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NATIONAL WEATHER SERVICE INSTRUCTION 30-302

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Operational Test and Evaluation NWSPD 30-3

OPERATIONAL TEST AND EVALUATION PROCESS

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SUMMARY OF REVISIONS: This instruction supersedes National Weather Service Instruction 30-302, *Field Test Process*, dated May 11, 2007, and includes the following changes:

Section 5.4, Test Review Group, includes the designated NWSEO representative as a voting member of the TRG.

Rewrote Appendix A as the decision making process is no longer a consensus but a simple majority vote for the TRG recommendation on whether to nationally deploy a system.

Signed by July 16, 2007
John McNulty Date
Director, Office of Operational Systems

Operational Test and Evaluation Process

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1. Introduction. This instruction supports National Weather Service Policy Directive 30-3, Operational Test and Evaluation, by delineating the process and procedures followed during Operational Test and Evaluation (OT&E). The tests described herein are administered by the Test and Evaluation Branch (OPS24) of the National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), Office of Operational Systems (OPS), Field Systems Operations Center (FSOC). This instruction describes the development, conduct, and reporting of OT&E.

2. References.

a. National Weather Service Policy Directive 30-3, Operational Test and Evaluation.

b. National Weather Service Policy Directive 80-2, System Commissioning and Decommissioning.

c. National Weather Service Instruction 80-201, System Commissioning Process.

d. National Weather Service Instruction 10-101, Change Management Process.

e. National Weather Service Instruction 30-301, System Test Process.

f. National Weather Service Policy Directive 60-7, Information Technology Security

Policy.

g. National Weather Service Instruction 30-1203, Configuration Management for Operational Systems.

h. National Weather Service Instruction 80-305, Master Test and Evaluation Plan.

3. Definitions. The following definitions apply for the purposes of this instruction.

3.1 Operational Test and Evaluation. An OT&E is a formal evaluation of a System-Under-Test that is conducted in an operational environment. An OT&E is conducted to evaluate the general fitness of the System-Under-Test for use in NWS field operations and to ensure that specific technical objectives have been met. An OT&E may be conducted during the commissioning of a new system into NWS operations, during the NWS Operations and Services Improvement Process (OSIP), or to evaluate a change in the baseline configuration of an existing system during the Change Management Process. An OT&E is conducted in coordination with Weather Service Headquarters, Regional Headquarters, Field Offices, and other Federal, state, and local agencies as required to fully evaluate the System-Under-Test. An OT&E considers all aspects of life cycle management of the system including: installation, documentation, performance, training, reliability, communications, information technology security, logistics, and maintenance support. An OT&E is performed after the successful completion of a Development Test and Evaluation (DT&E) and/or a System Test. An OT&E must be successfully completed prior to national deployment of the System-Under-Test.

3.2 System Commissioning. System commissioning is the process of applying technical and administrative judgment to determine when a major system can be officially used in the conduct of NWS operations. An OT&E is conducted during the commissioning process to verify that the commissioning criteria can be met when a new system is placed into NWS service operations.

3.3 System Test. A System Test is a formal evaluation of a System-Under-Test that is conducted in a simulated operational environment. The NWS maintains test bed facilities that may be used to simulate the conditions encountered at operational field sites. If the System-Under-Test does not allow simulation, limited deployment of the system to selected field sites may be authorized. A System Test is conducted to evaluate the general fitness of the System-Under-Test for use in NWS field operations and to ensure that specific technical objectives have been met prior to use of the system at selected NWS operational sites for OT&E. A System Test must be successfully completed prior to an OT&E. OPS24 is responsible for the planning, conduct, and reporting of System Tests.

3.4 System-Under-Test. A System-Under-Test may be a major NWS operational system (see Section 4.1), or any subsystem or component thereof.

4. Scope. Major operational systems are maintained by the NWS for the collection, distribution, and dissemination of meteorological, climatologic, and hydrologic data. Support for these critical services is provided by the NWS, Office of Operational Systems. The Office of Operational Systems performs OT&Es during commissioning of new systems, to evaluate proposed changes in the baseline configuration of existing major operational systems, and during

OSIP as a prerequisite for national deployment of the System-Under-Test. The major operational systems currently under management of the Office of Operational Systems include:

- Automated Surface Observing System (ASOS)
- Radiosonde Replacement System (RRS)
- NOAA Weather Radio All Hazards (NWR)
- Advanced Weather Interactive Processing System (AWIPS)
- Weather Surveillance Radar-1988 Doppler (NEXRAD)
- Ocean Data Buoy Sensors

4.1 Major Operational Systems Covered by this Instruction. OPS24 personnel perform OT&E for the following systems: ASOS; AWIPS hardware; RRS; and NWR including the Console Replacement System (CRS), Voice Improvement Processor (VIP), and radio transmitters. The procedures described in this instruction may also be applied to other systems as assigned by the Director, OPS.

