6. Detailed criteria to be addressed for each technical review and audit

6.1 General

This clause contains the detailed criteria to be addressed for each technical review and audit contained in Clause 5 of this standard.

6.2 Alternative systems review (ASR) detailed criteria

6.2.1 ASR technical review products acceptability criteria

Table 1 lists the products that should be reviewed at ASR, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful ASR. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 1—ASR technical review products acceptability criteria

Product	ASR acceptability criteria
Refined joint requirements	a) Joint context and initial CONOPS are updated to reflect current user position about capability gap(s), supported missions, interfacing/enabling systems in the operational environment; overall system of systems (SoS) context. b) Required related solutions and supporting references (ICD and draft CDD) are identified. c) Joint refined thresholds and objectives are initially stated as broad measures of effectiveness and suitability [e.g., measures of effectiveness (MOE), measures of suitability, and measures of performance (MOP)].
Initial architecture for the preferred materiel solution(s)	a) High-level description of the preferred materiel solution(s) is available and sufficiently detailed and understood to enable further technical analysis. b) SoS interfaces and external dependencies are adequately defined.
System functional and performance requirements documentation	a) The system requirements statements conform to the characteristics of well-formed requirements statements, enabling a clear understanding consistent with the ICD and draft CDD (if available). NOTE—ISO/IEC/IEEE 29148 contains a list of characteristics of well-formed requirements statements. b) System requirements are sufficiently understood to enable system functional definition. c) Draft system specification has sufficiently achievable requirements to allow for design trade space. d) Relationship between draft system specification and competitive prototyping objectives is established.

Product	ASR acceptability criteria
Preferred materiel solution(s) documentation	a) Completed AoA contains acceptable coverage of alternative solutions and adequate detail of analysis. b) Comprehensive rationale is available for the preferred materiel solution(s), including scoring results for the preferred system concept(s), based on the AoA. c) The draft CONOPS supports the details of the preferred system concept(s). d) Key assumptions and constraints associated with preferred materiel solution(s) are identified and support the conclusion that this solution can reasonably be expected to satisfy the ICD (or draft CDD if available) in terms of technical, operational, risk, and schedule/cost (affordability) criteria. e) Results of trade studies/technical demonstrations for concept risk reduction, if available. f) Initial producibility assessments of preferred system concept(s) indicate acceptable technology levels. g) System cost model has been updated, allocated to lower system element levels, and tracked against targets; production cost model is constructed. h) Initial hazard analysis/system safety analysis for preferred solution(s) is complete.
Program risk assessment	a) A comprehensive cost/schedule/technical risk assessment has been accomplished and mitigation plans are in development.

6.2.2 ASR preparation

Table 2 lists the actions that should be considered during preparation for the ASR. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 2—ASR technical review preparation actions

Responsible person	ASR preparation actions
Program manager	a) Approve, fund, and staff the ASR as planned by the systems engineer. b) Appoint an ASR chair no later than 45 days prior to the technical review, in coordination with the systems engineer. c) Ensure that a preliminary life-cycle cost estimate (LCCE) has been prepared and made available to all ASR participants 45 to 60 days prior to the technical review. d) Ensure the LCCE addresses hardware and software maintenance and support concepts.
Systems engineer	a) Ensure adequate plans are in place to complete the necessary technical activities for the ASR. b) Ensure results of all technical trade studies are captured in documents that are carried through to the next phase. c) Develop preferred materiel solution documentation. d) Ensure technical risk items are identified and analyzed, and appropriate mitigation plans are in place. This activity should include, for example, the identification of critical technologies and identification of key interfaces with supporting or enabling systems. e) Coordinate arrangements for ASR location and support. f) Ensure all of the technical review products whose acceptability criteria are defined in Table 1 are completed for the ASR. g) Ensure the preparation of all presentation material is coordinated across integrated product teams (IPT).
ASR chair	a) Determine ASR team membership. b) Approve the final ASR agenda. c) Identify any final Clause 6 ASR detailed criteria tailoring for the specific program. d) Identify any specific elements for in-depth review as required.

6.2.3 ASR conduct

Table 3 lists the technical review elements and associated content details that should be considered for the conduct of the ASR. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 3—ASR conduct elements

ASR technical review element	Content details
Introduction, agenda, administrative	a) Review location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) Purpose of the technical review e) ASR agenda f) Action item procedures g) Risk assessment procedures h) Program overview i) Status of action items from previous technical reviews
System specification review	a) Overview of requirements categories and structure of the specification b) Requirements traceability to the ICD and CDD if available c) Relationship of requirements to prototyping objectives
Preferred materiel solution(s) documentation review	a) Rationale for the selected solution(s) based on the AoA results b) Key assumptions and constraints related to the selected solution(s) c) Trade studies supporting the AoA
Risk and mitigation review	a) Current risk/opportunity assessment and associated risk mitigation/opportunity handling plans b) Mitigation plans and their phasing, focusing on TMRR phase
Program cost estimate review	a) CARD contents related to preferred material solution b) LCCE build up, including coverage for research, development, test, and evaluation, production, military construction, military personnel, and O&S funding

6.2.4 ASR closure

Table 4 lists the actions that should be considered for ASR closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included in accordance with the acquirer-supplier agreement to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 4—ASR closure actions

Responsible person	ASR closure actions
Program manager	a) Manage and approve changes to any baselined documentation as a result of the ASR b) If funding profiles are insufficient to support development, notify user/sponsor of funding shortfall and request funding profile adjustments c) Support preparation of the ASR summary report
Systems engineer	a) Organize and supervise the responses to all action items generated during ASR b) Support preparation of the ASR summary report c) Ensure technical documentation is updated if required as a result of ASR action items d) Ensure all information products required to be put under configuration control have been delivered to the configuration manager e) Monitor and control the execution of the ASR closure plans
ASR chair	a) Ensure preparation of the ASR summary report and formal ASR minutes with the support of the program manager and systems engineer b) Sign off final approval of all action items c) Approve the ASR minutes d) Approve and distribute the ASR summary report e) Prepare and distribute the formal ASR closure letter
Recorder	a) Collate all action items for submission to the ASR chair b) Prepare the ASR summary report and ASR minutes for signature and distribution by the ASR chair

6.3 System requirements review (SRR) detailed criteria

6.3.1 SRR technical review products acceptability criteria

Table 5 lists the products that should be reviewed at SRR, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful SRR. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 5—SRR technical review products acceptability criteria

Product	SRR acceptability criteria
System specification	a) Supplier clearly demonstrates an understanding of the system requirements consistent with the ICD and draft CDD. b) System requirements are sufficiently detailed and understood to enable system functional definition and functional decomposition. c) System requirements are assessed to be verifiable. d) Requirements can be met given the technology maturity. e) External interfaces to the system have been documented. f) System requirements have been synthesized into conceptual architectures. g) System conceptual architecture alternatives are developed and assessed in the context of engineering trade space, technical requirements, system specification, risks (technical, programmatic, schedule, cost), LCC and cost as an independent variable (CAIV). h) The preliminary system conceptual architectures support implementation of operational concepts, interoperability objectives, and system and external interface requirements. i) The preliminary system conceptual architectures identify the interfaces to the global information grid. j) System operational and life-cycle sustainment requirements are defined and documented. k) Critical human safety and health requirements are documented. l) Hazardous materials management and pollution prevention requirements are documented. m) System command, control, communication, computer, and intelligence (C4I) requirements are assessed and preliminary performance is allocated across segments and subsystems. n) System security engineering (SSE), communications security (COMSEC), cybersecurity, and program protection (PP) anti-tamper security requirements are documented for each preliminary system conceptual architecture in accordance with DoD directives. o) Preliminary cybersecurity requirements for both hardware and software are documented that address system data protection, availability, integrity, confidentiality, and authentication, and non-repudiation and are consistent with the National Institute of Standards and Technology (NIST) risk management framework certification and accreditation requirements. p) Cybersecurity requirements are mapped for each preliminary logical architecture. q) Threat scenario assessments are completed, threat environments, categories of expected threats and their likelihood of occurrence are defined and correlated with preliminary system logical architectures, survivability and vulnerability KPPs are established for each assessed threat and correlated with the preliminary logical architectures.

Product	SRR acceptability criteria
System specification *(continued)*	r) SoS technical interface requirements are adequately defined, including interdependences associated with schedule, test, and configuration changes. s) Preliminary interoperability analyses are completed, ensuring compatibility and defining interrelationships between other interfacing systems and system users. t) A preliminary interoperability logical architecture is defined within each system preliminary design concept, based on the system and external interfaces. u) Software requirements analysis has allocated high-level software functionality to the applicable portions of the preliminary system logical architecture. v) Preliminary data management software requirements are documented (e.g., automatic file migration and transparent file retrieval, migration between hierarchical levels, utilities to report on media usage, and error detection). w) Hardware and software human systems integration (HSI) requirements have been documented consistent with DoD standards and implementation guidance (e.g., MIL-STD-1472 [B9], DoD HCI Style Guide [B3]) mapped to the preliminary system logical architectures, and coordinated with applicable acquirer organizations. x) Environmental qualification requirements (vibration, thermal, humidity, transport, etc.) are documented and correlated with the preliminary system logical architectures. y) Electromagnetic interference (EMI) and electromagnetic compatibility (EMC) requirements are documented and correlated with the preliminary system logical architectures. z) Preliminary quality and product assurance requirements and their associated verification criteria have been documented. aa) Supportability requirements have been documented, are consistent with the preliminary system logical architectures, and are traceable to the draft or validated CDD, ICD, CONOPS, and maintenance/sustainment concept. bb) Supplier has adequately expanded the system specification to reflect tailored, derived, and correlated design requirements. cc) Performance requirements of major subsystems are documented for each candidate system logical architecture. dd) Critical design and manufacturing requirements are documented, including requirements addressing COTS and diminishing manufacturing sources (DMS). ee) Preliminary reliability and maintainability (R&M) requirements are documented and subsystem allocations support the system specification requirements. ff) Preliminary parts, materials and processes (PM&P) requirements have been documented. gg) Bi-directional requirements traceability between the draft or validated CDD and the system specification has been documented. hh) Requirements allocations and associated rationale from the source documents to the system specification have been documented. ii) System specification is approved, including stakeholder concurrence, with sufficiently conservative requirements to allow for design trade space.

Product	SRR acceptability criteria
Technical plans	a) Supplier's SEMP is complete, adequate and aligned with the program SEP. b) Cost and critical path drivers have been identified. c) The program schedule is executable with an acceptable level of technical and cost risk. d) Adequate processes and metrics are in place for the program to succeed. e) Systems engineering is properly staffed. f) Program is executable within the existing budget. g) The SDP documents the preliminary identification of all software components (tactical, support, deliverable, non-deliverable, etc.) h) Software functionality in the system specification is consistent with the software sizing estimates and the resource-loaded schedule. i) Plans for developing critical algorithms to meet requirements are adequate and incorporated into budget and IMS. j) Programming languages and logical architectures, security requirements, and operational and support concepts have been identified. k) Hazards have been reviewed and mitigating courses of action have been allocated within the overall system design. l) Mission critical failure modes are identified and agreement has been reached for plans for mitigation or acceptance. m) Critical technologies have been identified, readiness assessed, and maturation plans developed. n) Software development strategy is complete and adequate. o) Draft verification methodologies and environments have been adequately defined for each specification requirement and are included in the requirements traceability. p) Overall DT&E approaches are defined for each system architectural concept. q) Development, qualification, and acceptance testing approaches are defined, including consideration for non-developmental items (NDI), COTS, and reuse items. r) The system safety program addresses critical human safety and health requirements. s) Preliminary verification methodologies for data gathering, reduction, and analysis are defined, including test environments, operations, data acquisition requirements, documentation, methods of analysis, and success criteria. t) Parts engineering design strategies and associated qualification/acceptance testing approaches are developed as they apply to the preliminary system architectural concepts, including risk assessments, technologies, sources of supply, and the common quality levels (i.e., reliability) of the parts. u) Review of budget margins and error allocations represent adequate understanding of requirements and any risks have plans and are managed. v) Initial plans for design address requirements that will drive stressing design solutions and associated specialized manufacturing requirements (extreme complexity, multiple or very tight tolerances, precision assembly, handling of fragile components, etc.) w) Initial plans for design include preliminary data storage logical architecture(s) consistent with computer resource growth margin requirements.

