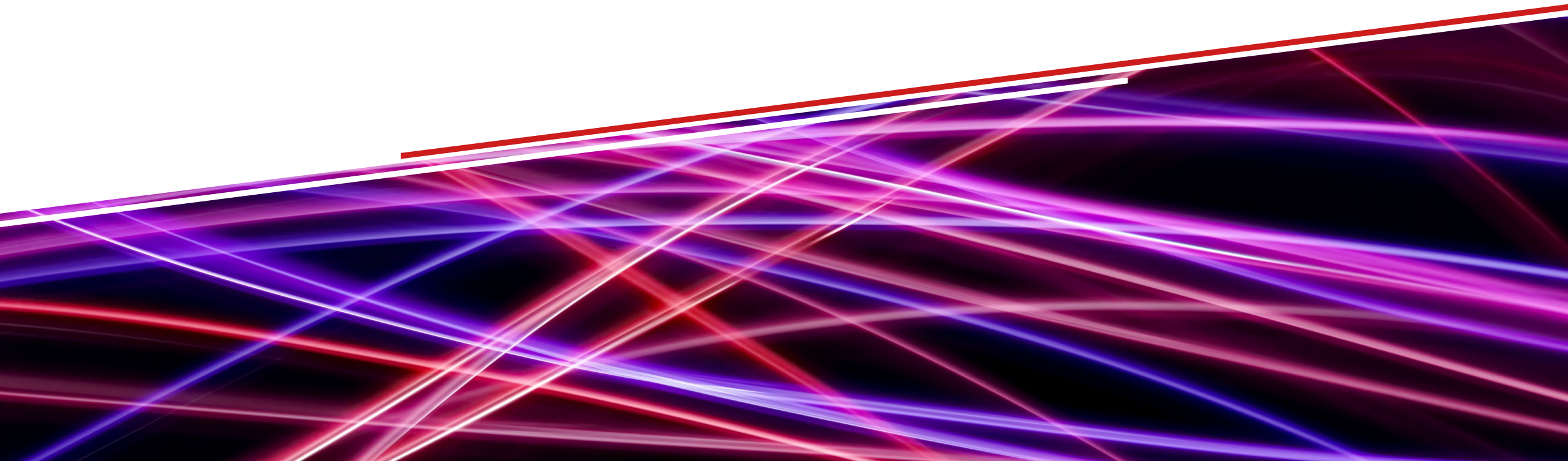


ACE 2024

20 Years of Innovator at SRC Inc

Kevin Murray

March 6, 2024





Agenda

20 Years of Innovator at SRC

- About SRC
- Innovator at SRC
 - Innovator as a Controlled Item
 - Extending Workflow
 - SRC Goes Global
 - The Twins at 20
 - Assembly & Test
 - Foreign Influences

About SRC



SRC at a Glance

- Defense, environment, intelligence

\$379M

FY24 Projected
Revenue

~1,400

Employees

1957

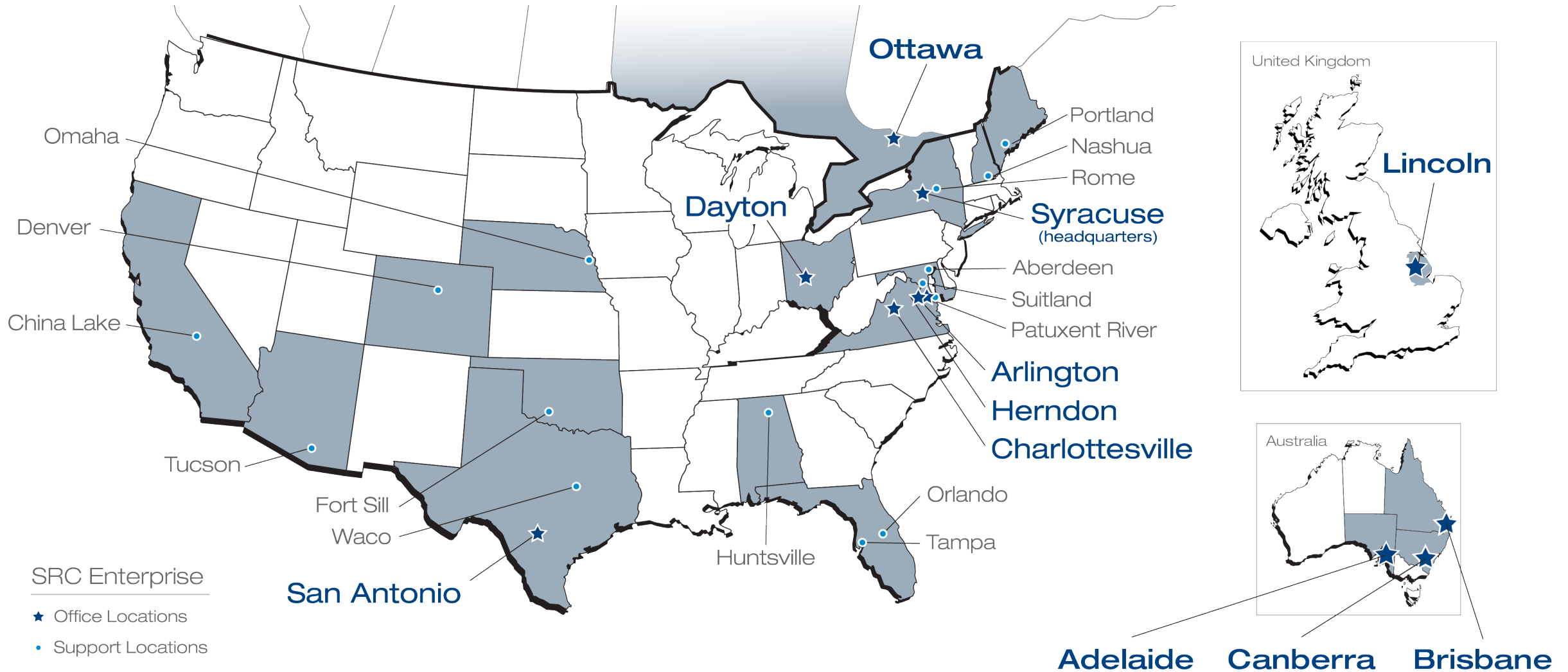
Founded

501(c)(3)

Not-for-Profit

Locations to Support Customers

Across the United States & Around the World



Redefining possible ▶



Experts in Radar

Battle-proven, award winning radar & sensor programs



Leaders in EW

World-class EW tools, services & life-saving solutions



Authorities in Environmental Science

Internationally recognized scientific experts



Design, Manufacture & Support

Full life cycle management for complex defense systems



Trusted Advisor

Not-for-profit; unbiased R&D & services



20 Years of Innovator at SRC



Today's Talk

- SRC's motto is "Redefining Possible™"
- "Redefining Possible" in the PLM Space
 - Today's is a rapid-fire retrospective of 20 "Possibilities".
 - Some easy, some difficult
 - Some mundane, some novel
 - Some you may want to try
 - This is a retrospective with no deep feature discussion
 - » For more detail
 - Download this slide deck
 - See past ACE presentations
 - Talk to me off-line
- Hopefully, you walk out with one good idea to apply.

Possibility 1

Self Managing Innovator



Innovator Work Request (2023)

- Any user can initiate an IWR for
 - Enhancements
 - Report Issues
- Formerly PRs were used
 - Processes diverged

SRC Innovator Work Request ?