4.2 Major Operational Systems Excluded from this Instruction. The following systems are excluded from this instruction: AWIPS Software, Ocean Data Buoy Sensors, and NEXRAD. The Software Branch (OPS23) and Office of Science and Technology, Systems Engineering Center are responsible for overseeing the development and maintenance of AWIPS software. The Office of Operational Systems, National Data Buoy Center (NDBC) is responsible for development and maintenance of Ocean Data Buoy Sensors. The Office of Operational Systems, Radar Operation Center (ROC) is responsible for development and maintenance of NEXRAD.

5. Roles and Responsibilities. A description of the major authorities for management of OT&E follows.

5.1 Change Management Process. OT&E may be authorized by a Request for Change under the Change Management Process. The Change Management Process is administered by the Program Manager or Program Management Committee and the Configuration Control Board.

5.1.1 Program Manager. A Program Manager may have overall responsibility for management of an NWS operational system including the authorization of changes in the baseline configuration of an existing operational system and the national deployment of a system, subsystem, or component thereof.

5.1.2 Program Management Committee. A Program Management Committee (PMC) may have overall responsibility for management of an NWS operational system including the authorization of changes in the baseline configuration of an existing operational system and the national deployment of a system, subsystem, or component thereof. The PMC is comprised of senior NWS managers and representatives of other Federal agencies.

5.1.3 Configuration Control Board. The Configuration Control Board (CCB) is subordinate to the Program Manager or PMC, as appropriate. The CCB reviews proposed changes to the baseline configuration of an existing operational system and authorizes any Request for Change for the system. The CCB may stipulate in the Request for Change the successful completion of a

System Test and OT&E as conditions for national deployment of the System-Under-Test. The CCB is typically chaired by the Program Manager.

5.2 Operations and Services Improvement Process. The NWS OSIP is a formal management process implemented to provide consistent evaluation of needs and opportunities for improvement of NWS operations and services. The current process describes five Stages for each project ranging from Stage 1, Collection and Validation, to Stage 5, Deployment, Assessment and Lifecycle Support. OSIP includes four key decision points, or Gates, that establish the conditions to proceed to the next OSIP stage. OSIP stipulates the successful completion of an OT&E as a Gate 4 condition for proceeding to Stage 5. The Operations/Executive Committee of the NWS Corporate Board has direct oversight responsibility for the activities of Gate 4.

5.3 Information Technology Security. NWS Information Technology (IT) resources and systems must comply with the NWS security policies established by NDS 60-7. Compliance with NWS security policies is established through Certification and Accreditation (C&A) of the system. System Certification and Accreditation is overseen by the NWS Chief Information Officer (CIO) and is separate from OT&E. The Office of Operational Systems may designate an Information System Security Officer (ISSO) for each of the major operational systems listed in Section 4, as appropriate. The designated ISSO coordinates the activities required to complete system Certification and Accreditation. The ISSO may participate in the OT&E and/or coordinate Certification and Accreditation activities with the OT&E as required.

5.4 Test Review Group. A Test Review Group (TRG) is established as an independent body to oversee the conduct of the OT&E. The TRG is comprised of operational user representatives and subject matter experts. The TRG must authorize the commencement of field tests at operational field sites: The TRG conducts a Test Readiness Review (TRR) prior to the commencement of field tests to review the status of the System-Under-Test and to ensure that all test prerequisites have been satisfied (see Section 6.2.2). The TRG may authorize field tests upon the satisfactory review of the System-Under-Test. The TRG meets periodically during OT&E to review test results and to prioritize any deficiencies discovered. The TRG reports to the Program Manger and recommends, based on a “user” perspective, whether to proceed with national deployment of the System-Under-Test, or to Stage 5 in the case of OSIP, at the conclusion of OT&E.

The composition of the TRG is selected to ensure a thorough evaluation of the System-Under-Test. The TRG is comprised of a Chair, Regional Focal Points, Other Agency Focal Points, the OT&E Director, and members of the Test Team. Membership in the TRG is open to the ISSO; the Program Manager; Office of Climate, Water, and Weather Services (OCWWS) representative; National Weather Service Employee Organization (NWSEO); and other NOAA agency representatives.

The recommendations of the TRG are based on input provided by the voting members. (A discussion of the TRG decision making process is provided in Appendix A.) The voting members of the TRG may only include user representatives: the OT&E Director, Regional Focal Points, and the designated NWSEO representative. Other agency focal points may be voting members of the TRG if actively participating in the OT&E. The ISSO is a voting member if the

System-Under-Test is an NWS information system or may impact an NWS information system. Stakeholders who are responsible for producing the System-Under-Test and/or services supporting the System-Under-Test may not be voting members of the TRG.

5.4.1 Test Review Group Chair. The TRG is chaired by the OPS24 Branch Chief or his/her designated representative. The Chair convenes the meetings of the TRG and works with the OT&E Director and the members of the TRG to ensure that tests are conducted efficiently. The Chair works to resolve any issues that may arise during the conduct of the OT&E.

