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## **NASA Shared Services Center Service Delivery Guide**

**NSSC-HR-SDG-0038 - DRAFT**

**Effective Date:** October 1, 2009  
**Expiration Date:** September 30, 2014

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# **ONLINE TRAINING SUPPORT SERVICES**

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**Responsible Office: Human Resources Division**

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## Approved by

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 Kenneth Newton  
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### DOCUMENT HISTORY LOG

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## **Online Training Course Content Conversion, Testing, and Upload**

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### **Introduction**

The NASA Shared Services Center (NSSC) supports the Agency with Online training course content conversion, testing, and upload to the Agency Learning Management System (LMS), currently the System for Administration, Training, and Educational Resources for NASA (SATERN).

Online training course content is any Web-enabled training course content hosted within SATERN and available to NASA users. The course content can be standardized Agency-wide training, Discipline or Center-specific training. Skillsoft and Books 24/7 are not covered within this Service Delivery Guide as they fall under standard SATERN Admin support.

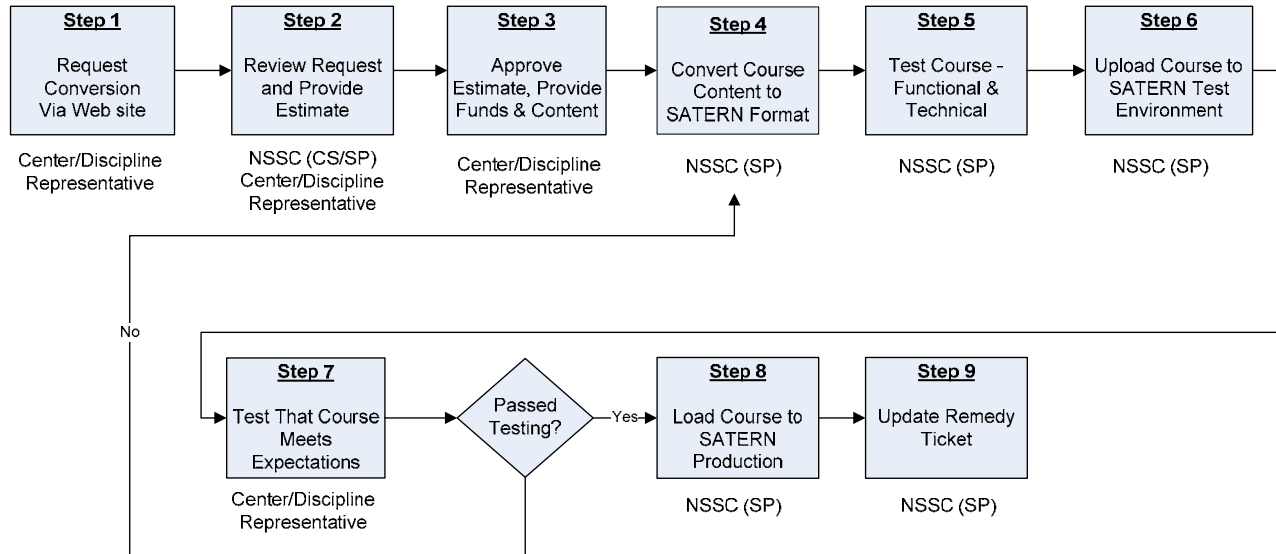
Cost estimates for new course loads and content updates will be based upon an initial estimate of the work to be provided (to include compliance and operational testing). Course catalog maintenance, deactivations, content updates of less than 4 hours labor, course customer support, and operational troubleshooting are included as part of the basic SATERN Admin support rate.

NSSC provides the single conduit for adding and updating online training within the Agency LMS.

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## PROCESS OVERVIEWS

### Process 1: Content Conversion for New Online Courses



## Roles & Responsibilities

Process 1 – Content Conversion for New Online Courses		
Roles and Responsibilities	Action	Tips/Notes
<b>Step 1</b>  <b>Center/Discipline Representative</b>  Request new course conversion	Customer requests the conversion and upload of non-SATERN related course material to SATERN by filling out an Online request form (providing pertinent course information).   <b>Output:</b> Completed initial request.	The form is located on the NSSC Web site at:   Electronic submission of request automatically creates Remedy ticket in NSSC work tracking system.

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Process 1 – Content Conversion for New Online Courses		
Roles and Responsibilities	Action	Tips/Notes
<p><b>Step 2</b></p> <p><b>NSSC (CS/SP), Center/Discipline Representative</b></p> <p>Review request and provide estimate</p>	<p>In coordination with the Requestor, NSSC (CS/SP) reviews the request and additional course materials and determines:</p> <ul style="list-style-type: none"> <li>- Whether the request is appropriate (see NSSC-HR-SDG-0023)</li> <li>- An appropriate estimate for work requested</li> <li>- Set a tentative priority and delivery date.</li> </ul> <p>Agency-wide Training takes precedent, followed by Discipline and then Center requests (first in-first out)</p> <p><b>Output:</b> Work Estimate</p>	<p>NSSC (CS/SP) will communicate with the requester during this step to gather additional details on the course complexity and features.</p>
<p><b>Step 3</b></p> <p><b>Center/Discipline Representative</b></p> <p>Provide estimate approval, funding and appropriate course content files</p>	<p>Requester provides estimate approval, funding, and electronic file formats (approved file formats outlined in appendix B).</p> <p>The requester is responsible for any licensing or copy right issues associated with requester-provided training content.</p> <p>Funding must be on hand prior to work being initiated. Funding receipt date, not request date, is used as the determining factor for “first-in first-out scheduling determination.</p> <p><b>Output:</b> Estimate approval, funding, and content files</p>	<p>It is expected that the requester will provide all required content materials (audio, video, graphics, and text) in the approved digital formats.</p> <p>All SATERN required course coding (example – EHRI) will be identified by the Requester.</p>
<p><b>Step 4</b></p> <p><b>NSSC (SP)</b></p> <p>Convert Course content to SATERN format</p>	<p>NSSC (SP) converts the requester-provided training content into a Web based format that is SCORM and 508 compliant in accordance with SATERN configuration requirements.</p> <p><b>Output:</b> Draft course content</p>	
<p><b>Step 5</b></p> <p><b>NSSC (SP)</b></p> <p>Test course - technical and functional</p>	<p>NSSC tests course for SCORM and Section 508 compliance (see Appendix B) as well as proper functionality with NASA standard desktop configurations.</p> <p><b>Output:</b> Completed course ready for upload for SATERN staging environment.</p>	<p>In the event that testing is unsuccessful, NSSC (SP) will go back to conversion activity in Step 4.</p>