Request Info:

IWR Number: IWR55149 State: New

Summary: Extend Initiate Workflow for PR, ECR, ECN

Category: Workflow Priority: 4 - Inconvenience Or Annoyance

Change Type: Enhancement Severity:

Responsible Organization: Created On: 11/13/2023 9:41:16 AM

Responsible Individual: Reported By:

DevOps Info:

DevOps ID: DevOps Assignee: DevOps State: DevOps Sprint:

Development:

Labor Estimate: 4-8 Hours Assigned Developer:

Design Impact: Single Module Assigned Functional Tester:

Process Owner: CM Assigned User Tester:

Testing Requirements: Functional Affects Multiple Processes

Proposed Sprint: 24-01 Capital Required

Training Materials Required

Deployment Plan:

Description/Reproduction Steps:

1. If the user is not CM or an administrator, reject the request.
2. If there is a running workflow on the item, display an "are you sure" dialog.
3. Terminate any workflow running on the item.
4. Force the state back to the lifecycle starting state.
5. Initiate new work flow.

Reason For Change:

Allow CM to restart workflows when untimely operations are requested.

Comments:

Convert Action SRC MTD ACT InitiateWorkflow to client side for "are you sure" dialog

User Story:

As a CM user or administrator, I need the ability to terminate a running workflow and start over.

Acceptance Criteria:

1. Attempts to use this feature by other than CM or administrators are rejected.
2. The user can cancel the request if there is a running workflow on the item.
3. Any workflow running on the item at the time of the request is terminated.
4. A new workflow is started with the PR, ECR or ECN in its lifecycle's starting state.

Workflow Possibilities (2023)



A Quick Business Orientation

- SRC is a Program driven business.
 - Programs closely tied to a product and funding
 - Many active programs
- Starter: PM's Program
- Customer's Mandate: "One workflow to rule them all."
 - No program specific workflows

The screenshot displays the SRC Program management interface. The top section, titled "Program", shows the "SRC Program" header. Below this, the "Program Details" section includes fields for Program Name (Test 1 - Prod), Mnemonic, Program Type (Production), and a checkbox for "Requires Customer Approval". It also lists key roles: Design Authority (SRC), Program Manager (Kevin Murray), CM Lead (Kevin Murray), Engineering Lead (Kevin Murray), and Workflow Manager (Test 1 - Prod Workflow I). The bottom section, titled "Teams", features a table with columns for Team Name and Team's Role [...].

Team Name	Team's Role [...]
Test 1 - Prod Full Team	Full Team
Test 1 - Prod CCB	CCB
Test 1 - Prod CM Lead	CM Lead
Test 1 - Prod Program Management	Program Management

Possibility 2

Dynamic Activity Assignment



Use Case: Program Driven Assignments

- Workforce Roles
- Link Roles to Activities.
- Programs provide labor.
 - Teams: program-role-team determine activity assignments.
 - » program-role-Identity is easier to do
- Assignments are made on activity activation. (code)

Program

SRC Program

Program Details:

Program Name: Test 1 - Prod
Mnemonic:
Program Type: Production
 Requires Customer Approval

Design Authority: SRC
Program Manager: Kevin Murray
CM Lead: Kevin Murray
Engineering Lead: Kevin Murray
Workflow Manager: Test 1 - Prod Workflow I
Division:

Comments:

Distribution Statement:

ITAR Statement:

Destruction Notice:

Teams Parts Deadlines Active Workflows PRs on Hold Attachments Projects

Teams

Team Name	Team's Role [...]
Test 1 - Prod Full Team	Full Team
Test 1 - Prod CCB	CCB
Test 1 - Prod CM Lead	CM Lead
Test 1 - Prod Program Management	Program Management

Possibility 3

Leverage PM's Business Calendar



Use Case: Durations and Deadlines

- Program Management's business calendar defines weekends and holidays
- On activity activation (code), durations and deadlines are extended.
 - Durations and deadlines in workdays, not calendar days.

Possibility 4

Dynamic Routing



Use Case: Program Driven Routing

- Development programs have simpler flows than Production programs, but ...
 - Changes affecting production items must follow production routing.
 - That's tricky, we don't want users to vote for trouble!
- We use an automatic activity with several exit paths.
 - » No default path designated in the Workflow Map
 - » The user votes
 - » Code sets the default path before the automatic activity before it activates.
 - » Flow then passes down the selected path.

Possibility 5

Hold a Workflow Pending until Others complete



Use Case: ECR Review Findings

PRs Add'l Programs Affected Affected Items Part Effectivity Tech Reviewers **Review Findings** Attachments Working Files Comments History

● ECR Review Finding ☆

🔍 Hidden 🔄 📄 🌐

Finding No	Finding State	*Reference T...	*Reference	*Defect Code	*Finding [...]	ECR State Fo...	Reviewer [...]	Reviewed On ...
F11483	Closed	Drawing	SRC84444-11...	DOC09 - Label/Marking Issue	SRC84444-11-02_DWG: Note 6 callout in zone C1 seems atypical.	Technical Rev...	Joseph C...	7/18/2023 8:...
F11484	Closed	ECR	ECR20178	ECR01 - Change desc Missi...	Should the parenthetical statements in the ECR change description be removed now?	Technical Rev...	Joseph C...	7/18/2023 8:...
F11485	Closed	Drawing	SRC84444-10...	DOC11 - Note Callout Missi...	SRC84444-10_DWG: ECR20178 should be listed in rev history table.	Technical Rev...	Joseph C...	7/18/2023 8:...

- ECR discrepancies must be fixed before progressing to the next activity.
 - Query for open review workflows in the ECR Activity Vote.
 - Block voting until all finding workflows close.

SRC ECR Review Finding

ECR: ECR20178

Reference Type: Drawing | Reference: SRC84444-11-02_Rev0 | Defect Code: DOC09 - Label/Marking Issue

ECR State: Technical Review

Finding #: F11483

Reviewer: Joseph C...

Reviewed On: 7/18/2023 8:01:14 AM

Finding: SRC84444-11-02_DWG: Note 6 callout in zone C1 seems atypical.

Possibility 6

Add Activities Ad-hoc to Running Workflows



Use Case: CCB Action Items for ECN

ECRs CCB Action Items Attachments Comments Add'l Programs Affected Affected Items Part Effectivity ECN Status History Working Files

CCB Action Items ☆ An ECN Relationship

CCB #	Program	RI [...]	Action Needed	Additional Information [...]	RI Response [...]	Completion Date [...]	Workflow Sta...
CCB#00503	NG PNR-Prod	Mathew Br...	CCB action to update workplans	346****; from A to B, from B to ...			
CCB#00504	NG PNR-Prod	Catherine...	CCB action to update SO's	Update any SO's for 346**** 4 fro...		2/6/2024	



SRC CCB Action Item ECN ECN#00148 CCB# CCB#00433
Program C...DEV

Action

RI Heather... Completion Date 1/24/2024

Action Needed
Immediate Cut In F...2

Additional Task Information
SRC91... 1 From Rev 0 to Rev 1

RI Response

Workflow Parameters

Can Delegate Can Refuse

E-Signature

Expected Duration 5 Reminder Interval 2

Timeout Duration 8 Reminder Count 3

Escalate To

Workflow Status

- CCB Action Items are post release activities performed by various actors.
- Hold the ECN workflow open until the last action completes.
 - Closeout may be protracted.
 - Don't want to revisit ECN weeks later.

SRC Goes Global (2016)



Commodity Classification

When SRC decided to pursue international opportunities, we extended Innovator with trade control features, enabling us to enter the international market.

To stay true to the old paper form we needed...

Possibility 7

Relationships in Form Body



Commodity Classification



- The CCI Determines trade restrictions for a group of parts.
 - » Performed by specially trained engineers.
 - » The applicable parts are a relationship type displayed in a table.