Product	SRR acceptability criteria
Technical plans *(continued)*	x) Certifying agencies have been identified and certification requirements are understood. y) Draft test plans have been developed in support of the TMRR phase. z) Acquirer and supplier CM strategies are complete and adequate. aa) The modeling and simulation (M&S) plan for life-cycle support, including LCC, total ownership costs (TOC), reliability, maintainability, availability, design models, training devices, system tactics, representation, and mission, etc. is complete, utilizes correctly translated system attributes to reflect operational performance, and is adequate to support system design, manufacturing, training, operation, and disposal. bb) The manufacturing and production strategy is complete and adequate. cc) IMS adequately identifies the critical path and is resourced at reasonable levels, based on realistic performance/efficiency expectations. dd) IMS includes early milestones for SSE, cybersecurity, COMSEC, and PP certification and accreditation timelines. ee) Unique work requirements for competitive prototyping have been identified. ff) Product support plan and sustainment concepts have been defined with the corresponding metrics. gg) R&M planning is complete and adequate.
Program risk assessment	a) Cost, schedule, and technical risks are identified, and mitigation plans are in place. b) Risk management plan is complete and adequate. c) Risk management process is in place demonstrated by documented execution results of existing mitigation plans.
Program life-cycle cost estimate	a) Preliminary CARD is consistent with the approved system specification. b) Preliminary software development estimates established with effort, schedule, and cost analysis. c) Updated cost estimate fits within the existing budget.

6.3.2 SRR preparation

Table 6 lists the actions that should be considered during preparation for the SRR. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 6—SRR technical review preparation actions

Responsible person	SRR preparation actions
Program manager	a) Approve, fund, and staff the SRR as planned in the SEP developed by the systems engineer. b) Manage and approve changes to the system specification. c) Establish the plan to SFR in applicable contract documents including the SEP, IMS, and IMP. d) Ensure the SEP includes objective SMEs to participate in the SRR. e) Coordinate a preliminary agenda between the program IPT and other acquirer SMEs no later than 30 days prior to the SRR. f) Appoint an SRR chair no later than 45 days prior to the technical review, in coordination with the systems engineer.
Systems engineer	a) Ensure all performance requirements, both explicit and derived, are defined and traceable (both directions) between requirements in the draft CDD including KPPs, KSAs, other system attributes, and the system specification. b) Ensure verification methods are identified for all system requirements. c) Ensure risk items associated with system requirements are identified and analyzed, and mitigation plans are in place. d) Coordinate arrangements for SRR location and support. e) Ensure all of the technical review products whose acceptability criteria are defined in Table 5 are completed for the SRR. f) Ensure the preparation of all presentation material is coordinated across IPTs. g) Ensure adequate plans are in place to complete the technical activities to proceed from SRR to the SFR. h) Ensure plans to proceed to SFR allow for contingencies.
SRR chair	a) Determine SRR team membership. b) Approve the final SRR agenda. c) Identify any final Clause 6 SRR detailed criteria tailoring for the specific program. d) Identify any specific elements for in-depth technical review as required.

6.3.3 SRR conduct

Table 7 lists the technical review elements and associated content details that should be considered for the conduct of the SRR. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 7—SRR conduct elements

SRR review element	Content details
Introduction, agenda, administrative	a) Review location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) SRR agenda e) Action item procedures f) Program overview g) Status of action items from previous technical reviews
Requirements review	a) Specification tree and overall layout of system specification b) Requirements traceability, methodology, and completeness c) KPPs, MOPs, and MOEs d) Verification and certification requirements e) Interoperability f) Software g) Hardware h) System safety requirements i) Logistics and personnel requirements j) Resources requirements to support development
Technical plans review	a) SEMP—structure and details b) IMP and IMS c) M&S plan d) Software development strategy e) Technology maturation and management plan f) Specialty engineering plans g) Hazard mitigation plan if applicable h) Government and supplier CM plans i) Manufacturing and production strategy j) Product support plan and sustainment strategy
Risk and mitigation review	a) Risk management plan focusing on TMRR phase b) Risk identification, including system security threats, cyber vulnerabilities, cyber risks, operational risks, hazard and system safety analysis, environment, safety, and occupational health (ESOH), and supplier's ability to meet specification requirements c) Completed preliminary industrial base assessment identifying and prioritizing risk areas against assessment results
Program life-cycle cost estimate review	a) Preliminary CARD consistency with the approved system specification b) Preliminary software development estimates

6.3.4 SRR closure

Table 8 lists the actions that should be considered for SRR closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 8—SRR closure actions

Responsible person	SRR closure actions
Program manager	a) Manage and approve changes to technical baselines resulting from SRR. b) If funding profiles are insufficient to support development, notify user/sponsor of funding shortfall and request funding profile adjustments. c) Support preparation of the SRR summary report.
Systems engineer	a) Organize and supervise the responses to all action items generated during SRR. b) Support preparation of the SRR summary report. c) Obtain concurrence between acquirer and supplier SMEs on requirements decomposition. d) Ensure all information products required to be put under configuration control have been delivered to the configuration manager. e) Ensure all IMP and IMS tasks associated with conduct of the SRR have been successfully completed and documented as such.
SRR chair	a) Ensure preparation of the SRR summary report and formal SRR minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the SRR minutes. d) Approve and distribute the SRR summary report. e) Prepare and distribute the formal SRR closure letter.
Recorder	a) Collate all action items for submission to the SRR chair. b) Prepare the SRR summary report and SRR minutes for signature and distribution by the SRR chair.

6.4 System functional review (SFR) detailed criteria

6.4.1 SFR technical review products acceptability criteria

Table 9 lists the products that should be reviewed at SFR, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful SFR. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 9—SFR technical review products acceptability criteria

Product	SFR acceptability criteria
System functional baseline documentation	a) Documentation is clear and unambiguous, enabling a clear understanding for assessment of achievability within cost and schedule constraints. b) Established functional baseline by mapping requirements to hardware, software, and human elements of the system. c) Documented performance requirements traced to draft or validated CDD requirements and reflecting clear linkage to the SoS context(s) (including use in multiple operational environments). d) Documented performance requirements reflect design considerations. e) Documented verification requirements, including testing, for FCA/SVR f) R&M requirements trace correctly to system functional design elements, which are supported by maintainer use case analysis. g) Bi-directional traceability between the system specification and the source documents has been documented.
Major system elements definition	a) Documented preliminary allocated requirements optimized through analyses (including functional analysis and sensitivity analysis), trade studies, and risk assessments. b) Documented element external interfaces.
Program risk assessment	a) Cost, schedule, and technical risks are identified, and mitigation plans are in place. b) Risk management process is in place demonstrated by documented execution results of existing mitigation plans.
Technical plans	a) Supplier's SEMP is complete, adequate and aligned with the program SEP. b) A detailed plan and schedule, sufficiently resourced to continue design and development, is established. c) Program life-cycle cost estimate is consistent with defined system functionality.

6.4.2 SFR preparation

Table 10 lists the actions that should be considered during preparation for the SFR. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 10—SFR technical review preparation actions

Responsible person	SFR preparation actions
Program manager	a) Approve, fund, and staff the SFR as planned in the SEP developed by the systems engineer. b) Chair the configuration control board (CCB) and manage and approve changes to the system specification. c) Establish the plan to PDR in applicable contract documents including the SEMP, IMS, and IMP. d) Ensure the SEP includes objective SMEs to participate in the SFR. e) Coordinate a preliminary agenda between the program IPT and other acquirer SMEs no later than 30 days prior to the SFR. f) Control the configuration of the government-controlled subset of the system functional baseline. g) Appoint an SFR chair no later than 45 days prior to the technical review, in coordination with the systems engineer.
Systems engineer	a) Ensure adequate plans are in place to complete the technical activities to proceed from SFR to PDR. b) Ensure plans to proceed to PDR allow for contingencies. c) Ensure all performance requirements, both explicit and derived, are defined and traceable (both directions) between requirements in the draft CDD including KPPs, KSAs, other system attributes, and the system specification. d) Ensure verification methods are identified for all requirements. e) Ensure risk items associated with the functional requirements are identified and analyzed, and mitigation plans are in place. f) Coordinate arrangements for SFR location and support. g) Ensure all of the technical review products whose acceptability criteria are defined in Table 9 are completed for the SFR. h) Ensure the preparation of all presentation material is coordinated across IPTs.
SFR chair	a) Determine SFR team membership. b) Approve the final SFR agenda. c) Identify any final Clause 6 SFR detailed criteria tailoring for the specific program. d) Identify any specific elements for in-depth technical review as required.

6.4.3 SFR conduct

Table 11 lists the technical review elements and associated content details that should be considered for the conduct of the SFR. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 11—SFR conduct elements

SFR review element	Content details
Introduction, agenda, administrative	a) Review location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) SFR agenda e) Action item procedures f) Status of action items from previous technical reviews g) Overview of system functional decomposition, allocated baseline elements, and preliminary physical architecture
System functional baseline documentation review	a) System logical architecture development b) System, segment and subsystem design, and functional requirements allocations c) M&S methodology and results mapped to derived requirements and allocations d) Results of trade studies and their integration into the system design baseline e) Interoperability requirements integration into the system design baseline f) Software logical architecture and interfaces g) System, segment and subsystem verification and validation (V&V) strategy and verification cross-reference matrix (VCRM) contents h) DT&E and OT&E requirements, test criteria and execution strategy
Major system elements definition review	a) Details of the allocated baseline elements and bi-directional traceability to requirements sources b) Element interfaces c) Software logical architecture and interfaces d) KPP and technical performance measure (TPM) mapping to system design elements e) Use cases analysis and threat scenario alignment with requirements allocations to system design elements f) Environmental requirements correlation to system design elements g) R&M requirements correlation to system design elements h) System operational sustainment strategy i) Engineering disciplines and specialties coverage of system design elements, to include the following: 1) Parts, materials, and processes 2) Test and evaluation 3) Survivability and vulnerability 4) ESOH 5) Mass properties 6) System security engineering, cybersecurity, COMSEC, and program protection 7) Interoperability

SFR review element	Content details
Major system elements definition review *(continued)*	8) R&M 9) EMI and EMC 10) Human systems integration 11) Manufacturing and producibility 12) Life-cycle logistics 13) System safety 14) Contamination control 15) Quality assurance 16) Data storage (security, access, distribution, and delivery) j) Manufacturing and production strategy k) Product support plan and sustainment strategy
Risk assessment review	a) Mitigation plans and their phasing focusing on TMRR phase elements and associated risk of proceeding into design
Technical plans review	a) Updates and details as applicable for plans including: 1) SEMP 2) Modeling and simulation plan 3) Software development plan 4) Hazard mitigation plan 5) Draft system test plan(s) 6) Product support plan 7) Integration plan

6.4.4 SFR closure

Table 12 lists the actions that should be considered for SFR closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 12—SFR closure actions

Responsible person	SFR closure actions
Program manager	a) Manage and approve changes to technical baselines resulting from SFR. b) If funding profiles are insufficient to support development, notify user/sponsor of funding shortfall and request funding profile adjustments. c) Support preparation of the SFR summary report.
Systems engineer	a) Organize and supervise the responses to all action items generated during SFR. b) Support preparation of the SFR summary report. c) Obtain concurrence between acquirer and supplier SMEs on requirements allocations, functional decomposition, and preliminary system design elements. d) Ensure all information products required to be put under configuration control have been delivered to the configuration manager. e) Ensure all IMP and IMS tasks associated with conduct of the SFR have been successfully completed and documented as such.
SFR chair	a) Ensure preparation of the SFR summary report and formal SFR minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the SFR minutes. d) Approve and distribute the SFR summary report. e) Prepare and distribute the formal SFR closure letter.
Recorder	a) Collate all action items for submission to the SFR chair. b) Prepare the SFR summary report and SFR minutes for signature and distribution by the SFR chair.