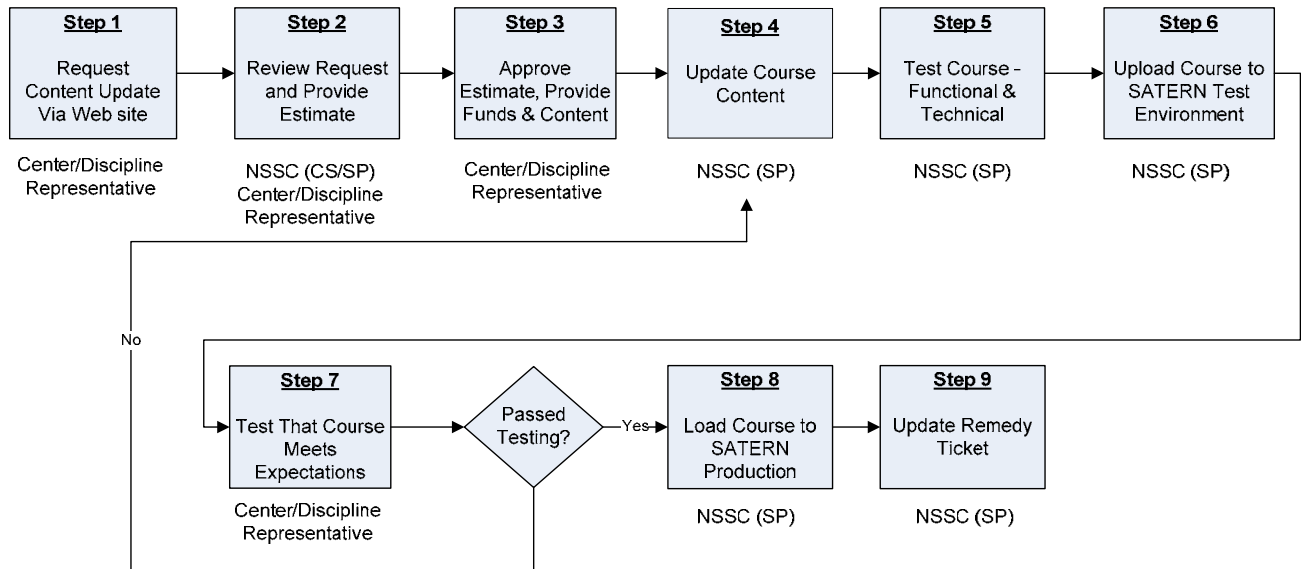
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Process 1 – Content Conversion for New Online Courses		
Roles and Responsibilities	Action	Tips/Notes
<u><b>Step 6</b></u> <b>NSSC (SP)</b> Course upload to staging environment	NSSC uploads the course content to the LMS content server and creates the item in the staging environment. NSSC provides the course item information to the customer for review.  <b>Output:</b> Course ready for Requester testing in SATERN staging environment.	
<u><b>Step 7</b></u> <b>NSSC (SP/CS), Center/Discipline Representative</b> Test and validation that the course meets requester expectations	NSSC (CS/SP) and requester test and validate the course in the staging environment. For Agency-wide required training, the NSSC Contact Center will participate in testing and validation process.  <b>Output:</b> Accepted course ready for upload to production environment	In the event that the course does not meet requester expectations, course NSSC (SP) will revert to Step 4.
<u><b>Step 8</b></u> <b>NSSC (SP)</b> Load course to production environment	NSSC creates the item in the production environment, validates access, and confirms access with requester.  <b>Output:</b> Course accessible in production.	
<u><b>Step 9</b></u> <b>NSSC (SP)</b> Close Remedy Ticket	NSSC (SP) completes documentation for work history log and resolves/closes the Remedy ticket  <b>Output:</b> Completed request.	



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## Process 2: Content Update for Existing Online Course



### Roles & Responsibilities

Process 2 – Content Update for Existing Online Courses		
Roles and Responsibilities	Action	Tips/Notes
<b>Step 1</b>  <b>Center/Discipline Representative</b>  Request course content update	Customer requests a content update for an existing SATERN Online course for which they are responsible.   <b>Output:</b> Completed initial request.	The form is located on the NSSC Web site at:   Electronic submission of request automatically creates Remedy ticket in NSSC work tracking system.

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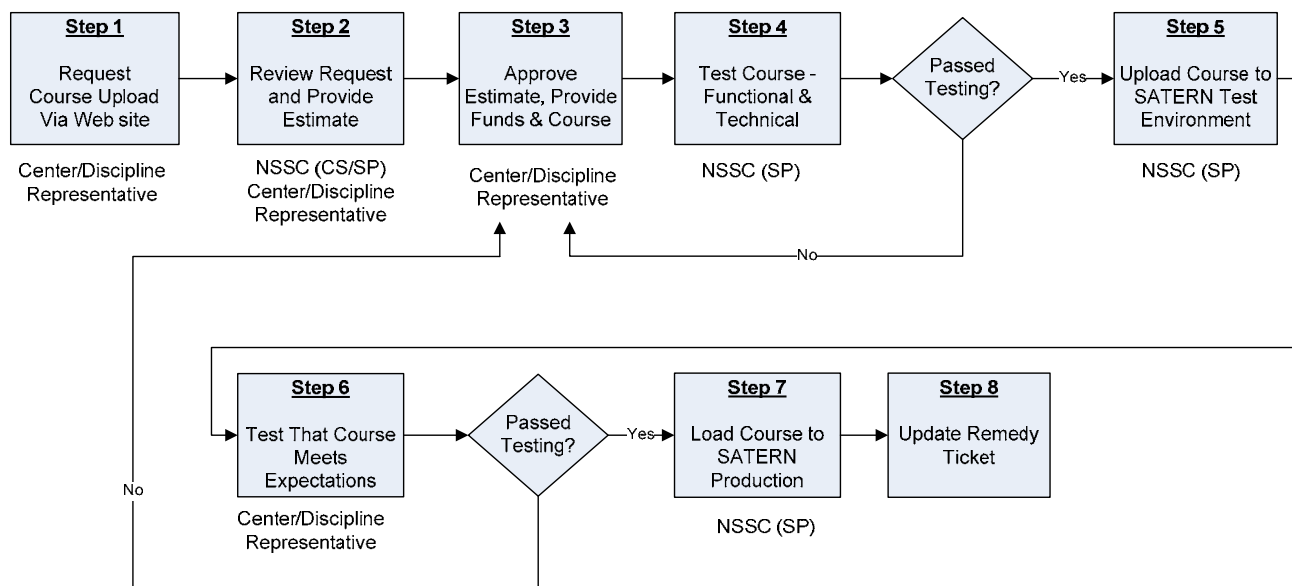
Process 2 – Content Update for Existing Online Courses		
Roles and Responsibilities	Action	Tips/Notes
<p><b>Step 2</b></p> <p><b>NSSC (CS/SP), Center/Discipline Representative</b></p> <p>Review request and provide estimate</p>	<p>In coordination with the Requestor, NSSC (CS/SP) reviews the requested changes and additional course materials (where appropriate) and determines:</p> <ul style="list-style-type: none"> <li>- Whether the request is appropriate as a content update</li> <li>- An appropriate estimate for work requested</li> <li>- Set a tentative priority and delivery date. Agency-wide Training takes precedent, followed by Discipline and then Center requests (first in-first out)</li> </ul> <p><b>Output:</b> Work Estimate</p>	<p>NSSC (CS/SP) will communicate with the requester during this step to gather additional details on the course changes to determine complexity and features of resulting changes.</p>
<p><b>Step 3</b></p> <p><b>Center/Discipline Representative</b></p> <p>Provide estimate approval, funding, and appropriate course content files</p>	<p>Requester provides estimate approval, funding, and electronic file formats (approved file formats outlined in appendix B).</p> <p>The requester is responsible for any licensing or copy right issues associated with requester-provided training content.</p> <p>Funding must be on hand prior to work being initiated. Funding receipt date, not request date, is used as the determining factor for “first-in first-out scheduling determination.</p> <p>NOTE: Content updates requiring less than 4 hours of effort, not to include test and validation, will not require funding.</p> <p><b>Output:</b> Estimate approval, funding, and content files</p>	<p>It is expected that the requester will provide all required content materials (audio, video, graphics, and text) in the approved digital formats.</p> <p>Any SATERN required course coding changes (example – EHRI) will be identified by the Requester.</p>
<p><b>Step 4</b></p> <p><b>NSSC (SP)</b></p> <p>Update course content to meet requested changes</p>	<p>NSSC (SP) updates the existing course and ensures that SCORM and 508 compliance are maintained in accordance with SATERN configuration requirements.</p> <p><b>Output:</b> Draft course content changes</p>	

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Process 2 – Content Update for Existing Online Courses		
Roles and Responsibilities	Action	Tips/Notes
<u><b>Step 5</b></u> <b>NSSC (SP)</b> Test course - technical and functional	NSSC tests course for SCORM and Section 508 compliance (see Appendix B) as well as proper functionality with NASA standard desktop configurations.  <b>Output:</b> Completed course changes ready for upload for SATERN staging environment.	In the event that testing is unsuccessful, NSSC (SP) will go back to conversion activity in Step 4.
<u><b>Step 6</b></u> <b>NSSC (SP)</b> Course upload to staging environment	NSSC uploads the course content to the LMS content server and creates a new item in the staging environment (if required for annual updates for example).  <b>Output:</b> Course ready for Requester testing in SATERN staging environment.	
<u><b>Step 7</b></u> <b>NSSC (SP/CS), Center/Discipline Representative</b> Test and validation that the course meets requester expectations	NSSC (CS/SP) and requester test and validate the course in the staging environment. For Agency-wide required training, the NSSC Contact Center will participate in testing and validation process.  <b>Output:</b> Accepted course ready for upload to production environment	In the event that the course does not meet requester expectations, course NSSC (SP) will revert to Step 4.
<u><b>Step 8</b></u> <b>NSSC (SP)</b> Load course to production environment	NSSC creates the item in the production environment (if required) validates access, and confirms access with requester.  <b>Output:</b> Course accessible in production.	
<u><b>Step 9</b></u> <b>NSSC (SP)</b> Close Remedy Ticket	NSSC (SP) completes documentation for work history log and resolves/closes the Remedy ticket  <b>Output:</b> Completed request.	