Commodity Classification



Commodity:

Review No: Rev: SME: [Joseph](#)

#	Commodity ID or PN	Commodity Version or Revision	Part Description
1.	SR 3E	0	Assembly, Kit, System, Mobile

Relationship Type in Form Body

Final Item Classification:

Type	Jurisdiction	Export Control Number (ECN)
Item	EAR	EAR99
Export Controlled Information (ECI)	EAR	EAR99

Commodity Classification

- Let's Scroll the form
 - » Performance characteristics are another relationship type displayed in a table.

Item Information And History:

1. Commodity Type (Select all that apply): ...
Definitions: 22 CFR 120.45 and 15 CFR 772

2. Is any of the data involved with the item classified (Confidential, Secret, Top Secret)?

3. Funding History:

4. The commodity has been the subject of a government determination (if so, list the CJ or CCATS reference number).

5. Describe the commodity's function:

Performance Characteristics:

Another relationship table in the form body.

#	Applies to	Minimum	Maximum	Unit of Measure	Description ++
---	------------	---------	---------	-----------------	----------------

Commodity Classification

- The CCI form is complex.
- The proper path through the form varies depending how the responses to certain items.
- To guide the user through the form and improve first pass quality we...

Possibility 8

Draw Forms Conditionally



Commodity Classification

- The CCI form is drawn as the process unfolds.
 - A “Specially Designed” determination injects the ITAR catch analysis section into the form.
 - A positive answer to any catch analysis question injects the ITAR release section.

ITAR Review:
Review 22 CFR Part 121 (USML) of the ITAR and determine the applicable categories. (++) indicates cells in that column expand on double click.)

#	Category	Paragraph Designation	Spec. Designed	Regulatory Text ++	Analysis ++	Designation Match
1.	20	a.4 ii	Yes	effectiveness of adversary electronics (e.g., electronic warfare equipment, electronic intelligence equipment, and electronic communications equipment);	The items on this CCI do not perform these functions. They are used for development testing for products that would perform these functions.	Yes

The item is not found in the USML; check the box and continue to the EAR Review.

ITAR Specially Designed Review:
Are the words "specially designed" found in the Category you identified? Yes

Continue to catch analysis.

ITAR Catch Analysis:
(a) Except for commodities or software described in paragraph (b) of this section, a commodity or software (see §120.45(f)) is specially designed if it:

(1) As a result of "development", has properties peculiarly responsible for achieving or exceeding the controlled performance levels, characteristics, or functions described in the relevant U.S. Munitions List paragraph

(2) Is a "part" (see §120.45 (d)), "component" (see §120.45(b)), "accessory" (see §120.45(c)), "attachment" (see §120.45(e)), or "software" for use in or with a defense article

Continue to the Release Analysis.

Commodity Classification

- If any release question is affirmative, ITAR doesn't apply but other laws may.
 - We inject additional catch and release blocks for other jurisdictions.
 - The outcome for each drives what's next on the form until we determine none apply.

ITAR Release Analysis:

(b) For purposes of this subchapter, a part, component, accessory, attachment, or software is not specially designed if it:

(1) Is subject to the EAR pursuant to a commodity jurisdiction determination

(2) Is, regardless of form or fit, a fastener (e.g., screws, bolts, nuts, nut plates, studs, inserts, clips, rivets, pins), washer, spacer, insulator, grommet, bushing, spring, wire, or solder;

(3) Has the same function, performance capabilities, and the same or "equivalent" form and fit as a commodity or software used in or with a commodity that:

(i) Is or was in production (i.e., not in development); and

(ii) Is not enumerated on the U.S. Munitions List;

(4) Was or is being developed with knowledge that it is or would be for use in or with both defense articles enumerated on the U.S. Munitions List and also commodities not on the U.S. Munitions List

(5) Was or is being developed as a general purpose commodity or software, i.e., with no knowledge for use in or with a particular commodity (e.g., a F/A-18 or HMMWV) or type of commodity (e.g., an aircraft or machine tool).

None of the releases are met and the commodity is caught.

The commodity belongs to the USML category you identified and you have completed the analysis.

More detailed information and examples are provided in [15 CFR §772](#). In order to properly determine if the (b)(3), (4), (5), or (6) release applies review the notes of the specially designed definition.

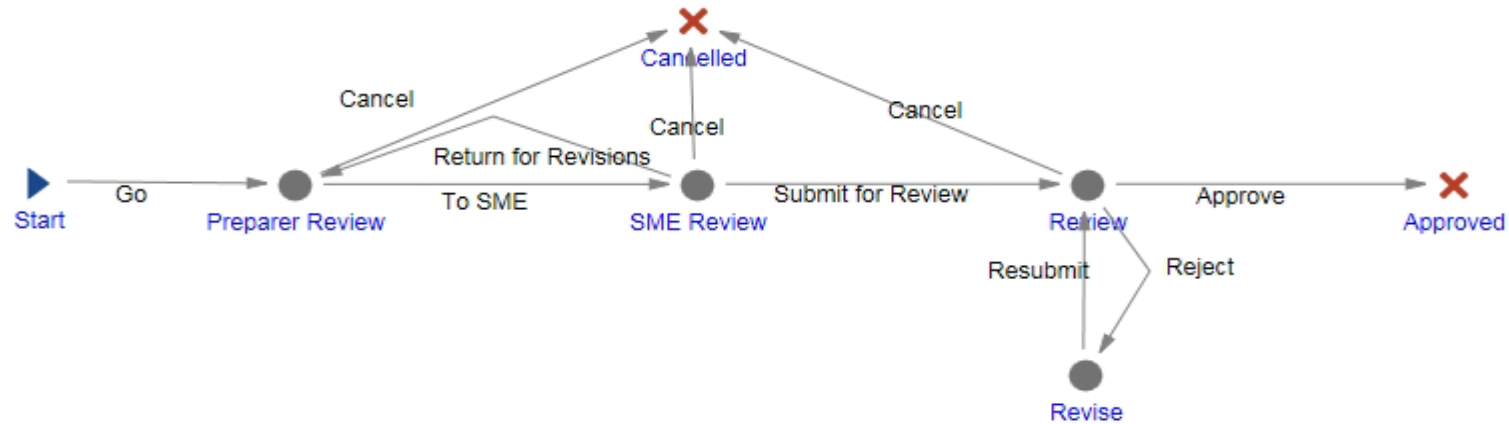
Release Explanation:

Possibility 9

Update Items from a Workflow



Use Case: Update Parts with Trade Data



- A workflow drives Commodity Classifications through review.
 - At the end, every part on the CCI is updated with its trade determination.

Possibility 10

The Digital Thread as a Compliance Tool



Use Case: No Part Trade Info, No Part Release

- Prevent part release unless the Part's trade info tab is populated.

The screenshot displays the SRC Part Master software interface. The main window is titled "SRC Part Master" and contains several sections for part information:

- Part Info:** Includes fields for Part Class (MFR), Part Number, Rev (9), State (Released 07/15/2020), and Part Type (MECH).
- Part Properties:** Includes Comm. Code (C04 - Mechanical), National Stock # (NONE), Package Type (Other), Make/Buy (Buy), UOM Code (EA), Manufacturer (Jtronics), Cage Code, End Of Life Date, and checkboxes for UID Required, ROHS/Lead Free, As Built Traceability, and Maintenance Required.
- Description:** M2.5, TAPPED STRIP
- Extended Description:** 2.11.1 Tapped Strips M2.5
- Comments:** See MFR Data Sheet Attachment

The bottom navigation bar includes tabs for BOM, BOM Structure, Documents, Attachments, Comments, PR Report, ECR Report, ECN Report, Change Effectivity, AML, Alternates, Programs, CAD Documents, Goals, History, **Trade Info** (highlighted with a red box), S/N, and Impact.

