The Technical Review and Audit process depends on objective documentation, analysis, and process plans. These documents are inherently part of the engineering process and are prepared to document the progress of a configuration managed design and historical design decisions. The correctness and completeness of these documents should be measured against clearly stated objective criteria defined in the acquirer-supplier agreement(s).

The program manager and systems engineer with assistance of the various program functional area experts should ensure that statements of work and contract data requirements list(s) (CDRL) in the acquirer-supplier agreements contain the required plans, specifications and analyses to support the Technical Review and Audit process.

A key technical plan that the acquirer should include in the supplier's CDRL is the supplier's SEMP. The SEMP documents the supplier's planning to implement and support each of the program's technical reviews and audits. The acquirer should ensure provisions are included in the acquirer-supplier agreement for the supplier to update the SEMP as required to ensure it remains aligned with the program SEP.

The SEP and SEMP should document the method and timing of the documentation delivery required for each technical review and audit such that they provide for acquirer SME review and adjudication of comments prior to the specific technical review or audit.

4.6 Media selection for products discussed in this standard

Various portions of this standard discuss specifications or the requirement to document other results. The focus of this standard in these cases is on content objectives and does not require any specific media (e.g., paper document) or any specific format.

5. Requirements for technical reviews and audits

5.1 General

This clause specifies the minimum normative properties for each technical review and audit to which defense program acquirers and suppliers shall agree. These properties are as follows:

a) Review or audit name

b) Purpose (why perform this technical review or audit?)

c) Description (what system properties does it address?)

d) Timing (when in the system life cycle or contract performance does it occur?)

e) Entry, content, and exit criteria

5.1.1 Clause 5 tailoring

5.1.1.1 Tailoring for a claim of full conformance

When claiming full conformance with the requirements of this standard, the acquirer shall tailor the contents of this clause only by deleting each technical review and audit not needed for the scope defined in a specific acquirer-supplier agreement.

5.1.1.2 Tailoring for a claim of tailored conformance

When claiming tailored conformance with the requirements of this standard, the acquirer shall tailor the contents of this clause by deleting each technical review and audit not needed for the scope defined in a specific acquirer-supplier agreement, and modifying as required the contents of the mandatory requirements in the remaining reviews and audits.

NOTE—Although certain technical reviews may be defined as mandatory, those definitions are beyond the scope of this standard since this standard is intended to be applicable to the largest possible domain of defense programs.

5.1.2 Accompanying detailed criteria

Each technical review and audit specified in this clause has a corresponding subclause in Clause 6 of this standard that contains detailed criteria for technical review or audit product acceptability, for technical review or audit preparation actions, for technical review or audit conduct and content, and for technical review or audit closure actions.

5.1.3 Detailed criteria tailoring

The acquirer and supplier shall achieve a tailored consensus on the content and criteria for each technical review or audit in this clause that is selected for a specific contract or other agreement during the agreement negotiations by deleting, modifying, or adding items in the tables of the four subordinate paragraphs for the corresponding subclause in Clause 6.

5.1.4 Detailed criteria normative content

The content of the subclause in Clause 6 corresponding to each technical review and audit specified in this clause shall become part of the normative content of that technical review or audit when tailoring is completed.

5.1.5 Detailed tailoring based on program type

Some programs may find the need to tailor the content of this standard at the program level to add numerous other reviews, based on program characteristics such as complexity, risk posture, nature, or specific domain. Some examples include Operational Readiness Review, System Readiness Review, and Transition Readiness Review. Tailoring at this level of detail is beyond the scope of this standard. Any tailoring required due to program type should be accomplished by service-level governance or acquirer PMOs or domains.

5.1.6 Clause 5 content application

5.1.6.1 Multiple instances of reviews and audits

Specific reviews or audits in this clause may be performed multiple times during the complete scope of work for a specific program. Multiple instances of a specific technical review or audit usually are performed to support an incremental approach that examines all the details of lower-level subsets of a complex system's hierarchy prior to a summary system-level technical review or audit. The content of this clause has been developed to state *what* actions and content should be included in each technical review or audit rather than the details of *how* those actions or content should be implemented so that the normative content of each subclause in this clause might be applied equally to each instance of its use.

5.1.6.2 Sequencing of multiple technical review or audit instances

If multiple instances of a given technical review or audit are incrementally performed for a system, the system-level technical review or audit shall be conducted only after all lower-level instances of that technical review or audit have been successfully performed and closed.

5.2 Alternative systems review (ASR)

5.2.1 ASR purpose

The ASR shall be conducted to help ensure the preferred materiel solution has the potential to affordably meet the user's needs and expectations, and that there is sufficient understanding of the technical maturity, feasibility, and risk of the proposed materiel solution.

5.2.2 ASR description

The ASR shall confirm that

a) The ASR-supported dialog between the end-user and the acquisition community leads to draft documentation of the preferred materiel solution’s functional and performance requirements.

b) The candidate materiel solutions considered in the analysis of alternatives (AoA) provide a broad and balanced evaluation of cost, schedule, performance, concepts of operations, and risk.

c) The preferred materiel solution resulting from the AoA has the best potential to be cost effective, affordable, operationally effective and suitable, and can be developed to provide a timely solution to the need at an acceptable level of risk.

d) Threshold requirements derived from the key performance parameters (KPP) and key system attributes (KSA) included in the draft capability development document (CDD) have been captured as threshold requirements in the system requirements documentation.

e) The decisions based on AoA recommendations, and additional constraints placed on the next phase of development are captured and documented.

5.2.3 ASR timing

The ASR shall be held after the system parameters for the preferred materiel solution are defined and that solution is balanced with cost, schedule, and risk.

5.2.4 ASR entry criteria

The ASR shall be conducted only after the following events have been successfully completed:

a) The acceptability criteria for each of the ASR technical review products have been established for the specific program by tailoring the contents of Clause 6, Table 1.

b) All preparatory actions in Clause 6, Table 2 as tailored for the specific program have been successfully accomplished to support conducting the technical review.

c) The acquirer and supplier concur that the preferred materiel solution, draft concept of operations (CONOPS), and technical plans support the case for a successful ASR as judged against the tailored product acceptance criteria.

d) Any prior technical reviews have been completed and their action items closed.