6.5 Preliminary design review (PDR) detailed criteria

6.5.1 PDR technical review products acceptability criteria

Table 13 lists the products that should be reviewed at PDR, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful PDR. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 13—PDR technical review products acceptability criteria

Product	PDR acceptability criteria
System allocated baseline documentation	a) Analysis of system performance is complete and is assessed to meet requirements traceable to the validated CDD. b) Trade studies related to the design of the system and its lowest level specified CIs are complete and documented, including the rationale for selection of the preferred alternative. c) Interoperability functional performance requirements are allocated to all system, segment and subsystem preliminary designs. d) Preliminary design satisfies design considerations and demonstrates consistency with a standard implementation framework such as department of defense architecture framework (DoDAF) 2.0 or equivalent. e) System operational functions and environments for the preliminary design are traceable to the supplier's CONOPS and the allocated baseline. f) Preliminary system-level design is producible and assessed to be within the production budget. g) Preliminary long lead production requirements are developed and documented. h) PM&P allocated requirements are incorporated into the preliminary design. i) Mass properties margins (average or complex) are established for PDR and correlated with the preliminary design, including allowable growth allocations and metrics. j) SSE, COMSEC, cybersecurity, and PP security requirements are allocated and incorporated into the preliminary design in accordance with DoD policies, directives, and system specifications. k) EMI control processes and procedures are developed for the preliminary design, and EMI/EMC allocated requirements are incorporated into the preliminary design. l) User interface hardware and software allocated requirements for operators, users, maintainers, and sustainers are incorporated into the preliminary design. m) Contamination control processes and procedures are developed for the preliminary design. n) Hazardous materials management and pollution prevention allocate requirements are incorporated into the preliminary design. o) Data storage analysis identifies reliability, maintainability, and availability requirements for storage systems environments. p) The preliminary data storage physical architecture fully addresses elements, including communications and processing capacity. q) The data storage logical architecture defines a complete list of data receivers to include both computer and human agents. r) The level of user integrity (e.g., access control lists) has been

Product	PDR acceptability criteria
System allocated baseline documentation *(continued)*	identified that enables the system requirements to be met. s) DT&E elements are correlated with the preliminary design. t) OT&E allocated requirements are incorporated into the preliminary design. u) Assessment of the technical effort and design indicates potential for OT&E success (operationally effective and suitable). v) The preliminary design incorporates all survivability, vulnerability, and threat allocated requirements for all categories of expected threats, threat environments and their likelihood of occurrence. w) A draft critical technologies list is documented. x) All CSIs and CAIs are identified. y) System safety allocated requirements are incorporated into the preliminary design. z) Preliminary hazard analyses are completed and a prioritized list of safety hazards is documented. aa) ESOH allocated requirements are incorporated into the preliminary design. bb) Functional failure modes, effects, and criticality analysis (FMECA) is completed. cc) R&M allocated requirements are supported by the preliminary design. dd) Program's reliability growth planning strategy and growth curve supports key program milestones needed to meet the CDD threshold at initial operational test and evaluation (IOT&E), and is adequate to grow to the specification value, considering the test schedule and resources. ee) Results from the R&M analyses are used in O&S cost estimates, availability analyses, provisioning plans (spares and repair parts), and maintenance concept. ff) Environmental qualification requirements are incorporated into the design and are addressed in the requirements traceability documentation. gg) Estimate of system reliability and maintainability is updated, based on engineering analyses, initial test results, or other sources of demonstrated reliability and maintainability. hh) Quality and product assurance allocated requirements are incorporated into the preliminary design. ii) Appropriate margins are established at the segment, subsystem, and component levels as applicable. jj) Requirements allocation and derivation from system to segment, subsystem and component levels are complete, traceable to the preliminary design and all "to be determined" (TBD) items are being tracked to resolution. kk) Interface definitions at the inter-segment and inter-subsystem levels are complete, documented, and traceable to the preliminary design and all TBDs are being tracked to resolution. ll) Preliminary ground support equipment designs if applicable are traceable to the system allocated baseline and to the preliminary design. mm) Supportability allocated requirements are incorporated into the preliminary design. nn) Key allocated performance requirements are traceable to the system's preliminary design at the segment, subsystem, and component levels as applicable. oo) Key allocated performance requirement parameters developed and assessed at SFR are implemented in each major subsystem and

Product	PDR acceptability criteria
System allocated baseline documentation *(continued)*	component preliminary design. pp) All deficiencies identified as a result of any testing performed to date, including those related to technology deficiencies identified at SFR, have been correlated with the applicable portions of the preliminary design, impacts have been assessed, and candidate design changes to correct the deficiencies have been identified. qq) The documented results of any prototyping done to date provide evidence that the technical approach is adequate and the risk levels for the corresponding design approach are acceptable. rr) Prototypes implemented to date correctly implement the corresponding portions of the functional baseline and are consistent with the preliminary physical architecture. ss) The physical and functional interfaces of each prototype implemented to date satisfy the corresponding allocated requirements, and validate the sufficiency of the applicable external interface requirements levied on the system for its interaction with facilities and personnel. tt) Computer system and software logical architecture designs have been established; all computer SWCIs, HWCIs, computer software components (CSCs), and computer software units (CSUs) have been defined. uu) The preliminary design is consistent with the end-to-end processing capabilities and capacities needed for mission operations as indicated by the system performance analysis results. vv) Preliminary growth margin requirements are documented for computer resources (memory and storage capacity, processor throughput, communications bandwidth, etc.) ww) Software requirements specifications (SRS) and interface requirement specifications (IRS), including verification plans, are complete and baselined for all SWCIs for the planned builds up to this point, and satisfy the system functional requirements. xx) Software functionality in the preliminary design is consistent with resources expended per the IMS and the software metrics. yy) Interface control documents trace all software interface requirements to the SWCIs and CSUs. zz) Preliminary software design has been defined and captured for the builds up to this point. aaa) System end-to-end data flow is complete and documented in the preliminary design. bbb) All required software-related documents are baselined and delivered for the builds up to this point. ccc) System allocated baseline documentation is sufficiently complete and correct to enable detailed design to proceed with proper CM.
System functional or allocated baseline documentation	a) Preliminary design (hardware, software, human procedures), including interface descriptions is complete, satisfies all requirements in the system functional baseline and is under CM without any major TBDs or open items. b) System, segment, subsystem, and component-level interfaces are baselined and are under configuration control. c) C4I allocations are incorporated into the preliminary design across segments, subsystems, and components.

Product	PDR acceptability criteria
System functional or allocated baseline documentation *(continued)*	d) The threat scenario operational and environmental allocations are incorporated into the preliminary design and are traceable to all segments, subsystems, and components. e) Test requirements and test data collected to date for the preliminary design are traceable to operational requirements via specifications and VCRMs. f) Bi-directional requirements traceability among functional and allocated baselines and the preliminary design is complete, consistent, and has been approved by all applicable stakeholders.
Technical plans	a) Supplier's SEMP is complete, adequate and aligned with the program SEP. b) Integrating activities of any lower-level PDRs have occurred; identified issues are documented in action plans. c) Plan to CDR is accurately documented in the SEP and SEMP, as well as in the IMP and IMS. d) Program is properly staffed by both the acquirer and supplier. e) Technical performance measures have been identified to track technical progression of design maturity concern areas. f) Plans documenting the system, segment, subsystem, and component V&V approaches are developed for the preliminary design. g) Preliminary V&V plans are traceable to the preliminary design correlating all test objectives, test environments and test resources with allocated requirements. h) Preliminary V&V plans address data acquisition, reduction, analysis and documentation, and success criteria. i) Hazardous materials management and pollution prevention processes and procedures are verified and baselined. j) Test bed(s) and test facilities chosen based on the preliminary design are deemed adequate to perform system, segment, subsystem, and interface requirements verification (e.g., for critical HWCIs and SWCIs, arrangements for procuring and scheduling the use of V&V resources—simulators, test beds, test facilities—have been demonstrated). k) Design development planning is completed and baselined. l) Program schedule, as depicted in the updated IMS is executable within acceptable technical and cost risks. m) Program is executable with the existing budget. n) Trade studies and system producibility assessments are under way. o) All critical manufacturing processes have been defined, characterized, and documented. p) Failure reporting and corrective action system (FRACAS) is established. q) Logistics (sustainment) and training systems planning and documentation are sufficiently complete to support the technical review. r) LCSP is approved, including updates on program sustainment development efforts and schedules based on current budgets and firm supportability design features. s) LCSP includes software support requirements. t) LCSP addresses DMS, PM&P guidelines, and counterfeit parts risk management. u) Long-lead and key supply chain elements are identified, to include strategic materials risk.

Product	PDR acceptability criteria
Technical plans *(continued)*	v) Software plans have sufficient content to demonstrate that 1) Computer systems and software design and development approach have been confirmed through analyses, demonstrations, and prototyping in a relevant environment. 2) Software increments have been defined and capabilities allocated to specific increments. 3) Software trade studies addressing COTS, reuse, and other software-related issues are completed. 4) Software development process is defined in a baselined software development plan and reflected in the IMP and IMS. 5) Software development schedules reflect supplier software processes and IMP/IMS software events for current and future development phases. 6) Software development environment and test/integration labs have been established with sufficient fidelity and capacity. 7) Software metrics have been defined and a reporting process has been implemented; metrics are being actively tracked and assessed. 8) Testability requirements—built-in test (BIT), false alarm rate, fault isolation, fault detection—have been identified and the required software support documented as requirements so that they can be tested in the proposed design. 9) TEMP addresses all SWCI plans, test facilities, and test plans, including testing required to support incremental approaches and regression tests. 10) Software development estimates [i.e., size, effort (cost), and schedule] are updated. w) Hardware plans have sufficient content to demonstrate that 1) The hardware design/development approach has been confirmed through analyses, demonstrations, and prototyping in a relevant environment. 2) Hardware trade studies addressing COTS, reuse, and other software-related issues are completed. 3) The major phases of the program's hardware design and development process are defined in a hardware development plan and reflected in the IMP and IMS. 4) Hardware development schedules reflect supplier hardware processes and IMP/IMS hardware design and development events. 5) Hardware development environment (e.g., computer modeling and design tools) and test/integration labs have been established with sufficient fidelity and capacity. 6) Hardware metrics have been defined and a reporting process has been implemented; metrics are being actively tracked and assessed. 7) R&M and testability requirements—BIT, false alarm rate, fault isolation, fault detection—have been identified and the required hardware support documented as requirements so that they can be tested in the proposed design. Also, requirements for detailed design have been identified such as thermal, vibration, shock environments, and highly accelerated life testing (HALT). 8) TEMP addresses all HWCI plans, test facilities, and test

Product	PDR acceptability criteria
Technical plans *(continued)*	plans, including testing required to support incremental approaches and regression tests. 9) Hardware development estimates [i.e., number of HWCIs, effort (cost) and schedule] are updated.
Problem risk assessment	a) Cost, schedule, and technical risks are identified, and mitigation plans are in place. b) Risk management process is in place demonstrated by documented execution results of existing mitigation plans.
Program life-cycle cost estimate	a) System cost model has been updated, allocated to lower system element levels, and tracked against targets; production cost model constructed. b) Updated CARD is consistent with the proposed allocated baseline.

6.5.2 PDR preparation

Table 14 lists the actions that should be considered during preparation for the PDR. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 14—PDR technical review preparation actions

Responsible person	PDR preparation actions
Program manager	a) Approve, fund, and staff the system PDR as planned in the SEP developed by the systems engineer. b) Manage and approve changes to the segment, subsystem and system element development specifications well enough in advance to allow successful execution of the PDR delivery of an acceptable allocated baseline at the PDR. c) Establish the plan to CDR in applicable contract documents including the SEMP, IMS, and IMP. d) Ensure the SEP includes objective SMEs to participate in the PDR. e) Appoint a PDR chair, in coordination with the systems engineer, no later than 45 days prior to the technical review. f) Coordinate a preliminary agenda between the program IPT and other acquirer SMEs no later than 30 days prior to the PDR.
Systems engineer	a) Ensure that the pre-established PDR criteria have been met, including measurement status of the program's technical metrics that demonstrate acceptable progress and developmental maturity of the system design to achieve a successful PDR. b) Ensure the system allocated baseline and physical architecture are complete and consistent. c) Ensure the set of system elements comprising the preliminary system design can achieve the complete set of system allocated baseline requirements. d) Ensure assessments and risks associated with all design constraints are conducted, documented and provided in the technical review material. e) Ensure verification methods are defined for all decomposed and allocated requirements. f) Ensure risk items associated with allocated requirements are identified and analyzed, and mitigation plans are in place. g) Provide supplier organization(s) the opportunity to participate in the PDR planning. h) Coordinate arrangements for PDR location and support. i) Ensure all of the technical review products whose acceptability criteria are defined in Table 13 are completed for the PDR. j) Ensure the preparation of all presentation material is coordinated across IPTs. k) Ensure adequate plans are in place to complete the technical activities to proceed from PDR to the CDR. l) Ensure plans to proceed to CDR allow for contingencies.
PDR chair	a) Determine PDR team membership. b) Approve the final PDR agenda. c) Identify any final Clause 6 PDR detailed criteria tailoring for the specific program. d) Identify any specific elements for in-depth technical review as required.