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### Process 3: Requester-Provided Course Content for Upload



### Roles & Responsibilities

Process 3 – Requester-Provided Content for Upload		
Roles and Responsibilities	Action	Tips/Notes
<b>Step 1</b>  <b>Center/Discipline Representative</b>  Request new course upload into SATERN	Customer requests the upload of a new, SATERN compliant, course to SATERN by filling out an Online request form (providing pertinent course information).  The requester is responsible for any licensing or copy right issues associated with requester-provided training courses.  <b>Output:</b> Completed initial request.	The form is located on the NSSC Web site at:  Electronic submission of request automatically creates Remedy ticket in NSSC work tracking system.
<b>Step 2</b>  <b>NSSC (CS/SP), Center/Discipline Representative</b>  Review request and provide estimate	In coordination with the Requestor, NSSC (CS/SP) reviews the request and course materials and determines: <ul style="list-style-type: none"> <li>- An appropriate estimate for work requested</li> <li>- Set a tentative priority and delivery date.</li> </ul> Agency-wide Training takes precedent, followed by Discipline and then Center requests (first in-first out)	NSSC (CS/SP) will communicate with the requester during this step to gather additional details as needed.  NSSC labor estimate to support customer-

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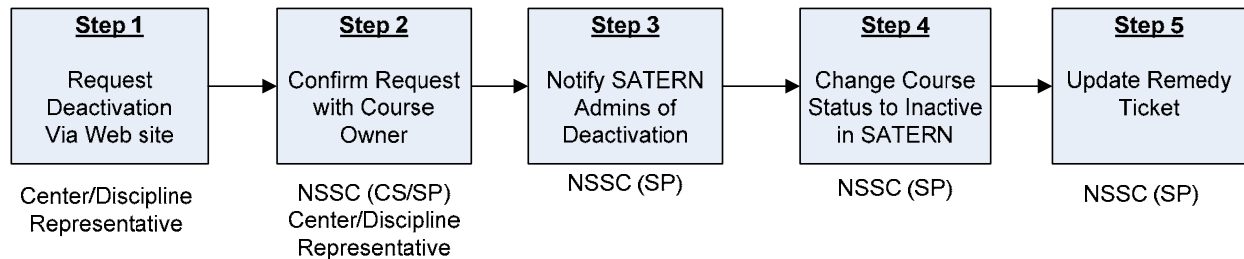
Process 3 – Requester-Provided Content for Upload		
Roles and Responsibilities	Action	Tips/Notes
	<b>Output:</b> Work Estimate	provided courses involves SCORM, 508, and desktop compliance testing required for all new SATERN courses.
<u><b>Step 3</b></u>  <b>Center/Discipline Representative</b>  Provide estimate approval, funding, and appropriate SCORM compliant course file	Requester provides estimate approval, funding, and course file in a SCORM-compliant electronic file format.  Note: Funding required for tasks greater than 4 hours effort.  Funding must be on hand prior to work being initiated. Funding receipt date, not request date, is used as the determining factor for “first-in first-out scheduling determination.”  <b>Output:</b> Estimate approval, funding, and SCORM content file	All SATERN required course coding (example – EHRI) will be identified by the Requester.
<u><b>Step 4</b></u>  <b>NSSC (SP)</b>  Test course - technical and functional	NSSC tests course for SCORM and Section 508 compliance (see Appendix B) as well as proper functionality with NASA standard desktop configurations.  In the event that testing is unsuccessful, NSSC (SP) will return course to the requester and identify issues requiring correction. (ticket will be placed in pending awaiting re-submission)  <b>Output:</b> Completed course ready for upload for SATERN staging environment.	In the event that the requestor wants NSSC to perform modifications to repair defects, the ticket will need to be changed to a conversion process and a new estimate will have to be provided & funded.
<u><b>Step 5</b></u>  <b>NSSC (SP)</b>  Course upload to staging environment	NSSC uploads the course content to the LMS content server and creates the item in the staging environment. NSSC provides the course item information to the customer for review.  <b>Output:</b> Course ready for Requester testing in staging.	

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Process 3 – Requester-Provided Content for Upload		
Roles and Responsibilities	Action	Tips/Notes
<p><b>Step 6</b></p> <p><b>NSSC (SP/CS), Center/Discipline Representative</b></p> <p>Test and validation that the course meets requester expectations</p>	<p>NSSC (CS/SP) and requester test and validate the course in the staging environment. For Agency-wide required training, the NSSC Contact Center will participate in testing and validation process.</p> <p>In the event that testing is unsuccessful, NSSC (SP) will return course to the requester and identify issues requiring correction. (ticket will be placed in pending awaiting re-submission)</p> <p><b>Output:</b> Accepted course ready for upload to production environment</p>	<p>In the event that the requester wants NSSC to perform modifications to repair defects, the ticket will need to be changed to a conversion process and a new estimate will have to be provided &amp; funded.</p>
<p><b>Step 7</b></p> <p><b>NSSC (SP)</b></p> <p>Load course to production environment</p>	<p>NSSC creates the item in the production environment, validates access, and confirms access with requester.</p> <p><b>Output:</b> Course accessible in production.</p>	
<p><b>Step 8</b></p> <p><b>NSSC (SP)</b></p> <p>Close Remedy Ticket</p>	<p>NSSC (SP) completes documentation for work history log and resolves/closes the Remedy ticket</p> <p><b>Output:</b> Completed request.</p>	

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## Process 4: Deactivate Posted Course Content



### Roles & Responsibilities

Process 4 – Deactivate Posted Course Content		
Roles and Responsibilities	Action	Tips/Notes
<b>Step 1</b>  <b>Center/Discipline Representative</b>  Request course be deactivated in SATERN	Customer requests the deactivation of an existing SATERN course by filling out an Online request form (providing pertinent course information such as title and ID).  <b>Output:</b> Completed initial request.	The form is located on the NSSC Web site at:  Electronic submission of request automatically creates Remedy ticket in NSSC work tracking system.
<b>Step 2</b>  <b>NSSC (CS/SP), Center/Discipline Representative</b>  Confirm Request with Course Owner	NSSC validates request with documented course owner (as identified in SATERN).  <b>Output:</b> Confirmation of request	
<b>Step 3</b>  <b>NSSC (SP), SATERN Admins</b>  Adjust Learning Plans	NSSC SP will send a message to the SATERN Admins to inform them of anticipated deactivation.  Depending upon the number of folks with the course on their lesson plan, NSSC in coordination with the owner may place instructional content in place of the old course to explain required changes to lesson plan.	SATERN Rules allow for a 3 business day delay prior to going on to Step 4. This allows Center Admins to adjust learning plans as required.

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Process 4 – Deactivate Posted Course Content		
Roles and Responsibilities	Action	Tips/Notes
<b>Step 4</b>  <b>NSSC (SP), Center/Discipline Representative</b>  Change Course Status to Inactive in SATERN	NSSC (SP) changes status of course to inactive in SATERN & confirm with course owner.  <b>Output:</b> Confirmation of course deactivation	
<b>Step 5</b>  <b>NSSC (SP)</b>  Close Remedy Ticket	NSSC (SP) completes documentation for work history log and resolves/closes the Remedy ticket  <b>Output:</b> Completed request.	

