Deployment.

4.4.1. Manufacturing Management. During Production and Deployment, the Program Manager performs the appropriate iterative activities described in [paragraph 3](#). The purpose of the pre-full-rate production decision point manufacturing readiness assessment is to ensure control of manufacturing processes, acceptable performance and reliability, and the establishment of adequate sustainment and support systems. The Program Manager reports the assessment finding(s) as a part of the reviews supporting the full-rate production decision.

4.4.2. Quality Management. During Production and Deployment, the Program Manager accomplishes the appropriate core activities identified in [paragraph 3](#). As a special emphasis in those activities, Program Managers should:

4.4.2.1. Monitor and review production metrics and data (for example non-conforming materials, dispositions, failure reporting, audits, customer satisfaction,

assignable causes, corrective actions, and assessments of effectiveness) to ensure that program quality goals are being met and that improvement efforts are implemented where goals are not met.

4.4.2.2. Track metrics related to the quality of critical components and/or parts from subcontractors.

4.5. Manufacturing and Quality Management during Operations and Support.

4.5.1. Manufacturing Management. During operations and support, the Program Manager accomplishes the appropriate core activities identified in [paragraph 3](#). As a special emphasis in those activities, Program Managers should:

4.5.1.1. Assess the capability of contractor, DoD depot, or Air Force organic maintenance organizations to execute new manufacturing activities during operations and support. Assessments consist of:

4.5.1.1.1. A review of performance during operations including manufacturing management plans, metrics, and other data required by contract.

4.5.1.1.2. A finding that depot manufacturing processes are demonstrated to be in control.

4.5.1.2. Validating that industrial base capabilities and supply chains remain in place to meet Operations and Support requirements.

4.5.2. Quality Management. During operations and support, the Program Manager accomplishes the appropriate core activities identified in [paragraph 3](#), with an emphasis on:

4.5.2.1. Validating that contractor, DoD depot, and Air Force organic maintenance quality management systems are consistent with the program planned approach for operations and support quality management.

4.5.2.2. Reviewing the performance of and outputs from deficiency reporting systems to ensure that they provide technical, engineering, and product quality feedback throughout operations and support.

William B. Roper, Jr.
Assistant Secretary of the Air Force
(Acquisition, Technology & Logistics)

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 63-1/20-1, *Integrated Life Cycle Management*, 7 August 2018

AFI 63-101/20-101, *Integrated Life Cycle Management*, 30 Jun 2020

AFI 33-322, *Records Management and Information Governance Program*, 23 March 2020

AFI 33-360, *Publications and Forms Management*, 1 December 2015

DoDI 5000.85, *Major Capability Acquisition*, 6 August 2020

DoDI 5000.02, *Operation of the Adaptive Acquisition Framework*, 23 January 2020

DoDI 5000.80, *Operation of the Middle Tier of Acquisition (MTA)*, 30 December 2019

TO 00-35D-54, *USAF Deficiency Reporting, Investigation, and Resolution*, 1 September 2015

MIL-HDBK-896A, *Manufacturing Management Program Guide*, 25 August 2016

Defense Manufacturing Management Guide for Program Managers, 18 October 2018

FAR, Part 46, *Quality Assurance*, current edition

DFARS, Part 246, *Quality Assurance*, current edition

FAR, Subpart 37.6, *Performance-Based Acquisition*, current edition

DFARS, Part 237, *Service Contracting*, current edition

DoDI 5000.75, *Business Systems Requirements and Acquisition*, 24 January 2020

DoD Manufacturing Readiness Level Deskbook, December 2018

DoDI 5000.60, *Defense Industrial Base Assessments*, 31 August 2018

International Organization for Standardization (ISO) 9000, *Quality Management Systems - Fundamentals and Vocabulary*, 2015

AFI 62-601, *USAF Airworthiness*, 11 June 2010

SAE International, Aerospace Standard (AS) 9100, *Quality Management Systems - Requirements for Aviation, Space and Defense Organizations*, 20 September 2016

SAE International, AS9110, *Quality Management Systems - Requirements for Aviation Maintenance Organizations*, 4 November 2016

ISO 9001, *Quality Management Systems - Requirements*, 2015

SMC-T-009, *Space and Launch Requirements Addendum to AS9100D Quality Management Systems*, 2 November 2018

SAE International, Aerospace Standard AS6500, *Manufacturing Management Program*, 13 November 2014

AFI 20-106_IP, *Management of Aviation Critical Safety Items*, 27 January 2020

SAE International, AS9017, *Control of Aviation Critical Safety Items*, 17 March 2017

FAR, Subpart 9.3, *First Article Testing and Approval*, current edition

Prescribed Forms

None

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

AFGM—Air Force Guidance Memorandum

AFI—Air Force Instruction

AFPD—Air Force Policy Directive

AS—Aerospace Standard

DFARS—Defense Federal Acquisition Regulation Supplement

DoD—Department of Defense

DoDI—Department of Defense Instruction

FAR—Federal Acquisition Regulation

ISO—International Organization for Standardization

MAJCOM—Major Command

MIL-HDBK—Military Handbook

MTA—Middle Tier of Acquisition

SAE—(Not an acronym. Originally stood for Society of Automotive Engineers)

TO—Technical Order

Terms

Acquisition—The conceptualization, initiation, design, development, test, contracting, production, fielding, deployment, sustainment, and disposal of a directed and funded effort that provides a new, improved, or continued materiel, weapon, information system, logistics support, or service capability in response to an approved need.