6.5.3 PDR conduct

Table 15 lists the technical review elements and associated content details that should be considered for the conduct of the PDR. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 15—PDR conduct elements

PDR review element	Content details
Introduction, agenda, administrative	a) Review location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) Purpose of the review e) PDR agenda f) Action item procedures g) Risk assessment procedures h) Program overview i) Status of action items from previous technical reviews
Allocated baseline and comparison with functional baseline	a) Updated specification tree to the system element level and description of requirements allocation process including technical budgets b) Requirements traceability, methodology and completeness to the system element level c) System physical architecture and design, correspondence of elements (hardware, software, manual procedures) to the specification tree and allocated requirements d) Trade studies, FMECA, and other studies and analyses e) System internal and external interfaces f) Updates to KPPs, MOPs, and MOEs g) Established metrics and measures h) Verification and certification requirements as allocated to system elements i) Preliminary design's support for interoperability j) Software logical architecture and development status k) Preliminary software design for the increments up to this point l) Test and certification requirements and initial test planning m) Logistics and personnel requirements n) Training requirements o) Resources requirements to support development
Technical plans review	a) IMP and IMS b) M&S support to PDR and subsequent M&S plans for CDR, TRR, etc. c) Software development plan maturity d) Software development environment and test and integration labs e) Manufacturing plan and processes f) Specialty engineering plans g) Hazard mitigation plan if applicable h) Government and supplier configuration CM plans i) Certification and accreditation plans j) Updates to product support plan and sustainment strategy k) Updates to LCSP including software support requirements and supportability features in the preliminary system design

PDR review element	Content details
Risk and mitigation review	a) Risk identification and mitigation, including: 1) Consideration of V&V resource requirements in support of the preliminary design 2) Consideration of producibility assessments of key technologies to support manufacturing 3) Consideration of test resources and availability 4) Consideration of ESOH 5) Consideration of ongoing industrial base assessment (diminishing manufacturing sources and material shortages, obsolete parts, etc.) 6) Consideration of unique software risks
Program life-cycle cost estimate review	a) Updates to the CARD to align it with the allocated baseline b) Updated software development estimates from detailed system-element level inputs c) Earned value baseline

6.5.4 PDR closure

Table 16 lists the actions that should be considered for PDR closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 16—PDR closure actions

Responsible person	PDR closure actions
Program manager	a) Manage and approve changes to technical baselines resulting from PDR. b) If funding profiles are insufficient to support development, notify user/sponsor of funding shortfall and request funding profile adjustments. c) Support preparation of the PDR summary report.
Systems engineer	a) Determine the root cause of problems, identify corrective actions, and manage to completion. b) Monitor and control the execution of the PDR closure plans. c) Organize and supervise the responses to all action items generated during PDR. d) Support preparation of the PDR summary report. e) Ensure all information products required to be put under configuration control have been delivered to the configuration manager. f) Ensure all IMP and IMS tasks associated with conduct of the PDR have been successfully completed and documented as such.
PDR chair	a) Ensure preparation of the PDR summary report and formal PDR minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the PDR minutes. d) Approve and distribute the PDR summary report. e) Prepare and distribute the formal PDR closure letter.
Recorder	a) Collate all action items for submission to the PDR chair. b) Prepare the PDR summary report and PDR minutes for signature and distribution by the PDR chair.

6.6 Critical design review (CDR) detailed criteria

6.6.1 CDR technical review products acceptability criteria

Table 17 lists the products that should be reviewed at CDR, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful CDR. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 17—CDR technical review products acceptability criteria

Product	CDR acceptability criteria
System product baseline documentation	a) Key product characteristics whose variation has a significant influence on product fit, performance, service life, or manufacturability have been identified to support production decisions. b) Initial product baseline documentation is sufficiently complete and correct to enable hardware fabrication and software implementation to proceed with proper CM and within the production budget. c) Trade studies related to the design of the system and its lowest level specified CIs are complete and documented, including the rationale for selection of the preferred alternative. d) Detailed design demonstrates bi-directional traceability among all considerations: allocated and physical requirements, engineering trade study results, technology selections and technical, programmatic, schedule and cost risks. e) Bi-directional traceability has been documented between the CDD, the CPD and the system design specifications. f) Detailed design captures the survivability and vulnerability threat allocations incorporated into the preliminary design for all categories of expected threats, threat environments and their likelihood of occurrence. g) All COTS items have been assessed and found to satisfy the requirements allocated to them and that they introduce no unexpected system attributes or behavior. h) R&M and testability analyses are complete and results demonstrate that the detailed design supports all R&M and testability requirements. i) Every requirement in the allocated baseline has a documented verification method and associated success criteria that are consistent with the verification cross-reference documentation. j) Interoperability functional performance requirements are allocated to all system CI detailed designs. k) Detailed design satisfies all design considerations and demonstrates consistency with a standard implementation framework such as DoDAF 2.0 or equivalent. l) Detailed design satisfies sustainment and HSI requirements. m) The detailed design incorporates all allocated ESOH requirements. n) The detailed design incorporates all allocated quality assurance requirements. o) 100% of CSIs and CAIs have completed drawings, specifications and instructions. p) Initial product baseline includes documented and approved detailed interface designs for all external devices required to interconnect with the system for its operation, support, maintenance and disposal. q) System operational functions and environments for the detailed design are

Product	CDR acceptability criteria
System product baseline documentation *(continued)*	traceable to the supplier's CONOPS and the allocated baseline. r) All development and off-the-shelf specifications are complete and validated by production, verification and operations organizations, and by specialty engineering groups. s) The detailed design is producible and assessed to be within the production budget. t) Long lead production requirements are defined and documented. u) The initial product baseline contains design alternatives for all strategic materials and component suppliers. v) Critical technologies list is updated and alternate sources for critical technologies are documented. w) System safety allocated requirements are incorporated into the detailed design. x) All hazard analyses are completed, and the detailed design incorporates all requirements derived from the prioritized list of safety hazards. y) PM&P allocated requirements are incorporated into the detailed design. z) Program's reliability growth planning curve supports key program milestones needed to meet the CDD threshold at IOT&E. Changes, if any, to the reliability growth strategy from the previous curve at PDR are addressed, and the curve is adequate to grow to the specification value, considering the test schedule and resources. aa) Results from the R&M analyses are used in O&S cost estimates, availability analyses, provisioning plans (spares and repair parts), and maintenance concept. bb) A level of repair analysis has been completed and the results documented. cc) The product baseline prescribes all necessary form, fit, and function characteristics and selected functional characteristics designated for production test requirements and production acceptance testing. dd) Mass properties margins (average or complex) are established for CDR and correlated with the detailed design, including allowable growth allocations and metrics. ee) SSE, COMSEC, cybersecurity, and PP security requirements are implemented into the detailed design in accordance with DoD policies, directives, and system specifications. ff) EMI control processes and procedures including EMI susceptibility are reflected in the detailed design. gg) User interface hardware and software allocated requirements for operators, users, maintainers, sustainers, and disposers are incorporated into the detailed design. hh) Contamination control processes and procedures are incorporated into the detailed design in order to meet production, mission operations, maintenance, and disposal requirements. ii) Growth margin requirements are documented for computer resources (memory and storage capacity, processor throughput, communications bandwidth, etc.) jj) Data storage reliability, maintainability, and availability requirements for storage systems environments are incorporated into the detailed design. kk) The data storage system design fully addresses communications and processing capacity. ll) The data storage system design defines a complete list of data receivers to include both computer and human agents. mm) The level of information security (e.g., user access control lists, data

Product	CDR acceptability criteria
System product baseline documentation *(continued)*	control, data protection, awareness of data state) incorporated into the detailed design satisfies the allocated system requirements. nn) DT&E assessment to date is consistent with the product baseline and indicates the potential for test and evaluation success. oo) OT&E allocated requirements are incorporated into the detailed design. pp) Assessment of the technical effort and detailed design indicates potential for OT&E success (operationally effective and suitable). qq) Detailed design documentation for all CSIs and CAIs is complete. rr) Detailed FMECA is completed. ss) Thermal, vibration, and shock environments; and HALT requirements are supported by the detailed design. tt) Results of critical design analyses used to develop final critical parts and long lead items are complete and address technologies, sources of supply, and reliability. uu) The detailed design incorporates all environmental parameters impacting parts performance. vv) R&M allocated requirements are supported by the detailed design. ww) Estimate of system reliability and maintainability is updated, based on engineering analyses, initial test results, or other sources of demonstrated reliability and maintainability. xx) Software functionality in the approved initial product baseline is consistent with the updated software metrics and resource-loaded schedule.
System functional or allocated or product baseline documentation	a) Detailed design (hardware, software, human procedures), including interface descriptions is complete, satisfies all requirements in the system functional baseline, and is under CM without any TBDs or open items. b) System, segment, subsystem and component-level interfaces are baselined and are under configuration control. c) C4I allocations are incorporated into the detailed design. d) The threat scenario operational and environmental allocations are incorporated into the detailed design and are traceable to all CIs and components. e) Test requirements and test data collected to date for the detailed design are traceable to operational requirements via specifications and VCRMs. f) Requirements trace among functional, allocated, and product baselines is bi-directional, complete, and consistent.
Technical plans	a) Supplier's SEMP is complete, adequate and aligned with the program SEP. b) PDR is successfully completed; all PDR action items are closed and corrective actions completed. c) Integrating activities of any lower-level CDRs have occurred; identified issues are documented in action plans. d) Plan to TRR is accurately documented in the SEP as well as the IMP and IMS. e) Program is properly staffed. f) Adequate processes and metrics are in place for the program to succeed. g) A draft certification plan has been developed and covers all required system certifications (e.g., statutory, safety, environmental, airworthiness, others as required).

Product	CDR acceptability criteria
Technical plans *(continued)*	h) Hazardous materials management and pollution prevention processes and procedures are verified and baselined. i) Process control plans have been developed for critical manufacturing processes. j) Plans documenting the system, segment, subsystem and component V&V approaches and methods are defined and traced into the detailed design. k) The test bed(s) and test facilities updates based on the detailed design are deemed adequate to perform system, segment, subsystem and interface requirements verification (e.g., for critical HWCIs and SWCIs, arrangements for procuring and scheduling the use of V&V resources—simulators, test beds, test facilities—have been demonstrated). l) All test plans are documented and include resource requirements and test schedules. m) Training plans for DT&E and OT&E are defined and approved. n) Program schedule as depicted in the updated IMS is executable within acceptable technical and cost risks. o) Program is executable with the existing budget and the approved initial product baseline. p) All critical manufacturing processes have been defined, characterized, updated for the detailed design, and the capability to meet design tolerances has been determined. q) Materials and tooling are available to meet the pilot line schedule. r) A parts management plan has been documented and flowed down to suppliers. s) The FRACAS is functional. t) Plans have been documented for reaching manufacturing readiness level 8 to support initial production efforts. u) Logistics (sustainment) and training systems planning and documentation are sufficiently complete to support the CDR. v) LCSP is approved, including updates on program sustainment development efforts and schedules based on current budgets, test, and evaluation results; and firm supportability design features. w) LCSP includes software support requirements. x) LCSP addresses DMS, PM&P guidelines, and counterfeit parts risk management. y) Long-lead procurement plans are in place, and key supply chain assessments are complete, to include strategic materials risk. z) HSI plans adequately translate applicable items from the following categories into the detailed design: 1) Concept of operations 2) Key manual operations 3) Key information to be inserted 4) Transformation of information from algorithms to user-friendly vernacular 5) Anticipated workload at operator/user stations aa) Software plans have sufficient content to demonstrate that 1) Computer systems and software detailed design approach have been confirmed through analyses, demonstrations, and prototyping in a relevant environment. 2) Software increments and their corresponding capabilities have been

Product	CDR acceptability criteria
Technical plans *(continued)*	defined. 3) Software trade studies addressing COTS, reuse, and other software-related issues are completed and the results incorporated into the detailed design. 4) The software development process defined in the baselined software development plan and reflected in the IMP and IMS will support implementation of the defined software increments. 5) Software development schedules reflect supplier software processes and IMP/IMS software events for current and future development phases. 6) Software development environment and test/integration labs have sufficient fidelity and capacity to support software and system integration, and acceptance testing. 7) Software metrics are being actively tracked, assessed and reported. 8) R&M and testability requirements—BIT, false alarm rate, fault isolation, fault detection) have been incorporated into the detailed design. 9) TEMP addresses all SWCI plans, test facilities, and test plans, including testing required to support incremental approaches and regression tests. 10) Software development estimates [i.e., size, effort (cost), and schedule] are updated. bb) Hardware plans have sufficient content to demonstrate that 1) The hardware detailed design approach has been confirmed through analyses, demonstrations, and prototyping in a relevant environment. 2) The major phases of the program's hardware development and fabrication process defined in a baselined hardware development plan and reflected in the IMP and IMS will support program hardware fabrication within program budget and schedule targets. 3) Hardware development schedules reflect supplier hardware processes and IMP/IMS hardware fabrication milestone events. 4) Hardware test/integration labs have sufficient fidelity, and capacity to support hardware integration and test, and system acceptance testing. 5) Hardware metrics are being actively tracked, assessed and reported. 6) R&M and testability requirements—BIT, false alarm rate, fault isolation, fault detection) have been incorporated into the detailed design. 7) TEMP addresses all HWCI plans, test facilities, and test plans, including testing required to support incremental approaches and regression tests. 8) Hardware fabrication estimates [i.e., number of HWCIs, effort (cost), and schedule] are updated.
Program risk assessment	a) Cost, schedule, and technical risks are identified, and mitigation plans are in place. b) Risk management process is in place demonstrated by documented execution results of existing mitigation plans.
Program life-cycle cost estimate	a) System production cost model has been updated, allocated to lower system CI levels, and tracked against targets. b) Updated CARD is consistent with the approved initial product baseline.

