# INDEPENDENT ORBITER ASSESSMENT

ASSESSMENT OF THE EXTRAVEHICULAR MOBILITY UNIT VOLUME 2 OF 2

10 MARCH 1988

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SUBSYSTEM MDAC ID:	M:			EMU 379 COI	9	M	UL	TIF	PLE	c	ON:	NE	CTOR	(	ITE	:M 3	30)	)			
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SUBSYSTEM MDAC ID:	M:		EMU 732 COMMOI	N MU	LTIPI	LE CO	NNECT	OR (	(ITEM	330)			
LEAD ANA	LYST	:	G. RA	FFAE]	LLI								
ASSESSME	NT:												
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THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-372	NASA DATA: BASELINE NEW	
	EMU 372 COMMON MULTIPLE CONNECTOR	R (ITEM 330)	)
LEAD ANALYST:	G. RAFFAELLI		
ASSESSMENT:			
FLIGHT			CIL ITEM
HDW/FU	NC A B	С	
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		ATA: INE [ ] NEW [ X ]	
SUBSYSTEM: MDAC ID: ITEM:	EMU 369 COMMON MULTIP	LE CONNECTOR (ITEM	330)
LEAD ANALYST:	G. RAFFAELLI		
ASSESSMENT:			
CRITICAL: FLIGHT		DANCY SCREENS	CIL ITEM
HDW/FUI		В С	TIBN
NASA [ 3 /1R IOA [ 3 /1R	] [ P ] ] [ P ]	[ NA] [ P ] [ F ] [ P ]	[ X ] * [ X ]
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THE IOA AGREES WITH THE NASA SCREEN B.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		: [		
	EMU 373 COMMON MULT	IPLE CONNECT	OR (ITEM 330	)
LEAD ANALYST:	G. RAFFAELL	ı		
ASSESSMENT:				
CRITICAL: FLIGHT HDW/FUI	r	UNDANCY SCRE	ENS C	CIL ITEM
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DATA: BASELINE [ ] NEW [ X ]
SUBSYSTEM: MDAC ID: ITEM:	EMU 371 COMMON MULTIPLE CONNECTOR	(ITEM 330)
LEAD ANALYST:	G. RAFFAELLI	
ASSESSMENT:		
CRITICAL		CIL ITEM
FLIGH HDW/FU		С
NASA [ 2 /1R IOA [ 2 /1R	] [ P ] [ P ] [ ] [ P ] [ F ]	P ] [ X ] * P ] [ X ]
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RECOMMENDATIONS:	(If different from NASA)	
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* CIL RETENTION	RATIONALE: (If applicable)	ADEQUATE [ ] NADEQUATE [ ]
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MISSION SCENARIO.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-371A		NASA DATA BASELINE NEW	
MDAC ID:	EMU 371 COMMON MUL	TIPLE CONNECTO	OR (ITEM 330)	)
LEAD ANALYST:	G. RAFFAEL	LI		
ASSESSMENT:				
CRITICALI FLIGHT	TY RE	DUNDANCY SCREE	ens	CIL
HDW/FUN		В	С	ITEM
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REMARKS:			ADEQUATE INADEQUATE	
THE IOA RECOMMEND TO REFLECT THE CO CRITICALITY SHOUL	MPLETE MISS	SION SCENARIO.	MODES 330-F THEREFORE,	M3 AND -FM4 A 2/1RB

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SUBSYSTEMDAC ID:	M:		EMU 370 COM	70 OMMON MULTIPLE CONNECTOR (ITEM 330)									)				
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ASSESSME	NT:																
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THE IOA RECOMMENDS PASSING DUE TO "CAPABILITY" FOR TEST.

REFLECT THE ENTIRE MISSION SCENARIO.

ADDITIONALLY THE IOA RECOMMENDS COMBINING 330-FM5 AND -FM6 TO

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-370A		A DATA: SELINE [ ] NEW [ X ]									
MDAC ID:	EMU 370 COMMON MULTIPLE (	CONNECTOR (IT	EM 330)									
LEAD ANALYST:	G. RAFFAELLI											
ASSESSMENT:												
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM												
HDW/FUN	IC A	В С										
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REMARKS: THE IOA RECOMMENT MISSION SCENARIO 330-FM5 AND -FM6.		LITY TO REFLEC	• •									

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-484 350-FM1		NASA DAT. BASELIN NE	
	EMU 484 DCM ELECTRON	ICS (ITEM	350)	
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-769	X		ASA DATA: BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	EMU 769 DCM ELE	CTRONICS (	(ITEM 350)		
LEAD ANALYST:	G. RAFF	AELLI			
ASSESSMENT:					
CRITICAL: FLIGH		REDUNDANC	CY SCREENS		CIL ITEM
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ASSESSMENT ASSESSMENT NASA FMEA #	ID:	12/10/ EMU-46 350-FM	9				ì	NASA DAT BASELIN NE		]
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REMARKS:

THE IOA AGREES WITH THE NASA ANALYSIS.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-470 350-FM17		NASA DAT. BASELIN NE	
SUBSYSTEM: MDAC ID: ITEM:	EMU 470 DCM ELECTR	RONICS		
LEAD ANALYST:	G. RAFFAEL	LI		
ASSESSMENT:				
CRITICAL: FLIGHT HDW/FUI	r	DUNDANCY SCR	EENS C	CIL ITEM
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* CIL RETENTION FREMARKS: THE IOA AGREES WI			le) ADEQUATE INADEQUATE	[ ]
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ASSESSMENT ASSESSMENT NASA FMEA	ID:		12/10 EMU-4 350-1	198										DATA LINI NEI	E			]	
SUBSYSTEM: MDAC ID: ITEM:			EMU 498 DCM	ELE	CTF	RON:	ıcs												
LEAD ANALY	ST:		G. R	AFF	AEI	LI													
ASSESSMENT	:																		
CR		CALI [GH]	TY		RI	EDU	NDAJ	NC?	7 8	SCF	REENS	;				CI:		1	
	HDW/				A			1	3			С							
NASA [ IOA [	2 /	/1R /2	]	[	P	]		[ ] [	?	]	[	P	]			[	X	]	*
COMPARE [		/N	]	[	N	]		[ ]	V	]	[	N	]			[		]	
RECOMMENDA	TIOI	NS:	(I	f d	if:	fer	ent	f	ro	m l	NASA)	)							
C	. ,	/	]	[		]		[		]	[		]	(	ΑĽ	[ D/			ETE)
* CIL RETE	ENTI	ON I	RATIO	NAL	E:	(I	f a	pp	li	cal	ble) Il	A A	DEQ!	UATE UATE		[		]	
REMARKS: THE IOA AG	REE	s W:	т нт	HE	NA	SA	ANA	LY	SI	s.									

ASSESSME ASSESSME NASA FME	ENT	ID:	EMU	/10/86 J-499 J-FM19				:	NASA BASE	DATA LINE NEW	[	] x ]	
SUBSYSTE MDAC ID:			EMU 499 DCM		RON:	ics							
LEAD ANA	LYS	T:	G.	RAFFAE	LLI								
ASSESSME	:TN												
		TICAL		R	EDUI	NDANCY	SCF	REENS			CI	L	
		FLIGH DW/FU		A		E	3	C	2		IT	EM	
NASA IOA	[	2 /2 2 /2	]	[	]	[	]	[ [	]		[ ]	K ]	*
COMPARE	[	/	]	[	]	[	]	[	]		C	]	
RECOMMEN	DAT:	ions:	(	If dif	fere	nt fr	om N	ASA)					
	[	/	]	[	]	[	]	[	]	(AI	[ DD/[		ETE)
* CIL RE	TENT	rion	RATIO	ONALE:	(If	appl	icab	A	DEQU <i>I</i> DEQU <i>I</i>		[	]	
REMARKS: THE IOA	AND	THE	NASA	ADE TE	1 AC	DPPMP	NT CT		-~-	- <b></b>	L	J	

ASSESSME ASSESSME NASA FME	ENT I	D:	EMU-4	92							ASA DATA: BASELINE NEW	[	x	]	
SUBSYSTE MDAC ID:			EMU 492 DCM E	LEC	TR	ONICS									
LEAD ANA	LYST	! •	G. RA	FFA	EL:	LI									
ASSESSME	ENT:														
		'ICAL 'LIGH'		:	RE	DUNDAN	CY	SCI	REENS	3		CI	L EM		
	_		NC		A		В			С		**	EM	•	
NASA IOA	[ 2 [ 2	/2	]	[	P	] [ ] [	P	]	[ [	P	]	[	X X	] <b>*</b>	
COMPARE	[	/	]	[	N	) [	N	]	[	N	1	[		]	
RECOMMEN	ITADI	ons:	(If	đi	ff	erent	fr	om 1	NASA)	ı					
	[	/	]	[	,	] [		]	(		] (A)	-	'DE	] LETE)	
* CIL RE	<b>.</b>						_		I	IAI	DEQUATE DEQUATE	[		]	
THE IOA RECOMMEN	AND NDS C	THE :	NASA A ING TH	RE E F	IN AI	AGREE LURE M	ME OD	NT; E FI	HOWI ROM I	SVI DRI	ER, THE : [FTS LOW	TOA	F	AILS	OFF

DUE TO AN ELECTRICAL OPEN.

ASSESSMENT DATE ASSESSMENT ID: NASA FMEA #:	: 12/10/86 EMU-493 350-FM21			NASA DAT BASELIN NE	
SUBSYSTEM: MDAC ID: ITEM:	EMU 493 DCM ELECT	ronics			
LEAD ANALYST:	G. RAFFAI	ELLI			
ASSESSMENT:					
CRITICA FLIG HDW/F	HT		NCY SCRI	EENS C	CIL ITEM
NASA [ 3 /3 IOA [ 2 /2	] [ ] [ F	· ]	[ ] [ P ]	[ ] [ P ]	[ ] * [ x ]
COMPARE [ N /N	] [ N	1 ]	[ N ]	[ N ]	[ N ]
RECOMMENDATIONS	: (If dif	ferent	from NA	ASA)	
[ /	] [	]	[ ]	[ ]	[ ] ADD/DELETE)
* CIL RETENTION REMARKS: THE IOA AGREES			-	.e) ADEQUATE INADEQUATE	
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	12/10/86 EMU-490 350-FM22			NASA DATA BASELINE NEW	
110110 201	EMU 490 DCM ELECT	RONICS			
LEAD ANALYST:	G. RAFFAE	ELLI			
ASSESSMENT:					
CRITICAL FLIGH		REDUNDA	NCY SCREI	ens	CIL ITEM
HDW/FU		A	В	С	
NASA [ 2 /1R IOA [ 2 /2	] []	P ]	[ F ] [ P ]	[ P ] [ P ]	[ X ] * [ X ]
COMPARE [ /N	] [	1	[и]	[ ]	[ ]
RECOMMENDATIONS:	(If di	fferent	from NAS	SA)	
[ /	] [	]	[ ]	[ ] (A	[ ] ADD/DELETE)
* CIL RETENTION	RATIONALE	: (If a	applicable	e) ADEQUATE INADEQUATE	
REMARKS: THE IOA AGREES W	ITH THE N.	ASA ANA	ALYSIS.		

ASSESSM ASSESSM NASA FM	ENT	ľ	D:	El	2/10 MU-4 50-F	94								N	IASA Bas	ELI		[		]	
SUBSYST MDAC ID ITEM:				E1 49 D0		LE	CT	RON	NICS	3											
LEAD AN	ALY	ST	:	G.	RA	FF	ΑE	LLI	[												
ASSESSM	ENT	:																			
		F	ICAL LIGH	r	?		R	EDU	INDA	M	CY	s	CREEN	S					IL PEN	٧ſ	
	•	HD	W/FU	NC			A				В			C						•	
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COMPARE	[		/N	]		[		]		[	N	]	[		]			[		]	
RECOMMEN	IDA!	ric	ONS:		(If	đ:	ifi	fer	ent	í	rc	m	NASA	)							
	[		/	J		[		]		[		]	[		3	(	(AD	[ D/	DE	] LE	TE:
* CIL RE	TE	T	ON F	TAS	IONA	LI	E :	(I:	f a	pp	li	.ca			DEQU DEQU			[		]	
THE IOA	AGF	REE	s Wi	TH	THE	N	IAS	A	ANA:	LY	SI	s.									

	12/10/8 EMU-495 350-FM2	5				]	NASA DATA BASELINE NEW		
SUBSYSTEM: MDAC ID: ITEM:	EMU 495 DCM ELI	ECTR	ONICS	<b>.</b>					
LEAD ANALYST:	G. RAF	FAEL	LI						
ASSESSMENT:									
CRITICAL		RE	DUNDA	MCY	SCREE	NS		CIL	
FLIGH HDW/FU		A		В			С		
NASA [ 2 /1R IOA [ 2 /2	; ] ]	[ P [ P	]	[ F	]	[ [	P ] P ]	[ X [ X	] <b>*</b> ]
COMPARE [ /N	]	[	]	[ и	]	[	1	[	]
RECOMMENDATIONS:	(If	diff	ferent	t fro	om NAS	A)			
[ /	1 .	[	]	[	1	[	] (A	[ .DD/D	] ELETE)
* CIL RETENTION	RATIONA	LE:	(If a	app1	icable		ADEQUATE IADEQUATE		]
REMARKS: THE IOA AGREES V	VITH THE	NAS	SA AN	ALYS	ıs.				

ASSESSMENT ASSESSMENT NASA FMEA	r ID:	12/10/ EMU-49 350-FM	7					NASA BASE	DATA LINE NEW	[		]	
SUBSYSTEM: MDAC ID: ITEM:		EMU 497 DCM EL	ECT:	RONIC	s							-	
LEAD ANALY	ST:	G. RAF	FAE:	LLI									
ASSESSMENT	<b>!:</b>												
	RITICALI FLIGHT HDW/FUN		RI A	EDUND		SCRE	ENS				IL PEM	ſ	
	·				В			С					
NASA [ IOA [	2 /1R 2 /2	]	[ P	]	[ F	]	[	P ]		[	X X	]	*
COMPARE [	/N	]	[ И	]	[ N	]	[	n j		[		]	
RECOMMENDA	TIONS:	(If o	liff	erent	fro	om NA	SA)						
[	/	] [	•	]	[	]	[	]	(AD	[ D/	DE	] LE	TE)
* CIL RETE	NTION R	ATIONAI	Œ:	(If a	ppli	cable		ADEQUA		[		]	
REMARKS: THE IOA AGI	REES WI	TH THE	NAS	A ANA	LYSI	s.	IN.	ADEQUA	TE	Ĩ		]	

ASSESSMEN ASSESSMEN NASA FMEA	T I	D:	12/10 EMU-4 350-F	81								ASA DATA BASELINI NEV		) X ]	
SUBSYSTEM MDAC ID: ITEM:	1:		EMU 481 DCM E	LEC	'TR	ONIC	:s	(II	EM	350)					
LEAD ANAI	LYST	:	G. RA	FFA	EL	LI									
ASSESSMEN	T:														
(		ICAL:			RE	DUNE	AN	CY	SCR	EENS	3		CI IT		
	HD	W/FUI	NC		A			В			С				
NASA IOA	[ 2 [ 2	/2 /1R	]	[	P	]	[	P	]	[	P	]	[	X ]	*
COMPARE	[	/N	]	[	N	]	[	N	]	[	N	]	[	]	1
RECOMMENI	DATI	ons:	(If	di	.ff	erer	nt :	fro	om N	ASA)	ı				
	[	/	]	]		]	[		3	[			_	DE Î	] LETE)
* CIL RE	FENT	ION 1	RATION	ALE	E:	(If	ap	pl:	icab			DEQUATE DEQUATE	_	:	]
REMARKS:	AGRE	ES W	ITH TH	EN	IAS	A AN	IAL	YS:	ıs.						

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-770X		NASA DATA BASELINE NEW	•
SUBSYSTEM: MDAC ID: ITEM:	EMU 770 DCM ELECTRONICS	(ITEM 350	)	
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
CRITICALI FLIGHT	TY REDUNDAI	NCY SCREEN	5	CIL ITEM
HDW/FUN	IC A	В	С	
NASA [ 3 /1R IOA [ 3 /1R	] [ P ]   ] [ P ]	[ NA] [ F ] [	P ] P ]	[ ] * [ X ]
COMPARE [ /	] [ ]	ן וו	J	[и]
RECOMMENDATIONS:	(If different	from NASA	)	
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* CIL RETENTION R	ATIONALE: (If ap	plicable)		
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REMARKS: THE IOA AND THE N IOA RECOMMENDS FA NOT DETECTABLE NO	ILURE OF SCREEN	MENT EXCEI B BECAUSE	T ON SCREE THE FAILED	N B. THE
	TO II MOIOMAII	CALLI DACI	CD UP.	

ASSESSMEN ASSESSMEN NASA FMEA	T :	ID	:	8/06 EMU- 350-	77:	lΧ								SA BASE	LIN	Œ	[ x		]	
SUBSYSTEM MDAC ID: ITEM:	:			EMU 771 DCM	EL	EC	TF:	ONIC	S	(I	rem	350)	)							
LEAD ANAL	YS!	T:		G. R	AF:	FA	ΕI	LI												
ASSESSMEN	T:																			
c			CALI IGHI	TY			RI	EDUNE	AI	1CY	SCR	REEN	S				CII			
		_	/FUN				A			В			С							
NASA IOA	[	2 .	/1R /1R	]		]	P P	]		[ F [ F	]	[	P P	]			[ }	ζ ζ	]	*
COMPARE	[		/	1		[		]		[	3	[		)			[		]	
RECOMMENI	TAC	'IO	NS:	(1	f	d:	if:	ferer	nt	fr	om 1	IASA	)							
	[		/	]		[		]		[	]	(		]		(A)	[ DD/I			ETE)
* CIL RET	ren	ΤI	ON 1	RATIC	ANC	L	Ε:	(If	a	ppl	icak			DEQI					]	
REMARKS:	AND	Τ	HE 1	NASA	AR	Œ	I	N AGI	RE	EME	NT.									

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-772X			NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	EMU 772 DCM ELEC	TRONICS	5 (ITEM 3	50)	
LEAD ANALYST:	G. RAFFA	ELLI			
ASSESSMENT:					
CRITICAL: FLIGHT	[ <b>TY</b> ]	REDUNDA	NCY SCREE	ens	CIL ITEM
HDW/FUN	1C /	A	В	С	TIEM
NASA [ 3 /1R IOA [ 3 /1R	] [1	P ] P ]	[ NA] [ F ]	[ P ] [ P ]	[ ] *
COMPARE [ /	] [	]	[и]	[ ]	[ N ]
RECOMMENDATIONS:	(If dia	fferent	from NAS	A)	
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* CIL RETENTION R	ATIONALE:	(If a	pplicable	) ADEQUATE	<b>.</b>
REMARKS:				INADEQUATE	
THE IOA AND THE N IOA RECOMMENDS FA DETECTABLE NOR IS	ILURE OF	SCREEN	B BECALIC	D MUD DATTIN	D TO

	8/06/87 EMU-773X 350-FM27		NASA DATA: BASELINE [ ] NEW [ X ]								
	EMU 773 DCM ELECTE	RONICS (ITEM :	350)								
LEAD ANALYST:	G. RAFFAEI	LLI									
ASSESSMENT:											
CRITICAL: FLIGH		EDUNDANCY SCRI		CIL ITEM							
HDW/FU	NC A	В	С								
NASA [ 2 /1R IOA [ 2 /1R	] [ P ] [ P	] [ F ] ] [ F ]	[ P ] [ P ]	[ X ] *							
COMPARE [ /	) [	] [ ]	[ ]	[ ]							
RECOMMENDATIONS:	(If dif	ferent from N	ASA)								
[ /	] [	] [ ]	[ ] <b>A</b> )	[ ] DD/DELETE)							
* CIL RETENTION	RATIONALE:	(If applicab	le) ADEQUATE INADEQUATE	[ ]							
REMARKS: THE IOA AND THE	NASA ARE II	N AGREEMENT.									

SUBSYSTEM: EMU MDAC ID: 774 ITEM: DCM ELECTRONICS (ITEM 350)  LEAD ANALYST: G. RAFFAELLI	
LEAD ANALYST: G. PAFFAFLLT	
O. IMITABLE	
ASSESSMENT:	
CRITICALITY REDUNDANCY SCREENS CITED	
HDW/FUNC A B C	<b></b>
NASA [3/3] [] [] [] [ IOA [3/3] [] [] [] [	] * ]
COMPARE [ / ] [ ] [ ] [	]
RECOMMENDATIONS: (If different from NASA)	
] [] [] [ ] [ / ] I\DD(A)	] DELETE)
* CIL RETENTION RATIONALE: (If applicable)  ADEQUATE [ INADEQUATE [ REMARKS: THE IOA AND THE NASA ARE IN AGREEMENT.	]

ASSESSMENT ASSESSMENT NASA FMEA	rID	<b>):</b>	EMU-7	MU-775X BASELINE [ ] 50-FM29 NEW [ X ]										
SUBSYSTEM: MDAC ID: ITEM:	•		EMU 775 DCM E	LECI	RONI	CS (I	TEM	350)						
LEAD ANALY	YST:	:	G. RA	FFAE	LLI									
ASSESSMEN'	T:													
C		CAL LIGH	ITY T	F	REDUNI	DANCY	SCR	EENS			CIL			
			NC	A	1	E	3	C	3					
NASA IOA	[ 3 [	/3 /	]	[	]	[ [	]	[	]		[	] <b>*</b>	:	
COMPARE	[ N	/N	]	[	]	[	]	[	]		[	]		
RECOMMEND	ATI	SMC:	(I	f di	ffere	nt fi	com N	ASA)						
	[	/	]	[	]	[	]	[	]	(A	[ DD/[	] DELET	re)	
* CIL RET	ENT:	ION	RATIO	NALE	: (If	app:	licab	Ž	ADEQU ADEQU		[	]		
REMARKS: THE IOA D RATHER AN THE NASA	AN	OMAI	CONS	IDER S SU	THIS CH, T	A FA	AILUR DA RE	E MO	DE OF	THE	SYS	TEM TIOI	BUT N FROM	

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-475		NASA DATA: BASELINE [ ] NEW [ X ]						
SUBSYSTEM: MDAC ID: ITEM:	EMU 475 DCM ELECTRONI	CS (ITEM 3	350)						
LEAD ANALYST:	G. RAFFAELLI								
ASSESSMENT:									
CRITICAL FLIGHT HDW/FU		DANCY SCRE	CENS	CIL ITEM					
NASA [ 2 /1R IOA [ 2 /1R	] [ P ]	[ P ] [ P ]	[ P ] [ P ]	[ X ] * [ X ]					
COMPARE [ /	] [ ]	[ ]	[ ]	[ ]					
RECOMMENDATIONS:	(If differer	nt from NA	SA)						
[ /	] [ ]	[ ]	[ ]	[ ] ADD/DELETE					
* CIL RETENTION R REMARKS: THE IOA AND THE N			e) ADEQUATE INADEQUATE						

ASSESSME ASSESSME NASA FME	NT	II		EM	2/10/86 NASA DATA: MU-477 BASELINE [ ] 50-FM3 NEW [ X ]																	
SUBSYSTE MDAC ID: ITEM:	M:			EM 47 DC		LΕ	CTI	RON	ıcs	(	ΙΊ	EM	35	0)								
LEAD ANA	LYS	ST	:	G.	RAI	FF	AE!	LLI														
ASSESSME	NT	:																				
	CR:		ICAL:				RI	EDUI	NDA	NC	Y	SCF	REEI	NS	3					CL CEI	M.	
	I	_	W/FUI				A				В				С							
NASA IOA		2	/1R /1R	]		[	P P	]		]	P P	]		[	P P	]			]	X X	]	*
COMPARE	[		/	]		[		]		[		]		[		]	-		[		]	
RECOMMEN	DA!	ΓI	ons:		(If	d.	if:	fer	ent	f	ro	om N	NAS	A)								
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* CIL RE	TE	NT:	ION 1	RA'I	NOI	AL	E:	(I	fa	pp	1 i	cak					TAUÇ TAUÇ		[		]	
DEMADEC.																_,	•		٠		•	

THE IOA AND THE NASA ARE IN AGREEMENT.

	SSMENT DATE: 12/10/86 SSMENT ID: EMU-489 FMEA #: 350-FM3															A DA SELI N		[		]	
SUBSYSTI MDAC ID: ITEM:				EM 48 DC		EC'	TI	ROI	VIC	s											
LEAD ANA	\LY!	ST	:	G.	RAF	FA:	E]	LL)	[												
ASSESSME	ENT	:																			
	CR		ICAL LIGH			1	RI	EDU	JND.	AN	CY	sc	REE	NS					IL PEN	a.	
	ŀ		/FU			7	A				В			(	С			<b>.</b>	r æt	1	
NASA IOA	[ [	2	/1R /1R	]		[ ]	P P	]		[	P P	]	!	[	P ]			[	X X	]	*
COMPARE	[		/	)		[		]		[		]	ı	[	]			[		]	
RECOMMEN	IDAT	ric	ons:		(If	di	£1	fer	en	t 1	fro	om	NAS <i>I</i>	A)							
	[		/	]		[		]		[		]	[		]		(AI	[ )D/	'DF	] ELF	ETE
* CIL REREMARKS: THE IOA													_	2		(TAU)		[		]	

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-776X		BASELINE NEW	
MDAC ID:	EMU 776 DCM ELECTRON	VICS (ITEM 35	50)	
LEAD ANALYST:	G. RAFFAELL	[		
ASSESSMENT:				
CRITICAL: FLIGHT		JNDANCY SCREI	ens	CIL ITEM
HDW/FU	NC A	В	С	
NASA [ 3 /3 IOA [ /	] [ ]	[ ]	[ ]	[ ] *
COMPARE [ N /N	] [ ]	[ ]	[ ]	[ ]
RECOMMENDATIONS:	(If diffe:	rent from NAS	SA)	
[ /	] [ ]	[ ]	[ ] (A)	[ ] DD/DELETE)
* CIL RETENTION	RATIONALE: (	If applicable	e) ADEQUATE INADEQUATE	
REMARKS: THE IOA DOES NOT CREDIBLE. THE IOBUT NOT AN FMEA.	OA CONSIDERS	IT APPLICAB	NASA "FAILU LE TO A HAZA	RE MODE" AS RD ANALYSIS

FMEA.

	12/10/86 EMU-482 350-FM31		NASA DATA: BASELINE NEW	
	EMU 482 DCM ELECTRO	ONICS (ITEM 350	)	
LEAD ANALYST:	G. RAFFAELL	,I		
ASSESSMENT:				
CRITICALI FLIGHT	?	UNDANCY SCREEN	5	CIL ITEM
HDW/FU	IC A	В	С	
NASA [ 3 /2R IOA [ 3 /2R	] [ P ]	[F] [ [P] [	P ] P ]	[ X ] *
COMPARE [ /	] [ ]	[ N ]	<b>1</b> ·	[ N ]
RECOMMENDATIONS:	(If diffe	rent from NASA	1	
\ ]	] [ ]	[ ] [	] (AD	[ ] DD/DELETE)
* CIL RETENTION F	RATIONALE: (		ADEQUATE IADEQUATE	[ ]
THE IOA AND THE NIOA NOW AGREES WI	ASA ARE IN A	AGREEMENT EXCEI	T ON SCEEN	B WHICH THE

ASSESSMEN ASSESSMEN NASA FME	NT I	D:	EMU												
SUBSYSTEM MDAC ID: ITEM:	M:		EMU 777 DCM		TRO	NICS	(II)	EM	350)						
LEAD ANA	LYST	:	G.	RAFFA	ELI	Ι									
ASSESSME	NT:														
(					RED	UNDAN	CY	sc	REENS			C)	L CEM	r	
		LIGH' W/FU			A		В			С			L Lik	•	
NASA IOA	[ 3	/1R /1R	]	]	P ] P ]	]	NA F	]	[	P ] P ]		[	x	]	*
COMPARE	[	/	]	[	]	[	N	]	[	]			N		
RECOMMEN	DATI	ons:	(	If di	ff∈	erent	fro	m	NASA)						
	[	/	)	]	]	] [	F	]	[	)	(A)		A /DE		TE)
* CIL RE	TENT	ION :	RATI	ONALE	: (	(If ap	pli	ica			JATE JATE			]	
REMARKS:	AND	THE :	NASA	ARE	IN	AGREE	MEI	T	EXCEP	T ON	SCRE	EN	В,	. T	HE IOA

RECOMMENDS FAILURE OF THE B SCREEN BECAUSE IT IS NOT DETECTABLE

NOR IS THE FAILED FUNCTION AUTOMATICALLY BACKED UP.

ASSESSMENT I ASSESSMENT I NASA FMEA #:	D:	,	91					ASA DAT. BASELIN NE		x	]	
SUBSYSTEM: MDAC ID: ITEM:		EMU 491 DCM E	LECT	roni	cs							
LEAD ANALYST	?:	G. RA	FFAI	ELLI								
ASSESSMENT:												
	'ICAL		F	REDUN	IDANC	Y SCR	EENS		CI	LEM		
HD	W/FUI	NC	P	7		В	С					
NASA [ 2 IOA [ 2	/1R /2	]	[ E	? ] ? ]	[ ]	F ] P ]	[ P [ P	]	[	X X	]	*
COMPARE [	/N	]	[	]	[ ]	ן א	[	]	[		]	
RECOMMENDATI	ons:	(If	dif	fere	ent f	rom N	ASA)					
3	/	]	[	]	[	]	[	] (2	[ ADD/	DE:	] LE:	re;
* CIL RETENT REMARKS: THE IOA AGRE							ΑI	DEQUATE DEQUATE	_		]	
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ASSESSMEN ASSESSMEN NASA FMEA	T	ID	):	EMU	6/87 1-778 1-FM	3 X								ASA DA' BASELI N		[		]	
SUBSYSTEM MDAC ID: ITEM:	<b>4:</b>			EMU 778 DCM		ECT	RON	IICS	(	IT	EM	350	))						
LEAD ANA	LYS	T:		G.	RAF	FAE	LL	r.											
ASSESSME	NT:	;																	
•	CRI		CAL:			R	EDU	JNDA	NC	Y	SCF	REEN	IS			CI	E	1	
	F	_	LIGHT V/FUI			A				В			C	;					
NASA IOA	[	3 2	/1R /1R	]		[ F	, ]		[	F F	]	. [	[ F	) ]		[	X X	]	*
COMPARE	[	N	/	]		[	]		[		]	!	[	]		[		]	
RECOMMEN	DA:	rio	ons:		(If	dif	fe	rent	: 1	fro	om 1	NAS	A)						
	[	2	/1R	]		[	]		[		]		[	]	(Al	-	/D	_	ETE)
* CIL RE	TE	NT:	ION	RAT	IONA	LE:	: (	If a	ıpı	pl:	ica)		Æ	ADEQUAT				]	
REMARKS: THE IOA THE IDEN	DE.	CO FI	MMEN ED F	DS AIL	A 2/ URE	1R 0C	TO	REI S TI	LI IEI	EC'	r A By	TW CAU	O I	FAILURI	E S	CEI	NA TH	RI E	O WHER

VOLTAGE ELECTRONICS" WHICH INCLUDES CO2 SENSING. IF A SECOND FAILURE (HIGH CO2 WERE TO THEN OCCUR, THE CREWPERSON COULD BE

LOST.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	8/06/87 EMU-7793 350-FM35				N	ASA DATA BASELINI NEV	3 [	] x ]
SUBSYSTEM: MDAC ID: ITEM:	EMU 779 DCM ELEC	CTRONI	CS (I	тем з	50)			
LEAD ANALYST:	G. RAFFA	ELLI						
ASSESSMENT:								
CRITICAL: FLIGHT HDW/FUI	r	REDUNI A	DANCY		ENS C		CII	-
NASA [ 2 /1R	1 r	ום	_			•		
IOA [ 2 /1R	] [	P]	[ F [ F	]	[ P [ P	]	K ] K ]	【 ] * 【 ]
COMPARE [ /	] [	]	ĵ.	]	[	]	[	]
RECOMMENDATIONS:	(If di	fferer	nt fro	om NA	SA)			
[ /	] [	]	[	]	[	] (A	[ DD/D	] ELETE)
* CIL RETENTION F REMARKS: THE IOA AND THE N					ΑI	DEQUATE DEQUATE	[	]

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-483 350-FM4	BASELII N	
	EMU 483 DCM ELECTRONIC	CS (ITEM 350)	
LEAD ANALYST:	G. RAFFAELLI		
ASSESSMENT:			
CRITICAL: FLIGH		DANCY SCREENS	CIL ITEM
HDW/FU		ВС	IIII
NASA [ 2 /2 IOA [ 2 /1R	] [ ] ] ]	[ ] [ ] [ P ] [ P ]	[ X ] * [ X ]
COMPARE [ /N	] [N]	[и] [и]	[ ]
RECOMMENDATIONS:	(If differe	nt from NASA)	
[ /	] [ ]	[ ] [ ]	[ ] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (If	applicable) ADEQUAT INADEQUAT	
REMARKS: THE IOA AGREES W	TH THE NASA A	NALYSIS BUT WOULD IN	CLUDE

ELECTRICAL OPENS ANYWHERE ALONG THE FEEDWATER VALVE CURRENT PATH.

ASSESSME ASSESSME NASA FME	NT I	D:		51X						NASA DA BASELI N		
SUBSYSTE MDAC ID:			EMU 761 DCM E	LECI	roni	cs	(II	rem :	350)			
LEAD ANA	LYST	:	G. RAI	FFAI	ELLI							
ASSESSME	NT:											
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C												
	HD	W/FUI	NC	P	1		В			С		
NASA IOA	[ 3 [ 3	/1R /1R	]	[ E	? ] ? ]	[ [	NA F	A] ]	] [	P ] P ]	[ x ] *	
COMPARE	[	/	]	[	]	[	N	]	[	1	[ N ]	
RECOMMEN	DATI	ons:	(If	dif	ferer	nt i	fro	om Na	ASA)			
	[	/	J	[	]	[	F	]	[	]	[ A ] (ADD/DELETE)	
* CIL RETENTION RATIONALE: (If applicable)  ADEQUATE [ ]  INADEQUATE [ ]												
THE IOA											REEN B. THE LURE MODE IS	

NOT DETECTABLE AND DOESN'T HAVE AUTOMATIC BACKUP FOR THE REQUIRED FUNCTION. THE IOA THEREFORE RECOMMENDS INCLUSION IN THE CIL.

	8/06/87 EMU-762X 350-FM6			SA DATA: ASELINE NEW	x ]	]
SUBSYSTEM: MDAC ID: ITEM:	EMU 762 DCM ELECTE	RONICS (II	TEM 350)			
LEAD ANALYST:	G. RAFFAEI	LLI				
ASSESSMENT:						
CRITICAL: FLIGHT HDW/FUI	r	EDUNDANCY B	SCREENS C		CIL ITEM	I
NASA [ 3 /1R IOA [ 3 /1R	] [ P	] [ F ] [ F	] [ P ] [ P	]	x ]	] * ]
COMPARE [ /	] [	] [	] [	]	[	]
RECOMMENDATIONS:	(If dif	ferent fro	om NASA)			
[ /	] [	1 [	] [	] (AI	[ A DD/DE	] :LETE)
* CIL RETENTION D	RATIONALE:	(If appli	AD	EQUATE EQUATE	[	]

THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSME ASSESSME NASA FME	TN	I	D:	EM	06/87 J-763X D-FM7				1		DATA ELINE NEW			
SUBSYSTE MDAC ID: ITEM:				EMU 763 DCM	-	RON	ıcs (ı	TEM	350)					
LEAD ANA	LYS	ST	:	G.	RAFFAE	LLI								
ASSESSME	NT:	:												
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM														
	F		W/FU		A		B	;	(	2		ITI	EM	
NASA IOA	[	3	/3 /3	]	[	]	[ [	]	[	]		[	]	*
COMPARE	[		/	]	[	]	[	]	[	]		[	]	
RECOMMEN	DAT	CIC	ons:	(	If diff	fere	ent fr	om N	NASA)					
	ĺ		/	]	[	]	[	]	[	]	(A)	[ DD/E	] ELE	TE)
* CIL RETREMENTS: THE IOA									P		ATE ATE		]	

ASSESSMENT DA ASSESSMENT ID NASA FMEA #:		54X		SA DATA ASELINE NEW		]		
SUBSYSTEM: MDAC ID: ITEM:	EMU 764 DCM E	LECTRONI	cs (I	<b>ГЕМ</b> 35	50)			
LEAD ANALYST:	G. RA	FFAELLI						
ASSESSMENT:								
	CALITY	REDUN	DANCY	SCRE	ens		CIL	
	IGHT /FUNC	A	В			TIE	.141	
NASA [ 3 IOA [ 3	/3 ] /3 ]	[ ]	[	]	[	]	[	] <b>*</b>
COMPARE [	/ ]	[ ]	[	]	[	]	[	]
RECOMMENDATIO	NS: (If	differe	nt fr	om NAS	SA)			
[	/ ]	[ ]	[	]	[	] (A)	[ DD/D	] ELETE)
* CIL RETENTI	ON RATION	ALE: (If	appl	icable	AD	EQUATE EQUATE	[	]

THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSME ASSESSME NASA FME	ENT	I		EMU	06/87 J-765X J-FM9				1	NASA BASI	DATA ELINE NEW	. [	) x ]	
SUBSYSTE MDAC ID:				EMU 765 DCM		RON:	ICS (I	TEM	350)					
LEAD ANA	LY	ST	:	G.	RAFFAE	LLI								
ASSESSME	NT	:												
	CR		ICAI LIGI	LITY	R	EDUI	NDANCY	SCF	REENS			CII		
	1	HDI	W/FU	JNC	A		E	3	(	С				
NASA IOA	]	3 3	/3 /3	]	[	]	]	]	[ [	]		[	]	*
COMPARE	[		/	]	[	]	[	]	[	]		[	]	
RECOMMEN	DA:	CIC	ONS:	: (	If dif	fere	ent fr	om N	IASA)					
	[		/	]	[	]	[	]	[	]	(A	[ DD/[	) ELF	ETE)
* CIL REREMARKS:									1	ADEQU ADEQU		[	]	
THE TUA	ANL	ני כ	LHE	NASA	AKE II	)A K	KEEME	NT.						

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-458			NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	EMU 458 BITE IN	DICATOR	(ITEM 363	3)	
LEAD ANALYST:	G. RAFF	AELLI			
ASSESSMENT:					
CRITICA FLIG		REDUND	ANCY SCREI		CIL ITEM
		A	В	С	
NASA [ 3 /2 IOA [ 2 /2	R ] [	P ]	[ F ] [ ]	[ P ] [ ]	[ X ] * [ X ]
COMPARE [ N /N	] [	N ]	[ N ]	[ N ]	[ ]
RECOMMENDATIONS	: (If d	lifferen	t from NA	SA)	
[ 2 /2	] [	]	[ ]	[ ] (A)	[ ] ADD/DELETE)
* CIL RETENTION	RATIONAL	LE: (If	applicable	e) ADEQUATE INADEQUATE	[ ]
REMARKS: BECAUSE A FAILE SYSTEM VERACITY ALSO BASED ON T DETECTED DURING	, THE ION HE FACT I	A RECOMM MISSION	ENDS A 2/ TERMINATI	REATE A QUES 2 CRITICALIT ON WILL OCCU	TION OF TY. THIS IS

ASSESSM ASSESSM NASA FM	ENT	ID:	EMU-	10/86 -457 -FM2	BASEL										[		]	
SUBSYSTI MDAC ID ITEM:			EMU 457 BITI	E IND	)I(	CAT	OR (	(I	TI	em 3	363)							
LEAD AND	ALYS'	T:	G. I	RAFFA	Æ	LLI	•											
ASSESSMI	ENT:																	
	]	TICAL FLIGH DW/FU	T		RI A	EDU	NDAN		Y B	SCR	REEN	s C				IL PEM	ſ	
NASA IOA	[ :	3 /1R 2 /2	]	[	P	]	[	•	F	]	[	P	]		[ [	X X	]	*
COMPARE	[ 1	N / N	]	[	N	]	[	1	N	]	[	N	1		[		]	
RECOMMEN	DAT]	cons:	(I	f di	ff	er	ent	f	ro	m N	(ASA)	)						
	[	/	]	[		]	[			]	[		]	(ADI	[ D/	DE	] LE	TE
* CIL RE REMARKS: THE IOA											•		EQUAT		[		]	
101	LIGICE	TIO W.	LIN I	UE N	42	A E	TWIT	Y L	ıΤ	5.								

