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telescope
array

CTAO Acceptance Process

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Abbreviations	
ACRV	Acceptance Review
AD	Applicable Document
AIV	Assembly, Integration, and Verification
EDMS	Electronic Documentation Management System
CCB	Configuration Control Board
CDR	Critical Design Review
CI	Configuration Item
CIDL	Configuration Item Data List
CM	Configuration Management
CR	Change Request
CTAO	Cherenkov Telescope Array Observatory
IKC	In-Kind Contribution
NCR	Non-Conformance Report
PM	Project Manager
PO	Project Office
QA	Quality Assurance
RAM	Reliability, Availability, and Maintainability
RD	Reference Document
RFW	Request for Waiver
SDMC	Science Data Management Centre
SE	Systems Engineering
SOW	Statement of Work
SW	Software
TRR	Test Readiness Review
WP	Work Package

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1 Introduction

This document describes the acceptance process to be applied by the CTAO for the acceptance of, among others, infrastructure, equipment, instrumentation, or software deliverables for the Cherenkov Telescope Array Observatory (CTAO) legal entity.

The process described follows standard project management and engineering practices for projects of the size and complexity of the CTAO, and it is intended to be consistent with the CTAO Quality Plan [RD02]. Deviations from the process described herein require prior approval and shall be explicitly stated in the relevant Statement of Work or In-Kind Contribution (IKC) Agreement. It is noted that legal aspects related to the transfer of usage rights or ownership of products are not discussed in this document, as these are assumed to be defined in the corresponding legal documents, e.g., in IKC Agreements or contracts.

This document provides a general description of the CTAO acceptance process and its related principles, and it is expected that a tailored *Acceptance Plan*¹ is prepared for each deliverable, which shall be consistent with the applicable IKC Agreement(s) or contracts, and with the baseline process described herein. Furthermore, *Acceptance Review (ACRV) Plans* will be prepared for the acceptance review of each unit/release (or batch of units) to be accepted, with details about the review process, related documentation, participants, and logistics, among other information.

1.1 Purpose

A structured and clearly established approach for acceptances enables the consistency and transparency within the CTAO Construction Project, while allowing making decisions based on technical data and evidence.

The purpose of this document is to describe the responsibilities and activities related to the acceptance process of deliverables to the CTAO legal entity, as outlined in section 5.9 of [RD01].

The acceptance process entails activities and reviews that seek to confirm that infrastructure, equipment, software and/or any other deliverables described in a Statement of Work (SOW) or in an IKC Agreement, which are delivered to the observatory

- are complete and correspondingly documented,
- meet applicable requirements,
- are safe to be used (if applicable).

The process also allows to settle the start-date of the deliverable's warranty period, according to what is defined in the corresponding IKC Agreement or contract with industrial suppliers. In addition, it should assess the readiness of the deliverables for integration with other elements of the CTA Observatory.

This acceptance process document does NOT provide definitions related to legal matters, as these are assumed to be defined within corresponding IKC Agreements, contracts, or in within institutional policies (e.g., in case of procurements within the framework for the Hosting Agreements).

¹ For deliverables from industrial suppliers this can be included already in the corresponding Statement of Work (SOW).

1.2 Scope

The process described in this document applies, among others, to any infrastructure, equipment, instrumentation, or software deliverable that is going to be integrated into the CTAO Observatory. It includes deliverables from IKC providers that have been defined in the corresponding IKC Agreements, as well as deliverables that are contracted by the CTAO legal entity or within the framework for the Hosting Agreements. For a detailed break-down of the anticipated CTAO deliverables please refer to the Product Break-down Structure (PBS) [RD05].

It is noted that the process described herein is similarly applicable to deliverables defined in the PBS that are developed “in-house” by an IKC provider, as well as to those that have been contracted to third parties (e.g., to industry). It is noted that this process applies only to the acceptance of products by the CTAO legal entity, i.e., it does not apply to the IKC-internal acceptance of sub-products, components, materials, or software from third parties (e.g., via sub-contracts). Here a special case is the delivery of products from one IKC Team to another IKC Team, which should be agreed by the involved teams on a case-by-case basis, and which is not covered by the present document.

1.3 Reference documents

The documents listed below provide reference information for this process to the extent specified and described herein, and the latest version shall be considered unless specified otherwise:

RD01	CTA Project Management Plan (CTA-PLA-MGT-000000-0003)
RD02	CTA Construction Project Quality Plan (MAN-QA_110405)
RD03	CTAO Configuration Management Plan (CTA-PLA-MGT-000000-0002)
RD04	CTAO Documentation Control Plan (CTA-PLA-MGT-000000-0009, in preparation)
RD05	CTAO Product Breakdown Structure (in preparation)

2 Overview

Acceptance is a process conducted to decide whether a deliverable is ready to be handed over from the provider, be it an IKC provider or an industrial supplier, to the CTAO. A structured and clearly established approach for acceptances enables the consistency and transparency within the CTAO Construction Project, while allowing making decisions based on technical data and evidence.