The Trade Info tab is active, showing a "Trade Data" section with a search bar and a table of trade data. The table has the following columns: Trade Descri..., Comm Class # [...], Date Review..., Country of Or..., Priority, Status, CC Ref, Jurisdiction, Item Classification, TD Classification, ITC Part Class, Harmonized ..., HTS Qty Type, Schedule B, Sch B Qty Type, Design Autho..., and Comments [...].

Trade Descri...	Comm Class # [...]	Date Review...	Country of Or...	Priority	Status	CC Ref	Jurisdiction	Item Classification	TD Classification	ITC Part Class	Harmonized ...	HTS Qty Type	Schedule B	Sch B Qty Type	Design Autho...	Comments [...]
2.11.1 Tappe...		7/15/2020			Complete		EAR	EAR99	EAR99						Elma Electronic	Siliconexpert, EU RoHS: Unknown (20...

The Twins at 20 (2004)



The Twins at 20

Day

Week

Month

Longer

In 2020 the Aras introduced the Digital Twin Core placing Innovator squarely in the manufacturing segment of the product life cycle.

In 2024, our digital twins turn 20.

Possibility 11

Manufacturing Records in Innovator



Part Serialization

- Customer Order
 - Line items
 - Make Items (Components)
- Work Order
 - One per make item w/ quantity
- Serialized Part

Our Twins – a Portrait

- Five Categories
 - Identification and tracking Information
 - Customer Order
 - Work Order
 - Status Information
 - Comments



Serialized Part

Part:		Customer Order:	Work Order:
SRC Part #: SRC14...	Serial Number: 000907	Customer: 	Work Order #: W06797
Current Rev: 1	UID Mark 	Customer Order #: SO3506	Program Name: <input type="text"/>
GFE #: <input type="text"/>	Last Maint. Date <input type="text"/>	Contract #: LO059.01.01.000...	Transferred To Program:
Cage Code: <input type="text"/>	Vendor SN: 907	Customer Order Rev: 5	EDM Information:
Built By: <input type="text"/>	EMS Company: <input type="text"/>	Contract To #: <input type="text"/>	<input type="checkbox"/> Engineering Development Model
Status:		Comments:	
Test Status: Passed	# Pending Changes: 17	SRC14... 8 was removed from this System and sent back for repair. 7/11/19	
Workflow Status: Inventory	MAC Address: <input type="text"/>		
Completion Date: <input type="text"/>	Warranty (Mos): <input type="text"/>		
<input type="checkbox"/> Remanufactured	Ship Date: <input type="text"/>		
<input type="checkbox"/> Shipped			
<input type="checkbox"/> Exported To UID Sys.			
<input type="checkbox"/> Changes Pending			



Possibility 12

Capture the lifecycle with versioning



As Built Configuration

The screenshot shows a software interface with a navigation bar at the top containing tabs: 'Current Config', 'Change Report', 'Change Installation', 'RMA's', 'Attachments', 'WIP', 'Flow Tags', 'Test Equipment', 'Test Data', and 'Configurations'. Below the navigation bar is a 'Parts' section with a gear icon, a star icon, and a search bar. The search bar contains the text 'Hidden'. Below the search bar is a table with the following columns: 'Item', 'Serialized Part [...]', 'Part #', 'Description', 'Curr Rev', 'Maturity Level', 'Manufacturer S/N', 'Vendor S/N', and 'Ref Designator'. The table contains four rows of data. The first row is highlighted in green and has a red 'Purchased Part' label. The second row is also highlighted in green. The third row is highlighted in red and has a red 'Built Part' label. The fourth row is highlighted in green.

Item	Serialized Part [...]	Part #	Description	Curr Rev	Maturity Level	Manufacturer S/N	Vendor S/N	Ref Designator
		SRC...	TRIPOD, ...	5	0	14C 007		
2		SRC...	Power Supply, E...	2	0	TD _2		
	SRC2... 005517	SRC...	... Column...	6	0		5 ... 101	POS 20
4	SRC2... 005530	SRC...	... Column...	6	0		... 701	POS 23

- The Current Config tab captures serial numbers for installed parts.
 - Lists traceable COTS, built and software/firmware components
 - Because we version, we not use from – to dates.

Possibility 13

Returned Material Requests (2013)



RMA

- Returned Material Authorizations
 - RMA – Serialized Part Relationship
 - » “Defective Components”
- Serialized Part- RMA Relationship
 - » RMAs listed with the serialized part

SRC RMA

RMA #: RMA1743 Summary: Power Supply Failure - MDR 23-0714

Serialized Part:
 Is Innovator Part
Serialized Part: SRC_1_000005
Vendor SN: _____
Original Program: _____
Original Contract #: _____

Ship/Receive:
Received Date: 12/1/2023 Shipped Date: _____

Government Property:
 Yes GP Tag #: 00000000-006-E

Info:
RMA RI: Christopher Repair Type: Existing Contract

Customer Info:
Customer Organization: _____ Customer POC: _____ Customer Contract #: _____
Customer Notes: _____

Financials:
Material Charge #: _____ Labor Charge #: UN.01
Estimated Material Cost: \$ 5000 Estimated Labor Cost: \$ 5000
Total Material Cost: \$ _____ Total Labor Cost: \$ _____

Problem:
See MDR23-0714. Fans found to be non-operational in the field. Lab technician identified failed power supply.

Regression Tests:

Notes:

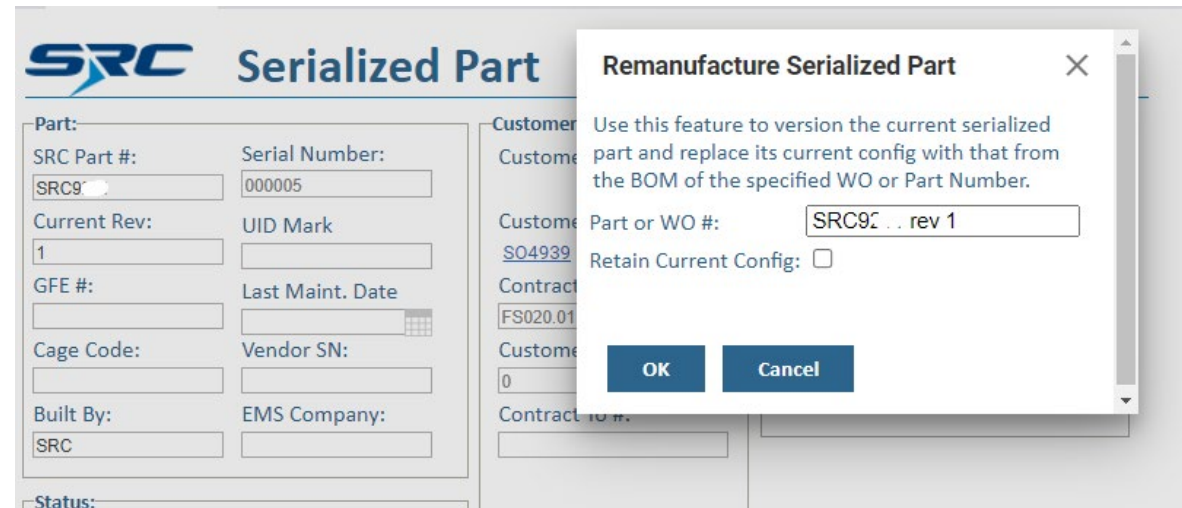
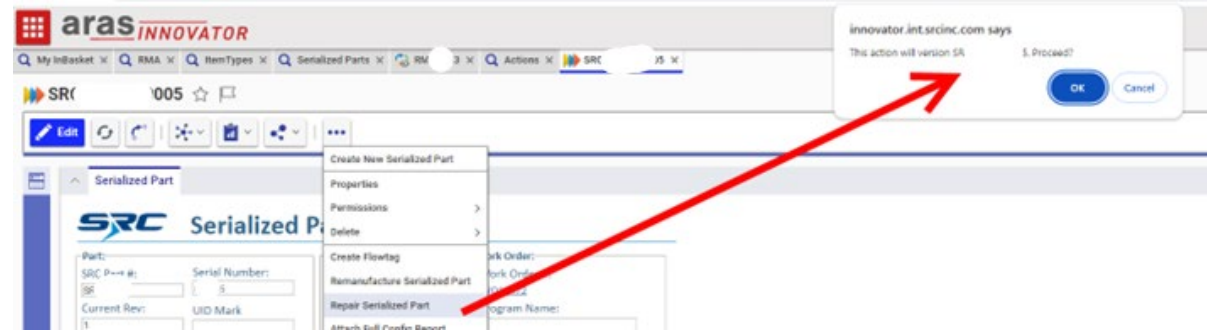
Repair:
Estimated Repair Date: 1/19/2024 Repair Start Date: 12/6/2023 Repair Complete Date: 1/24/2024
Total Repair Hours: 11 Estimated Repair Hours: _____