6.6.2 CDR preparation

Table 18 lists the actions that should be considered during preparation for the CDR. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 18—CDR technical review preparation actions

Responsible person	CDR preparation actions
Program manager	a) Approve, fund, and staff the system CDR as planned in the SEP developed by the Systems Engineer. b) Control configuration of acquirer-controlled baselines (functional, allocated) that impact the system of interest; convene the CCB when changes are warranted; communicate the results of the CCB to relevant stakeholders no later than 30 days prior to CDR. c) Manage and approve changes to the segment, subsystem, and system element development specifications well enough in advance to allow successful execution of the CDR delivery of an acceptable product baseline at the CDR. d) Establish the plan to SVR in applicable contract documents including the SEMP, IMS, and IMP. e) Ensure the SEP includes objective SMEs to participate in the CDR. f) Appoint a CDR chair, in coordination with the systems engineer, no later than 45 days prior to the technical review. g) Coordinate a preliminary agenda between the program IPT and other SMEs no later than 30 days prior to the CDR.
Systems engineer	a) Ensure that the pre-established quantifiable CDR criteria have been met, including measurement status of the program's technical metrics that demonstrate acceptable progress and developmental maturity of the system detailed design to achieve a successful CDR. b) Ensure the system initial product baseline and physical architecture are complete and consistent. c) Ensure the initial product baseline documentation is sufficiently complete and correct to support the CDR. d) Ensure the set of system elements comprising the detailed system design can achieve the complete set of allocated system baseline requirements. e) Ensure assessments and risks associated with all design constraints are conducted, documented and provided in the technical review material. f) Ensure verification methods are defined for all decomposed and allocated requirements. g) Ensure risk items associated with allocated requirements are identified and analyzed, and mitigation plans are in place. h) Provide supplier organization(s) the opportunity to participate in the CDR planning. i) Coordinate arrangements for CDR location and support. j) Ensure all of the technical review products whose acceptability criteria are defined in Table 17 are completed for the CDR. k) Ensure the preparation of all presentation material is coordinated across IPTs.
CDR chair	a) Determine CDR team membership. b) Approve the final CDR agenda. c) Identify any final tailoring of the Clause 6 CDR detailed criteria for the specific program. d) Identify any specific elements for in-depth technical review as required.

6.6.3 CDR conduct

Table 19 lists the technical review elements and associated content details that should be considered for the conduct of the CDR. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 19—CDR conduct elements

CDR review element	Content details
Introduction, agenda, administrative	a) Review location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) Purpose of the technical review e) CDR agenda f) Action item procedures g) Risk assessment procedures h) Program overview i) Status of action items from previous technical reviews
Initial product baseline and comparison with functional and allocated baselines	a) Updated specification tree to the system element level and description of requirements allocation process including assignment of technical budgets to the detailed design b) Requirements traceability, methodology and completeness to the system element level of the detailed design c) System physical architecture and detailed design of system elements (hardware, software, human manual procedures), correspondence of elements to the specification tree, and allocated requirements d) Trade studies, FMECA and other studies and analyses e) Detailed designs of system internal and external interfaces f) Detailed design implementation of system safety requirements g) Updates to KPPs, MOPs, and MOEs h) Status updates for established metrics and measures i) Verification and certification requirement methods and success criteria as allocated to system elements j) Detailed design support for interoperability k) Threat scenario allocations to detailed design elements l) Test and certification requirements updates m) Logistics and personnel requirements n) Training requirements o) Resources requirements to support production, integration acceptance test and evaluation
Technical plans review	a) IMP and IMS b) Staffing plans c) M&S support to CDR and subsequent M&S plans for production, test and evaluation d) Software development plan updates to support software incremental implementation, integration and test e) Software development environment and test and integration labs f) Long lead procurement plans g) Manufacturing plan and processes h) Process control plans

CDR review element	Content details
Technical plans review *(continued)*	i) Hazard mitigation plan if applicable j) Government and supplier CM plans k) Certification and accreditation plans l) Detailed test plans for integration, CI acceptance, DT&E, and OT&E support m) Training plans n) Updates to product support plan and sustainment strategy o) Updates to LCSP including software support requirements and supportability features in the detailed system design
Risk and mitigation review	a) Risk identification and mitigation, including: 1) Consideration of V&V resource requirements in support of detailed design 2) Consideration of test resources and current availability ESOH risks are known and being mitigated 3) Consideration of ongoing industrial base assessment (diminishing manufacturing sources and material shortages, obsolete parts, etc.) 4) Consideration of CI fabrication 5) Consideration of unique software
Program life-cycle cost estimate review	a) Updates to the CARD to align it with the initial product baseline b) Updated software implementation and hardware production estimates from detailed SWCI and HWCI inputs; and test and integration plans

6.6.4 CDR closure

Table 20 lists the actions that should be considered for CDR closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 20—CDR closure actions

Responsible person	CDR closure actions
Program manager	a) Manage and approve changes to technical baselines resulting from CDR. b) Assume acquirer control of the initial product baseline class I configuration changes as defined in accordance with the program's CM policy or plan. c) If funding profiles are insufficient to support development, notify user/sponsor of funding shortfall and request funding profile adjustments. d) Support preparation of the CDR summary report.
Systems engineer	a) Determine the root cause of problems, identify corrective actions and manage to completion. b) Monitor and control the execution of the CDR closure plans. c) Organize and supervise the responses to all action items generated during CDR. d) Support preparation of the CDR summary report. e) Determine the root cause of problems, identify corrective actions, and manage to completion. f) Monitor and control the execution of the CDR closure plans.

Responsible person	CDR closure actions
Systems engineer *(continued)*	g) Document the plan to SVR in the SEP and elsewhere as appropriate. h) Ensure plans to proceed to SVR allow for contingencies. i) Ensure all information products required to be put under configuration control have been delivered to the Configuration Manager. j) Ensure all IMP and IMS tasks associated with conduct of the CDR have been successfully completed and documented as such.
CDR chair	a) Ensure preparation of the CDR summary report and formal CDR minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the CDR minutes. d) Approve and distribute the CDR summary report. e) Prepare and distribute the formal CDR closure letter.
Recorder	a) Collate all action items for submission to the CDR chair. b) Prepare the CDR summary report and CDR minutes for signature and distribution by the CDR chair.

6.7 Test readiness review (TRR) detailed criteria

6.7.1 TRR technical review products acceptability criteria

Table 21 lists the products that should be reviewed at TRR, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful TRR. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 21—TRR technical review products acceptability criteria

Product	TRR acceptability criteria
System technical documentation	a) Supplier's SEMP is complete, adequate, and aligned with the program SEP. b) The TEMP is current and approved. c) The requirements to be verified by the test event include all approved changes. d) The configuration of the system or system element(s) under test is clearly defined. e) Any design changes made to the system element(s) under test since CDR will not adversely affect the formal test event. f) The system elements under test are under configuration control by the CM organization and the configuration of each hardware and software element of the system element(s) under test is documented. g) The system elements under test are judged sufficiently mature to begin the formal test event planned. h) No catastrophic or critical problems or deficiencies are open for the system element(s) under test, where the problem criticality levels are as defined in the program's system safety policy or plan. i) All changes to the test plan have been approved. j) The approved test plan with changes incorporated is robust enough to ensure the full verification of all requirements to be verified by the test event. k) The test plan is consistent with the required verification methods and levels for the requirements planned for verification by the test event. l) The test procedures for each test case together with the planned test input data and drivers are correct, complete, and sufficiently robust to verify all of the requirements allocated to the test case. m) The test procedures are consistent with the required verification methods and levels.

Product	TRR acceptability criteria
System technical documentation *(continued)*	n) The test procedures are sufficiently detailed to be repeatable. o) The test procedures are in compliance with the approved test plan. p) All redlines from dry-run testing have been incorporated into the test procedures. q) Bi-directional traceability that is correct, complete, and consistent is provided between the requirements to be verified by the formal test event and the test procedures and test cases in which the requirements will be verified. r) The test procedures' steps are identified where each requirement's verification is completed. s) The acquirer and supplier agree on the test report content. t) A detailed description of the planned test event sufficiently defines how it will verify each requirement allocated to the system element(s) under test. u) Test plans and procedures adequately support the cybersecurity requirements and interoperability as required. v) Test plans and procedures are sufficient to verify all system security and supply chain risk management requirements allocated to the system element(s) under test. w) System-level tests stress the system within the intended mission environment(s). x) Evaluation of performance data for the system element(s) under test shows it appropriately depicts that performance of the system element(s) under test as tested in the test conditions. y) R&M scoring guidelines have been documented and agreed to by the acquirer and supplier.
Test environment	a) The test environment, including all hardware, software, emulators, and simulators is sufficiently robust to adequately verify the requirements to be verified. b) The test environment has the required components to support verification of system security requirements. c) Sufficient validation has occurred prior to the planned test event to ensure that the test environment will correctly perform the functions necessary to support the test event. d) The test environment is under configuration control by the CM organization and the configuration of each component of the test environment is documented. e) Data reduction procedures and responsibilities are documented and accepted.
Program execution and process control	a) Personnel roles and responsibilities are documented, clear, and concise both for the acquirer and the supplier, including test witnessing requirements, and are agreed to by the acquirer and supplier. b) Processes to be followed during test execution are defined and documented and will result in a controlled and disciplined test execution. c) Appropriate security test facilities, test equipment, schedules, and personnel are adequate and available to support the planned test event. d) Any test limitations will not affect the ability to verify the planned requirements. e) The anomaly reporting system is functional. f) The FRACAS is functional. g) Logistics and supply support for testing is adequate. h) Review of production logs confirms that the system elements under test have been manufactured in accordance with approved process and material specifications. i) The presence and role of QA personnel are sufficient to ensure 1) The test process is followed. 2) Test execution rigorously follows the test procedures with any deviations documented as redlines.

Product	TRR acceptability criteria
Program execution and process control *(continued)*	3) All problems or deficiencies encountered during testing are appropriately documented. 4) The test log faithfully documents the execution of the test, including test start, test end, interruptions and anomalies.
Risk assessment	a) Technical risks are identified, and mitigation plans are in place. b) Risk management process in place demonstrated by documented execution results of existing mitigation plans associated with the purpose of the review.
Program life-cycle cost estimate and schedules	a) Test schedules have been finalized and are feasible. b) Hour-by-hour test schedules for the formal test event are documented, including justification for the timeline based on dry run test timing.

6.7.2 TRR preparation

Table 22 lists the actions that should be considered during preparation for the TRR. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 22—TRR technical review preparation actions

Responsible person	TRR preparation actions
Program manager	a) Approve, fund, and staff the TRR as planned in the TEMP developed by the chief developmental tester. b) Ensure the scope of the TRR(s) is addressed in the TEMP. c) Assure all required safety documentation has been approved and all required safety releases have been procured. d) Appoint a TRR chair, in coordination with the chief developmental tester, no later than 45 days prior to the technical review. e) Coordinate a preliminary agenda between the program IPT and other SMEs no later than 30 days prior to the TRR.
Systems engineer	a) Ensure that the pre-established quantifiable TRR criteria have been met. b) Ensure verification methods and success criteria are defined for all decomposed and allocated requirements. c) Ensure risk items associated with allocated requirements are identified and analyzed, and mitigation plans are in place. d) Coordinate arrangements for TRR location and support. e) Ensure all of the technical review products whose acceptability criteria are defined in Table 21 are completed for the TRR. f) Ensure the preparation of all presentation material is coordinated across IPTs.
TRR chair	a) Determine TRR team membership. b) Approve the final TRR agenda. c) Identify any final tailoring of the Clause 6 TRR detailed criteria for the specific program. d) Identify any specific elements for in-depth technical review as required.