Acquisition Execution Chain—The AF acquisition chain of authority reflects the management structure from the Service Acquisition Executive through the Program Executive Officer to the accountable Program Manager.

Additive Manufacturing—The industry standard term for processes of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies.

Advanced Manufacturing—Innovative manufacturing processes used to fabricate or assemble parts or assemblies that are not currently in widespread use within the commercial or defense

industry. Advanced manufacturing technologies and processes may require additional development and qualification prior to their use.

Critical Design Review—The technical review that assesses design maturity, design build-to or code-to documentation, and remaining risks and establishes the initial product baseline.

First Article Testing and Approval—Inspection of the first produced item that ensures that the contractor can furnish a product that conforms to all contract requirements for acceptance.

Full-Rate Production Decision—The decision at which the Milestone Decision Authority determines whether or not to approve proceeding to Full-Rate Production.

Headquarters Air Force—The Headquarters Air Force is comprised of both Secretariat and Air Staff offices.

Integrated Life Cycle Management—The seamless governance, transparency, and integration of all aspects of infrastructure, resource management, and business systems necessary for successful development, test, production, fielding, sustainment, and disposal of systems, subsystems, end items, and services to satisfy validated warfighter capability needs.

Materiel Management—That phase of military logistics that includes managing, cataloging, requirements determinations, procurement, distribution, overhaul, and disposal of materiel.

Milestone Decision Authority—The designated individual with overall responsibility for a program. The Milestone Decision Authority has the authority to approve entry of an acquisition program into the next phase of the acquisition process and is accountable for cost, schedule, and performance reporting to higher authority, including Congressional reporting.

Preliminary Design Review—The technical review that assesses the maturity of the preliminary design supported by the results of requirements trades, prototyping, and critical technology demonstrations.

Product Support Manager—The individual responsible for managing the package of support functions required to field and maintain the readiness and operational capability of major weapon systems, sub-systems, and components.

Program Documentation—This term refers to the program's strategic and technical documentation, as described in AFI 63-101/20-101. Examples of program documentation include the Acquisition Strategy, the Systems Engineering Plan, and the Life Cycle Support Plan.

Program Executive Officer—The individual dedicated to executive management and supervision of a portfolio of mission-related acquisition and selected programs. Program Executive Officer organizations do not correspond to the standard Air Force Wing, DRU, FOA organizational structure that is directed by AFI 38-101, *Manpower and Organization*. Instead, the Program Executive Officer is chartered by and is accountable to the Service Acquisition Executive. (See DoDI 5000.02T, AFPD 63-1/20-1, and AFI 63-101/20-101).

Program Manager—The designated individual with responsibility for and authority to accomplish program objectives for development, production, and sustainment to meet the user's operational needs. The Program Manager is accountable to the Program Executive Officer and the Service Acquisition Executive for credible cost, schedule, performance, and materiel readiness. Program Executive Officer organizations, with subordinate Program Managers, do

not correspond to the standard Air Force Wing, DRU, FOA organizational structure that is directed by AFI 38-101. (See DoDI 5000.02, AFPD 63-1/20-1, and AFI 63-101/20-101).

Quality—The degree to which material attributes, performance features, and characteristics of a product satisfy a given need. Quality may apply to a product, process, or system and may be physical, sensory, behavioral, temporal, ergonomic, or functional.

Quality Assurance—That part of quality management focused on providing confidence that quality requirements are being fulfilled. (See ISO 9000:2015 and Defense Acquisition Guidebook)

Quality Management—The coordinated activities to direct and control an organization with regard to quality policy, quality objectives, quality planning, quality control, quality assurance and quality improvement. (See ISO 9000:2015)

Quality Management System—That part of the organization's management system that focuses on the achievement of results, in relation to the quality objectives, to satisfy the needs, expectations and requirements of interested parties, as appropriate. (See ISO 9000:2015)

Service Acquisition Executive—Designated by AFPD 63-1/20-1 as SAF/AQ. The Service Acquisition Executive executes all Service Acquisition Executive (referred to in DoD policy as Component Acquisition Executive) and Senior Procurement Executive responsibilities and authorities outlined in statute and regulation. Responsible for all science and technology acquisition, contracting, systems engineering, supply chain management, maintenance of military materiel, and product support policy, guidance, and oversight.