Repair Notes:
SRC DC converter module failed causing loss of power to the fans. Replaced the failed DC converter module.

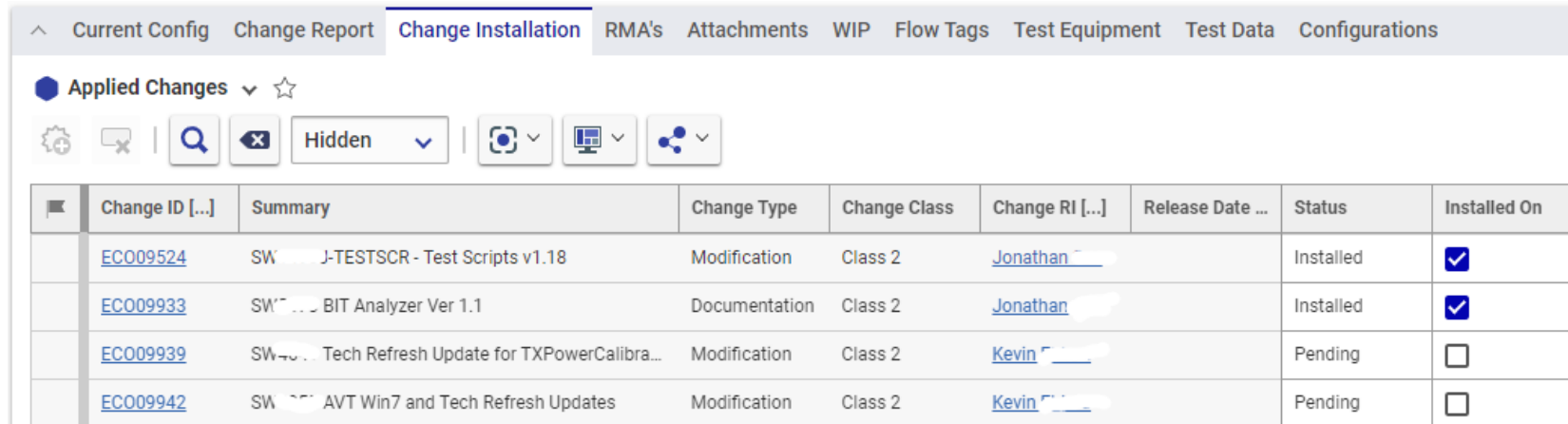
Inspection:
Receipt Inspection By: _____ Receipt Inspection Date: _____
Repair Inspection By: Pamela Repair Inspection Date: 1/23/2024
Audit Inspection By: Pamela Audit Inspection Date: 1/24/2024

Repair and Remanufacture

- Repair
 - Versions the serialized part
 - Promotes it to a workable state
- Remanufacture
 - Additionally (and Optionally) updates the as built to the specified revision level.



Change Tracking



The screenshot shows a software interface with a navigation bar at the top containing tabs: Current Config, Change Report, Change Installation (selected), RMA's, Attachments, WIP, Flow Tags, Test Equipment, Test Data, and Configurations. Below the navigation bar is a section for 'Applied Changes' with a dropdown menu and a star icon. There are several icons for filtering and search, including a search icon, a close icon, a 'Hidden' dropdown, and three other icons. Below this is a table with the following columns: Change ID [...], Summary, Change Type, Change Class, Change RI [...], Release Date ..., Status, and Installed On.

Change ID [...]	Summary	Change Type	Change Class	Change RI [...]	Release Date ...	Status	Installed On
ECO09524	SW J-TESTSCR - Test Scripts v1.18	Modification	Class 2	Jonathan		Installed	<input checked="" type="checkbox"/>
ECO09933	SW BIT Analyzer Ver 1.1	Documentation	Class 2	Jonathan		Installed	<input checked="" type="checkbox"/>
ECO09939	SW Tech Refresh Update for TXPowerCalibra...	Modification	Class 2	Kevin		Pending	<input type="checkbox"/>
ECO09942	SW AVT Win7 and Tech Refresh Updates	Modification	Class 2	Kevin		Pending	<input type="checkbox"/>

- Change Installation status.
 - » The returned configuration often differs from as delivered.
 - » Customers may perform field repairs or modifications.
 - » Customers may not want to pay for installing all changes
- Capturing changes installed later in life.

Possibility 14

Assembly & Test Records (2020)



Assembly and Test for R&D

- Flow Tags capture assembly and test data
 - Development builds & RMA work
 - More flexible than an MES system.
 - Flow Tags are one-to-one with serialized parts.
- The steps and requirements differ for every part.
 - Flow Tag Masters define Flow Tag content on a per part basis.
 - Each time we build a part we create a Flow Tag from the master.

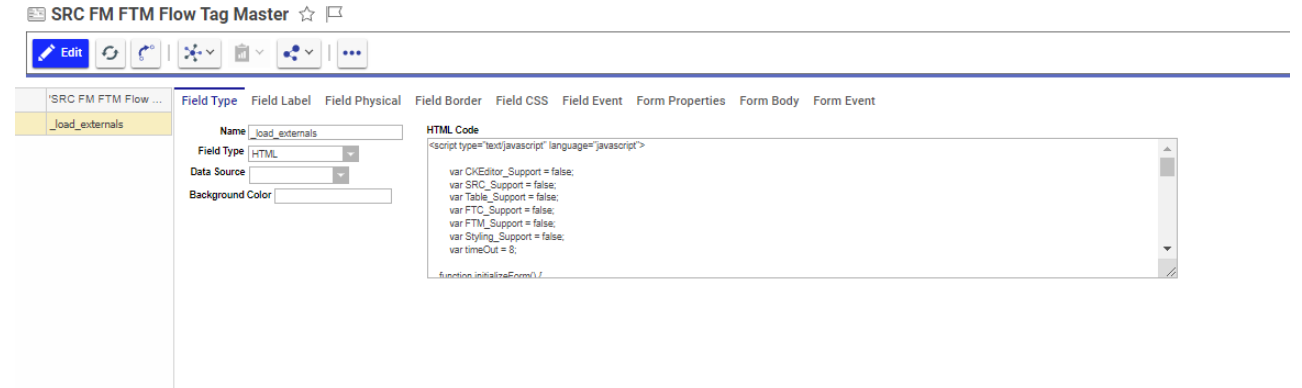
Possibility 15

Roll-Your-Own Forms Designer



Assembly and Test for R&D

- This is NOT easy to do!
- Flow Tag and Flow Tag Master Forms are blank.
 - At right – that's all of it!
 - Bootstrapping code loads an external code module. (We used Visual Studio & TypeScript).
 - The external code draws the form's elements.