6.7.3 TRR conduct

Table 23 lists the technical review elements and associated content details that should be considered for the conduct of the TRR. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 23—TRR conduct elements

TRR review element	Content details
Introduction, agenda, administrative	a) Review location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) Purpose of the technical review e) TRR agenda f) Action item procedures g) Risk assessment procedures h) Program overview i) Status of action items from previous technical reviews j) Overall test and evaluation (T&E) program overview and how planned tests support the overall program
System technical documentation	a) Requirements planned to be verified during this test event b) Any changes to these requirements that have been approved since the previous technical review c) Required verification methods, and verification level(s) for each requirement planned to be verified during this formal test event d) Any changes to the design of the system element(s) under test that have occurred since the previous technical review that affect the planned testing e) Any changes to the test plan(s) that cover the planned test that have occurred since the previous technical review f) Critical technologies are addressed in the test plans and test procedures g) Description of the test methodology and data collection to be used along with test procedures h) Description of test driver data and scenarios to be used with the test procedures i) Results of any dry runs, including anomalies encountered and any anticipated problems with requirements verification j) Bi-directional traceability among the test cases, test procedures, design documentation of the system element(s) under test, and the requirements documentation covering the requirements to be verified k) Hardware and software descriptions, and human procedures and user manuals required for the system element(s) under test l) Specific configuration of the system element(s) under test including version(s) or release(s) of software; configuration identification, and status accounting documentation for the system element(s) under test m) All known hardware and software problems or deficiencies at the start of the test event for the system element(s) under test, along with their severity levels and expected impacts to testing n) Expected test results with success criteria and how the test results will affect the program o) Status of program metrics

TRR review element	Content details
Test environment	a) Description of the test environment including hardware, software, automated test equipment, test tools, simulators, emulators, drivers, etc. b) Confirmation by the CM organization that the test environment is validated and under configuration control c) Status of validation performed on the test environment to ensure it correctly performs the functions necessary to support the formal test event d) All known test environment problems or deficiencies and their expected impact on the testing e) Any test limitations or other conditions that might impact conduct of the formal test event
Program execution and process control	a) Test personnel and their roles and responsibilities, including both acquirer and supplier personnel, and CM and QA personnel as well as test team personnel performing the test procedures b) Test processes being implemented including both the nominal process and retest process(es) when test anomalies are encountered that require corrections c) The anomaly adjudication process to determine whether and how testing can be continued after an anomaly has occurred during test execution d) A recorded process for managing the requirements verification status for the system element(s) under test (i.e.., fully verified, partially verified, not verified) following test completion and data analysis
Program risk assessment	a) Risk identification and mitigation, including consideration of all current hazards, and the next planned formal test event
Program life-cycle cost estimate and schedules	a) Detailed test schedules for the formal test event b) Review of the current program schedule showing the phasing of the planned formal test event in the overall T&E plan

6.7.4 TRR closure

Table 24 lists the actions that should be considered for TRR closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 24—TRR closure actions

Responsible person	TRR closure actions
Program manager	a) Manage and approve changes to any baselined documentation as a result of the TRR. b) If funding profiles are insufficient to support further test and evaluation, notify user/sponsor of funding shortfall and request funding profile adjustments. c) Support preparation of the TRR summary.
Systems engineer	a) Monitor and control the execution of the TRR closure plans. b) Organize and supervise the responses to all action items generated during TRR. c) Support preparation of the TRR summary. d) Ensure all information products required to be put under configuration control have been delivered to the configuration manager. e) Ensure all IMP and IMS tasks associated with conduct of the TRR have been successfully completed and documented as such.
TRR chair	a) Ensure preparation of the TRR summary and formal TRR minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the TRR minutes. d) Approve and distribute the TRR summary. e) Prepare and distribute the formal TRR closure letter.
Recorder	a) Collate all action items for submission to the TRR chair. b) Prepare the TRR summary and TRR minutes for signature and distribution by the TRR chair.

6.8 Functional configuration audit (FCA) detailed criteria

6.8.1 FCA technical review products acceptability criteria

Table 25 lists the products that should be reviewed at FCA, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful FCA. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 25—FCA technical review products acceptability criteria

Product	FCA acceptability criteria
Functional, allocated and product baseline documentation	a) CI performance has been verified against the allocated baseline, and integrated functional performance has been verified against the functional baseline. b) Adequately detailed requirements verification traceability documentation exists outlining the method for verification for each requirement in the CI specification. c) All approved engineering change proposals (ECP), requests for deviation, and requests for waiver have been incorporated into the system product baseline. d) All CSIs and CAIs have been identified, documented and are being effectively managed. e) For software, a technical understanding is reached on the validity and the degree of completeness of the software test reports and as appropriate, computer system operator's manual, software user's manual, and the system diagnostic manual. f) System product baseline is maintainable per the configuration management plan (CMP).
Program execution and process control	a) The CCB is processing configuration changes in accordance with the CMP and maintaining the proper configuration baselines. b) Audit of PDR and CDR minutes shows that all technical review findings have been addressed, all action items closed and corrections listed in corrective action plans have been successfully completed for the baseline documentation being audited.
Verification results	a) Each requirement listed in the requirements verification traceability documentation has been successfully verified in accordance with the identified methodology based on all available test data, analysis, or inspection. b) The CI demonstrated the capability to satisfy KPP and KSA thresholds based on available test data, analysis or inspection. c) The CI satisfies TPM thresholds as verified by available design documentation, test data, analysis, or inspection. d) CI acceptance test reports are complete, have been reviewed, and deficiencies have been addressed. e) Audit of supplier test procedures and results shows compliance with specification requirements as mapped down to the lowest level end item in the requirements verification traceability documentation, and that formal test data is complete and accurate as judged against the test procedures. f) For CIs that failed initially to pass quality assurance test provisions, analysis shows cause of failure has been determined and appropriate corrections have been made to both the CIs and the associated engineering data prior to being subjected to requalification.

6.8.2 FCA preparation

Table 26 lists the actions that should be considered during preparation for the FCA. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 26—FCA preparation actions

Responsible person	FCA preparation actions
Program manager	a) Approve, fund, and staff the FCA as planned in the SEP developed by the Systems Engineer. b) Continue to control class I changes to the system initial product baseline. c) Establish the plan to SVR, PRR and PCA in applicable acquirer-supplier agreement documents including the SEMP, IMS, and IMP. d) Ensure the SEP includes objective SMEs to participate in the FCA. e) Appoint a FCA chair, in coordination with the systems engineer, no later than 45 days prior to the audit. f) Coordinate a preliminary agenda between the program IPT and other SMEs no later than 30 days prior to the FCA.
Systems engineer	a) Develop and execute the FCA plans with established quantifiable technical review criteria, carefully tailored to satisfy program and CI objectives. b) Develop a checklist to be used to ensure that all required documentation, hardware and computer software is available at the FCA for the CI(s) to be audited. c) Ensure that the pre-established technical FCA criteria have been met. d) Ensure all requirements in the system specification have been verified through the appropriate verification method(s) and have been appropriately documented. e) Coordinate arrangements for FCA location and support. f) Ensure all of the audit products whose acceptability criteria are defined in Table 25 are completed for the FCA. g) Ensure the preparation and assembly of all audit material and any presentations required to be given to the FCA team are coordinated across IPTs.
Supplier	a) Submit the final draft product specification(s) for the CI(s) to be audited to the acquirer for review prior to conduct of the FCA. b) Prior to the FCA date, submit the following information to the acquirer: 1) Names and roles of individuals who will participate in the FCA, including the test manager. 2) Identification of the CI(s) to be audited: i) Nomenclature ii) Specification identification number(s) iii) CI number(s) iv) Current listing of all deviations and waivers against the CI(s) either requested of, or approved by, the acquirer v) Status of the test program to test system elements (CIs) with automatic test equipment if applicable
FCA chair	a) Determine FCA team membership. b) Approve the final FCA agenda. c) Identify any final tailoring of the Clause 6 FCA detailed criteria for the specific program and CI. d) Identify any specific elements for in-depth technical review as required.

6.8.3 FCA conduct

Table 27 lists the technical review elements and associated content details that should be considered for the conduct of the FCA. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 27—FCA conduct elements

FCA review element	Content details
Introduction, agenda, administrative	a) FCA location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) Purpose of the audit e) FCA agenda f) Action item procedures g) Risk assessment procedures h) Program overview and verification test status i) Status of action items from previous technical reviews
System product baseline and comparison with functional and allocated baselines	a) Test program structure, plans, procedures, testing accomplished, test results b) A briefing to the FCA team for each CI being audited that delineates the test results and findings for each CI. At a minimum, the briefing should include CI requirements that were not met along with a proposed solution to each deficiency, an account of the ECPs incorporated and tested, as well as proposed and a general presentation of the entire CI test effort delineating problem areas as well as accomplishments c) Bi-directional requirements traceability, methodology, and completeness to the CI level between the product baseline and the verification test results d) Verification and certification requirement methods and success criteria as allocated to system elements e) Test and certification requirements updates f) Actual system performance verification against the allocated baseline and the functional baseline g) Test reports—coverage of testing and verification results
Program execution and process control review	a) CCB process and CMP consistency

6.8.4 FCA closure

Table 28 lists the actions that should be considered for FCA closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 28—FCA closure actions

Responsible person	FCA closure actions
Program manager	a) If funding profiles are insufficient to support activities leading to SVR, PRR and PCA, and to support production, notify user/sponsor of funding shortfall and request funding profile adjustments. b) Acknowledge FCA completion with the indication that successful FCA performance satisfies the requirements for conduct of the FCA. c) Support preparation of the FCA summary report.
Systems engineer	a) Monitor and control the execution of the FCA closure plans. b) Organize and supervise the responses to all action items generated during FCA. c) Support preparation of the FCA summary report. d) Produce corrective action plans if required and manage to completion. e) Ensure the supplier records FCA accomplishment in the applicable system element development records. f) Document the plan to SVR, PRR, and PCA in the SEP and elsewhere as appropriate. g) Ensure adequate plans and resources are in place to accomplish the necessary technical activities among FCA, SVR, PRR, and PCA, and that these plans allow for contingencies. h) Ensure all information products required to be put under configuration control have been delivered to the configuration manager. i) Ensure all IMP and IMS tasks associated with conduct of the FCA have been successfully completed and documented as such.
Supplier	a) Record FCA accomplishment in the applicable system element development records. b) Support production of the FCA summary report and formal FCA minutes.
FCA chair	a) Ensure preparation of the formal FCA summary report and formal FCA minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the FCA minutes. d) Approve and distribute the FCA summary report. e) Prepare and distribute the formal FCA closure letter.
Recorder	a) Collate all action items for submission to the FCA chair. b) Prepare the FCA summary report and FCA minutes for signature and distribution by the FCA chair.

6.9 System verification review (SVR) detailed criteria

6.9.1 SVR review products acceptability criteria

Table 29 lists the products that should be reviewed at SVR, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful SVR. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 29—SVR technical review products acceptability criteria

Product	SVR acceptability criteria
System functional and product baseline documentation	a) Review of CI(s) and system-level test and analysis results verifies documented achievement of functional requirements through the appropriate documented verification methods. NOTE—Verification testing may include developmental, operational (e.g., early operational assessments, operational assessments), or live fire testing. b) Bi-directional traceability has been documented among the CDD, the CPD, and the system specifications. c) System-level performance has been verified as satisfactory against the functional baseline. d) The system has demonstrated the capability to satisfy all KPP and KSA thresholds based on all available test data, analysis, and inspection. e) Certification activities are sufficiently underway with all certifying agencies. f) Logistics support analysis and maintenance task analysis are complete and the results incorporated into the LCSP. g) Audit of the operation and support documents shows consistency with the LCSP. h) Assessment of the documented system product baseline for the initial production system shows a low risk of operational test failure during IOT&E.
Technical plans	a) Supplier's SEMP is complete, adequate and aligned with the program SEP. b) Detailed plans and schedules have been established and sufficiently resourced to proceed into initial production or initial deployment for the system to be used in OT&E. c) The SEP and supplier's SEMP have been updated as required to adequately address the production and deployment phase of acquisition. d) Adequate life-cycle logistics planning has been conducted and results are documented in the LCSP. e) A training plan that adequately supports OT&E is consistent with the system product baseline and has been reviewed and approved. f) The TEMP is up-to-date, signed, and being properly executed. g) The CMP has been updated as required.

Product	SVR acceptability criteria
Program execution and process control	a) Adequate processes and metrics are in place for the program to succeed. b) Critical program information (CPI) is being adequately managed and protected. c) The CCB is processing configuration changes in accordance with industry standards, supplier instructions, processes and procedures, and maintaining the proper configuration baselines. d) Configuration changes have been identified as required for reliability growth to ensure threshold compliance at initial operational capability (IOC).
Risk assessment	a) Technical risks are identified, and mitigation plans are in place. b) Risk management process is in place demonstrated by documented execution results of existing mitigation plans associated with the purpose of the review.
Program life-cycle cost estimate and schedule	a) The CARD or other verified cost estimate has been updated and accurately reflects the as-tested system product baseline. b) The system is producible within the production budget. c) The acquirer/supplier IMS is resourced at reasonable levels based on realistic performance and efficiency expectations. d) Earned value management (EVM) status supports transition to production.
Verification results	a) New or additional qualification data since CI-level FCAs as determined by review of the FCA minutes indicate successful results as judged against the system specification. b) All system specification qualification test requirements have been successfully completed.

