

DOCUMENTED CHANGE REQUEST	
Document Title:	
Date Modified:	Revision: V1.1.1
Revision Note:	
IFS Document #:	Alt Doc #:

PROJECT INFORMATION	
Proposal Number:	QXQ1K1017B_V1.5
Project Number:	P4CZ009933
Project Name:	Personal Safety Interlock System
Project Manager:	Georg Naeger

CHANGE INFORMATION	
DCR#: 03	Date: 05. 03.2020
Subject: Additional Efforts for SRS V4.0	Initiated By: Eli Beam

<b>Classification of Request:</b>	<input checked="" type="checkbox"/>	Functional Change	<input type="checkbox"/>	Documentation Error
	<input type="checkbox"/>	Clarification	<input type="checkbox"/>	Operational Suggestion
	<input type="checkbox"/>	Final Design Detail	<input checked="" type="checkbox"/>	Schedule Change
	<input checked="" type="checkbox"/>	Other: Engineering Support		

**Recommended Priority:**     High     Medium     Low

**Areas Impacted:**

<input checked="" type="checkbox"/> Hardware & Engineering	<input checked="" type="checkbox"/> Software & Engineering
<input checked="" type="checkbox"/> Drafting	<input checked="" type="checkbox"/> Assembly
<input type="checkbox"/> Other:	

Description of Change		
Item No.	Item Description	Price
	<p><i>Reason of the additional request:</i></p> <ul style="list-style-type: none"> <li>The SRS version 2.0 was approved in December 2018. Upon request of ELI BEAM the document was opened again and a 3<sup>rd</sup> version and a 4<sup>th</sup> version of it were created. Significant changes and efforts were required in order to finalize the documents based on the change requests of ELI.</li> <li>The original project scope does not contain the creation of 2 more versions during project execution. Each version contained new information which was received by Eli Beam.</li> <li>Rockwell informed Eli repeatedly, that related efforts have to be considered as extra efforts and need to be handled under change control.</li> </ul>	

Document Class:



Template Rev: V1.1.1

File: P4CZ009933-DCR-03 AddEngForSRSV4 R03.docx

**Confidential Information**

Page: 1/8

**DOCUMENTED CHANGE REQUEST**

Document Title:	
Date Modified:	Revision: V1.1.1
Revision Note:	
IFS Document #:	Alt Doc #:

	<p><b>Subject of the change:</b></p> <ul style="list-style-type: none"> <li>• This changes includes the additional efforts required to:             <ul style="list-style-type: none"> <li>○ To finalize SRS V3.0 and SRS V4.0 including 7 review sessions</li> <li>○ The creation of preparation documents like preliminary SIL calculations for preparation of review sessions.</li> <li>○ Subsequent updates required on the HRA V7.0 (compared to V5.0 approved in Nov 2018)</li> <li>○ Internal alignments with the technical team on subsequent impacts of changes on SRS level</li> <li>○ The additional efforts for new information received (Including FDS update and related documents, implementation of the changes and efforts for formal testing and commissioning.</li> </ul> </li> <li>• The efforts include the actual efforts of the Safety Authority and Functional Safety Engineers as well as the estimated hours</li> </ul> <p><b>Update for R03</b></p> <ul style="list-style-type: none"> <li>• In order to demonstrate good will, Rockwell Automation is giving a one off special discount on this DCR. It's worth to mention, that the cost charged below are covering additional cost for updating already approved documents due to changed HRA considerations and subsequently required changes on the SRS side. Without acknowledgement or admission of any liability and without prejudice, but for the sake of continuing the project work in a trustful way and since Rockwell Automation wants to demonstrate its willingness to find a mutual agreement with Eli Beams, we propose this special price.</li> </ul> <p><b>Summarized Event History</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Item</th> <th style="width: 20%;">Date</th> <th style="width: 70%;">Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>06.12.2018</td> <td>SRS Version 2.0 Approved by ELI</td> </tr> <tr> <td>2</td> <td>11.02.2019</td> <td>ELI requested confirmation that changing the fast acting shutter to a gate valve on the PXS for SIF E would be suitable from a FS perspective.</td> </tr> <tr> <td>3</td> <td>01.04.2019</td> <td>SRS Version 3.0 Updated and sent to ELI for approval</td> </tr> <tr> <td>4</td> <td>10.06.2019</td> <td>Technical Note 001 - Summary of Analysis for SIF B and SIF E sent to ELI for information</td> </tr> </tbody> </table>	Item	Date	Description	1	06.12.2018	SRS Version 2.0 Approved by ELI	2	11.02.2019	ELI requested confirmation that changing the fast acting shutter to a gate valve on the PXS for SIF E would be suitable from a FS perspective.	3	01.04.2019	SRS Version 3.0 Updated and sent to ELI for approval	4	10.06.2019	Technical Note 001 - Summary of Analysis for SIF B and SIF E sent to ELI for information	
Item	Date	Description															
1	06.12.2018	SRS Version 2.0 Approved by ELI															
2	11.02.2019	ELI requested confirmation that changing the fast acting shutter to a gate valve on the PXS for SIF E would be suitable from a FS perspective.															
3	01.04.2019	SRS Version 3.0 Updated and sent to ELI for approval															
4	10.06.2019	Technical Note 001 - Summary of Analysis for SIF B and SIF E sent to ELI for information															