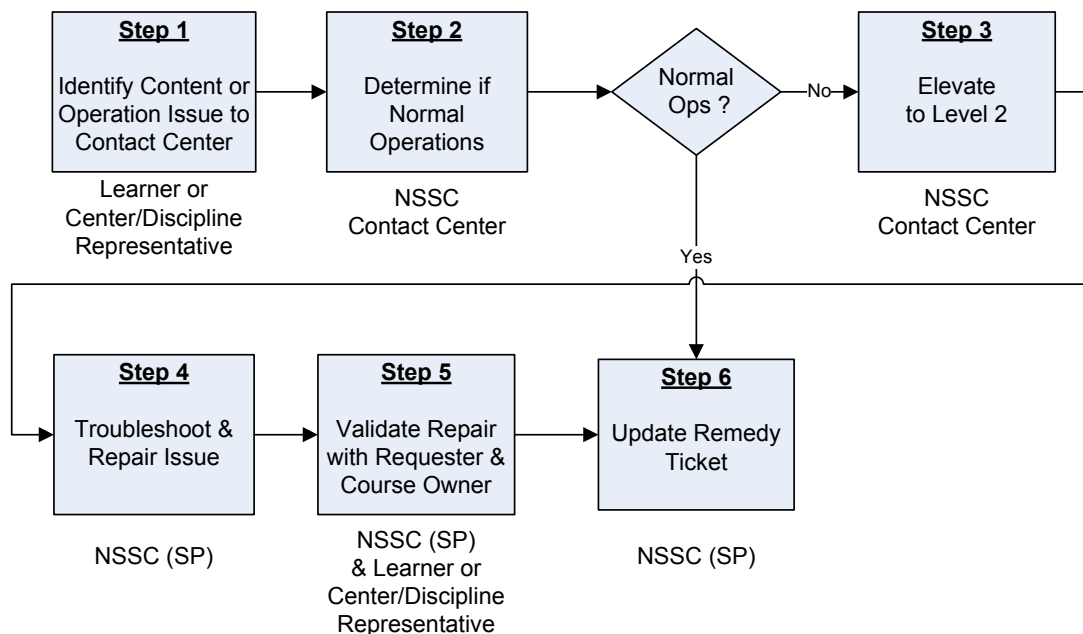


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## PROCESS – Troubleshoot Course Content/Operation

### Process 5: Troubleshoot Course Content/Operation



### Roles & Responsibilities

Process 5 – Troubleshoot Course Content/Operation		
Roles and Responsibilities	Action	Tips/Notes
<b>Step 1</b>  <b>Learner or Center/Discipline Representative &amp; NSSC Contact Center</b>  Identify Content or Operation Issue to Contact Center	The customer calls or e-mails the NSSC Contact Center when they experience an issue with Online course content or operations. The  The Contact Center creates a helpdesk ticket and gathers/documents details on the issue  <b>Output:</b> Remedy Help Desk Ticket that details issue with Online Course	

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Process 5 – Troubleshoot Course Content/Operation		
Roles and Responsibilities	Action	Tips/Notes
<p><b>Step 2</b></p> <p><b>NSSC Contact Center</b></p> <p>Determine if Normal Operations or identified issue</p>	<p>The Contact Center Specialist will compare the issue reported to information available in their Knowledge Database to determine if an explanation or process recovery are already identified.</p> <p>Examples of CCC resolved issues include desktop configuration and course specific process requirements (such as inability to skip to test). The majority of course operation calls will be elevated to level 2.</p> <p><b>Output:</b> Determination if the issue can be resolved by the Contact Center</p>	<p>NSSC CS/SP must keep the Contact Center apprised of any existing issues with Online Courses so that they can respond to any additional calls on the items already being troubleshot.</p>
<p><b>Step 3</b></p> <p><b>NSSC Contact Center</b></p> <p>Close issue or elevate to NSSC (SP)</p>	<p>Based upon the initial discovery, the Contact center will elevate the ticket to NSSC (SP) for new, unre4solved issues, or skip to step 6 and document/close the Help desk ticket if resolved in the Contact Center.</p> <p><b>Output:</b> Elevate ticket to NSSC (SP)</p>	
<p><b>Step 4</b></p> <p><b>NSSC (SP)</b></p> <p>(Troubleshoot &amp; Repair Issue)</p>	<p>NSSC (SP) will troubleshoot the issue with the Requester, course owner, and/or General Physics (System Host) to resolve any content or operational issue with the Online Course.</p> <p>A “course under repair” notice should be placed in SATERN for courses out of service</p> <p><b>Output:</b> Resolution/repair of issue</p>	<p>NSSC SP should also notify the course owner of course problems at this point.</p>
<p><b>Step 5</b></p> <p><b>NSSC (SP) &amp; Learner or Center/Discipline Representative</b></p> <p>Validate Repair with Requester &amp; Course Owner</p>	<p>The NSSC (SP) will validate resolution of the repair with the Requester in either Staging or Production environments as determined by the repair action and the Requester access. The NSSC (SP) will also ensure that the Course Owner is involved in the validation of the repair.</p> <p><b>Output:</b> Validation of issue repair</p>	

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Process 5 – Troubleshoot Course Content/Operation		
Roles and Responsibilities	Action	Tips/Notes
<b>Step 6</b>  <b>NSSC (SP)</b>  Close Remedy Ticket	NSSC (SP) completes documentation for work history log and resolves/closes the Remedy ticket  <b>Output:</b> Completed request.	

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## GOALS

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Initiating Office/Entity	Deliverable (Output)	Receiving Office/Entity	Metric
Requesting Center/Discipline Representative	Defined estimate for level of effort and funding required by NSSC to complete requested Online course support	Customer that submitted request	Complete Online Training Estimates within 5 business days of receiving all required information
Learner or Center/Discipline Representative	Response to Course Issue with Content or Operations	Customer that called in the issue	Contact Customer within 1 business day

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## SYSTEM COMPONENTS

### Existing Systems/Software Tools

IT System Title	IT System Description	Access Requirements	IT System Interfaces
SATERN	NASA's Learning Management System (LMS)	Access to all environments, domains, and catalogs. Also require access to General Physics staging server for posting of new courses	
PC Test Platform	Test course operation in 2 browser environments	Limited access to Online course team & IT	MS Explorer & Firefox
MAC Test Platform	Test course operation in 2 browser environments	Limited access to Online course team & IT	
Secure File Server	Transfer mechanism for training content	Limited access to Online course team & IT	SATERN

### New Systems/Software Tools

IT System Title	IT System Description	Access Requirements	IT System Interfaces
Trivantis Lectora	HTML-based authoring/Conversion tool	Desk-top tool	None
Adobe Captivate	swf-based authoring/Conversion tool	Desk-top tool	None
Media Semantics	Avatar Insertion tool	Desk-top tool	None
Neo-Speech voice packs	e-Learning voice over tool	Desk-top tool	None
Advanced Distributed Learning Test Suite	Testing tool for SCORM Compliance	Desk-top tool	None
Freedom Scientific JAWS software	Testing tool for screen reader functionality	Desk-top tool	None
Section 508 Web accessibility checker	Checks 508 compliance of courses	Desk-top tool	None

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## CUSTOMER CONTACT CENTER STRATEGY

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The NSSC Contact Center Service Delivery Guide provides details regarding menu positioning, routing, and escalation of inquiries for this activity. The NSSC Contact Center Service Delivery Guide can be found on the NSSC Customer Service Web site using the following link: [https://search.nssc.nasa.gov/servlet/sm.web.Fetch/NSSC-CC-SDG-0001\\_RevD.pdf?rhid=1000&did=1766&type=released](https://search.nssc.nasa.gov/servlet/sm.web.Fetch/NSSC-CC-SDG-0001_RevD.pdf?rhid=1000&did=1766&type=released)