ASSESSME ASSESSME NASA FME	NT I		12/1 EMU- 351-	459	i								DATA: LINE NEW	[		]	
SUBSYSTEMDAC ID:	M:		EMU 459 ALPH	ANUM	ŒF	RIC	DIS	PLA	ΔY	(ITEM	13	169)					
LEAD ANA	LYST	:	G. R	AFFA	ΕI	LI											
ASSESSME	NT:																
			ITY		RE	EDUN	DAN	CY	sc	REENS	3			C)	L EM	ſ	
	_	LIGH'	NC		A			В			С					-	
NASA IOA	[ 2	/1R /2	]	]	P	]	]	F	]	[ [	P	]		[	X X	]	*
COMPARE	[	/N	]	[	N	]	[	N	]	[	N	]		[		]	
RECOMMEN	DATI	ons:	(I	f di	Lf1	fere	nt	fro	om	NASA	)						
	[	/	]	[		]	[		]	[		]	(A)	DD,	/DI	] ELE	TE)
* CIL RE	TENT	NOI	RATIO	NALI	≘:	(If	ap	pl:	ica				ATE ATE			]	
REMARKS:	AGRE	ES W	ITH I	HE I	NAS	SA I	NCL	UD:	INC	PAR	TIZ	AL D	ISPL	ΑY	LO	)SS	IN VER.

THIS FAILURE MODE AND WITH THE NASA ANALYSIS R THE IOA RECOMMENDS THAT UPON DETECTION DURING PERIODIC STATUS CHECK (OR TONE GENERATION) THE MISSION BE TERMINATED THEREFORE A HARDWARE CRITICALITY OF "2". THE IOA DOES NOT SEE A SECOND FAILURE AS CAUSING LOSS OF LIFE DUE TO TONE AVAILABILITY AND THE REQUIREMENT OF A SIGNIFICANT HARDWARE FAILURE.

ASSESSM ASSESSM NASA FM	ENT	'I	D:	EN	/06/ /U-7 51-F	80	X									DAT ELIN NI	1E	[ ]	] x ]	
SUBSYST MDAC ID ITEM:				EN 78 DI		ΑY	(	ITE	em :	35:	1)									
LEAD AN	ALY	ST	:	G.	RA	FF.	AE:	LLI												
ASSESSMI	ENT	:																		
		F	ICAL LIGH	T	•		R	EDU	NDA	ĮN(	CY	SCF	REEN	S				CII	-	
		HD	W/FU	NC			A				В			C						
NASA IOA	]	2 2	/1R /1R	]		]	P P	]		[	F F	]	[	P P	]			[ [	]	*
COMPARE	[		/	]		[		]		[		]	[		]			[	]	
RECOMMEN	IDA!	ΓI	ons:		(If	đ	ifi	fer	ent	: f	ro	om N	(ASA	)						
	[		/	]		[		]		[		]	[		]	(	<b>A</b> D	[ D/D	ELI	ETE)
* CIL RERESTREMENTS:																JATE JATE		[	]	
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ASSESSMI ASSESSMI NASA FMI	ENT	II		EMU	06/87 J-7813 L-FM5	ζ.			N		DATA: LINE NEW	[	[ ]	
SUBSYSTIMDAC ID:				EM0 783 DIS	l	(ITE	M 351)	)						
LEAD AND	ALYS	ST	:	G.	RAFF	AELLI								
ASSESSM	ENT	:												
	CR		ICAI LIGH			REDU	NDANC'	Y SCF	REENS			CII		
	I		W/FU			A	1	В	(	C				
NASA IOA	[	3	/3 /3	]	[	]	[	]	[	]		[	]	*
COMPARE	[		/	]	ĺ	]	Ţ	]	[	]		[	]	
RECOMME	NDA'	ΓI	ons:		(If d	iffer	ent f	rom N	NASA)					
	[		/	]	ť.	]	[	]	[	]	(A)	[ DD/1		ETE)
* CIL R		NT:	ION	RAT	IONAL	E: (I	f app	lical	i	ADEQU ADEQU	JATE JATE	[	]	

THE IOA AND THE NASA ARE IN AGREEMENT.

# $\begin{array}{c} \textbf{APPENDIX} \ \ \textbf{C} \\ \textbf{ASSESSMENT} \ \ \textbf{WORKSHEET} \end{array}$

8/06/87 EMU-782X

•		-782X -FM6				•	BASELIN NI		] x ]
	EMU 782 DISI	PLAY	(ITEI	M 351	)				
	G. I	RAFFA	ELLI						
GI		I	REDUN	NDANC:	y sci	REENS		CII ITI	
FU	INC	7	Ą	I	3	C	2		
3 3	]	]	]	[	]	]	]	[	] <b>*</b>
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is:	(I	fdif	fere	nt fr	om N	IASA)			
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NASA DATA:

ASSESSME ASSESSME NASA FME	NT I	D:	12/10/ EMU-39 360-FM	2	F <b>M</b> 6	NASA DATA: BASELINE [ ] NEW [ X ]							
SUBSYSTE MDAC ID: ITEM:	M:		EMU 392 VOLUME	e con	ITROI	, (IT	EM 360	))					
LEAD ANA	LYSI	7:	G. RAF	FAEI	LLI								
ASSESSME	NT:							4					
	F	TICALI FLIGHT	ľ	RI A	EDUNE	ANCY B	SCRE	ENS C	:	CIL			
NASA IOA		•	]	[ P	]	[ P	]	[ E	? ]	[	] *		
COMPARE	[	/	]	[	]	[	]	E	1	[	]		
RECOMMEN	DAT]	cons:	(If	dif	ferer	nt fr	om NAS	SA)					
	[	/	]	[	]	[	]	[	] (A	[ DD/D	] ELETE)		
* CIL RE	TENT	rion i	RATION	ALE:	(If	appl	icable	Z	ADEQUATE ADEQUATE	[	]		
DEMADKC.													

THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSMENT DATE: 12/10/86 ASSESSMENT ID: EMU-393 NASA FMEA #: 360-FM2									NASA DATA: BASELINE [ ] NEW [ X ]													
SUBSYSTE MDAC ID:					39 VC		E (	COI	NTRO	OL	(I	TI	em :	360)	)							
LEAD ANA	LY	ST	:		G.	RA:	FF.	AE:	LLI													
ASSESSME	NT	:																				
FLIGHT													CIL ITEM									
	I	HDI	N/F	UN	C			A			В С											
NASA IOA	[	3 3	/2 /2	R R	]		[	P P	]		] [	P P	]	(		P P	] ]		[	]	*	
COMPARE	[		/		]		[		]		[		]	[	•		]		[	]		
RECOMMEN	DAT	ric	ONS	:		(If	d:	ifi	fere	ent	f	rc	m 1	NASA	A)							
	[		/		]		[		]		[		]	[	•		]	(Al	[ DD/I	)EL	ETE	1)
* CIL RE											_						EQUA EQUA		[	]		
THE IOA	ANI	ניכ	HE	N.	AS.	A AF	Œ	IN	I AG	FRE	EM:	EΝ	T.									

ASSESSMENT ASSESSMENT NASA FMEA	ID:	EMU-73	3 X			N	BASELINE NEW				
SUBSYSTEM: MDAC ID: ITEM:		EMU 733 VOLUME	coi	NTROL	(ITI)	EM 360	))				
LEAD ANALY	ST:	G. RAF	'FAE	LLI							
ASSESSMENT	? <b>:</b>										
CF	RITICAL: FLIGH	r			ANCY B	SCREE	NS C	•	CIL		
	HDW/FU		A		_					_	
NASA [ ] AOI	3 /2R 3 /2R	]	[ P	]	[ P	]	[ E	? ] ? ]	[	] *	
COMPARE [	. /	]	[	]	[	1	[	]	[	3	
RECOMMENDA	ATIONS:	(If	dif	feren	t fr	om NAS	SA)				
1	. /	]	[	]	[	]	[	] (2	[ ADD/E		'E)
* CIL RETE	ENTION	RATIONA	ALE:	(If	appl	icable	2	ADEQUATE ADEQUATE	[	]	
REMARKS: THE IOA AN	ND THE	NASA AF	RE I	N AGR	EEME:	NT.					

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	8/06/87 EMU-734X 360-FM4,	FM9			ASA DATA BASELINE NEW	-	]
SUBSYSTEM: MDAC ID: ITEM:	EMU 734 COLUME CO	ONTROL (	(ITEM 36	0)			
LEAD ANALYST:	G. RAFFAE	LLI					
ASSESSMENT:							
CRITICAL FLIGH HDW/FU	T		ICY SCRE	ENS C		CIL	
NASA [ 3 /2R					1	•	
IOA [ 3 /2R	] [ P	, ; ;	P ] P ]	[ P	]	[	] <b>*</b> ]
COMPARE [ /	] [	] [	]	[	]	[	]
RECOMMENDATIONS:	(If dif	ferent	from NAS	SA)			
[ /	] [	] [	1	[	] (A)	[ DD/DE	] ELETE)
* CIL RETENTION 1	RATIONALE:	(If ap	plicable	AD	EQUATE	[	]
REMARKS: THE IOA AND THE I	NASA ARE II	N AGREEI	MENT.	INAD	EQUATE	[	]

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-391	)	NASA DATA BASELINE NEW		]
MDAC ID:	EMU 391 VOLUME CONTRO	OL (ITEM 36	50)		
LEAD ANALYST:	G. RAFFAELLI				
ASSESSMENT:					
CRITICAL FLIGH	ITY REDUI	NDANCY SCRI	EENS	CIL ITE	
HDW/FU		В	С		
NASA [ 3 /2R IOA [ 3 /2R	] [ P ] ] [ P ]	[ P ] [ P ]	[ P ] [ P ]	[	] <b>*</b> ]
COMPARE [ /	] [ ]	[ ]	[ ]	[	]
RECOMMENDATIONS:	(If differ	ent from N	ASA)		
[ /	] [ ]	[ ]	[ ]	[ ADD/D	] ELETE)
* CIL RETENTION	RATIONALE: (I	f applicab	le) ADEQUATE INADEQUATE	[	]
REMARKS: THE IOA AND THE	NASA ARE IN A	GREEMENT.			

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-393A 360-FM7		NASA DATA BASELINE NEW	•
MDAC ID:	EMU 393 VOLUME CONTROL	(ITEM 360	<b>)</b> )	
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
CRITICALI FLIGHT	TY REDUND	ANCY SCREE	:NS	CIL ITEM
HDW/FUN	IC A	В	С	IIEM
NASA [ 2 /2 IOA [ 3 /2R	] [ p ]	[ ] [ P ]	[ ] [ P ]	[ X ] *
COMPARE [ N /N	] [N]	[ N ]	[ N ]	[ N ]
RECOMMENDATIONS:	(If differen	t from NAS	A)	
[ 3 /2R	] [P]	[ P ]		[ ] DD/DELETE)
* CIL RETENTION R	ATIONALE: (If a	applicable		
REMARKS:			ADEQUATE INADEQUATE	[ ]
THE IOA RECOMMEND SECOND VOLUME CON NASA FMEA 360-FM2	TROL CHANNEL AI	CALITY DUE	TO AVAILABI TAIN CONSIST	LITY OF ENCY WITH

ASSESSMEN ASSESSMEN NASA FME	T	II	<b>):</b>	EMU-	-396	5			NASA DATA: BASELINE [ ] NEW [ X ]					
SUBSYSTEM MDAC ID: ITEM:	M:			EMU 396 DISI	PLAY	IN	ITEN	SIT	<i>Y</i> (	CONT	ROL	(ITEM 361	)	
LEAD ANA	LYS	ST:	:	G. I	RAFFA	ÆΙ	LI							
ASSESSME	NT:	;												
(	CR]			ITY		RE	EDUN	DAN	CY	SCR	REENS	S	CIL ITEM	
	F		LIGH V/FU	NC		A			В			С	11111	
NASA IOA	[	3 2	/3 /2	]	[	P	]	[	P	]	[	NA]	[ ] * [ x ]	
COMPARE	[	N	/N	]	[	N	]	[	N	1	ĺ	N ]	[ N ]	
RECOMMEN	DA:	ΓI	ons:	(:	If d	ifi	fere	nt	fr	n mc	NASA	)		
	[	2	/2	]	[		]	[		]	[	] (A	[ A ] DD/DELETE)	
* CIL RE	TEI	NT:	ION	RATI(	ONAL	Ε:	(If	ap	pl.	icah		ADEQUATE NADEQUATE		
REMARKS: THE IOA WORST CA	ANI SE	D'	THE CENA	NASA RIO	ARE CAN	N( IN(	OT I	N A E E	GR VA	EEMI OPI	ENT. ERAT		BELIEVES THE E DEEP SPACE	

THE IOA AND THE NASA ARE NOT IN AGREEMENT. THE IOA BELIEVES THE WORST CASE SCENARIO CAN INCLUDE EVA OPERATIONS ON THE DEEP SPACE SIDE OF THE EARTH WITHOUT SIGNIFICANT LUNAR REFLECTION. PAYLOAD BAY LIGHTING, ALTHOUGH AVAILABLE, CANNOT ENSURE READABILITY. THEREFORE, THE IOA RECOMMENDS A 2/2 CRITICALITY AND INCLUSION IN THE CIL. THIS WILL ACCOUNT FOR MISSION TIMELINE IMPACTS RESULTING FROM FINDING AN ACCEPTABLE LIGHT SOURCE.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-398			NASA DATA BASELINE NEW	
MDAC ID:	EMU 398 DISPLAY	INTENSIT	Y CONTRO	OL (ITEM 361	)
LEAD ANALYST:	G. RAFFA	ELLI			
ASSESSMENT:					
FLIGHT		REDUNDAN	CY SCREI	ens	CIL ITEM
HDW/FUN	IC 2	A	В	С	
NASA [ 3 /3 IOA [ 2 /2	] [	] [ P ] [	p ]	[ ] [ NA]	[ x ] *
COMPARE [ N /N	] [1	и] [	N ]	[ N ]	[ N ]
RECOMMENDATIONS:	(If di	fferent	from NAS	SA)	
[ 2 /2	) [	) [	]		[ A ] DD/DELETE)
* CIL RETENTION F	ATIONALE:	: (If ap	plicable	e) ADEQUATE INADEQUATE	[ ]
THE IOA RECOGNIZE NASA FMEA 361-FM1 ASSESSMENT ID EMU	; HOWEVER	R, FOR T	HE SAME	REASONS STAT	TED IN TOA

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-735X		BASELINE NEW	[ x ]
SUBSYSTEM: MDAC ID: ITEM:	EMU 735 DISPLAY INT	PENSITY CONTROL	(ITEM 361)	
LEAD ANALYST:	G. RAFFAELI	I.		
ASSESSMENT:				
CRITICAL: FLIGH		OUNDANCY SCREEN	S	CIL ITEM
HDW/FU		В	С	
NASA [ 3 /3 IOA [ 2 /2	] [ ] ]	[ ] [ [ P ] [	P ]	[ x ] *
COMPARE [ N /N	] [ N ]	[и] [	N ]	[ N ]
RECOMMENDATIONS:	(If diffe	erent from NASA	.)	
[ 2 /2	] [ ]	ן נין נ	] (AI	[ A ] DD/DELETE)
* CIL RETENTION	RATIONALE: (		ADEQUATE NADEQUATE	[ ]
REMARKS: THE IOA AND THE WORST CASE SCENA SIDE OF THE EART	RIO CAN INCI	LUDE EVA OPERAT	TIONS ON THI	E DEEP SPACE

THEREFORE, THE IOA RECOMMENDS A 2/2 CRITICALITY AND INCLUSION IN

THE CIL. THIS WILL ACCOUNT FOR MISSION TIMELINE IMPACTS

BAY LIGHTING, ALTHOUGH AVAILABLE, CANNOT ENSURE

RESULTING FROM FINDING AN ACCEPTABLE LIGHT SOURCE.

ASSESSMEN ASSESSMEN NASA FMEA	T ID:	: 12/10/ EMU-39 361-FM	97				NASA DAT BASELIN NE		]	
SUBSYSTEM MDAC ID:	<b>1</b> :	EMU 397 DISPL	AY I	NTE	NSITY (	CONTR	OL (ITEM 36	1)		
LEAD ANAI	LYST:	G. RAI	FFAE	LLI						
ASSESSMEN	T:									
C	RITICA FLIG HDW/F		R A		ndancy B	SCRE	ens C	CII		
NASA IOA	[ 3 /3 [ 2 /2	]	[ [ P	]	[ [ P	]	[ ] [ NA]	[ }	] { ]	*
COMPARE	[ N /N	]	[ N	]	[ N	]	[ N ]	[ ]	1 ]	
RECOMMEND	ATIONS	: (If	dif	fere	ent fro	om NAS	SA)			
	[ /	]	[	]	[	]	[ ] (2	[ ADD/E	) DELE	ΓE)
* CIL RET REMARKS: THE IOA A							e) ADEQUATE INADEQUATE		]	

NASA DATA:

ASSESSMENT DATE ASSESSMENT ID: NASA FMEA #:	EMU-399	)	NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	EMU 399 DISPLAY	INTENSITY C	ONTROL (ITEM 361	)
LEAD ANALYST:	G. RAFI	FAELLI		
ASSESSMENT:				
FLIC	HT	REDUNDANCY		CIL ITEM
HDW/I	UNC	A B	С	
NASA [ 3 /3 IOA [ 2 /3	]	[ ] [ [ P ] [ P	] [ ] ] [ NA]	[ x ] *
COMPARE [ N /	· ]	[и] [и	] [ N ]	[ N ]
RECOMMENDATIONS	: (If o	different fro	m NASA)	
[ 2 /	1	[ ] [	[ ]	[ A ] ADD/DELETE)
* CIL RETENTION	RATIONA	LE: (If appli	cable) ADEQUATE INADEQUATE	
VALUE, THE DIST	CUR, THE	D BE UNREADAB MISSION TIME	INTENSITY IS AT LE FOR THE EVA M LINE COULD BE IN EPTABLE LIGHT SO	MISSION. IF MPACTED BY THE

THEREFORE, THE IOA RECOMMENDS A CRITICALITY OF 2/2.

REPORT DATE 02/25/88 C-569

ASSESSMI ASSESSMI NASA FMI	ENT	I	D:	EM	<b>™-</b> 736	X					DATA ELINE NEW		x ]		
SUBSYSTIMDAC ID				EM 73 DI	6	INT	ENSITY	CON	TROL	(ITE)	1 361	)			
LEAD AND	ALY	ST	:	G.	RAFF	AELL	I								
ASSESSMENT:															
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C															
		HDW/FUNC					1	3	(	2					
NASA IOA	[	3 3	/3 /3	]	]	]	[	]	]	]		[	]	*	
COMPARE	[		/	]	[	1	[	]	[	]		.[	]		
RECOMMEN	IDA'	ri(	ons:		(If d	iffer	ent fi	om :	NASA)						
	[	2	/2	]	[	]	[	]	[	]	(AI	A ] D/DC		TE)	
* CIL RE	TE	NT:	ION :	RAT	IONAL	E: (I	f app]	.ica	•						
REMARKS:											ATE ATE		]		
UPON FUR	THI	ER	REV	IEW	, THE	IOA	BELIEV	ES '	THE WO	RST	CASE	SCE	NAR	IO	CAN
INCLUDE WITHOUT	SIC	GN:	[FIC	ANT	LUNA	R REF	LECT.	PA'	YLOAD	BAY	LIGHT	ING		NNO	т
ENSURE R	EAI	DAI	BILI	TY.	THE	REFOR	E THE	IOA	RECOM	MEND	S A 2	1/2			-

ACCEPTABLE LIGHT SOURCE.

MISSION TIMELINE IMPACTS RESULTING FROM EFFORTS TO FIND AN

ASSESSMEN	ASSESSMENT DATE: 12/10/86 ASSESSMENT ID: EMU-410 NASA FMEA #: 362-FM1								ASA D BASEL		[		
SUBSYSTEM MDAC ID:	м:		EMU 410 EVC S	ELEC	TOR	SWITC	н (І	TEM 3	62)				
LEAD ANA	LYS	r:	G. RA	FFAE	LLI								
ASSESSME	T:												
(	]	FLIGH DW/FU		F		idancy B		REENS C			CII		
WA CA						r	,	r	1		г 3	<i>?</i> 1	*
IOA	[ ;	2 /2	]	[ ]	, ן	[ P	]	[ P	j		נ ז	( ] ( ]	
COMPARE	(	/	]	[ ]	1 ]	[ N	1	[ N	]		[	]	
RECOMMEN	DAT:	ions:	(If	dif	fere	ent fr	om N	IASA)					
	[	/	]	[	]	[	]	[	]	(A)	_	) DELE	TE)
* CIL RE	ren'	rion	RATION	ALE:	(I)	f appl	icab	A	DEQUA DEQUA			]	
THE IOA	AND	THE	NASA A	RE I	N A	GREEME	NT.						

ASSESSMEN ASSESSMEN NASA FMEA			1		DATA ELINE NEW	[	x	]					
SUBSYSTEM MDAC ID: ITEM:	<b>:</b>		EMU 400 EVC SI	ELEC	CTOF	R SWITC	ri) H	гем з	362)				
LEAD ANAL	YST	:	G. RA	FFAI	ELLI	<u>.</u>							
ASSESSMEN	T:												
C	F	LIGHT				NDANCY B	SCRE	EENS			CI IT	L EM	
NASA IOA	[ 3 [ 3	/2R /2R	]	[ ]	9 ]	[ F [ F	]	[ F	) )		[	X X	] <b>*</b> ]
COMPARE	[	/	]	[	]	[	]	]	]		[		]
RECOMMEND	ATIO	ons:	(If	dif	fer	ent fro	om NA	SA)					
	[	/	]	[	]	[	]	[	]	(AI	[ DD/:	DEI	] LETE)
* CIL RET	ENT	ION F	RATIONA	ALE:	(I	f appli	.cabl	A		ATE ATE	[	]	<b>]</b>
THE IOA A	ND T REV	THE N	IASA AF	E MC	N A	GREEMEN COMPREH	IT. IENSI	HOWE	VER,	THE	CA	USE	ES

ASSESSMENT DAT ASSESSMENT ID: NASA FMEA #:	EMU-40	)1		BASELINI NEV	
SUBSYSTEM: MDAC ID: ITEM:	EMU 401 EVC SE	LECTOR S	SWITCH (IT	EM 362)	
LEAD ANALYST:	G. RAF	FAELLI			
ASSESSMENT:					
	ALITY GHT	REDUNI	DANCY SCRE	ENS	CIL ITEM
	FUNC	A	В	С	
NASA [ 3 / IOA [ 3 /	'2R ] '2R ]	[ P ] [ P ]	[ F ] [ P ]	[ P ] [ P ]	[ X ] * [ ]
COMPARE [ /	' 1	[ ]	[ N ]	[ ]	[ N ]
RECOMMENDATION	s: (If	differe	nt from NA	SA)	
[ /	' ]	[ ]	[ ]	[ ] (	[ ] ADD/DELETE)
* CIL RETENTIO	ON RATIONA	ALE: (If	applicabl	ADEQUATE	
REMARKS: THE IOA AGREES AGREEMENT WITH SHOULD BE REVI	H THE REMA	AINING A	NALYSIS.	HOWEVER, TH	D IS IN

ASSESSMENT ASSESSMENT NASA FMEA	ID:	EMU-4	11			NASA DA BASELI N		] K ]		
SUBSYSTEM: MDAC ID: ITEM:			ELEC	TOR :	SWITC	H (ITE	M 362)			
LEAD ANALY	ST:	G. RA	FFAE	LLI						
ASSESSMENT	:									
CR	ITICAL FLIGH	ITY T	R	EDUNI	DANCY	SCREE	NS	CII		
1		NC	A		В		С	111	71.1	
NASA [ IOA [	3 /2R 3 /3	]	[ P	]	[ P	]	[ NA] [ NA]	[	] <b>*</b>	
COMPARE [	/N	]	[	]	[	]	[ ]	[	]	
RECOMMENDA!	rions:	(If	dif	ferer	nt fro	om NAS	A)			
]	3 /3	]	[	]	(	]		[ (ADD/D	] ELETE	)
* CIL RETEN	NTION 1	RATIONA	ALE:	(If	appli			3 3	]	
REMARKS:						•	ADEQUATI INADEQUATI	] 2	j	
BECAUSE THI AND BECAUSI IOA RECOMME ASSIGNMENTS	E LOSS ENDS A	OF REI	OUND! RITI(	ANCY CALIT	DOES	NOT FI	JRTHER TME	PACT T	ጥ ጥዝ	F

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-402 362-FM4		NASA DATA: BASELINE NEW	[ ]
MDAC ID:	EMU 402 EVC SELECTOR S	362)		
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
CRITICALI FLIGHT	1	ANCY SCREENS		CIL ITEM
HDW/FU	IC A	В	С	
NASA [ 3 /2R IOA [ 3 /2R	] [ P ] ] [ P ]	[ F ] [ [ F ] [	P ] P ]	[ X ] * [ X ]
COMPARE [ /	] [ ]	[ ] [	]	[ ]
RECOMMENDATIONS:	(If differen	nt from NASA	)	
[ /	] [ ]	[ ] [	] (AI	[ ] DD/DELETE)
* CIL RETENTION 1	RATIONALE: (If		ADEQUATE NADEQUATE	
REMARKS: THE IOA AND THE I RECOMMENDS A MORI	NASA ARE IN AGE COMPREHENSIVE	REEMENT. AD	DITIONALLY, OF CAUSES.	THE IOA

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-403		NASA DATA BASELINE NEW	
MDAC ID:	EMU 403 EVC SELECTOR SWI	TCH (ITEM	362)	
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
CRITICALI FLIGHT	TY REDUNDAN	ICY SCREENS	3	CIL ITEM
HDW/FUN	C A	В	С	
NASA [ 3 /2R IOA [ 3 /2R	] [ P ] [	F ] [ P ] [	P ] P ]	[ X ] * [ X ]
COMPARE [ /	] [ ] [	и][	]	[ ]
RECOMMENDATIONS:	(If different	from NASA)		
[ /	] [ ] [	] [	] (AD	[ ] D/DELETE)
* CIL RETENTION R	ATIONALE: (If ap		ADEOUATE	r ı
REMARKS:		IN	ADEQUATE ADEQUATE	
THE IOA AND THE N REGARDING WHICH T RECOMMENDS A MORE	HE IOA NOW AGREE	S WITH THE	NASA. TH	N B E IOA ALSO

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-412			BASELINE NEW	
	412	CTOR SWI	TCH (ITEM	362)	
LEAD ANALYST:	G. RAFFA	ELLI			
ASSESSMENT:					
CRITICAL FLIGH		REDUNDAN	CY SCREEN	S	CIL ITEM
		A	В	С	
NASA [ 3 /2R IOA [ 3 /3	] [	P ] [ P ] [	P ] [ P ] [	NA] NA]	[ ] *
COMPARE [ /N	] [	] [	] [	]	[ ]
RECOMMENDATIONS:	(If di	fferent	from NASA	)	
[ 3 /3	] [	] [	] [	] (Al	[ ] DD/DELETE)
* CIL RETENTION	RATIONALI	E: (If ap		ADEQUATE NADEQUATE	
REMARKS: BECAUSE THE FAIL FURTHER LOSS OF RECOMMENDS A 3/3	REDUNDANO	CY IS NO	ATIONAL"  IMPACT TO	FOR MODE B	AND BECAUSE HE IOA

IN AGREEMENT.

ASSESSMEN' ASSESSMEN' NASA FMEA							ASA D BASEL		[	ζ .	]				
SUBSYSTEM MDAC ID: ITEM:		ror sv	TIW	CH	I (IT	EM	3 (	62)							
LEAD ANAL	YST:	G. RAFF	AE	LLI											
ASSESSMENT	T:														
CI	RITICALI FLIGHT HDW/FUN			EDUND <i>i</i>			SCRE	ENS				CII	_		
	HDW/FUR	iC .	A			В			С						
NASA   IOA	[ 3 /2R [ 3 /2R	] [	P P	]	[	F F	]	[	P P	]		[ X	[ ]	; 	*
COMPARE (	[ /	] [		]	[		]	[		]		[	]		
RECOMMENDA	ATIONS:	(If d	iff	erent	f	ro	m NA	SA)	l						
Į	[ /	] [		]	[		]	[		]	(AI	[ DD/D	EI		ΓE)
* CIL RETE	ENTION R	ATIONAL	E:	(If a	pp.	li	cabl	-	ΑC	EQUAT	Ë	<u>[</u>	]		
REMARKS: THE IOA AN RECOMMENDS	ND THE N	ASA ARE	IN HEN	AGRE	EMI TRI	EN EA	T. 1	HOW	ΈV	EQUAT ER, 1 CAUSE	HE		-		

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-405			NASA DATA: BASELINE NEW	
MDAC ID:	EMU 405 EVC SELE	CTOR SW	ITCH (ITEM	362)	
LEAD ANALYST:	G. RAFFA	ELLI			
ASSESSMENT:					
CRITICAL		REDUNDA	NCY SCREEN	S	CIL ITEM
FLIGH HDW/FU		A	В	С	
NASA [ 3 /2R IOA [ 3 /2R	] [	P ] P ]	[ F ] [ [ P ] [	P ] P ]	[ X ] *
COMPARE [ /	] [	]	[и]	1	[ N ]
RECOMMENDATIONS:	(If d	ifferent	from NASA	7)	
[ /	] [	1	[ ]	(A)	[ ] DD/DELETE)
* CIL RETENTION	RATIONAL	E: (If a		ADEQUATE INADEQUATE	-
REMARKS: THE IOA AND THE	NASA ARE	IN AGRI	EMENT EXC	EPT ON SCRE	EN B

REGARDING WHICH THE IOA NOW AGREES WITH THE NASA ASSIGNMENT. ADDITIONALLY, THE IOA RECOMMENDS A MORE COMPREHENSIVE TREATMENT

OF CAUSES.

ASSESSM ASSESSM NASA FM	ENT	I	D:	E	2/10/8 MU-40 62-FM	5							DAT. ELIN		x	]	
SUBSYST				4		LEC	TOR	SWI	TC	н	(ITEM	362)					
LEAD AND	ALYS	T	•	G	. RAFI	AE	LLI										
ASSESSMI	ENT:																
		FI	CAL LIGH	T				NDAN		S	CREENS				IL PEM	ſ	
	11	U	/FU	NC		A			В			С					
NASA IOA	[	3 3	/2R /2R	]	<u>[</u>	P P	]	[	N. F	A]	[	P ] P ]		]	X X	]	*
COMPARE	[		/	]	C		]	[	N	]	[	]		[		]	
RECOMMEN	DAT	ΙO	NS:		(If d	if	fere	ent :	fro	om	NASA)						
	[		/				]			]	-	]	(A	[ .DD/	DE	] LE:	ΓE)
* CIL RE	TEN'	ΤI	ON I	RAT	'IONAL	E:	(If	app	ol i	.ca	ble)						
REMARKS:											IN	ADEQU ADEQU	ATE	•		]	
THE IOA :	AND NOW	T	HE N ONCU	IAS IRS	A ARE WITH	IN	I AG	REEM	EN	T	EXCEP'	r for	SCR	EEN	В	WE	IICH

	12/10/80 EMU-407 362-FM7	6		NASA DATA: BASELINE NEW	
MDAC ID:	EMU 407 EVC SELI	ECTOR SW	ITCH (ITE	м 362)	
LEAD ANALYST:	G. RAFF	AELLI			
ASSESSMENT:					
CRITICAL: FLIGHT HDW/FUI	r	REDUNDA A	NCY SCREE	ns C	CIL ITEM
•			ר אז א ז	ר די ז	(X 1 *
NASA [ 3 /2R IOA [ 3 /2R	] [	P ]	[ P ]	[ P ] [ P ]	[ X ] *
COMPARE [ /	] [	]	[ א ]	[ ]	[ N ]
RECOMMENDATIONS:	(If d	ifferent	from NAS	'A)	
( /	] [	]	[ ]	[ ] (A)	[ ] DD/DELETE)
* CIL RETENTION	RATIONAL	E: (If a	applicable	e) ADEQUATE INADEQUATE	[ ]
REMARKS: THE IOA AND THE REGARDING WHICH	NASA ARE THE IOA	IN AGRE	EMENT EXC	EPT FOR SCR THE NASA FI	EEN B; NDING.

ASSESSMENT DATE: 12/10/86 ASSESSMENT ID: EMU-413											NASA					
NASA FME											BASE	LINE NEW			]	
SUBSYSTEMDAC ID:			EMU 413 EVC SELECTOR G. RAFFAELLI						ен і	(ITEM	362)		L		J	
LEAD ANA	LYSI	!:	G. RA	FF	AE:	LLI										
ASSESSMEI	NT:															
(		'ICAL 'LIGH	ITY T		RI	EDUN	DAI	1CY	s	CREENS	3			IL TEN		
	HD	W/FU	NC		A			B	3		С		_	. Li		
NASA IOA	[ 3 [ 3	/2R /3	]	[	P P	]	[	F	]	[ [	NA] NA]		[	x	]	*
COMPARE	C	/N	]	[		]	(	N	]	[	]		[	N	]	
RECOMMEN	DATI	ons:	(If	đ	ifí	ferei	nt	fr	om	NASA)	1					
	[ 3	/3	]	[		]	í	•	)	£	]	(AD				ETE)
* CIL RET	TENT	ION 1	RATION	ALE	E :	(If	ap	pl	ica	•	ADEQU.	ATE	ſ		1	
REMARKS:											IADEQU.	ATE	Ĩ		_	
BECAUSE I LOSS OF R RECOMMEND	REDU	NDAN(	CY IS 1	10	IM	[PAC]	PER I I	TAI O	ION BAC	AL" A	ND BE	CAUSE THE I	O.P	'UF	≀TH	IER

ASSESSMENT DATASSESSMENT ID:	EMU-4	08		NASA DA' BASELII N		]
SUBSYSTEM: MDAC ID: ITEM:	EMU 408 EVC S	ELECTOR	SWITCH (I	TEM 362)		
LEAD ANALYST:	G. RA	FFAELLI				
ASSESSMENT:						
	CALITY	REDUN	DANCY SCR	EENS	CIL ITE	
	IGHT /FUNC	A	В	С		•
NASA [ 3 , IOA [ 3 ,	/2R ] /2R ]	[ P ] [ P ]	[ F ] [ F ]	[ P ] [ P ]	x ]	] * ]
COMPARE [	/ ]	[ ]	[ ]	[ ]	[	]
RECOMMENDATIO	NS: (I	f differe	nt from N	ASA)		
[ .	/ ] ·	[ ]	[ ]	[ ]	[ (ADD/D	] ELETE)
* CIL RETENTI REMARKS:	ON RATIO	NALE: (If	applicab	le) ADEQUAT INADEQUAT	'E [	]
THE IOA AND T	HE NASA	ARE IN AG	REEMENT.			

ASSESSMENT DATE ASSESSMENT ID: NASA FMEA #:	EMU-409	6		NASA DA BASELI	
SUBSYSTEM: MDAC ID: ITEM:	EMU 409 EVC SELE	ECTOR S	WITCH (1	TEM 362)	
LEAD ANALYST:	G. RAFF	AELLI			
ASSESSMENT:					
CRITICA: FLIG	IT		ANCY SCR	EENS	CIL ITEM
HDW/F	INC	A	В	С	
NASA [ 3 /2] IOA [ 3 /2]	] [ 5	P ] P ]	[ F ] [ P ]	[ P ] [ P ]	[ X ] * [ ]
COMPARE [ /	] [	]	[ N ]	[ ]	[ N ]
RECOMMENDATIONS	(If di	fferen	t from N	ASA)	
[ /	] [	]	[ ]	[ ]	[ D ] (ADD/DELETE)
* CIL RETENTION	RATIONALE	: (If	applicab	le)	
REMARKS:		·		ADEQUAT	
THE IOA AND THE CONCURS WITH THE	NASA ARE NASA SCR	IN GENI EEN B.	ERAL AGR	EEMENT. TH	E IOA NOW

ASSESSMENT DA' ASSESSMENT ID NASA FMEA #:	: EMU					ATA: INE [ ] NEW [ X ]
SUBSYSTEM: MDAC ID: ITEM:	EMU 423 POV	3	SELECT	ror sw	ITCH (ITEM	364)
LEAD ANALYST:	G.	RAFFAEI	LI			
ASSESSMENT:						
	CALITY IGHT	RE	DUNDAN	CY SCR	EENS	CIL ITEM
	/FUNC	A		В	С	
NASA [ 2 IOA [ 2	/2 ] /2 ]	[ [ P	] [	P ]	[ ] [ P ]	[ X ] * [ X ]
COMPARE [	/ ]	[ N	] [	N ]	[ N ]	[ ]
RECOMMENDATIO	ns:	(If dif	ferent	from N	ASA)	
[	/ 1	ſ	] [	]	[ ]	[ ] (ADD/DELETE)
* CIL RETENTI	ON RAT	IONALE:	(If ap	plicab	ole) ADEQUA INADEQUA	TE [ ]
REMARKS: THE IOA AND T	HE NAS	A ARE I	N AGREE	MENT.		