Flow Tag Masters

- At run time, the author draws flow tag steps selecting needed elements from the authoring tool bar.
 - » Data collects
 - » Test Measurements
 - » Instructions
 - » Signoffs
 - » Fixed Elements

The screenshot displays the 'Flow Tag Master' software interface. At the top, there are tabs for 'Coversheet', 'Detail', and 'Revision History'. A toolbar with various icons is visible, with a red annotation: 'Toolbar buttons inject elements into the active step.' Below the toolbar, the first step is configured with 'Step No: 1.0' and 'Step Type: Assembly'. A red annotation 'Steps are a relationship type.' points to the step type dropdown. The 'Summary' field contains 'Do this'. The 'Step Detail' section shows 'Detailed Instructions: Put the lime in the coconut and make it all better.' Below this is a 'Miscellaneous Data Collection' table with two rows: 'Kernel Version' and 'LAN MAC Address'. A red annotation 'Relationship Type' points to this table. The 'Performed By' and 'Date' fields are empty.

The second step is configured with 'Step No: 2.0' and 'Step Type: Unit Test'. The 'Summary' field contains 'Test That'. The 'Step Detail' section shows 'Detailed Instructions: Verify coverage of coconut interior with the lime paste.' Below this is a 'Test Data' table with two rows: 'T1' and 'T2'. A red annotation 'Relationship Type' points to this table. The 'Performed By' and 'Date' fields are empty.

#	Data Point	Value
1	Kernel Version	
2	LAN MAC Address	

#	Data Point	Device Configuration	Parameter	Calibration	Measurement	Measurement Units	Value Units	Value	Minimum	Maximum	Pass	Fail
1	T1			0		ohm	ohm		2	5		
2	T2			0		amp	amp		5	8		

Flow Tag

- The Master is copied to the Flow Tag and extended with performance data.
- At runtime flow tag, it looks like this.
 - Tabbed interface
 - As with the trade form, flow tags display relationships in the form body.
 - » 17 Relationships

Unit - Flow Tag FT01626

SRC Part #	SRC 728A	Part Rev	0	Doc Revision	0
Serial #	SRC 000039	Vendor Serial #	2 / 18	Issued By	Audrey Acch
WIP	On Order	WIP Comments		Save WIP	
Unit Name	EXPANSION BOARD, I/O, S:1				
Program Name		Program Type		Contract #	RAT5/ .MT
Material #		Inspection #		Assembly #	
Integration #		PWT #		RMA Reference #	
Test #		Rework #			

Section 1: Milestones	% Complete	Date
Build	0%	
Conformal Coat	0%	
Final Assembly	0%	
Final Inspection	0%	
In-Process Inspection	0%	
Unit Test	0%	

Software Installation Record
N/A SRC7 ... 000039 does not contain software.

Distribution and Export Control Statements

Special Instructions
The SRC is a lead-free assembly. Lead-free processes shall be used for all rework.

Assembly and Test: Flow Tag

- Integrates with
 - Serialized Part
 - » Read/Writes to As built
 - » Read/Writes ECN Change Installation
 - Material Deficiency Reports
 - » Quality System Federation

The screenshot displays a 'Flow Tag' interface for a unit test. The top navigation bar includes 'Coversheet', 'Event Log', 'Detail', 'MDR', 'Current Config', 'Change Install', 'Revision History', and a part number 'SRC6423C 000046'. Below the navigation is a toolbar with various icons. The main content area shows a list of test steps, each with a 'Step No.' and 'Step Type: Unit Test'. Step 1.3 has a summary 'Power to Ground'. Step 1.4 has a summary 'No Load Current' and detailed instructions. Step 1.5 has a summary '28 VDC Input'. Step 1.6 has a summary '18 VDC Input'. Step 1.7 has a summary '1.7'. The 'Detailed Instructions' for step 1.4 include required equipment (SRC 2x backplane, SRC I/O module, SRCES cable, Power supply) and steps (a, b, c). Below the instructions is a 'Test Equipment' field (N/A) and a 'Test Data' table. The table has columns for #, Description, Minimum, Maximum, Measurement, Units, Pass, Waived, Moved By, Waived Date, Waiver Justification, MDR #, and PG #. The first row shows '1 Power Supply Current' with a minimum of 0, maximum of 3, and a measurement of 0 Amps. The 'Pass' column is checked. Below the table is a 'Performed By' field (Nich... Jim) and a 'Date' field (02/14/2022).



Possibility 16

Assembly Data Extends the Digital Thread



Extending the thread

- Serialized Part Tab display
 - All flow tags ever used (build & repair)
 - All test measurements
 - All test equipment
- Test Equipment
 - Where used
 - Not showing the Equipment Management (2021) package today
 - » Maybe next year

Foreign Influences (2014 – 2023)



Possibility 17

Silo Demolition with Federation



Quality System (2020)

- Material Deficiency Reports exist in the Quality System
 - MDRs are viewable, searchable and sortable in Innovator
 - Even have their own form
 - Flow Tag - MDR relationship

Day

Week

Month

Longer

The screenshot shows a web interface for a Material Deficiency Report (MDR). At the top, there is a header with the ID '24-0028', a star icon, and a flag icon. Below this is a toolbar with icons for 'Edit', refresh, back, search, delete, share, and a menu. The main content area is titled 'SRC MDR' and contains a form with the following fields:

MDR #	Part #	Part Rev	Part Type	Serial #	Vendor Serial #
2 028	SRC04	2 Mat 3	MECH		

Below the table, there are two more rows of fields:

Description	Completed_date
Missing Qty 4 Part Number 3 2 Marking is located on wrong side of plate	1/26/2024 12:49:49 PM

At the bottom, there are two more fields:

Initiator	Modified_by
..... Pamela Pamela

Possibility 18

Federation Can Display SQL Views as Items



Self Federation (2023)

- Federation is useful for more than integration.
 - Examples
 - » Workflow Status
 - » Various Process Metrics

Workflow Assignment Metrics

Workflow Na...	Workflow Desc	Workflow Sta...	Controlled Ite...	Controlled Ite...	workflow_sta...	Quarter	Month	Workflow Started On	Workflow Ended On	Workflow Duration	WF Expected Duration	WF Completion Margin	Activity [...]	Activity Status	Activity Started On	Activity Ended On	Activity Expe...	Activity Durat...
FI1942	ECR Review FL...	Complete	FI1942	David V...	24Q1	2311	11/13/2023 11:17:59 A...	11/15/2023 10:35:03 A...	1.97	10	-3	Start	Complete	11/13/2023 11:17:59 A...	11/13/2023 11:17:59 A...	0	0	
PR55692	SRC Problem ...	Complete	PR55692	Edward Co...	23Q3	2306	6/28/2023 2:16:05 PM ...	7/19/2023 3:08:23 PM ...	21.04	40	-23	Verification/Test	Not Started			5	0	
PR55831	SRC Problem ...	In Work	PR55831	Matthew Vi...	23Q4	2307	7/25/2023 8:08:18 AM ...		0	40		In Work	Not Started			5	0	
CCI01696	SRC Commod...	Complete	CCI01696	Iain F...	22Q2	2202	2/7/2022 2:16:33 PM ...	2/9/2022 11:54:48 AM ...	1.9	3	-10	Revise	Not Started			0	0	
CCR01723	SRC CI additio...	Complete	CCR01723	William Wk...	22Q3	2205	5/25/2022 8:35:20 AM ...	5/25/2022 8:39:51 AM ...	0	0	-17	Preparer Review	Complete	5/25/2022 8:35:20 AM ...	5/25/2022 8:38:15 AM ...	0	0	
PR55712	SRC Problem ...	Complete	PR55712	Michael F...	23Q3	2306	6/30/2023 12:15:43 P...	7/11/2023 8:30:49 AM ...	10.84	40	-33	Proposed Solution Review	Complete	6/30/2023 3:22:09 PM ...	7/11/2023 8:23:20 AM ...	11	10.71	