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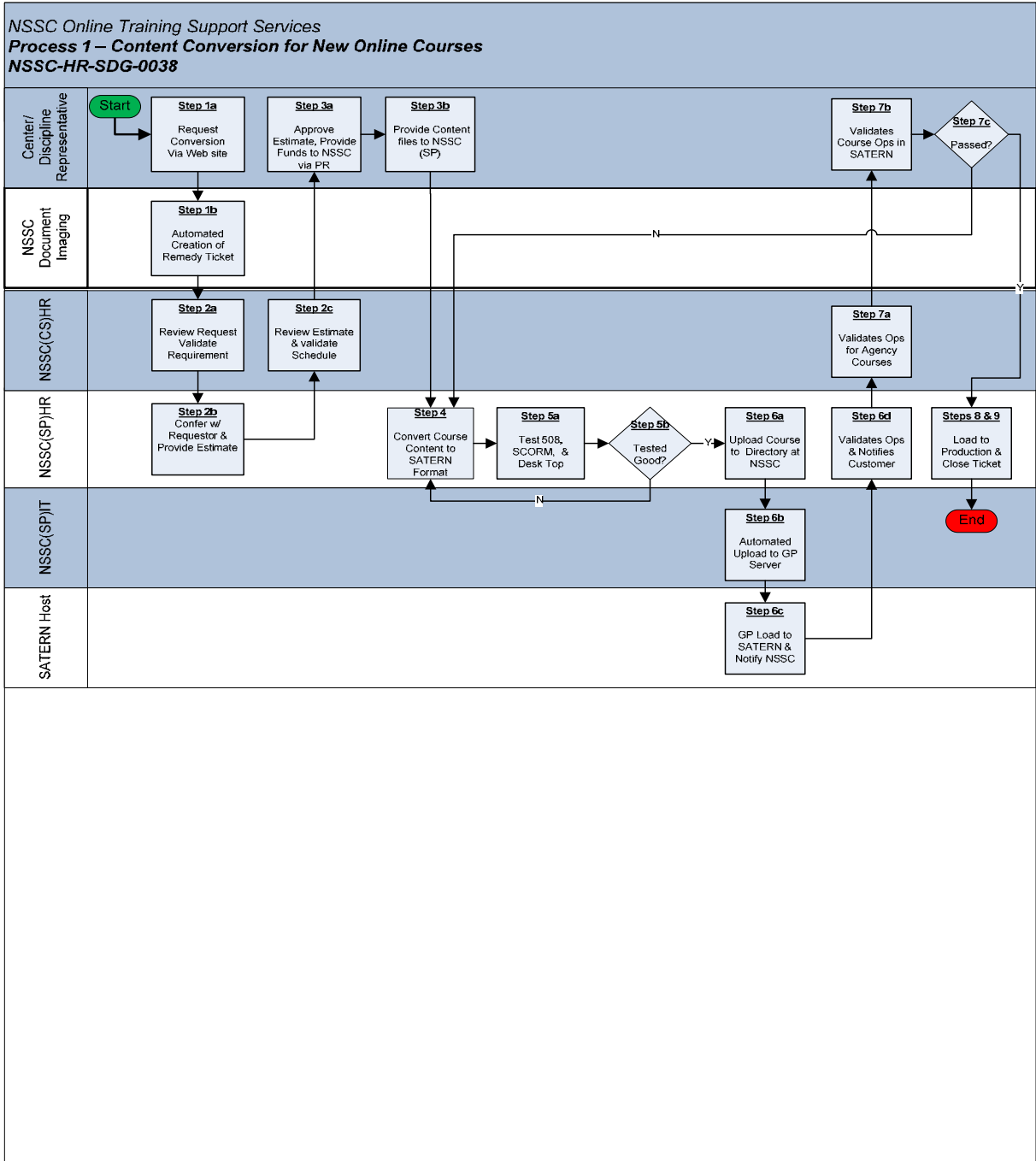
## APPENDIX

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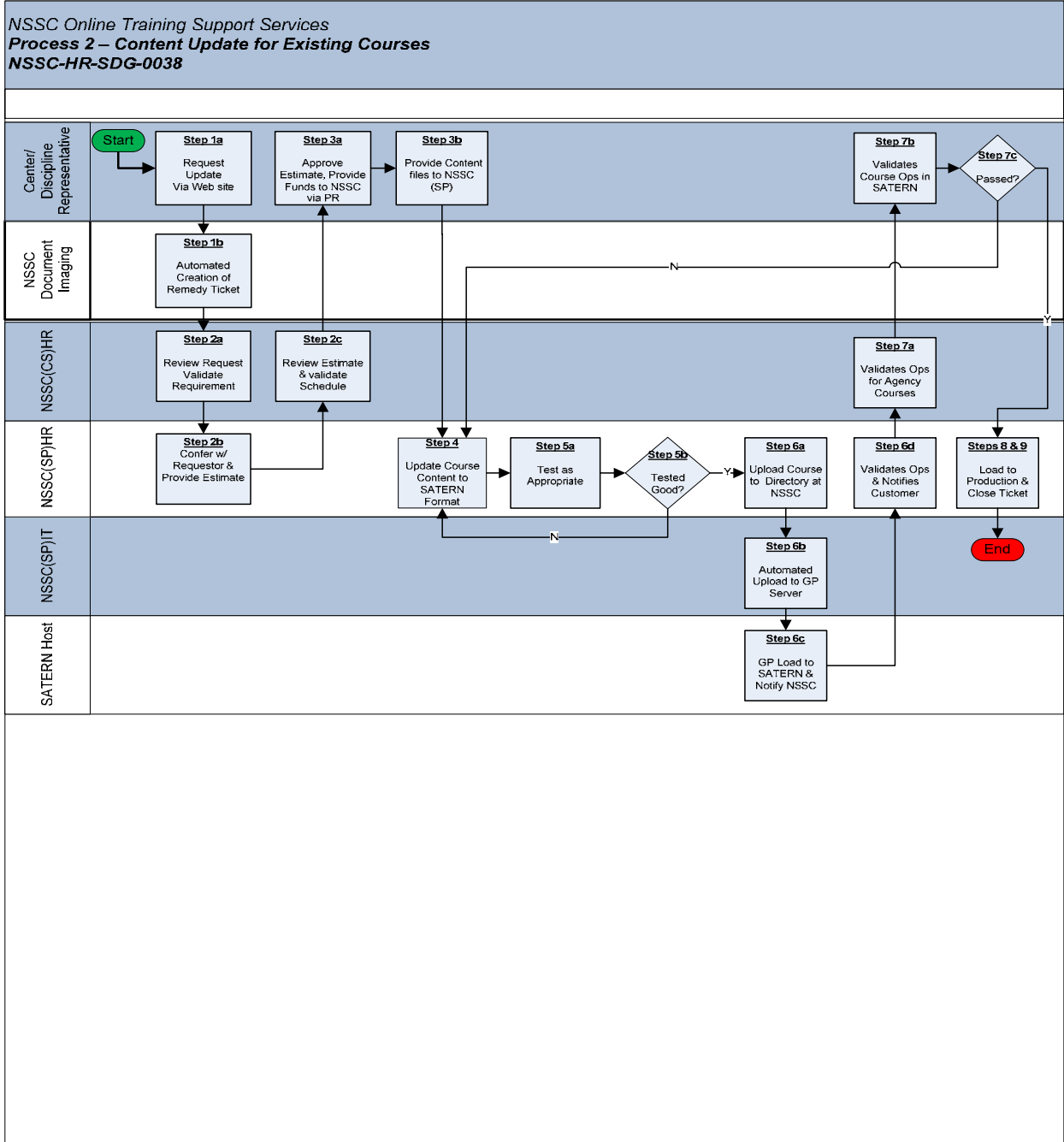
### Appendix A – Detailed Process Flows