The Chair is a non-voting member of the TRG except in the case of a tied vote. The TRG Chair casts the deciding vote in the event of a tie.

5.4.2 Operational Test and Evaluation Director. The OPS24 OT&E Group Leader or his/her designated representative serves as the OT&E Director. The OT&E Director manages the development of the OT&E Plan, oversees the conduct of tests, and manages the development and coordination of the OT&E Report. The OT&E Director is the primary point of contact for the OT&E. The OT&E Director coordinates the timely delivery of all hardware, software, and documentation required for the OT&E. The OT&E Director reports to the TRG Chair. The OT&E Director prepares and disseminates the minutes of TRG meetings in a timely manner, typically within 24 hours following the meeting.

The OT&E Director is a voting member of the TRG.

5.4.3 Program Manager. The Program Manager serves as the primary focal point for the System-Under-Test. The Program Manager may present the recommendations of the TRG to the Program Management Committee, or OSIP Gate 4 members, as input to their deliberations regarding national deployment of the System-Under-Test.

The Program Manager may be a member of the TRG, however the Program Manager is a non-voting member of the TRG.

5.4.4 Test Team. The Test Team is typically comprised of NWS staff members from OPS24 and other organizational units within NWS. OPS24 is organized into an OT&E Group and a System Test Group; the OPS24 Branch Chief may designate staff members from either group as members of the OT&E Test Team. Members of the OT&E Group typically develop the OT&E Plan, document and track deficiencies, record the minutes of TRG meetings, ensure appropriate technical experts analyze the test results, and develop the OT&E Report. The OT&E Director may designate a Test Coordinator to assist in these duties. The OT&E Director may solicit support from other organizational units within NOAA, other Federal agencies, and/or the user community to serve on the Test Team as required to satisfy the objectives of the OT&E. Members of the Test Team may be required to travel to field sites to fully assess the System-Under-Test.

Test Team members are non-voting members of the TRG.

5.4.5 National Weather Service Headquarters Test Support. The organizational units within National Weather Service Headquarters (WSH) responsible for software and hardware development provide the OT&E Director with all requisite system components, e.g., field

modification kits (FMK), draft installation procedures, and draft operations user and hardware maintenance documentation, prior to commencement of the OT&E. The OT&E Director may solicit support from OCWWS on potential issues related to operational services requirements and procedures. The OT&E Director may solicit support from the National Weather Service Training Center (NWSTC), as required to satisfy the technical objectives of the OT&E.

National Headquarters staff are non-voting members of the TRG.

5.4.6 Information System Security Officer. The ISSO, or other designated authority, may be required to participate in the TRG if the System-Under-Test is an information system or if the System-Under-Test might impact NWS information systems. The OT&E Director may solicit support form the ISSO, or other designated authority, as required to meet the technical objectives of the OT&E.

The ISSO, or other designated authority, is a voting member of the TRG if participation is required.

5.4.7 Regional Headquarters Test Support. Personnel from NWS Regional Headquarters may serve as Regional Focal Points for the OT&E. One Focal Point is typically selected from each of the Regional Offices. Regional Focal Points are typically selected from the System Operations Division, however, Meteorological and Hydrological Services Division personnel may also be selected as required to support the technical objectives of the OT&E. The Regional Focal Points provide input regarding issues that impact site operations. Regional Focal Points are the primary liaison between WSH and the Regional Headquarters and coordinate the support required for the OT&E with their respective Field Offices.

Regional Focal Points are voting members of the TRG.

5.4.8 Field Office Test Support. Field sites, including the National Centers for Environmental Prediction (NCEP), are selected for OT&E in coordination with the Regional Headquarters; the OCWWS; and the appropriate operations support office. Field Office staff members may be selected to participate in the OT&E. Field Office Test Support typically includes the Meteorologist-in-Charge (MIC) or Hydrologist-in-Charge (HIC) and subject matter experts, such as the Electronic Systems Analyst (ESA), Operations Program Leader (OPL), and program focal points, as required to meet the technical and management objectives of the OT&E. Field Office Support personnel may report to the TRG and/or participate in meetings of the TRG at the request of their respective Regional Headquarters.

Field Office Support staff are non-voting members of the TRG.

5.4.9 NOAA Test Support. The OT&E Director may invite staff members from other organizational units within NOAA, such as the National Climatic Data Center (NCDC), Ashville, NC, to participate in the OT&E as required to meet the technical and operational objectives of the OT&E.

NOAA agency representatives are voting members of the TRG if actively participating in the OT&E.

5.4.10 NWSEO Test Support. TRG membership is open to representatives of the NWSEO. NWSEO representation is sought to provide input on working conditions at NWS field sites and to avoid any negative impact on working conditions.

The NWSEO representative is a voting member of the TRG.