Systems Engineering Plan—An acquisition program's primary technical planning document to help Program Managers develop, communicate, and manage the overall systems engineering approach that guides all technical activities of the program.

Tailor or Tailoring—As described in AFI 63-101/20-101, tailoring refers to the flexible manner in which certain core issues (program definition, program structure, program design, program assessments, and periodic reporting) may be addressed in a particular program. The Milestone Decision Authority seeks to minimize the time it takes to satisfy an identified need consistent with common sense, sound business management practice, applicable laws and regulations, and the time sensitive nature of the requirement itself. Tailoring may be applied to various aspects of the acquisition process, including program documentation, acquisition phases, the time and scope of decision reviews, Supportability Analysis, and decisions levels consistent with all applicable statutory requirements.

Test and Evaluation Master Plan—Documents the overall structure and objectives of an acquisition program's test and evaluation program.

Attachment 2

MANUFACTURING AND QUALITY MANAGEMENT PLANNING CHECKLIST

A2.1. Overview. In accordance with [paragraph 3.1.1](#), the checklist provided in [Table A2.1](#) outlines the considerations that a Program Manager should tailor and apply when integrating manufacturing and quality management planning into program documentation required by AFI 63-101/20-101.

A2.1.1. Programs, especially those with manufacturing or quality risks, should consider using focused manufacturing or quality plans (for example a program Quality Assurance Plan) to document and guide the program's approach.

A2.1.2. If the program develops detailed, standalone government manufacturing or quality plans, reference them in and attach them to the System Engineering Plans to preserve integration with the program's overall engineering and technical approach.

A2.1.3. In developing program plans and objectives, program managers should take advantage of the subject matter expertise and capabilities available in the Air Force Life Cycle Management Center Manufacturing and Quality Branch (AFLCMC/EZSM), the Air Force Research Laboratory Manufacturing Technology Office (AFRL/RXM), and the Manufacturing Innovation Institutes.

Table A2.1. Manufacturing and Quality Management Planning.

<input type="checkbox"/>	Acquisition Strategy	The Industrial Capability and Manufacturing Readiness section of the Acquisition Strategy includes summaries of how the program uses manufacturing management and quality management systems to contribute to the minimization of cost, schedule, and performance risks throughout the product life cycle. It also briefly summarizes the results of manufacturing readiness assessments and strategies for sustaining industrial capability for the product (for example identification of sole/foreign sources, product technology obsolescence, replacement of limited-life items, and regeneration options for unique manufacturing processes), if applicable.
<input type="checkbox"/>	The Systems Engineering Plan	Integrate manufacturing and quality topics and planning into the Systems Engineering Plan.
		<input type="checkbox"/> Include manufacturing and quality risks, if they have been identified, in the Engineering and Integration Risk Management section of the Systems Engineering Plan.
		<input type="checkbox"/> Document how the program will evaluate opportunities to implement advanced manufacturing and additive manufacturing to improve system design, speed schedule, reduce life cycle cost, and increase availability.

		<input type="checkbox"/> Consider how the program's digital engineering approach will support manufacturing -- especially advanced manufacturing and additive manufacturing data requirements
		<input type="checkbox"/> Identify the program manufacturing and quality management points of contact and describe how manufacturing and quality management execution responsibilities are allocated in the program Integrated Product Team structure in the Technical Organization section of the Systems Engineering Plan.
		<input type="checkbox"/> Include manufacturing metrics in the minimum set of technical performance measures that DoD requires in the Technical Performance Measures and Metrics section of the Systems Engineering Plan in order to provide quantitative insight into how the program is executing to plan.
		<input type="checkbox"/> Document how the program establishes government-contractor manufacturing management and quality management systems in the Design Considerations section of the Systems Engineering Plan.
		<input type="checkbox"/> Include specific manufacturing and quality contractual requirements in the Systems Engineering Plan's "Mapping Key Design Considerations into Contracts" matrix.
		<input type="checkbox"/> Programs placing industry or military manufacturing and quality management system standards on contract, per Attachment 3 , should list these standards by identification number in the matrix under the Contractual Requirements column. Programs not using these standards should attach a report, under the Documentation (Hotlinks) column, describing how the program has implemented a customized manufacturing and quality management system that is consistent with industry standards.
		<input type="checkbox"/> Indicate connections between manufacturing and quality management and other design considerations. For instance, manufacturing and quality management processes directly support the issuance of military certificates of airworthiness, which certify that each delivered aircraft complies with the system's approved design (see AFI 62-601, <i>USAF Airworthiness</i>). They support similar certification processes for space vehicles and launch vehicles, as well.
<input type="checkbox"/>	Integrated Master Plan	Based on the Acquisition Strategy and the System