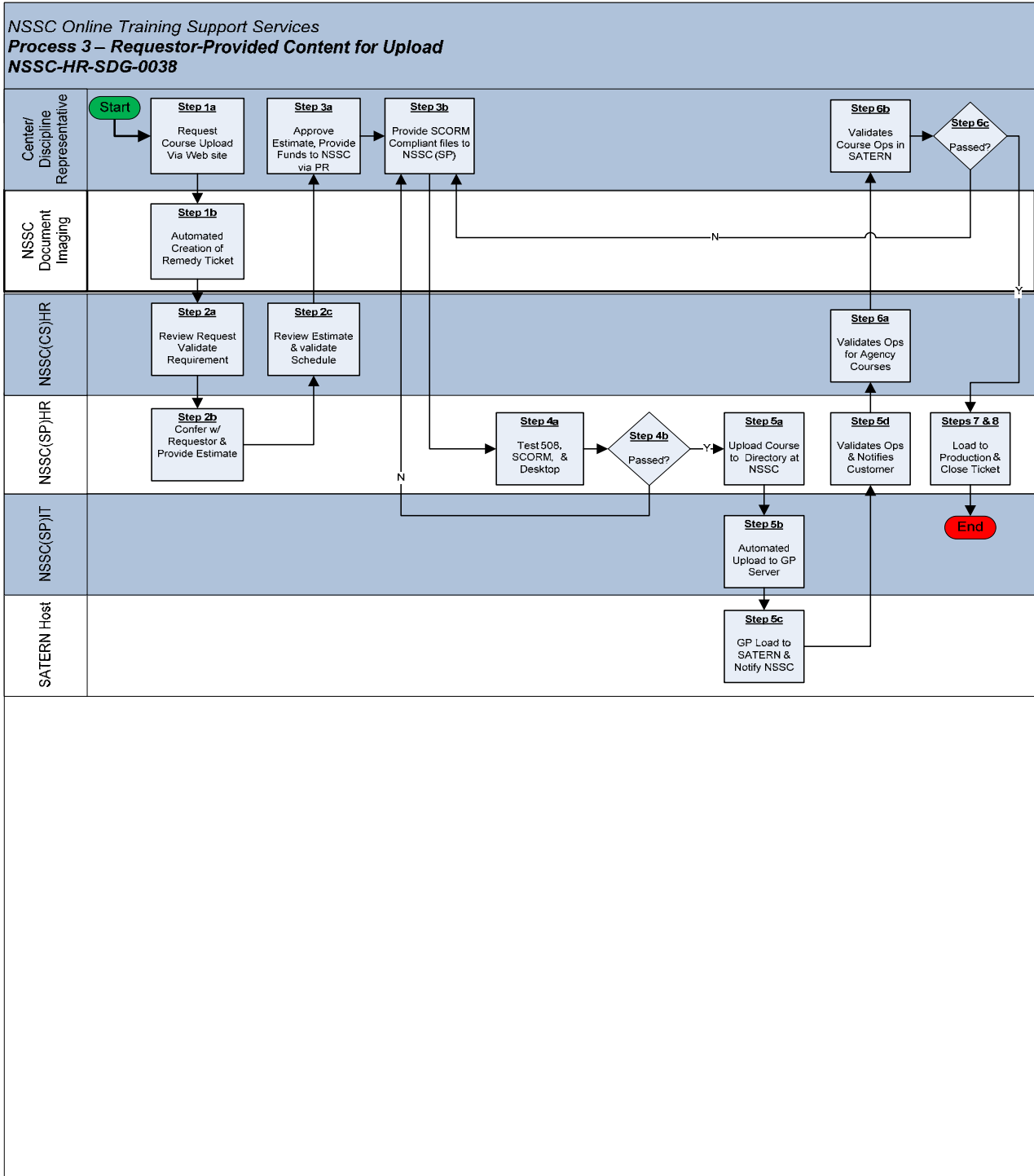


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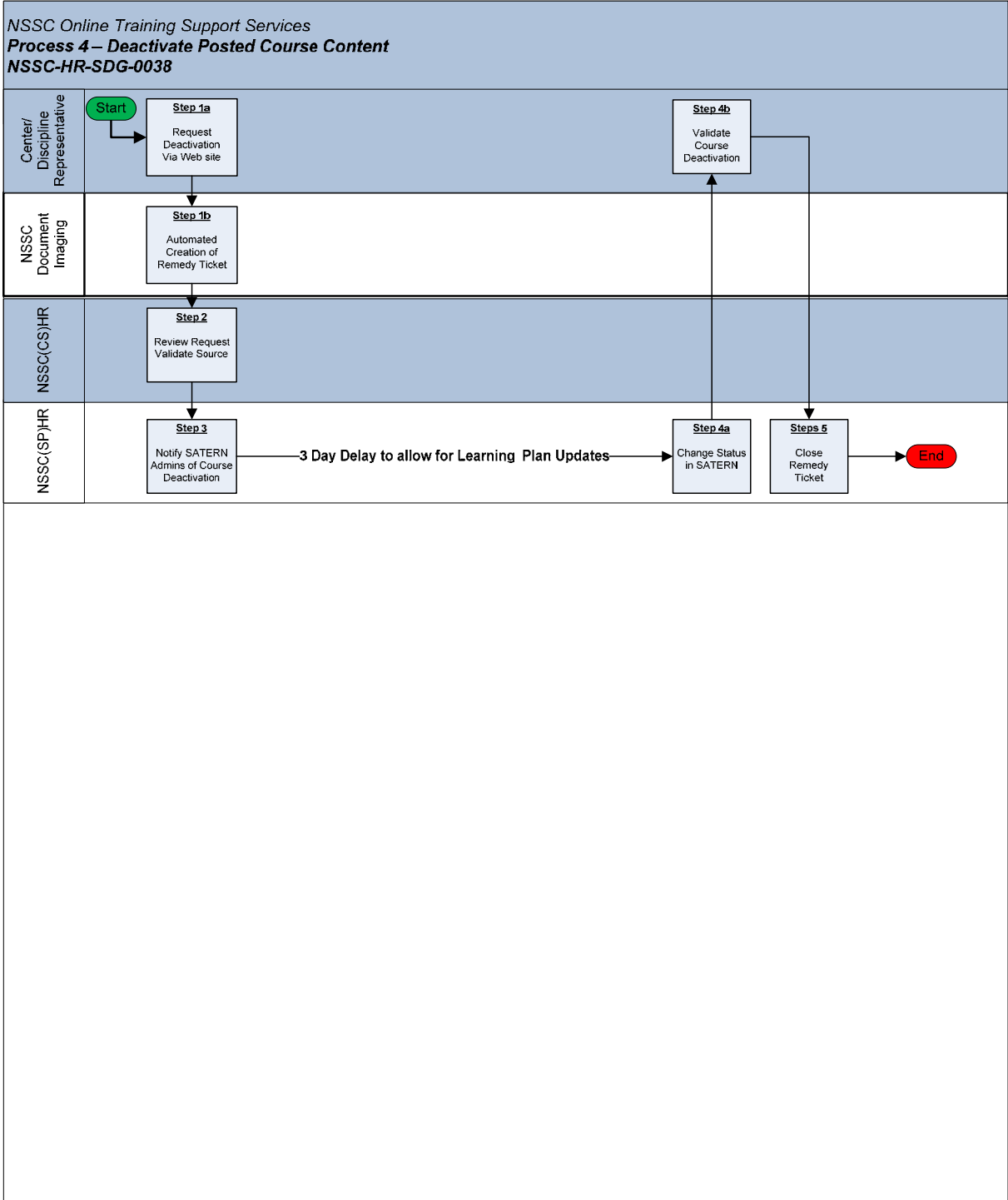
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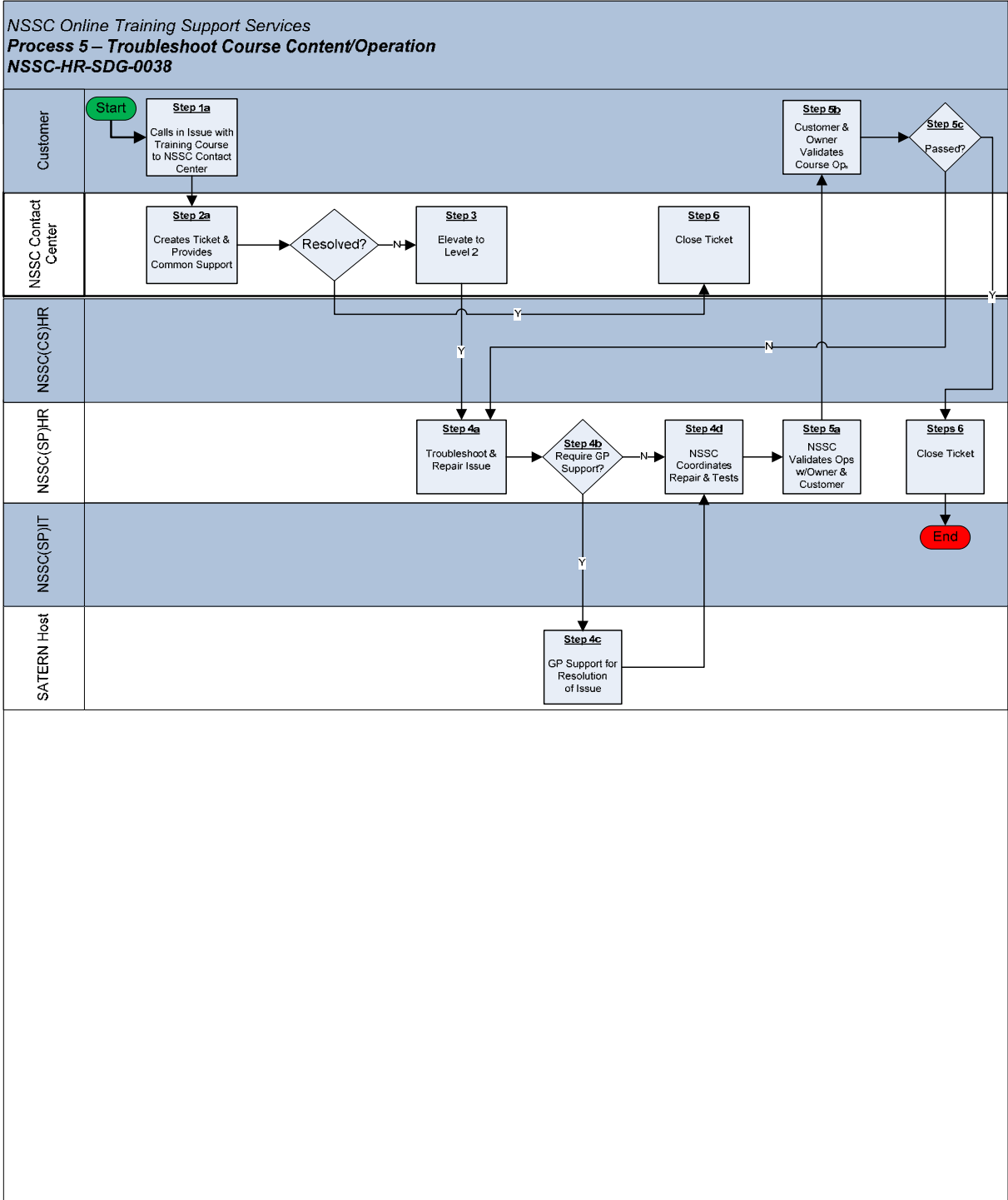


