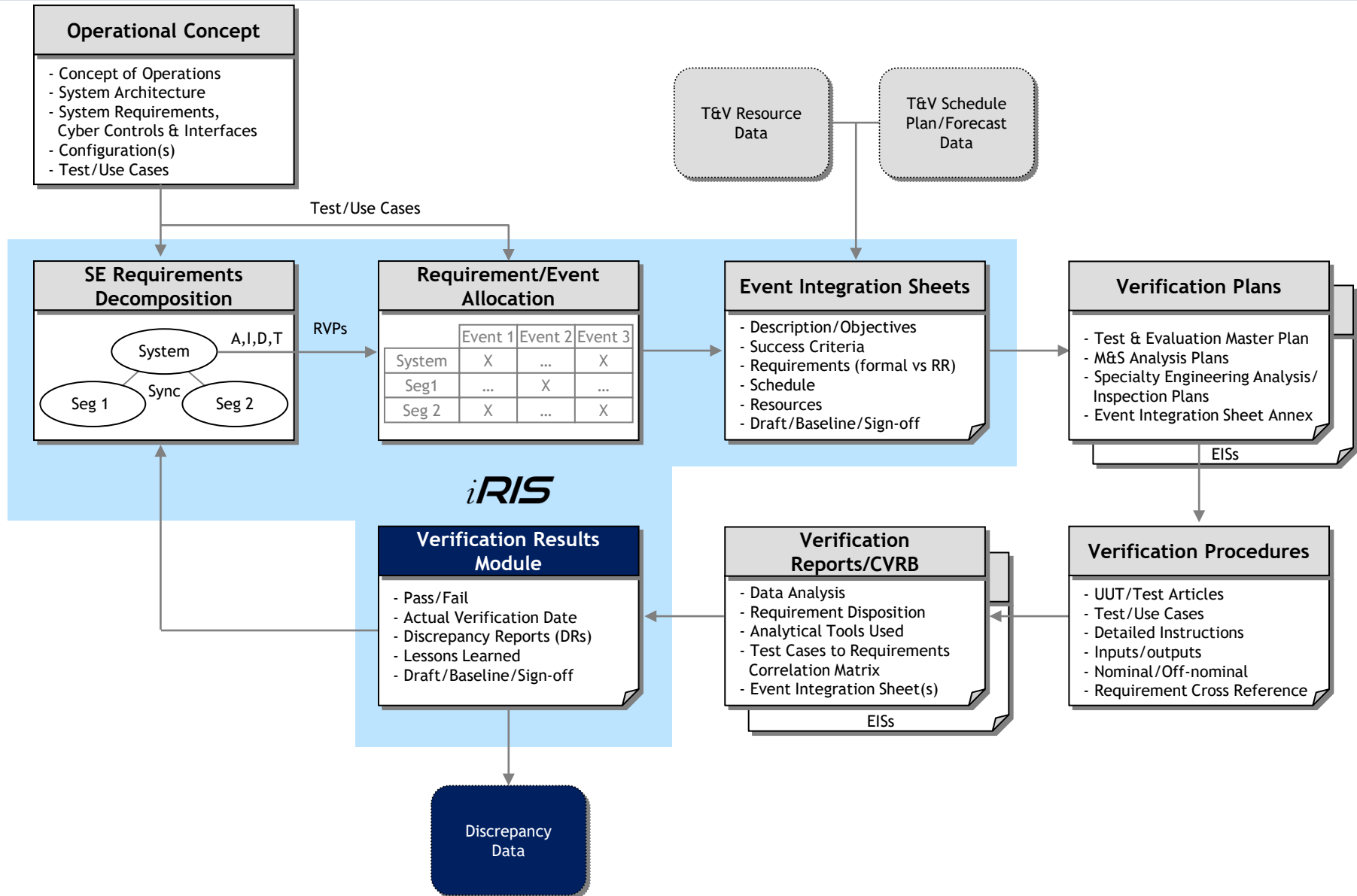




Module 4: Requirements Verification Completion

Celeris Systems Inc.
3335 E. Miraloma Ave., Suite 143
Anaheim, California 92806
www.celeris-systems.com/iris