The following diagram (Fig. 1) shows the high-level workflow from the definition of requirements, over their verification to the acceptance of a product (note: the titles on the left refer to the related CTAO documentation for each step):

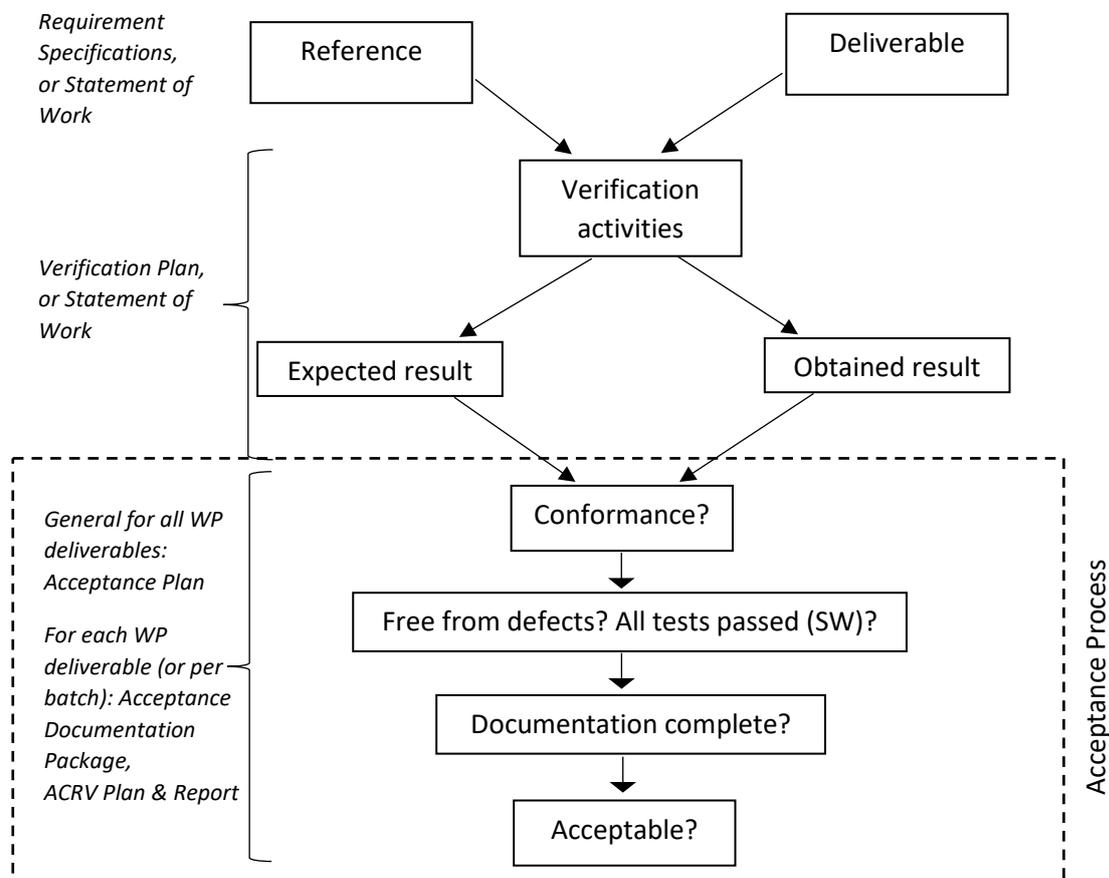


Figure 1: CTAO Acceptance Process - Overview: the acceptance process is based on the preceding verification steps, it should proof that the product is free from defects and that the documentation is complete, to allow making an informed recommendation on the acceptance of the deliverable.

In general, each deliverable to the CTAO, be it hardware or software, will be provided by an IKC provider or an industrial supplier who will fully demonstrate that each of their deliverables meets the applicable requirements. After formal acceptance by CTAO, the deliverable will be integrated into the Observatory.

As described in [RD01], an acceptance shall follow general acceptance procedures defined and implemented by CTAO. In general, the acceptance process considers two major milestones²:

1. **Provisional Acceptance** of an IKC or third-party deliverable by the CTAO legal entity, which implies that equipment, infrastructure, or a software application³, can be used, operated and/or integrated into the system at the target site(s), and responsibilities related to safety (if applicable), operations, and maintenance (except warranty work) are transferred from the provider to the CTAO, as defined in the corresponding IKC Agreement or contract.
 - a. If deemed convenient, an incremental acceptance approach can be used, for example:
 - i. A first part of the acceptance review could be planned to take place after a deliverable has been tested/verified at the Contributor's (or Contractor's) facility, and a second part could consider a health check and performance tests after shipment (or deployment) of a product to (or at) the target site.
 - ii. In case of software products, intermediate acceptance events could be planned for incremental releases of the deliverable.
 - b. When the acceptance process is split over several incremental events, the last one would conclude the provisional acceptance. The related, incremental steps shall be defined in the corresponding *Acceptance Plan* (see section 5.1).