5.4.11 Other Agency Support. Several of the major operational systems listed in Section 4 are managed in cooperation with other Federal agencies. Membership in the TRG is open to user representatives and subject matter experts from other Federal agencies when applicable.

Other Agency Focal Points are voting members of the TRG if actively participating in the OT&E and representing their users.

6. Operational Test and Evaluation Process. A description of the process followed during the conduct of an OT&E follows.

6.1 Test Conduct. Tests conducted at NWS operational field sites require the full consent and cooperation of the agency responsible for the site. The operation of the field site should be carefully monitored at all times during tests. The MIC or HIC retains full authority for the operation of the site during the OT&E: the MIC or HIC may suspend tests at any time and return the site to its initial configuration if he or she believes that continuing the OT&E may jeopardize critical site operations. The MIC or HIC should notify the OT&E Director as soon as practical if field tests are suspended. The site MIC or HIC will approve all decisions affecting site operations during the OT&E including the schedule for installations and site staff assignments.

System installation is performed by field site staff members with support of other development organizations as required using the draft installation instructions. Tests are conducted as described in the OT&E Plan.

6.2 Test Commencement. The OT&E formally begins with a TRR.

6.2.1 Test Readiness Review. The TRR is held to confirm that all prerequisites for the OT&E have been properly satisfied prior to moving to field tests. The TRR is convened by the TRG Chair and is attended by the members of the TRG, hardware and software developers, the OT&E Director, the System Test Director, and other subject matter experts as required to fully assess the readiness of the System-Under-Test. The OT&E Director will provide a checklist of prerequisites for the OT&E (see Appendix B for an example) and coordinate presentations by subject matter experts as required to fully establish the status of the System-Under-Test. A decision to proceed to field tests is based on the majority opinion of the voting members of the TRG. (See Appendix A for a discussion of the TRG decision making process.)

The minutes of the TRR are prepared by the OT&E Director and disseminated to the members of the TRG and other stakeholders.

6.2.2 Test Prerequisites. Typical prerequisites for an OT&E follow:

a. **A successful System Test/DT&E** - The System Test/DT&E must be successfully completed before the OT&E may begin. Successful completion of the System Test/DT&E stipulates that: 1) no critical problems may remain unresolved at the conclusion of the System Test/DT&E, and 2) any problems resolved by workaround are properly noted and incorporated into the draft release notes and other system documentation. All workarounds must be acceptable for normal field operations.

b. **Hardware and software certification** - System hardware engineers certify that the hardware delivered for the OT&E is representative of the hardware that will be deployed to operational sites. System software engineers certify that the software delivered for the OT&E is the latest revision and that all fixes implemented as a result of the System Test have been properly incorporated.

c. **IT security Certification and Accreditation** - The ISSO must report the status of the IT security Certification and Accreditation. The NWS CIO or other designated official must authorize the use of the system at selected NWS operational sites for OT&E.

d. **Maintenance logistics** - An initial issue FMK may be distributed through the National Logistics Support Center (NLSC). If support from the NLSC cannot be arranged prior to commencing field tests, the Program Manager must ensure that all required FMKs and draft installation procedures are delivered to the OT&E sites.

e. **System documentation** - Draft versions of system documentation must be available for the OT&E. System documentation includes: NWS engineering handbooks, user/operator manuals, system administration manuals, maintenance manuals, release notes, and installation instructions.

f. **Training** - Appropriate operations and maintenance training must be provided for all personnel participating in the OT&E. Other Federal agencies may be required to provide training for their personnel.

g. **OT&E documentation** - The OT&E Plan including any Test Case Procedures (see Sections 6.3.3) must be approved and authorized by the Director, Field Systems Operations Center (OPS2), prior to commencing field tests.

6.3 Test Methodology. The testing strategy is fully documented in the OT&E Plan. The test should, to the extent possible, ensure that all installation materials and new functions are validated for both normal and service backup operations using normal and backup system configurations. System configurations not evaluated during the System Test/DT&E should be included among the sites selected for field tests whenever possible. Test site selection must encompass all pertinent site configurations and risks to operations presented by the change.

6.3.1 Purpose and Objectives. The OT&E verifies that the System-Under-Test acceptably supports operations. An OT&E is conducted, in general, to verify that the System-Under-Test meets or exceeds the technical specifications, is reliable, and that all associated documentation and logistical support required to operate and maintain the system is available prior to national

deployment. Specific test objectives should be developed by OPS24 personnel in coordination with NWS subject matter experts. The test objectives must address each critical system characteristic and all affected major operational concerns and must be clearly stated in the OT&E Plan.

6.3.2 Evaluation Criteria. Evaluation criteria must be provided in the OT&E Plan for each test objective. Evaluation criteria must be testable and clearly stated in the OT&E Plan.