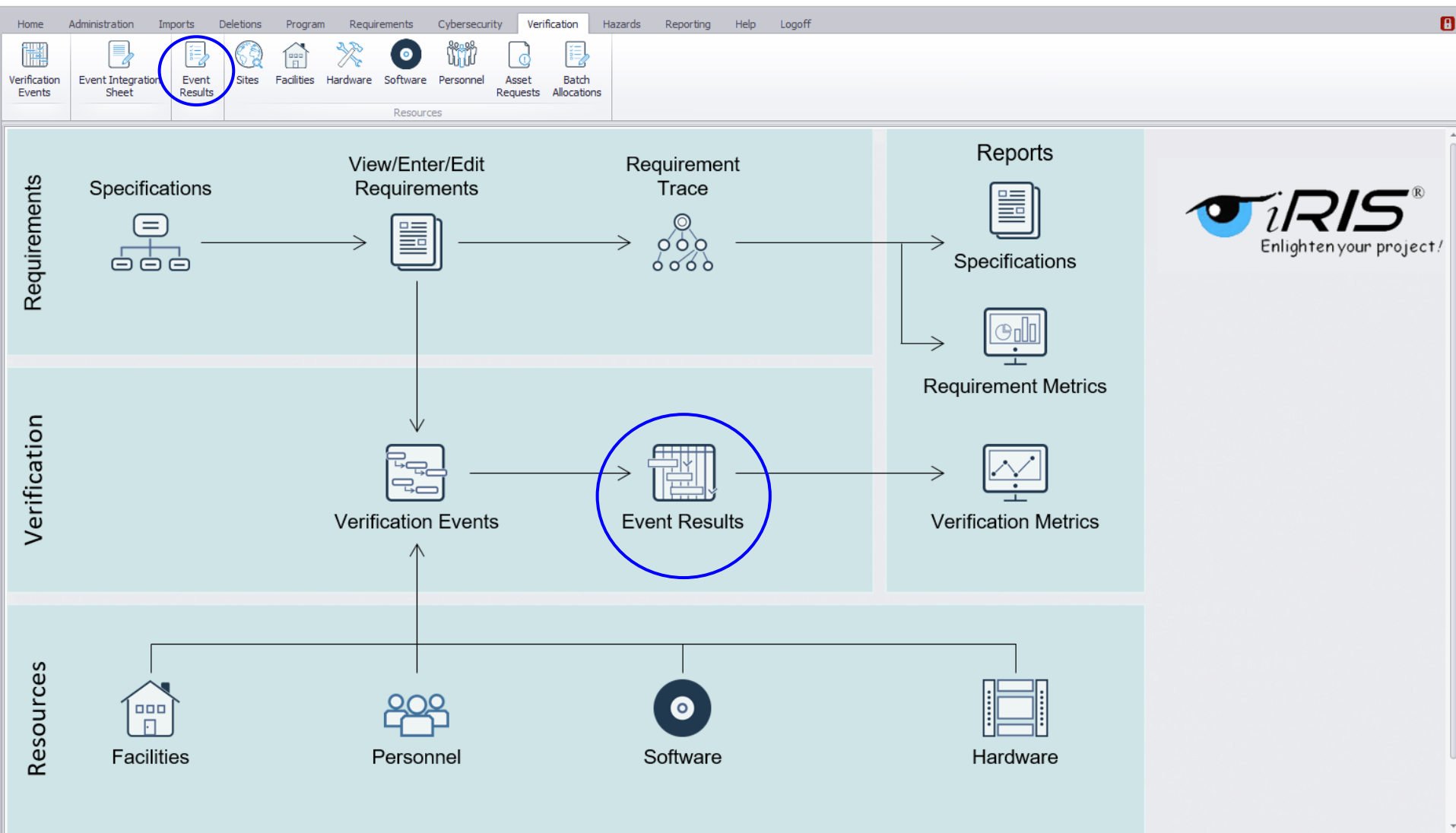
iRIS in the Verification Completion Workflow