Provisional Acceptance is the formal recognition by CTAO that the deliverable item subject to the acceptance process is compliant with the relevant requirements and interface specifications, and with safety regulations (if applicable).

2. **Final Acceptance** of an IKC or third-party deliverable by the CTAO legal entity: Once the warranty period has expired and when all obligations of the provider have been fulfilled, including the implementation of remedial actions following possible reservations or open works from *Provisional Acceptance* as well as responses to warranty claims made during the warranty period, *Final Acceptance* can be granted for the corresponding deliverable. This is the formal recognition that the delivering party has fulfilled all its obligations as specified in the respective IKC Agreement or contract.

² The definitions of *Provisional* and *Final Acceptance* in this document are different from the ones used in the IKC Framework and IKC Agreement Template. The definitions will be made identical depending on the decision of the (future) ERIC Council.

³ Software applications here correspond to deliverables such as ACADA, DPPS, SUSS, and SOSS, but not to software that is part of a deliverable (a telescope, for example), in which case the software application should be considered part of that deliverable's package at time of acceptance.

3 Acceptance definitions

Incremental Acceptance Process	Corresponds to an acceptance process for a specific deliverable (or set of deliverables) that is separated into several, incremental steps. For example, first steps of the process could connect to verification tests that are performed at a factory, or at a local test facility (in case of software products), and further verification could follow shipping and erection, or deployment (in case of software products), at the target site(s). Intermediate reviews of the verification results would be performed, culminating in an Acceptance Review (ACRV).
Acceptance Review (ACRV)	Review that examines the deliverable’s acceptance documentation package, seeking to confirm that all issues and action items from prior reviews and incremental acceptance events have been addressed, to verify the as-built status of the element and differences from the Design Baseline, to evaluate test results and inspection results against specification and interface requirements, to check the compliance with safety requirements and regulations (if applicable), and to review the applicable non-conformances and Requests-for-Waiver (RFWs), among other items. The outcome of the Acceptance Review (ACRV) is a recommendation about the provisional acceptance of the element, including a list of related action items and deadlines.
Provisional Acceptance	If no major issues have been identified during the Acceptance Review, “Provisional Acceptance” of a deliverable can be granted by the CTAO Director to the supplying party. This implies that equipment, or a software application, can be used, operated and/or integrated into the system at the target site(s), and responsibilities related to safety (if applicable), operations, and maintenance (except warranty work) are transferred from the supplier to the CTAO, as defined in the corresponding IKC Agreement or contract. A “Provisional Acceptance Certificate” is issued by CTAO, and the warranty period (as established in the corresponding Statement of Work or IKC Agreement) would begin.
Provisional Acceptance with Reservations	If during the Acceptance Review a set of remedial actions is identified that needs further attention, and if the Acceptance Team ⁴ considers that none of these issues blocks the safe use of the deliverable, “Provisional Acceptance with Reservations” could be recommended, i.e., provisional acceptance would be conditioned to resolving first the pending action items. In this case integration activities and/or use of the deliverable could proceed, and a Provisional Acceptance Certificate could be issued where a description of the applicable reservations should be included. Once all remedial work is completed the reservations can be removed.
Final Acceptance	Once the warranty period has expired and when all obligations of the supplier have been fulfilled, including the implementation of remedial actions as well as responses to warranty claims made during the warranty period, “Final Acceptance” can be granted by the CTAO Director. A corresponding “Final Acceptance Certificate” is issued by CTAO and signed.

⁴ For the composition of the Acceptance Team please refer to section 4.2.

4 Organization

This section describes the organization and responsibilities related to the CTAO acceptance process.

4.1 Acceptance: roles and responsibilities

The delivering party (IKC provider, or an industrial supplier) is responsible for the due preparation for the acceptance process and its corresponding Acceptance Reviews (ACRVs), in collaboration with the CTAO Systems Engineering and/or CTAO-PO Task Groups. Specifically, these are the delivering party's responsibilities that are relevant in the context of the acceptance process:

- Preparation and update (using change control) of all documentation that has been identified to form part of the deliverable's configuration baseline (see [RD03] for details).
- Execution and/or coordination of the verification tests that have been defined for the acceptance review of the product(s) in the corresponding Verification Plan, including independent verification⁵ (where applicable), and the preparation of corresponding test reports.
- Provision of evidence of the deliverable's compliance with safety regulations (if applicable).
- Realization of quality assurance activities, including the preparation of related quality and/or workmanship inspection reports (if applicable).
- Provision of evidence of the deliverable's conformance with requirements, including a compliance matrix per deliverable. In case of detected non-conformances, coordination of remedial actions or, if deemed appropriate, the issuing of respective Requests-for-Waivers⁶ (RFWs, see [RD02] for details).
- Preparation of the Acceptance Review (ACRV) Plan (see Appendix B), with support from the CTAO-PO (provision of templates, guidance, support with logistics arrangements, etc.).
- Preparation of the Acceptance Review (ACRV) documentation package.
- Coordination of the ACRV events, including related communications, meeting preparations, and providing/coordinating facilities and/or logistics support for the ACRV event, if/as needed.
- Providing timely responses to the questions and/or discrepancies that are raised during the review process.
- Participating in the ACRV meeting(s), negotiating and agreeing on resulting action items and deadlines.
- Addressing the action items within the agreed time frames.