5.2.5 ASR content

5.2.5.1 Products to be reviewed at ASR

The following work products at a minimum shall be reviewed by the ASR team. Other products may be added as necessary during tailoring of Clause 6, Table 1 for the specific program.

a) Refined joint requirements

b) Initial architecture for the preferred materiel solution(s)

c) System functional and performance requirements documentation

d) Preferred materiel solution(s) documentation

e) Program risk assessment

5.2.5.2 Conduct of the ASR

ASR participants shall assess the ASR work products and judge the products' acceptability according to the applicable criteria in Clause 6, Table 1 as tailored for the specific program.

5.2.5.3 ASR outputs

a) The review team shall document sufficient assessment results to show the program has produced the following:

   1) An agreement on the preferred materiel solution to take forward into development
   2) Logical architectural constraints and drivers to address external interface requirements, standards, and system extensibility requirements
   3) A comprehensive rationale for the preferred materiel solution, including the results of the AoA that evaluated the relative cost, schedule, performance (hardware, human, software), and technology risks
   4) An updated (if necessary) risk and opportunity assessment and associated risk mitigation and opportunity handling plans
   5) Draft system requirements derived from the KPPs and KSAs
   6) Identification of critical technologies that will be prototyped

b) The ASR technical review summary report shall be distributed containing the following attachments:

   1) List of attendees
   2) Final copies of all presentations

3) Updated (if necessary) risk assessment, mitigation plans, and opportunity handling plans
4) Documented action items including those required for closure
5) The tailored Clause 6, Table 1 through Table 4 as completed following the technical review
6) Meeting minutes

5.2.6 ASR exit criteria

The ASR shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the technical review have been appropriately addressed.
b) All actions listed in the action items required for review closure have been completed and approved by the required parties.
c) The preferred materiel solution documentation is complete and acceptable according to the pre-defined acceptance criteria, and the solution has the potential to meet user needs.
d) Each of the technical review products listed in Clause 6, Table 1 as tailored for the specific program meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.
e) The acquirer and supplier concur that the program risk level is acceptable.
f) The ASR chair formally closes the review.

5.3 System requirements review (SRR)

5.3.1 SRR purpose

The SRR shall be conducted to help ensure the level of understanding of top-level system requirements is adequate to support further requirements analysis and design activities, and that the system can proceed into initial system design with acceptable risk.

5.3.2 SRR description

The SRR shall confirm that

a) The acquirer and supplier mutually understand the system requirements and performance requirements as captured in the system specification documentation, and that those requirements
    1) Are consistent with the preferred materiel solution (including its support concept)
    2) Are consistent with program budget, schedule, risk, user and other program-specific constraints
    3) Are feasible given available technologies for the preferred system solution
    4) Adequately consider the maturity of interdependent system elements
    5) Have bi-directional traceability with the set of source documents
    6) Have verification methods that are defined and agreed upon
    7) Can meet the program's objectives with manageable risk
b) All system requirements and performance requirements derived from the initial capabilities document (ICD), draft CDD, other acquirer source documentation, and acquirer-accepted requirements previously provided by suppliers' mission analysis or other supplier in-house

requirements definition are documented; and consistent with budget, schedule, risk, other program and system constraints, and with end-user expectations.

c) Technical requirements from all acquisition documentation [e.g., program protection plan (PPP), TEMP, reliability, availability, maintainability, and cost (RAM-C) rationale report] are allocated to specifications.

d) The technical requirements, including statutory and regulatory requirements, have been correctly and completely represented in the set of system requirements and can be developed within program budget and schedule constraints.

e) The level of understanding of top-level system requirements is adequate to support further requirements analysis, decomposition, allocation, and design activities.

f) Tailorable, derived, and correlated requirements are established within the framework of a candidate system logical architecture and fully derived functional segments.

g) System performance requirements, non-tailorable design requirements, tailorable design requirements, available technology, and program resources (funding, schedule, staffing, and processes) are understood and will support further definition of the system logical architecture.

5.3.3 SRR timing

The SRR shall be held when the level of understanding of top-level system requirements is adequate to support further requirements analysis and design activities.

5.3.4 SRR entry criteria

The SRR shall be conducted only after the following events have been successfully completed:

a) The acceptability criteria for each of the SRR technical review products have been established for the specific program by tailoring the contents of Clause 6, Table 5.

b) All preparatory actions in Clause 6, Table 6 as tailored for the specific program have been successfully accomplished to support conducting the technical review.

c) The acquirer and supplier have received evidence that the system specification, technical plans, and program budget estimate are sufficiently mature to support the case for a successful SRR as judged against the tailored product acceptance criteria.

d) Any prior technical reviews have been completed and its action items closed.

5.3.5 SRR content

5.3.5.1 Products to be reviewed at SRR

The following work products at a minimum shall be reviewed by the SRR team. Other products may be added as necessary during tailoring of Clause 6, Table 5 for the specific program.

a) System specification
b) Technical plans
c) Program risk assessment
d) Program life-cycle cost estimate

5.3.5.2 Conduct of the SRR

SRR participants shall assess the SRR work products and judge the products' acceptability according to the applicable criteria in Clause 6, Table 5 as tailored for the specific program.