ASSESSMI ASSESSMI NASA FMI	ENT :	ID:	EMU-4	19				1	NASA D BASEI	INE			
SUBSYSTE MDAC ID:			EMU 419 POWER	MOD	E SEI	LECTO	R SV	VITCH	(ITEM	36	4)		
LEAD ANA	LYS	r:	G. RA	FFAE	LLI								
ASSESSME	ENT:												
	CRIT	FICAL:	ITY r	R	EDUNI	DANCY	SCF	REENS			CIL		
			NC	A		E	}	C	!		ITE	M	
NASA IOA	[ 2	2 /1R 2 /1R	]	[ P	]	[ P	]	[ P	]		[ X [ X	] *	
COMPARE	[	/	]	[	]	[ N	]	[	]		[	]	
RECOMMEN	DATI	ONS:	(If	dif	feren	t fr	om N	ASA)					
	[	/	. ]	[	]	[	]	ί	]	(AI	[ DD/D	] ELETE	)
* CIL RE	TENT	ION F	RATION	ALE:	(If	appl	icab	le)					
REMARKS:								A INA	DEQUA:	re re	[	]	
THE IOA	AND EEN	THE N B ASS	IASA AF IGNMEN	RE IN	N AGR	EEME	A TN	ND TH	E IOA	AGR	EES	WITH	THE

ASSESSMEN ASSESSMEN NASA FME	I TN	D:	12/10, EMU-4: 364-F	17A									LINE NEW	[		
SUBSYSTEMDAC ID:	M:		EMU 417 POWER	MO	DE	SE	LEC	TOI:	R SW	ITCH	H (	ITE	M 364	4)		
LEAD ANA	LYSI	r:	G. RA	FFA:	EL	LI										
ASSESSME	NT:															
		CICAL			RE	DUN	DAN	ICY	SCR	REENS	3			CIL		
	_	FLIGH DW/FU			A			В			С					
NASA IOA	[ 2	2 /2	]	[	P	]	[	P	]	[	P	]		K ]	[ ]	*
COMPARE	[	/	]	[	N	]	(	N	]	[	N	]		[	]	
RECOMMEN	DAT:	ions:	(If	di	ff	ere	ent	fr	om N	NASA	)					
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SUBSYSTE MDAC ID: ITEM:			EMU 415 POWER	MOI	DE SI	ELECTOR	SWITCH	(ITE	M 36	4)		
LEAD ANA	LYS	r:	G. RA	FFAE	ELLI							
ASSESSME	NT:											
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COMPARE	[	/	]		[ ]	[ N ]	[	N ]		[	]	
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SUBSYSTE MDAC ID:	M:			EM 41 PO	4	M	DI	E SI	ELE	CI	OF	R S	WITC	CH	(1	TEM	364	1)			
LEAD ANA	LYS	T:		G.	RAI	FFZ	AEI	LLI													
ASSESSME	NT:																				
		FI	CAL	r				EDUI	NDA	NC		sc	REEN						IL PEN	1	
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SUBSYSTEM: MDAC ID: ITEM:		EMU 416 POWER	MODI	E SEI	LECTO	R SWI	тсн	(ITEM	364	<b>!</b> )		
LEAD ANALYS	ST:	G. RAF	FAE	LLI								
ASSESSMENT:	:											
CRI	TICAL:	ITY	R	EDUNI	DANCY	SCRE	ENS			CIL		
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SUBSYSTE MDAC ID:				4	MU 14 OWER	M	OD:	E S	SELE	EC!	<b>ro</b> i	R S	TIWE	'CI	H	(I	rem	36	4)			
LEAD ANA	\LY	ST	:	G	RA:	FF.	AE:	LLI	C .													
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* CIL RE REMARKS: THE IOA														•			UAT TAU		[		]	
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ASSESSMENT DA ASSESSMENT II NASA FMEA #:	):		5A				1	NASA DATA BASELINI NEV			]
SUBSYSTEM: MDAC ID: ITEM:		EMU 415 POWER	MODE	: SELE	CTO:	R SWIT	rch	(ITEM 3	54)		
LEAD ANALYST:	;	G. RAF	FAEL	LI							
ASSESSMENT:											
	CALI LIGHT		RE	DUNDA		SCREI			CI	L EM	
HDV	/FUN	C	A		В		(	С			
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COMPARE [	/N	]	[	]	[ N	]	[	. ]	[		]
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IMPACT AND BECAUSE THE OTHER FAILURES WHICH CAN CAUSE LOSS OF LIFE ARE NOT REDUNDANT IN NATURE OR FUNCTION AND THEREFORE, PER 22206, CANNOT BE EMPLOYED TO UPGRADE FUNCTIONAL CRITICALITY.

EMU-426			BASELIN	
426	DE SELECTO	OR SWIT	сн (ітем з	64)
G. RAFFAE	ELLI			
_	REDUNDANC	Y SCREE	INS	CIL ITEM
NC A	. ]	В	С	
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	364-FM18  EMU 426 POWER MOI  G. RAFFAR  ITY F NC  [ F ] [ F	EMU-426 364-FM18  EMU 426 POWER MODE SELECTOR G. RAFFAELLI  ITY REDUNDANCE INC A I  [ P ] [ ]  [ P ] [ ]  [ (If different for a point of a poin	EMU-426 364-FM18  EMU 426 POWER MODE SELECTOR SWIT  G. RAFFAELLI  ITY REDUNDANCY SCREE  NC A B  [ P ] [ P ]  [ P ] [ P ]  [ If different from NAS  ] [ ] [ ]  RATIONALE: (If applicable	EMU-426 364-FM18  EMU 426 POWER MODE SELECTOR SWITCH (ITEM 3 G. RAFFAELLI  ITY REDUNDANCY SCREENS T NC A B C  ] [P] [P] [P] [P] ] [P] [P] [P]  (If different from NASA)  ] [] [] [] []  (ARATIONALE: (If applicable)  ADEQUATE INADEQUATE

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LEAD ANA	LYS	ST:	:	G.	RAI	FFA	AE1	LLI											
ASSESSME	NT:	;																	
		FI	CAL LIGH V/FU	Т	?		RI A	EDUN	DAÌ	ICY B		REEN		C			IL FEN	М	
W1.G1			•			r						r				г	v	٦	
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RECOMMEN	DA'I	CIC	ons:		(If	d:	if	fere	nt	fr	om 1	NASA	١)						
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* CIL RE	TEN	<b>T</b>	ION	RAT	NOI	AL	Ε:	(If	aı	ppl	ica		7	ADEQU <i>I</i> ADEQU <i>I</i>				]	

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SUBSYSTE MDAC ID: ITEM:				EMU 424 POW		ODI	E SI	ELE	CJ	OI	R SV	VITC	н	(II)	CEM	36	4)			
LEAD ANA	LYS	5 <b>T</b> :	:	G.	RAFF	AE:	LLI													
ASSESSME	NT:	:																		
		EDUI	NDA	NC		SCF	REEN						IL PEN	M						
	ì	100	v/Ft	JNC	A B C															
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COMPARE	[		/	]	(	N	]		[	N	]	[	N	]			[		]	
RECOMMEN	DAT	ľIC	ons:	: (	If d	ifi	fere	ent	f	rc	m N	IASA	)							
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* CIL RE	TEN	T]	ON	RATI	ONALI	Ξ:	(II	f a	pp	1 i	.cab	•			TAU TAU		[		]	
THE IOA	ANI	rc	HE	NASA	ARE	I	I AC	GRE	EM	EN	T.									

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-421		BASELIN NE	
MDAC ID:	EMU 421 POWER MODE	E SELECTOR	SWITCH (ITEM 3	64)
LEAD ANALYST:	G. RAFFAE	LLI		
ASSESSMENT:				
CRITICAL FLIGH HDW/FU	r	EDUNDANCY S B	C C	CIL ITEM
NASA [ 2 /2 IOA [ 2 /1R	] [ ] [ P	] [ ]	[ ] [ P ]	[ X ] * [ X ]
COMPARE [ /N	) [ N	] [N]	[ N ]	[ ]
RECOMMENDATIONS:	(If dif	ferent from	n NASA)	
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* CIL RETENTION :			ADEQUATE INADEQUATE	[ ]
THE IOA AGREES W	ITH THE NA	SA ANALYSIS	•	

ASSESSME ASSESSME NASA FME									DAT ELIN NI			x	]							
SUBSYSTE MDAC ID: ITEM:	M:			EMU 420 POW		DDE	E SI	ELE	CT	OF	s sw	ITC	H	(IT	EM 3	364	)			
LEAD ANA	LYS	ST:	:	G.	RAFFA	ÆΙ	LI													
ASSESSME	NT:	:																		
		EDUN	ADA			SCR	EENS					CI IT	L EM	ſ						
	r	IDN	// F C	JNC		A				В			С							
NASA IOA	[	2	/2 /2	]	[	P	]		[	F	]	[	P	]			[ [	X X	]	*
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* CIL RE												•	IA IAV	DEQ DEQ	UATE UATE	E E	[		]	
THE IOA	ANI	r (	HE	NASA	ARE	IN	I AC	GRE	EM.	ΕN	T.									

SUBSYSTEM: EMU MDAC ID: 422 ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)  LEAD ANALYST: G. RAFFAELLI  ASSESSMENT:  CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C
ASSESSMENT:  CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C
FLIGHT ITEM HDW/FUNC A B C
HDW/FUNC A B C
NASA [2/2] [] [] [X]* IOA [2/1R] [P] [P] [X]
COMPARE [ /N ] [ N ] [ N ] [ ]
RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] (ADD/DELETE)
* CIL RETENTION RATIONALE: (If applicable)  ADEQUATE [ ]  INADEQUATE [ ]
REMARKS: THE IOA AGREES WITH THE NASA ANALYSIS.

ASSESSME ASSESSME NASA FME	ENT	I		EM		ΟA									DA SELI N		[	x	]	
SUBSYSTE MDAC ID:				EM 42 PO		MOD	E SI	ELE(	CT	or	swin	rci	H	(II)	EM	36	4)			
LEAD ANA	LY	ST	:	G.	RAF	FAE	LLI													
ASSESSME	ENT	:																		
	CRITICALITY REDUNDANCY SCRI FLIGHT HDW/FUNC A B																	IL PEI	M	
	1	HDI	W/FU																	
NASA IOA	[	2 2	/2 /2	]	_											[	X X	]	*	
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SUBSYSTEM MDAC ID:	<b>:</b>			EMU 42: PO	1	MC	DE	SE	LEC	T	or	. S¹	WITC	H	(IT	EM 3	64)				
LEAD ANAI	LYS	T:		G.	RAF	FA	EL	LI													
ASSESSMEN	1T :																				
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	I		/FUI				A				В			(	3						
NASA IOA	[	2 2	/2 /1R	]		[	P	]		[ [	P	]	[	I	] P ]			[	X X	]	*
COMPARE	[		/N	]		[	N	]		[	N	]	ξ	ì	[ 1/			[		]	
RECOMMEN	DA:	ΓΙ	ons:		(If	<b>d</b> :	if	fere	ent	1	r	om	NASA	۲)							
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* CIL RE		NT:	ION	RAI	MOI	ΑL	E:	(I:	f a	Įq.	pl:	ica				TAU TAU	E E	[		]	
REMARKS:	A.C.	RF	es W	TTF	i TH	E	NA	SA Z	ANA	L	YS	IS.	•								

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-418 364-FM8				NASA DA BASELI		] X ]	
SUBSYSTEM: MDAC ID: ITEM:	EMU 418 POWER MOD	DE SEL	ECTO	R SWI	TCH (ITEM	364)		
LEAD ANALYST:	G. RAFFAE	ELLI						
ASSESSMENT:								
CRITICALI FLIGHT	TY R	EDUND	Ancy	SCRE	ENS	CI		
HDW/FUN	IC A	•	В		С	1.1	EM	
NASA [ 2 /2 IOA [ 2 /1R	] [ ] [ P	]	[ [ P	]	[ ] [ P ]	]	х ј х ј	*
COMPARE [ /N	] [ N	]	[ N	]	[ N ]	[	]	
RECOMMENDATIONS:	(If dif:	ferent	frc	m NA	SA)			
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* CIL RETENTION R	ATIONALE:	(If a	ppli	cable	e) ADEQUATI INADEQUATI		]	
REMARKS: THE IOA AGREES WI	TH THE NAS	SA ANA	T.VCT	c	THADEQUATE	ъ į	J	

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LEAD ANA	LYS	ST	:	G.	RAI	FF	AEI	LLI											
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COMPARE	[		/	]		[	N	]		[ N	3	.[	N	]		[		]	
RECOMMEN	IDA!	ΓI	ons:		(If	<b>d</b> :	if	fere	nt	fr	om 1	NASA	.)						
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SUBSYSTI MDAC ID: ITEM:				EN 42 PU		ro.	- <b>T</b>	ALK	( SW	VI:	ГСI	H (	ITE	ví 3	65)						
LEAD ANA	ALY	ST	:	G.	RA	FF	AE:	LLI													
ASSESSMI	ENT	:																			
		F	ICAL: LIGH: W/FU	r	?		RI A	EDU	NDA	M	CY B	sc	REEI	1S C	:			CI	L EM	I	
NASA IOA	[	3	/2R /2R	]		[	P P	]		[	P P	]	 	P	]			[		]	*
COMPARE	[		/	]		[		]		[		]		•	]			[		]	
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* CIL REREARKS: THE IOA														A		UATI UATI		[		]	
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	12/10/86 EMU-435 365-FM2			NASA DATA BASELINE NEW	
MDAC ID:	EMU 435 PUSH-TO-T	ALK SWI	TCH (IT	ЕМ 365)	
LEAD ANALYST:	G. RAFFAE	LLI			
ASSESSMENT:					
CRITICAL FLIGH	T		ICY SCRE	ENS C	CIL ITEM
HDW/FU	NC A	•	Д	C	
NASA [ 3 /2F IOA [ 2 /2	[ P	] [	P ] P ]	[ P ] [ F ]	[ x ] *
COMPARE [ N /N	] [	] [	]	[ N ]	[ N ]
RECOMMENDATIONS:	(If dif	ferent	from NA	SA)	
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* CIL RETENTION REMARKS:	RATIONALE:	(If ap	plicabl	e) ADEQUATE INADEQUATE	[ ]
THE IOA AGREES W	ITH THE NA	SA ANAI	LYSIS.		

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SUBSYSTE MDAC ID:				EM 43 PU	6	ro.	-T	ALK	(SW	ZI.	ľCI	H (	ITEM	3	65)						
LEAD ANA	LY	ST	:	G.	RA	FF	AE:	LLI	[												
ASSESSME	NT	:																			
		F	ICAL LIGH	T	•		R	EDU	INDA	NC	CY	SCI	REEN	s					IL PEM	ſ	
	]	HD	W/FU	NC			A				В			С							
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* CIL RE													•			UAT UAT		[		]	
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SUBSYSTEM MDAC ID: ITEM:			EMU 432 PUSH-1	ro-	TAL	k swii	гсн	Ι) Ι	TEM 3	65)		
LEAD ANA	LYST:		G. RAI	FFA	ELL	I						
ASSESSMEN	YT:											
C		CALI IGHT	TY		RED	UNDANG	CY	SCR	REENS		CIL ITE	
	HDW/				A		В		С			
NASA IOA	[ 3 /	/2R /2R	]	[	P ] P ]	[	P P	]	[ P	]	[	] * ]
COMPARE	[ /	/	]	[	]	[		]	[	]	[	1
RECOMMENI	OATIO	NS:	(If	di	ffe	rent i	fro	m N	IASA)			
	[ /	/	]	[	]	[		3	[	] (2	[ ADD/D	] ELETE)
* CIL RE	renti(	ON R	RATION	ALE	: (	If app	pli	.cab	A	DEQUATE DEQUATE		]
REMARKS:			o mun	711		DOD 3 M	ras	. 05				ים דא אאפי

THE IOA RECOGNIZES THE INCORPORATION OF THIS FAILURE MODE IN NASA FMEA 365-FM4; HOWEVER, THE IOA EFFECTS DIFFER. THE IOA BELIEVES THE VOX POSITION COULD BE LOST (IT IS NORMALLY IN OPEN POSITION) AND WOULD REQUIRE LOSS OF A REDUNDANT FUNCTION (E.G., PTT) TO CAUSE MISSION TERMINATION.

ASSESSME ASSESSME NASA FME	NT	II	ATE:	EM	/10, IU-4 55-F1	33	6									SA I ASEI		E	[	]	
SUBSYSTE MDAC ID:	M:			EM 43 PU	3	ro.	- <b>T</b>	ALK	( SV	riv	CI	i (	ITEN	1	365	5)					
LEAD ANA	LYS	T:	:	G.	RA	FF	AE:	LLI													
ASSESSME	NT:																				
1	CRI		[CAL] LIGH		•		R	EDU	NDA	MC	Y	sc	REEN	1S					CIL		
	H	IDV	V/FU	NC			A				В			(	С						
NASA IOA	[	3 3	/2R /3	]		]	P P	]		[	P P	]	[		P ] F ]				[	]	*
COMPARE	[		/N	]		[		]	•	[		]	[	. 1	N ]				[	]	
RECOMMEN	DAT	PIC	ons:		(If	d:	ifi	fer	ent	: f	ro	om :	NASA	۲)							
	[		/	]		[		]		[		]	(		]		(2	ΑD	[ D/D	ELI	ETE)
* CIL RE	ren	TI	ON I	RAT	ION	LI	Ξ:	(I	fa	pp	1 i	.cal	·	1		QUA QUA			[	]	
REMARKS: THE IOA	AGR	EE	S W	LTH	THE	1 3	IAS	SA.	ANA	LY	SI	s.	1	. 145	1DE	YUZ	LE		L	j	

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-434 365-FM5	NASA DATA: BASELINE NEW	•
MDAC ID:	EMU 434 PUSH-TO-TALK SWITCH (ITEM	365)	
LEAD ANALYST:	G. RAFFAELLI		
ASSESSMENT:			
CRITICAL: FLIGHT	ר	5 C	CIL ITEM
HDW/FUI	NC A B		
NASA [ 2 /2 IOA [ 2 /2	] [ P ] [ P ] [	<b>F</b> ]	[ X ] * [ X ]
COMPARE [ /	] [и] [и] [	N ]	[ ]
RECOMMENDATIONS:	(If different from NASA	)	
[ /	] [][][	] (AI	[ ] DD/DELETE)
* CIL RETENTION DEMARKS.	RATIONALE: (If applicable)	ADEQUATE NADEQUATE	[ ]

THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSM ASSESSM NASA FM	ENT	I		EM	2/10/ MU-42 55-FI	29									ASA BASI	ELI	NE	: [	x	]	
SUBSYSTI MDAC ID ITEM:				EM 42 PU		го.	- <b>T</b> .	ALK	SW	ΙΤ	СН	(1	TEM	3	65)						
LEAD AND	ALY	ST	:	G.	RAI	FF	AE:	LLI													
ASSESSMI	ENT	:																			
		F	ICAL LIGH W/FU	T			RI A	EDUI	NDA		Y B	SCR	EEN	s c				CI IT			
Nasa			•					,				•		_	_			_		_	
IOA	[	3	/2R /2R	]		[	P	]		[ ]	P	]	[	P	]			[		]	*
COMPARE	[		/	]		[		]		[		]	[		]			[		]	
RECOMMEN	1DA!	ri	ons:		(If	di	if	fere	ent	fı	0	m N	ASA)	)							
	[		/	]		[		]		[		]	[		]	(	AD	[ D/1	DE:	] LE	TE)
* CIL RERESTRE THE IOA													-		DEQU DEQU			[	:	]	
THE TOR	7.2TAT	•	ا بندید	יבטי	v vv	æ	TL	A W	3KT)	CILL	M.	L.									

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-430A		NASA DATA: BASELINE NEW	[ x ]
MDAC ID:	EMU 430 PUSH-TO-TALK SW	ITCH (ITEM	365)	
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
	ITY REDUNDA	NCY SCREENS	S	CIL ITEM
FLIGH HDW/FU	NC A	В	С	<b></b>
NASA [ 3 /3 IOA [ 3 /2R	] [ ] ] ]	[ ] [ [ F ] [	P ]	[
COMPARE [ /N	] [ N ]	[и]	N ]	[и]
RECOMMENDATIONS:	(If different	from NASA	)	
[ 3 /2R	] [ P ]	[ P ] [	P ]	[ ] DD/DELETE)
* CIL RETENTION	RATIONALE: (If a	pplicable) I	ADEQUATE NADEQUATE	[ ]
REMARKS: THE IOA RECOMMEN WITH LOSS OF RED SCREEN B SHOULD	UNDANCY. FURTHI	ER REVIEW A	LSO INDICA	res the

REPORT DATE 02/25/88 C-611

ON THE IMPACTED LINE SHOULD REFLECT THE WORST CASE FOR THE FAILURE ON ALL OF THE OUTPUTS (PTT MOMENTARY, VOX, OR VOX DISABLE). ALSO, THE IOA NOW RECOMMENDS PASSAGE OF SCREEN B.

ASSESSMI ASSESSMI NASA FMI	ENT	ID:	12/1 EMU- 365-	-430				N	IASA D BASEL		[ [ X	]	
SUBSYSTI MDAC ID: ITEM:			EMU 430 PUSH	I-TO-T.	ALK	SWITC	H (:	ІТЕМ З	65)				
LEAD ANA	ALYS'	T:	G. F	RAFFAE:	LLI								
ASSESSME	ENT:												
	1	FLIGH				NDANCY	SCI	REENS			IL TE		
	H	DW/FU	INC	A		В		С					
NASA IOA	[ :	3 /2R 3 /2R	]	[ P [ P	]	[ P [ F	]	[ P	]	]	x	]	*
COMPARE	[	/	]	[	]	[ N	]	[	]	(	N	]	
RECOMMEN	DAT:	cons:	(I	f diff	ere	ent fro	om N	IASA)					
	[	/	]	[	]	[	)	C	]	[ADD	/DI		TE)
* CIL RE	TENT	NOI	RATIO	NALE:	(If	appli	cab	Al	DEQUAT DEQUAT	re (		]	
REMARKS: THE IOA AGREEMEN	AGRE T ON	EES W	ITH T	HE NAS INDER	A S	CREEN	В А гат.v	SSIGNI	MENT A	ND I	s 1	IN	

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/00	NASA DATA: BASELINE NEW	•
MDAC ID:	EMU 431 PUSH-TO-TALK SWITCH (ITEM	365)	
LEAD ANALYST:	G. RAFFAELLI		
ASSESSMENT:			
CRITICAL: FLIGH		5	CIL
HDW/FU		С	<u> </u>
NASA [ 2 /2 IOA [ 3 /2R	] [ ] [ ] [ ] [ P ] [	P ]	[ X ] *
COMPARE [ N /N	] [N] [N] [	N ]	[и]
RECOMMENDATIONS:	(If different from NASA)	)	
[ 3 /2R	] [P] [P] [	P ] (AI	[ D ] DD/DELETE)
* CIL RETENTION	RATIONALE: (If applicable)	ADEQUATE NADEQUATE	
RECOMMENDED DUE	NASA ARE NOT IN AGREEMENT. TO CAPABILITY OF CREWPERSOI ICATIONS POSITION (E.G. VO	N TO SWITCH	RITICALITY IS

ASSESSMI ASSESSMI NASA FMI	ENT	II		EM	/10/8 IU-444 6-FM1									ASA BASE	LIN			]	
SUBSYSTI MDAC ID: ITEM:				EM 44 FA		TC	н (	ITEI	M	36	6)								
LEAD ANA	ALYS	ST:	3	G.	RAFF	'AE	LLI	•											
ASSESSME	ENT:	:																	
		FI	LIGI	T				NDAI			SCR	EEN				CI II	L EM	I	
	ŀ	IDW	//FU	JNC		A				В			С						
NASA IOA	] [	3	/3 /3	]	[ ]	P	]	<u>[</u>	- : ;	P	) ]	[ [	P	]		[		]	*
COMPARE	[		/	]	[	N	]	[	. 1	N	]	[	N	]		[		]	
RECOMMEN	DAT	'IO	NS:		(If d	if	fer	ent	f	ro	n N.	ASA)	١						
	[		/	]	[		]	[			)	[		]	(A	[ .DD/	DE:	] LE	TE)
* CIL RE	TEN	TI	ON	RAT	IONAL	Ε:	(I:	f ap	[q	lio	cab:	·		EQUA EQUA		[		]	
THE IOA	AND	<b>T</b>	HE	NAS!	A ARE	IN	I AC	GREE	ME	ENE	۲.								

	12/10/86 EMU-437 366-FM2				NASA DATA BASELINE NEW		
<del></del>	EMU 437 FAN SWITC	H (ITI	EM 36	i6)			
LEAD ANALYST:	G. RAFFAE	LLI					
ASSESSMENT:							
CRITICAL FLIGH		EDUND?	ANCY	SCREE	ns	CIL ITEM	
HDW/FU			В		С		
NASA [ 2 /1R IOA [ 2 /1R	] [ P	) ]	[ P	]	[ P ] [ P ]	[ X ] * [ X ]	
COMPARE [ /	] [	]	[	]	[ ]	[ ]	
RECOMMENDATIONS:	(If dif	ferent	fro	om NAS	A)		
[ /	] [	]	[	3	[ ] (2	[ ] ADD/DELETE	:)
* CIL RETENTION	RATIONALE:	(If a	appli		ADEQUATE		
REMARKS:	NASA ARE T	N AGRI	EEMEN				

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-443 366-FM2	1		[ x ]
SUBSYSTEM: MDAC ID: ITEM:	EMU 443 FAN SWITCH	(ITEM 366)		
LEAD ANALYST:	G. RAFFAELLI	I		
ASSESSMENT:				
CRITICAL: FLIGHT		UNDANCY SCREENS		CIL
HDW/FUI	IC A	В		
NASA [ 2 /1R IOA [ 2 /1R	] [ P ] ] [ P ]	[ P ] [ I	? ] ? ]	[ X ] * [ X ]
COMPARE [ /	] [ ]	[ N ]	1	[ ]
RECOMMENDATIONS:	(If differ	rent from NASA)		
[ /	] [ ]	[ ] [	•	[ ] D/DELETE)
* CIL RETENTION F	RATIONALE: (I	A	DEQUATE	[ ]
REMARKS: THE IOA ACCEPTS T RESPOND AND IS IN	THE NASA SCRE AGREEMENT W	EEN B ASSIGNMENT WITH THE REMAIND	DUE TO C	APABILITY TO ANALYSIS.

ASSESSMENT DATE ASSESSMENT ID: NASA FMEA #:	EMU-441			NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	EMU 441 FAN SWI	TCH (ITE	M 366)		
LEAD ANALYST:	G. RAFF	AELLI			
ASSESSMENT:					
CRITICA FLIG	LITY	REDUNDA	NCY SCREI	ens	CIL ITEM
HDW/F	UNC	A	В	С	
NASA [ 2 /2 IOA [ 2 /2	] [	p ]	[ ] [ P ]	[ P]	[ X ] * [ X ]
COMPARE [ /	] [	и ј	[и]	[ N ]	[ ]
RECOMMENDATIONS	: (If d	ifferent	from NAS	5A)	
[ 2 /1	R ] [	P ]	[ F ]	[ P ] (A	[ ] DD/DELETE)
* CIL RETENTION	RATIONAL	E: (If a	pplicable	e) ADEQUATE INADEQUATE	
REMARKS: THE IOA AND THE INDICATES THAT AN ITEM 172 FAI LOSS OF LIFE (F THEREFORE NOW F ASSIGNMENT ALSO	SUCH A FA LURE, AND EFERENCE ECOMMENDS	ILURE WH AN SOP NASA FME A 2/1R	EN COMBII FAILURE ( A 366-FM) CRITICAL	NED WITH A H COULD RESULT 6). THE IOA ITY. (NOTE:	ARD CHARGE, IN POSSIBLE THIS

THE EMU.)

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-438 366-FM4	NASA DATA BASELINE NEW	
	EMU 438 FAN SWITCH (ITEM 366)		
LEAD ANALYST:	G. RAFFAELLI		
ASSESSMENT:			
CRITICAL: FLIGHT		ENS	CIL ITEM
HDW/FU	NC A B	С	1111
NASA [ 2 /1R IOA [ 2 /1R	] [P] [P]	[ P ] [ P ]	[ X ] *
COMPARE [ /	] [ ] [ ]	[ ]	[ ]
RECOMMENDATIONS:	(If different from NA	SA)	
[ /	] [ ] [ ]	[ ] (A)	[ ] DD/DELETE)
REMARKS:	RATIONALE: (If applicable with the state of	e) ADEQUATE INADEQUATE	[ ]

ASSES ASSES NASA	SMEN	$\mathbf{T}$	ID	:	EM	06/8 U-70 6-FM	1}	ζ.									DAT LII NI		[		]	
SUBSY MDAC ITEM:		:			EM 70 FA	1	נוז	'CH	I (IT	ΈΝ	<b>4</b> 3	86	6)									
LEAD	ANAL	ΥS	T:		G.	RAF	'F <i>F</i>	ÆΙ	LI													
ASSES	SMEN	T:																				
	C		FL	CAL:	ľ			RE A	DUND	AI	NCY E		SCREE	NS	c				CI	L EN	1	
373	C3			•					7				7	r	_	1			r	Y	1	*
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COMPA	RE	[		/N	]		[		]	-	[		]	[		]			[		]	
RECOM	MEND	ΆT	ΊO	NS:		(If	đi	lff	eren	it	fı	:0	m NAS	A)								
		[		/	]		[		]	1	[		]	[		]	i	(AI		'DI		ETE)
* CIL	RET	EN	TI	ON I	RAI	'ION <i>A</i>	LI	Ξ:	(If	aj	pp]	li	cable				JATI JATI				]	
REMAR	KS:																		<u>-</u> .		-	

THE IOA AGREES WITH THE NASA ANALYSIS AND SCENARIO.

ASSESSME ASSESSME NASA FME	NT	I		EM	06/8 U-7 6-FI	02	X									DA ELI N		[	x	]	
SUBSYSTE MDAC ID:	M:			EM 70 FA	_	WI	rci	н (	(ITE	EΜ	3	56)									
LEAD ANA	LY	ST	:	G.	RA	FF	AE:	LLI	:												
ASSESSME	NT	:																			
		F	ICAL LIGH	r				EDU	INDA	N(		SCE	REEN						IL PEM	ſ	
	,	ועמ	W/FU	NC			A				В			С							
NASA IOA	[	3 2	/1R /2	]		[	P P	]		]	F	]	[ [	P	].			[	X X	]	*
COMPARE	[	N	/N	]		[		]		[	N	]	[	N	]			[		]	
RECOMMEN	DA!	ric	ons:		(If	d:	if:	fer	ent	: 1	fro	om N	IASA	)							
	[		/	]		[		]		[		]	[		]		(AI	[ DD/	'DE	] LF	ETE)
* CIL RE REMARKS: THE IOA													•		_	UAT UAT		[		]	
			JJ 11.		****		1476	<i>,</i>	<b>LM1U</b>	. ب		. U .									

ASSESSMEN ASSESSMEN NASA FMEN	I Tr		EMU	-44	5	;									DA' ELII N		: [ [ X	]	
SUBSYSTEM MDAC ID:	M:		EMU 445 FEE	;	TE	R	VAI	LVE	SV	rIV	сн	נו)	CEN	13	67)				
LEAD ANA	LYST	:	G.	RAF	FA	ΕI	LI												
ASSESSME	NT:																		
•		ICAL				RE	EDUN	IDAI	NC	2 5	CRE	ENS	5				CII		
		W/FUI				A			I	3			С						
NASA IOA	[ 2 [ 2	/2 /1R	]		]	P	]		[ ]	? ]		[	P	]			[ X [ X	: ] : ]	*
COMPARE	[	/N	]		[	N	]		[ ]	1		[	N	]			[	]	
RECOMMEN	DATI	ons:	(	Ίf	đi	fí	fere	ent	f	ror	n NA	SA)	)						
	Ţ	/	]		[		]		[			[		]		(Al	[ DD/E	) EI	ETE)
* CIL RE	TENT	'ION	RATI	ONA	LI	€:	(Ii	f a	pp:	lio	cabl				UAT UAT		[	]	
REMARKS: THE IOA	AGRE	ES W	ITH	THE	1	IA!	SA A	ANA	LY	SIS	s.								

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-450 367-FM2		NASA DATA BASELINI NEV	
SUBSYSTEM: MDAC ID: ITEM:	EMU 450 FEEDWATER VAI	VE SWITCH	(ITEM 367)	
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
CRITICAL FLIGH HDW/FU	r	DANCY SCR	EENS C	CIL ITEM
NASA [ 2 /2 IOA [ 2 /2	] [ ] ]	[ ] [ F ]	[ ] [ P ]	[ X ] *
COMPARE [ /	] [ N ]	[ 11 ]	[ N ]	[ ]
RECOMMENDATIONS:	(If differe	nt from N	ASA)	
. [ /	] [ ]	[ ]	[ ] (A)	[ ] DD/DELETE)
* CIL RETENTION I REMARKS: THE IOA AND THE I			le) ADEQUATE INADEQUATE	[ ]

ASSESSME NASA FME	NT ID:	EMU-			NASA DA BASELI N	<del>-</del>
SUBSYSTE MDAC ID:		449	WATER VAI	LVE SWITCH	I (ITEM 367)	
LEAD ANA	LYST:	G. R	AFFAELLI			
ASSESSME	NT:					
	CRITIC.	ALITY GHT	REDUI	NDANCY SCR	REENS	CIL ITEM
	HDW/	FUNC	A	В	С	1111
NASA IOA	[ 2 /	2 ] 1R ]	[ ] [ P ]	[ ] [ P ]	[ ] [ P ]	[ X ] * [ X ]
COMPARE	[ /1	n j	[ N ]	[и]	[ N ]	[ ]
RECOMMEN	DATIONS	s: (I	f differe	ent from N	ASA)	
	[ /	]	[ ]	[ ]	[ ]	[ ] (ADD/DELETE)
* CIL RE	TENTIO	N RATIO	NALE: (If	applicab	•	
REMARKS:					ADEQUAT: INADEQUAT:	E [ ] E [ ]
UPON FUR	THER RI	EVIEW, S	THE IOA S	CENARIO W		E CREW ERROR A THEREFORE

AGREES WITH THE NASA FINDINGS.

ASSESSMEN ASSESSMEN NASA FME	I TV		12/10/ EMU-44 367-FM	16					A DATA: SELINE NEW	[	[	
SUBSYSTEM MDAC ID: ITEM:	M:		EMU 446 FEEDWA	ATEF	VAL	VE SWI	rch (I	TEM	367)			
LEAD ANA	LYST	:	G. RAI	FFAE	LLI							
ASSESSME	NT:											
•		ICAL	ITY	F	REDUN	DANCY :	SCREEN	is		CII		
			NC	P		В		С				
NASA IOA	[ 2	/2 /2	]	[ [	)	[ [ F	] [	P ]		[ ]	K ] K ]	*
COMPARE	[	/	]	[ ]	1]	[ N	] [	и ]		[	]	
RECOMMEN	DATI	ons:	(If	dif	fere	nt from	m NASA	۷)				
	ĺ	/	]	[	]	[	] [	]	(A		DELE	ETE)
* CIL RE	TENT	'ION	RATION	ALE:	(If	appli		ADE	QUATE QUATE		]	
REMARKS:	AND	THE	NASA A	RE I	IN AG	REEMEN	т.					

ASSESSMEN ASSESSMEN NASA FME	NT ]	ID:	EM		•							ì	IASA BASE		[		]	
SUBSYSTEM MDAC ID:	M:		EM 44 FE		ER	VAI	LVE	s	WI	TC	H (I	TI	EM 36	7)				
LEAD ANA	LYS	r:	G.	RAFFA	ŒΙ	LI												
ASSESSME	NT:																	
		rical			RI	EDUN	IADI	1C	Y	sc	REEN	IS				IL PEN	4	
	_	FLIGH DW/FU			A				В			(	2 .		-		•	
NASA IOA	[ :	2 /2 2 /11	]	[	P	]		[	F	]	) (	: 1	] P ]		[	X	]	*
COMPARE	[	/N	]	ι	N	]		[	N	]	[	. 1	4 ]		[		]	
RECOMMEN	DAT	IONS	•	(If di	if	fere	ent	f	ro	om.	NAS <i>I</i>	¥)						
	[	2 /1	R ]	[	P	3		[	P	]	(		P ]	(A	] ,dd.		] ELI	ETE)
* CIL RE	TEN'	TION	RAT	IONAL	Ε:	<b>(I</b> :	f a	pŗ	11	ica			ADEQU ADEQU				]	
REMARKS: THE IOA CIRCUIT	REC FRO	OMME M OP	NDS EN T	A 2/11	R (	CRIT	TIC.	AI •-	LIT	ry rhi	TO A	AD AN	RESU	POS	N.	ro:	SS	OF.

COOLING AND CONDENSATE REMOVAL; THEREBY, REQUIRING SOP USAGE. THE CONCURRENT LOSS OF THE SOP CAN RESULT IN LOSS OF LIFE. THE IOA ALSO RECOMMENDS MODIFYING THE FAILURE MODE DESCRIPTION. THE SCREEN B HAS BEEN FURTHER REVIEWED AND IS NOW RECOMMENDED TO BE PASSED.

ASSESSMEN ASSESSMEN NASA FMEA	IT ID:	,,			NASA DA BASELI N	
SUBSYSTEM MDAC ID: ITEM:	= -	EMU 448 FEEDWATE	R VAL	VE SWITCE	H (ITEM 367)	
LEAD ANAI	LYST:	G. RAFFA	ELLI			
ASSESSMEN	T:					
c	RITICAL: FLIGHT HDW/FU			DANCY SCI B	REENS	CIL ITEM
VI	•			_		
NASA IOA	[ 2 /2	] [1	<b>)</b>	[ ] [P]	[ ] [P]	[ X ] * [ X ]
COMPARE	[ /	] [ 1	<b>7</b> ]	[ N ]	[ N ]	[ ]
RECOMMEND	ATIONS:	(If di	fere	nt from N	IASA)	
	[ /	] [	]	[ ]		[ ] (ADD/DELETE)
* CIL RET					ADEQUAT:	
THE IOA A	ND THE V	INDA ANALY	SIS	AKE IN AG	REEMENT.	

ASSESSME ASSESSME NASA FME	NT	II	<b>):</b>	EM	/10/ U-45 8-FM	1	5									DA ELI N		[		]	
SUBSYSTE MDAC ID: ITEM:				EM 45 CA	1	N	Al	1D 1	WAR	NI	:NG	; si	WITC	H	(IT	EM	368	3)			
LEAD ANA	LYS	ST:	:	G.	RAF	F	AE]	LLI													
ASSESSME	NT:	:																			
		FI	CAL LIGH	T				EDUI	NDA	NC		SCI	REEN	s c				CI II	L	1	
	1	1DY	/FU	NC			A				В			C							
NASA IOA	[ [	2 2	/2 /2	]		]	P	]		]	P	]	]	N.	] A]			[	X X	]	*
COMPARE	[		/	]		[	N	]		[	N	]	[	N	]			[		]	
RECOMMEN	DAI	ric	ons:		(If	đ:	if:	fer	ent	f	ro	om l	NASA	)							
	[		/	]		[		]		[		]	[		]		(Al	[ DD/		] ELE	ETE)
* CIL RE	TE	nt]	ION	RAT	IONA	L	Ε:	(I:	f a	pp	)1i	cal				UAT UAT				]	
THE IOA	ANI	כ כ	CHE	NAS.	A AF	₹E	Il	A V	GRE	EM	Œ	IT.									

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMTI-453			NASA DATA BASELINE NEW	
	EMU 453 CAUTION	AND WAR	NING SWI	TCH (ITEM 368	3)
LEAD ANALYST:	G. RAFF	AELLI			
ASSESSMENT:					
CRITICAL: FLIGHT		REDUNDA	NCY SCRE	ENS	CIL ITEM
	NC	A	В	C .	TIEM
NASA [ 2 /2 IOA [ 2 /1R	] [	P ]	[ ] [P]	[ ] [ P ]	[ X ] * [ X ]
COMPARE [ /N	] [	N ]	[и]	[ N ]	[ ]
RECOMMENDATIONS:	(If di	fferent	from NA	SA)	
[ 2 /1R	] [	Pj	[ F ]	[ P ] (AI	[ ] DD/DELETE)
* CIL RETENTION F	RATIONALE	: (If a	pplicable	•	
				ADEQUATE INADEQUATE	
REMARKS: THE IOA RECOMMENI CONVERTER SHUTDOW COMBINED WITH A C LIFE. ALSO, UPON OF	N RESULT CO2 CONTR	ING IN I OL FUNC	MISSION T TION FAIR	TERMINATION A LURE, POSSIBI	ND, IF E LOSS OF

SCREEN B DUE TO THE FAILURE BEING NOT READILY DETECTABLE.