The involved CTAO Project Office (PO) members are responsible for chairing and participating in the Acceptance Reviews (ACRVs). Specific CTAO responsibilities related to the acceptance process include:

- Together with the delivering party, developing an *Acceptance Plan* (unless already defined in a corresponding Statement of Work), including the approach to be followed and the specific acceptance criteria that shall be applied.
- Supporting the preparation of *Acceptance Review(s)* (ACRVs) for a specific unit/release (or batch of units).

⁵ Independent verification could refer to certifications performed by third parties, e.g., in the context of industrial contracts.

⁶ Requests-for-Waivers (RFWs) would ideally be issued, and a resolution be obtained prior to the corresponding acceptance reviews.

- At acceptance events, reviewing the acceptance documentation package, raising questions and/or observed discrepancies.
- Defining and providing resources for the Acceptance Team, participating in the ACRV events, elaborating acceptance recommendations, including the recording, approval, and release of meeting minutes.
- Recording and monitoring of resulting action items and deadlines.
- Produce, approve, and release corresponding *Acceptance Certificate(s)*.

4.2 Acceptance process participants

From the delivering party side, as a reference the following roles are expected to be involved (note: this can depend on the particular deliverable, and the roles might be different in case of, e.g., an industrial contract):

- IKC/Work-package Manager
- Principal Investigator (or equivalent, if applicable)
- Systems Engineer (or equivalent)
- Quality Engineer (or equivalent)
- Lead Engineer(s)

The composition of the provider's team members that are going to participate at the ACRV shall be recorded in the *ACRV Plan* of the specific unit/release (or batch of units).

For each acceptance event a corresponding Acceptance Team shall be defined and assembled by the corresponding CTAO-PO Task Coordinator, in consultation with the CTAO Lead Systems Engineer, including as a baseline the following CTAO roles (or their delegates):

- CTAO-PO Task Coordinator or Lead Systems Engineer (chairperson)
- Project Scientist (if related to science performance)
- CTAO-PO Verification/Quality Engineer (if/as applicable)
- Safety Engineer (if applicable)
- A representative from the organization that is going to integrate and/or use the deliverable (e.g., CTAO Site Manager, or operations representative)

The exact composition and the names of the Acceptance Team members shall be recorded in the *ACRV Plan* (see section 5.7) of the specific unit/release (or batch of units).

4.3 Decision-making authority

While the Acceptance Team shall, as part of the ACRV, elaborate an acceptance recommendation, it is only the CTAO Director who can decide regarding *Provisional* or *Final Acceptance* of deliverables. These decisions shall be formalized via the issuing and signature of a corresponding *Acceptance Certificate*. It is noted that under certain circumstances, e.g., in case of industrial suppliers contracted within the framework for the Hosting Agreements, deviations of the *Acceptance Certificate* can be agreed to fulfill also the applicable, administrative requirements of the respective institute.

In case of an incremental acceptance approach, for example, via a first acceptance review event after factory tests, which could be followed by an ACRV upon assembly and testing at the target destination, the corresponding CTAO-PO Task Coordinator, in agreement with the CTAO Project Manager, can

authorize the progression of the intermediate acceptance phases, e.g., the authorization to ship a deliverable or to deploy a software application to/at the site. If delegation occurs, this shall be noted in the corresponding *ACRV Plan*.

4.4 Responsibilities before provisional acceptance

Prior to provisional acceptance, all responsibilities related to the deliverable remain with the IKC provider, or with the industrial supplier, as applicable.

4.5 Responsibilities after provisional acceptance

After *Provisional Acceptance (or Provisional Acceptance with Reservations)* has been granted for a deliverable, the CTAO is responsible for (unless specified differently in the agreement/contract):

- Preparing for use and/or integrating the product(s) into the Observatory at the target site(s).
- Ensuring the safety of personnel related to the delivered product(s), and of the product(s) themselves, as applicable.
- Operating and maintaining (except warranty work) the product(s), including making decisions about its use.
- Covering the costs related to the use, operation, and maintenance (except corrective maintenance under warranty) of the element.
- During the established warranty period, informing the delivering party of any non-conformances that are observed, providing corresponding records including supporting data and information.

The delivering party (IKC provider, or industrial supplier) is responsible for (unless specified differently in the agreement/contract):

- Analyze and implement remedial measures for any non-conformances that are reported by the CTAO during the established warranty period of the deliverable.