5.3.5.3 SRR outputs

a) The review team shall document sufficient assessment results to show the program has produced the following:

   1) An approved preliminary system specification
   2) A preliminary allocation of system requirements to hardware, human, and software subsystems, with bi-directional traceability between the allocated requirements and the source documents
   3) Documented external interface requirements
   4) An approved product support plan (PSP) with updates
   5) Technical plans that are current and address the full scope of work
   6) A software development plan (SDP) that adequately addresses the software-specific acceptability criteria in the tailored Clause 6, Table 5 technical plans section
   7) An updated (if necessary) risk and opportunity assessment and associated risk mitigation and opportunity handling plans
   8) A determination that the system requirements, preferred system solution, available technology, and program resources form a satisfactory basis for proceeding

b) The SRR technical review summary report shall be distributed containing the following attachments:

   1) List of attendees
   2) Final copies of all presentations
   3) Updated (if necessary) risk assessment, mitigation plans, and opportunity handling plans
   4) Documented action items including those required for closure
   5) The tailored Clause 6, Table 5 through Table 8 as completed following the technical review
   6) Meeting minutes

5.3.6 SRR exit criteria

The SRR shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the technical review have been appropriately addressed.

b) All actions listed in the action items required for review closure have been completed and approved by the required parties.

c) Each of the technical review products listed in Clause 6, Table 5 as tailored for the specific program meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.

d) The acquirer and supplier concur that the program risk level is acceptable.

e) All affected baselines have been updated in the applicable configuration management (CM) system(s).

f) The SRR chair formally closes the review.

5.4 System functional review (SFR)

5.4.1 SFR purpose

The SFR shall be conducted to help ensure that the system under review can proceed into preliminary design with acceptable risk and that all system requirements and functional performance requirements derived from the approved preliminary system specification are defined and are consistent with the program budget, program schedule, risk, and other program and system constraints.

5.4.2 SFR description

The SFR shall confirm that

a) The system performance requirements, lower-level performance requirements, and plans for design and development form a satisfactory basis for proceeding to preliminary design.

b) Design decisions and supporting rationale are documented to support bi-directional traceability from the source of the requirement to the functional baseline and preliminary allocated baseline.

c) The lower-level performance requirements are fully defined and are consistent with the mature system concept.

d) The requirements analysis has progressed to the point that the proposed requirements baseline is accurate, comprehensive, and fulfills the user-specified performance requirements contained in the draft CDD.

e) Verification criteria and methods have been identified for all requirements, to be used during the SVR.

f) The preliminary allocated baseline reflects the proposed requirements baseline and is balanced with respect to performance, cost, schedule, risk, and potential for evolutionary growth.

g) The system functional baseline is technically achievable with regard to cost, schedule, and performance.

h) The life-cycle cost (LCC) for the evolving design is consistent with the program affordability constraints.

i) The preliminary physical architecture, program work breakdown structure, and contract work breakdown structure to be used subsequent to the SFR are all consistent.

j) Risks have been identified and mitigation plans are in place.

5.4.3 SFR timing

The SFR shall be held after the system functionality has been fully defined and all functional baseline documentation is complete.

5.4.4 SFR entry criteria

The SFR shall be conducted only after the following events have been successfully completed:

a) The acceptability criteria for each of the SFR technical review products have been established for the specific program by tailoring the contents of Clause 6, Table 9.

b) All preparatory actions in Clause 6, Table 10 as tailored for the specific program have been successfully accomplished to support conducting the technical review.

c) The acquirer program manager and systems engineer have received evidence that the system functional baseline is fully defined and sufficiently documented to support the case for a successful SFR as judged against the tailored product acceptance criteria.

d) Any prior technical review has been completed and its action items closed.

5.4.5 SFR content

5.4.5.1 Products to be reviewed at SFR

The following work products at a minimum shall be reviewed by the SFR team. Other products may be added as necessary during tailoring of Clause 6, Table 9 for the specific program.

a) System functional baseline documentation
b) Major system elements definition
c) Program risk assessment
d) Technical plans

5.4.5.2 Conduct of the SFR

SFR participants shall assess the SFR work products and judge the products' acceptability according to the applicable criteria in Clause 6, Table 9 as tailored for the specific program.

5.4.5.3 SFR outputs

a) The review team shall document sufficient assessment results to show the program has produced the following:

   1) An established system design traceable to the approved system specification (functional baseline).
   2) An updated (if necessary) risk and opportunity assessment and associated risk mitigation and opportunity handling plans.
   3) Current data to update the cost analysis requirements description (CARD) document, based on the supplier's proposed system functional baseline.
   4) An updated program development schedule including system and software critical path drivers.
   5) Initial requirement allocations to hardware configuration items (HWCI), software configuration items (SWCI), and humans.

b) The SFR technical review summary report shall be distributed containing the following attachments:

   1) List of attendees
   2) Final copies of all presentations
   3) Requirements compliance assessment to determine the degree to which each requirement in the system functional baseline documentation satisfies one or more of the requirements in the draft CDD
   4) Updated (if necessary) risk assessment, mitigation plans, and opportunity handling plans
   5) Documented action items including those required for closure

6) The tailored Clause 6, Table 9 through Table 12 as completed following the technical meeting minutes

5.4.6 SFR exit criteria

The SFR shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the technical review have been appropriately addressed.

b) All actions listed in the action items required for review closure have been completed and approved by the required parties.

c) Each of the technical review products listed in Clause 6, Table 9 as tailored for the specific program meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.

d) The acquirer and supplier concur that the program risk level is acceptable.

e) All affected baselines have been updated in the applicable CM system(s).

f) The SFR chair formally closes the review.

5.5 Preliminary design review (PDR)

5.5.1 PDR purpose

The PDR shall be conducted to help ensure the preliminary design for the system under review is sufficiently mature and ready to proceed into detailed design and can meet the stated performance requirements within program budget, schedule, risk, and other program and system constraints.