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## Appendix B – Training Content Specifications

Prior to upload to SATERN, it is the responsibility of the NSSC to insure that modules (including videos):

- are accessible via the NASA and SATERN approved list of Web browsers and hardware as listed in the Client Reference Configuration in NASA-STD-2804M, Effective August, 2009
- are Section 508 compliant
- are Sharable Content Object Reference Module (SCORM) conformant
- meet NASA Internet Publishing Content Guidelines

Modules that do not meet these guidelines will not be accepted into the SATERN Learning Management System. The following sections will give a cursory look at the minimum browser sets, Section 508 Compliance, SCORM, and the NASA Internet Publishing Content Guidelines.

Approved list of Web browsers (from the Client Reference Configuration in NASA-STD-2804M, effective August, 2009):

<b>Windows XP</b>			
Browser	Interface Standard	Version	Effective Date
Mozilla Firefox	W3C and industry standards, including the following: HTML 4.01, XHTML 1.0 CSS 2 (Cascading Style Sheets) ECMA script (JavaScript) capability to run Java 2 applets, SSL version 2 and 3, TLS 1.0	3.0.x	October 1, 2008
Microsoft Internet Explorer		7.0.x	June, 2009
<b>Mac OS X</b>			
Mozilla Firefox	W3C and industry standards, including the following: HTML 4.01 XHTML 1.0 CSS 2 (Cascading Style Sheets) ECMA script (JavaScript) capability to run Java 2 applets, SSL version 2 and 3, TLS 1.0	3.0.x	October 1, 2008
Apple Safari		4.0.x	July 2009

## Section 508 Compliance

NASA Section 508 Web Policy states:

"all NASA Web sites, i.e., all Web sites in the 'nasa.gov' Internet domain whether hosted by NASA or for NASA under contracts, grants, or other agreements and all Web sites provided by or hosted by NASA contractors and grantees where the contract or grant requires the provision of Web services on behalf of NASA's missions, even if the Web

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sites are not in the 'nasa.gov' Internet domain must meet requirements set by Section 508 of the Rehabilitation Act. Owners of Web sites must make their Web sites accessible, or, if doing so constitutes an undue burden, provide other means to make the information or service provided at the Web site available."

### Section 508 Standards Summary

According to The U.S. Access Board, an independent Federal agency devoted to accessibility for people with disabilities, a Web site will be in compliance with the 508 standards if it meets paragraphs (a) through (p) of Section 1194.22. They are summarized as follows:

- (a) Text Tags - A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).
- (b) Multimedia Presentations - Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.
- (c) Color - Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.
- (d) Readability (style sheets) - Documents shall be organized so they are readable without requiring an associated style sheet.
- (e) Server-Side Image Maps - Redundant text links shall be provided for each active region of a server-side image map.
- (f) Client-Side Image Maps - Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
- (g) Data Table - Row and column headers shall be identified for data tables.
- (h) Multi-logic Row or Column Headers - Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.
- (i) Frames - Frames shall be titled with text that facilitates frame identification and navigation.
- (j) Flicker Rate - Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

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(k) Text-Only Alternative - A text-only page, with equivalent information or functionality, shall be provided to make a Web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.

(l) Scripts - When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.

(m) Applets and Plug-Ins - When a Web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).

(n) Electronic Forms - When electronic forms are designed to be completed online, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

(o) Navigation Links - A method shall be provided that permits users to skip repetitive navigation links.

(p) Time Delays - When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

#### **Additional resources:**

There are several sources of information regarding Section 508 Web policy and compliance. Here are just a few resources that can be found via the Internet:

- NASA Section 508 Web site: (<http://www.section508.nasa.gov/>)
- The U.S. Access Board 508 Website: (<http://www.access-board.gov/508.htm>)
- The U.S. Access Board Guide to the Section 508 Standards: (<http://www.access-board.gov/sec508/guide/index.htm>)
- Web Accessibility Made Easy, U.S. Government Website Accessibility guidelines: (<http://www.hq.nasa.gov/webaccess/index.html>)
- Infocus: (<http://www.ssbtechnologies.com/products/infocus/index.html>)

#### **Sharable Content Object Reference Model (SCORM)**

All online training developed for SATERN must be SCORM 1.2 conformant.



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The Sharable Content Object Reference Model (SCORM) specification was designed by Advanced Distributed Learning (ADL) to provide a technical means to share distance learning courses (objects) among the different learning delivery environments. One objective of SCORM is the ability to move a course from one learning platform to another. Another is to create reusable chunks (SCOs) of Web-based learning content to enable its use in other courses. Once a common language or standard is defined, then all systems that are built using that language can "talk" to each other (in theory). SCORM addresses these issues by specifying a standard way for defining and accessing information about learning objects.

Developing to the SCORM standards allows your course to appear almost identical in any SCORM compatible LMS on the market. Using SCORM commands can also allow you to control how users advance through your course by only unlocking certain sections once they have completed the sections that come before it. You can also set bookmarks in your courses to allow learners to jump directly to the bookmark the next time they enter the course.

ADL currently has two standards which are widely used, version 1.2 and version 1.3 (aka 2004). Technical specs for both versions can be downloaded from ADL's Web site. SATERN currently only supports the SCORM 1.2 standards. Using the SATERN customized version of ADL's JavaScript API interfaces (see below) should eliminate any problems with browser compatibility issues.

## **SCORM 1.2**

SCORM 1.2 is the easier of the two SCORM standards to program for. All that is required is a valid course Manifest file (named imsmanifest.xml), a call to the LMS to initialize the course (via JavaScript) and a call to the LMS to finish the course (again via JavaScript). Of course, there are other things that you can do with SCORM 1.2, but these are the only pieces that you must provide.

The manifest file is an XML file that must be named 'imsmanifest.xml' and has to reside at the root directory of your content module. It can contain five parts: Manifest tag, Metadata (optional) tags, Organizations, Resources, and Sub-Manifests (optional). The format of the manifest file is very specific, so you must be careful when writing it.

The Manifest tag just contains references to the various SCORM reference documents that are stored online. This section rarely changes from module to module. Since the reference documents are kept online there is a potential that they could not be available all the time. Most developers tend to place local copies of these documents within their courses to avoid problems should the reference Web sites not be available at the time

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the course is run. It is the developer's responsibility to make sure that the local copies of the files are current with the ones on the reference Web sites.