4.6 Responsibilities after final acceptance

Once the deliverable has reached *Final Acceptance*, the CTAO is responsible for (unless specified differently in the agreement/contract):

- All responsibilities listed already for *Provisional Acceptance*.
- Long-term maintenance including corrective maintenance and coordination of upgrades and improvements of the product.
- Decommissioning of the product at the end of its lifetime.

After *Final Acceptance* has been granted for a deliverable, the delivering party (IKC provider, or industrial supplier) has no more obligations related to the deliverable (unless agreed otherwise, e.g., for maintenance support).

5 Acceptance process

This section lists and describes the different activities related to the acceptance workflow (Fig. 2):

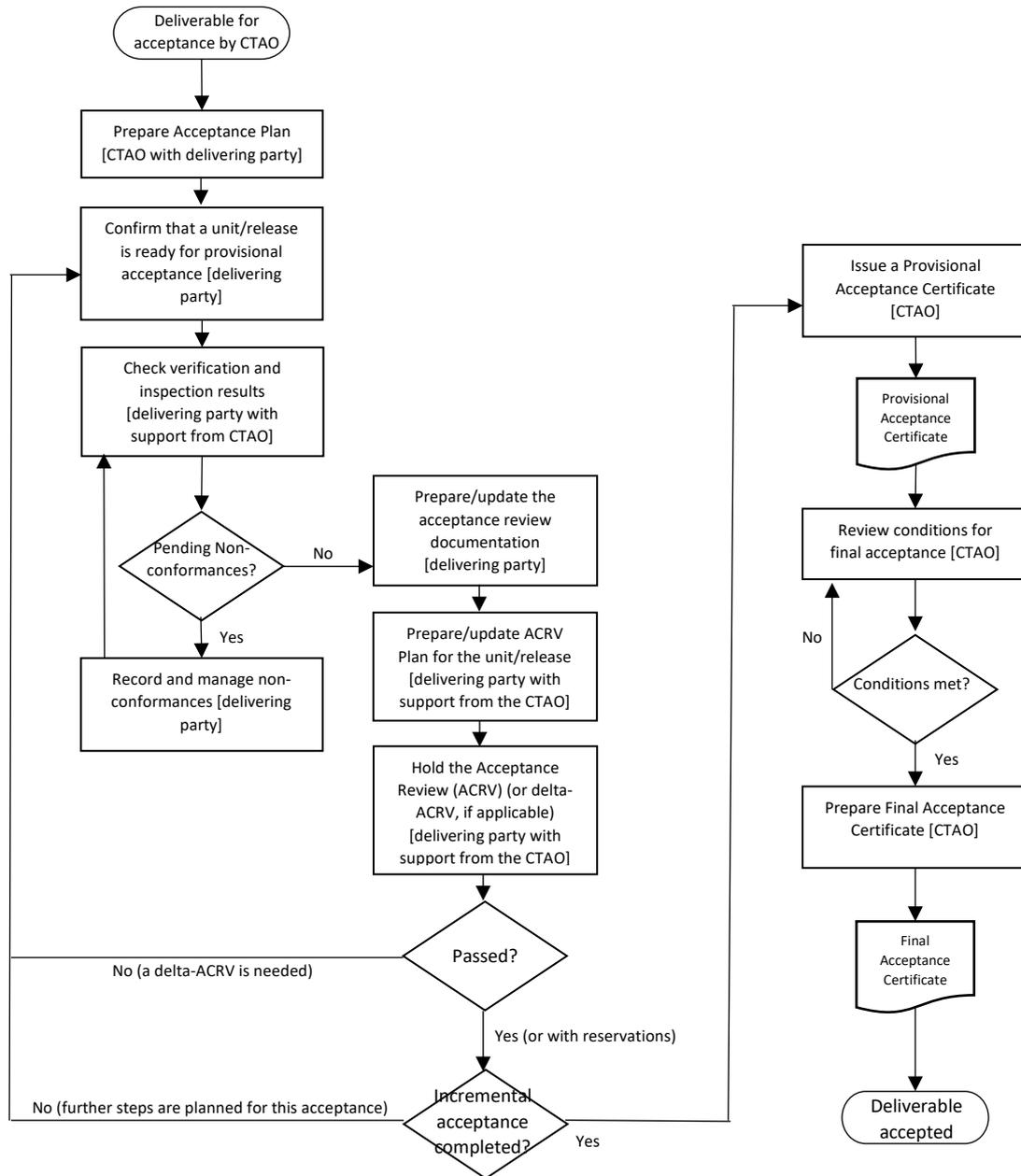


Figure 2: CTAO Acceptance Process - Workflow

5.1 Plan for acceptance

The acceptance process connects to what is established in the Verification Plan of the corresponding deliverable, which seeks to ensure that all applicable requirements and interfaces are verified correspondingly. Therefore, the acceptance process does not consider the execution of verification activities, but only the review of the results that were obtained by the prior verification process. It is assumed that the Verification Plans describe the detailed verification activities for each deliverable, either for single units, or correspondingly for a series of units.