5.5.2 PDR description

The PDR shall confirm that

a) All system-level functional and performance requirements baselined at SRR and SFR have been correctly decomposed or directly allocated to the lowest level of the specification tree for all system elements uniquely identified.

b) Sufficient requirements trades have been conducted, supported by systems engineering trade-off analyses, to influence the system physical architecture and allocated requirements.

c) The allocated baseline is complete.

d) The design as disclosed satisfies all requirements in the approved system specification.

e) All external interfaces to the system, as defined at the SRR, have been documented in interface control documents.

f) All system internal interfaces (system element to system element) have been documented in interface control documents.

g) The verification approach to demonstrate achievement of all allocated performance requirements has been documented.

h) All design constraints have been captured and incorporated into the allocated requirements and the design.

i) Bi-directional traceability exists between the source requirements and the design elements for all decomposed and allocated requirements.

j) All system hardware element physical architectures are complete.

k) All system hardware element development specifications are complete.

l) The software logical and physical architectures are complete to the extent specified in the SDP for the point in its life cycle at which PDR occurs, based on the selected life-cycle model(s).

m) The set of system elements comprising the preliminary system design can achieve the complete set of allocated system baseline requirements, and forms a satisfactory basis for proceeding into detailed design with acceptable risk.

n) All critical technologies have been demonstrated in a relevant environment and can be integrated into a system with acceptable risk.

o) Risks have been identified and mitigation plans are in place.

5.5.3 PDR timing

The PDR shall be held when the acquirer and supplier concur that the system-level preliminary design and allocated baseline documentation are complete, and prior to the beginning of detailed design.

5.5.4 PDR entry criteria

The PDR shall be conducted only after the following events have been successfully completed:

a) The acceptability criteria for each of the PDR technical review products have been established for the specific program by tailoring the contents of Clause 6, Table 13.

b) All preparatory actions in Clause 6, Table 14 as tailored for the specific program have been successfully accomplished to support conducting the technical review.

c) The acquirer and supplier concur that the allocated baseline and the program budget estimate are sufficiently mature to support the case for a successful PDR as judged against the tailored product acceptance criteria.

d) Any prior system element level or incremental PDRs on which this PDR is dependent have been completed and their action items closed, or documented action items required for closure are acknowledged.

5.5.5 PDR content

5.5.5.1 Products to be reviewed at PDR

The following work products at a minimum shall be reviewed by the PDR team. Other products may be added as necessary during tailoring of Clause 6, Table 13 for the specific program.

a) System allocated baseline documentation
b) System functional or allocated baseline documentation
c) Technical plans
d) Program risk assessment
e) Program life-cycle cost estimate

5.5.5.2 Conduct of the PDR

PDR participants shall assess the PDR work products and judge the products' acceptability according to the acceptability criteria in Clause 6, Table 13 as tailored for the specific program.

5.5.5.3 PDR outputs

a) The review team shall document sufficient assessment results to show the program has produced

1) Technical data for the allocated baseline that are complete, satisfy the system specification, and provide a sufficient foundation for detailed design to proceed.
2) Bi-directional traceability between all decomposed and allocated requirements to the lowest level of the specification tree, demonstrating that each and every function in the functional baseline has been allocated to one or more of the system elements, that the physical hierarchy is consistent with the functional baseline, and that there are no orphan system elements.
3) Technical plans that are current and address the full scope of work.
4) An updated (if necessary) risk and opportunity assessment, and associated risk mitigation and opportunity handling plans.
5) Feasibility, budget, and schedule that are determined to be within acceptable risk margins.
6) A program IMS that has been updated (including systems and software critical path drivers) and includes all activities required to complete CDR (assuming same developer responsible for PDR and CDR).
7) Updates to the CARD that reflect the design in the allocated baseline.
8) Evidence to inform realistic requirements for EMD contract specifications.
9) Interface requirements contained in system external interface control documentation and internal interface control documentation.

b) The PDR technical review summary report shall be distributed containing the following attachments:

1) List of attendees
2) Final copies of all presentations
3) Updated (if necessary) risk assessment, mitigation plans, and opportunity handling plans
4) Documented action items including those required for closure
5) The tailored Clause 6, Table 13 through Table 16 as completed following the technical review
6) Meeting minutes

5.5.6 PDR exit criteria

The PDR shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the technical review have been appropriately addressed.
b) All actions listed in the action items required for review closure have been completed and approved by the required parties.
c) The content of corrective action plans for issues identified in the PDR is sufficiently complete and unambiguous to enable successful completion of all corrective actions.
d) Each of the technical review products listed in Clause 6, Table 13 as tailored for the specific program meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.
e) The acquirer and supplier concur that the program risk level is acceptable.
f) All affected baselines have been updated in the applicable CM system(s).
g) The PDR chair formally closes the review.

5.6 Critical design review (CDR)

5.6.1 CDR purpose

The CDR shall be conducted to help ensure that the detailed design for the system under review is adequate to proceed into fabrication, system integration, demonstration and test and can meet stated performance requirements within budget, schedule, risk, and other system constraints.

5.6.2 CDR description

The CDR shall confirm that

a) The initial product baseline is complete and describes the detailed design for production, fielding/deployment, and operations and support.

b) The system detailed design, down to the lowest system element level, is expected to satisfy the requirements of the system specification as derived from the CDD within current budget and schedule constraints.

c) The set of system elements comprising the detailed system design, including all internal and external interfaces, forms a satisfactory basis for proceeding into fabrication, integration and testing of pre-production versions of the system's HWCIs and SWCI(s) with acceptable risk.

d) The detailed design of each individual configuration item (CI) that is an integral part of the system under review can meet the stated performance and engineering specialty requirements of the CI development specifications within program budget, schedule, risk, and other program and system constraints.

e) The flowdown of requirements from the functional baseline to the lowest-level system detailed design element for each end item in the specification tree is complete and captured in each CI detailed design.

f) Bi-directional traceability exists between the source of the functional and allocated baselines and the lowest-level detailed design baselines.

g) The detailed designs for all external interfaces to the system satisfy the interface requirements contained in the system external interface control documentation defined at the PDR.

h) The detailed designs for all interfaces internal to the system elements satisfy the interface requirements contained in the system internal interface control documentation defined at the PDR.

i) Verification requirements to demonstrate achievement of all specified allocated performance characteristics have been documented.

j) All design constraints and considerations have been captured and incorporated into the allocated requirements and the detailed design.

k) All design items incorporate technologies that have been demonstrated in a relevant environment and can be integrated into a system with acceptable risk.

l) Critical manufacturing processes that affect the system's key characteristics have been identified and their capability to meet design tolerances has been demonstrated in a production-representative environment.

m) All system hardware element physical architectures and most detailed designs are complete.

n) Detailed designs are complete for all critical safety items (CSI) and critical application items (CAI).

o) Most system hardware element development specifications are complete.

p) Development specifications are complete for all CSIs and CAIs.

q) The software logical and physical architectures and detailed design are complete to the extent specified in the SDP for the point in its life cycle at which CDR occurs, based on the selected life-cycle model(s).

r) The program's decision management process documentation shows that key decisions are fully documented, executable and accompanied by sufficient rationale that supports each decision.