6.3.3 Installation. Field tests begin with installation of the System-Under-Test. The System-Under-Test is installed by field site personnel using the draft installation procedures and any required FMKs. Test Case Procedures included in the OT&E Plan should be completed immediately following installation, if appropriate. Members of the Test Team may witness the system hardware and/or software installation and the initial operation of the system. If Test Team members are dispatched to the field sites, the Team should provide a status report to the OT&E Director before departing the site.

6.3.4 Test Case Procedures. The OT&E Plan may include specific Test Case Procedures as required to fully evaluate the System-Under-Test. Test Case Procedures typically exercise specific critical functions that are used infrequently during normal field operations. Test Case Procedures may also test for compliance with current NWS policies for IT security. Each Test Case Procedure should contain a description of the testing scenario, the objectives of the test, and the criteria for a successful outcome. Each Test Case Procedure should provide step-by-step instructions. The expected outcome should be indicated and a pass/no pass check-off should be provided for each step. Space should be provided for comments and the tester should be encouraged to annotate the procedure both as a record of the test and for improvements to the procedure. An example of a typical Test Case Procedure is provided in Appendix E. Completed Test Case Procedures are included in the OT&E Report and are part of the official test record. All Test Case Procedures included in the OT&E Plan must be completed.

6.3.5 Operational Testing. An OT&E will typically include a period of not less than 30 days to verify system performance, stability, reliability, and communications. During this period, site personnel perform their normal service operations using the System-Under-Test. Specific Test Case Procedures may be completed immediately following installation or during operational tests, as appropriate. Test Case Procedures may include affected critical or major operational concerns.

The OT&E Plan may include provisions for monitoring and reporting product availability and reliability if network communications might be affected. The Product Availability and Monitoring System (PAMS), Section 7.3, may be used to collect, analyze, and report these data. In general, product availability and reliability for the System-Under-Test should be equal to or greater than the current system performance.

The OT&E Plan may include provisions for testing compliance with NWS IT security policies during field tests. Such tests will typically be conducted by the ISSO under guidance of the NWS CIO and/or other responsible authorities.

6.3.6 Surveys and Questionnaires. The OT&E Plan may contain surveys and/or questionnaires to solicit comments from field forecasters, electronic technicians, and other staff members. Surveys and questionnaires may be considered by the TRG in developing its recommendations. An example of a typical survey is provided in Appendix F.

6.4 Trouble Reporting. A Test Trouble Report (TTR), or other suitable report, must be completed and submitted to the OT&E Director for each deficiency discovered during the OT&E. The TTR should include a complete description of the defect including any supporting data. A TTR may also be used to suggest enhancements to the system that are beyond the scope of the OT&E. A sample TTR form is provided in Appendix G. TRG meetings are periodically convened during the OT&E to review and classify TTRs. The OT&E Director coordinates the collection and dissemination of TTRs to the members of the TRG for adjudication.

6.4.1 Classification of Test Trouble Reports. TTRs may be assigned numerical scores to indicate the severity of the defect, i.e., the Impact and the Priority.

A typical assignment scheme for Impact follows:

Impact 1. Critical: A repeatable problem that prevents or compromises the full delivery of products or services. No workaround exists for the problem.

Action: The TRG recommends the immediate suspension of OT&E and the System-Under-Test is turned over to the system developers to resolve the problem. The OT&E may be resumed at the recommendation of the TRG after an appropriate fix or workaround has been developed. The TRG may recommend that tests be resumed under the existing OT&E Plan; or, if significant re-coordination and re-planning are required, the TRG may recommend that the OT&E Plan be amended or that a separate Follow-On OT&E Plan be prepared and that tests continue under the new plan. The Test Team may repeat selected Test Case Procedures or develop new Test Case Procedures to fully evaluate the proposed solution.

Impact 2. Urgent: A repeatable problem that prevents or compromises the full delivery of products or services. A temporary workaround may be implemented to allow continuation of field tests, however the workaround is not acceptable for national deployment. The System-Under-Test may not be deployed without development of a fix or acceptable workaround.

Action: The TRG may recommend that the OT&E continue with the temporary workaround in place. The TRG recommends that an acceptable workaround or fix be developed prior to national deployment of the System-Under-Test. If a fix becomes available during the OT&E, the TRG may recommend immediate implementation of the fix. The Test Team may develop new Test Case Procedures and/or repeat selected Test Case Procedures to fully evaluate the proposed fix. A Follow-On OT&E may be required to verify the proposed fix.

Impact 3. Major: A repeatable problem that prevents or compromises the full delivery of

products or services. An acceptable workaround has been developed that allows national deployment to proceed.

Action: The TRG may recommend that the OT&E continue with an approved workaround in place until an appropriate fix is developed. If a fix becomes available during the OT&E, the TRG may recommend immediate implementation of the fix. The Test Team may develop new Test Case Procedures and/or repeat selected Test Case Procedures to fully evaluate the proposed fix. A Follow-On OT&E may be required to verify the proposed fix.

Impact 4. Routine: A repeatable problem that does not prevent or compromise the full delivery of products and services.