ASSESSMEI ASSESSMEI NASA FME	NT I	D:	12/1 EMU- 368-	-452								SA DA ASEL: 1			] [ }		
SUBSYSTEM MDAC ID:	M:		EMU 452 CAUT	rion	ANI	O W	ARN	IIN	G SI	WITCH	H (	ITEM	36	в)			
LEAD ANA	LYST	:	G. F	RAFFA	ELI	Ί											
ASSESSME	NT:																
•		ICAL			REI	OUN	DAI	1CY	SCI	REENS	5			CII			
	_		NC		A			В			С						
NASA IOA	[ 2	/2	]	]	P :	] ]	1	[ [ P	]	[ [	NA	]		[ ]	K ]	*	
COMPARE	[	/	3	[	N ]	]	(	[ .N	]	[	N	]		[	]	Ì	
RECOMMEN	DATI	ONS:	(:	If di	ffe	ere	nt	fr	om 1	NASA	)						
	[	/	]	[	•	]		[	]	[		]	(A	[ DD/1	DEI	 LET	E)
* CIL RE	TENT	NOI	RATI(	ONALE	2:	(If	aj	ppl	ica	ble) I	AD NAC	EQUA EQUA	TE TE	[	]	) }	
REMARKS: THE IOA	AND	THE	NASA	ARE	IN	AG	RE	EME	NT.								

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-454			NASA DATA BASELINE NEW	-
SUBSYSTEM: MDAC ID: ITEM:	EMU 454 CAUTION A	AND WARNI	NG SWITCH	I (ITEM 36	8)
LEAD ANALYST:	G. RAFFA	ELLI			
ASSESSMENT:					
FLIGH	_		Y SCREENS		CIL ITEM
HDW/FUI	NC A	<b>A</b> :	В	С	
NASA [ 2 /1R IOA [ 2 /1R	] [ F	P ] [ ] P ] [ ]	F ] [ P ] [	P ] P ]	[ X ] * [ X ]
COMPARE [ /	] [	] [1	и ] [	1	[ ]
RECOMMENDATIONS:	(If dif	fferent f	rom NASA)		
[ /	] [	J [	] [		[ ] DD/DELETE)
* CIL RETENTION F	RATIONALE:	(If app		ADEQUATE ADEQUATE	[ ]
REMARKS: THE IOA AGREES WI ARE IN AGREEMENT.	TH THE NA	ASA SCREEN			•

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	8/06/87 EMU-7372 368-FM5	7X BASELINE [ ]									
SUBSYSTEM: MDAC ID: ITEM:	EMU 737 CAUTION	ANI	D WARN	ING	SWIT	СН	(ITEM 36	8)			
LEAD ANALYST:	G. RAFF	AEL!	LI								
ASSESSMENT:											
CRITICAL FLIGH		REDUNDANCY SCREENS									
HDW/FU		A		В			С				
NASA [ 2 /2 IOA [ 2 /2	] [	P	] [ ] [	P	]	[ [	P ]	[ ]	X X	]	k
COMPARE [ /	] [	N	] [	N	]	[	N ]	[		]	
RECOMMENDATIONS:	(If d	iff	erent	fro	om NAS	SA)	)				
[ /	] [		] [	Ĺ	]	[	] (A	[ .DD/	DE	]	TE)
* CIL RETENTION	RATIONAL	E:	(If ag	ppl:	icable		ADEQUATE NADEQUATE			]	
REMARKS: THE IOA AND THE	NASA ARE	IN	AGRE	EME	NT.						

ASSESSMENT DAT ASSESSMENT ID: NASA FMEA #:	E: 12/10/ EMU-45 368-FN	55			ASA DATA BASELINE NEW	[	) x ]	
SUBSYSTEM: MDAC ID: ITEM:	EMU 455 CAUTIO	ON AND W	NARNING :	SWITCH (	ITEM 36	8)		
LEAD ANALYST:	G. RAF	FAELLI						
ASSESSMENT:								
CRITIC FLIC	ALITY GHT	REDUN	DANCY SO	CREENS		CII		
HDW/	FUNC	A	В	С		<b>T</b> 1 1	714	
NASA [ 2 /: IOA [ 2 /:	2 ] 2 ]	[ ]	[ ]	[ [	]	[ ]	к ј к ј	*
COMPARE [ /	]	[ ]	[ . ]	[	]	[	)	
RECOMMENDATIONS	3: (If	differe	nt from	NASA)				
[ /	]	[ ]	[ ]	[		[ DD/E	] DELE	TE)
* CIL RETENTION REMARKS: THE IOA AND THE				•	EQUATE EQUATE	[	]	

ASSESSMEN ASSESSMEN NASA FME	I TN		12/10 EMU-4 368-F	-456 BASELINE [ ]									
SUBSYSTEM MDAC ID:	M:		EMU 456 CAUTI	ON A	ND W	ARNIN	G SW	ITCH	(ITE	M 368	3)		
LEAD ANA	LYST	<b>':</b>	G. RA	FFAE	LLI								
ASSESSME	NT:												
		ICAL LIGH	ITY	F	EDUN	DANCY	SCR	EENS			CIL		
	_	W/FU		P	<b>\</b>	B	3	C	?				
NASA IOA	[ 2	2 /2	]	[ [	]	[	]	[	]		K ]	[ ]	*
COMPARE	[	/	]	[	]	E	]	[	]		[	]	
RECOMMEN	DAT]	cons:	(I:	f di	ffere	nt fr	com N	ASA)					
	[	/	]	[	3	[	]	[	]	(A	[ DD/I		ETE)
* CIL RE	TEN	rion	RATIO	NALE	: (If	appl	licab	4	ADEQU ADEQU			]	
REMARKS:	AND	THE	NASA .	ARE :	IN AG	REEMI	ENT.						

ASSESSM ASSESSM NASA FM	ENT	' I	D:	EM	'06/ IU-7 8-FI	03										A DAT SELIN NI		х	]	
SUBSYST MDAC ID ITEM:				EM 70 CA	3	ИС	A	ND	WAF	SN:	IN	G S	SWIT	СН	(II	PEM 3	(68			
LEAD AN	ALY	ST	:	G.	RAI	FF	ΑE	LLI												
ASSESSMI	ENT	:																		
		F	LIG	LITY HT UNC			R:		NDA	N	CY B	sc	CREEN		2			IL TEI		
NASA			Ť							_			_							
IOA	[	2	/2	]		ĺ	P	]		[	P	]	[	I	· ]		[ [	X X	]	*
COMPARE	[		/	]		[	N	]		[	N	]	[	N	1]		[		]	
RECOMMEN	IDA'I	CIC	SNC	:	(If	di	fí	fer	ent	f	rc	om .	NASA	.)						
	[		/	]		[		]		[		]	[		]	(2	[ ADD/	'DF	] :LF	ETE)
* CIL RE																UATE UATE			]	
THE IOA	AND	) T	'HE	NASA	AR:	E	IN	AC	GREI	EM	EN	T.								

ASSESSME ASSESSME NASA FME	NT I	D:	8/06, EMU-1 384-1	739X									DATA: ELINE NEW	[	]	
SUBSYSTEM MDAC ID:	M:		EMU 739 DCM	rmg	(II)	EM	384	1)								
LEAD ANA	LYST	:	G. R	AFFA	ELI	Ί										
ASSESSME	NT:															
•	CRIT	ICAL LIGH			REI	OUND	ANC	CY	SCRI	EENS	;			CIL		
		W/FU			A			В			С					
NASA IOA	[ 3 [ 3	/3 /3	]	]	P ]		[	F	]	]	P	]		[	]	*
COMPARE	[	/	]	[	N ]	}	[	N	]	[	N	]		[	]	
RECOMMEN	DATI	ons:	(I:	f di	ffe	eren	t i	fro	om NA	ASA)						
	[	/	]	[	]		[		]	[		]	(Al	[ DD/E	) ELE	ETE)
* CIL RE	TENT	ION	RATIO	NALE	: (	(If	apı	<b>)</b> 1:	icab]	-			JATE JATE		]	
THE IOA	AND	THE	NASA Z	ARE	IN	AGR	EE	MEI	T.							

ASSESSMENT ASSESSMENT NASA FMEA	r ID:	12/10/8 EMU-388 385-FM	3				1	NASA DAT BASELIN NE		]
SUBSYSTEM: MDAC ID: ITEM:		EMU 388 HARD UI	PPEI	R TORS	<b>50 (</b> 1	HUT) :	INTI	ERFACE (	ITEM	385)
LEAD ANALY	YST:	G. RAFI	FAEI	LLI						
ASSESSMENT	r:									
CI	RITICAL: FLIGH		RI	EDUNDA	ANCY	SCRE	ENS		CIL	
	HDW/FU	NC	A		В		(	C		
NASA (	2 /1R 2 /1R	] [	P	]	[ P	]	[ ] [ ]	? ] ? ]	( X )	*
COMPARE [	. /	] [	•	]	[	]	[	]	[	]
RECOMMENDA	ATIONS:	(If d	liff	ferent	fro	om NAS	SA)			
[	. /	] [	•	]	[	]	[		[ ADD/D	] ELETE)
* CIL RETERMENT * CIL RETERMEN							A	ADEQUATE ADEQUATE		]
TITE TON DI	,	AUCH UVE	, TL	INUL I	للبللالندن	17.				

	EMU-389 385-FM2				TA: NE [ ] EW [ X ]
	EMU 389 HARD UP	PER TOR	SO (HUT)	INTERFACE	(ITEM 385)
LEAD ANALYST:	G. RAFF	AELLI			
ASSESSMENT:					
CRITICA FLIG		REDUND	ANCY SCR	EENS	CIL ITEM
HDW/F		A	В	С	11211
NASA [ 2 /1 IOA [ 2 /1	R ] [ R ] [	P ] P ]	[ P ] [ P ]	[ P ] [ P ]	[ X ] * [ X ]
COMPARE [ /	] [	3	[ ]	[ ]	[ ]
RECOMMENDATIONS	: (If d	ifferen	t from N	ASA)	
[ /	] [	]	[ ]	[ ] .	[ ] (ADD/DELETE)
* CIL RETENTION	RATIONAL	E: (If	applicab	le) ADEQUAT INADEQUAT	
REMARKS: THE IOA AND THE	NASA ARE	IN AGR	EEMENT.		

ASSESSME ASSESSME NASA FME	TN	II		E	2/10 MU-3 85-F	90										A DA		[	x	]	
SUBSYSTE MDAC ID: ITEM:				E: 3 H.	90	UP	PE:	R T	ors	80	(HU	T) I	N'.	re:	RFA	CE	(I	TE:	MI :	38:	5)
LEAD ANA	LYS	ST	:	G	. RA	FF.	AE:	LLI													
ASSESSME	NT:	:																			
		FI	LIGI	LIT HT JNC					NDA			CREE	NS						IL PEN	M	
	1.	ייענו	1) F	JINC			A			J	В			С							
NASA IOA	[	2	/1F /1F	R ]		]	P P	]		[ ]	P ]		[ [	P P	]			[	X X	]	*
COMPARE	[		/	]		[		]		[	)		[		]			[		]	
RECOMMEN	DAT	'IC	NS:	:	(If	d:	ifí	fere	ent	fı	com	NAS.	A)								
	[		/	]		[		]		[	]		(		]		(Al		'DE		ETE)
* CIL RE	TEN	TI	ON	RAT	CION	ALI	Ξ:	(If	f a	pp]	.ic					UAT UAT		[		]	
REMARKS: THE IOA 2 389).	AND	Т	HE	NAS	SA AI	RE	IN	I AG	GRE	EME	ENT				_			•		'C	ID

ASSESSME ASSESSME NASA FME	NT I	D:	8/06/ EMU-7 385-1	738X					ASA DA BASELI N		-	
SUBSYSTE MDAC ID: ITEM:	M:		EMU 738 SUIT	PRES	SSURI	E GAGE	(II)	YEM 311	L)			
LEAD ANA	LYST	:	G. R	AFFAI	ELLI							
ASSESSME	NT:											
		ICAL LIGH		3	REDUN	NDANCY	SCR	REENS		CI	L	
	HD	W/FU	NC	1	A	В		С				
NASA IOA	[ 3 [ 3	/3 /3	]	[ ]	] P ]	[ [ P	]	[ [ P	]	[ [	]	*
COMPARE	[	/	3	[ ]	N ]	[ N	]	[ N		[	]	
RECOMMEN	DATI	ons:	(I	f di:	ffere	ent fr	om N	IASA)				
	[	/	]	[	]	[	]	[	]	(ADD/	DEL	ETE)
* CIL RE	TENT	ION	RATIO	NALE	: (I1	f appl	icak		DEQUAT DEQUAT	'E [	]	
REMARKS: THE IOA	AND	THE	NASA A	ARE :	IN A	GREEME	NT.					

ASSESSME ASSESSME NASA FME	NΤ	I		EM	U-4	74	6									DATA ELINE NEW		x	]	
SUBSYSTEM MDAC ID:	M:			EM 47 DC	4	LE(	CT:	RONI	ICS	(	IJ	rem	350	)						
LEAD ANA	LYS	ST	:	G.	RA	FF	AE:	LLI												
ASSESSME	NT:	;																		
•		F	ICAL LIGH W/FU	r			RI A	EDUN	ADA		Y	SCI	REENS	s c			CI:	_		
	1.		M/ 1 01	10			A				D			C						
NASA IOA	[	2 3	/2 /2R	]		[	P	]		[	P	]	[	P	]		[ ]	X	] * ]	
COMPARE	[	N	/N	]		[	N	]		[	N	]	[	N	]		[ ]	N	]	
RECOMMENI	ľAC	'IC	ons:		(If	d:	if	fere	ent	f	rc	m N	IASA)	)						
	[		/	]		[		]		[		]	[		]	(A	[ DD/I	DΕ	] LETI	歪)
* CIL RET													-			ATE ATE	[		]	
THE IOA A	\GR	E	es Wi	[TH	THE	1	SAV	SA A	LNA!	LY	SI	S.								

ASSESSMENT ASSESSMENT NASA FMEA	ID:	12/10/8 EMU-473 385-FMS	3					ASA DATA: BASELINE NEW	[	]
SUBSYSTEM: MDAC ID: ITEM:		EMU 473 DCM ELI	ECTR	onics	ri)	PEM 35	0)			
LEAD ANALYS	ST:	G. RAF	FAEL	LI						
ASSESSMENT	:									
	TICAL	נ		DUNDA	NCY B	SCREE	NS C		CIL ITEN	1
1	HDW/FU	NC	A		D		C			
NASA [ ] AOI	3 /3 3 /2R	]	[ [ P	]	[ [ P	]	[ [ P	]	[	] <b>*</b>
COMPARE [	/N	].	[ N	1.	[ N	]	[ N	]	[	]
RECOMMENDA'	TIONS:	(If	diff	erent	fro	om NAS	A)			
[	2 /2	]	[	]	[	]	[	] (A	[ A DD/DI	] ELETE)
* CIL RETE	NTION 1	RATIONA	LE:	(If a	ppli	icable	A	DEQUATE DEQUATE		]
REMARKS:	CDOIN	n witt	DECT	TM TY	T EV	TECCT	7TP (	ת ידימים מסוז	ו שגם	FROM

A SHORT TO GROUND WILL RESULT IN EXCESSIVE CURRENT DRAW FROM VEHICLE POWER UNTIL FINALLY LOST. THEREFORE, THE IOA RECOMMENDS A 2/2 CRITICALITY TO REFLECT MISSION IMPACTS, AND INCLUSION IN THE CIL FOR THIS FAILURE MODE. ADDITIONALLY, THE IOA RECOMMENDS MODIFICATION OF THIS FAILURE MODE TO SHORTS TO GROUND.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-323	ASA DATA: BASELINE [ ] NEW [ X ]
MDAC ID:	EMU 323 COMMON MULTIPLE CONNECTOR (	ITEM 410)
LEAD ANALYST:	G. RAFFAELLI	
ASSESSMENT:		
CRITICALI FLIGHT		- <del></del>
HDW/FUN		ITEM
NASA [ 2 /2 IOA [ 3 /2R	] [ ] [ ] [ P	] [ X ] *
COMPARE [ N /N	] [и] [и] [и	] [N]
RECOMMENDATIONS:	(If different from NASA)	
[ /	] [ ] [ ]	] [ ] (ADD/DELETE)
* CIL RETENTION R	ATIONALE: (If applicable)	7011
REMARKS:		PEQUATE [ ] PEQUATE [ ]
THE IOA AGREES WI AGREEMENT WITH TH	TH THE NASA CRITICALITY ASSI E REMAINING ANALYSIS. THE I FAILURE MODES, 410-FM1 AND	OA ALSO RECOMMENDS

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		MU-323A BASELINE [ ]									
MDAC ID:	EMU 323 COMMON MU	LTIPLE C	(ITEM 410)	ı							
LEAD ANALYST:	G. RAFFAE	RAFFAELLI									
ASSESSMENT:											
FLIGH'	r	REDUNDANCY SCREENS			CIL ITEM						
HDW/FU	NC A	•	В	С							
NASA [ 3 /3 IOA [ 3 /2R	] [ ] [ P	] [	P ] [	P ]	[ x ] *						
COMPARE [ /N	] [ N	1 [	и][	и ј	[ N ]						
RECOMMENDATIONS:	(If dif	ferent f	rom NASA	)							
[ 2 /2	] [	] [	] [		[ A ] OD/DELETE)						
* CIL RETENTION	RATIONALE:	(If app	olicable) I	ADEQUATE NADEQUATE	[ ]						
REMARKS: THE IOA RECOMMEN WAS LIMITED TO T	DS A 2/2 C HE EVA PHA	CRITICALI ASE AND D	TY BECAU	SE THIS FA	ILURE MODE						

MISSION WHICH WOULD HAVE INDICATED A 2/2. IF DONE (REFERENCE NASA FMEA 410-FM1). THE IOA ALSO RECOMMENDS COMBINING 410-FM1 AND

FM2 INTO ONE FAILURE MODE.

ASSESSMEN NASA FMEA	T I	D:	EMU-	325							NASA DATA: BASELINE [ ] NEW [ X ]						
SUBSYSTEM MDAC ID: ITEM:				ION 1	MU:	LTI	PLE	CO]	NNE	CTOR	(	ITEM 41	0)				
LEAD ANAL	YST	:	G. F	AFF	AE:	LLI											
ASSESSMEN	T:																
CRITICALITY FLIGHT							NDAN	CY	SCI	REEN	s			CIL ITEM			
	HD	W/FUN	IC		A			В			С						
NASA IOA	[ 3 [ 3	/3 /2R	]	[	P	]	[	P	]	[	P	]	]	]	*		
COMPARE	(	/N	]	[	N	]	[	N	]	[	N	]	[	3			
RECOMMENDA	ATIC	ONS:	(I	f di	lf1	fer	ent :	fro	om N	IASA	)						
i	[ 2	/2	]	[		]	[		]	[				A ] DELI	ETE)		
* CIL RETI	ENTI	ON R	ATIO	NALE	: :	(I:	f app	pli	cab	ole)							
REMARKS:										II	AI IAI	DEQUATE DEQUATE	[	]			
BECAUSE THE IOA RECRITICALITY	ECOM	iasa Mend	LIMI S CO	TED MBIN	TH	IIS IG :	FAII IT W	LUF	RE T	O SI	ELE	ECTED MI EA 410-F	SSI M4	ON F	PHASES IA 2/2		

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-325A	EMU-325A BASELINE [								
	EMU 325 COMMON MUI									
LEAD ANALYST:	G. RAFFAEL	LLI								
ASSESSMENT:										
CRITICAL: FLIGH										
HDW/FU		В	С	ITEM						
NASA [ 2 /2 IOA [ 3 /2R	] [ ] [ P	] [ ] ] [ P ]	[ ] [ P ]	[ X ] *						
COMPARE [ N /N	] [ N	] [ N ]	[ N ]	[и]						
RECOMMENDATIONS:	(If diff	ferent from NA	SA)							
[ /	] [	] [ ]	[ ] (AI	[ ] DD/DELETE)						
* CIL RETENTION	RATIONALE:	(If applicabl	e) ADEQUATE INADEQUATE							
REMARKS: THE IOA SCENARIO IS NOT AS REPRESENTATIVE THE WORST CASE AS IS NASA; THE IOA, THEREFORE, AGREES WITH THE NASA CRITICALITY. THE IOA ALSO RECOMMENDS COMBINING NASA FMEAS 410-FM3 AND FM4 TO										

REPRESENT THE ENTIRE MISSION SCENARIO UNDER ONE ANALYSIS.

ASSESSMENT ID:	SSESSMENT DATE: 12/10/86 NA SSESSMENT ID: EMU-324 E ASA FMEA #: 410-FM5									
MDAC ID:	EMU 324 COMMON MULTIPLE CONNECTOR	(ITEM 410)								
LEAD ANALYST: G. RAFFAELLI										
ASSESSMENT:										
FLIGH	_	S CIL ITEM								
HDW/FU	NC A B	С								
NASA [ 3 /3 IOA [ 2 /1R	] [ ] [ ] [ ] [ P ] [ P ] [	[ ] * P ] [ x ]								
COMPARE [ N /N	] [N] [N] [	N ] [ N ]								
RECOMMENDATIONS:	(If different from NASA	)								
[ 2 /2	] [ ] [ ] [	] [ A ] (ADD/DELETE)								
* CIL RETENTION 1	RATIONALE: (If applicable)	ADEQUADE ( )								
REMARKS:	II	ADEQUATE [ ] NADEQUATE [ ]								
THE NASA SPLIT THE MISSION PHASES FOR THIS FAILURE MODE BETWEEN NASA FMEAS 410-FM5, FM6, AND FM7. THE IOA RECOMMENDS THEY BE COMBINED AS ONE FMEA AND WITH A 2/2 CRITICALITY. (NOTE: THE IOA										
AGREED WITH THE I	NASA ANALYSIS IN 41-FM6).	·								

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DATA: BASELINE NEW	[ ] [ x ]						
MDAC ID:	EMU 324 COMMON MULTIPLE CONNECT	OR (ITEM 410)							
LEAD ANALYST:	G. RAFFAELLI								
ASSESSMENT:									
CRITICAL: FLIGHT			CIL ITEM						
	NC A B	С							
NASA [ 2 /2 IOA [ 2 /1R	] [ ] [ ] ] [ P ] [ P ]	[ ] [ P ]	[ X ] * [ X ]						
COMPARE [ /N	] [N] [N]	[и]	[ ]						
RECOMMENDATIONS:	(If different from NA	ASA)							
[ /	] [ ] [ ]	[ ] (AD	[ ] D/DELETE)						
* CIL RETENTION	RATIONALE: (If applicab)	ADEQUATE	[ ]						
INADEQUATE [ ]  REMARKS:  THE IOA AGREES WITH THE NASA ANALYSIS. THE IOA ALSO RECOMMENDS  COMBINING NASA FMEAS 410-FM5, FM6, AND FM7 TO REFLECT THE ENTIRE  MISSION SCENARIO FOR THIS FAILURE MODE UNDER ONE ANALYSIS.									

	12/10/86 EMU-326 410-FM8	NASA DATA: BASELINE [ ] NEW [ X ]
MDAC ID:	EMU 326 COMMON MULTIPLE CONNECTOR	(ITEM 410)
LEAD ANALYST:	G. RAFFAELLI	
ASSESSMENT:		
CRITICALI FLIGHT HDW/FUN		CIL ITEM
NASA [ 2 /2 IOA [ 3 /2R	] [ ] [ ] [ ] [ ] [ ]	] [X]* P] [X]
COMPARE [ N /N	] [и] [и] [і	4 ] [ ]
RECOMMENDATIONS:	(If different from NASA)	
[ /	] [][][	] [ ] (ADD/DELETE)
* CIL RETENTION R		ADEQUATE [ ] ADEQUATE [ ]
	TH THE NASA CRITICALITY WHE	N THE SECOND SCU IS

	12/10/86 EMU-327 410-FM9				NASA DATA: BASELINE [ ] NEW [ X ]					
MDAC ID:	EMU 327 COMMON MU									
LEAD ANALYST:	G. RAFFAF	ELLI								
ASSESSMENT:										
CRITICAL FLIGH	T		NCY SCR		CIL ITEM					
HDW/FU	INC A	1	В	С						
NASA [ 2 /2 IOA [ 2 /2	] [ F	) )	[ ] [ F ]	[ ] [ NA]	[ X ] * [ X ]					
COMPARE [ /	] [ N	, ]	[иј	[ N ]	[ ]					
RECOMMENDATIONS:	(If dif	ferent	from N.	ASA)						
[ /	] [	]	[ ]	[ ]	[ ADD/DELETE)					
* CIL RETENTION	RATIONALE:	(If a	pplicab	le) ADEQUATE INADEQUATE	[ ]					
REMARKS: THE IOA AND THE	NASA ARE I	N AGRE	EMENT.							

	12/10/86 EMU-336 411-FM1	NASA DATA: BASELINE NEW			
MDAC ID:	EMU 336 HIGH PRESSURE OXY	GEN LINE (ITEM 411)	)		
LEAD ANALYST:	G. RAFFAELLI				
ASSESSMENT:					
CRITICAL: FLIGHT		Y SCREENS	CIL ITEM		
		В С			
NASA [ 2 /2 IOA [ 3 /2R	] [ ] [ ] [ P ] [	F ] [ P ]	[ X ] * [ X ]		
COMPARE [ N /N	] [N] [1	и) [и]	[ ]		
RECOMMENDATIONS:	(If different f	rom NASA)			
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* CIL RETENTION 1	RATIONALE: (If app	- · · · · · · · · · · · · · · · · · · ·	[ ]		
REMARKS: THE IOA AGREES WINOT EMPLOYED AS		CALITY SINCE THE SI			

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-337 412A-FM1		NASA DATA: BASELINE [ ] NEW [ X ]										
SUBSYSTEM: MDAC ID: ITEM:	EMU 337 PORTABLE												
LEAD ANALYST:	G. RAFFAE	RAFFAELLI											
ASSESSMENT:													
CRITICAL FLIGH HDW/FU	r	REDUNDAN	ens C	CIL ITEM									
NDW/FO.	NC A	•	В	_									
NASA [ 2 /2 IOA [ 3 /2R	] [ ] [ F	] [	] F ]	[ ] [ P ]	[ X	] *							
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RECOMMENDATIONS:	(If dif	ferent	from NAS	SA)									
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* CIL RETENTION	RATIONALE:	: (If ar	pplicable	ADEQUATE	[	]							
REMARKS: THE IOA AGREES W SECOND SCU IS CO													

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-338		NASA DATA: BASELINE [ ] NEW [ X ]							
SUBSYSTEM: MDAC ID: ITEM:	EMU 338 COOLING H	120 IN-L]	NE (ITE	EM 412B)						
LEAD ANALYST:	G. RAFFAE	LLI								
ASSESSMENT:										
CRITICALI FLIGHT HDW/FUN	יים - ב- ני	EDUNDANC	Y SCREE	ens C	CIL ITEM					
·			_	_						
NASA [ 2 /2 . IOA [ 3 /2R	] [ P	] [	F ]	[ ] [P]	[ X ] * [ X ]					
COMPARE [ N /N	] [ N	] [	и ]	[ N ]	[ ]					
RECOMMENDATIONS:	(If dif	ferent f	rom NAS	A)						
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* CIL RETENTION R	ATIONALE:	(If app		ADEQUATE	[ ]					
REMARKS: THE IOA AGREES WI SECOND SCU IS NON	TH THE NAS	SA CRITI		INADEQUATE ASSIGNMENT S	•					

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-339	<u>.</u>	BASELINE NEW							
	EMU 339 COOLING H2O O	UT-LINE (ITEM	412C)							
LEAD ANALYST:										
ASSESSMENT:										
CRITICAL FLIGH HDW/FU	T	DANCY SCREENS B	С	CIL ITEM						
NASA [ 2 /2 IOA [ 3 /2R	] [ ] ] [ P ]	[ ] [ [ F ] [	] P ]	[ X ] * [ X ]						
COMPARE [ N /N	] [N]	[ N ] [ I	n ]	[ ]						
RECOMMENDATIONS:	(If differe	ent from NASA)								
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	* CIL RETENTION RATIONALE: (If applicable)  ADEQUATE [ ]  INADEQUATE [ ]									
REMARKS: THE IOA AGREES W SECOND SCU IS NO		CRITICALITY AS	SIGNMENT S	SINCE THE						

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SUBSYSTEMDAC ID:				EMU 340 BAC	)	RIZ	ΑL	FILT	'ER	Н	OUSIN	G	(I'	rem	416	)			
LEAD ANA	ALYS	T:	:	G.	RAF	'F	AE1	LLI											
ASSESSME	ENT:	;																	
CRITICALIT FLIGHT HDW/FUNC			ľ	REDUNDANCY SCREENS A B C					s C				CIL ITEM						
NASA IOA	]	2	/2 /2R	]		[	P	]	[	F	]	[	P	]		]	X X	]	*
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RECOMMEN	IDAT	'IC	ons:	(	Ιf	di	ff	eren	t	fro	om NAS	SA)	)						
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* CIL RE	TEN	ΤI	ON F	RATI	ONA	LF	:	(If	apj	pli	cable	•	AI IAI	EQU EQU	JATE JATE	[		]	
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SUBSYSTE MDAC ID:				EM 34 CO	3	is?	AТЕ	Е Н2С	R	EGŪ	JLA	TOR	: (	(I)	EM	41	8)				
LEAD ANA	LY	ST	:	G.	RAF	F	AEI	LLI													
ASSESSME	ENT	:																			
		F	ICAL: LIGH' W/FUI	r			RI A	EDUNI	AN	CY B	sc	REE	NS	C					[L [EN	1	
NASA IOA	[	2	/2 /2R	]		[	P	]	[	P	]		[	P	]			[	X	]	*
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RECOMME	VDA	TI	ons:		(If	đ.	if	ferer	nt	fr	om	NAS	A)	)							
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* CIL R		NT	ION :	RAI	NOI	AL	E:	(If	ap	pl	ica	able				UAT UAT		[		]	
REMARKS	:																				

THE IOA AGREES WITH THE NASA ANALYSIS.

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SUBSYSTE MDAC ID:				EMU 345 CON	5	SAT	E I	H20	RE	GU	LAT	'OR	(I	rem	41	8)				
LEAD ANA	LYS	T:		G.	RAF	FAE	LL	I												
ASSESSME	SSESSMENT: CRITICALITY PEDI																			
	CRITICALITY REI FLIGHT HDW/FUNC A											EEN	s C					IL PEM	Ī	
	FLIGHT								[	P	]	[	P	]			]	X X	]	*
COMPARE	[	N .	/N	1		N	]		[	N	]	[	N	]			[		]	
RECOMMEN	DAT	IO	NS:	(	If o	lif	fer	cent	f	ro	n N	ASA)	ļ							
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* CIL RETRIENT REMARKS: THE IOA												·			JATE JATE		[		]	
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ASSESSMEN ASSESSMEN NASA FME	T T	D:	12/10/ EMU-34 418-FM	4					NASA D BASEL		[	
SUBSYSTEM MDAC ID: ITEM:	<b>1</b> :		EMU 344 CONDEN	ISAT]	Е Н20	REG	ULATO:	R (	ITEM 4	18)		
LEAD ANA	LYST	<b>':</b>	G. RAF	FAE	LLI							
ASSESSME	NT:											
(	F	'ICAL' 'LIGH' W/FUI	r	RI A		DANCY B	SCRE		C		CIL	
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NASA IOA	[ 2	/2	]	[ P	]	[ F	]	[	Р ]		[ X	] <b>*</b>
COMPARE	[	/	]	[ N	]	[ N	]	[	N ]		[	]
RECOMMEN	DATI	ons:	(If	dif	fere	nt fr	om NA	SA)				
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* CIL RE	rent	I NOI	RATION	ALE:	(If	appl	icabl		ADEQUA IADEQUA			]
REMARKS:												

THE IOA AND THE NASA ARE IN AGREEMENT.

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SUBSYSTI MDAC ID ITEM:				EM 34 CO	6	SAT	E H	120	RI	EGī	JLAT	ror	(I'	TEM	418)				
LEAD AND	ALY	ST	:	G.	RAFI	FAE	LLI												
ASSESSMI	ENT	:																	
		F	ICAI LIGH V/FU			R A		NDA	NC	EY B	SCI	REEN	s c				I L FEI	M	
NASA IOA	[	2 2	/2 /2	]	[	P	]		[	F	]	[	P	]		[	X X	]	*
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RECOMMEN	NDA!	ric	ns:		(If d	lif	fer	ent	f	rc	om N	IASA	)						
	[		/	]	[		]		[		]	[		]	(A	] .DD,	/DI	] ELE	ETE)
* CIL RERESTREE THE IOA	;											•			JATE JATE	[		]	

ASSESSMEN ASSESSMEN NASA FMEA	II TN	<b>):</b>	EMU	10/8 -347 -FM3								SA DA BASELI		[		]		
SUBSYSTEM MDAC ID:	M:		EMU 347 CON		AΤ	E H	20 RE	EGU	J <b>LA</b> J	ror	rı)	EM 4	18)					
LEAD ANA	LYST	:	G.	RAFF	ΆE	LLI												
ASSESSME	T:																	
•		ICAL:			R	EDUI	NDANC	CY	SCI	REEN	S			CI	L	ſ		
		W/FU			A			В			С					-		
NASA IOA	[ 2 [ 3	/2 /2R	]	[	P	]	]	P	]	[	P	]		[	X	]	*	
COMPARE	[ N	/N	]	[	N	]	[	N	3	[	N	]		[	N	3		
RECOMMEN	DATI	ons:	(	If d	lif	fer	ent i	Ero	om l	NASA	)							
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* CIL RE	TENT	ION	RATI	ONAI	LE:	(I	f app	<b>91</b> :	ica			DEQUA DEQUA				]		
REMARKS: THE IOA THE IOA	AGRE WOUL	ES W D RE	ITH COMM	THE IEND	NA IN	SA ICLU	ANAL' DING	YS:	IS :	RESU BIN	LT: DI	S AND NG" A	EF:	FE(	CTS [A]	3. 3LF		LSO,

CAUSE.

ASSESSMI ASSESSMI NASA FMI	ENT ID	<b>):</b>	12/10 EMU-3 418-F	41				Ŋ	IASA BASE	LINE		]	
SUBSYSTI MDAC ID: ITEM:			EMU 341 CONDE	NSAT	'E H20	REG	ULATO	OR (I	TEM	418)			
LEAD ANA	LYST:		G. RA	FFAE	LLI								
ASSESSME	ENT:												
	CRITI FL	CALI IGHI		R	EDUND	ANCY	SCRE	EENS			CIL		
	HDW	/FUN	IC	A		E	<b>;</b>	C				••	
NASA IOA	[ 2 [ 3	/2 /2R	]	[ [ P	].	[ [ <b>F</b>	]	[ [ P	]		[ X	] <b>*</b>	
COMPARE	[ ]	/N	]	[ N	]	[ N	]	[ N	]		[	]	
RECOMMEN	DATIO:	NS:	(If	dif	feren	t fr	om NA	SA)					
	[ ,	/	]	[	]	[	]	C	]	(AI	[ DD/DI	] ELETE)	
* CIL RE	TENTI	ON R	ATION	ALE:	(If	appl	icabl	A.	DEQUA DEQUA		[	]	
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-349	5		NASA DA BASELI N	TA: NE [ ] EW [ X ]								
MDAC ID:	EMU 349 WATER SU	JPPLY PF	RESSURE	REGULATOR (	ITEM 419)								
LEAD ANALYST:	G. RAFF	AELLI											
ASSESSMENT:													
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C													
HDW/FUI	1C	A	В	С									
NASA [ 3 /2R IOA [ 3 /2R					[ X ] * [ ]								
COMPARE [ /	] [	N ]	[ ]	[ ]	[ N ]								
RECOMMENDATIONS:	(If d	ifferent	from N	ASA)									
[ 2 /2	] [	]	[ ]	[ ]	[ ] (ADD/DELETE)								
* CIL RETENTION 1	RATIONALI	E: (If a	applicab	le) ADEQUAT INADEQUAT	E [ ]								
REMARKS: BECAUSE THE SECON BECAUSE RECHARGE MODE, THE IOA RECOMMODE, THE IOA RECOMMODES CONSIDER	IS TERM:	INATED U A 2/2 G	JPON DET CRITICAL	BY GROUND ECTION OF T LITY. ADDIT	RULE) AND HIS FAILURE TONALLY, THE								

FAILURE MODE AND THEREFORE RECOMMENDS PASSAGE OF SCREEN A.

ASSESSMENT ASSESSMENT NASA FMEA #	ID:		0					ASA DA BASELI N			]
SUBSYSTEM: MDAC ID: ITEM:		EMU 350 WATER	SUPF	PLY PI	RESSU	JRE RI	EGUL	ATOR (	(ITEM	41	L9)
LEAD ANALYS	T:	G. RAF	FAEI	LLI							
ASSESSMENT:											
:	FLIGHT			DUND	<b>ANCY</b>	SCREE	ENS			IL PEM	1
H	DW/FUN	C	A		В		С				
NASA [ :	2 /2 3 /2R	]	[ [ P	]	[ [ P	]	[ [ P	]	[	X	] <b>*</b>
COMPARE [ ]	N /N	]	[ N	]	[ N	]	[ N	]	ſ	N	]
RECOMMENDAT:	ions:	(If	diff	erent	fro	m NAS	SA)				
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* CIL RETENT	rion R	ATIONA	LE:	(If a	ppli	.cable	AL	EQUAT EQUAT	'E [		]
REMARKS: BECAUSE THE AGREES WITH							REDU	JNDANT	, THI	z I	

ASSESSMEN ASSESSMEN NASA FME	II T	<b>):</b>	12/10/ EMU-34 419-FN	18					ASA DA BASELI N			
SUBSYSTEM MDAC ID: ITEM:	<b>1</b> :		EMU 348 WATER	SUPE	FLY I	PRESSI	JRE R	EGUL#	ATOR (	(ITEN	<b>1 4</b> :	19)
LEAD ANAI	LYST	:	G. RAI	FFAEI	LLI							
ASSESSMEN	T:											
C	F	ICAL: LIGH: N/FUI	ר	RI A	EDUNI	DANCY B	SCRE	ENS C			CIL (TEI	
NASA IOA	[ 2 [ 3	/2 /2R	]	[ [ P	]	[ [ F	]	[ [ P	]	[	X	] *
COMPARE	[ N	/N	]	[ N	3	[ N	]	[ 1	]	l		]
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* CIL RE	rent:	ION 1	RATION	ALE:	(If	appl	icabl	AI	DEQUAT	re		]
REMARKS:												

THE IOA AGREES WITH THE NASA CRITICALITY AND ANALYSIS.

	: 12/10/86 EMU-357 420-FM1		NASA DATA BASELINE NEW	[ ]
SUBSYSTEM: MDAC ID: ITEM:	EMU 357 O2 FILTER AN	D ORIFICE (	ITEM 420)	
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
CRITICA		NDANCY SCRE	ENS	CIL ITEM
HDW/F		В	С	IIEM
NASA [ 2 /2 IOA [ 3 /2	R ] [ P ]	[ ] [ P ]	[ ] [ P ]	[ X ] *
COMPARE [ N /N	) [N]	[ N ]	[ N ]	[ N ]
RECOMMENDATIONS	: (If differ	ent from NA	SA)	
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* CIL RETENTION	RATIONALE: (I	f applicabl	e) ADEQUATE INADEQUATE	[ ]
REMARKS: THE IOA AGREES THE SECOND SCU.	NITH THE NASA	CRITICALITY		-

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-356		DATA: ELINE [ ] NEW [ X ]
	EMU 356 O2 FILTER AND	ORIFICE (ITEM 420	<b>)</b> )
LEAD ANALYST:	G. RAFFAELLI		
ASSESSMENT:			
CRITICAL: FLIGH		DANCY SCREENS	CIL
HDW/FU		в с	ITEM
NASA [ 2 /2 IOA [ 3 /2R	] [ ] ] ]	[ ] [ ] [ P ]	[·X] *
COMPARE [ N /N	] [ N ]	[ N ] [ N ]	[ n ]
RECOMMENDATIONS:	(If differen	nt from NASA)	
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* CIL RETENTION I	RATIONALE: (If	ADEOU	VATE [ ]
REMARKS: THE IOA AGREES WI SECOND SCU.	ITH THE NASA CR		NON-REDUNDANCY OF

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SUBSYSTI MDAC ID: ITEM:				EM 35 BA	3	RIZ	A (	CARTR	lD	GE	(I	TEM	42	3)						
LEAD ANA	LY	ST	:	G.	RAI	FF	AEI	LLI												
ASSESSMI																				
	ASSESSMENT:  CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C																			
	1	HD	W/FUI	NC			A			В			C	!						
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COMPARE	[		/	]		[	N	]	[	N	]	[		]		[	•	]		
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* CIL RI	E <b>TE</b> l	NT	ION 1	RAI	ION	AL	Ξ:	(If	ap	pl:	ica		A	DEQUAT		[		]		
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## REMARKS:

THE IOA AND THE NASA ARE IN GENERAL AGREEMENT EXCEPT ON SCREENS A AND B; REGARDING WHICH THE IOA NOW CONCURS WITH THE NASA.