5.6.3 CDR timing

The CDR shall be held when the acquirer and supplier concur that the initial product baseline is complete, and when the system design is stable and is expected to meet system performance requirements and affordability goals.

5.6.4 CDR entry criteria

The CDR shall be conducted only after the following events have been successfully completed:

a) The acceptability criteria for each of the CDR technical review products have been established for the specific program by tailoring the contents of Clause 6, Table 17.

b) All preparatory actions in Clause 6, Table 18 as tailored for the specific program have been successfully accomplished to support conducting the technical review.

c) The acquirer and supplier concur that the initial product baseline and the program budget estimate is sufficiently mature to support the case for a successful CDR as judged against the tailored product acceptance criteria.

d) For the final CDR, any prior system element level or incremental CDRs have been completed and their action items closed.

5.6.5 CDR content

5.6.5.1 Products to be reviewed at CDR

The following work products at a minimum shall be reviewed by the CDR team. Other products may be added as necessary during tailoring of Clause 6, Table 17 for the specific program.

a) System product baseline documentation
b) System functional or allocated or product baseline documentation
c) Technical plans
d) Program risk assessment
e) Program life-cycle cost estimate

5.6.5.2 Conduct of the CDR

CDR participants shall assess the CDR work products and judge the products' acceptability according to the acceptability criteria in Clause 6, Table 17 as tailored for the specific program.

5.6.5.3 CDR outputs

a) The review team shall document sufficient assessment results to show the program has produced

    1) A documented system initial product baseline with approved HWCIs and SWCI(s).

2) Detailed design data for the initial product baseline that satisfy the system specification and that are sufficiently complete to support hardware fabrication and continued software implementation.
3) A documented and approved analysis with rationale supporting the conclusion that the initial product baseline satisfies the CDD.
4) Bi-directional traceability between all decomposed and allocated requirements to the lowest level of the specification tree and the system detailed design elements, demonstrating that each and every function in the functional baseline has been allocated to one or more of the system elements and that there are no orphan system elements in the detailed design.
5) Technical plans that are current and that address the full scope of work.
6) Corrective action plans for issues identified in the CDR.
7) An updated (if necessary) risk and opportunity assessment and associated risk mitigation and opportunity handling plans.
8) Feasibility, budget, and schedule that are determined to be within acceptable risk margins.
9) A program IMS that has been updated including fabrication, software implementation, test and evaluation, and critical path drivers.
10) Updates to the CARD based on the system initial product baseline.
11) An updated life-cycle sustainment plan (LCSP) including program sustainment development efforts and schedules based on current budgets, test evaluation results and firm supportability design features.

b) The CDR technical review summary report shall be distributed containing the following attachments:

1) List of attendees
2) Final copies of all presentations
3) Updated (if necessary) risk assessment, mitigation plans, and opportunity handling plans
4) Documented action items including those required for closure
5) The tailored Clause 6, Table 17 through Table 20 as completed following the technical review
6) Meeting minutes

5.6.6 CDR exit criteria

The CDR shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the technical review have been appropriately addressed.
b) All actions listed in the action items required for review closure have been completed and approved by the required parties.
c) The content of corrective action plans for issues identified in the CDR is sufficiently complete and unambiguous to enable successful completion of all corrective actions.
d) Each of the technical review products listed in Clause 6, Table 17 as tailored for the specific program meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.
e) The acquirer and supplier concur that the program risk level is acceptable.
f) All affected baselines have been updated in the applicable CM system(s).
g) The CDR chair formally closes the review.

5.7 Test readiness review (TRR)

5.7.1 TRR purpose

The TRR shall be conducted to assess test objectives, test methods and procedures, test scope, safety, readiness for acquirer and supplier development test and evaluation (DT&E), and whether test resources have been properly identified and obtained.

5.7.2 TRR description

The TRR shall confirm that

a) The system or system element(s) are sufficiently mature and stable in configuration to begin testing.

b) The test procedures together with the planned test data to be collected are sufficiently robust to verify satisfaction of the requirements set for which the test is intended to address.

c) Disciplined test processes are in place and the test procedures have been validated prior to use.

d) Sufficient test personnel and their collective skill sets are available, and their roles and responsibilities have been clearly defined.

e) The test team understands the system or system element capabilities to be tested and any vulnerabilities and limitations of the system element(s) under test sufficiently well to conduct the testing accurately.

f) Sufficient test facilities, data collection systems, calibrated test support equipment, and logistics support necessary to perform the planned test is available and assigned to the task.

g) Risks to equipment and human safety have been identified, analyzed, and addressed to mitigate potential hazardous outcomes.

5.7.3 TRR timing

The TRR shall be held prior to any formal testing for the record, when the acquirer and supplier agree that all applicable documentation for the system elements under test are sufficiently complete and that all planning for personnel, test facilities, logistics and support equipment is sufficiently robust to support a successful test.

5.7.4 TRR entry criteria

The TRR shall be conducted only after the following events have been successfully completed:

a) The acceptability criteria for each of the TRR technical review products have been established for the specific program by tailoring the contents of Clause 6, Table 21.

b) All preparatory actions in Clause 6, Table 22 as tailored for the specific program have been successfully accomplished to support conducting the technical review.

c) All applicable test procedures have been validated for use in formal testing for the record, by dry runs or alternative methods.

d) The acquirer and supplier concur that the results of any preliminary functional or pre-qualification testing form a satisfactory basis for proceeding with the TRR.

e) Any prior system element level or incremental readiness reviews have been completed and their action items closed.