Module Objective: Learn how to use EBP/iRIS to support verification completion

- EIS Requirement Disposition
 - Requirement Disposition Data Entry Options
 - Manual
 - Batch Processing
 - Verification Status Definitions
 - Electronic Signature
 - Requirement Level
 - Event Level

Entering the Requirements Verification Completion Workspace



EIS Completion Report

Status Options

- ☒ Met
- ☐ Not Met
- ☐ Partial
- ☐ Not Tested

Verification Report: 1017-FTS Flight Termination System Performance Test					
18 Requirements					
Start: 12/28/2019			End: 12/28/2019		
Links to EIS Documents and Information					
Description:			Hyperlink:		
Requirement Number:	CA-007	External ID:		Name:	Nozzle Control Actuator Drive nut and thrust base assembly
Description					
For multi turn rising stem applications, the drive nut shall be installed in a detachable, ductile iron thrust base. The design shall allow actuator removal from the thrust base, leaving the thrust base attached to the valve to retain valve position. Thrust bearings shall be lubricated by means of an easily accessible grease fitting.					
Status:	Met	Specification:	08) Booster TVC Actuators	Deviation Report Number	
Verification Evidence	Test Report 123, Page 96			Waiver Number	
Verification Approach					
Specific data monitors were sampled to verify correct levels					
Links to Result Documents and Information					
Description:			Hyperlink:		
Compliance Artifact			http://localhost/pro_1/Hyperlinks/risetime.png		
Signatures					
Responsibility		Staff Name:		Date	
Responsible Engineer					
Customer					

Verification Status Color Code Definition *CelerisSystems*SM

Verification Status Color Code Legend	
Formal Verification	Risk Reduction
Met	Met
Open	Open
Not Tested	Not Tested
Partial	Partial
Not Met	Not Met

- Color Codes Used in iRIS GUIs & Reports
- Provide Real-time Verification Status

Verification Report: 1017-FTS

Flight Termination System Performance Test

Requirement Details

Requirement Number: CA-013

Requirement Name: Nozzle Control Actuator Single Point Failure

Requirement Description

The Nozzle Control Actuator shall undergo an analysis that demonstrates that the system satisfies the fault tolerance requirement. Each analysis shall follow a standard industry methodology such as a fault tree analysis or a failure modes effects and criticality analysis.

.....

Verification Evidence

Test Report 123, Page 99

.....

Deviation Report Number

Waiver Number

Status:

☒ Met

☐ Not Met

☐ Partial

☐ Not Tested

Verification Approach

Specific data monitors were sampled to verify correct levels

.....

Back

Update

Result Sign-Off

.....

Result Hyperlinks

Name	Hyperlink	
▶ Compliance Artifact	http://localhost/pro_1/Hyperlinks/risetime.png	<div>New...</div> <div>View</div> <div>Delete</div>

iRIS Administrator Can also Batch Import Results Using MS Excel

- On Occasion, Requirements May Migrate in-to or out-of EISs During the Verification Results Data Entry Process
- iRIS has Built-in Controls to Notify Users When Requirement Migration has Occurred:

iRIS
Administrators
and EIS Owners
can Accept or
Reject these
Changes

Session Results

Verification Report:

Drag a column header here to group by that column

Locked	Verification Num...	Title	Actual St...	Actual End	Assessments or Verifica...	Results Prep...	Results In
<input type="checkbox"/>	1000-IMU	IMU Mass Properties	9/7/2019	9/7/2019	5	5	1
<input type="checkbox"/>	1001-IMU	IMU Design and Construction	9/8/2019	9/10/2019	3	3	3
<input type="checkbox"/>	1002-IMU	IMU Load Deflection			3	3	3
<input type="checkbox"/>	1003-IMU	IMU Reliability Analysis			3	3	3
<input type="checkbox"/>	1004-IMU	IMU Load Dynamics Test			2	2	2
<input checked="" type="checkbox"/>	1005-IMU	IMU End-to-End Test			28	26	26
<input type="checkbox"/>	1006-Batt	Battery Mass Properties			5	5	4
<input type="checkbox"/>	1007-Batt	Battery Design and Construc...			2	2	2
<input type="checkbox"/>	1008-Batt	Battery Load Deflection			2	2	2
<input type="checkbox"/>	1009-Batt	Battery Reliability Analysis	10/6/2019	10/12/2...	7	7	7
<input type="checkbox"/>	1010-Batt	Battery Load Dynamics Test	10/13/2019	10/18/2...	6	6	6
<input checked="" type="checkbox"/>	1011-Batt	Battery End-to-End Test	10/18/2019	10/26/2...	14	12	12
<input type="checkbox"/>	1012-FTS	FTS Mass Properties	10/22/2019	10/26/2...	7	7	5

Open Session

Event is missing requirement result records! No further work can be done on this Session until this condition is resolved

OK

Indicates
Requirements
have been added
to the EIS

Verification Report:

Drag a column header here to group by that column

Locked	Verification Num...	Title	Actual Start	Actual End	Assessments or Verificati...	Results Prepped	Results In
<input type="checkbox"/>	1000-IMU	IMU Mass Properties	9/7/2019	9/7/2019	5	5	1
<input type="checkbox"/>	1001-IMU	IMU Design and Construction	9/8/2019	9/10/2019	3	3	3
<input type="checkbox"/>	1002-IMU	IMU Load Deflection	9/11/2019	9/13/2019	3	3	3
<input type="checkbox"/>	1003-IMU	IMU Reliability Analysis	9/14/2019	9/16/2019	3	3	3
<input type="checkbox"/>	1004-IMU	IMU Load Dynamics Test	9/17/2019	9/18/2019	2	2	2
<input checked="" type="checkbox"/>	1005-IMU	IMU End-to-End Test	9/19/2019	10/14/20...	25	26	26
<input type="checkbox"/>	1006-Batt	Battery Mass Properties	10/1/2019	10/17/20...	5	5	4
<input type="checkbox"/>	1007-Batt	Battery Design and Construc...			2	2	2
<input type="checkbox"/>	1008-Batt	Battery Load Deflection			2	2	2
<input type="checkbox"/>	1009-Batt	Battery Reliability Analysis			7	7	7
<input type="checkbox"/>	1010-Batt	Battery Load Dynamics Test			6	6	6
<input checked="" type="checkbox"/>	1011-Batt	Battery End-to-End Test			14	12	12
<input type="checkbox"/>	1012-FTS	FTS Mass Properties			7	7	5
<input type="checkbox"/>	1013-FTS	FTS Design and Construction			3	3	3
<input type="checkbox"/>	1014-FTS	FTS Load Deflection	10/20/2019	11/6/2019	8	8	8

Requirements have been removed from this event. Please contact your system administrator to synchronize the requirements in this session.

OK

Indicates
Requirements
have been
Removed from
the EIS

Verification Report: 1017-FTS

Flight Termination System Performance Test

Requirement Details

Requirement Number: CA-013

Requirement Name: Nozzle Control Actuator Single Point Failure

Requirement Description: The Nozzle Control Actuator shall undergo an analysis that demonstrates as a fault tree analysis or a failure modes effects and criticality analysis

Verification Evidence: Test Report 123, Page 99

Deviation Report Number:

Waiver Number:

Status:

Met

Not Met

Partial

Not Tested

Verification Approach: Specific data monitors were sampled to verify correct levels

Event Requirement Result Signatures

Requirement: CA-013 Event: 1017-FTS

Responsible Engineer Approval:

Sign Off

Customer Approval:

Sign Off

?

Back

Update

Result Sign-Off

Result Hyperlinks

Name	Hyperlink	
Compliance Artifact	http://localhost/pro_1/Hyperlinks/risetime.png	<div><div>New...</div><div>View</div><div>Delete</div></div>

Session Results

Verification Report: 1017-FTS

Flight Termination System Performance Test

Session Details:

Signatures

Back

Update

Lock Session

Session Hyperlinks

Name

Session Requirements

Requirement N...