**DOCUMENTED CHANGE REQUEST**

Document Title:	
Date Modified:	Revision: V1.1.1
Revision Note:	
IFS Document #:	Alt Doc #:

5	26.06.2019	Conference Call with ELI discussing the use of the terminology 'permissive' in the E1 SRS.
6	05.07.2019	SRS Version 4.0a Updated to address additional hazard scenarios (28a, 52 & 52)
7	09.07.2019	SRS Version 4.0b Updated
8	22/07/2019 - 23/07/2019	ELI External Audit
9	30.07.2019	ELI email final Comments (including SRS related comments from the external auditors) on SRS Version 4.0b
10	07.08.2019	Formal letter containing ELI External Auditors Comments received
11	09/08/2019 / 12/08/2019	Conference Calls discussing ELI SRS comments
12	15.08.2019	Technical Note 002 - Summary of Analysis for SIF B1, B2, E1, E2 and BOB Safety Action sent to ELI for discussion
13	16.08.2019	Conference Calls discussing ELI SRS comments
14	16.08.2019	Email to ELI providing additional analysis and 6 options to resolve access to the radiation hatch: (1) accept current design - close PXS shutter & GV01 (2) accept a 3 week proof test interval (3) Revisit H&RA (4) Additional Beam Block (PSI) (5) Additional Beam Block (Independent Protective Layer) (6) Warning Lights in the hatch (Independent Protective Layer)
15	19.08.2019	Email to ELI providing 2 options for SIL target for BOB safety function: (1) Leave H&RA Allocate the PFD target of 1.25 E-03 to a preventive SIF (the search function) and a mitigative SIF (the hatch BOB which will shut the PXS Shutter and unlock the hatch doors). (2) add an extra scenario (28b) which has the same hazard, consequence and initiating cause,

Document Class:



Template Rev: V1.1.1

File: P4CZ009933-DCR-03 AddEngForSRSV4 R03.docx

**Confidential Information**

Page: 3/8

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**DOCUMENTED CHANGE REQUEST**

Document Title:	
Date Modified:	Revision: V1.1.1
Revision Note:	
IFS Document #:	Alt Doc #:

		but is targeting specifically for the BOB function with a PFD target of 1.25 E-03 (SIL1)
16	19.08.2019	Conference Calls discussing ELI SRS comments
17	20.08.2019	Email from ELI providing drawings for proposals for redundant PXS/GV01 architectures
18	21.08.2019	Conference Calls discussing ELI SRS comments
19	22.08.2019	Email to ELI providing outline proof test procedures for each SIF
20	23.08.2019	Conference Calls discussing ELI SRS comments
21	30.08.2019	Conference Call discussing ELI SRS comments
22	02.09.2019	Email to ELI with SIF B1 option to meet the target with a 6 month Proof Test Interval for GV01, by amending the failure mode ratios of GV01 failure data. Second option was to include the 2-off shutters which resulted in a complicated solution but with an increased proof test interval of 1 year.
23	02.09.2019	Email from ELI confirming that BOB will cut power to all sockets powering X-ray sources
24	05.09.2019	Conference Call discussing ELI SRS comments.  ELI confirmed that the simple solution with GV01 only with a 6 month proof test interval is acceptable.
25	09.09.2019	SRS V4.0 issued to ELI for approval.
26	13.09.2019	Conference call discussing ELI SRS comments and changes (3 <sup>rd</sup> . Laser)

Document Class:



Template Rev: V1.1.1

File: P4CZ009933-DCR-03 AddEngForSRSV4 R03.docx

**Confidential Information**

Page: 4/8

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**DOCUMENTED CHANGE REQUEST**

Document Title:	
Date Modified:	Revision: V1.1.1
Revision Note:	
IFS Document #:	Alt Doc #:

27	27.09.2019	Conference call discussing ELI final SRS comments
28	30.09.2019	SRS V4.1 issued for approval
29	02.10.2019	SRS V4.1 approval by ELI
<i>Sub sequential Modifications of Design and System</i>		
1	<p>SRS Version 4.0a Updated to address additional hazard scenarios (28a, 52 &amp; 52)</p> <p>ELI external audit. RA not aware of requirement for audit.</p> <p>(1) SIF B1/B2 added to SRS  (2) SIF E1/E2 added to SRS  (3) References to 'permissive' removed</p> <p>Pressure monitoring for shutters added.  E1/E2 removed. E4 added. SIF G removed.</p> <p>Pressure monitoring added in SRS.  Added 2 PSW for GV01 and 4 PSW for PXS.</p> <p>DOC - ICD, FDS, C&amp;E, SFC, DWG to be updated  HW - buying PSW, modifications in L1_IO01, E1_IO03.  SW - Logic for PSW to be added. New SIFs to be added.</p>	
2	<p>Conference Calls discussing ELI SRS comments</p> <p>We were previously informed (verbally during a conference call) that we could not assume that the PXS Shutter could close on loss of air under gravity and so it should be treated as GV01. This was the basis of Technical Note 001.</p> <p>SIFs which include the PXS Shutter require updating  Addition of safety function for BOB  SIF K added.</p> <p>HW - none.  DOC - ICD, FDS, C&amp;E, SFC, to be updated  SW - Logic for SIFs to be updated.</p>	

Document Class:



Template Rev: V1.1.1

File: P4CZ009933-DCR-03 AddEngForSRSV4 R03.docx

**Confidential Information**

Page: 5/8

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**DOCUMENTED CHANGE REQUEST**

Document Title:	
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3	<p>ELI have advised that there are other X-ray sources within the hutch.</p> <p>Hazard and Risk Assessment will also require review and update. SIF I deleted.</p> <p>DOC - ICD, FDS, C&amp;E, SFC, DWG to be updated HW - wiring removal E1_IO3 SW - delete part of PLC&amp;HMI application</p>	
<p><i>Affected areas:</i></p> <ul style="list-style-type: none"> <li>➤ E1</li> </ul> <p><i>Required customer support</i></p> <ul style="list-style-type: none"> <li>➤ As for main project.</li> </ul> <p><i>RFQ received:</i></p> <ul style="list-style-type: none"> <li>➤ Changes on SRS requested by Eli Beam</li> </ul> <p><b><u>Proposal includes:</u></b></p> <p><b><u>A/ Material</u></b></p> <ul style="list-style-type: none"> <li>➤ Pressure Switches</li> </ul> <p><b><u>B/Services</u></b></p> <ul style="list-style-type: none"> <li>➤ Project management and administration</li> <li>➤ Related Functional Safety Consulting</li> <li>➤ Related Engineering</li> <li>➤ Commissioning</li> </ul> <p><b><u>Proposal does not include:</u></b></p> <ul style="list-style-type: none"> <li>- Modification and changes of another parts then described</li> <li>- Modification and changes of another part of technologies</li> </ul>		

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Revision Note:			
IFS Document #:			

Item	Description	Labour (days/hours)	Price Rate	Sub Total cost
1	Additional hours Functional Safety Engineer & Safety Authority	554,0	162 €	89.748 €
2	Additional hours Technical Team to support SRS update process	232,0	51 €	11.832 €
3	Implementation cost of changes including design, engineering, installation, testing & commissioning	639,0	51 €	32.589 €
4	Hardware (4x pressure switches ) incl. Overhead	4,0	143 €	572 €
5	Additional PM & Admin	171	162 €	27.702 €
<b>Total Cost</b>				<b>162.443 €</b>
<b>One off - good will discount</b>				<b>-27.443 €</b>
				<b>135.000 €</b>
<b>Notes:</b>				<b>excl. VAT</b>
<b>Payment milestones</b>		<b>%</b>	<b>EUR</b>	
After approval of DCR		100%	135.000 €	

**Notes:**

Project Impact Estimate			
Lost Time:		Labor	X
Schedule:	X	Expenses	
Other:		Material	X

<b>Offer Expires 30 Days from Date of Record</b> <input type="checkbox"/> Approved <input type="checkbox"/> Rejected <input type="checkbox"/> Revise as Noted & Re-submit	<b>DCR Value</b>   <b>135.000 €</b> Customer Notes:
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Revision Note:	
IFS Document #:	Alt Doc #:

Customer Approval:	Date:		Date:
			5-Mar-20

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File: P4CZ009933-DCR-03 AddEngForSRSV4 R03.docx



Template Rev: V1.1.1

**Confidential Information**

Page: 8/8

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