6.9.2 SVR preparation

Table 30 lists the actions that should be considered during preparation for the SVR. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 30—SVR preparation actions

Responsible person	SVR preparation actions
Program manager	a) Approve, fund, and staff the SVR as planned in the SEP developed by the systems engineer. b) Continue to control class I changes to the system product baseline. c) Ensure the SEP includes objective SMEs to participate in the SVR. d) Appoint an SVR chair, in coordination with the systems engineer, no later than 45 days prior to the technical review. e) Coordinate a preliminary agenda between the program IPT and other SMEs no later than 30 days prior to the SVR.
Systems engineer	a) Develop and execute the SVR plans with established, quantifiable, technical review criteria, carefully tailored to satisfy program objectives. b) Ensure that the pre-established technical SVR criteria have been met. c) Ensure all requirements in the system specification have been verified through the appropriate verification method(s) and have been appropriately documented. d) Ensure technical risk items associated with the verified system product baseline are identified and analyzed, and mitigation plans are in place. e) Coordinate arrangements for SVR location and support. f) Ensure all of the technical review products whose acceptability criteria are defined in Table 29 are completed for the SVR. g) Ensure the preparation and assembly of all audit material and any presentations required to be given to the SVR team are coordinated across IPTs.
Supplier	a) Submit any new or additional qualification data since FCA to the acquirer for review prior to conduct of the SVR. b) Prior to the technical review, submit the names and roles of individuals who will participate in the SVR.
SVR chair	a) Determine SVR team membership. b) Approve the final SVR agenda. c) Identify any final tailoring of the Clause 6 SVR detailed criteria for the specific program. d) Identify any specific elements for in-depth technical review as required.

6.9.3 SVR conduct

Table 31 lists the technical review elements and associated content details that should be considered for the conduct of the SVR. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 31—SVR conduct elements

SVR technical review element	Content details
Introduction, agenda, administrative	a) SVR location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) Purpose of the audit e) SVR agenda f) Action item procedures g) Risk assessment procedures h) Program overview and status i) Status of action items from previous technical reviews
System functional and product baseline documentation	a) Identification and results of any new or additional CI(s) qualification data since FCA b) Bi-directional requirements traceability, methodology and completeness to the CI level between the functional baseline and the verification test results c) Actual system performance verification against the functional baseline d) Test reports—coverage of testing and verification results e) Resources requirements to support production, initial deployment, operational test and evaluation
Technical plans review	a) SEP and supplier SEMP—coverage for OT&E, production and deployment b) LCSP—consistency with the as-tested system product baseline c) Training plan—consistency with the as-tested system product baseline and support for OT&E d) TEMP adequacy to support remaining system testing and evaluation e) CMP—support for all program CM requirements and CCB functions
Program execution and process control review	a) CCB process and CMP consistency b) Details of currently established manufacturing, production, and quality assurance processes and metrics
Risk and mitigation review	a) Risk identification and mitigation including consideration of the initial production of the system to be used in OT&E or formal test event
Program life-cycle cost estimate and schedule review	a) Consistency between the CARD, IMS, and EVM status

6.9.4 SVR closure

Table 32 lists the actions that should be considered for SVR closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 32—SVR closure actions

Responsible person	SVR closure actions
Program manager	a) Manage and approve changes to any baselined documentation as a result of the SVR. b) If funding profiles are insufficient to support activities leading to PRR or PCA, and to support production, notify user/sponsor of funding shortfall and request funding profile adjustments. c) Support preparation of the SVR summary report.
Systems engineer	a) Monitor and control the execution of the SVR closure plans. b) Organize and supervise the responses to all action items generated during SVR. c) Support preparation of the SVR summary report. d) Produce corrective action plans if required and manage to completion. e) Ensure the supplier records SVR accomplishment in the applicable system element development records. f) Ensure technical risk items associated with the as-tested system product baseline are identified and analyzed, and that mitigation plans are in place. g) Document the plan to PRR and PCA in the SEP and elsewhere as appropriate. h) Ensure adequate plans and resources are in place to accomplish the necessary technical activities leading to PRR and PCA, and that these plans allow for contingencies. i) Ensure all information products required to be put under configuration control have been delivered to the configuration manager. j) Ensure all IMP and IMS tasks associated with conduct of the SVR have been successfully completed and documented as such.
Supplier	a) Record SVR accomplishment in the applicable system element development records. b) Support preparation of the SVR summary report and formal SVR minutes.
SVR chair	a) Ensure preparation of the SVR summary report and formal SVR minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the SVR minutes. d) Approve and distribute the SVR summary report. e) Prepare and distribute the formal SVR closure letter.
Recorder	a) Collate all action items for submission to the SVR chair. b) Prepare the SVR summary report and SVR minutes for signature and distribution by the SVR chair.

6.10 Production readiness review (PRR) detailed criteria

6.10.1 PRR technical review products acceptability criteria

Table 33 lists the products that should be reviewed at PRR, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful PRR. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 33—PRR technical review products acceptability criteria

Product	PRR acceptability criteria
Verified system product baseline documentation	a) System product baseline is stable and under proper configuration control to enable hardware fabrication and system software production during low-rate production. b) The system product baseline is producible as verified by the results of any incremental lower-level PRRs or by production modeling and analysis. c) Applicable production-related DoD directives, statutory and regulatory guidance, threshold design and certification standards, and public law have been adequately represented in the manufacturing and production processes in the system product baseline. d) Production processes have satisfied all TPM thresholds as verified by all available design documentation, test data, analysis, and inspection. e) All identified production critical technologies have demonstrated adequate technical maturity in accordance with the technology maturation plans. f) Adequate manufacturing maturity of the system product baseline has been demonstrated. g) All CSIs and CAIs have been identified, documented, and are being effectively managed. h) Technologies are mature and proven in the final form, in operational environments. i) Manufacturing processes are stable and have been demonstrated in a pilot line environment. j) Adequate production line processes and metrics are in place for the delivery of on-time quality products. k) The audit trail from the initial product baseline established at CDR accurately tracks all incorporated and unincorporated system product baseline changes that have occurred since CDR.
Technical plans	a) Supplier's SEMP is complete, adequate and aligned with the program SEP. b) Prior readiness reviews are completed, action items closed, and corrective action plans successfully completed. c) Supply chain is stable and adequate to support planned LRIP and FRP. d) The manufacturing plan is up-to-date and reflects the planned LRIP and FRP operations. e) The manufacturing plan contains sufficient planning to address the following: 1) Methods for certifying the qualification of the machines, equipment and procedures used in complex or critical operations 2) Required cleanliness, contamination, and corrosion controls 3) Required control of physical environment (temperature, humidity, lighting, work area arrangements, etc.)

Product	PRR acceptability criteria
Technical plans *(continued)*	4) Critical item quality control and verification at production use point 5) Electrostatic discharge control 6) Nondestructive evaluation methods and techniques, as applicable 7) Completed item inspection and test records review prior to shipment 8) Statistical process control, if applicable f) A manufacturing maturation plan has been developed for any item assessed to not have the industrial capability in place to support LRIP. g) Program is properly staffed with qualified production, quality (engineering and assurance), and manufacturing personnel. h) The product acceptance system including acceptance test procedures and associated equipment has been validated and put under configuration control. i) Production facilities are ready and required personnel are trained and certified as required. j) Delivery schedule is executable (technical/cost risks, long lead items). k) Diminishing manufacturing sources and material shortages plan is in place and mitigates the risk of obsolescence during LRIP and FRP. l) The CMP has been updated as required to support production. m) The SEP and supplier SEMP have been updated as required to adequately address the production and deployment phase of acquisition.
Program execution and process control	a) Adequate processes and metrics are in place to ensure the system product baseline is maintained throughout the production and deployment phase of acquisition. b) The following items at a minimum have been successfully verified in a pilot line environment: 1) Manufacturing technology solutions 2) Manufacturing processes 3) Quality targets 4) Special personnel skills 5) Successful performance of all special test equipment and special inspection equipment c) CPI is being adequately managed and protected d) The CCB is processing configuration changes in accordance with industry standards, supplier instructions, processes, and procedures; and maintaining the proper configuration baselines.
Risk assessment	a) Technical risks are identified, and mitigation plans are in place. b) Risk management process is in place demonstrated by documented execution results of existing mitigation plans associated with the purpose of the review.
Program life-cycle cost estimate and schedule	a) System as designed is producible within the production budget. b) Production cost model is based on the stable detailed design and supply chain, and has been validated. c) IMP and IMS have sufficient details of planned tasks for production and deployment to achieve acceptable risk. d) The acquirer/supplier IMS is resourced at reasonable levels based on realistic performance and efficiency expectations. e) The CARD or verified cost estimate has been updated and accurately reflects the current system product baseline. f) EVM status supports transition to production.

6.10.2 PRR preparation

Table 34 lists the actions that should be considered during preparation for the PRR. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 34—PRR preparation actions

Responsible person	PRR preparation actions
Program manager	a) Approve, fund, and staff the PRR as planned in the SEP developed by the systems engineer. b) Continue to control class I changes to the system product baseline. c) Establish the plan to PCA in applicable acquirer-supplier agreement documents including the SEMP, IMS, and IMP. d) Ensure the SEP includes objective SMEs to participate in the PRR. e) Determine if the readiness of manufacturing processes, quality management system, and production planning (facilities, tooling and test equipment capacity, personnel development and certification, process documentation, inventory management, suppler management, etc.) provide low-risk assurances for supporting LRIP and FRP. f) Appoint a PRR chair, in coordination with the systems engineer, no later than 45 days prior to the technical review. g) Coordinate a preliminary agenda between the program IPT and other SMEs no later than 30 days prior to the PRR.
Systems engineer	a) Develop and execute the PRR plans with established quantifiable review criteria, carefully tailored to satisfy program objectives. b) Ensure that the pre-established technical PRR criteria have been met to ensure the production capability forms a satisfactory, affordable, and sustainable basis for proceeding into LRIP and FRP. c) Advise the program manager on whether production capability forms a satisfactory, affordable, and sustainable basis for proceeding into LRIP and FRP. d) Ensure adequate plans and resources are in place to proceed from PRR to PCA and FRP decision review (DR). e) Ensure plans to proceed to PCA and FRP allow for contingencies. f) Ensure production implementation supports overall performance and R&M requirements. g) Coordinate arrangements for PRR location and support. h) Ensure all of the technical review products whose acceptability criteria are defined in Table 33 are completed for the PRR. i) Ensure the preparation and assembly of all technical review material and any presentations required to be given to the PRR team are coordinated across IPTs.
Supplier	a) Submit the final draft product specification(s) for the system product baseline element(s) to be audited to the acquirer for review prior to conduct of the PRR. b) Prior to the PRR date, submit the following information to the acquirer: 1) Names and roles of individuals who will participate in the PRR; specifically, identify the test manager(s) 2) Identification of the system product baseline element(s) to be

Supplier *(continued)*	reviewed: i) Nomenclature ii) Specification identification number(s) iii) CI number(s) iv) Current listing of all deviations and waivers against the CI(s) either requested of, or approved by, the acquirer
PRR chair	a) Determine PRR team membership. b) Approve the final PRR agenda. c) Identify any final tailoring of the Clause 6 PRR detailed criteria for the specific program. d) Identify any specific elements for in-depth technical review as required.