	and Integrated Master Schedule	Engineering Plans, include key manufacturing activities in the Integrated Master Plan and Integrated Master Schedule.
<input type="checkbox"/>	Life-Cycle Sustainment Plan	Briefly describe how the program achieves manufacturing and quality management objectives during operations and sustainment.
		<input type="checkbox"/> Evaluate opportunities to utilize advanced manufacturing methods and technologies to improve sustainment efficiencies, reduce cost, and increase availability.
		<input type="checkbox"/> Identify whether the program requires contractor, DoD depot, and Air Force organic Quality Management System that comply with or that are consistent with one of the following: SAE International, AS9100, <i>Quality Management Systems - Requirements for Aviation, Space and Defense Organizations</i> ; SAE International, AS9110, <i>Quality Management Systems - Requirements for Aviation Maintenance Organizations</i> ; ISO 9001, <i>Quality Management Systems</i> ; or SMC-T-009, <i>Space and Launch Requirements Addendum to AS9100D Quality Management Systems</i> .
		<input type="checkbox"/> Describe how the program utilizes its deficiency reporting system, required to be established in accordance with AFI 63-101/20-101, to provide product quality feedback during operations and sustainment. Note: For efficiency and interoperability, the deficiency reporting system should conform to TO 00-35D-54 and, where possible, utilize the Joint Deficiency Reporting System.
<input type="checkbox"/>	Program Protection Plan	Describe how the program's quality assurance surveillance approach can support counterfeit parts prevention.

Attachment 3

MANUFACTURING AND QUALITY MANAGEMENT CONTRACT CONSIDERATIONS CHECKLIST

A3.1. Overview. In accordance with [paragraph 3.2.1](#), the Program Manager uses the checklist in [Table A3.1](#) to tailor manufacturing and quality management requirements and appropriately include them in contract documents. As alternatives to the recommendations outlined below, the Program Manager can include in the Systems Engineering Plan the program's equivalent approach for meeting these requirements or identify why the requirements do not apply to the program.

Table A3.1. Manufacturing and Quality Management Contract Considerations.

<input type="checkbox"/>	Manufacturing Management System	For programs with a manufacturing component, require contractors to have a manufacturing management system that promotes the timely development, production, modification, fielding, and sustainment of affordable products by managing manufacturing risk throughout the program life cycle. To meet this requirement, Acquisition Category I programs include SAE International, AS6500, <i>Manufacturing Management Program</i> , in contracts, with tailoring appropriate to the program's needs. SAE International, AS6500 is the preferred approach for programs in other Acquisition Categories. Note: Existing contracts at the time of publication of this instruction do not have to be changed to include AS6500.
<input type="checkbox"/>	Quality Management System	Require contractors to have a quality management system that is compliant with one of the following industry standards: SAE International, AS9100, ISO 9001, or SMC-T-009.
<input type="checkbox"/>	Manufacturing Readiness Assessments	Require contractor to support assessments of manufacturing readiness.
<input type="checkbox"/>	Metrics	Specify appropriate manufacturing and quality metrics to provide insight into program development, production and sustainment. Examples include defect rate, workmanship, organic damage, and incidents of nonconformance to technical data. In the contract, identify a methodology and required frequency for reporting metrics to the program office or other government representative.
		<input type="checkbox"/> Apply continuous process improvement methodologies to the establishment of contractor manufacturing and quality assurance goals, objectives, and measures throughout the lifecycle.
		<input type="checkbox"/> Review metrics, statistics, and other artifacts (for example audit results, trend data, deficiency reporting

		and resolution, scrap/rework/repair status and cost, sub-tier/supplier management, etc.) and revise metrics, data collection requirements, and other guidance to contractors, suppliers, and depots when possible to reflect lessons learned and improve quality throughout the life cycle.
<input type="checkbox"/>	Critical Safety Items	For aviation, space, and defense systems, require the identification and management of critical safety items in accordance with AFI 20-106 (InterService Publication), <i>Management of Aviation Critical Safety Items</i> . Consider applying industry standard SAE International, AS9017, <i>Control of Aviation Critical Safety Items</i> .
<input type="checkbox"/>	First Article Testing and Approval	If the contract contains requirements for First Article Testing or First Article Inspection in accordance with FAR, Subpart 9.3, <i>First Article Testing and Approval</i> , and AS6500, the Program Manager ensures that the requirements and test methods support the demonstration of product quality in accordance with program's quality management planning. When the Program Manager does not require First Article Testing or Inspection, the Program Manager should include a rationale in the Test and Evaluation Master Plan or Systems Engineering Plan.
<input type="checkbox"/>	Subtier/Supplier Management	Ensure the contract specifies which manufacturing and quality management requirements the prime contractor is required to impose on its subcontracts or supplier contracts