Action: The OT&E may continue at the discretion of the TRG. An approved workaround may be authorized until the problem is fixed, but this is not mandatory. Routine deficiencies are documented and prioritized by the proper authority for future fixes.

Impact 5. Watch Item: Infrequent or poorly documented behavior of the System-Under-Test that might prevent or compromise the delivery of products or services.

Action: The TRG may recommend that the OT&E continue. The Test Team may develop new Test Case Procedures and/or repeat selected Test Case Procedures in an attempt to reproduce the problem. Any further observations are documented and submitted to the TRG for review.

Impact 6. Potential Enhancement: An item identified by the TRG for consideration as a new system requirement.

Action: The TRG forwards the recommended change to the Program Manager for consideration under the Configuration Management process.

The Priority addresses how the problem is to be resolved. A typical assignment scheme for the Priority follows:

Urgent: Immediate emergency action is required.

Action: All appropriate resources are directed to resolve the problem.

High: Include before national deployment.

Action: The available resources are directed to promptly resolve the problem.

Routine: Include in the next interim release.

Action: Resources are directed to resolve the problem as allowed.

Low: Consider for the next major release.

Action: The item is deferred to future system improvements.

Undetermined: The Priority has not yet been assigned.

Action: None.

6.5 The Conclusion of Testing. The TRG Chair will convene an OT&E Wrap-up meeting following the successful completion of field tests. The OT&E Director will review the activities conducted to date including a summary of TTRs and their disposition, and any other findings and/or recommendations. The TRG will review the materials presented and recommend whether to proceed with national deployment of the System-Under-Test, or to Stage 5, in the case of OSIP.

The following conditions must be satisfied for the system to receive a positive recommendation:

- All Test Case Procedures must be successfully completed.
- All test objectives provided in the OT&E Plan must be met.
- All TTRs submitted during the OT&E must be adjudicated by the TRG.
- The System-Under-Test must be free of critical deficiencies, i.e., all TTRs assigned Impact 1 or 2 must be resolved. Non-critical deficiencies, i.e., TTRs assigned Impact 3 or 4, may be present; however, a workaround that is acceptable for field operations must be approved and authorized by the TRG. The workaround must be fully documented in the system release notes and/or other system documentation as appropriate.
- All draft documentation (e.g., installation, operations, system administration, support, and maintenance) must be acceptable for use in field operations.

The TRG Director reports the recommendation of the TRG to the Program Manager or other designated authority.

The OT&E Report is prepared following the conclusion of testing, see Section 8.2.

7. Tools. OPS24 maintains tools specific to the management of test projects.

7.1 Test Archive. Test documents are kept on file for not less than 5 years. Both hard and soft copies of the documents are kept when feasible. Test documents include: the OT&E Plan and the OT&E Report, and may include test case procedures, data results and analyses, Test Review Group minutes, interim reports, and other supporting records of the test.

OPS24 maintains a shared file server to store electronic copies of test documents. Hard copies of test documents are locally filed and maintained.

7.2 Deficiency Status Tracking and Archive. The Software Branch (OPS23) maintains a database program, Test Track Pro, for tracking TTRs. The program may be used to track TTRs during an OT&E. OPS24 personnel are granted user and administrator rights to the program as required.

7.3 Data Analyses. OPS24 has developed a Product Availability and Monitoring System (PAMS) to measure the reliability and availability of network communications.

7.4 Dissemination. OPS24 maintains a Website, for the dissemination of OT&E Plans and Reports at http://www.nws.noaa.gov/ops24/documents/. Interim reports, minutes, and other correspondence may be sent by electronic mail, fax, or mail, as appropriate.

8. Documentation. The official record of an OT&E is comprised of two documents: 1) the OT&E Plan, and 2) the OT&E Report.

8.1 Operational Test and Evaluation Plan. The OT&E Plan describes the actual conduct of tests. The Plan will typically include an introduction, purpose, objectives, evaluation criteria for each objective, test configurations, test materials, test methodology, methods for deficiency adjudication, test focal points, and contact information. A typical outline for an OT&E Plan is provided in Appendix C. The test plan must include all Test Case Procedures and a TTR Form as appendices and may include user surveys and/or questionnaires as appropriate. The OT&E Plan is developed in coordination with WSH, Regional Headquarters, test sites, and other Federal, state, and local agencies. The OT&E Plan should be reviewed by the members of the TRG and other subject matter experts as appropriate. The OT&E Plan must be approved by the Director, Field Systems Operations Center (OPS2), prior to commencing the OT&E.

8.2 Operational Test and Evaluation Report. The OT&E Report should include a purpose; introduction; test objectives, their verification, and recommendations; a description of how the test was conducted; a summary of the test results including a listing of all TTRs and their disposition; and the test conclusions and final recommendation. A typical outline for an OT&E Report is provided in Appendix D. The OT&E Report should describe any follow-on testing that may be required as a result of problems found during the OT&E. The draft OT&E Report should be reviewed by the members of the TRG and other subject matter experts as appropriate. The OT&E Report is forwarded to the Director, Field Systems Operations Center (OPS2), for signature.