Using the defined activities as a starting point, the CTAO-PO, with support from the delivering party (IKC provider, or industrial supplier), shall prepare an *Acceptance Plan* that shall be based on what is established in the respective IKC Agreement or contract, and which shall contain, at a minimum, the following information:

- Identification of the exact infrastructure, equipment, instrumentation, software application(s), etc., to be delivered.
- Number of items/units/releases anticipated that need to be accepted.
- Acceptance approach: provisional acceptance process steps, acceptance of the first unit/release, acceptance of the following units/releases (if applicable), acceptance in batches (if applicable), etc.
- Reference to the product's Verification Plan (which is expected to include also references to the verification procedures).
- Required, or reference to, quality assurance activities (e.g., workmanship inspections, quality and/or performance metrics, software testing, etc.).
- Description of how non-conformances detected during testing shall be recorded and managed (unless stated in a corresponding Quality Assurance Plan).
- Provision of resources required to perform inspections and/or other activities related to the acceptance process.
- Definition of roles and responsibilities within the team related to this acceptance process.
- Schedule information (if a series of items/units/releases).
- Composition of the acceptance documentation package (general outline only); shall be consistent with the respective Product Baseline (see section 4.1.3 of [RD03]) and IKC Agreement.

In case of industrial suppliers, the information listed above can also be part of the corresponding Statement of Work (SOW), in which case a separate *Acceptance Plan* does not have to be prepared (unless deemed convenient or required by related agreements, contracts, or institutional policies).

For an example Table of Content of an *Acceptance Plan* please refer to Appendix A. Upon completion of the document, it shall be approved by the representative of the delivering party, by the corresponding CTAO-PO Task Coordinator or by the CTAO Lead Systems Engineer, and be released by the CTAO Project Manager (see [RD04]).

5.2 Confirm item is ready for provisional acceptance

If the verification of a specific deliverable (product, or software release) is sufficiently advanced to enter the acceptance process, the delivering party (IKC provider, or industrial supplier) shall inform the corresponding CTAO-PO Task Coordinator.

It is assumed that, in case that a specific verification step/test did not pass, a related non-conformance report (NCR) was recorded using the approach/system described in the *Acceptance Plan* (see section 5.1). Furthermore, it is noted that verification for acceptance shall be performed only on items that are foreseen for production, i.e., shall not be performed on test, prototype, or pre-production units (unless it has been agreed that the unit is going to be delivered to the CTAO in that condition), nor on software test releases that differ from the production scope.

5.3 Check verification and inspection results

The verification of the deliverable for acceptance shall follow what has been defined in the applicable Verification Plan for the specific product (or batches of products).

The outcome of the verification of requirements by “inspection”, as defined in the deliverables Verification Plan, and/or quality and workmanship inspections defined in the deliverable’s Acceptance or QA Plan, shall be documented and due evidence of the inspection results shall be provided as part of the acceptance review documentation package. If the Acceptance Team has concerns or doubts about the inspector’s competence or the provided evidence, the Acceptance Team might raise this as a discrepancy that needs to be addressed.

5.4 Record and manage non-conformances

Any discrepancies found during verification tests (e.g., failed tests) and/or inspections (e.g., observed defects/discrepancies) shall be recorded following the approach defined in the respective Acceptance or QA Plan. This to ensure that:

- the (root) cause of the problem is properly evaluated,
- corrective-/preventive actions are agreed by all relevant disciplines and parties involved,
- corrective-/preventive actions are properly implemented.

At a minimum, the following information shall be recorded for each non-conformance or defect/discrepancy:

- date and time when the non-conformance or defect/discrepancy has been detected,
- exact identification of the item under test,
- detailed description of the non-conformance or defect/discrepancy,
- references (test procedures, test reports, configuration records, etc.).

Recorded non-conformances shall then be managed following the process described in the applicable Acceptance or Quality Plan. It is noted that a final disposition of the issue (e.g., rework/repair, return to supplier, scrap, use as-is) shall be determined and, in case it is proposed to use the deliverable as-is, a corresponding Request-for-Waiver (RFW) shall be issued to the CTAO (see [RD03]). CTAO will then assess whether the non-conformance is acceptable, or not.

5.5 Prepare acceptance review documentation package

Once no major non-conformances are pending, the detailed acceptance review documentation package shall be prepared/updated by the delivering party (IKC provider, or industrial supplier). This

shall include all documents that correspond to the Product Baseline (see section 4.1.3 of [RD03]), which corresponds to the “as-built” configuration that reflects the completed system. In addition, the specific documents identified in the applicable *Acceptance Plan* shall be included, among them the test and inspection reports, a summary compliance matrix, the final Configuration Item Data List (CIDL) and its derived As-Built Configuration List (ABCL) for the specific item/release that is proposed for acceptance.