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SUBSYSTEM MDAC ID:	M:		EMU 352 BACTE	RIA		CARTI	RID	GE	(ITE	em 4	423	3)					
LEAD ANA	LYST	<b>':</b>	G. RA	FFA	ΕI	LLI											
ASSESSMENT:  CRITICALITY REDUNDANCY SCREENS CI																	
(		ICAL:			RE	EDUNI	DAN	CY	SCRE	EEN				CII ITI		Ī	
	HD	W/FUI	NC		A			В			С						
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* CIL RE	I NOI	ALE	:	(If	ap	pl:	icab]			DEQUATE DEQUATE		]		]			
REMARKS:												<b>-</b>	-	•		3	

THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSMENT DATE: 12/10/86 ASSESSMENT ID: EMU-351 NASA FMEA #: 423-FM4														DAT <i>I</i> LINI NEV	] 3		]	
SUBSYSTI MDAC ID: ITEM:				EMU 351 BACT	ERI	A (	CAI	RTRID	GE	(I:	rem	42	3)					
LEAD ANA	YLY:	ST	:	G. R	AFF	AE:	LLI	<b>c</b>										
ASSESSMI	ENT	:																
	CRITICALITY RE FLIGHT HDW/FUNC A										REEN					IL Per	M	
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NASA IOA	]	2 3	/2 /2R	]	[	P	]	[ [	P	]	[	P	]		[	X	]	*
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* CIL RE	TE	NT:	ION I	RATIO	NALI	Ξ:	(I	f app	p1:	icak	ole)	Al	DEQU.	ATE	[		1	
REMARKS:											I	NAI	DEQU	ATE	Ī		j	
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	12/10/86 EMU-354 424-FM1		NASA DATA: BASELINE NEW	
MDAC ID:	EMU 354 POTABLE H2O FI	LTER (ITEM 4	.24)	
LEAD ANALYST:	G. RAFFAELLI			
ASSESSMENT:				
CRITICAL: FLIGH' HDW/FU	r	ANCY SCREENS	c c	CIL ITEM
,	<u>-</u>	r 1 [	1	( X 1 *
IOA [ 3 /2R	] [ ] ] [ P ]	[P] [	P ]	[ X ] *
COMPARE [ N /N	] [ N ]	[и] [	и ]	[ N ]
RECOMMENDATIONS:	(If differen	t from NASA)		
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* CIL RETENTION	RATIONALE: (If		ADEQUATE NADEQUATE	[ ]
REMARKS: BECAUSE THE SECO AGREES WITH THE		ONSIDERED RI	DUNDANT,	THE IOA

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SUBSYSTE MDAC ID:				EM 35 PO	_	н	20	FILT	ER	(I	rem 4	42	4)					
LEAD ANA	LYS	ST	:	G.	RAFF	AE:	LLI											
ASSESSME	NT:	:																
FLIGHT												CI	L EM					
	I	HDI	W/FU	JNC		A			В			C						
NASA IOA	[	2 2	/2 /2	]	[ [	P	]	[ [	F	]	[	P	]		]	X X	]	* .
COMPARE	[		/	]	[	N	]	[	N	]	[	N	3		[		]	
RECOMMEN	DAT	CIO	ONS:	:	(If d	if:	fer	ent :	fro	om 1	(ASA	)						
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* CIL RE REMARKS: THE IOA											•		DEQUAT:		[		]	
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SUBSYSTEM MDAC ID: ITEM:	M:		EMU 332 COMMO	n m	JLTIP	LE CO	NNECTO	OR (	(ITEM 4	10)			
LEAD ANA	LYST:	:	G. RA	FFAI	ELLI								
ASSESSME	NT:												
•		LIGHT		1		DANCY B	SCRE	ENS C	2		CIL ITEN	И	
NASA IOA		·	]	[ ]	P ]	[ P	]	[ F	? ]		[	] *	
COMPARE	[	/	]	[	]	[	]	[	]		ι	]	
RECOMMEN	DATIO	ons:	(If	di:	ffere	nt fr	om NA	SA)					
	[	/	]	[	]	[	]	[	]	(AI	[ [D/D	] ELET	E)
* CIL RE	TENT	ION 1	RATION	ALE	: (If	appl	icabl	7	ADEQUAT		_	]	
REMARKS:													

THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSMENT DATE: 12/10/86 ASSESSMENT ID: EMU-333 NASA FMEA #: 425-FM1															ASA DA BASELI N		[	]	
SUBSYSTI MDAC ID: ITEM:				EM 33 CO	3	N ]	MU:	LTI	PLE	c	01	NNEC	TOR	(	ITEM 4	10)	)		
LEAD ANA	ALY:	ST	:	G.	RA	FF.	AE:	LLI											
ASSESSMI	ENT	:																	
		F	ICAL: LIGH:	r	•		R	EDUI	NDA	NC	Y	SCR	EEN	S			CIL		
	]	HD	W/FUI	NC.			A				В			С					
NASA IOA	[ [	3 3	/2R /2R	]		[	P P	]		[	P P	]	[	P P	]		[	]	*
COMPARE	[		/	.]		[		]		[		]	[		]		[	]	
RECOMMEN	IDA'	ΓΙ	ONS:		(If	d:	ifi	fere	ent	f	rc	om N	ASA)	)					
	[		/	]		[		]		[		]	[		]	(AE	[ D/D	ELI	ETE
* CIL REREMARKS: THE IOA													•		DEQUAT:		[	]	
THE IOA	ANI	נכ	CHE 1	IAS.	A AF	Œ	I	I AG	REI	EM)	ΕN	T.							

ASSESSME ASSESSME NASA FME	NT	II		EM	/10/ U-32 5-FM	8	5							SA D BASEL		[	x	]	
SUBSYSTE MDAC ID: ITEM:				EM 32 CO	8	M	<b>I</b> UI	TIPL	E C	CON	INECT	ror	()	TEM	410)				
LEAD ANA	LYS	ST:	:	G.	RAF	FA	ÆΙ	LI											
ASSESSME	:TK	:																	
	CR		ICAL:				RE	EDUND	ANC	CY	SCRI	EENS	5				L CEN	1	
	I		W/FUI				A			В			С						
NASA IOA	[	2	/2 /2R	]		[	P	]	[	P	]	[	P	]		]	X	]	*
COMPARE	[	N	/N	]		[	N	]	[	N	]	[	N	]		[	N	]	
RECOMMEN	IDA'	TI	ons:		(If	d:	if	ferer	nt :	fro	om N	ASA)	)						
	[		/	)		[		]	[		]	[		]	(A)	] DD,	/DI	ELI ELI	ETE)
* CIL RI	ETE:	NT:	ION :	RAT	'ION <i>I</i>	L	E:	(If	ap	<b>p1</b> :	icab			DEQU <i>I</i> DEQU <i>I</i>		[		]	
DEMARKS	•																		

THE IOA AGREES WITH THE NASA ANALYSIS.

ASSESSMI ASSESSMI NASA FMI	ENT	' I	D:	EM	/10/ U-32 5-FM	9	;								DAT. ELIN: NE		x	]	
SUBSYSTI MDAC ID: ITEM:				EM 32 CO	9	M	U	LT:	IPL	E	CO:	NN]	ECTOR	(ITE	M 41	0)			
LEAD ANA	<b>ALY</b>	ST	<b>':</b>	G.	RAF	FA	E	LL:	r										
ASSESSME	ENT	:																	
		F	ICAL LIGH W/FU	T			Ri A		JND	AN	CY B	S	CREEN	s C			IL FEI	M	
NASA						ſ		1		ſ	_	1	r	_		г	¥	1	*
IOA	Ī	3	/2R	ĵ		<b>ו</b>	P	j		į	P	j	]	j		[	Λ	j	••
COMPARE	[	N	/N	]		[ ]	N	]		[	N	]	[	]		[	N	]	
RECOMMEN	IDA!	ΓI	ons:	1	(If d	di:	£1	fer	ent	: 1	fro	om.	NASA	)					
	[		/	]		[		]		[		]	[	]	(A	[ .DD/	/DE	] ELE	ETE
* CIL RE														ADEQU VADEQU		[		]	
THE IOA	AGI	REI	es wi	TH	THE	N2	18	A	ANA	LY	SI	s.							

ASSESSME	ASSESSMENT DATE: 12/10/86  ASSESSMENT ID: EMU-334  NASA FMEA #: 425-FM4  SUBSYSTEM: EMU  NASA DATA: BASELINE [ ] NEW [ X ]																					
SUBSYSTEM MDAC ID:	M:			EMU 334 COM	мои	M	UI	πII	PLE	: (	CON	INE	CTOI	R								
LEAD ANA	LYS	ST:	:	G. 1	RAF	FA	EI	LI														
ASSESSME	NT	:																				
	CR:		ICAL: LIGH'				RE	DUI	NDA	N	CY	sc	REE	NS					II: IT:			
	1		W/FU				A				В				С							
NASA IOA	[	2	/2 /2R	]		[	P	]		[	P	]		[ [	P	]		( (	: 3	K	]	*
COMPARE	[	N	/N	)		[	N	]		[	N	]		[	N	]		(	_ 1	N	]	
RECOMMEN	'DA'	ΤΙ	ons:	(	Ιf	d:	Ĺfí	fer	ent	: :	fro	om	NAS.	A)								
	[		/	]		[		]		[		]		[		]	(		[ ]/:			TE)
* CIL RE	TE	NT	ION	RATI	ONA	L	Ξ:	(I	fa	ap]	pl:	ica					QUATE QUATE		[ [		]	
REMARKS: DUE TO D NASA ANA	EF			on-r	EDU	JNI	DAI	NCY	01	<b>ਦ</b> ੋਂ	SC1	Us,	тн	E	I	ΟA	AGRE	ES	W	ΙΊ	Ή	THE

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/86 EMU-335 425-FM5			ASA DATA BASELINE NEW	[ ]
SUBSYSTEM: MDAC ID: ITEM:	EMU 335 COMMON MU	LTIPLE CO	NECTOR		
LEAD ANALYST:	G. RAFFAE	LLI			
ASSESSMENT:					
CRITICALI FLIGHT	?	EDUNDANCY			CIL ITEM
HDW/FUN	IC A	В	С		
NASA [ 2 /2 IOA [ 3 /2R	] [ ] [ P	] [ ] [ P	] [ ] [ P	]	[ X ] *
COMPARE [ N /N	] [ N	] [ N	] [ N	]	[ N ]
RECOMMENDATIONS:	(If dif	ferent fro	m NASA)		
[ /	] [	] [	] [		[ ] D/DELETE)
* CIL RETENTION R	ATIONALE:	(If appli	AI	DEQUATE	[ ]
REMARKS: THE IOA AGREES WI SCU.	TH THE NAS	SA ANALYSI		_	-

ASSESSMENT I ASSESSMENT I NASA FMEA #:	D:	12/10/ EMU-33 425-FM	0				NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:		EMU 330 COMMON	MUI	LTIPL	E CO	NNECTOF	R (ITEM 410	)
LEAD ANALYST	?:	G. RAF	'FAEI	LLI				
ASSESSMENT:								
F	CICALI LIGHT	?	RI A	EDUND	ANCY B	SCREEN	rs C	CIL ITEM
NASA [ 2 IOA [ 3	2 /2 3 /2R	]	[ [ P	[ X ] *				
COMPARE [ N	1 /N	]	[ N	]	[ N	) [	[ א ]	[ N ]
RECOMMENDATI	ons:	(If	dif	feren	t fr	om NASA		
ι	/	]	[	]	[	] [	[ ] (A	[ ] DD/DELETE)
* CIL RETENT	rion i	RATIONA	LE:	(If	appl		ADEQUATE NADEQUATE	•
REMARKS: THE IOA AGRE SCUs).	EES W	TH THE	NAS	SA AN	ALYS	IS (DUE	TO NON-RE	DUNDANT

ASSESSME	ASSESSMENT DATE: 12/10/86 NASA DATA: ASSESSMENT ID: EMU-331 BASELINE [ ] NASA FMEA #: 425-FM7 NEW [ X ] SUBSYSTEM: EMU												
SUBSYSTE MDAC ID: ITEM:			EMU 331 COMMOI	um v	LTIF	LE CO	NNE	CTOR	(ITI	EM 410	))		
LEAD ANA	LYS'	T:	G. RA	FFAE	LLI								
ASSESSME	NT:												
	CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C												
NASA IOA	[ ;	2 /2 3 /2R	]	[ [ P	]	[ [ P	]	[	p ]		[	] *	
COMPARE	[ ]	N / N	]	[ N	]	[ и	]	Ţ	N ]		[	]	
RECOMMEN	DAT	ions:	(If	dif	fere	nt fr	om 1	NASA)					
	[	/	]	[	]	[	]	[	]	(A	[ DD/D	] ELETE)	
* CIL RE	TENT	rion 1	RATIONA	ALE:	(If	appl	ical	-	ADEÇ IADEÇ	UATE UATE	[	]	
DUE TO T	DUE TO THE SECOND SCU BEING NON-REDUNDANT, THE IOA AGREES WITH												

ASSESSME ASSESSME NASA FME	NT I	D:	8/06/8 EMU-74 425-FN	19X							ASA DATA BASELINE NEW	]	x	]	
SUBSYSTEM MDAC ID:	M:		EMU 749 COMMON	ı MU	LTIPI	LE C	ON	NECTO	R						
LEAD ANA	LYST	1.	G. RAI	FFAE	LLI										
ASSESSME	NT:														
(		CALICALI		R	EDUNI	DANC	Y	SCREE	:NS	3			IL TEN	1	
	HD	W/FUI	1C	A			В			С					
NASA IOA	[ 2 [ 2	/2	]	[ [ P	]	[ [	P	]	[	P	]	[	X X	]	*
COMPARE	[	/	]	[ N	]	[	N	]	[	N	]	[		].	
RECOMMEN	DATI	ons:	(If	dif	ferer	nt f	ro	m NAS	A)	)					
•	[	/	]	[	]	[		]	[		] (A	DD,	/DI	] ELE	ETE)
* CIL RE	TENT	NOI!	RATION	ALE:	(If	app	li	cable			DEQUATE DEQUATE	]		]	
REMARKS:												-		-	

THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	8/06/87 EMU-750X 425-FM9	NASA DATA BASELINE NEW	[ ]
SUBSYSTEM: MDAC ID: ITEM:	EMU 750 COMMON MULTIPLE	CONNECTOR	
LEAD ANALYST:	G. RAFFAELLI		
ASSESSMENT:			
CRITICALI FLIGHT HDW/FUN	יייייייייייייייייייייייייייייייייייייי	CY SCREENS  B C	CIL ITEM
NASA [ 2 /2 IOA [ 2 /2	] [ ] [ ] [ P ] [	P ] [ P ]	[ X ] *
COMPARE [ /	] [ N ] [	иј [иј	[ ]
RECOMMENDATIONS:	(If different	from NASA)	
[ /	] [ ] [		[ ] DD/DELETE)
* CIL RETENTION R REMARKS: THE IOA AND THE N		ADEQUATE INADEQUATE	[ ]

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	8/06/87 EMU-7833 440-=FM5			NASA DAT BASELIN NI	
DODD 10 1	EMU 783 EEH				
LEAD ANALYST:	G. RAFF	AELLI			
ASSESSMENT:					
CRITICAL		REDUNDA	MCY SCF	REENS	CIL ITEM
FLIGH HDW/FU		A	В	С	
NASA [ 2 /1R IOA [ 2 /1R	] [	P ] P ]	[ P ] [ P ]	[ P ] [ P ]	[ X ] *
COMPARE [ /	] [	]	[ ]	[ ]	[ ]
RECOMMENDATIONS:	(If d	ifferen	t from 1	NASA)	
[ /	] [	]	[ ]	[ ]	(ADD/DELETE)
* CIL RETENTION REMARKS:	RATIONAL	E: (If	applical	ole) ADEQUAT INADEQUAT	
THE IOA AND THE	NASA ARE	IN AGR	EEMENT.		

ASSESSM	ASSESSMENT DATE: 8/06/87 ASSESSMENT ID: EMU-743X NASA FMEA #: 470-FM1 SUBSYSTEM: EMU														DAT ELIN NE		[ ]	] <b>(</b> ]	
SUBSYST MDAC ID ITEM:				74	_	: A	DAP	TER	P	LÆ	ΛΤΕ	(IT	EM	47	0)			_	
LEAD AN	ALY	ST	:	G.	RAFF	ΆE	LLI												
ASSESSMI	ENT	:																	
		F:	ICA: LIGI			R A		NDA		Y B	SCF	REEN	s c				CIL	-	
NASA			•							_			_						
IOA	[	2	/2	]	] [	P	]		[ [ :	F	]	[ [	P	]		[	X X	]	*
COMPARE	[		/			N			[ ]				N			[		]	
RECOMMEN	[ADI	CIC	ns:	: (	(If d	if	fere	ent	f	ro:	m N	ASA)	)						
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* CIL RE REMARKS: THE IOA															ATE ATE			]	
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	8/06/87 EMU-744X 470-FM2			BASELINE NEW	
MDAC ID:	EMU 744 AIRLOCK A	ADAPTER	PLATE (I	TEM 470)	
LEAD ANALYST:	G. RAFFAE	ELLI			
ASSESSMENT:					
CRITICAL FLIGH HDW/FU	T .	REDUNDAI A	NCY SCREE	ens C	CIL ITEM
•			_	_	
NASA [ 2 /2 IOA [ 2 /2	] [1	] P ]	[ ·] [ <b>F</b> ]	[ ] [P]	[ X ] * [ X ]
COMPARE [ /	] [1	N ]	[ N ]	[ N ]	[ ]
RECOMMENDATIONS:	(If di	fferent	from NAS	SA)	
[ /	] [	1	[ ]	[ ] (A	[ DD/DELETE)
* CIL RETENTION	RATIONALE	: (If a	pplicable	ADEQUATE INADEQUATE	[ ]
REMARKS: THE IOA AND THE	NASA ARE	IN AGRE	EMENT.		

ASSESSM	ASSESSMENT DATE: 8/06/87 ASSESSMENT ID: EMU-745X NASA FMEA #: 470-FM3 SUBSYSTEM: EMU															A DA SELI	NE		x	]	
SUBSYST MDAC ID ITEM:				74	5	CK	A	DAP'	TER	2 1	PL	ATE	rI)	'EM	47	70)					
LEAD AN	ALYS	ST	:	G.	RA	FF.	AE	LLI													
ASSESSMI	ENT	:																			
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RECOMMEN	IDAT	CIC	ons:		(If	<b>d</b> :	ifi	fere	ent	f	rc	om 1	NASA	)							
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* CIL REREMARKS:													·			UAT: UAT:		[		]	

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ASSESSME	NT I	D:	EM	U-74	462	X							BAS	ELINE	[		]		
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			T36	**															
SUBSYSTE			EM																
MDAC ID:			74																
ITEM:			CO	IATN	IIP	'AN	ſΕ	CONT	RO1	L C	ARTI	RID	GE	(ITEM	48	30)			
LEAD ANA	T.VST	:	G.	RAI	44	ΔEI	ттт												
LLAD AMA.		•	٠.	1411	•														
ASSESSME	N.T.:																		
	CRIT	ICAL:	ITY			$\mathbf{R}$	EDU	NDAN	CY	SC	REE	IS			C:	ΙL			
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RECOMMEN	DATI	ons:		(If	d.	lf:	ter	ent	iro	om	NASA	7)							
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REMARKS:															_		-		
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THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT ON SCREEN A; HOWEVER, UPON FURTHER REVIEW, THE IOA AGREES WITH THE NASA SCREEN A ASSIGNMENT.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-193		NASA DATA: BASELINE NEW										
	EMU 193 CONTAMINA	NT CONTROL CAR	RTRIDGE (ITEM	480)									
LEAD ANALYST:	G. RAFFAE	LLI											
ASSESSMENT:													
CRITICALI FLIGHT	CIL ITEM												
HDW/FUN	IC A	В	С										
NASA [ 2 /1R IOA [ 2 /1R	] [ P ] [ P	] [ P ] ] [ P ]	[ P ] [ P ]	[ X ] * [ X ]									
COMPARE [ /	] [	] [ ]	[ ]	[ ]									
RECOMMENDATIONS:	(If dif	ferent from NA	ASA)										
\ ]	] [	] [ ]		[ DD/DELETE)									
* CIL RETENTION F	RATIONALE:	(If applicabl	.e) ADEQUATE INADEQUATE	[ ]									
REMARKS: THE IOA AND THE N 194).	IASA ARE IN	N AGREEMENT.	(ALSO REFEREN	ICE MDAC ID-									

ASSESSMI ASSESSMI NASA FMI	ENT I	D:	EMU-	194				NASA DA BASELI N	TA: NE [ ] EW [ X ]
SUBSYSTEMDAC ID:			194	'AMINA	NT C	CONTRO	L CI	ARTRIDGE (IT	EM 480)
LEAD ANA	ALYST	<b>!:</b>	G. F	RAFFAE	LLI				
ASSESSMI	ENT:								
		'ICAL 'LIGH		R	EDUN	IDANCY	SCI	REENS	CIL ITEM
				A		В		С	
NASA IOA	[ 2	/1R	]	[ P	]	[ P [ P	]	[ P ] [ P ]	[ X ] * [ X ]
COMPARE	[	/	]	[	)	[	]	[ ]	[ ]
RECOMME	NDATI	ons:	(]	f dif	fere	ent fr	om 1	NASA)	
	[	/	]	[	]	[	]	[ ]	[ ] (ADD/DELETE)
* CIL RI	ETENT	NOI	RATIO	NALE:	(If	appl	ical	ole) ADEQUAT INADEQUAT	E [ ]
REMARKS: THE IOA 193).		THE	NASA	ARE I	n ac	REEME	NT.	(ALSO REFE	RENCE MDAC ID-

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:				ASA DATA: BASELINE NEW	
	196	NT CONTROI	CARTRIDO	E (ITEM	480)
LEAD ANALYST:	G. RAFFAE	LLI			
ASSESSMENT:					
CRITICALI FLIGHT		EDUNDANCY	SCREENS		CIL
HDW/FUN		В	С		ITEM
NASA [ 2 /1R IOA [ 2 /1R	] [ P	] [ P	] [ P	]	[ X ] * [ X ]
COMPARE [ /	] [	] [и	) [	]	[ ]
RECOMMENDATIONS:	(If dif	ferent fro	m NASA)		
[ /	) [	] [ F	] [		[ ] D/DELETE)
* CIL RETENTION R	ATIONALE:	(If appli	AD	EQUATE EQUATE	[ ]
REMARKS:	101 100 T			-	• •
THE IOA AND THE N RECOMMENDS FAILUR BECAUSE THE DETEC OF THE FAILURE HA THEREFORE NOT REA	E OF SCREI TION METHO VING OCCUI	EN B. THI OD IDENTIF RED SOME P	S RECOMME IED BY TH	NDATION E NASA I	IS MADE S AN EFFECT

ASSESSME ASSESSME NASA FME	ENT	I	D:	8/06/8 EMU-74 480-FN	17				1	NASA I BASEI		•		]	
SUBSYSTE MDAC ID:				EMU 747 CONTAN	MANIN	IT CC	NTROI	L CAF	RTRII	DGE (	ITEM	48	0)		
LEAD ANA	YLYS	ST	:	G. RAI	FFAEI	LI									
ASSESSME	ENT	:													
	CR		ICALI LIGHT	TY	RE	DUNE	ANCY	SCRE	EENS			CI		ſ	
	I		W/FUI		A		В		(	C				•	
NASA IOA	[	2	/1R /NA	]	[	]	[	]	[ [	]		[	X	]	*
COMPARE	[	N	/N	]	[	]	[	]	[	]		[	N	]	
RECOMMEN	NDA:	ΓI	ONS:	(If	diff	erer	nt fro	om NA	ASA)						
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* CIL RE		NT:	ION I	RATIONA	ALE:	(If	appli	icab]	1	ADEQU <i>I</i> ADEQU <i>I</i>				]	
REMARKS:		NS:	IDERS	S THIS	FAII	URE	MODE	NON	CREI	DIBLE	FOR	AN	·	MI	EA.

THE FAILURE SHOULD BE ADDRESSED IN A HAZARD ANALYSIS.

ASSESSME ASSESSME NASA FME	ENT	I	D:	E		48		FM6							DAT ELIN NE		x	]	
SUBSYSTE MDAC ID:				E: 7 - C	48	ΜI	N <b>A</b> l	NT (	CON	rrc	OL C	ARTF	RID	GE	(ITE	M 4	80	)	
LEAD ANA	LY	ST	:	G	. RA	FF	AE:	LLI											
ASSESSME	ENT	:																	
	CR		ICA: LIG		Y		R	EDUI	NDAI	NCY	sc:	REEN	S				IL TEI		
	1	HDI	W/F	UNC			A			E	3		С						
NASA IOA	[ [	2	/1! /1!	R ] R ]		[	P P	]		[ F	) )	[ [	P P	]		[	X X	]	*
COMPARE	[		/	]		[		]	1	[	]	[		)		[		]	
RECOMMEN	IDA!	ric	ONS	:	(If	d:	if	fere	ent	fr	om 1	NASA	.)						
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* CIL REREMARKS:									_	_		·			UATE UATE	_		]	
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ASSESSMENT DATE: 12/10/8 ASSESSMENT ID: EMU-192 NASA FMEA #: 480-FM7						6								DA'I ELIN NE		[		]	
SUBSYSTEM MDAC ID:	M:		1	MU 92 ONTAI	MII	NAI	VT C	гио	'RO	L CA	RTR	IDO	GE	(ITE	EM	48	80)	)	
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REMARKS:																			

THE IOA AND THE NASA ARE IN AGREEMENT.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	EMU-192A		NASA DATA BASELINE NEW	=				
SUBSYSTEM: MDAC ID: ITEM:	EMU 192 CONTAMINANT (							
LEAD ANALYST:	G. RAFFAELLI							
ASSESSMENT:								
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ASSESSMEN ASSESSMEN NASA FMEA	T I	D:	EMU-2	290	5							SA DATA SELIN NE	E	[ [ x		
SUBSYSTEM MDAC ID: ITEM:	:		EMU 290 BATTI	ERY	(1	TEM	490	))								
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ASSESSMENT DATE ASSESSMENT ID: NASA FMEA #:	E: 12/10/8 EMU-289 490-FM2	•	NASA DATA: BASELINE [ ] NEW [ X ]						
SUBSYSTEM: MDAC ID: ITEM:	EMU 289 BATTERY	(ITEM 4							
LEAD ANALYST:	G. RAFF	FAELLI							
ASSESSMENT:									
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THE IOA RECOMMENDS A 2/1R CRITICALITY TO REFLECT POSSIBLE LOSS OF LIFE RESULTING FROM A VIOLENT RUPTURE OF THE BATTERY DUE TO A CONCURRENT SHORT WHICH GENERATES HYDROGEN GAS. THE IOA DOES AGREE WITH THE NASA SCREEN ASSIGNMENTS.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DATA: BASELINE [ ] NEW [ X ]								
	EMU 288 BATTERY	TTERY (ITEM 490)								
LEAD ANALYST:	G. RAFFA	AELLI								
ASSESSMENT:										
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ASSESSME	NT:																
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SUBSYSTEM MDAC ID:			EMU 291 BATTI	ERY	(ITEI	M 490)						
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APPENDIX D

CRITICAL ITEMS

# APPENDIX D POTENTIAL CRITICAL ITEMS

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE
131/162-FM1	100	PRIMARY H2O TANK 1	DIADDED EATTUDE
131/162-FM3	100	PRIMARY H20 TANK 1 PRIMARY H20 TANK 1	BLADDER FAILURE
131/162-FM2	102	PRIMARY H20 TANK 1 PRIMARY H20 TANK 1	LEAK-02 SIDE EXT
131/162-FM1	102		LEAK-H2O SIDE
131/162-FM3		PRIMARY H20 TANK 1	BLADDER FAILURE
131/162-FM3 131/162-FM2	104 105	PRIMARY H20 TANK 1 PRIMARY H20 TANK 1	LEAK-02 SIDE
131/162-FM2 148-FM1	105		LEAK-H2O SIDE
148-FM3		RESERVE H20 TANK	BLADDER FAILURE
	107	RESERVE H20 TANK	LEAK-02 SIDE
148-FM2 132B-FM1	108	RESERVE H2O TANK	LEAK-H2O SIDE
	109	FDW SUPPLY PRESSURE FDW SUPPLY PRESSURE	BIASED HIGH
132B-FM2, FM3 132B-FM5	110 111	FDW SUPPLY PRESSURE	BIASED LOW
132B-FM4	112		EXTERNAL H20 LEAK
		FDW SUPPLY PRESSURE	INTERNAL SHORT
142-FM1 142-FM3	113	WATER RELIEF VALVE	INTERNAL LKG
142-FM1	115	WATER RELIEF VALVE	EXTERNAL LKG
143-FM2	116	WATER CHECK VALVE	INTERNAL LKG
143-FM3	117	WATER CHECK VALVE	FAILS CLOSED
136-FM2	118	WATER CHECK VALVE	EXTERNAL LEAKAGE
136-FM3	119 120	FEEDWATER PRESSURE	REGULATES HIGH
136-FM1	121	FEEDWATER PRESSURE	REGULATES LOW
136-FM4	121	FEEDWATER PRESSURE	INTERNAL LKG
135-FM1	123	FEEDWATER PRESSURE	EXTERNAL LKG
135-FM3	124	FEEDWATER RELIEF VLV	INTERNAL LKG
135-FM2	125	FEEDWATER RELIEF VLV FEEDWATER RELIEF VLV	EXTERNAL LKG
137-FM4	126	FEEDWATER SHUTOFF VLV	FAILS TO OPEN
137-FM5	127	FEEDWATER SHUTOFF VLV	INTERNAL LEAKAGE
137-FM1	128	FEEDWATER SHUTOFF VLV	EXTERNAL LEAKAGE
137-FM2	129	FEEDWATER SHUTOFF VLV	FAILS CLOSED FAILS OPEN
137-FM6	130	FEEDWATER SHUTOFF VLV	
137-FM3	131	FEEDWATER SHUTOFF VLV	ELECTRONICS SHORT
138-FM1	132	FEEDWATER PRESSURE	EXCESSIVE/CONTINU BIASED HIGH
138-FM2	133	FEEDWATER PRESSURE	BIASED LOW
138-FM3	135	FEEDWATER PRESSURE	INTERNAL SHORT
140-FM8	136	SUBLIMATOR (ITEM 140)	EXTERNAL H20 FDW
140-FM2	137	SUBLIMATOR (ITEM 140)	SUBLIMATOR BLOCKE
140-FM7	138	SUBLIMATOR (ITEM 140)	EXTERNAL LCG H20
140-FM6	139	SUBLIMATOR (ITEM 140)	INTERNAL LCG-TO-F
140-FM5	140	SUBLIMATOR (ITEM 140)	INTERNAL LCG-VENT
140-FM9	141	SUBLIMATOR (ITEM 140)	EXTERNAL VENT LOO
140-FM4	142	SUBLIMATOR (ITEM 140)	SLURPER BLOCKED
139-FM5	143	TEMPERATURE SENSOR	EXTERNAL LEAKAGE
	145	TEMPERATURE SENSOR	ELECTRICAL SHORT
125-FM1	147	PITOT ACTUATED VALVE	INTERNAL LEAKAGE
125-FM2	148	PITOT ACTUATED VALVE	INTERNAL LEAKAGE
	240	TIOI MOTORITO ANTIAR	THIERMAN DEAGAGE

NASA	FMEA		ITEM	FAILURE MODE
125-FM3 125-FM4 125-FM4 128-FM3 128-FM1		149	PITOT ACTUATED VALVE PITOT ACTUATED VALVE PITOT ACTUATED VALVE	EXTERNAL LEAKAGE
125-FM4		150	PITOT ACTUATED VALVE	INLET FILTER BLOC
125-FM4		151	PITOT ACTUATED VALVE	FAILS CLOSED
128-FM3		152	CHECK VALVE AND HOUSI	EXTERNAL LEAKAGE
128-FM1		153	CHECK VALVE AND HOUSI	INTERNAL H20 LEAK
128-FM2		154	CHECK VALVE AND HOUSI	FAILED CLOSED
127-FM3		155	PUMP INLET FILTER	EXTERNAL LEAKAGE
127-FM2		156	PUMP INLET FILTER	BLOCKED
			PUMP INLET FILTER	PASSAGE OF CONTAM
141-FM4		158	GAS TRAP (ITEM 141)	EXTERNAL LEAKAGE
		159	GAS TRAP (ITEM 141)	
		160		SCREEN BLOCKED
			GAS TRAP (ITEM 141)	INTERNAL LEAKAGE
			CONDENSATE H20 RELIEF	
			CONDENSATE H20 RELIEF	
134-FM2				VALVE FAILS CLOSE
171-FM5		167	H2O SHUTOFF VALVE	EXTERNAL LEAKAGE
171-FM2, 171-FM1	FM4	168	H2O SHUTOFF VALVE	INTERNAL LEAKAGE
171-FM1		169	H2O SHUTOFF VALVE H2O SHUTOFF VALVE H2O SHUTOFF VALVE	FAILS CLOSED (NO
171-FM3		170	H2O SHUTOFF VALVE	CONTINUOUS MOTOR
171-FM1		171	H2O SHUTOFF VALVE	FILTER ELEMENT BL
171-FM6		172	H2O SHUTOFF VALVE	ELECTRICAL SHORT
171-FM1 171-FM6 172-FM3 172-FM1		173	COOLANT RELIEF VALVE	EXTERNAL LEAKAGE
1/2-FM1		174	COOLANT RELIEF VALVE	FAILS OPEN
170 EWO		175 176	COOLANT RELIEF VALVE COOLANT RELIEF VALVE	BLOCKED INLET FIL
1/2-FM2		178		
172-FM2 123-FM4 123-FM6 123-FM9 123-FM6		170	ROTARY H2O SEPARATOR ROTARY H2O SEPARATOR ROTARY H2O SEPARATOR WATER PUMP (ITEM 123C) WATER PUMP (ITEM 123C) WATER PUMP (ITEM 123C) FAN (ITEM 123A)	PITOT TODE
123-FM0		179	DOTARY HOO SEPARATOR	READINGS RIND
123 TM5		181	WATER DIME (TTEM 123C)	FYTFDNAI IFAKACE
123 FM5		182	WATER FOME (ITEM 123C)	PEDUCED FLOW
123 FM7		183	WATER FOME (ITEM 123C)	TNTEDNAL LEAKAGE
123-FM3		184	FAN (ITEM 123A)	EXTERNAL LEAKAGE
123-FM1		185	FAN (ITEM 123A)	LOW FLOW
123-FM9		186	BRUSHLESS MOTOR	BEARINGS BIND
123-FM10	)	187	BRUSHLESS MOTOR	FAILS OFF
123-FM10		188	BRUSHLESS MOTOR	LOW SPEED
123-FM8		189	BRUSHLESS MOTOR	HIGH SPEED
123-FM11	_	190	BRUSHLESS MOTOR	SHORT
170-FM1		191	MUFFLER (ITEM 170)	EXTERNAL LEAKAGE
480-FM7		192	CONTAMINANT CONTROL	EXTERNAL LEAKAGE
480-FM8		192	CONTAMINANT CONTROL	EXTERNAL LEAKAGE
480-FM2		193	CONTAMINANT CONTROL	PARTICULATE FILTER
480-FM2		194	CONTAMINANT CONTROL	TEFLON SCREEN PAR
480-FM3		196	CONTAMINANT CONTROL	Lioh RELEASED TO
121-FM5		197	CHECK VALVE AND VENT	EXTERNAL LEAKAGE
121-FM3		198	CHECK VALVE AND VENT	VALVE FAILS CLOSE
121-FM2		199	CHECK VALVE AND VENT	SENSOR FAILS LOW
121-FM4		200	CHECK VALVE AND VENT	VALVE FAILS OPEN