5.7.5 TRR conduct

5.7.5.1 Products to be reviewed at TRR

The following work products at a minimum shall be reviewed by the TRR team. Other products may be added as necessary during tailoring of Clause 6, Table 21 for the specific program.

a) System technical documentation
b) Test environment
c) Program execution and process control
d) Risk assessment
e) Program life-cycle cost estimate and schedules

5.7.5.2 Conduct of the TRR

TRR participants shall assess the TRR work products and judge the products' acceptability according to the acceptability criteria in Clause 6, Table 21 as tailored for the specific program.

5.7.5.3 TRR outputs

a) The review team shall document sufficient assessment results to show the program has produced the following:
    1) A documented plan for addressing technical issues and obstacles that might occur during conduct of the test
    2) An updated (if necessary) risk and opportunity assessment and associated risk mitigation and opportunity handling plans
    3) Lists of potential anomalies, limitations and system vulnerabilities for the planned test event
    4) Verification that all planned preliminary or informal tests have been conducted and that the results satisfactorily indicate that the formal test event can begin
    5) Verification that the system elements under test are sufficiently mature, defined and representative to accomplish the planned test objectives
    6) Verification that the necessary safety releases from the program office have been provided to the testers prior to any test activities using personnel
    7) Completed and approved test plans and procedures for the planned test event
    8) Complete identification and allocation of all required test resources to the planned test
    9) A recommendation on readiness to commence testing
b) The TRR summary shall be distributed containing the following attachments:
    1) List of attendees
    2) Final copies of all presentations
    3) Updated (if necessary) risk assessment, mitigation plans, and opportunity handling plans
    4) Documented action items including those required for closure
    5) The tailored Clause 6, Table 21 through Table 24 as completed following the technical review
    6) Recommendation on readiness to commence the formal test event
    7) Meeting minutes

5.7.6 TRR exit criteria

The TRR shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the technical review have been appropriately addressed.
b) All actions listed in the action items required for review closure have been completed and approved by the required parties.
c) The content of corrective action plans for issues identified in the TRR is sufficiently complete and unambiguous to enable successful completion of all corrective actions.
d) Each of the technical review products listed in Clause 6, Table 21 as tailored for the specific program meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.
e) The acquirer and supplier concur that the risk level is acceptable.
f) The TRR chair formally closes the review.

5.8 Functional configuration audit (FCA)

5.8.1 FCA purpose

The FCA shall be conducted to ascertain that a CI's actual performance meets the requirements stated in the functional and allocated baseline documentation.

5.8.2 FCA description

The FCA shall confirm that

a) The CI's actual performance based on results of approved verification methods (test, demonstration, analysis, or inspection) satisfies the performance requirements in the functional and allocated baselines.
b) For those performance requirements that cannot be completely verified during testing, adequate analysis or simulation using approved methods has produced validated data to permit assessment of an acceptable risk level that system performance will satisfy those requirements.
c) The initial product baseline documentation (drawings, parts lists) accurately reflects the physical configuration for which the test data and any analysis and simulation data are verified.

5.8.3 FCA timing

The FCA shall be held when the acquirer and supplier concur that the CI development is complete and actual CI performance as documented in development test (DT), analysis, and simulation data is sufficient to show satisfaction of the functional and allocated baselines.

NOTE—A system-level FCA may be held concurrently with SVR.

5.8.4 FCA entry criteria

The FCA shall be conducted only after the following events have been successfully completed:

a) The acquirer has verified that actual CI performance satisfies the functional and allocated baselines.
b) The acceptability criteria for each of the FCA technical review products have been established for the specific program and CI by tailoring the contents of Clause 6, Table 25.

c) All preparatory actions in Clause 6, Table 26 as tailored for the specific program and CI have been successfully accomplished to support conducting the audit.

d) Any prior CI-level or incremental FCAs have been completed and their action items closed.

5.8.5 FCA content

5.8.5.1 Products to be reviewed at FCA

The following work products at a minimum shall be reviewed by the FCA team. Other products may be added as necessary during tailoring of Clause 6, Table 25 for the specific program and CI.

a) Functional, allocated and product baseline documentation
b) Program execution and process control
c) Verification results

5.8.5.2 Conduct of the FCA

FCA participants shall assess the FCA work products and judge the products' acceptability according to the acceptability criteria in Clause 6, Table 25 as tailored for the specific program and CI.

5.8.5.3 FCA outputs

a) The review team shall document sufficient assessment results to show the program has produced the following:

    1) Official, approved FCA minutes incorporating at a minimum the following items as part of the official record:

        i) All test plans, specifications, descriptions, procedures, reports, and test data that were reviewed by the FCA team

        ii) A complete list of successfully accomplished functional tests

        iii) A complete list of any functional tests required by the system specification or other test plans that have not yet been performed

        iv) Partial FCA completion status for any CIs whose functional test completion is contingent on higher-level integration testing

        v) Audit results for each of the work product categories assessed during the audit

        vi) Configuration identification documentation that comprehensively defines the system product baseline configuration that is the object of the FCA work products

    2) An FCA team assessment of the CI's satisfaction of its functional and allocated requirements

b) The FCA technical audit summary report shall be distributed containing the following attachments:

    1) List of attendees

    2) Final copies of any presentations given to the FCA team

    3) FCA minutes

    4) The FCA team's assessment of the CI's satisfaction of its functional and allocated requirements

5.8.6 FCA exit criteria

The FCA shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the audit have been appropriately addressed.
b) All actions listed in the action items required for review closure have been completed and approved by the required parties.
c) The content of corrective action plans, if any, for issues identified in the FCA is sufficiently complete and unambiguous to enable successful completion of all corrective actions.
d) Each of the technical review products listed in Clause 6, Table 25 as tailored for the specific program and CI meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.
e) All baselines in the applicable CM system(s) are current and consistent with the audited FCA work products.
f) The FCA chair formally closes the audit.