Appendix A – Test Review Group Decision Making Process

A.1 Introduction. The Test Review Group (TRG) has two roles:

1. Direct oversight responsibility for decisions regarding the conduct of the Operation Test and Evaluation (OT&E), e.g., verifying the prerequisites for OT&E have been met and the adjudication of Test Trouble Reports.

2. Recommends the disposition of the system-under-test.

A.2 Guidelines.

- Trust each other. This is not a competition; everyone should feel free to express their ideas and opinions.
- Make sure everyone understands the topic/problem. In developing recommendations, make sure everyone is following, listening to, and understanding each other.
- All members should contribute their ideas and knowledge related to the subject.
- Stay on the task.
- You may disagree-disagreement is acceptable and healthy.
- Separate the issue from the personalities. This is not a time to disagree just because you don't like someone.

A.3 Raising Issues. During discussion a proposal for resolution is put forward. It is amended and modified through discussion, or withdrawn if it seems to be a dead-end. During this discussion, it is important to articulate differences clearly. It is the responsibility of those who are having trouble with a proposal to raise their objections and to put forward alternative suggestions. When a proposal seems to be well understood by everyone, and there are no new changes asked for, the OT&E Director can call the point.

A.4 Voting. Issues may be decided by voice or roll call vote. Secret ballots should not be used. A voting member may vote to approve, disapprove, or abstain from voting. The decisions of the TRG are based on a simple majority among the voting members. In the event of a tie, the TRG Chair casts the deciding vote. Dissenting opinions should be recorded and reported in minutes and reports.

A.5 The Decision. After a decision is reached, the issue should be clearly restated, including any dissenting opinions, as a check that everyone is clear on what has been decided. Before moving away from the subject, the TRG should be clear on who is taking on the responsibility for implementing the decision.

A.6 Recommendations. In developing recommendations, input and ideas of all participants are gathered and synthesized. No ideas are lost, each member's input is valued as part of the recommendation. The TRG is not only working to achieve better solutions, but also to promote the growth of community and trust. The recommendations of all TRG members should be accurately reflected in the minutes and in reports issued by the TRG, including any dissenting opinions.

Appendix B – Test Readiness Review Checklist

- ☐ OT&E Plan completed.
- ☐ The System Test successfully completed.
- ☐ All critical Deficiency Reports/Test Trouble Reports closed.
- ☐ All OT&E site personnel trained.
- ☐ Request for Change for test approved.
- ☐ All draft documentation is available.
- ☐ All OT&E site configurations are complete and verified.
- ☐ All operationally acceptable workarounds are fully documented

Appendix C – Example - Operational Test and Evaluation Plan Outline

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Attachments

Installation Evaluation Method
Test Procedures
EMRS Guidance
PAMS Processing
List of Contacts

Appendix D – Example - Operational Test and Evaluation Report Outline

1. Introduction
2. Recommendations
3. Purpose
4. Success Criteria
5. OT&E Objectives and Results
6. Conclusions

Attachment: Test Results

Appendix E – Example - Test Case Procedure

PX1 to PX2 Failover

CONDUCTED BY: _____ DATE/TIME: _____ ITERATION: _____

Step No.	Test Step	Expected Results	Comments/ Observations	Pass Y/N
PX1 to PX2 failover test. Simulate a PX1 failure. Note: The installation must be completed and the NCF notified to resume site monitoring before beginning this procedure.				
1	*From a Unix window on px2-<site> as root enter:* ***clustat*** *Repeat from a Unix window on px1-<site>.*	The status of the PXs is displayed. Ensure both PXs are up, the power switch status is good, the heartbeat status is good and px1apps is owned by px1-<site> and px2apps is owned by px2-<site>.		
2	*From a Unix window on px2-<site> as root enter:* ***cd /data/logs*** ***tail -f px1apps.log***	The px1apps.log is opened and pending.		
3	*From another Unix window on px2-<site> as root enter:* ***cd /data/logs*** ***tail -f start.ingest.px1.log***	The start.ingest.px1.log is opened and pending.		

Step No.	Test Step	Expected Results	Comments/ Observations	Pass Y/N
4	*Pull the LAN cable from the rear of the PX1 box to remove it from the LAN. (Port Gb1)* *— or —* *On px1 as root, shutdown px1:* ***shutdown -h now*** *After completion of the shutdown process, power off px1.*	*Red banner message appear on all workstations indicating preprocessor swap in progress. When the failover is successful, activity is displayed in the tail of the px1apps.log and the start.ingest.px1.log.* *Note: The processes for failover for a LAN failure is different from a failure in the PX server. Both scenarios should be tested.*		
5	The failover process takes less than 5 (five) minutes.		*Failover time* _____	
6	*The NCF detects the failover, and notifies the site.* *Continue with the test while waiting for NCF notification.*	The NCF notifies the site of the failover.	*NCF's response time:* _____	
7	Upon completion of the failover, enter: cluadmin – cluster status or clustat	*Verification the px1apps is now owned by px2-<site>.* Verify the px1-<site> node is down.		
8	Enter: ps -ef | grep fxa	The fxa processes are listed.		
9	Use Process List: Single Server table to verify all system processes that normally run on px1 are now running on px2.	All system processes are on px2.		
10	Maintain this failover configuration for a few minutes. Assess the system's performance while running solely on the px2.	No system instability or other problems while running on px2.		