121-FM1	NASA FMEA	MDAC-ID	ITEM	FAILURE MODE
202   CHECK VALVE AND VENT   SHORT				
122-FM5				
122-FM1				
122-FM2				
122-FM4				
126-FM2				
114-FM3, FM4			CO2 TRANSDUCER	ELECTRICAL SHORT
114-FM3, FM4	126-FM2	207	FILTER AND ORIFICE	EXTERNAL LEAKAGE
114-FM5	126-FM1	208	FILTER AND ORIFICE	ORIFICE BLOCKED
114-FM5	114-FM3, FM4	210		
145-FM1		211		
145-FM2       214       RELIEF VALVE AND ORIF       INTERNAL LEAKAGE         146-FM2       216       POSITIVE PRESSURE REL       EXTERNAL LEAKAGE         146-FM1       217       POSITIVE PRESSURE REL       FAILS CLOSED         146-FM3       218       POSITIVE PRESSURE REL       FAILS CLOSED         147-FM1       219       NEGATIVE PRESSURE REL       EXTERNAL LEAKAGE         147-FM2       220       NEGATIVE PRESSURE REL       FAIL OPEN         113A-FM3       222       CHECK VALVE AND FILTER       EXTERNAL LEAKAGE         113A-FM4       223       CHECK VALVE AND FILTER       EXTERNAL LEAKAGE         124       CHECK VALVE AND FILTER       INLET GUTLET       OUTLET         125       CHECK VALVE AND FILTER       OUTLET FILTER FAIL       CHECK VALVE AND FILTER       VALVE FAILS CLOSE         113A-FM1       227       CHECK VALVE AND FILTER       VALVE FAILS OPEN         113B-FM2       228       CHECK VALVE AND FILTER       VALVE FAILS OPEN         113B-FM3       229       ADJUSTABLE ORIFICE       EXTERNAL LEAKAGE         113B-FM3       230       ADJUSTABLE ORIFICE       NO FLOW-BLOCKED         113C-FM3       232       ON/OFF VALVE       FAILED CLOSED         113C-FM4       234 <t< td=""><td></td><td>212</td><td></td><td></td></t<>		212		
146-FM2		213	RELIEF VALVE AND ORIF	EXTERNAL LEAKAGE
146-FM1		214	RELIEF VALVE AND ORIF	INTERNAL LEAKAGE
113A-FM3		216		
113A-FM3		217	POSITIVE PRESSURE REL	FAILS OPEN
113A-FM3		218	POSITIVE PRESSURE REL	FAILS CLOSED
113A-FM3		219	NEGATIVE PRESSURE REL	EXTERNAL LEAKAGE
CHECK VALVE AND FILTER EXTERNAL LEAKAGE  CHECK VALVE AND FILTER INLET OR OUTLET  CHECK VALVE AND FILTER INLET FAIL  CHECK VALVE AND FILTER OUTLET FILTER FAIL  CHECK VALVE AND FILTER OUTLET FILTER FAIL  CHECK VALVE AND FILTER VALVE FAILS CLOSE  CHECK VALVE AND FILTER VALVE FAILS OPEN  CHECK VALVE AND FILTER OUTLET FAILS OLOSE  CHECK VALVE AND FILTER INLET FAIL  CHECK VALVE AND FILTER OUTLET FAILS OLOSE  CHECK VALVE AND FILTER INLET FAIL  CHECK VALVE AND FILTER OUTLET FAILS OLOSE  CHECK VALVE AND FILTER INLET FAIL  CHECK VALVE AND FILTER  CHECK V		220		
224 CHECK VALVE AND FILTER INLET OR OUTLET 225 CHECK VALVE AND FILTER INLET FILTER FAIL 226 CHECK VALVE AND FILTER OUTLET FILTER FAIL 113A-FM1 227 CHECK VALVE AND FILTER VALVE FAILS CLOSE 113A-FM2 228 CHECK VALVE AND FILTER VALVE FAILS OPEN 113B-FM3 229 ADJUSTABLE ORIFICE EXTERNAL LEAKAGE 113B-FM1 230 ADJUSTABLE ORIFICE NO FLOW-BLOCKED 113B-FM2 231 ADJUSTABLE ORIFICE HIGH FLOW 113C-FM3 232 ON/OFF VALVE EXTERNAL LEAKAGE 113C-FM2 233 ON/OFF VALVE FAILED CLOSED 113C-FM1 234 ON/OFF VALVE FAILED OPEN 113D-FM4 235 PRIMARY REGULATOR EXTERNAL LEAKAGE 113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR REGULATES LOW 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH				
225 CHECK VALVE AND FILTER INLET FILTER FAIL 226 CHECK VALVE AND FILTER OUTLET FILTER FAIL 113A-FM1 227 CHECK VALVE AND FILTER VALVE FAILS CLOSE 113A-FM2 228 CHECK VALVE AND FILTER VALVE FAILS OPEN 113B-FM3 229 ADJUSTABLE ORIFICE EXTERNAL LEAKAGE 113B-FM1 230 ADJUSTABLE ORIFICE NO FLOW-BLOCKED 113B-FM2 231 ADJUSTABLE ORIFICE HIGH FLOW 113C-FM3 232 ON/OFF VALVE EXTERNAL LEAKAGE 113C-FM2 233 ON/OFF VALVE FAILED CLOSED 113C-FM1 234 ON/OFF VALVE FAILED OPEN 113D-FM4 235 PRIMARY REGULATOR EXTERNAL LEAKAGE 113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR REGULATES LOW 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH	113A-FM4			
226 CHECK VALVE AND FILTER OUTLET FILTER FAIL  113A-FM1 227 CHECK VALVE AND FILTER VALVE FAILS CLOSE  113A-FM2 228 CHECK VALVE AND FILTER VALVE FAILS OPEN  113B-FM3 229 ADJUSTABLE ORIFICE EXTERNAL LEAKAGE  113B-FM1 230 ADJUSTABLE ORIFICE NO FLOW-BLOCKED  113B-FM2 231 ADJUSTABLE ORIFICE HIGH FLOW  113C-FM3 232 ON/OFF VALVE EXTERNAL LEAKAGE  113C-FM2 233 ON/OFF VALVE FAILED CLOSED  113C-FM1 234 ON/OFF VALVE FAILED OPEN  113D-FM4 235 PRIMARY REGULATOR EXTERNAL LEAKAGE  113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE  113D-FM2 237 PRIMARY REGULATOR REGULATES LOW  113D-FM3 238 PRIMARY REGULATOR REGULATES HIGH				
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113A-FM2 128 CHECK VALVE AND FILTER VALVE FAILS OPEN 113B-FM3 229 ADJUSTABLE ORIFICE EXTERNAL LEAKAGE 113B-FM1 230 ADJUSTABLE ORIFICE NO FLOW-BLOCKED 113B-FM2 113C-FM3 231 ADJUSTABLE ORIFICE HIGH FLOW 113C-FM3 232 ON/OFF VALVE EXTERNAL LEAKAGE 113C-FM2 233 ON/OFF VALVE FAILED CLOSED 113C-FM1 234 ON/OFF VALVE FAILED OPEN 113D-FM4 235 PRIMARY REGULATOR EXTERNAL LEAKAGE 113D-FM4 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 113D-FM3 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH	1123 - EW1			
113B-FM3 229 ADJUSTABLE ORIFICE EXTERNAL LEAKAGE 113B-FM1 230 ADJUSTABLE ORIFICE NO FLOW-BLOCKED 113B-FM2 231 ADJUSTABLE ORIFICE HIGH FLOW 113C-FM3 232 ON/OFF VALVE EXTERNAL LEAKAGE 113C-FM2 233 ON/OFF VALVE FAILED CLOSED 113C-FM1 234 ON/OFF VALVE FAILED OPEN 113D-FM4 235 PRIMARY REGULATOR EXTERNAL LEAKAGE 113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH		227		
113B-FM1 230 ADJUSTABLE ORIFICE NO FLOW-BLOCKED 113B-FM2 231 ADJUSTABLE ORIFICE HIGH FLOW 113C-FM3 232 ON/OFF VALVE EXTERNAL LEAKAGE 113C-FM2 233 ON/OFF VALVE FAILED CLOSED 113C-FM1 234 ON/OFF VALVE FAILED OPEN 113D-FM4 235 PRIMARY REGULATOR EXTERNAL LEAKAGE 113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH			ADTHUMABLE ODIFICE	FYTEDNAT LEAVACE
113B-FM2 231 ADJUSTABLE ORIFICE HIGH FLOW 113C-FM3 232 ON/OFF VALVE EXTERNAL LEAKAGE 113C-FM2 233 ON/OFF VALVE FAILED CLOSED 113C-FM1 234 ON/OFF VALVE FAILED OPEN 113D-FM4 235 PRIMARY REGULATOR EXTERNAL LEAKAGE 113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH			ADJUSTABLE ORIFICE	NO FIOW-BLOCKED
113C-FM3 232 ON/OFF VALVE EXTERNAL LEAKAGE 113C-FM2 233 ON/OFF VALVE FAILED CLOSED 113C-FM1 234 ON/OFF VALVE FAILED OPEN 113D-FM4 235 PRIMARY REGULATOR EXTERNAL LEAKAGE 113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH			ADJUSTABLE ORIFICE	HIGH FLOW
113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH			ON/OFF VALVE	FYTERNAL LEAKAGE
113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH	113C-FM2	232	ON/OFF VALVE	FATLED CLOSED
113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH	113C-FM1	233	ON/OFF VALVE	FAILED OPEN
113D-FM1 236 PRIMARY REGULATOR INTERNAL LEAKAGE 113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH			PRIMARY REGULATOR	EXTERNAL LEAKAGE
113D-FM2 237 PRIMARY REGULATOR FAILS CLOSED 113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH			PRIMARY REGULATOR	INTERNAL LEAKAGE
113D-FM3 238 PRIMARY REGULATOR REGULATES LOW 113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH				
113D-FM3 239 PRIMARY REGULATOR REGULATES HIGH				
113E-FM5 241 H2O REGULATOR EXTERNAL LEAKAGE	•			EXTERNAL LEAKAGE
113E-FM1 242 H2O REGULATOR FAILS OPEN-INTERN			H2O REGULATOR	FAILS OPEN-INTERN
113E-FM2 243 H2O REGULATOR REGULATES HIGH			H2O REGULATOR	REGULATES HIGH
113E-FM4 244 H2O REGULATOR REGULATES LOW		244	H2O REGULATOR	REGULATES LOW
113E-FM3 245 H2O REGULATOR FAILS CLOSED	113E-FM3	245	H2O REGULATOR	FAILS CLOSED
111-FM2 246 PRIMARY OXYGEN BOTTLE EXTERNAL LEAKAGE	111-FM2	246	PRIMARY OXYGEN BOTTLE	EXTERNAL LEAKAGE
111-FM1 247 PRIMARY OXYGEN BOTTLE RUPTURE-VIOLENT	111-FM1	247	PRIMARY OXYGEN BOTTLE	RUPTURE-VIOLENT
112-FM7 248 PRIMARY O2 PRESSURE EXTERNAL LEAKAGE	112-FM7	248	PRIMARY O2 PRESSURE	EXTERNAL LEAKAGE
112-FM1 249 PRIMARY O2 PRESSURE DRIFTS LOW	112-FM1	249		
112-FM3 250 PRIMARY O2 PRESSURE FAILS FULL LOW	112-FM3			
112-FM4 251 PRIMARY O2 PRESSURE DRIFTS HIGH	112-FM4			
112-FM2 252 PRIMARY O2 PRESSURE FAILS HIGH				
112-FM5 253 PRIMARY O2 PRESSURE BOURDON TUBE RUPT	112-FM5	253	PRIMARY O2 PRESSURE	BOURDON TUBE RUPT

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE
112-FM6	254	PRIMARY O2 PRESSURE	
115-FM16	255	SHEAR PLATE ASSEMBLY	O2 MANIFOLD FILTER
115-FM18	256	SHEAR PLATE ASSEMBLY	O2 MANIFOLD FILTE
115-FM13	257	SHEAR PLATE ASSEMBLY	EXTERNAL LEAKAGE
115-FM14	258	SHEAR PLATE ASSEMBLY	EXTERNAL LEAKAGE
115-FM15	258	SHEAR PLATE ASSEMBLY	EXTERNAL LEAKAGE
115-FM1	259	SHEAR PLATE ASSEMBLY	FAILS IN THE "OFF
115-FM2	260	SHEAR PLATE ASSEMBLY	FAILS IN THE "IV"
115-FM3	261	SHEAR PLATE ASSEMBLY	FAILS IN THE PRE
115-FM4	262	SHEAR PLATE ASSEMBLY	FAILS IN THE EVA
115-FM7	263	SHEAR PLATE ASSEMBLY	FAILURE TO OPEN
115-FM8	264	SHEAR PLATE ASSEMBLY	FAILURE TO CLOSE
115-FM5	265	SHEAR PLATE ASSEMBLY	
115-FM6	266	SHEAR PLATE ASSEMBLY	
115-FM9	267	SHEAR PLATE ASSEMBLY	
115-FM10	268	SHEAR PLATE ASSEMBLY	
115-FM12	269	SHEAR PLATE ASSEMBLY	
116-FM1	271	EVA POSITION SWITCH	
116-FM2	272	EVA POSITION SWITCH	EXTERNAL LEAKAGE
120A-FM3	273	BLEED ORIFICE	INTERNAL LEAKAGE
120A-FM2	274	BLEED ORIFICE DUAL MODE RELIEF VLV	
120B-FM1	276		
120B-FM2, FM3	277	DUAL MODE RELIEF VLV	
120B-FM5	278	DUAL MODE RELIEF VLV	
120B-FM4	279	DUAL MODE RELIEF VLV FEEDWATER CHECK VALVE	
120C-FM3	280	FEEDWATER CHECK VALVE	
120C-FM1	282 283	FDW SUPPLY PRESSURE	EXTERNAL LEAKAGE
132A-FM5 132A-FM2, FM3	285 285	FDW SUPPLY PRESSURE	FAILED LOW
132A-FM2, FM3	286	FDW SUPPLY PRESSURE	INTERNAL SHORT
490-FM4	287	BATTERY (ITEM 490)	EXTERNAL LEAKAGE
490-FM3	288	BATTERY (ITEM 490)	RELIEF VALVE FAIL
490-FM2	289	BATTERY (ITEM 490)	RELIEF VALVE FAIL
490-FM1	290	BATTERY (ITEM 490)	GENERATION OF HYD
490-FM5	291	BATTERY (ITEM 490)	HIGH RESISTANCE
490-FM1	292	BATTERY (ITEM 490)	SHORT
200-FM2	295	SECONARY O2 BOTTLE	EXTERNAL LEAKAGE
210-FM1	295	SECONARY O2 BOTTLE	EXTERNAL LEAKAGE
210-FM2	296	SECONARY O2 BOTTLE	BOTTLE RUPTURE
215-FM3	297	PRESSURE TRANSDUCER	EXTERNAL LEAKAGE
215-FM4	298	PRESSURE TRANSDUCER	INTERNAL LEAKAGE
215-FM5	298	PRESSURE TRANSDUCER	INTERNAL LEAKAGE
215-FM6	299	PRESSURE TRANSDUCER	ELECTRONICS SHORT
215-FM2	300	PRESSURE TRANSDUCER	READS HIGH
215-FM1, FM7	301	PRESSURE TRANSDUCER	READS LOW
213B-FM4	302	1ST STAGE REGULATOR	EXTERNAL LEAKAGE
213B-FM3	303	1ST STAGE REGULATOR	INTERNAL LEAKAGE
	304	1ST STAGE REGULATOR	REGULATES HIGH
213B-FM2	305	1ST STAGE REGULATOR	REGULATES LOW
213B-FM2	306	1ST STAGE REGULATOR	FAILS CLOSED

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE		
213B-FM1	307	1ST STAGE REGULATOR	DIAPHRAM RUPTURE		
213D-FM7	308	2ND STAGE REGULATOR	EXTERNAL LEAKAGE		
213D-FM1	309	2ND STAGE REGULATOR	INTERNAL LEAKAGE		
213D-FM5	311	2ND STAGE REGULATOR	REGULATES LOW		
213D-FM6	312	2ND STAGE REGULATOR	FAILS CLOSED		
213D-FM9	312	2ND STAGE REGULATOR	FAILS CLOSED		
213D-FM10	313	2ND STAGE REGULATOR	MECH LINKAGE		
213E-FM3	314	SOP PRESSURE GAGE	EXTERNAL LEAKAGE		
213E-FM4	315	SOP PRESSURE GAGE	BOURDN TUBE RUPT		
213F-FM1	318	SOP FILL PORT QD	EXTERNAL LEAKAGE		
	320	SOP FILL PORT QD	FILTER PASSES CON		
	321	SOP ASSEMBLY	BOTTLE INLET FILT		
200-FM1	322	SOP ASSEMBLY	EXTERNAL LEAKAGE		
410-FM1	323	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE		
410-FM2	323	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE		
410-FM5	324	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE		
410-FM6, FM7	324	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE		
410-FM3	325	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE		
410-FM4	325	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE		
410-FM8	326	COMMON MULTIPLE CONN	CONNECTOR DOES NO		
410-FM9	327	COMMON MULTIPLE CONN	CONNECTOR DOES NO		
425-FM2	328	COMMON MULTIPLE CONN	ELECTRICAL POWER		
425-FM3 425-FM6	329 330	COMMON MULTIPLE CONN COMMON MULTIPLE CONN	ELECTRICAL POWER OPEN IN VOLTAGE		
425-FM4	334	COMMON MULTIPLE CONN	BATTERY RECHARGE		
425-FM5	335	COMMON MULTIPLE CONN	BATTERY RECHARGE		
411-FM1	336	HIGH PRESSURE OXYGEN	EXTERNAL LEAKAGE		
412A-FM1	337	PORTABLE H20 LINE	EXTERNAL LEAKAGE		
412B&C-FM1	338	COOLING H20 IN-LINE	EXTERNAL LEAKAGE		
412B&C-FM1	339	COOLING H2O OUT-LINE	EXTERNAL LEAKAGE		
416-FM1	340	BACTERIAL FILTER HOUS	EXTERNAL LEAKAGE		
418-FM4	341	CONDENSATE H20 REGULA	EXTERNAL LEAKAGE		
418-FM1	343	CONDENSATE H20 REGULA	INTERNAL LEAKAGE		
418-FM2	344	CONDENSATE H2O REGULA	FAILS CLOSED		
418-FM1	345	CONDENSATE H20 REGULA	REGULATES LOW		
418-FM2	346	CONDENSATE H2O REGULA	REGUALTES HIGH		
418-FM3	347	CONDENSATE H2O REGULA	MANUAL OVERRIDE		
419-FM3	348	WATER SUPPLY PRESSURE	EXTERNAL LEAKAGE		
419-FM1	349	WATER SUPPLY PRESSURE	INTERNAL LEAKAGE		
419-FM2	350	WATER SUPPLY PRESSURE	FAILED CLOSED		
423-FM4	351	BACTERIA CARTRIDGE	INLET SCREEN BLOC		
423-FM3	352	BACTERIA CARTRIDGE	INLET SECREEN BLO		
423-FM1, FM2	353	BACTERIA CARTRIDGE	FAILURE OF CARTRI		
424-FM1	354	POTABLE H2O FILTER	BLOCKED/CLOGGED		
424-FM2	355 356	POTABLE H2O FILTER	BLOCKED/CLOGGED		
420-FM2	356 357	O2 FILTER AND ORIFICE	EXTERNAL LEAKAGE		
420-FM1	357 350	O2 FILTER AND ORIFICE	FILTER BLOCKED		
311-FM4	359 360	SUIT PRESSURE GAGE	EXTERNAL LEAKAGE		
314-FM3	360 364	SUIT PRESSURE GAGE DCM PURGE VALVE	BOURDON TUBE RUPT EXTERNAL LEAKAGE		
T#-LM2	304	DCM FUNGE VALVE	EATERNAL LEARAGE		

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE			
314-FM1	365	DCM PURGE VALVE	INLET FILTER BLOG			
314-FM1	366	DCM PURGE VALVE	FAILED CLOSED			
314-FM2	367	DCM PURGE VALVE	FAIL OPEN			
314-FM1	368	DCM PURGE VALVE	REDUCED FLOW			
330-FM2	369	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE			
330-FM5	370	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE			
330-FM6	370	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE			
330-FM3	371	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE			
330-FM4	371	COMMON MULTIPLE CONN	EXTERNAL LEAKAGE			
330-FM19	372	COMMON MULTIPLE CONN	FAILS TO MATE			
330-FM20	373	COMMON MULTIPLE CONN	FAILS TO DEMATE			
330-FM9	374	COMMON MULTIPLE CONN	OPEN IN POWER LIN			
330-FM10	375	COMMON MULTIPLE CONN	SHORT IN POWER			
330-FM12	377	COMMON MULTIPLE CONN	SHORT IN BATTERY			
330-FM15	378	COMMON MULTIPLE CONN	OPEN IN VOLTAGE			
330-FM16	379	COMMON MULTIPLE CONN	SHORT IN VOLTAGE			
330-FM13	383	COMMON MULTIPLE CONN	BATTERY RECHARGE			
	384	COMMON MULTIPLE CONN	OXYGEN FLOW BLOCK			
	387	COMMON MULTIPLE CONN	LCG IN/OUT VALVE			
385-FM1	388	HARD UPPER TORSO	VENT LOOP INTERFA			
385-FM2	389	HARD UPPER TORSO	COOLING LOOP INTE			
385-FM2	390	HARD UPPER TORSO	POTABLE H20 LEAKA			
360-FM7	393	VOLUME CONTROL	SHORT IN ONE COMM			
	394 305	VOLUME CONTROL	SHORT ACROSS TWO INCREASED RESISTA			
261_EW1	395 396	VOLUME CONTROL DISPLAY INTENSITY CON				
361-FM1 361-FM1	396 398	DISPLAY INTENSITY CON	INCREASED RESISTA			
361-FM4	399	DISPLAY INTENSITY CON	SHAFT BINDS			
362-FM2	400	EVC SELECTOR SWITCH	OPEN IN PRIMARY			
362-FM2	401	EVC SELECTOR SWITCH	OPEN IN SECONDARY			
362-FM4	402	EVC SELECTOR SWITCH	OPEN IN PRIMARY			
362-FM4	403	EVC SELECTOR SWITCH	OPEN IN SECONDARY			
362-FM6	404	EVC SELECTOR SWITCH	OPEN IN PRIMARY			
362-FM6	405	EVC SELECTOR SWITCH	OPEN IN SECONDARY			
362-FM7	406	EVC SELECTOR SWITCH	OPEN IN PRIMARY			
362-FM7	407	EVC SELECTOR SWITCH	OPEN IN SECONDARY			
362-FM9	408	EVC SELECTOR SWITCH	SHORT TO GROUND			
362-FM1	410	EVC SELECTOR SWITCH	SWITCH FAILS			
364-FM14	414	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM16	414	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM13	415	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM17	415	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM15	416	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM11	417	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM9	417	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM12	418	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM8	418	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM10	419	POWER MODE SELECTOR	SWITCH FAILS OPEN			
364-FM4	420	POWER MODE SELECTOR	SWITCH FAILS OPEN			

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE		
364-FM6	420	POWER MODE SELECTOR	SWITCH FAILS OPEN		
364-FM3	421	POWER MODE SELECTOR POWER MODE SELECTOR	SWITCH FAILS OPEN		
364-FM5	422	POWER MODE SELECTOR	SWITCH FAILS OPEN		
364-FM1	423	POWER MODE SELECTOR	SWITCH STAYS		
364-FM2	424	POWER MODE SELECTOR	SWITCH STAYS		
364-FM19	425	POWER MODE SELECTOR	SHORT-VEHICLE PWR		
364-FM18	426	POWER MODE SELECTOR	SHORT-BATTERY PWR		
365-FM5	434	POWER MODE SELECTOR PUSH-TO-TALK SWITCH FAN SWITCH (ITEM 366) FAN SWITCH (ITEM 366)	FAIL CLOSED		
366-FM2	437	FAN SWITCH (ITEM 366)	FAN POWER ON CONT		
366-FM4	438	FAN SWITCH (ITEM 366)	FAN POWER ON CONT		
	439	FAN SWITCH (ITEM 366)	CLIV POWER "OPEN"		
	440	FAN SWITCH (ITEM 366)	CLIV POWER "CLOSE		
366-FM3	441	FAN SWITCH (ITEM 366)	CLIV POWER SHORT		
366-FM3 366-FM2 367-FM1 367-FM4	443	FAN SWITCH (ITEM 366)	SWITCH FAILS OFF		
367-FM1	445	FEEDWATER VALVE SW	ELECTRICAL OPEN		
367-FM4	446	FEEDWATER VALVE SW	ELECTRICAL OPEN		
30/-rm3	44/	FEEDWATER VALVE SW	ELECTRICAL SHORT		
367- <b>FM</b> 6	448	FEEDWATER VALVE SW	ELECTRICAL SHORT		
367-FM3	449	FEEDWATER VALVE SW	SWITCH FAILS		
367-FM2	450	FEEDWATER VALVE SW			
368-FM1	451	CAUTION AND WARNING			
368-FM3	452	CAUTION AND WARNING			
368-FM2					
368-FM4					
368-FM6					
368-FM7		CAUTION AND WARNING	SWITCH FAILS		
351-FM2	457	BITE INDICATOR	OPEN IN ELECTRICA		
351-FM1	458	BITE INDICATOR	SHORT TO BITE IND		
		ALPHANUMERIC DISPLAY			
		CAUTION AND WARNING			
150-FM8		CAUTION AND WARNING			
	463	CAUTION AND WARNING			
150 EW2	464	CAUTION AND WARNING	MULTIPLEXER INPUT		
150-FM3 150-FM10	465	CAUTION AND WARNING CAUTION AND WARNING	ANALOG TO DIGITAL		
150-FM11	466 467	CAUTION AND WARNING	BITE CIRCUIT FAIL		
350-FM16	467	DCM ELECTRONICS	BITE CIRCUIT FAIL OPEN IN CURRENT		
350-FM17	470	DCM ELECTRONICS	SHORT IN CURRENT		
350-FM15	471	DCM ELECTRONICS	OPEN IN VOLTAGE		
385-FM5	473	DCM ELECTRONICS	EMI FILTER SHORTS		
385-FM4	474	DCM ELECTRONICS	EMI FILTER OPEN		
350-FM3	475	DCM ELECTRONICS	EVC PRIMARY/CLIV		
350-FM3	477	DCM ELECTRONICS	EVC SEC/FEEDWATER		
- 3	479	DCM ELECTRONICS	EVC PRIMARY/CLIV		
	480	DCM ELECTRONICS	EVC SEC/FEEDWATER		
350-FM23	481	DCM ELECTRONICS	EVC PRI/CLIV CURR		
350-FM31	482	DCM ELECTRONICS	EVC SEC/FEEDWATER		
350-FM4	483	DCM ELECTRONICS	EVC SEC/FEEDWATER		

350-FM1	NASA FMEA	MDAC-ID	ITEM	FAILURE MODE		
485	350 <b>-FM</b> 1	484	DCM ELECTRONICS	EVC PRIMARY/CLIV		
A	330 1111					
187   DCM ELECTRONICS						
188						
350-FM3						
150-FM22	350-FM3					
150-FM20						
350-FM20				OPEN IN DC/DC CON		
350-FM22			DCM ELECTRONICS	OPEN IN +14.2V		
350-FM22			DCM ELECTRONICS	SHORT IN 3.8V OUT		
350-FM22		495	DCM ELECTRONICS	SHORT IN +14.2V		
350-FM18		497	DCM ELECTRONICS	SHORT IN 18V OUTP		
S21-FM4	350-FM18	498	DCM ELECTRONICS	OPEN IN LINE		
321-FM4		499				
321-FM3		500				
102-FM2	321-FM1, FM2	501				
102-FM1	321-FM3	502	COOLING CONTROL VALVE	JAMS FULL COLD		
102-FM6	102-FM2	600	NECK RING			
102-FM6	102-FM1	601	NECK RING			
102-FM16	102-FM3		NECK RING			
102-FM16	102-FM6	603				
102-FM25						
102-FM26	102-FM16		WATER LINE	WATER LINE LEAKAG		
102-FM26	102-FM25		MULTIPLE WATER CONNEC	JAM. FAIL TO MAT		
102-FM10			MULTIPLE WATER CONNEC			
612 HARD UPPER TORSO SHEL UNABLE TO MATE 102-FM20 613 GIMBAL ASSY. DISATTACHMENT 102-FM21 614 BELLOWS ASSEMBLY LEAKAGE 102-FM18 615 BODY SEAL CLOSURE LEAKAGE 105-FM6 620 COMBINATION PURGE VLV FAIL CLOSED 105-FM7 621 COMBINATION PURGE VLV FAIL OPEN 105-FM1 622 HELMET ASSEMBLY LEAKAGE 108-FM8 623 EXTRAVEHICULAR VISOR JAM OF SUN VISOR 108-FM3 625 EXTRAVEHICULAR VISOR CRACK IN SUN VISOR 108-FM7 626 EXTRAVEHICULAR VISOR CRACK IN SUN VISOR 108-FM5 627 UPPER/LOWER ARM RESTR LEAKAGE 103-FM5 627 UPPER/LOWER ARM RESTR LEAKAGE 103-FM6, FM8 628 UPPER/LOWER ARM RESTR LOSS OF PRIMARY A 103-FM6, FM8 628 UPPER/LOWER ARM RESTR LOSS OF PRIMARY A 103-FM1 629 SCYE BEARING ASSEMBLY LEAKAGE 103-FM4 630 SCYE BEARING ASSEMBLY LEAKAGE 103-FM9 631 ARM BEARING ASSEMBLY LEAKAGE 103-FM10 632 ARM BEARING ASSEMBLY LEAKAGE 103-FM10 632 ARM BEARING ASSEMBLY LEAKAGE 103-FM10 634 WRIST DISCONNECT LOCK/JAM OPEN 103-FM20 634 WRIST DISCONNECT LOCK/JAM CLOSED 103-FM19 635 WRIST DISCONNECT LOCK JAM CLOSED						
102-FM20	102-FM10					
102-FM21         614         BELLOWS ASSEMBLY         LEAKAGE           102-FM18         615         BODY SEAL CLOSURE         LEAKAGE           105-FM6         620         COMBINATION PURGE VLV         FAIL CLOSED           105-FM7         621         COMBINATION PURGE VLV         FAIL OPEN           105-FM1         622         HELMET ASSEMBLY         LEAKAGE           108-FM8         623         EXTRAVEHICULAR VISOR         JAM OF SUN VISOR           108-FM3         625         EXTRAVEHICULAR VISOR         CRACK IN SUN VISO           108-FM3         625         EXTRAVEHICULAR VISOR         CRAZING           103-FM15         627         UPPER/LOWER ARM RESTR         LEAKAGE           103-FM15         627         UPPER/LOWER ARM RESTR         LOSS OF PRIMARY A           103-FM13, FM14         628         UPPER/LOWER ARM RESTR         LOSS OF PRIMARY A           103-FM6, FM8         628         UPPER/LOWER ARM RESTR         LOSS OF PRIMARY A           103-FM1         629         SCYE BEARING ASSEMBLY         LEAKAGE           103-FM4         630         SCYE BEARING ASSEMBLY         BEARING TORQUES           103-FM9         631         ARM BEARING ASSEMBLY         BEARING TORQUES           103-FM10						
102-FM18 615 BODY SEAL CLOSURE LEAKAGE 105-FM6 620 COMBINATION PURGE VLV FAIL CLOSED 105-FM7 621 COMBINATION PURGE VLV FAIL OPEN 105-FM1 622 HELMET ASSEMBLY LEAKAGE 108-FM8 623 EXTRAVEHICULAR VISOR JAM OF SUN VISOR 108-FM3 625 EXTRAVEHICULAR VISOR CRACK IN SUN VISOR 108-FM7 626 EXTRAVEHICULAR VISOR CRACK IN SUN VISOR 103-FM15 627 UPPER/LOWER ARM RESTR LEAKAGE 103-FM5 627 UPPER/LOWER ARM RESTR LEAKAGE 103-FM6, FM8 628 UPPER/LOWER ARM RESTR LOSS OF PRIMARY A 103-FM6, FM8 628 UPPER/LOWER ARM RESTR LOSS OF PRIMARY A 103-FM1 629 SCYE BEARING ASSEMBLY LEAKAGE 103-FM4 630 SCYE BEARING ASSEMBLY BEARING TORQUES 103-FM9 631 ARM BEARING ASSEMBLY LEAKAGE 103-FM10 632 ARM BEARING ASSEMBLY BEARING TORQUES 103-FM20 634 WRIST DISCONNECT LOCK/JAM OPEN 103-FM20 635 WRIST DISCONNECT LOCK JAM CLOSED 103-FM19 635 WRIST DISCONNECT LOCK JAM CLOSED						
105-FM6 620 COMBINATION PURGE VLV FAIL CLOSED 105-FM7 621 COMBINATION PURGE VLV FAIL OPEN 105-FM1 622 HELMET ASSEMBLY LEAKAGE 108-FM8 623 EXTRAVEHICULAR VISOR JAM OF SUN VISOR 108-FM3 625 EXTRAVEHICULAR VISOR CRACK IN SUN VISOR 108-FM7 626 EXTRAVEHICULAR VISOR CRAZING 103-FM15 627 UPPER/LOWER ARM RESTR LEAKAGE 103-FM5 627 UPPER/LOWER ARM RESTR LEAKAGE 103-FM13, FM14 628 UPPER/LOWER ARM RESTR LOSS OF PRIMARY A 103-FM6, FM8 628 UPPER/LOWER ARM RESTR LOSS OF PRIMARY A 103-FM1 629 SCYE BEARING ASSEMBLY LEAKAGE 103-FM4 630 SCYE BEARING ASSEMBLY LEAKAGE 103-FM9 631 ARM BEARING ASSEMBLY BEARING TORQUES 103-FM10 632 ARM BEARING ASSEMBLY BEARING TORQUES 103-FM10 632 ARM BEARING ASSEMBLY BEARING TORQUES 103-FM20 634 WRIST DISCONNECT LOCK JAM CLOSED 103-FM19 635 WRIST DISCONNECT LOCK JAM CLOSED						
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103-FM21 633 WRIST DISCONNECT LOCK/JAM OPEN 103-FM20 634 WRIST DISCONNECT LOCK JAM CLOSED 103-FM19 635 WRIST DISCONNECT LEAKAGE						
103-FM20 634 WRIST DISCONNECT LOCK JAM CLOSED 103-FM19 635 WRIST DISCONNECT LEAKAGE						
103-FM19 635 WRIST DISCONNECT LEAKAGE				•		
				LEAKAGE		
		636	WRIST DISCONNECT	LOCK FAILURE		

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE		
106-FM1	637	RESTRAINT MODIFIED	RESTRAINT LAYER		
106-FM7	638	RESTRAINT MODIFIED	SIZING LINES		
106-FM5	639	RESTRAINT MODIFIED	PALM BAR SEPARATE		
106-FM2	640	RESTRAINT MODIFIED	PRIMARY AXIAL RES		
106-FM3	640	RESTRAINT MODIFIED	PRIMARY AXIAL RES		
106-FM8	641	BLADDER ASSEMBLY	LEAKAGE		
106-FM10	642	WRIST DISCONNECT	LEAKAGE		
106-FM13	643	WRIST DISCONNECT	BEARING TORQUE		
106-FM15	644	PALM RESTRAINT	PALM BAR RESTRAIN		
106-FM14	645	PALM RESTRAINT	PALM BAR BENT		
104-FM9	646	WAIST RESTRAINT	LEAKAGE		
104-FM11	647	WAIST RESTRAINT	LOSS OF PRIMARY A		
104-FM13	648	WAIST BEARING	LEAKAGE		
104-FM21	649	WAIST BEARING	BEARING TORQUES		
104-FM22	650	LOWER TORSO RESTRAINT	LEAKAGE		
104-FM24	651	LOWER TORSO RESTRAINT	LOSS OF PRIMARY A		
104-FM25	651	LOWER TORSO RESTRAINT	LOSS OF PRIMARY A		
104-FM29	652	BOOT DISCONNECT	LEAKAGE		
104-FM34	653	PRESSURE BOOT ASSY	LEAKAGE		
104-FM32	654	PRESSURE BOOT ASSY	LOSS OF PRIMARY A		
104-FM33	654	PRESSURE BOOT ASSY	LOSS OF PRIMARY A		
104-FM4	656	BODY SEAL CLOSURE	JAMMED OPEN		
104-FM3	657 653	BODY SEAL CLOSURE	JAMMED CLOSED		
104-FM1	658	BODY SEAL CLOSURE	LEAKAGE		
107-FM2	660	RESTRAINT ASSEMBLY	ZIPPER JAMMED		
107-FM3 107-FM6	660	RESTRAINT ASSEMBLY	ZIPPER JAMMED		
107-FM13	662 665	RESTRAINT ASSEMBLY	PUNCTURED OR LEAK		
107-FM13 107-FM17	666	VENT MANIFOLD MULTIUPLE CONNECTOR	COMPLETE BLOCKAGE		
107-FM15	667	MULTIUPLE CONNECTOR	WILL NOT MATE		
107-FM16	668	MULTIUPLE CONNECTOR	LEAKAGE WHEN DEMA LEAKAGE WHEN MATE		
110-FM1	669	BITE VALVE ASSEMBLY	LEAKAGE WHEN MATE		
110-FM4	671	BLADDER ASSEMBLY	LEAKAGE		
110-FM5	672	BLADDER ASSEMBLY	BAG DISLODGED		
	675	ROLLON CUFF	LEAKAGE		
	676	VALVE	FAILS CLOSED		
	677	BLADDER	LEAKAGE		
	678	BLADDER	MISPOSITIONED		
	679	HARNESS	HARNESS LOOSE		
	680	CCA	LOSS OF POWER		
366-FM5	701	FAN SWITCH (ITEM 366)	CLIV SWITCH FAILS		
366-FM6	702	FAN SWITCH (ITEM 366)	CLIV SWITCH FAILS		
368-FM8	703	CAUTION AND WARNING	LOSS OF INPUT PWR		
150-FM1	704	CAUTION AND WARNING	5V POWER SUPPLY		
150-FM2	705	CAUTION AND WARNING	5V REFERENCE SUPP		
150-FM4	706	CAUTION AND WARNING	EMU TIMELINE MEMO		
150-FM5	707	CAUTION AND WARNING	C&W TONE DISCRETE		
150-FM6	708	CAUTION AND WARNING	C&W TONE DISCRETE		
150-FM7	709	CAUTION AND WARNING	FAILURE OF PERMAN		

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE					
150-FM9	710	CAUTION AND WARNING	CPU FAILURE					
150-FM12	711	CAUTION AND WARNING	ELECTRICAL SHORT					
115-FM17	714	SHEAR PLATE ASSEMBLY FILTER CLOGS						
115-FM19	715	SHEAR PLATE ASSEMBLY	CONTAMINATION BRE					
122-FM3	716	CO2 TRANSDUCER	SLOW RESPONSE					
123-FM2	717	FAN (ITEM 123A)	BLADE FRACTURES					
131/162-FM5	718	PRIMÀRY H2O TANK ASSY						
131/162-FM4	719	PRIMARY WATER TANK AS	LEVER LATCH ASSEM					
131/162-FM6	720	PRIMARY WATER TANK AS	GAS LINES CLOG					
140-FM1	721	SUBLIMATOR (ITEM 140)						
161-FM1	726	PLSS/SOP TMG	LOOSE TMG PARTIAL					
174-FM2	728	REAL TIME DATA SYSTEM						
330-FM17	731	COMMON MULTIPLE CONN	ELECTRICAL OPEN					
330-FM18	732	COMMON MULTIPLE CONN						
361-FM2	735	DISPLAY INTENSITY CON						
361-FM5	736	DISPLAY INTENSITY CON	BROKEN SHAFT					
368-FM5	737	CAUTION AND WARNING	SWITCH FAILS					
470-FM1	743	AIRLOCK ADAPTER PLATE						
470-FM2	744	AIRLOCK ADAPTER PLATE						
470-FM3	745	AIRLOCK ADAPTER PLATE	SCU DETACHES					
480-FM1	746	CONTAMINATE CONTROL	FAILS TO REMOVE					
480-FM4	747	CONTAMINANT CONTROL	PRESENCE OF DICHL					
480-FM5, FM6	748	CONTAMINANT CONTROL	OVERHEATING/HYROG					
425-FM8	749	COMMON MULTIPLE CONN	OPEN IN BATT SENS					
425-FM9	750	COMMON MULTIPLE CONN	SHORT IN BATT SEN					
123-FM12	751	FAN/SEPARATOR/PUMP/MO						
114-FM7	752	FAN/SEPARATOR/PUMP/MO PRESSURE SUIT SENSOR	FAILS STUCK					
115-FM20	753	SHEAR PLATE ASSEMBLY	CAM DETACHES					
115-FM21	754	SHEAR PLATE ASSEMBLY SUBLIMATOR (ITEM 140)	MOUNTING SCREW					
140-FM3	755	SUBLIMATOR (ITEM 140)	REDUCED AIR STREA					
140-FM10	756	SUBLIMATOR (ITEM 140)	POROUS PLATE SPAT					
150-FM13	757	CAUTION AND WARNING	5.6V POWER SUPPLY					
150-FM14	758	CAUTION AND WARNING	TIMELINE MEMORY					
300-FM7	75 <del>9</del>	DCM	SCREW BRACKET DIS					
300-FM2	760	DCM ELECTRONICS	SHORT INPUT					
350-FM5	761	DCM ELECTRONICS	INPUT TO OUTPUT					
350-FM6	762	DCM ELECTRONICS	BATTERY POWER					
350-FM10	766	DCM ELECTRONICS	FAN/PUMP SWITCH					
350-FM24	770	DCM ELECTRONICS	SHORT INPUT					
350-FM25	771	DCM ELECTRONICS	DC/DC CURRENT LIM					
350 <b>-FM2</b> 6	772	DCM ELECTRONICS	SHORT INPUT					
350-FM27	773	DCM ELECTRONICS	NEGATIVE CURRENT					
350-FM32	777	DCM ELECTRONICS	SHORT INPUT					
350-FM34	778	DCM ELECTRONICS	ALL SECONDARY VOL					
350-FM35	779	DCM ELECTRONICS	LCD MICROPROCESSOR					
440-=FM5	783	EEH	LEAKAGE AT HUT					
100-FM1	784	PLSS	LOWER BRACKET FRA					
100-FM2	785	PLSS	H2O MAKEUP TUBE					
100-FM3	786	PLSS	O2 PRESSURE RELIEF					