5.9 System verification review (SVR)

5.9.1 SVR purpose

The SVR shall be conducted to verify that the as-tested system meets the requirements in the system functional baseline and is ready to proceed to the next phase with acceptable risk.

5.9.2 SVR description

The SVR shall confirm that

a) The system correctly and completely implements the system requirements, and system development and applicable implementation and integration are complete.
b) The system satisfies the requirements in the functional baseline and therefore has a high likelihood of meeting the user's requirements documented in the CDD or capability production document (CPD).
c) The product baseline documentation (drawings, parts lists) accurately reflects the physical configuration for which the test data and any analysis and simulation data are verified.
d) Complete, detailed, bi-directional traceability has been maintained between the system requirements and the current approved version of the product baseline.
e) System specification requirements allocated to commercial off-the-shelf (COTS) or government-furnished equipment items that do not have development specifications are satisfied with test results.

5.9.3 SVR timing

The SVR shall be held following completion of system-level DT&E, and CI-level FCAs.

NOTE—The SVR may be held concurrently with system-level FCA.

5.9.4 SVR entry criteria

The SVR shall be conducted only after the following events have been successfully completed:

a) CDR has been successfully completed, all CDR action items have been closed and any corrective actions have been successfully completed.

b) The FCA has verified that the as-tested CIs satisfy the requirements in the functional and allocated baselines.

c) The acceptability criteria for each of the SVR technical review products have been established for the specific program by tailoring the contents of Clause 6, Table 29.

d) All preparatory actions in Clause 6, Table 30 as tailored for the specific program have been successfully accomplished to support conducting the technical review.

e) The acquirer and supplier concur that all system qualification testing and system-level DT&E have been successfully completed.

5.9.5 SVR content

5.9.5.1 Products to be reviewed at SVR

The following work products at a minimum shall be reviewed by the SVR team. Other products may be added as necessary during tailoring of Clause 6, Table 29 for the specific program.

a) System functional and product baseline documentation
b) Technical plans
c) Program execution and process control
d) Risk assessment
e) Program life-cycle cost estimate and schedule
f) Verification results

5.9.5.2 Conduct of the SVR

SVR participants shall assess the SVR work products and judge the products' acceptability according to the acceptability criteria in Clause 6, Table 29 as tailored for the specific program.

5.9.5.3 SVR outputs

a) The review team shall document sufficient assessment results to show the program has produced the following:

    1) Official, approved SVR minutes incorporating at a minimum the following items as part of the official record:

        i) The specific versions under configuration control of the system functional and product baselines examined during the technical review

        ii) List of all test plans, descriptions, procedures, reports and validated test data that were reviewed by the SVR team

        iii) Review results for each of the work product categories assessed during the technical review

    2) Verification that system requirements are fully satisfied in the system's current configuration

    3) An updated (if necessary) risk and opportunity assessment and associated risk mitigation and opportunity handling plans

    4) An SVR team assessment that the system (as documented in the current product baseline) has a low risk of failure during operational test and evaluation (OT&E)

b) The SVR technical review summary report shall be distributed containing the following attachments:

   1) List of attendees
   2) Final copies of any presentations given to the SVR team
   3) SVR minutes
   4) Updated (if necessary) risk assessment, mitigation plans, and opportunity handling plans
   5) The SVR team's recommendation that the program's technical readiness is sufficient to enter the Production and Deployment phase
   6) The SVR team's assessment that the system has a low risk of failure during OT&E

5.9.6 SVR exit criteria

The SVR shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the technical review have been appropriately addressed.
b) All actions listed in the action items required for review closure have been completed and approved by the required parties.
c) The content of corrective action plans, if any, for issues identified in the SVR is sufficiently complete and unambiguous to enable successful completion of all corrective actions.
d) Each of the technical review products listed in Clause 6, Table 29 as tailored for the specific program meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.
e) The acquirer and supplier concur that the risk level is acceptable.
f) All baselines in the applicable CM system(s) are current and consistent with the audited SVR work products.
g) The SVR chair formally closes the review.

5.10 Production readiness review (PRR)

5.10.1 PRR purpose

The PRR shall be conducted to ascertain that the system design is ready for production and that the supplier has accomplished adequate production planning for entering low-rate initial production (LRIP) or full-rate production (FRP).

5.10.2 PRR description

The PRR shall confirm that

a) The supplier's production planning is sufficient to implement the product baseline within expected delivery schedules at targeted costs.
b) All required processes, materials, and skills required for production have been demonstrated in a pilot line environment.
c) The technical data package (TDP) is complete to the extent needed to support LRIP or FRP, such as drawings, comprehensive software documentation, specifications, standards, performance requirements, quality assurance (QA) provisions, and packaging details.

5.10.3 PRR timing

The PRR shall be held to support LRIP or FRP decisions.

5.10.4 PRR entry criteria

The PRR shall be conducted only after the following events have been successfully completed:

a) The action items from all previous technical reviews have been considered for production readiness impact and have been addressed as appropriate.
b) The acceptability criteria for each of the PRR technical review products have been established for the specific program by tailoring the contents of Clause 6, Table 33.
c) All preparatory actions in Clause 6, Table 34 as tailored for the specific program have been successfully accomplished to support conducting the technical review.
d) Any prior system element level or incremental PRRs have been completed and their action items have been either closed or have agreed-upon closure plans.

5.10.5 PRR content

5.10.5.1 Products to be reviewed at PRR

The following work products at a minimum shall be reviewed by the PRR team. Other products may be added as necessary during tailoring of Clause 6, Table 33 for the specific program.

a) Verified system product baseline documentation
b) Technical plans
c) Program execution and process control
d) Risk assessment
e) Program life-cycle cost estimate and schedule

5.10.5.2 Conduct of the PRR

PRR participants shall assess the PRR work products and judge the products' acceptability according to the acceptability criteria in Clause 6, Table 33 as tailored for the specific program.