The Metadata section of the manifest file is optional. This section allows the developer to add information specific to the module such as copyright notices, browsers supported, languages, etc.

The Organizations section allows the developer to decide how they want their content to be displayed. It is this section that allows you to generate the table of contents for the course which will be displayed by the LMS the course is loaded into. You can have multiple layouts for your course by using different Organization tags within this section. The Resources section is the most technical section of the manifest. It is in this section that you list every file used by the module, and how the LMS should treat them. The two main types of resources are Assets and Sharable Content Objects (SCO). An asset is like a library. It contains files which can be used by multiple SCOs. A SCO is an independent 'block' of the module which can stand by itself. These 'blocks' can be used by other courses in the future. If you do not set up an organization, you might want to consider organizing your resources into a single SCO or asset.

The Sub-Manifest is an optional section that allows you to incorporate other learning content into your course.

The second requirement for SCORM 1.2 is to have the course let the LMS know that the user has entered the course. This is done through a JavaScript call: `LMSInitialize()` and is usually done when the page loads. This call tells the LMS that the user is attempting the learning resource and sets flags accordingly.

The third requirement for SCORM 1.2 is to let the course know when the user has completed the course. This is done through the JavaScript call: `LMSFinish()` and is usually done on the last page of the learning material and is done when the page unloads. This call lets the LMS know that the user has probably gone through the course material, and the course is now complete for them.

## **SATERN and SCORM**

Communication between SATERN and the online training is done through a Java API that SATERN launches on the learner's computer. This is why the Java Runtime Environment (JRE) is required by SATERN. Content developers do not need to worry about the API, SATERN will start it automatically when the online training is launched. You will be able to communicate with the API via JavaScript calls to ADL's JavaScript libraries.

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It is extremely important that you let SATERN know when the learner has exited your online training, even if they do not use the controls you put in your code to exit. When the training window is closed, you must terminate communication with SATERN. Failure to do so will cause problems if the learner tries to launch any other courses. Keep in mind that browser windows can be closed unexpectedly and in ways that you do not anticipate (such as in the middle of the SCO). It is up to you to make sure that communication is still concluded with the LMS in these situations.

To tell SATERN that the learner has completed the online training, you must pass a lesson\_status of 'passed.' Any other value sent will not record a completion. ADL's model for SCORM, found in most of their examples, focuses on Microsoft Internet Explorer on the Windows platform.

You can implement SCORM controls in quite a few different ways. One of the easier methods is the 'SCORM wrapper' method where you use a frameset to mostly keep the SCORM controls separate from your online content. We've provided a sample working 'course' below that contains the SATERN modified API libraries as well as instructions for implementing the SCORM wrapper method.

### **SATERN SCORM Tips**

This section provides simple tips for designing your learning content in SCORM with the least amount of potential problems with SATERN.

- SATERN only grants credit for a cmi.core.lesson\_status value of 'passed'.
- ADL's SCORM API interfaces that are used in their examples are usually tailored to users using Internet Explorer on a Windows platform.
- SATERN will display each item in the Organization area of your manifest on a 'Content Structure' page. These items should point to a specific Sharable Content Object (SCO) and not an asset.
- If you have more than one SCO in your learning content, DO NOT provide links between the two. Users must return to the 'Content Structure' page in order to proceed to the next SCO in your learning material; otherwise SATERN will not properly record an item's completion on the 'Content Structure' page.
- It is up to you to handle the communication between your SCO and the LMS. When the training window is closed, you must terminate communication with the LMS. Failure to do so will cause problems if the user tries to launch the course again. Keep in mind that browser windows can be closed unexpectedly and in

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ways that you do not anticipate (such as in the middle of the SCO). It is up to you to make sure that communication is still concluded with the LMS in these situations.

- If your content consists of a single SCO, it may be more convenient to place your learning content in a 'SCORM wrapper.' Create a two frame frameset containing one visible frame and one invisible frame. Place your learning content in the visible frame and all SCORM interaction in the hidden one. This gives you a central location to troubleshoot any SCORM issues that may arise in your learning content.
- When using ADL's Conformance Test Suite v. 1.2.7, test your archive file using the Content Package Conformance Test. Pay special attention to the note listed in the instructions. You have the option to just test your manifest file, or your entire learning content package. If you have an Organization section in your manifest, you probably want the Content Aggregation Package option.

## NASA Internet Publishing Content Guidelines

All online training on SATERN must meet the NASA Internet Publishing Content Guidelines found in section 11.3.9 of NPR 2810.1A (Security of Information Technology). These guidelines identify and categorize information that can and cannot be posted on the Internet. Visit <http://nodis3.gsfc.nasa.gov/> for the latest version of this NPR.

SATERN is not a publicly-accessible Web site but if your online training contains any of the prohibited information, you must take additional precautions when developing your training to make sure that only valid learners of SATERN can access your materials.

## Development Tools

### HTML

- CSE HTML Validator (<http://www.htmlvalidator.com/>) - Checks your HTML code for any problems that might affect how the code displays. The Lite version is free.
- Total Validator (<http://www.totalvalidator.com/>) - Checks your HTML code for any problems that might affect how the code displays, broken links, spelling, and Section 508 issues. There is a free version available.
- Arachnophilia (<http://www.arachnoid.com/arachnophilia/>) - A HTML editor which is good for people who are unfamiliar with HTML. The Web site also contains some basic HTML tutorials. The product is CareWare (free, but with a modest behavior request from the creator).

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#### Section 508

- InFocus (<https://www.ssbartgroup.com/>) - Tests your code for Section 508 issues. There is not a free version available.
- Total Validator (<http://www.totalvalidator.com/>) - Checks your HTML code for any problems that might affect how the code displays, broken links, spelling, and Section 508 issues. There is a free version available.

#### SCORM

- ADL's Web site (<http://www.adlnet.gov/>) - Contains lots of tools to help with SCORM development, including SCORM examples, a sample SCORM conformant Learning Management System, and the SCORM Version 1.2 Conformance Test Suite Version 1.2.7.

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## Appendix C – Online Course Support Services Request Form

The Online Request Form should be used to submit a request. The Online Request Form can be located on the NSSC Customer Service Web site (<https://www.nssc.nasa.gov/customerservice>) by clicking the "Training" tab, selecting "Online Training Services" and then clicking on the "Online Course Upload/Conversion Form" link

<b>SATERN Online Content Upload/Conversion Request</b>	
<b>Part I - Basic Information</b>	
1. Please provide the following information.	
Name:	
Center:	
Email Address:	Phone Number:
Course Title:	Date Required:
2. Which of the following best describes the service you are requesting? (Check one)	
<input type="radio"/> Content upload (course content is in a single zipped SCORM conformant file)	
<input type="radio"/> Content update (course content is currently housed in SATERN and needs updates or corrections)	
<input type="radio"/> Content conversion (course content is in a format such as MS Word, PowerPoint, or other non-SCORM-compliant format and must be converted)	
<b>Part II - Content Upload</b>	
Complete this information if your online course content is in a web-based, SCORM conformant format and is ready for upload.	
3. Is the course material copyrighted? Yes/No	
4. Does this course replace an existing SATERN course? Yes/No	
5. Please complete the course information below.	
Item ID:	Mandatory? Yes/No
Course Length in hours:	Test required? Yes/No
Catalog for placement:	
Subject area:	
<b>Part III - Content Update</b>	
Complete this information if your online course content is already in SATERN and needs an update or corrections.	
6. Please complete the course information below.	
Item ID:	Mandatory? Yes/No
Course Length in hours:	Test required? Yes/No
Catalog for placement:	
Subject area:	
7. Please explain the changes/corrections you are requesting here.	
<b>Part IV - Content Conversion</b>	
Complete this information if your online content is not in a Web-based SCORM conformant format and you need it converted, tested and uploaded. If not applicable, please mark NA.	
8. Presentation file format and size:	
Number of pages, screens, or slides:	Mandatory? Yes/No
Audio file format, duration and size:	Test required? Yes/No
Video file format, duration and size:	
Graphics/Animations file format, duration and size:	

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