CA-007

CA-013

CA-010

CA-002

CA-011

CA-016

CA-021

CA-022

Result Signatures

1017-FTS

Event Developer Results Approval:

Ray Della

09/22/2020 03:33 PM

Remove

Event Conductor Results Approval:

Joe Dunn

09/22/2020 03:42 PM

Remove

Customer Results Approval:

Angel Martinez

09/22/2020 03:43 PM

Remove

?

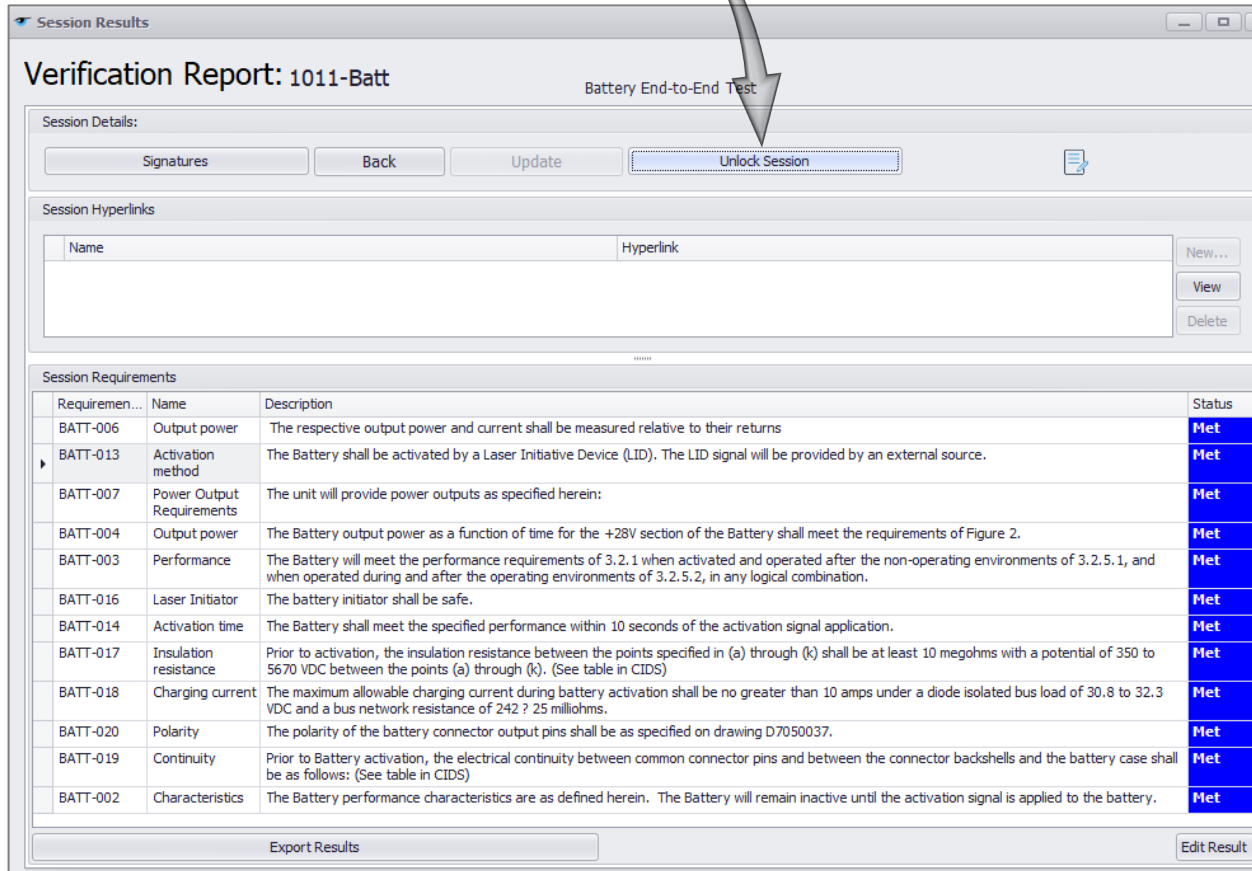
Close

		effects and criticality analysis.	
CA-010	Mass Properties	The actuator shall weigh less than TBD pounds.	Met
CA-002	Nozzle Control Actuator Sizing	The actuator shall be sized to guarantee valve closure at the specified torque and/or thrust requirement as indicated by the valve manufacturer or supplier. The actuator must be adequately sized to provide the torque required to operate the valve at 90% of the nominal voltage. The operating speed shall provide valve closing and opening at approximately 12 inches per minute for gate valves, 4 inches per minute for globe valves and as indicated in the valve list for quarter turn valves. Quarter-turn valves shall be furnished with mechanical stops that restrict the valve/actuator travel.	Met
CA-011	Nozzle Control Actuator Activation time	b. The output data interface, including BIT, shall be present within 2 seconds after application of all input power and system clock.	Met
CA-016	Nozzle Control Actuator Sneak Circuit	With all components functioning nominally, the Nozzle Control Actuator analysis shall demonstrate that there are no latent paths that could cause an undesired event or inhibited function.	Met
CA-021	Nozzle Slew Rate	The slew rate shall exceed XX°/sec in each axis, for all four nozzles acting simultaneously, retract or extend, for a greater than X° nozzle step command.	Met
CA-022	Nozzle Torque	The nozzle torque values shall not exceed XXXX in-lbs.	Met

Export Results

Edit Result

iRIS Administrators and Event Owners can Lock the Results Session When Data Entry is Complete



The screenshot shows the 'Session Results' window for a 'Verification Report: 1011-Batt'. The window title bar includes standard OS controls. The main content area is divided into several sections:

- Session Details:** Contains buttons for 'Signatures', 'Back', 'Update', and 'Unlock Session'. An arrow points to the 'Unlock Session' button.