5.6 Hold the Acceptance Review (ACRV)

When the acceptance documentation package is considered ready by the respective CTAO Task Coordinator or by the CTAO Lead Systems Engineer, an *Acceptance Review (ACRV)* shall be prepared by the delivering party. The preparation of the plan shall be supported by the respective CTAO Task Coordinator and/or by the CTAO Systems Engineering group, and the review be held either in person or via remote participation. The *Acceptance Review* shall address the following objectives:

- Confirm that all issues and action items from prior reviews (such as CDR or CDMR) and acceptance events have been closed, or that a plan to address the issues is in place (proposed solution with due date) and has been approved by the corresponding stakeholders.
- Verify the as-built status of the item and differences from the Design Baseline (see section 4.1.3 of [RD03]).
- Verify the compliance status of the deliverable(s) and check the consistency of reported non-conformances with corresponding Requests-for-Waiver (RFWs).
- Assess whether the deliverable is safe to be used and operated (including the status/plans for related training), if applicable.
- Review the Acceptance Documentation Package documentation for consistency, correctness, and completeness.
- Based on the above-mentioned information, issue a recommendation about the provisional acceptance of the element, including a list of related action items and deadlines.

For this purpose, and for each unit/release (or batch of units), the delivering party shall prepare an *ACRV Plan* (for an example Table of Content please refer to Appendix B), which shall contain, at a minimum, the following contents:

- Scope of the acceptance: identification of the unit/release (or batch of units) that are proposed to be accepted.
- If an intermediate ACRV event (for example, after verification tests have been performed at a factory, or at a local test facility in case of software products): scope of the intermediate acceptance review event, as established in the corresponding *Acceptance Plan*.
- Applicable documents: requirement specifications and interface control documents, or the corresponding Statement of Work (industrial supplier).
- Composition of the Acceptance Team (see section 4.2) and review participants.
- Information about review logistics, process, and agenda.
- Summary of pending action items from previous reviews.
- Detailed acceptance documentation package.

A typical acceptance review agenda would be as follows:

- Review of pending action items from previous reviews (design review, or from previous incremental acceptance events).
- Review the verification results and quality/inspection reports.
- Review of the compliance matrix.
- Assess, if applicable, related non-conformance reports and/or RFWs.
- Review of safety compliance (if applicable).
- Review the preparedness of the shipping/deployment of the deliverable and of the handover activities, including training, as applicable.
- Summary of action items.
- Recommendation for the acceptance (or for the specific incremental acceptance step).

At the acceptance review, the Acceptance Team shall issue a recommendation that can be one of the following possibilities:

- *Provisional Acceptance* (see definition in section 3): if there are no pending issues, or if these are considered “minor” by the Acceptance Team, provisional acceptance can be recommended. Similarly, in case provisional acceptance with reservation had been recommended before, once the Acceptance Team confirms that all open issues have been addressed satisfactorily the reservations can be removed. In case of updates after an ACRV meeting a corresponding addendum to the meeting minutes shall be prepared and the minutes be re-released.
- *Provisional Acceptance with reservations* (see definition in section 3): in case of pending issues (action items), of which none is considered a blocker for the safe and effective use of the deliverable by the Acceptance Team, acceptance conditioned to the resolution of the identified action items can be recommended. The recommendation shall be recorded in the ACRV meeting minutes.
- *Provisional Acceptance is not recommended*: this corresponds to those cases where the Acceptance Team considers that at least one pending issue blocks the safe and effective use of the deliverable in the CTAO system. Once the issue has been addressed, the relevant parts of the acceptance review shall be repeated (delta-ACRV). The statement shall be recorded in the minutes of the meeting, and in case of a delta-ACRV new meeting minutes shall be prepared.

The Acceptance Team shall propose a recommendation by consensus. If consensus cannot be reached the discussion shall be escalated to the next management level for resolution. Corresponding ACRV meeting minutes shall be jointly prepared, which shall also include the recommendation of the Acceptance Team (or a corresponding note if no consensus could be reached), and which shall be approved by the review chairperson, by a representative of the delivering party, by the CTAO-PO Task Coordinator or by the CTAO Lead Systems Engineer, and be released by the CTAO Project Manager. Both the ACRV plan and minutes documents shall follow the indications described in the CTAO Documentation Control Plan [RD04].

5.7 Intermediate incremental acceptance steps

If an intermediate Acceptance Review event had a positive outcome and recommendation, the delivering party should be authorized by the CTAO Lead Systems Engineer or CTAO-PO Task Coordinator, in agreement with the CTAO Project Manager, to proceed with the next phase of the acceptance process, for example, the shipment of the element to the target destination, or with the deployment of the application, in case of software products. All related steps shall be coordinated closely with the corresponding CTAO counterparts.

In case of shipping of equipment, the delivering party shall pursue all necessary, administrative aspects of the shipping, including - unless agreed otherwise – logistics coordination and insurance coverage during transport and until the asset reaches its delivery location as specified in the relevant IKC Agreement or contract, and/or similar aspects.