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE		
100-FM4	787	PLSS	EMU/MMU LATCH DIS		
	803	NECK RING AND VENT	EXTERNAL LOOP TAP		
102-FM15	804	WATER LINE AND VENT	REDUCED VENT FLOW		
	805	BODY SEAL CLOSURE	TMG LOOP TAPE LOO		
102-FM19	806	BODY SEAL CLOSURE	MINI WORK STATION		
105-FM3	807	HELMET ASSEMBLY	VALSALVA DEVICE D		
105-FM5	808	HELMET ASSEMBLY	HELMET FOGGING		
105-FM2	809	HELMET ASSEMBLY	VENT PAD DE-BONDS		
108-FM1	810	EVVA	SHELL CRACKED		
	813	UPPER/LOWER ARM RESTR	TMG LOOSE		
103-FM7	814	UPPER ARM RESTRAINT	AXIAL RESTRAINT		
103-FM3	815	SCYE BEARING ASSEMBLY	RESTRAINT BRACKET		
103-FM11	816	ARM BEARING ASSEMBLY	LOWER PRIMARY RES		
103-FM17	817	WRIST DISCONNECT	PRIMARY RESTRAINT		
103-FM18	818	WRIST DISCONNECT	PRIMARY RESTRAINT		
	820	RESTRAINT MODIFIED	TMG ATTACHMENT		
106-FM9	821	BLADDER ASSEMBLY	FLOCK DELAMINATES		
106-FM11	822	WRIST DISCONNECT	RESTRAINT BRACKET		
106-FM12	823	WRIST DISCONNECT	TETHER SEVERS		
104-FM10	824	WAIST RESTRAINT	HOLE OR SEPARATION		
	825	WAIST RESTRAINT	AXIAL RESTRAINT		
	826	WAIST RESTRAINT	TMG LOOSE		
104-FM20	827	WAIST BEARING	TETHER BRACKET LO		
104-FM23	828	WAIST BEARING LOWER TORSO RESTRAINT	HOLE OR SEPARATION		
	829	LOWER TORSO RESTRAINT	TMG SEPARATION		
104-FM30	830	BOOT DISCONNECT	LOSS OF AXIAL RES		
104-FM36	831	PRESSURE BOOT ASSEMBL	HEEL-TOP RETAININ		
104-FM37	832	PRESSURE BOOT ASSEMBL	RUBBER SOLE ABRAD		
104-FM35	833	PRESSURE BOOT ASSEMBL	HOLE OR TEAR		
	834	PRESSURE BOOT ASSEMBL	TMG DISATTACHES		
102-FM8	844	HARD TORSO SHELL	H2O LEAKAGE		
102-FM9	845	HARD TORSO SHELL	VENT RETURN FLOW		
102-FM11	846	HARD TORSO SHELL	GIMBAL PIVOT SOCK		
102-FM13	848	HUT ASSEMBLY	IDB DETACHES		
102-FM14	849	HUT ASSEMBLY	BROKEN GIMBAL TRA		
102-FM28	851	HUT TMG	LOOSE OR HAS HOLE		
103-FM23	852	ARM TMG	LOOSE OR HAS HOLE		
104-FM40	856	WAIST/BRIEF/LTA/BOOT	LOOSE OR HAS HOLE		
106-FM17	858	GLOVE TMG	HOLE OR SEPARATION		
107-FM8	862	RESTRAINT ASSEMBLY	H2O FLOW RESTRICT		
106-FM19	864	MITTEN ASSEMBLY	INSULATION TORN		
103-FM12	865	ARM BEARING ASSEMBLY	LOWER PRIMARY RES		
103-FM16	866	LOWER ARM RESTRAINT A	AXIAL RESTRAINT		
104-FM31	867	BOOT DISCONNECT	LOSS OF AXIAL RES		
101-FM5	870	CCA	CHIN STRAP FAILS		
103-FM2A	872	SCYE BEARING ASSEMBLY	LOSS OF PRIMARY A		
104-FM2	873	BODY SEAL CLOSURE	LOSS OF PRIMARY A		
104-FM12	874	WAIST BEARING	UPPER PRIMARY EXI		
104-FM14	875	WAIST BEARING	LOSS OF BALL BEAR		

NASA FMEA	MDAC-ID	ITEM	FAILURE MODE	
			LOSS OF LOWER PRI	
104-FM15	876	WAIST BEARING		
104-FM16	877	WAIST BEARING	LOSS OF PRIMARY A	
104-FM17	878	WAIST BEARING	LOSS OF PRIMARY A	
104-FM18	879	WAIST BEARING	LOSS OF REAR REST	
104-FM19	880	WAIST BEARING	TETHER BRACKET FR	
104-FM26	881	LOWER TORSO RESTRAINT	LOSS OF HIP JOINT	
104-FM27	882	LOWER TORSO RESTRAINT	CROTCH BUCKLE YIE	
105-FM4	886	HELMET ASSEMBLY	FRESNEL LENS DETA	
106-FM4	887	RESTRAINT MODIFIED	GIMBAL RING FRACT	
107-FM1	888	RESTRAINT ASSEMBLY	ZIPPER DETACHES	
108-FM2	889	EXTRAVEHICULAR VISOR	CRACKED/SCRATCHED	
108-FM4	890	EXTRAVEHICULAR VISOR	EYE SHADES JAMMED	
108-FM9	891	EXTRAVEHICULAR VISOR	TENSION BAND BREA	

#### APPENDIX E DETAILED ANALYSIS

This appendix contains the IOA analysis worksheets supplementing previous results reported in STSEOS Working Paper 1.0-WP-VA86001-15, Analysis of the Extravehicular Mobility Unit, (28 November 1986). Prior results were obtained independently and documented before starting the FMEA/CIL assessment activity. Supplemental analysis was performed to address failure modes not previously considered by the IOA. Each sheet identifies the hardware item being analyzed, parent assembly and function performed. For each failure mode possible causes are identified, and hardware and functional criticality for each mission phase are determined as described in NSTS 22206, Instructions for Preparation of FMEA and CIL, 10 October 1986. Failure mode effects are described at the bottom of each sheet and worst case criticality is identified at the top.

# LEGEND FOR IOA ANALYSIS WORKSHEETS

#### Hardware Criticalities:

- 1 = Loss of life or vehicle
- 2 = Loss of mission or next failure of any redundant item (like or unlike) could cause loss of life/vehicle
- 3 = All others

#### Functional Criticalities:

- 1R = Redundant hardware items (like or unlike) all of which,
   if failed, could cause loss of life or vehicle.
- 2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission.

#### Redundancy Screen A:

- 1 = Is Checked Out PreFlight
- 2 = Is Capable of Check Out PreFlight
- 3 = Not Capable of Check Out PreFlight
- NA = Not Applicable

#### Redundancy Screens B and C:

- P = Passed Screen
- F = Failed Screen
- NA = Not Applicable

# INDEPENDENT ORBITER ASSESSMENT ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 701 FLIGHT: 3/2R

ITEM: FAN SWITCH (ITEM 366)

FAILURE MODE: CLIV SWITCH FAILS IN "VALVE OPEN"

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/2R EVA: 3/3

POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV771887-2

CAUSES: ELECTRICAL ARCING, MATERIAL FAILURE

#### EFFECTS/RATIONALE:

CONCURRENT FAILURE OF ITEM 134 CHECK VALVE WHEN MOTOR NOT OPERATING CAN RESULT IN FLOODING OF FAN SEPARATOR AND MISSION TERMINATION.

#### REFERENCES:

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 702

FLTGHT

FLIGHT: 2/2

ITEM:

FAN SWITCH (ITEM 366)

FAILURE MODE: CLIV SWITCH FAILS IN "VALVE CLOSE"

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 3/2R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV771887-2

CAUSES: ELECTRICAL ARCING, MATERIAL FAILURE

EFFECTS/RATIONALE:

DURING PRE- AND POST-EVA A FAILED CLOSED VALVE CAN RESULT IN INABILITY TO PERFORM LCVG CHANING. DURING EVA, A CONCURRENT FAILURE OF THE 172 CHECK VALVE (WITH A "HARD" CHARGE) CAN RESULT IN SEPARATOR FLOODING DUE TO INABILITY TO REMOVE CONDESATE.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 703

FLIGHT:

2/2

ITEM:

CAUTION AND WARNING SWITCH (ITEM 368)

FAILURE MODE: LOSS OF INPUT POWER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV767792-2

CAUSES: WIRE CHAFFING/SEVERS, CONTACT FRACTURES

EFFECTS/RATIONALE: LOSS OF C&W DISPLAY RESULTS IN MISSION TERMINATION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 704

FLIGHT: 2/2

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)

FAILURE MODE: 5V POWER SUPPLY FAILS HIGH

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) C&W
- 3)
- 4)
- 5)
- 6) 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/2 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: SHORT CIRCUIT, ELECTRONIC VOLTAGE CONTROL CIRCUIT FAILS

## EFFECTS/RATIONALE:

LOSS OF REFERENCE VOLTAGE TO A/D CONVERTER RESULTS IN ANALOG-TO-DIGITAL CONVERSION FUNCTION OF C&W SYSTEM. POSSIBLE FALSE MESSAGES CAN RESULT. MISSION TERMINATION DUE TO LOSS OF C&W FUNCTION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 705 FLIGHT: 2/2

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)

FAILURE MODE: 5V REFERENCE SUPPLY FAILS LOW

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) C&W

3)

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/2

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: OPEN OR SHORT CIRCUIT, ELECTRONIC VOLTAGE CONTROL

CIRCUIT FAILS

EFFECTS/RATIONALE:

LOSS OF ANALOG-TO-DIGITAL CONVERSION FUNCTION FOR C&W PARAMETERS.

MISSION TERMINATION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 706

FLIGHT: 2/2

ITEM:

CAUTION AND WARNING ELECTRONICS (ITEM 150)

FAILURE MODE: EMU TIMELINE MEMORY FAILS

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- C&W 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA: 2/2 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: THERMAL STRESS ON MEMORY, BUS FAILURE

EFFECTS/RATIONALE:

INABILITY TO SEQUENCE PROGRAMS BETWEEN EMU "STATES". TERMINATE

MISSION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 707

FLIGHT:

2/2

ITEM:

CAUTION AND WARNING ELECTRONICS (ITEM 150)

FAILURE MODE: C&W TONE DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- 2) C&W
- 3)
- 4)
- 5)
- 6)
- 7) 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: SHORT CIRCUIT, THERMAL STRESS, VIBRATION

### EFFECTS/RATIONALE:

C&W TONE GENERATED CONTINUOUSLY CAUSING CREW DISCOMFORT AND DEPENDENCE UPON DISPLAY FOR C&W. TERMINATE MISSION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 708 FLIGHT: 2/1R

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)

FAILURE MODE: C&W TONE DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) C&W
- 3)
- 4)
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2 EVA: 2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: ELECTRICAL OPEN, THERMAL STRESS, BUFFER FAILURE

#### EFFECTS/RATIONALE:

LOSS OF TONE CAN RESULT IN CREWPERSON NOT BEING MADE AWARE OF A PARTICULAR FAILURE (UPON ITS DETECTION BY THE C&W SYSTEM). IF A SECOND FAILURE (I.E., A SUIT LEAK, HIGH CO2, OR FAILED SUBLIMATOR) SHOULD OCCUR IN CONCERT WITH TONE FAILURE, CREWPERSON REACTION TIME COULD BE SIGNIFICANTLY REDUCED AND MAY RESULT IN LOSS OF LIFE. MISSION TERMINATION WOULD OCCUR FOR THE FIRST FAILURE IF DETECTED.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 2/2 MDAC ID: 709

CAUTION AND WARNING ELECTRONICS (ITEM 150) ITEM:

FAILURE MODE: FAILURE OF PERMANENT MEMORY

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) C&W

3)

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/2

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: INPUT/OUTPUT FAILURE, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:

INABILITY OF CWS TO PERFORM ITS FUNCTIONS WITH INTEGRITY.

MISSION TERMINATION WILL RESULT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 710

FLIGHT: 2/1R

TTEM:

CAUTION AND WARNING ELECTRONICS

FAILURE MODE: CPU FAILURE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) C&W
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA: 2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: I/O PORT FAILURE, GATE FAILURE, THERMAL STRESS, OPEN,

SHORT

EFFECTS/RATIONALE:

INABILITY TO PERFORM C&W PROCESSING AND CHECKS. MISSION TERMINATION. IF CPU FAILURE INHIBITS TONE USAGE AND IS COMBINED WITH A SECOND CRITICAL EMU FAILURE LOSS OF LIFE CAN RESULT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 711

FLIGHT:

2/1R

ITEM:

CAUTION AND WARNING ELECTRONICS (ITEM 150)

FAILURE MODE: ELECTRICAL SHORT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- 2) C&W
- 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

# CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: CONTAMINATION, VIBRATION, WIRE CHAFFING

# EFFECTS/RATIONALE:

LOSS OF ANY POWER SUPPLY OR MAJOR ELECTRONIC FUNCTION CAN SEVERLY INHIBIT CWS OPERATION. MISSION TERMINATION. POSSIBLE CREWPERSON LOSS IF COMBINED WITH A SECOND "CRITICAL" EMU FAILURE DURING EVA.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

712

FLIGHT:

3/3

ITEM:

PRIMARY REGULATOR (ITEM 113D)

FAILURE MODE: OSCILLATING OUTPUT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/3

EVA:

3/3

POST-EVA:

3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV77873-12

CAUSES: CONTAMINATION, BALANCE STEM MISALIGNED

# EFFECTS/RATIONALE:

OSCILLATING OUTPUT WITHIN ACCEPTABLE PRESSURE LIMITS WILL HAVE NO IMPACT TO MISSION OR CREWMEMBER.

HIGHEST CRITICALITY HDW/FUNC DATE: SUBSYSTEM: EMU MDAC ID: 713 FLIGHT: 3/3 ITEM: H2O REGULATOR (ITEM 113E) FAILURE MODE: OSCILLATING OUTPUT LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) LSS 3) PLSS 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3 REDUNDANCY SCREENS: A [ ] B [ ] C [ ] LOCATION: PART NUMBER: SV77873-12 CAUSES: CONTAMINATION, BALANCE STEM MISALIGNED EFFECTS/RATIONALE: OSCILLATING OUTPUT WITHIN ACCEPTABLE PRESSURE LIMITS WILL HAVE NO IMPACT TO MISSION OR IMPACT CREWPERSON SAFETY.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 714 FLIGHT: 2/2

ITEM: SHEAR PLATE ASSEMBLY (ITEM 115)

FAILURE MODE: FILTER CLOGS AT DCM FILL OR END FITTING

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 3/3

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV778540-26

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:

POSSIBLE INABILITY TO CHARGE THE PLSS WITH 02. MISSION TERMINATION WILL RESULT DURING PRE-EVA AND/OR POST-EVA.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

FLIGHT:

3/2R

ITEM:

MDAC ID: 715

SHEAR PLATE ASSEMBLY (ITEM 115)

FAILURE MODE: CONTAMINATION BREAKTHROUGH AT DCM END FITTING

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/2R 3/2R

EVA: POST-EVA:

3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV778540-26

CAUSES: FILTER EROSION

# EFFECTS/RATIONALE:

CONTAMINATON WOULD NORMALLY BE PICKED UP BY 02 MANIFOLD FILTERS; HOWEVER, IF THESE FILTERS WERE ALSO FAILED CONTAMINATION CAN RESULT IN FAILURE OF THE 113 REGULATOR AND REQUIRE SOP USAGE TO RETURN TO VEHICLE.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

716

FLIGHT:

2/1R

ITEM:

CO2 TRANSDUCER (ITEM 122)

FAILURE MODE: SLOW RESPONSE

LEAD ANALYST: G. RAFFAELLI

SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV767798-1

CAUSES: CONTAMINATION, MEMBRANE DOES NOT PASS SAMPLE

#### EFFECTS/RATIONALE:

NO IMMEDIATE EFFECT RESULTS FROM THE SENSOR FAILURE; HOWEVER, IF THE CCC ALSO FALIED, HIGH CO2 LEVEL CAN RESULT IN CREWPERSON LOSS THROUGH DISORIENTATION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 717 FLIGHT: 1/1

ITEM: FAN (ITEM 123A)
FAILURE MODE: BLADE FRACTURES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7) 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 1/1 EVA: 1/1 POST-EVA: 1/1

REDUNDANCY SCREENS: A [ 3 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV787994-8

CAUSES: MATERIAL DEFECT, VIBRATION

## EFFECTS/RATIONALE:

FRACTURE OF FAN BLADE RESULTS IN LOSS OF VENT LOOP; IF SOP ALSO FAILS, CREWPERSON CAN BE LOST. ADDITIONALLY, SEINCE THE FAN BLADES ARE METALLIC, A FAN BLADE STRIKING THE HOUSING CAN RESULT IN AN OXYGEN FIRE.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

718 MDAC ID:

FLIGHT:

SUBSYS LEAD: G. RAFFAELLI

3/1R

ITEM:

PRIMARY H2O TANK ASSEMBLY (ITEM 131/162)

FAILURE MODE: LEVER LATCH ASSEMBLY FAILS - BATTERY

LEAD ANALYST: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1)

2)

3)

4)

5) 6)

7)

8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

/NA PRE-EVA:

/NA EVA:

/NA POST-EVA:

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV769592-24

CAUSES: SPRING FRACTURE, LATCH FRACTURE, MATERIAL DEFECT

EFFECTS/RATIONALE:

THE LATCH FEATURES TWO LOCKING MECHANISMS FOR THE BATTERY. BATTERY ELECTRICAL CONNECTION AND THE TMG PROVIDE ADDITIONAL RETENTION CAPABILITY. FAILURE OF ONE LOCK MECHANISM WILL HAVE NO IMPACT, HOWEVER, FAILURE OF ALL REDUNDANT MECHANISMS AND THE SOP CAN RESULT IN CREWPERSON LOSS.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 719

FLIGHT:

3/1R

ITEM:

PRIMARY WATER TANK ASSEMBLY (ITEM 131/162)

FAILURE MODE: LEVER LATCH ASSEMBLY FAILS - CCC

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/2R

EVA: POST-EVA:

3/1R 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV769592-24

CAUSES: SPRING FRACTURE, LATCH FRACTURE, MATERIAL DEFECT

# EFFECTS/RATIONALE:

THE LATCH FEATURES TWO LOCKING MECHANISMS FOR THE CCC. THE CCC CONNECTIONS AND THE TMG PROVIDE ADDITIONAL RETENTION CAPABILITY. FAILURE OF ONE LOCK MECHANISM WILL HAVE NO IMPACT, HOWEVER, FAILURE OF ALL REDUNDANT MECHANISMS FOR CCC RETENTION CAN RESULT IN CREWPERSON LOSS FROM DEPRESSURIZATION.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 2/1R MDAC ID: 720

PRIMARY WATER TANK ASSEMBLY (ITEM 131/162) ITEM:

FAILURE MODE: GAS LINES CLOG

SUBSYS LEAD: G. RAFFAELLI LEAD ANALYST: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

HDW/FUNC FLIGHT PHASE

2/2 PRE-EVA: 2/1R EVA:

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ F ]

LOCATION:

PART NUMBER: SV769592-24

CAUSES: EXCESSIVE KRYTOX OR BLADDERS MOVES AND BLOCKS LINES

EFFECTS/RATIONALE:

LOSS OF BLADDER PRESSUREANT WILL RESULT IN LOSS OF CAPABILITY TO SUPPLY SUBLIMATOR PRESSURIZED FEEDWATER AND TO SUPPLY MAKEUP LCVG H2O/COOLING H2O. THIS WILL RESULT IN LOSS OF COOLING FUNCTION AND MISSION TERMINATION. IF SOP ALSO LOST, CREWPERSON CAN BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 721

FLIGHT:

2/1R

ITEM:

SUBLIMATOR (ITEM 140)

FAILURE MODE: BREAKTHROUGH

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R 2/2

POST-EVA:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV783850-14

CAUSES: CONTAMINATION

### EFFECTS/RATIONALE:

LOSS OF SUBLIMATOR RESULTS IN LOSS OF PRIMARY TEMPERATURE CONTROL TECHNIQUE. MISSION TERMINATION RESULTS; HOWEVER, IF COMBINED WITH LOSS OF SOP COOLING, CREWPERSON CAN BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 723 FLIGHT: 3/3

ITEM: POSITIVE PRESSURE RELIEF VALVE (ITEM 146)

FAILURE MODE: VALVE CHATTER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6) 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV787036-3

CAUSES: SPRING UNSEAT/RESEAT FORCE HIGH

### EFFECTS/RATIONALE:

SUIT PRESSURE WILL BE "JUMPY" DURING DEPRESS DUE TO VALVE CHATTER BUT WILL NOT RESULT IN MISSION TERMINATION OR CREWPERSON INJURY.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 724 FLIGHT: 2/1R

ITEM: RESERVE WATER TANK (ITEM 148)

FAILURE MODE: GAS LINES CLOG

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2

EVA: 2/2 EVA: 2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: SV769592-24

CAUSES: EXCESSIVE KRYTOX ON BLADDERS MOVES AND BLOCKS LINES

#### EFFECTS/RATIONALE:

LOSS OF BLADDER PRESSURANT WILL RESULT IN LOSS OF CAPABILITY TO EMPLOY SUBLIMATOR AND TO SUPPLY MAKEUP H20 FOR LCVG AND COOLING LOOPS. MISSION TERMINATION. IF SOP ALSO LOST, CREWPERSON CAN BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 726

FLIGHT:

1/1

ITEM:

PLSS/SOP TMG (ITEM 161)

FAILURE MODE: LOOSE TMG PARTIALLY EXPOSES PLSS/SOP

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

1/1 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV772168-15

CAUSES: SEAM SEPARATION, THREAD/CORD BREAKS, FASTENER OPENS

EFFECTS/RATIONALE:

LOCAL "HOT/COLD" SPOT WILL RESULT. IF HEATING RESULTS ON PLSS O2 BOTTLES OR SOP O2 BOTTLES, GAS PRESSURE CAN SIGNIFICANTLY INCREASE DUE TO NO PRESSURE RELIEF AT THE BOTTLES. POSSIBLE RUPTURE/EXPLOSION OF OXYGEN TANK(S) CAN CAUSE LOSS OF CREWPERSON.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 727 FLIGHT: 3/3 ITEM: REAL TIME DATA SYSTEM (ITEM 174) FAILURE MODE: LOSS OF SIGNAL LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3 REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV791230-2

CAUSES: ELECTRICAL OPEN, POWER LOSS, COMPONENT/SENSOR FAILURE

EFFECTS/RATIONALE:

EKG SIGNAL NOT REQUIRED FOR EVA.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 728 FLIGHT: 2/1R

ITEM: REAL TIME DATA SYSTEM

FAILURE MODE: ELECTRICAL SHORT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2)

3)

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV791230-2

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:

ELECTRICAL SHORT CAN CAUSE PARTIAL TO TOTAL LOSS OF DC/DC CONVERTER OR EXCESSIVE CURRENT DRAW. MISSION TERMINATION RESULTS. IF SOP IS ALSO LOST, CREWPERSON CAN BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 729 FLIGHT: 3/3

ITEM: FIRST STAGE REGULATOR (ITEM 213B)

FAILURE MODE: OSCILLATING OUTPUT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) LSS
- 3) SOP
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV778475-13

CAUSES: CONTAMINATION, BALANCE STEM AND SPRING NOT MATCHED UP

EFFECTS/RATIONALE:

AN OSCILLATING OUTPUT WITHIN PRESSURE LIMITS WILL HAVE NO EFFECT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 730 FLIGHT: 3/3

ITEM: SECOND STAGE REGULATOR (ITEM 213D)

FAILURE MODE: OSCILLATING OUTPUT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) LSS

3) SOP

4)

5)

6)

7)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3 EVA: 3/3

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV778475-13

CAUSES: CONTAMINATION, MISMATCHED PARTS

EFFECTS/RATIONALE:

OSCILLATING OUTPUT WITHIN PRESSURE LIMITS WILL HAVE NO IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 731 FLIGHT: 2/2 ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330) FAILURE MODE: ELECTRICAL OPEN - BATTERY RECHARGE SENSE LINE LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) LSS 3) DCM 4) 5) 6) 7) 8)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2 EVA: 3/3 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

9)

PART NUMBER: SV778872-11

CAUSES: VIBRATION, CONTACT SEVERS

EFFECTS/RATIONALE:

LOSS OF SENSE SIGNAL WILL RESULT IN INABILITY TO RECHARGE BATTERY. MISSION TERMINATION CAN RESULT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 732

FLIGHT: 2/2

ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

FAILURE MODE: ELECTRICAL SHORT - BATTERY RECHARGE SENSE LINE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2

PRE-EVA: 2/2 EVA: 3/3 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV778872-11

CAUSES: CONTAMINATION, VIBRATION, CHAFFING

EFFECTS/RATIONALE:

SHORT WILL CAUSE BATTERY DISCHARGE AND WILL RESULT IN MISSION TERMINATON AT PRE-EVA.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 733 FLIGHT: 3/2R

ITEM: VOLUME CONTROL (ITEM 360) FAILURE MODE: INTERMITTENT OPERATION

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/2R EVA: 3/2R POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV767784-1

CAUSES: CORROSION/CONTAMINATION ON WIPER

EFFECTS/RATIONALE:

EGRADED COMUNICATIONS OPERATION. IF BOTH COMMUNICATIONS SETS ARE

FAILED, TERMINATE MISSION.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU MDAC ID: 734

FLIGHT:

3/2R

ITEM:

COLUME CONTROL (ITEM 360)

FAILURE MODE: SHAFT BREAKS

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- LSS 2)
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/2R 3/2R EVA: POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV767784-1

CAUSES: IMPACT, EXCESSIVE FORCE APPLIED TO SHAFT

EFFECTS/RATIONALE:

INABILITY TO CHANGE VOLUME. POSSIBLE LOSS OF ONE COMMUNICATIONS SET. TERMINATE MISSION IF BOTH SETS ARE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

735

FLIGHT:

2/2

ITEM:

DISPLAY INTENSITY CONTROL (ITEM 361)

FAILURE MODE: INTERMITTENT OPERATION

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV767785-1

CAUSES: CONTAMINATION ON CONTACTS

EFFECTS/RATIONALE:

PROBABLE DISPLAY LOSS. TERMINATE MISSION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 736 FLIGHT: 3/3

ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)

FAILURE MODE: BROKEN SHAFT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) LSS

3) DCM

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3 EVA: 3/3

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV767785-1

CAUSES: IMPACT, EXCESSIVE FORCE

EFFECTS/RATIONALE:

INABILITY TO VERY DISPLAY INTENSITY. IF ENVIRONMENT IS BRIGHT,

DISPLAY MAY REQUIRE SHADING.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 737

FLIGHT:

2/2

ITEM:

CAUTION AND WARNING SWITCH (ITEM 368)

FAILURE MODE: SWITCH FAILS IN CENTER (OFF) POSITION

LEAD ANALYST: G. RAFFAELLI

SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV767792-2

CAUSES: BEARING BINDS, CAM BINDS, CORROSION

## EFFECTS/RATIONALE:

INABILITY TO EMPLOY PROGRAM OR STATUS FUNCTION. THIS WILL RESULT IN MISSION TERMINATION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 738

FLIGHT:

3/3

ITEM:

SUIT PRESSURE GAGE (ITEM 311)

FAILURE MODE: LIGHT FAILS OFF

LEAD ANALYST: G. RAFFAELLI

SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- LSS 2)
- DCM 3)
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE

HDW/FUNC

PRE-EVA:

3/3

EVA:

3/3

POST-EVA:

3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV767706-3

CAUSES: OPEN CIRCUIT, VIBRATION

EFFECTS/RATIONALE:

NO MISSION IMPACT. CREWPERSON CAN EMPLOY AVAILABLE LIGHTING OR

C&W DISPLAY.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 739 FLIGHT: 3/3

ITEM: DCM TMG (ITEM 384)

FAILURE MODE: PARTIALLY EXPOSES DCM

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV771987-11

CAUSES: SEAM SEPARATION, THREAD/CORD SEVERS OR COMES UNDONE

## EFFECTS/RATIONALE:

LOCAL "COLD/HOT" SPOTS ON DCM ARE REMOTE FROM CREWPERSON AND HIGH PRESSURE OXYGEN. ELECTRONICS SHOULD NOT BE AFFECTED DUE TO HEAT DISTRIBUTION. NO IMPACT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 742

FLIGHT:

3/3

ITEM:

SHEATH ASSEMBLY (ITEM 428)

FAILURE MODE: CLOTH TORN

LEAD ANALYST: G. RAFFAELLI

SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- SCU 2)
- 3)
- 4)
- 5)
- 6) 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/3

EVA:

3/3

POST-EVA:

3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV771749-3

CAUSES: DEFECTIVE MATERIAL, ABRASION, SEAM SEPARATES

EFFECTS/RATIONALE:

NO IMPACTS SINCE SCU IS NOT IN A SEVERE THERMAL ENVIRONMENT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 743 FLIGHT: 2/2

AIRLOCK ADAPTER PLATE (ITEM 470) ITEM:

FAILURE MODE: ADAPTER DETACHES FROM WALL

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2)

3)

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

/NA

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV767680-03

CAUSES: MOUNTING BRACKET FRACTURES

EFFECTS/RATIONALE:

LOSS OF ANY ONE BRACKET WOULD RESULT IN AAP DETACHING. MISSION TERMINATION. FAILURE MODE WILL MOST LIKELY OCCUR DURING ASCENT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 744 FLIGHT: 2/2

ITEM: AIRLOCK ADAPTER PLATE (ITEM 470)

FAILURE MODE: EMU DETACHES FROM AAP

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2)

3)

4)

5)

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: /NA

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV767680-03

CAUSES: LATCH MECHANISM FAILS OPEN/FRACTURES, PIN FRACTURES

EFFECTS/RATIONALE:

LOSS OF ONE OF TWO PIN-LATCH MECHANISMS OR ONE OF TWO PIN INSERT MECHANISMS CAN RESULT IN DETACHMENT DURING ASCENT LOADS. MISSION TERMINATION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 745 FLIGHT: 2/2

ITEM: AIRLOCK ADAPTER PLATE (ITEM 470)

FAILURE MODE: SCU DETACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2)

3)

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: EVA:

2/2

POST-EVA:

/ 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV767680-03

CAUSES: SCU LATCH FAILS OPEN/FRACTURES

EFFECTS/RATIONALE:

SCU DETACHMENT CAN RESULT IN DAMAGE TO SCU, AIRLOCK, AND EMU

DURING ASCENT. MISSION TERMINATION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 746

FLIGHT:

2/1R

ITEM:

CONTAMINATE CONTROL CARTRIDGE (ITEM 480)

FAILURE MODE: FAILS TO REMOVE CO2

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV792600-00

CAUSES: CHANNELING, EARLY LIFE LIMIT REACHED, MOISTURE

PENETRATION

EFFECTS/RATIONALE:

LOSS OF CO2 REMOVAL CAPABILITY WILL RESULT IN MISSION TERMINATION. IF CONCURRENT CO2 SENSOR FAILURE ALSO OCCURS,

CREWPERSON CAN BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

748

FLIGHT:

2/1R

ITEM:

CONTAMINANT CONTROL CARTRIDGE (ITEM 480)

FAILURE MODE: OVERHEATING/HYROGEN GENERATION

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

# CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV792600-00

CAUSES: WATER IN LIOH

# EFFECTS/RATIONALE:

DEGRADED CO2 REMOVAL CAPABILITY WILL RESULT IN MISSION

TERMINATION. IF COUPLED WITH A CO2 SENSOR FAILURE CREWPERSON CAN

BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 749

FLIGHT:

2/2

ITEM:

COMMON MULTIPLE CONNECTOR

FAILURE MODE: OPEN IN BATT SENSE LINE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- SCU 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE

HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

/NA 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV771763-3

CAUSES: VIBRATION, WIRE SEVERS

EFFECTS/RATIONALE:

LOSS OF SENSE SIGNAL WILL RESULT IN INABILITY TO RECHARGE

BATTERY. MISSION TERMINATION CAN RESULT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

750

FLIGHT: 2/2

ITEM:

COMMON MULTIPLE CONNECTOR

FAILURE MODE: SHORT IN BATT SENSE LINE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SCU
- 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

/NA 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV771763-3

CAUSES: VIBRATION, CONTAMINATION

SHORT WILL CAUSE BATTERY DISCHARGE DURING IV OPERATION. NOT

APPLICABLE TO EVA.

EFFECTS/RATIONALE:

DATE:

HIGHEST CRITICALITY HDW/FUNC

1/1

SUBSYSTEM: EMU

MDAC ID: 751 FLIGHT:

ITEM:

FAN/SEPARATOR/PUMP/MOTOR ASSEMBLY

FAILURE MODE: O2 LEAKAGE TO ELECTRONICS/ROTOR

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- EMU 1)
- 2) LSS
- PLSS 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

1/1

EVA: POST-EVA:

1/1 1/1

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV787994-8

CAUSES: SEAL FAILURE-GALLED, AGE, WEAR

EFFECTS/RATIONALE:

O2 LEAKAGE INTO ELECTRONICS CAN RESULT IN AN OXYGEN FIRE AND

CREWPERSON LOSS.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 752

FLIGHT:

3/2R

ITEM:

PRESSURE SUIT SENSOR

FAILURE MODE: FAILS STUCK AT NOMINAL PRESSURE VALUE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/2R

EVA:

3/2R

POST-EVA:

3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV767788-2

CAUSES: INTERNAL LINKAGE FAILURE, WIPER STICKS

# EFFECTS/RATIONALE:

IF ONLY ONE FAILURE, NO IMPACTS WOULD RESULT. HOWEVER, IF COMBINED WITH A PLSS REGULATOR FAILURE OR A LEAK THE SOP WOULD NECESSARILY BE USED AND MISSION TERMINATION WOULD RESULT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 753 FLIGHT: 2/1R

ITEM: SHEAR PLATE ASSEMBLY

FAILURE MODE: CAM DETACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV778540-26

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE, JOINT FRACTURES

#### EFFECTS/RATIONALE:

FREE MOVEMENT OF THE REGULATOR ASSEMBLY ACTUATION MECHANISM CAN RESULT IN MOVEMENT OUT OF THE EVA POSITION. WERE THIS TO OCCUR WITH FAILURES OF REDUNDANT PRESSURE MAINTENENACE FUNCTIONS (E.G., A LEAK) THE PLSS AND SOP MAY NOT BE AVAILABLE AND CREWPERSON COULD BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 754 FLIGHT: 3/1R

ITEM: SHEAR PLATE ASSEMBLY

FAILURE MODE: MOUNTING SCREW FRACTURES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/2R
EVA: 3/1R
POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: SV778540-26

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE

#### EFFECTS/RATIONALE:

THE IOA RECOGNIZES THAT 10 MOUNTING SCREWS EXIST AND SEVEN ARE REQUIRED TO MAINTAIN INTEGRITY. THEREFORE 3 SCREW MUST BE LOST BEFORE THE SYSTEM AND CREWPERSON COULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM:

EMU

MDAC ID: 755 FLIGHT:

2/1R

ITEM:

SUBLIMATOR (ITEM 140)

FAILURE MODE: REDUCED AIR STREAM HEAT REMOVAL

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- PLSS 3)
- 4)
- 5)
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE

HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV783850-14

CAUSES: CONTAMINANT DEPOSITION ON HEAT EXCHANGER WALLS

# EFFECTS/RATIONALE:

LOSS OF HEAT EXCHANGER EFFICIENCY CAN RESULT IN WARMER VENT FLOW THAN DESIRED. THIS IN TURN DEGRADES THE HUMIDITY CONTROL FUNCTION AND CAN LEAD TO FOGGING OF THE HELMET AREA AND SOP OPERATION. MISSION TERMINATION CAN RESULT. IF THE SOP WERE ALSO FAILED, CREWPERSON CAN BE LOST FROM DISORIENTATION DUE TO HELMET FOGGING.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 756 FLIGHT: 2/1R

ITEM: SUBLIMATOR (ITEM 140)

FAILURE MODE: POROUS PLATE SPATIAL RELATION TO SUBLIMATOR

CHANGES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1)

2)

3)

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV783850-14

CAUSES: IMPACT ON POROUS PLATE MOUNTING EDGE

EFFECTS/RATIONALE:

DECREASED EFFICIENCY CAN LEAD TO LOSS/DEGRADATION OF HUMIDITY CONTROL AND COOLING FUNCTIONS. MISSION TERMINATION WILL RESULT AS WILL SOP OPERATIONS. WERE THE SOP ALSO FAILED, THE CREWPERSON WOULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 757

FLIGHT: 2/1R

ITEM:

CAUTION AND WARNING ELECTRONICS (ITEM 150)

FAILURE MODE: 5.6V POWER SUPPLY FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- **EMU** 1)
- 2) C&W
- 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

POST-EVA:

2/2

EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

CAUSES: OPEN AT 5.6V INPUT

EFFECTS/RATIONALE:

LOSS OF 5V NON-VOLATILE RAM POWER AND 5V DIGITAL POWER SUED BY NUMEROUS C&W COMPONENTS THEREBY CAUSING OVERALL C&W LOSS. MISSION TERMINATION SHOULD RESULT. ADDITIONALLY, WERE A SIMULTANEOUS CCC FAILURE TO OCCUR, THE CREWPERSON COULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

758

FLIGHT:

2/1R

ITEM:

CAUTION AND WARNING ELECTRONICS (ITEM 150)

FAILURE MODE: TIMELINE MEMORY FAILS AT X=1

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) C&W
- 3)
- 4)
- 5)
- 6)
- 7) 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R 2/2

POST-EVA:

CAUSES: INTERNAL MEMORY ADDRESS LATCH FAILS CLOSED

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV785970-5

EFFECTS/RATIONALE:

LOSS OF NUMEROUS EVA CAUTION AND WARNING MONITORING FUNCTIONS (INCLUDING CO2 LEVELS). MISSION TERMINATION. WERE THE CCC TO ALSO FAIL, THE CREWPERSON COULD BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 759 FLIGHT: 3/1R

ITEM: DCM

FAILURE MODE: SCREW BRACKET DISATTACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/2R
EVA: 3/1R
POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER:

CAUSES: IMPACT, STRIPPED SCREW, MATERIAL DEFECT/FATIGUE

#### EFFECTS/RATIONALE:

NO IMPACT FOR FAILURE OF SINGLE SCREW/BRACKET; HOWEVER, IF ALL WERE TO FAIL THE DCM COULD DETACH FROM THE HUT AND CAUSE LOSS OF CREWPERSON DUE TO GROSS EXTERNAL OXYGEN LEAKAGE.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 760 FLIGHT: 3/1R

DCM ELECTRONICS (ITEM 350) ITEM:

FAILURE MODE: SHORT INPUT TO OUTPUT IN PRIMARY EVC CURRENT

LIMITER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- **EMU** 1)
- LSS 2)
- DCM 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/2R EVA: 3/1R

POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

#### EFFECTS/RATIONALE:

LOSS OF CURRENT LIMITER FUNCTION. NO INPACT UNLESS SUBSEQUENT FAILURE IN DOWNSTREAM ELECTRONICS (I.E., A SHORT) RESULTS IN EXCESSIVE CURRENT DRAW UPON THE BATTERY. THIS CAN RESULT IN A SHORTENED MISSION OR LOSS OF BATTERY POWER. IF BATTERY POWER IS LOST THE SOP WOULD BE EMPLOYED TO RETURN TO VEHICLE. THEREFORE, LOSS OF LIFE CAN RESULT IF THE SOP WERE ALSO FAILED.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

761

FLIGHT:

3/1R

ITEM:

DCM ELECTRONICS (ITEM 350)