Step No.	Test Step	Expected Results	Comments/ Observations	Pass Y/N
Restore System to Normal Configuration				
11	Return the PX1 LAN cable back into the LAN (Port Gb1) or if a shutdown was performed, reboot PX1.	PX1 is reconnected to the LAN.		
12	Request the NCF to swap back to the dual PX configuration. Perform any restoration procedures needed for site-unique systems.	The NCF configures px1 back into the cluster. (See Section 5 in the AWIPS Linux Preprocessor Prototype Technical Notes for the commands to restore the system.)		
13	Note the time the NCF took to perform the failover process.		Failover time _____	
14	On px1-<site> enter: **cluadmin – cluster status**	The px1apps is now owned by px1-<site>.		
15	On px1 enter: ps -ef | grep fxa	The fxa processes are listed.		
16	Use Process List: px1apps table to ensure all processes for px1 are displayed.	Verification all fxa processes successfully moved over to px1-<site>.		
17	Use the crontab table and verify the crontabs are running.			
18	End of test			

Witnessed: _____

Overall Outcome: [ ] Pass [ ] Suspend
Date: _____

Appendix F - Example – Survey

RRS Documentation Survey

Use this survey (next page) to evaluate the RRS documentation provided for the OT&E.

Instructions for Completing Survey:

1. Fill out the identification section.

2. For each document listed in the RRS Documentation Ratings table:

   - If you did not use the document during the OT&E, check the Not Used block in the table.
   - If you did use the document, rate the document for completeness, usability, and accuracy. Select a rating from the Rating Scale below and enter the number in the appropriate block in the table. The Rating Factors are defined below.

3. If you have suggestions for improving any of the documents you used during the OT&E, write them in the space provided following the table.

Rating Scale:

← Negative ---------- Positive →

1 2 3 4 5 6 7 8 9 10

Rating Factors:

Complete: Did the document contain the information you needed to complete your tasks?

Usable: Was it easy to find and understand the information you needed?

Accurate: When you found the information, was it accurate?

Identification:

DATE: _____ SITE: _____ JOB TITLE: _____

NAME (optional): _____

RRS Documentation Ratings					Not Used
Ref #	**Document Title**	Complete	Usable	Accurate	
1	RRS Deployment Plan				
2	RRS Site Implementation Plan				
3	Engineering Handbook 1 (EHB-1): Instrumental Equipment Catalog				
4	EHB-4: Engineering Management Reporting System				
5	EHB-9: Aerological Sounding Equipment				
6	NWSO Handbook 10: Rawinsonde Observations				
7	RWS User Guide				
8	SIPPICAN Radiosonde/SPS Workstation S/W User's Manual				
9	SIPPICAN SPS Operations and Maintenance Manual				
10	RSOIS User/Maintenance Manual				
11	RSOIS-TM, Organizational Level Maintenance Manual				

Suggested Improvements (include Ref # from table):

(If you need more space, use the back of this page.)

Appendix G - Example -Test Trouble Report Form

RRS SYSTEM ISSUE REPORT (SIR) FORM					
Title/Summary:					
Originator:		**RWS Build:**		**Phone :**	
Location:		**Date/Time:**		**Email:**	

Priority		Impact		Operation Mode		Type of Issue		Frequency	
1. Immediate fix		**1**. Prevents successful observation; **NO WORKAROUND**		Live Flight		System malfunction		Always	
2. Include in the next build		**2**. Prevents successful observation; **REASONABLE WORKAROUND**		Rework		Modification of existing function/ design		Sometimes	
3. Include in a future build		**3**. Less critical degradation of data		Offline or Maintenance		New function or requirement		One-time occurrence	
4. Include in next major build		**4**. Degradation of system capabilities; **no data affected**		In-line Simulation		Not sure or indeterminate		See description	
5. Undetermined		**5**. Minimum to no impact; nice to have		Other				Unknown	
		6. Undetermined							

Problem Description:	**Ascension No./Release No.:**

*Date/Time of Flight (UTC):*_____ *Capture File:* _____

Please send by e-mail to samuel.cochran@noaa.gov and jae.lee@noaa.gov

Call Samuel Cochran at 301-713-0326 x112 or Jae Lee at 301-713-0326 x158 if you have any questions or comments.