5.8 Issue a Provisional Acceptance Certificate

Upon confirmation of the provisional acceptance (or provisional acceptance with reservations) of a deliverable by the CTAO Director a corresponding *Provisional Acceptance Certificate* shall be prepared by the CTAO, containing at a minimum the following information:

- Applicable documents:
 - Corresponding IKC Agreement(s) and/or Statement of Work (SoW)
 - Provisional Acceptance Review(s) meeting minutes
 - CIDL(s) of the deliverables
- Exact identification of the delivered item(s)
- Date of provisional acceptance
- Description of applicable reservations (if any)
- Warranty period and specific agreements for the delivered item(s)
- A statement that the CTAO accepts the responsibility of using, operating and maintaining the product(s) (as defined in the corresponding IKC Agreement, contract, or institutional policy)

The *Provisional Acceptance Certificate* shall be signed by the representative of the delivering party (IKC provider, or by the industrial supplier) and by the CTAO Project Manager, and be released via the signature of the CTAO Director. In certain cases, e.g., when an industrial supplier is contracted within the framework for the Hosting Agreements, deviations to this *Provisional Acceptance Certificate* can be agreed to fulfill also the applicable, administrative processes of the contract holder.

A *Provisional Acceptance Certificate* shall follow the indications outlined in the CTAO Documentation Control Plan [RD04].

5.9 Review conditions for final acceptance

Once the warranty period has expired and when all obligations of the supplier have been fulfilled⁷, including the implementation of remedial actions as well as responses to warranty claims made during the warranty period, the corresponding CTAO-PO Task Coordinator or the CTAO Lead Systems

⁷ This process can be triggered by the IKC, if deemed necessary.

Engineer, in agreement with the CTAO Project Manager, shall review the conditions for recommending *Final Acceptance* of the deliverable to the CTAO Director.

The recommendation shall be documented via a corresponding *Recommendation for Final Acceptance – Summary Report*, which shall contain at a minimum the following information:

- Applicable documents:
 - Corresponding IKC Agreement(s) and/or Statement of Work (SoW)
 - Provisional Acceptance Certificate(s)
 - Acceptance Review meeting minutes
- Exact identification of the delivered item(s)
- List of applicable reservations (if any) and their status
- List of filed warranty claims (if any) and their status
- Final acceptance recommendation

The process of preparing the recommendation shall be performed timely so that the final certificate can be issued at the end of the agreed end-of-warranty period. The summary report shall be approved by the CTAO-PO Task Coordinator or by the CTAO Lead Systems Engineer, and be released by the CTAO Project Manager. The document shall follow the indications described in the CTAO Documentation Control Plan [RD04].

5.10 Issue a final acceptance certificate

Based on a positive recommendation (see section 5.9), *Final Acceptance* can be granted by the CTAO Director. A corresponding *Final Acceptance Certificate* shall be issued by the CTAO, containing at a minimum the following information:

- Applicable Documents:
 - Corresponding IKC Agreement(s) and/or Statement of Work (SoW)
 - The corresponding Provisional Acceptance Certificate(s)
- Exact identification of the delivered item(s)
- Date of final acceptance
- A statement that the CTAO confirms that there are no pending obligations of the provider related to the accepted product(s) (as defined in the corresponding IKC Agreement, contract, or institutional policy)

The approval and release process of this certificate shall follow the same steps outlined in section 5.8. Also here, in certain cases, e.g., when an industrial supplier is contracted within the framework for the Hosting Agreements, deviations to this *Final Acceptance Certificate* can be agreed to fulfill also the applicable, administrative processes of the contract holder.

6 Appendix A: Acceptance Plan (Example Table of Content)

- Introduction
 - Purpose
 - Scope
 - Applicable and Reference Documents
 - IKC Agreement and/or Statement of Work
 - Applicable requirements and interface control documents
 - Reference to the product's Verification Plan
 - Reference to the product's Quality Assurance Plan
- Deliverables
- Acceptance
 - Provisional acceptance approach
 - Incremental acceptance events (if applicable)
 - Acceptance criteria
 - Shipping, handling, and storage (HW) / Deployment (SW)
 - Documentation package
 - Training plan to CTAO personnel
- Management of non-conformances (unless covered in a corresponding QA Plan)
 - Workflow for the management of non-conformances
 - Tool for the management of non-conformances
 - Action item tracking
- Resources (unless covered in the Verification Plan)
 - Required tools, facilities, and equipment
 - Metrology/calibrations
 - Allocation of personnel
 - Roles and responsibilities
- Schedule

7 Appendix B: ACRV Plan (Example Table of Content)

- Introduction
 - Purpose
 - Scope
 - Applicable and Reference Documents
- Deliverables for acceptance
- Acceptance review objectives
- Participants
 - Acceptance Team
 - Presenters
 - Observers
- Acceptance
 - Process
 - Logistics
 - Agenda
- Summary of open actions from previous reviews
- Summary of applicable NCRs and RFWs
- Acceptance Documentation Package