6.10.3 PRR conduct

Table 35 lists the technical review elements and associated content details that should be considered for the conduct of the PRR. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 35—PRR conduct elements

PRR review element	Content details
Introduction, agenda, administrative	a) PRR location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) Purpose of the technical review e) PRR agenda f) Action item procedures g) Risk assessment procedures h) Program overview i) Status of action items from previous technical reviews
Verified system product baseline documentation review	a) Production engineering—focus on how the product has been designed for producibility, and what planning has been accomplished to ensure methods, processes, and test equipment have been defined and are available to support manufacturing and production operations b) Product assurance—focus on how quality has been designed into the product and how product quality will be pursued and verified c) System element qualification test planning, conduct, and results d) Engineering release and configuration status accounting details for all system product baseline elements e) Technical readiness consistent with technology maturity targets
Technical plans review	a) Production/manufacturing plan—details for facilities, processes, equipment, and personnel b) SEP and supplier SEMP—coverage for production and OT&E c) Training plan—coverage for required personnel skills and certifications to support production d) Production test plan—coverage for all planned production testing e) CMP—support for product baseline configuration control during production

PRR review element	Content details
Technical plans review *(continued)*	f) LCSP—coverage for planning applicable to production g) Quality management plan—coverage for continuous improvement, supplier quality management systems, statistical process control, lot acceptance, quality assurance provisions, inspection/test procedures, and accept/reject criteria h) R&M plan—coverage for reliability growth including environmental stress screening/highly accelerated stress screen, FRACAS, and Failure Review Board incorporation
Program execution and process control review	a) Production management—focus on how well the manufacturing organization is structured and managed b) Production operations—focus on how manufacturing and production will be planned and executed. Include production schedule, cost per unit and acceptance testing c) Manufacturing readiness consistent with manufacturing readiness planning in the SEP d) Configuration management and control during production e) Status of industrial resources, both at supplier's and subcontractor/vendor locations f) Status and management of materials and purchased parts, inventory control, vendor management g) Status and management of diminishing manufacturing sources, material shortages, and obsolete parts issues h) Personnel skill development and certification
Risk and mitigation review	a) Risk identification and mitigation, including: 1) Consideration of producibility trade studies 2) Consideration of manufacturing, production, and quality risks 3) Consideration of ESOH risks
Program life-cycle cost estimate and schedule review	a) Updated production cost estimates b) IMP and IMS production task identification and descriptions c) Consistency among the CARD, IMS, and production earned value data

6.10.4 PRR closure

Table 36 lists the actions that should be considered for PRR closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 36—PRR closure actions

Responsible person	PRR closure actions
Program manager	a) Manage and approve changes to any baselined documentation as a result of the PRR. b) If funding profiles are insufficient to support activities leading to PCA, and to support production, notify user/sponsor of funding shortfall and request funding profile adjustments. c) Acknowledge PRR completion with the indication that successful PRR performance satisfies the requirements for conduct of the PRR. d) Support preparation of the PRR summary report.
Systems engineer	a) Monitor and control the execution of the PRR closure plans. b) Organize and supervise the responses to all action items generated during PRR. c) Support preparation of the PRR summary report. d) Produce corrective action plans if required and manage to completion. e) Ensure the supplier records PRR accomplishment in the applicable system element development records. f) Document the plan to PRR in the SEP and elsewhere as appropriate. g) Ensure adequate plans and resources are in place to accomplish the necessary technical activities, and that these plans allow for contingencies. h) Ensure all information products required to be put under configuration control have been delivered to the configuration manager. i) Ensure all IMP and IMS tasks associated with conduct of the PRR have been successfully completed and documented as such.
Supplier	a) Record PRR accomplishment in the applicable system element development records. b) Support preparation of the PRR summary report and formal PRR minutes.
PRR chair	a) Ensure preparation of the formal PRR summary report and formal PRR minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the PRR minutes. d) Approve and distribute the PRR summary report. e) Prepare and distribute the formal PRR closure letter.
Recorder	a) Collate all action items for submission to the PRR chair. b) Prepare the PRR summary report and PRR minutes for signature and distribution by the PRR chair.

6.11 Physical configuration audit (PCA) detailed criteria

6.11.1 PCA review products acceptability criteria

Table 37 lists the products that should be reviewed at PCA, and the associated acceptability criteria that should form a sufficient basis by which to assess each product's content as acceptable to support a successful PCA. Specific products and associated acceptability criteria shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 37—PCA technical review products acceptability criteria

Product	PCA acceptability criteria
Verified system product baseline documentation	a) The system product baseline is complete and accurately reflects the configuration of the representative production item that was inspected and validated through OT&E. b) All operation and support documents are complete and conform to any data item descriptions contained in the acquirer-supplier agreement. c) Supporting processes used by the supplier to produce the CI(s) are adequate to support production. d) Released engineering documentation and quality control records are complete and accurately reflect the "as-built" or "as-coded" configuration of the CI(s). e) Final product specifications for CI(s) are complete and traceable to their allocated requirements. f) Traceability is complete from design documentation to build plans. g) All differences between manufacturing of EMD assets and production assets are identified. h) The as-designed parts, materials, and processes (PM&P) list is complete. i) All required certifications have been successfully completed by all certifying agencies. j) The product baseline specification(s) for the CI(s) have been reviewed and validated to assure that they adequately define the CI(s) and the necessary testing, mobility/transportability, and packaging requirements for the production of the CI(s). k) The drawings to be controlled by the acquirer have been compared with the equipment to ensure that the latest drawing changes have been incorporated into the equipment, that part numbers used for support by the acquirer agree with the drawings, and that the drawings are complete and adequately describe the equipment. l) The deliverable software has been compared to the listing of deliverables contained in the software version description (SVD). All required changes have been incorporated into both the specifications and the deliverable software, and the listing in the specifications exactly match the software being delivered. m) The deliverable software listing and related documentation have been compared to the listing of deliverables contained in the SVD to ensure that all documentation required for use of the software is correctly identified in the SVD. n) Comparison of run-time code generated from the software listings being audited matches the run-time code that successfully passed OT&E. o) The parts being used in the hardware design as listed on the drawing parts lists and as installed in the audit article have been compared to the applicable program parts selection list (PPSL) to ensure that only approved parts are being used.

Product	PCA acceptability criteria
Program execution and process control	a) All technical baselines—functional, allocated and product—are complete, current and consistent and are under configuration control. b) The CCB is processing configuration changes in accordance with industry standards, supplier instructions, processes, and procedures, and maintaining the proper configuration baselines.
Validation (OT&E results)	a) Acceptance test procedures and test results are consistent with the corresponding product specification requirements. b) The acceptance test procedures have been reviewed to ensure that the testing has been properly completed and certified. c) The PCA articles have been examined to ensure that the inspection/receiving document adequately defines the hardware/software and that all applicable deficiencies are listed on the inspection/receiving document.

6.11.2 PCA preparation

Table 38 lists the actions that should be considered during preparation for the PCA. The responsible people listed are those most often tasked with the listed preparation actions, but the acquirer and supplier may agree to assign the actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 38—PCA preparation actions

Responsible person	PCA preparation actions
Program manager	a) Approve, fund, and staff the PCA as planned in the SEP developed by the systems engineer. b) Continue to control class I changes to the system product baseline. c) Ensure the plan to FRP DR is contained in the applicable acquirer-supplier agreement documents including the SEMP, IMS, and IMP. d) Ensure the SEP includes objective SMEs to participate in the PCA. e) Appoint a PCA chair, in coordination with the systems engineer, no later than 45 days prior to the technical review. f) Coordinate a preliminary agenda between the program IPT, the supplier and other SMEs no later than 30 days prior to the PCA.
Systems engineer	a) Develop and execute the PCA plans with established quantifiable technical review criteria, carefully tailored to satisfy program objectives. b) Coordinate with CM and manufacturing SMEs and the production facility to develop an efficient approach to the PCA. c) Identify methods of examining the production-representative CI(s) (e.g., disassembly, inspection, and reassembly) and verify the CI(s) against related design documentation. d) Coordinate arrangements for PCA location and support. e) Ensure all of the audit products whose acceptability criteria are defined in Table 37 are completed for the PCA. f) Ensure the preparation and assembly of all audit material and any presentations required to be given to the PCA team are coordinated across IPTs.
Supplier	a) Submit the final product specification(s) for the system product baseline CI(s) to be audited to the acquirer for review prior to conduct of the PCA.

Responsible person	PCA preparation actions
Supplier *(continued)*	b) Submit documentation of inspection and test at point of manufacture as applicable for any end-items procured from subcontractors. c) Prior to the PCA date, submit the following information to the acquirer: 1) Names and roles of individuals who will participate in the PCA 2) Identification of the system product baseline CI(s) to be audited: i) Nomenclature ii) Specification identification number(s) iii) CI number(s) iv) Serial number(s) v) Drawing and part number(s) vi) Identification number(s) vii) Software inventory numbering system viii) Current listing of all deviations and waivers against the element(s) either requested of, or approved by, the acquirer
PCA chair	a) Determine PCA team membership. b) Approve the final PCA agenda. c) Identify any final tailoring of the Clause 6 PCA detailed criteria for the specific program. d) Identify any specific elements for in-depth technical review as required.

6.11.3 PCA conduct

Table 39 lists the technical review elements and associated content details that should be considered for the conduct of the PCA. Specific elements and their content details shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program.

Table 39—PCA conduct elements

PCA review element	Content details
Introduction, agenda, administrative	a) PCA location layout and safety procedures b) Security procedures if applicable c) Introduction of chair and team members d) Purpose of the audit e) PCA agenda f) Action item procedures g) Risk assessment procedures h) Program overview i) Status of action items from previous technical reviews
System product baseline	a) Status of drawings (including computer-aided design artifacts) and associated manufacturing instructions: 1) Number, title, approval date, discrepancies, comments 2) Comparisons of selected part numbers with the PPSL 3) Consistency of dimensions, tolerances, and finishes between drawings and manufacturing instructions 4) Identification of special processes 5) Incorporation of all approved changes 6) Identification of any differences between the physical configuration of CI(s) at FCA and PCA.

System product baseline *(continued)*	b) Status of deliverable software code, documentation, and media: 1) Software source listings and other product specification content 2) Design description consistency between top-level and low-level descriptions 3) Coverage of software users, programmers, operators and diagnostics manuals related to any data item descriptions included in the acquirer-supplier agreement 4) Actual CI delivery media—conformance with applicable requirements in the acquirer-supplier agreement c) Status of any nonconforming material d) Status of training material and support of training plan e) Status of certifications f) Approach to production acceptance testing g) Validation and completeness of non-software related operations and maintenance documentation h) Resources requirements to support production and deployment
Program execution and process control review	a) CCB process and CMP consistency b) FCA minutes for each CI being audited c) PCA minutes for each lower level CI d) Engineering release system—status and history of changes and configurations; traceability between assembly-level and low-level part numbers, and associated specifications e) Quality control system f) Manufacturing/production/construction process control
Validation (OT&E) results	a) Consistency of acceptance test procedures and results with the corresponding product specification requirements b) Review of completed and certified acceptance test procedures c) Review of the inspection/receiving document that defines the hardware/software, including any lists of deficiencies

6.11.4 PCA closure

Table 40 lists the actions that should be considered for PCA closure. The responsible people listed are those most often tasked with the listed closure actions. The acquirer and supplier may agree to assign the program manager and systems engineer actions to different people or organizations depending on a given program's organizational structure. Specific actions shall be deleted, modified, or additional items included, in accordance with the acquirer-supplier agreement, to support a given program. Responsibilities shall be assigned to people or organizations in accordance with the acquirer-supplier agreement.

Table 40—PCA closure actions

Responsible person	PCA closure actions
Program manager	a) If funding profiles are insufficient to support activities leading to, and supporting production, notify user/sponsor of funding shortfall and request funding profile adjustments. b) Determine that the readiness of manufacturing processes, quality management system and production planning (e.g., facilities, tooling and test equipment capacity, personnel, certification, process documentation, inventory management, supplier management) provide low risk assurances for supporting FRP or FD. c) Support preparation of the PCA summary report. d) Coordinate preparation of the PCA certification package.

Responsible person	PCA closure actions
Systems engineer	a) Support preparation of the PCA certification package. b) Monitor and control the execution of the PCA closure plans. c) Organize and supervise the responses to all action items generated during PCA. d) Support preparation of the PCA summary report. e) Produce corrective action plans if required, including any additional acceptance or qualification testing required by the PCA team, and manage to completion. f) Ensure the supplier records PCA accomplishment in the applicable system element development records. g) Ensure that the pre-established technical PCA criteria have been met to ensure the production capability forms a satisfactory, affordable, and sustainable basis for proceeding with FRP/FD. h) Advise the program manager on whether production capacity forms a satisfactory, affordable, and sustainable basis for proceeding with FRP. i) Ensure adequate plans and resources are in place to get from PCA to IOC and full operational capability (FOC). j) Ensure plans to get to FOC allow for contingencies. k) Ensure production implementation supports overall performance and R&M requirements. l) Ensure all information products required to be put under configuration control have been delivered to the configuration manager. m) Ensure all IMP and IMS tasks associated with conduct of the PCA have been successfully completed and documented as such.
Supplier	a) Record PCA accomplishment in the applicable system element development records. b) Support preparation of the PCA summary report and formal PCA minutes.
PCA chair	a) Ensure preparation of the PCA summary report and formal PCA minutes with the support of the program manager and systems engineer. b) Sign off final approval of all action items. c) Approve the PCA minutes. d) Approve and distribute the PCA summary report. e) Prepare and distribute the formal PCA closure letter.
Recorder	a) Collate all action items for submission to the PCA chair. b) Prepare the PCA summary report and formal PCA minutes for signature and distribution by the PCA chair. c) Prepare the contents of the PCA certification package.