5.10.5.3 PRR outputs

a) The review team shall document sufficient assessment results to show the program has produced the following:

    1) Official, approved PRR minutes incorporating at a minimum the following items as part of the official record:

        i) All plans, specifications, descriptions, procedures, reports and validated test data that were reviewed by the PRR team
        ii) A complete list of PRR attendees
        iii) Completed action item forms
        iv) Test results for pre-production and production processes
        v) Review results for each of the work product categories assessed during the technical review

vi) Configuration identification documentation that completely defines the system product baseline configuration that is the object of the PRR work products

2) A PRR team assessment that the following conditions have been adequately met:

i) The final system design is producible

ii) The program's production capability and capacity form a satisfactory basis for proceeding into LRIP and/or FRP

3) An updated (if necessary) risk and opportunity assessment, and associated risk mitigation and opportunity handling plans

b) The PRR technical review summary report shall be distributed containing the following attachments:

1) List of attendees
2) Final copies of any presentations given to the PRR team
3) PRR minutes
4) Updated (if necessary) risk assessment, mitigation plans, and opportunity handling plans
5) The PRR team's assessment of the system product baseline's satisfaction of all its functional and allocated requirements, and that it is producible within the program budget, schedule and acceptable risk levels

5.10.6 PRR exit criteria

The PRR shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the technical review have been appropriately addressed.
b) All actions listed in the action items required for review closure have been completed and approved by the required parties.
c) The content of corrective action plans, if any, for issues identified in the PRR is sufficiently complete and unambiguous to enable successful completion of all corrective actions.
d) Each of the technical review products listed in Clause 6, Table 33 as tailored for the specific program meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.
e) The acquirer and supplier concur that the production risk level is acceptable.
f) All baselines in the applicable CM system(s) are current and consistent with the audited PRR work products.
g) The PRR chair formally closes the review.

5.11 Physical configuration audit (PCA)

5.11.1 PCA purpose

The PCA shall be conducted to determine conformance of the as-built configuration of a validated CI with its design documentation, and to verify the product baseline.

5.11.2 PCA description

The PCA shall confirm that

a) The drawing release system, nomenclature, unique identification numbers, part numbers, manufacturing processes, software development processes and documentation, quality control system, measurement and test equipment, and training are adequately planned, followed, and controlled.

b) The acceptance testing requirements, prescribed by the documentation, are adequate for acceptance of production units of the corresponding CI(s) by quality assurance activities.

c) All production-related activities (tooling, acceptance/inspection equipment, instructions, molds, jigs, and make-buy decisions) are focused on a validated and accurate design.

d) Any CIs that were affected or redesigned after completion of the FCA now meet all requirements allocated to the CIs.

e) Any testing deficiencies have been resolved and appropriate changes implemented.

f) Any system changes to the product baseline occurring after FCA (including changes during OT&E) have been incorporated into the product baseline.

g) The formal examination of the validated system confirms agreement with the configuration-controlled product baseline.

h) The TDP (as defined in MIL-STD-31000A [B9]) is complete to the extent needed to support program objectives.

5.11.3 PCA timing

The PCA shall be held after successful completion of OT&E and system validation, but prior to the full-rate production or full deployment (FD) decision review and operational use.

5.11.4 PCA entry criteria

The PCA shall be conducted only after the following events have been successfully completed:

a) A PRR if conducted has been successfully completed.

b) The acceptability criteria for each of the PCA technical review products have been established for the specific program and CI by tailoring the contents of Clause 6, Table 37.

c) All preparatory actions in Clause 6, Table 38 as tailored for the specific program and CI have been successfully accomplished to support conducting the technical review.

d) Any prior CI-level or incremental PCAs have been completed and their action items closed.

e) Successful completion of OT&E and resolution of OT&E results.

5.11.5 PCA content

5.11.5.1 Products to be reviewed at PCA

The following work products at a minimum shall be reviewed by the PCA team. Other products may be added as necessary during tailoring of Clause 6, Table 37 for the specific program.

a) Verified system product baseline documentation

b) Program execution and process control

c) Validation (OT&E) results

5.11.5.2 Conduct of the PCA

PCA participants shall assess the PCA work products and judge the products' acceptability according to the acceptability criteria in Clause 6, Table 37 as tailored for the specific program and CI.

5.11.5.3 PCA outputs

a) The review team shall document sufficient assessment results to show the program has produced the following:

   1) Official, approved, PCA minutes incorporating at a minimum the following items as part of the official record:

      i) All specifications, drawings, descriptions, procedures, and reports that were reviewed by the PCA team

      ii) A list of any differences between the configuration of the CI(s) qualified and the element(s) being audited

      iii) Audit results for each of the work product categories assessed during the audit

      iv) Configuration identification documentation that completely defines the system product baseline configuration that is the object of the PCA work products

   2) Approved hardware and software product baselines, TDP, and other baselined documentation

   3) Determination that the design and manufacturing documentation matches the formally qualified CI(s) assessed during the PCA

   4) Determination that the audited documentation can be used for full rate production or full deployment of the audited CI(s), or for replication of one-of-a-kind elements

b) The PCA technical audit summary report shall be distributed containing the following attachments:

   1) List of attendees

   2) Final copies of any presentations given to the PCA team

   3) PCA minutes

   4) The PCA team's certification that the CI(s) have been built in accordance with the drawings and specifications

5.11.6 PCA exit criteria

The PCA shall be deemed completed only after the following events have been successfully completed:

a) All action items submitted during the audit have been appropriately addressed.

b) All actions listed in the action items required for review closure have been completed and approved by the required parties.

c) The content of corrective action plans, if any, for issues identified in the PCA is sufficiently complete and unambiguous to enable successful completion of all corrective actions.

d) Each of the technical review products listed in Clause 6, Table 37 as tailored for the specific program and CI meets all of its acceptability criteria, or has a corrective action plan documenting the corrective actions required to achieve acceptability.

e) All baselines in the applicable CM system(s) are current and consistent with the audited PCA work products.

f) The PCA chair formally closes the audit.