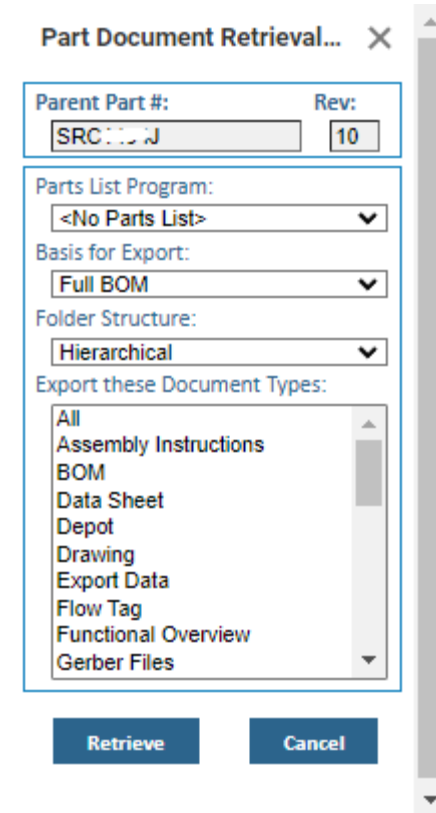
Possibility 19

Generate Technical Data Packages



Technical Data Package Generator (2013)

- A Part Item Action
 - A TDP is a set of part named folders containing document arranged by BOM Hierarchy.
 - Multiselect document types
 - TDP is constructed server-side
 - Returned as a zip file.



The screenshot shows a dialog box titled "Part Document Retrieval...". It contains several input fields and dropdown menus. The "Parent Part #" field is set to "SRC:100J" and the "Rev:" field is set to "10". The "Parts List Program:" dropdown is set to "<No Parts List>". The "Basis for Export:" dropdown is set to "Full BOM". The "Folder Structure:" dropdown is set to "Hierarchical". The "Export these Document Types:" list is checked for "All", "Assembly Instructions", "BOM", "Data Sheet", "Depot", "Drawing", "Export Data", "Flow Tag", "Functional Overview", and "Gerber Files". At the bottom, there are "Retrieve" and "Cancel" buttons.

Possibility 20

Boost Productivity with Federation



Purchasing (2023)

- Buyers were creating hundreds of TDPs serially for each part on their “Buy List”.
 - Using federation we expose the purchasing system “Buy List” in Innovator.
 - Multi-select from hundreds of parts on buyer’s list for one click TDPs Creation

Buyer's Document Retrieval Tool

Part List:

	Buyer ID	Assigned Date	Community Code	Status Code	Req ID	Line #	Part #	Rev	Description	ECO #	Trade Classification	Trade Subclassification
3	10746	01/11/2021	004	A	FR	342	SRC21	6	Mounting Assy, Isolators	07	306	SP
4	10746	01/11/2021	004	A	FR	343	SRC21	6	Mounting Assy, Isolators, I	03	306	SP
5	10746	03/12/2023	004	A	FR	803	SRC2	6	FRAME, COLUMN SUPPORT	03	257	3
6	10746	03/12/2023	004	A	FR	813	SRC	2	COLUMN COVER ASSEMBLY WITH GROUND STRIP	07	270	3
7	10746	03/12/2023	004	A	FR	823	SRC	2	INSULATOR, POWER AMPLIFIER	1	7	3A
8	10746	03/12/2023	004	A	FR	333	SRCB4L	0	HEATSH, DSP	1	3	3A
9	10746	03/20/2023	004	A	FR	443	SRC2	6	FRAME, COLUMN SUPPORT	0	7	3A
10	10746	03/20/2023	004	A	FR	453	SRC2	2	COLUMN COVER ASSEMBLY WITH GROUND STRIP	0	1	3A
11	10746	03/20/2023	004	A	FR	803	SRC2	2	INSULATOR, POWER AMPLIFIER	0	1	3A
12	10746	03/20/2023	004	A	FR	023	SRCB4L	0	HEATSH, DSP	0	1013	3A
13	10746	03/20/2023	004	A	FR	033	SRCB4L	0	HEATSH, DSP	0	1013	3A
14	10746	03/20/2023	004	A	FR	043	SRCB4L	0	HEATSH, DSP	07	1013	3A
15	10746	03/20/2023	004	A	FR	053	SRCB4L	0	HEATSH, DSP	0	1013	3A
16	10746	03/20/2023	004	A	FR	063	SRCB4L	0	HEATSH, DSP	0	1013	3A
17	10746	03/20/2023	004	A	FR	073	SRCB4L	0	HEATSH, DSP	0	1013	3A
18	10746	03/20/2023	004	A	FR	083	SRCB4L	0	HEATSH, DSP	0	1013	3A
19	10746	03/20/2023	004	A	FR	093	SRCB4L	0	HEATSH, DSP	0	1013	3A
20	10746	03/20/2023	004	A	FR	103	SRCB4L	0	HEATSH, DSP	0	1013	3A
21	10746	03/20/2023	004	A	FR	113	SRCB4L	0	HEATSH, DSP	0	1013	3A
22	10746	03/20/2023	004	A	FR	123	SRCB4L	0	HEATSH, DSP	0	1013	3A
23	10746	03/20/2023	004	A	FR	133	SRCB4L	0	HEATSH, DSP	0	1013	3A
24	10746	03/20/2023	004	A	FR	143	SRCB4L	0	HEATSH, DSP	0	1013	3A
25	10746	03/20/2023	004	A	FR	153	SRCB4L	0	HEATSH, DSP	0	1013	3A
26	10746	03/20/2023	004	A	FR	163	SRCB4L	0	HEATSH, DSP	0	1013	3A
27	10746	03/20/2023	004	A	FR	173	SRCB4L	0	HEATSH, DSP	0	1013	3A
28	10746	03/20/2023	004	A	FR	183	SRCB4L	0	HEATSH, DSP	0	1013	3A
29	10746	03/20/2023	004	A	FR	193	SRCB4L	0	HEATSH, DSP	0	1013	3A
30	10746	03/20/2023	004	A	FR	203	SRCB4L	0	HEATSH, DSP	0	1013	3A
31	10746	03/20/2023	004	A	FR	213	SRCB4L	0	HEATSH, DSP	0	1013	3A
32	10746	03/20/2023	004	A	FR	223	SRCB4L	0	HEATSH, DSP	0	1013	3A
33	10746	03/20/2023	004	A	FR	233	SRCB4L	0	HEATSH, DSP	0	1013	3A
34	10746	03/20/2023	004	A	FR	243	SRCB4L	0	HEATSH, DSP	0	1013	3A
35	10746	03/20/2023	004	A	FR	253	SRCB4L	0	HEATSH, DSP	0	1013	3A
36	10746	03/20/2023	004	A	FR	263	SRCB4L	0	HEATSH, DSP	0	1013	3A
37	10746	03/20/2023	004	A	FR	273	SRCB4L	0	HEATSH, DSP	0	1013	3A
38	10746	03/20/2023	004	A	FR	283	SRCB4L	0	HEATSH, DSP	0	1013	3A
39	10746	03/20/2023	004	A	FR	293	SRCB4L	0	HEATSH, DSP	0	1013	3A
40	10746	03/20/2023	004	A	FR	303	SRCB4L	0	HEATSH, DSP	0	1013	3A
41	10746	03/20/2023	004	A	FR	313	SRCB4L	0	HEATSH, DSP	0	1013	3A
42	10746	03/20/2023	004	A	FR	323	SRCB4L	0	HEATSH, DSP	0	1013	3A
43	10746	03/20/2023	004	A	FR	333	SRCB4L	0	HEATSH, DSP	0	1013	3A
44	10746	03/20/2023	004	A	FR	343	SRCB4L	0	HEATSH, DSP	0	1013	3A
45	10746	03/20/2023	004	A	FR	353	SRCB4L	0	HEATSH, DSP	0	1013	3A
46	10746	03/20/2023	004	A	FR	363	SRCB4L	0	HEATSH, DSP	0	1013	3A
47	10746	03/20/2023	004	A	FR	373	SRCB4L	0	HEATSH, DSP	0	1013	3A
48	10746	03/20/2023	004	A	FR	383	SRCB4L	0	HEATSH, DSP	0	1013	3A
49	10746	03/20/2023	004	A	FR	393	SRCB4L	0	HEATSH, DSP	0	1013	3A
50	10746	03/20/2023	004	A	FR	403	SRCB4L	0	HEATSH, DSP	0	1013	3A
51	10746	03/20/2023	004	A	FR	413	SRCB4L	0	HEATSH, DSP	0	1013	3A
52	10746	03/20/2023	004	A	FR	423	SRCB4L	0	HEATSH, DSP	0	1013	3A
53	10746	03/20/2023	004	A	FR	433	SRCB4L	0	HEATSH, DSP	0	1013	3A
54	10746	03/20/2023	004	A	FR	443	SRCB4L	0	HEATSH, DSP	0	1013	3A
55	10746	03/20/2023	004	A	FR	453	SRCB4L	0	HEATSH, DSP	0	1013	3A
56	10746	03/20/2023	004	A	FR	463	SRCB4L	0	HEATSH, DSP	0	1013	3A
57	10746	03/20/2023	004	A	FR	473	SRCB4L	0	HEATSH, DSP	0	1013	3A
58	10746	03/20/2023	004	A	FR	483	SRCB4L	0	HEATSH, DSP	0	1013	3A
59	10746	03/20/2023	004	A	FR	493	SRCB4L	0	HEATSH, DSP	0	1013	3A
60	10746	03/20/2023	004	A	FR	503	SRCB4L	0	HEATSH, DSP	0	1013	3A
61	10746	03/20/2023	004	A	FR	513	SRCB4L	0	HEATSH, DSP	0	1013	3A
62	10746	03/20/2023	004	A	FR	523	SRCB4L	0	HEATSH, DSP	0	1013	3A
63	10746	03/20/2023	004	A	FR	533	SRCB4L	0	HEATSH, DSP	0	1013	3A
64	10746	03/20/2023	004	A	FR	543	SRCB4L	0	HEATSH, DSP	0	1013	3A
65	10746	03/20/2023	004	A	FR	553	SRCB4L	0	HEATSH, DSP	0	1013	3A
66	10746	03/20/2023	004	A	FR	563	SRCB4L	0	HEATSH, DSP	0	1013	3A
67	10746	03/20/2023	004	A	FR	573	SRCB4L	0	HEATSH, DSP	0	1013	3A
68	10746	03/20/2023	004	A	FR	583	SRCB4L	0	HEATSH, DSP	0	1013	3A
69	10746	03/20/2023	004	A	FR	593	SRCB4L	0	HEATSH, DSP	0	1013	3A
70	10746	03/20/2023	004	A	FR	603	SRCB4L	0	HEATSH, DSP	0	1013	3A
71	10746	03/20/2023	004	A	FR	613	SRCB4L	0	HEATSH, DSP	0	1013	3A
72	10746	03/20/2023	004	A	FR	623	SRCB4L	0	HEATSH, DSP	0	1013	3A
73	10746	03/20/2023	004	A	FR	633	SRCB4L	0	HEATSH, DSP	0	1013	3A
74	10746	03/20/2023	004	A	FR	643	SRCB4L	0	HEATSH, DSP	0	1013	3A
75	10746	03/20/2023	004	A	FR	653	SRCB4L	0	HEATSH, DSP	0	1013	3A
76	10746	03/20/2023	004	A	FR	663	SRCB4L	0	HEATSH, DSP	0	1013	3A
77	10746	03/20/2023	004	A	FR	673	SRCB4L	0	HEATSH, DSP	0	1013	3A
78	10746	03/20/2023	004	A	FR	683	SRCB4L	0	HEATSH, DSP	0	1013	3A
79	10746	03/20/2023	004	A	FR	693	SRCB4L	0	HEATSH, DSP	0	1013	3A
80	10746	03/20/2023	004	A	FR	703	SRCB4L	0	HEATSH, DSP	0	1013	3A
81	10746	03/20/2023	004	A	FR	713	SRCB4L	0	HEATSH, DSP	0	1013	3A
82	10746	03/20/2023	004	A	FR	723	SRCB4L	0	HEATSH, DSP	0	1013	3A
83	10746	03/20/2023	004	A	FR	733	SRCB4L	0	HEATSH, DSP	0	1013	3A
84	10746	03/20/2023	004	A	FR	743	SRCB4L	0	HEATSH, DSP	0	1013	3A
85	10746	03/20/2023	004	A	FR	753	SRCB4L	0	HEATSH, DSP	0	1013	3A
86	10746	03/20/2023	004	A	FR	763	SRCB4L	0	HEATSH, DSP	0	1013	3A
87	10746	03/20/2023	004	A	FR	773	SRCB4L	0	HEATSH, DSP	0	1013	3A
88	10746	03/20/2023	004	A	FR	783	SRCB4L	0	HEATSH, DSP	0	1013	3A
89	10746	03/20/2023	004	A	FR	793	SRCB4L	0	HEATSH, DSP	0	1013	3A
90	10746	03/20/2023	004	A	FR	803	SRCB4L	0	HEATSH, DSP	0	1013	3A
91	10746	03/20/2023	004	A	FR	813	SRCB4L	0	HEATSH, DSP	0	1013	3A
92	10746	03/20/2023	004	A	FR	823	SRCB4L	0	HEATSH, DSP	0	1013	3A
93	10746	03/20/2023	004	A	FR	833	SRCB4L	0	HEATSH, DSP	0	1013	3A
94	10746	03/20/2023	004	A	FR	843	SRCB4L	0	HEATSH, DSP	0	1013	3A
95	10746	03/20/2023	004	A	FR	853	SRCB4L	0	HEATSH, DSP	0	1013	3A
96	10746	03/20/2023	004	A	FR	863	SRCB4L	0	HEATSH, DSP	0	1013	3A
97	10746	03/20/2023	004	A	FR	873	SRCB4L	0	HEATSH, DSP	0	1013	3A
98	10746	03/20/2023	004	A	FR	883	SRCB4L	0	HEATSH, DSP			

User Accounts

- Automate User Account Maintenance (2015)
 - Nightly batch process
 - » Shut user accounts off automatically on termination.
 - » Update name, title changes and other information
- Smart Creation of User Accounts (2023)
 - We use login name to query the HR system.
 - Populates the user record during onBeforeAdd

Thank You
Kevin Murray
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ACE
2024