- Session Hyperlinks:** A table with columns 'Name' and 'Hyperlink', and buttons for 'New...', 'View', and 'Delete'.
- Session Requirements:** A table listing various requirements and their status.
- Export Results:** A button at the bottom left.
- Edit Result:** A button at the bottom right.

The 'Session Requirements' table is as follows:

Requirement...	Name	Description	Status
BATT-006	Output power	The respective output power and current shall be measured relative to their returns	Met
BATT-013	Activation method	The Battery shall be activated by a Laser Initiative Device (LID). The LID signal will be provided by an external source.	Met
BATT-007	Power Output Requirements	The unit will provide power outputs as specified herein:	Met
BATT-004	Output power	The Battery output power as a function of time for the +28V section of the Battery shall meet the requirements of Figure 2.	Met
BATT-003	Performance	The Battery will meet the performance requirements of 3.2.1 when activated and operated after the non-operating environments of 3.2.5.1, and when operated during and after the operating environments of 3.2.5.2, in any logical combination.	Met
BATT-016	Laser Initiator	The battery initiator shall be safe.	Met
BATT-014	Activation time	The Battery shall meet the specified performance within 10 seconds of the activation signal application.	Met
BATT-017	Insulation resistance	Prior to activation, the insulation resistance between the points specified in (a) through (k) shall be at least 10 megohms with a potential of 350 to 5670 VDC between the points (a) through (k). (See table in CIDS)	Met
BATT-018	Charging current	The maximum allowable charging current during battery activation shall be no greater than 10 amps under a diode isolated bus load of 30.8 to 32.3 VDC and a bus network resistance of 242 ± 25 milliohms.	Met
BATT-020	Polarity	The polarity of the battery connector output pins shall be as specified on drawing D7050037.	Met
BATT-019	Continuity	Prior to Battery activation, the electrical continuity between common connector pins and between the connector backshells and the battery case shall be as follows: (See table in CIDS)	Met
BATT-002	Characteristics	The Battery performance characteristics are as defined herein. The Battery will remain inactive until the activation signal is applied to the battery.	Met