FAILURE MODE: INPUT TO OUTPUT SHORT IN FEEDWATER VALVE CURRENT

LIMITER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC 3/2R PRE-EVA: 3/1R EVA:

3/2R POST-EVA:

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

#### EFFECTS/RATIONALE:

LOSS OF CURRENT LIMITER FUNCTION. NO IMPACT UNLESS SUBSEQUENT FAILURE IN DOWNSTREAM ELECTRONICS (I.E., A SHORT) CAUSES EXCESSIVE CURRENT DRAW UPON THE BATTERY. THIS CAN RESULT IN A SHORTENED MISSION OR LOSS OF BATTERY POWER. IF BATTERY POWER IS LOST,

THE SOP IS REQUIRED FOR RETURN TO VEHICLE; HOWEVER, IF THE SOP WERE ALSO FAILED, THE CREWPERSON COULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 762 FLIGHT:

3/1R

ITEM:

DCM ELECTRONICS (ITEM 350)

FAILURE MODE: BATTERY POWER "ON" DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- DCM 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/2R

EVA:

3/1R

POST-EVA:

3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN, VIBRATION

#### EFFECTS/RATIONALE:

LOSS OF CONSUMMABLES MANAGEMENT AND MONITORING FUNCTION BY CWS. WERE A SECOND FAILURE TO RESULT (I.E., AN OXYGEN LEAK), THE CREWPERSON MAY BE REQUIRED TO EMPLOY THE SOP TO RETURN TO VEHICLE. IF THE SOP WERE ALSO FAILED THE CREWPERSON COULD BE LOST.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU 3/3 FLIGHT: MDAC ID: 763

DCM ELECTRONICS (ITEM 350) ITEM:

FAILURE MODE: BATTERY POWER "ON" DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) LSS

DCM 3)

4)

5)

6)

7) 8)

9)

CRITICALITIES

HDW/FUNC FLIGHT PHASE PRE-EVA: 3/3

3/3 EVA: 3/3 POST-EVA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV792291

CAUSES: LIMITED SHORT, CONTAMINATION

EFFECTS/RATIONALE:

ERRONEOUS MESSAGE DURING IV OPERATIONS; OTHERWISE, NO IVA OR EVA IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU

MDAC ID: 764 FLIGHT: 3/3

ITEM: DCM ELECTRONICS (ITEM 350)

FAILURE MODE: FEEDWATER VALVE SWITCH DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN, CONTAMINATION

## EFFECTS/RATIONALE:

ERRONEOUS MESSAGE DISPLAYED AND LOSS OF CWS SUBLIMATOR PRESSURE MONITORING FOR LIMIT VIOLATIONS. SUBLIMATOR PRESSURE READOUT REMAINS AVAILABLE. NO MISSION OR CREWPERSON IMPACTS.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 3/3 MDAC ID: 765

ITEM: DCM ELECTRONICS (ITEM 350)

FAILURE MODE: FEEDWATER VALVE SWTICH DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC 3/3 PRE-EVA: 3/3 EVA:

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV792291

CAUSES: LIMITED SHORT, CONTAMINATION

EFFECTS/RATIONALE:

ERRONEOUS MESSAGE DURING IVA OPERATONS; OTHERWISE, NO IMPACTS.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 766

FLIGHT:

2/1R

ITEM:

DCM ELECTRONICS (ITEM 350)

FAILURE MODE: FAN/PUMP SWITCH DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN, VIBRATION

## EFFECTS/RATIONALE:

LOSS OF THIS DISCRETE CAUSES ERRONEOUS FAN STATUS MESSAGE AND LOSS OF CWS VENT FLOW MONITORING. WERE VENT FLOW ALSO FAILED SUCH THAT AN INEFFICIENT ORAL/NASAL FLUSH TO OCCUR, THE CREWPERSON COULD BE SUBJECTED TO HIGH CO2 LEVELS THAT CAN RESULT IN

DISORIENTATION AND LOSS OF LIFE.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU 3/3 FLIGHT: MDAC ID: 767

DCM ELECTRONICS (ITEM 350) ITEM:

FAILURE MODE: FAN/PUMP SWITCH DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) LSS

3) DCM

4)

5)

6) 7)

8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC 3/3 PRE-EVA:

3/3 EVA: 3/3 POST-EVA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV792291

CAUSES: SHORT, CONTAMINATION

EFFECTS/RATIONALE:

ERRONEOUS MESSAGE GENERATION WHEN FAN IS ACTUALLY OFF. NO IMPACTS ON MISSION OR CREWPERSON.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 768 FLIGHT: 3/3

ITEM: DCM ELECTRONICS (ITEM 350)

FAILURE MODE: VEHICLE VOLTAGE DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) LSS

3) DCM

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN, CONTAMINATION

EFFECTS/RATIONALE:

ERRONEOUS MESSAGE GENERATION DURING IVA; OTHERWISE, NO OTHER

IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 769 FLIGHT: 3/1R

ITEM: DCM ELECTRONICS (ITEM 350)

FAILURE MODE: VEHICLE VOLTAGE DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/2R EVA: 3/1R POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: SHORT, CONTAMINATION

#### EFFECTS/RATIONALE:

LOSS OF CWS MONITORING FOR HIGH AXYGEN USE RATE AND H2O OFF STATUS DURING EVA. SHOULD AN OXYGEN ALSO OCCUR DURING EVA THE CREWPERSON WOULD NOT BE ALERTED (EXCEPT BY THE CONSUMMABLES MANAGEMENT FUNCTION WHICH WOULD INDICATE ONLY 30 MINUTES OXYGEN LEFT:

HOWEVER, THIS TIME COULD BE ERRONEOUS DUE TO THE MANNER OF THE CWS CALCULATION). THIS CAN RESULT IN SOP USAGE WHICH IF ALSO FAILED CAN RESULT IN LOSS OF LIFE.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 770 FLIGHT: 3/1R

ITEM: DCM ELECTRONICS (ITEM 350)

FAILURE MODE: SHORT INPUT TO OUTPUT IN CLIV CURRENT LIMITER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- LSS 2)
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/2R EVA: 3/1R POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

#### EFFECTS/RATIONALE:

LOSS OF CURRENT LIMITER FUNCTION RESULTS IN POSSIBLE LOSS OF ALL POWER SHOULD A SUBSEQUENT DOWNSTREAM SHORT OCCUR. IF THE SOP IS ALSO FAILED WITH LOSS OF POWER, THE CREWPERSON COULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 771

FLIGHT: 2/1R

ITEM:

DCM ELECTRONICS (ITEM 350)

FAILURE MODE: DC/DC CURRENT LIMITER FAILS OPEN

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: VIBRATION, THERMAL CYCLING

EFFECTS/RATIONALE:

LOSS OF DC/DC CONVERTER SUPPORTED ELECTRONICS - CWS, SENSORS, AND RTDS. MISSION TERMINATION. WERE A CO2 CONTROL FUNCTION FAILURE TO ALSO OCCUR, THE CREWPERSON COULD BECOME DISORIENTED AND UNABLE TO REACT PROPERLY, THEREBY CAUSING LOSS OF LIFE.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 772

FLIGHT:

3/1R

ITEM:

DCM ELECTRONICS (ITEM 350)

FAILURE MODE: SHORT INPUT TO OUTPUT FOR DC/DC CONVERTER CURRENT

LIMITER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/2R

EVA:

3/1R

POST-EVA:

3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE: LOSS OF CURRENT LIMITER FUNCTION. IF ACCOMPANIED BY A DOWNSTREAM SHORT THE BATTERY COULD BE SIGNIFICANTLY DRAWN DOWN SUCH THAT PLSS FUNCTIONS COULD NOT BE SATISFIED AND THE SOP REQUIRED. AN ADDITIONAL SOP FAILURE COULD THEN RESULT IN LOSS OF LIFE.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 773

FLIGHT:

2/1R

ITEM:

DCM ELECTRONICS (ITEM 350)

FAILURE MODE: NEGATIVE CURRENT RETURN LINE FAILS OPEN

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: VIBRATION, IMPACT

EFFECTS/RATIONALE:

LOSS OF CIRCUIT AND, THEREFORE, ALL EMU POWER. MISSION

TERMINATION. IF THE SOP WERE ALSO FAILED, THE CREWPERSON WOULD

BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 774 FLIGHT: 3/3 DCM ELECTRONICS (ITEM 350) ITEM: FAILURE MODE: MOTOR TACH SIGNAL OPEN/SHORT LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: EMU 1) 2) LSS 3) DCM 4) 5) 6) 7) 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV792291

CAUSES: VIBRATION, CONTAMINATION

EFFECTS/RATIONALE:

LOSS OF MOTOR TACHAMETER SENSING. NO IMPACTS TO MISSION OR

CREWPERSON.

DATE: SUBSYSTEM:	EMU		HIGH		LIGHT:	HDW/FUNC	
MDAC ID:	//5			1.1	JI GIII .	,	
ITEM: DCM ELECTRONICS (ITEM 350) FAILURE MODE: TEMPORARY DROP IN DC/DC CONVERTER VOLTAGES							
LEAD ANALYS	r: G. RAFFA	ELLI	SUBSYS	LEAD: G	. RAFFAEL	LI	
BREAKDOWN H  1) EMU  2) LSS  3) DCM  4)  5)  6)  7)  8)	IERARCHY:						
		CRIT	ICALITIE	S			
		FLIGHT PHA		• .			
		PRE-EVA: EVA:		/			
		POST-EVA		1			
REDUNDANCY	SCREENS:	A [ ]	В [	3	c [ ]		
LOCATION: PART NUMBER	: SV79229	L					
CAUSES:							
EFFECTS/RAT NOT A FAILU	IONALE: RE - THIS	IS AN ANOMA	LY.				
REFERENCES:							

DATE: SUBSYSTEM: EMU MDAC ID: 776	HIGHEST CRITICALITY HDW/FUNC
ITEM: DCM ELECTRONICS (ITE FAILURE MODE: RADIATED EMISSIONS H	EM 350) HIGH
LEAD ANALYST: G. RAFFAELLI SU	JBSYS LEAD: G. RAFFAELLI
BREAKDOWN HIERARCHY:  1) EMU  2) LSS  3) DCM  4)  5)  6)  7)  8)	
CRITICA	LITIES
FLIGHT PHASE PRE-EVA: EVA: POST-EVA:	HDW/FUNC / /
REDUNDANCY SCREENS: A [ ]	в[ ] с[ ]
LOCATION: PART NUMBER: SV792291	
CAUSES:	
EFFECTS/RATIONALE: SHOULD BE COVERED AS A HAZARD ANALYS	sis.
REFERENCES:	

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 777 FLIGHT: 3/1R

ITEM: DCM ELECTRONICS (ITEM 350)

FAILURE MODE: SHORT INPUT TO OUTPUT OF SECONDARY EVC CURRENT

LIMITER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) LSS

3) DCM

4)

5)

6)

7)8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/2R
EVA: 3/1R
POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:

LOSS OF CURRENT LIMITER FUNCTION CAN RESULT IN COMPLETE EMU POWER LOSS IF ACCOMPANIED BY DOWNSTREAM SHORT. POSSIBLE CREWPERSON LOSS IF SOP ALSO FAILS IN THIS SCENARIO.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 778 FLIGHT: 2/1R

ITEM:

DCM ELECTRONICS (ITEM 350)

FAILURE MODE: ALL SECONDARY VOLTAGES DRIFT HIGH

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2

EVA: 2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: ELECTRONIC FAILURE IN FEEDBACK GENERATOR OR MODULATOR

# EFFECTS/RATIONALE:

HIGH VOLTAGE SUPPLIED TO "LOW VOLTAGE" ELECTRONICS CAN RESULT IN FAILURE OF THESE ITEMS. IF A SUBSEQUENT FAILURE OF CO2 CONTROL FUNCTION OCCURS, THE CREWPERSON COULD BECOME DISORIENTED AND POSSIBLY LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 779 FLIGHT: 2/1R

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: LCD MICROPROCESSOR FAILURE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN/SHORT, VIBRATION, CONTAMINATION

#### EFFECTS/RATIONALE:

LOSS OF LCD DISPLAY WILL RESULT IN MISSION TERMINATION. THIS WILL HAVE NO EFFECT ON THE TONES AND ACTUAL MONITORING OF VALUES BY THE CWS; HOWEVER, IF A CONCURRENT CO2 CONTROL FAILURE OR LOW VENT FLOW FAILURE WERE TO OCCUR, THE CREWPERSON WOULD BE ALERTED BUT NOT INFORMED OF THE PROPER CORRECTIVE ACTION. THEREFORE, THE CREWMEMBER CAN BE SUBJECTED TO HIGH CO2 AND DISORIENTATION PRIOR TO RETURN TO VEHICLE. DISORIENTATION CAN RESULT IN LOSS OF CREWPERSON.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 780 FLIGHT: 2/1R

ITEM: DISPLAY (ITEM 351)
FAILURE MODE: DISPLAY FAILS ON

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV 792526-1

CAUSES: ELECTRICAL OPEN, CLOCK FAILURE

## EFFECTS/RATIONALE:

DISPLAY OUTPUT WILL NOT CHANGE OR BLANK. THIS IS THE SAME "EFFECT" AS LOSS OF DISPLAY. IF A CONCURRENT CO2 CONTROL FAILURE WERE TO ALSO OCCUR, THE CREWPERSON WOULD NOT BE ALERTED TO THE PROPER CORRECTIVE ACTION ALTHOUGH THE TONE WILL OCCUR. THIS CAN RESULT IN CREWPERSON DISORIENTATION AND LOSS.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU MDAC ID: 781

FLIGHT: 3/3

ITEM: DISPLAY (ITEM 351)

FAILURE MODE: BACKLIGHTING FAILS ON

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) LSS
- 3) DCM
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 3/3 EVA:

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV 792526-1

CAUSES: SHORT, VIBRATION

EFFECTS/RATIONALE:

NO IMPACT. (POWER USAGE IS INSIGNIFICANT).

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 782 FLIGHT: 3/3 ITEM: DISPLAY (ITEM 351) FAILURE MODE: BACKLIGHTING FAILS OFF LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU LSS 2) 3) DCM 4) 5)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

6) 7) 8) 9)

PART NUMBER: SV 792526-1

CAUSES: ELECTRICAL OPEN, VIBRATION

EFFECTS/RATIONALE:

THIS WILL NOT INHIBIT USE OF THE DISPLAY; THEREFORE, NO IMPACT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 783

FLIGHT: 2/1R

TTEM:

EEH

FAILURE MODE: LEAKAGE AT HUT FEEDTHROUGH

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3)
- 4)
- 5) 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA: 2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER:

CAUSES: SEAL FAILURE

EFFECTS/RATIONALE:

LOSS OF OXYGEN SUPPLY REQUIRES SOP USAGE TO RETURN TO VEHICLE.

POSSIBLE CREWPERSON LOSS IF SOP ALSO FAILS.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 784

FLIGHT:

2/1R

ITEM:

PLSS

FAILURE MODE: LOWER BRACKET FRACTURED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) **PLSS**
- 4)
- 5)
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R 2/2

POST-EVA: REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: SV 789200

CAUSES: IMPACT, MATERIAL FATIGUE/DEFECT

## EFFECTS/RATIONALE:

LOSS OF LOWER BRACKET (ONE OF TWO) CAN RESULT IN SEPARATION OF HUT AND PLSS IF SECOND BRACKET ALSO LOST. IF SECOND BRACKET IS ALSO LOST AND SEPARATION WERE TO OCCUR EVA, CREWPERSON WOULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 785

FLIGHT: 2/1R

ITEM:

PLSS

FAILURE MODE: H20 MAKEUP TUBE-EXTERNAL LEAKAGE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- 3) PLSS
- 4)
- 5)
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV 789200

CAUSES: IMPACT, SEAL FAILURE

EFFECTS/RATIONALE:

LOSS OF FEEDWATER SUPPLY CAN RESULT IN LOSS OF HUMIDITY CONTROL. IF SOP ALSO LOST, CREWPERSON WILL BE LOST DUE TO NO DEFOG CAPABILITY FOR HELMET.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 786 FLIGHT: 2/1R

ITEM: PLSS

FAILURE MODE: O2 PRESSURE RELIEF TUBE - EXTERNAL LEAKAGE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) LSS
- 3) PLSS

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV 789200

CAUSES: IMPACT, SEAL FAILURE

EFFECTS/RATIONALE:

LOSS OF PRIMARY OXYGEN SUPPLY RESULTS IN SOP USAGE. IF SOP IS

FAILED, THE CREWPERSON WOULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 787

FLIGHT:

2/1R

ITEM:

**PLSS** 

FAILURE MODE: EMU/MMU LATCH DISCONNECTS

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) LSS
- PLSS 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV789200

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE, SCREW(S) SHEAR,

CONTAMINATION

### EFFECTS/RATIONALE:

FAILURE OF THE LATCH OF SECURE THE EMU TO THE MMU WILL RESULT IN DEPENDENCY UPON THE RETENTION BELT (OTHER LATCH ALONE IS INSUFFICIENT). IF THE RETENTION BELT WERE TO FAIL DURING EMU-MMU OPERATIONS, THE CREWPERSON COULD BE LOST DUE TO SEPARATION FROM THE MMU.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID:

801

FLIGHT:

3/3

ITEM:

NECK RING AND VENT SEAL ASSEMBLY

FAILURE MODE: INTERNAL LEAKAGE OF HELMET INLET DUCT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/3 3/3

EVA: POST-EVA:

3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: A/L 9357-10/9713-03

CAUSES: SEAL WEAR OR DETERIORATION, CONTAMINATION ON SEAL

## EFFECTS/RATIONALE:

MINIMAL LOSS OF VENT FLOW TO HELMET SHOULD NOT HAVE MISSION OR CREW IMPACT. CAN RESULT IN MINOR LOSS OF SOP OXYGEN DURING SOP CHECK BUT SHOULD ALSO NOT BE A SIGNIFICANT QUANTITY TO HAVE NEGATIVE IMPACTS.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

802

FLIGHT:

2/2

ITEM:

NECK RING AND VENT SEAL ASSEMBLY

FAILURE MODE: INTERNAL LOOP TAPE CLIP ATTACHMENT SCREW LOOSE OR

MISSING

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- SSA 2)
- HUT 3)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2 2/2

POST-EVA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9357-10/9713-03

CAUSES: SCREW DEFECTIVE, INEFFECTIVE THREADLOCK, CORROSION,

VIBRATION

EFFECTS/RATIONALE:

NO EFFECT ON THE BRACKET; HOWEVER, A LOOSE SCREW WITH THE SSA (DURING AN EVA) CAN RESULT IN CREWPERSON DISCOMFORT, ABRATION OF WATER LINES ON THE LCVG (SUCH THAT A LEAK CAN OCCUR), OR SUIT BLADDER ABRASION. SUCH AN EFFECT CAN RESULT IN MISSION TERMINATION. ALSO IF ALL THE SCREWS FAILED, BRACKET LOSS OF FUNCTION SHOULD HAVE NO MORE SEVERE AN EFFECT THAN THE LOOSE SCREW.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 803

FLIGHT:

3/2R

ITEM:

NECK RING AND VENT SEAL ASSEMBLY

FAILURE MODE: EXTERNAL LOOP TAPE BRACKET ATTACHING SCREW LOOSE

OR MISSING

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/2R

EVA: POST-EVA:

3/2R 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9357-10/9713-03

CAUSES: DEFECTIVE SCREW, INEFFECTIVE THREADLOCK, CORROSION,

**VIBRATION** 

#### EFFECTS/RATIONALE:

LOSS OF ONE SCREW SHOULD HAVE NO EFFECT ON BRACKET; HOWEVER, LOSS OF ALL SCREWS AND THEREFORE BRACKET FUNCTION CAN RESULT IN UNRESTRAINED TMG GARMENT WHICH IN TURN CAN CAUSE POSSIBLE "HOT" OR "COLD" SPOTS. MISSION TERMINATION WOULD THEN RESULT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 804 FLIGHT: 2/1R

ITEM: WATER LINE AND VENT TUBE ASSEMBLY

FAILURE MODE: REDUCED VENT FLOW

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2

EVA: 2/2 EVA: 2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: 0102-82437-18

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:

PARTIAL BLOCKAGE OF VENT TUBE REDUCES FLOW. MISSION TERMINATION RESULTS. IF SIGNIFICANT FLOW REDUCTION OCCURS AND THE SOP IS ALSO FAILED, CREWMEMBER LOSS CAN ALSO OCCUR.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 805 FLIGHT: 2/2

ITEM: BODY SEAL CLOSURE (HUT HALF)
FAILURE MODE: TMG LOOP TAPE LOOSE OR BROKEN

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3

EVA: 2/2 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9786-05

CAUSES: MATERIALS DEFECT

## EFFECTS/RATIONALE:

LOCAL HOT OR COLD SOPTS CAN RESULT. DEPENDENT UPON THE ENVIRONMENT, THIS CAN PRESENT THE CREWPERSON WITH SIGNIFICANT DISCOMFORT OVER TIME; THEREFORE, MISSION TERMINATION CAN RESULT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 806

FLIGHT:

2/2

ITEM:

BODY SEAL CLOSURE

FAILURE MODE: MINI WORK STATION WILL NOT ENGAGE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

EVA: 2/2 POST-EVA: /

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9786-05

CAUSES: CONTAMINATION IN MORENTS

EFFECTS/RATIONALE:

INABILITY TO EMPLOY MINI WORK STATION MAY RESULT IN MISSION

TERMINATION.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 807 FLIGHT: 3/3 HELMET ASSEMBLY ITEM: FAILURE MODE: VALSALVA DEVICE DISCONNECTS LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) SSA 3) HELMET

4) 5) 6) 7) 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9672-01

CAUSES: DEFECTIVE ADHESIVE, IMPACT BY CREWPERSON

EFFECTS/RATIONALE:

NO EFFECTS EXCEPT FOR POSSIBLE CREW DISCOMFORT.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

MDAC ID:

808

FLIGHT:

2/2

ITEM:

HELMET ASSEMBLY

FAILURE MODE: HELMET FOGGING (NOT DUE TO SYSTEM FAILURE)

LEAD ANALYST: G. RAFFAELLI

SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) HELMET
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE

HDW/FUNC

PRE-EVA:

3/3

EVA:

2/2

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9672-01

CAUSES: IMPROPER APPLICATION OF ANTI FOG FILM

EFFECTS/RATIONALE:

FOGGING CAN IMPAIR VISION AND PERFORMANCE OF EVA TASKS. TERMINATE

MISSION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 809

FLIGHT:

2/1R

ITEM:

HELMET ASSEMBLY

FAILURE MODE: VENT PAD DE-BONDS FROM HELMET

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) HELMET
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: A/L 9672-01

CAUSES: OLD OR DEFECTIVE BONDING AGENT

EFFECTS/RATIONALE:

DEGRADATION OF ORAL-NASAL FLUSH CAN RESULT IN HELMET FOGGING AND CO2 BUILDUP. USE OF HELMET CPV AND/OR DCM PURGE VALVE AND SOP MAY BE REQUIRED, BUT IF THESE TOO ARE FAILED, CREWPERSON CAN BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

810

FLIGHT:

2/2

ITEM:

EVVA

FAILURE MODE: SHELL CRACKED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- SSA 2)
- 3) HELMET
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

3/3 PRE-EVA:

2/2 EVA:

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9813-12

CAUSES: DEFECTIVE MATERIAL, IMPACT

EFFECTS/RATIONALE:

EVVA VISOR MOVEMENT CAN BE IMPAIRED AS COULD THE CAPABILITY TO MOUNT THE LIGHTS. THIS CAN RESULT IN MISSION TERMINATION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 811 FLIGHT: 3/2R

ITEM: EVVA

FAILURE MODE: CRACKED/FRACTURED EYE SHADES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) HELMET

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3 EVA: 3/2R

POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: A/L 9813-12

CAUSES: IMPACT, MATERIAL DEFECT

EFFECTS/RATIONALE:

NONE UNLESS VISORS ARE ALSO FAILED THEN MISSION WOULD BE

TERMINATED.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 812

FLIGHT:

3/2R

ITEM:

EVVA

FAILURE MODE: BRACKET LOOSE FOR LIGHTS OR BATTERY

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1)

2)

3)

4)

5)

6) 7)

8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/3

EVA: POST-EVA: 3/2R

3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: A/L 9813-12

CAUSES: IMPACT, DEFECTIVE THREADLOCK, SCREW FRACTURES, VIBRATION

EFFECTS/RATIONALE:

LOSS OF ONE OF THREE BRACKETS SHOULD NOT RESULT IN IMPACT; HOWEVER, LOSS OF ONE MORE CAN RESULT IN MISSION TERMINATION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 813

FLIGHT:

2/2

ITEM: UPPER

UPPER/LOWER ARM RESTRAINT AND BLADDER ASSEMBLY

FAILURE MODE: TMG LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) ARM ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 2/2 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0103-82318-22/0103-82351-16

CAUSES: LOOP TAPE DEFECTIVE/TORN, VELCRO DEFECTIVE, THREAD/CORD

BREAKS

EFFECTS/RATIONALE:

PROBABLE LOCALIZED HOT OR COLD SPOTS CAN RESULT ARM ASSEMBLY. IF ENVIRONMENT IS SEVERE, THESE SPOTS CAN RESULT IN CREWPERSON DISCOMFORT SUFFICIENT ENOUGH FOR MISSION IMPACT OR TERMINATION.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 814 FLIGHT: 2/1R

ITEM: UPPER ARM RESTRAINT AND BLADDER ASSEMBLY

FAILURE MODE: AXIAL RESTRAINT SEAM SEPARATION OR SIZING INSERT

MOVES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) ARM ASSEMBLY

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0103-82318-22

CAUSES: FABRIC DEFECT, DEFECTIVE THREAD OR CORD

EFFECTS/RATIONALE:

BLADDER IS STILL UNDER TMG AND CAN ACCEPT OPERATING SUIT PRESSURES BUT IS SUBJECT TO ABRASION AND WEAR. IF BLADDER WERE TO ALSO FAIL, CREWPERSON LOSS CAN RESULT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 815 FLIGHT: 2/1R

ITEM: SCYE BEARING ASSEMBLY

FAILURE MODE: RESTRAINT BRACKET SCREW LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) ARM ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9782-04

CAUSES: IMPACT, VIBRATION, DEFECTIVE THREADLOCK OR SCREW

EFFECTS/RATIONALE:

NO IMPACT FOR LOSS OF 1 OF 4 SCREWS. BUT IF ONE MORE IS LOST ASSEMBLY COULD SEPARATE AND CREWMEMBER COULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 816

FLIGHT: 2/1R

ITEM:

ARM BEARING ASSEMBLY

FAILURE MODE: LOWER PRIMARY RESTRAINT BRACKET BROKEN/FAILED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) ARM ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA: 2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9657-06

CAUSES: MATERIAL DEFECT, IMPACT, KEEPER SCREW BACKED OUT,

DEFECTIVE THREADLOCK

EFFECTS/RATIONALE:

LOSS OF PRIMARY AXIAL LOAD RESTRAINT INTEGRITY. IF COMBINED WITH LOSS OF SECONDARY RESTRAINT OR COMPLETE LOSS OF ATTACHMENT

SCREWS, CREWMEMBER COULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 817

FLIGHT:

2/1R

ITEM:

WRIST DISCONNECT

FAILURE MODE: PRIMARY RESTRAINT BRACKET BROKEN

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- ARM ASSEMBLY 3)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9813-02, A/L 9814-02

CAUSES: MATERIAL DEFECT, IMPACT

## EFFECTS/RATIONALE:

NO IMMEDIATE IMPACT DUE TO BLADDER FABRIC BEING SECONDARY RESTRAINT; HOWEVER, FAILURE OF SECONDARY RESTRAINT CAN RESULT IN GROSS OXYGEN LOSS AND LOSS OF CREWPERSON.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

818 MDAC ID:

FLIGHT:

2/1R

ITEM:

WRIST DISCONNECT

FAILURE MODE: PRIMARY RESTRAINT BRACKET LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) ARM ASSEMBLY
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9813-02, A/L 9814-02

CAUSES: SCREW FRACTURES OR BACKS OUT, VIBRATION, DEFECTIVE

THREADLOCK

EFFECTS/RATIONALE:

LOOSE BRACKET HAS NO IMPACT UNLESS REMAINING SCREWS AND SECONDARY RESTRAINT ALSO LOST THEREBY CAUSING GROSS LOSS OF PRESSURE AND CREWPERSON LOSS.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 819 FLIGHT: /NA ITEM: RESTRAINT MODIFIED FAILURE MODE: CREWPERSON NERVE COMPRESSION LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) 2) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: EVA: POST-EVA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0106-85894-11/12

CAUSES: POOR SIZING

## EFFECTS/RATIONALE:

CREW DISCOMFORT CAN RESULT BUT THIS FAILURE CAN ONLY RESULT FROM PROCEDURAL OR GROUND OPERATION/PROCESSING ERRORS. THEREFORE, THIS IS MORE SUITED TO A HAZARD ANALYSIS OR AN ANALYSIS OF GSE OPERATIONS.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 820 FLIGHT: 2/2

ITEM: RESTRAINT MODIFIED

FAILURE MODE: TMG ATTACHMENT FAILURE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) GLOVE ASSEMBLY
- 4)
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3

EVA: 2/2 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0106-85894-11/12

CAUSES: DEFECTIVE LOOP TAPE, DEFECTIVE CORD, WEAR ON LOOP TAPE OR CORD

#### EFFECTS/RATIONALE:

POSSIBLE LOCALIZED HOT/COLD SPOTS WHICH, DEPENDENT UPON THE ENVIRONMENT, CAN RESULT IN VARYING LEVELS OF CREWPERSON DISCOMFORT. IF ENVIRONMENT IS SEVERE AND CREWPERSON DISCOMFORT SIGNIFICANT, MISSION CAN BE TERMINATED.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 821

FLIGHT:

3/2R

ITEM:

BLADDER ASSEMBLY

FAILURE MODE: FLOCK DELAMINATES FROM BLADDER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) GLOVE ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/2R

EVA: POST-EVA:

3/2R 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: 0106-87543-01/02

CAUSES: DEFECTIVE ADHESIVE, WEAR

## EFFECTS/RATIONALE:

FLOCK CAN ENTER THE VENT SYSTEM. IF SIGNIFICANT FLOCK AMOUNT CAN TRANSLATE TO AND CONSTRICT FLOW TO THE CCC, THE CREWPERSON WOULD HAVE TO EMPLOY THE SOP AND TERMINATE THE MISSION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 822

FLIGHT:

2/1R

ITEM:

WRIST DISCONNECT (GLOVE SIDE)

FAILURE MODE: RESTRAINT BRACKET BROKEN OR LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- GLOVE ASSEMBLY 3)
- 4)
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE

HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9924-01

IMPACT, VIBRATION, SCREW FRACTURE, DEFECTIVE THREADLOCK CAUSES:

EFFECTS/RATIONALE:

NONE FOR FIRST FAILURE; HOWEVER, IF REMAINING BRACKET SCREWS FAIL OR LOSS OF SECONDARY RESTRAINT ALSO OCCURS CREWPERSON CAN BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 823 FLIGHT: 2/2

ITEM: WRIST DISCONNECT (GLOVE SIDE) FAILURE MODE: TETHER SEVERS OR DISATTACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) GLOVE ASSEMBLY
- 4)
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3

EVA: 2/2 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9924-01

CAUSES: MATERIAL DEFECT, ABRASION, BRACKET FRACTURES

EFFECTS/RATIONALE:

THE TETHER FALURE HAS NO CREWPERSON IMPACT BUT CAN RESULT IN MISSION TERMINATION IF ITEM(S) TETHERED ARE ESSENTIAL TO THE MISSION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 824

FLIGHT:

2/1R

ITEM:

WAIST RESTRAINT AND BLADDER

FAILURE MODE: HOLE OR SEPARATION IN RESTRAINT FABRIC

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- SSA 2)
- 3) LTA
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0104-82347-107/0104-84811-05

CAUSES: DEFECTIVE MATERIAL OR THREAD, SEAM SEPARATION

EFFECTS/RATIONALE:

BLADDER FABRIC ASSUMES LOAD; HOWEVER, IF BLADDER FAILS CREWPERSON

CAN BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 825

FLIGHT:

2/2

ITEM:

WAIST RESTRAINT AND BLADDER

FAILURE MODE: AXIAL RESTRAINT DISATTACHES FROM CLOTH

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0104-82347-107/0104-84811-05

CAUSES: THREAD BREAKS OR DEFECTIVE, FABRIC DEFECTIVE

## EFFECTS/RATIONALE:

LOSS OF AXIAL RESTRAINT CAUSES THE WAIST SECTION TO DISFORM AND RESULTS IN THE CREWPERSON HAVING TO PROVIDE SIGNIFICANT EXERTION TO OVERCOME THE DISFORMATION OF THE WAIST AREA. MISSION IMPACT AND TERMINATION CAN RESULT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 826 FLIGHT: 2/2

ITEM: WAIST RESTRAINT AND BLADDER

FAILURE MODE: TMG LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3 EVA: 2/2

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0104-82347-107/0104-84811-05

CAUSES: DEFECTIVE/WORN THREAD, DEFECTIVE FABRIC

EFFECTS/RATIONALE:

PROBABLE LOCAL "HOT/COLD" SPOTS WHICH CAN CAUSE CREWPERSON DISCOMFORT. IF ENVIRONMENT IS SEVERE AND CREWPERSON DISCOMFORT SIGNIFICANT, MISSION WOULD BE TERMINATED.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 827 FLIGHT: 2/1R

ITEM: WAIST BEARING

FAILURE MODE: TETHER BRACKET LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9698-08

CAUSES: FRACTURED OR LOOSE SCREW, DEFECTIVE THREADLOCK

## EFFECTS/RATIONALE:

LOSS OF 1 OF 4 SCREWS RESULTS IN LOOSE TETHER BRACKET WITH NO IMMEDIATE IMPACT. HOWEVER, LOSS OF ONE MORE SCREW CAN RESULT IN LOSS OF BRACKET AND CREWPERSON BEING UNRESTRAINED TO ORBITER. POSSIBLE LOSS OF CREWPERSON.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

MDAC ID: 828

FLIGHT:

2/1R

ITEM:

LOWER TORSO RESTRAINT/BLADDER ASSEMBLY

FAILURE MODE: HOLE OR SEPARATION IN RESTRAINT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) SSA
- LTA 3)
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0104-82335-22

CAUSES: FABRIC/THREAD DEFECTIVE, WEAR OR TEAR, SEAM SEPARATION

EFFECTS/RATIONALE:

BLADDER UNPROTECTED BY RESTRAINT MATERIAL WILL ASSUME SUIT LOADS;

HOWEVER, IF BLADDER ALSO FAILS, CREWPERSON CAN BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 829 FLIGHT: 2/2

LOWER TORSO RESTRAINT/BLADDER ASSEMBLY ITEM:

FAILURE MODE: TMG SEPARATION FROM ASSEMBLY

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 2/2 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0104-82335-22

CAUSES: DEFECTIVE/TORN LOOP TAPE, MATERIAL DEFECT

EFFECTS/RATIONALE:

LOCAL "HOT/COLD" SPOTS CAN CAUSE CREWPERSON DISCOMFORT. IF THE ENVIRONMENT IS SEVERE ENOUGH, CREWPERSON DISCOMFORT CAN BE SIGNIFICANT AND RESULT IN MISSION TERMINATION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 830

FLIGHT:

2/1R

ITEM:

BOOT DISCONNECT

FAILURE MODE: LOSS OF AXIAL RESTRAINT (PRIMARY OR SECONDARY)

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9752-01

CAUSES: DEFECTIVE MATERIAL, SCREW BACKS OUT, INEFFECTIVE

THREADLOCK

EFFECTS/RATIONALE:

SUIT LOADS WILL BE ASSUMED BY REMAINING RESTRAINT WHICH, IF ALSO FAILED, CAN RESULT IN CREWPERSON LOSS DUE TO INABILITY OF SUIT TO WITHSTAND LOADS AT BOOT.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 831 FLIGHT: 2/2 ITEM: PRESSURE BOOT ASSEMBLY FAILURE MODE: HEEL-TOP RETAINING SCREW LOOSE LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) SSA 3) LTA 4) 5) 6) 7) 8)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2 EVA: 2/2 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

9)

PART NUMBER: 0104-82403-29/30

CAUSES: DEFECTIVE THREADLOCK, VIBRATION, SCREW

FRACTURED/STRIPPED

EFFECTS/RATIONALE:

MAY CAUSE DIFFICULTY IN USING FOOT RESTRAINT NECESSARY FOR

MISSION SUCCESS. TERMINATE MISSION.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 2/2 MDAC ID: 832

PRESSURE BOOT ASSEMBLY ITEM: FAILURE MODE: RUBBER SOLE ABRADED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- SSA 2)
- LTA 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2 2/2 EVA: POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0104-82403-29/30

CAUSES: WEAR, DEFECTIVE MATERIAL

EFFECTS/RATIONALE:

POSSIBLE LOCAL "HOT/COLD" SPOTS ON SOLE OF BOOT ASSEMBLY. MAY ALSO CREATE DIFFICULTY IN USING FOOT RESTRAINT(S). IF CREW DISCOMFORT IS SIGNIFICANT OR UNABLE TO EMPLOY FOOT RESTRAINT, TERMINATE MISSION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 833

FLIGHT:

2/1R

ITEM:

PRESSURE BOOT ASSEMBLY

FAILURE MODE: HOLE OR TEAR IN RESTRAINT FABRIC

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA: 2/1R 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0104-82403-29/30

CAUSES: DEFECTIVE MATERIAL, DEFECTIVE/TORN THREAD/CORD

### EFFECTS/RATIONALE:

BLADDER WOULD BE SUBJECTED TO LOADS AND WEAR DUE TO LOSS OF COVERING RESTRAINT FABRIC. IF BLADDER ALSO FAILS, CREWPERSON CAN BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 834

FLIGHT:

2/2

ITEM:

PRESSURE BOOT ASSEMBLY

FAILURE MODE: TMG DISATTACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- EMU 1)
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0104-82403-29/30

CAUSES: LOOP TAPE DEFECTIVE/TORN

EFFECTS/RATIONALE:

PROBABLE LOCAL "HOT/COLD" SPOTS CAN CAUSE CREWPERSON DISCOMFORT. ALSO, LOOSE TMG CAN CAUSE DIFFICULTY IN USING FOOT RESTRAINTS. IF DISCOMFORT IS SIGNIFICANT OR FOOT RESTRAINTS CANNOT BE USED, TERMINATE MISSION.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 835 FLIGHT: 3/3 ITEM: BOOT SIZING INSERT FAILURE MODE: FOAM SEPARATES FROM INSERT LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) **EMU** 2) SSA 3) LTA 4) 5) 6) 7) 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0104-82664-17/18

CAUSES: DEFECTIVE VELCRO

EFFECTS/RATIONALE:

NO MISSION OR CREWPERSON IMPACTS. CAN MAKE DONNING MORE

DIFFICULT.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU FLIGHT: 3/3 MDAC ID: 836

RESTRAINT ASSEMBLY ITEM: FAILURE MODE: VENT TUNNEL DETACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) LCVG

4)

5)

6) 7)

8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC 3/3 PRE-EVA:

3/3 EVA: POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0107-82968-07

CAUSES: THREAD TEARS OR DEFECTIVE

EFFECTS/RATIONALE:

CAN PROVIDE MINIMAL CREW DISCOMFORT BUT WHEN CONNECTED AND SUIT IS DONNED NO IMPACTS ARE ENVISIONED.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 837 FLIGHT: 3/3 ITEM: VENT MANIFOLD AND DUCTS FAILURE MODE: THRUMB LOOP BROKEN LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) SSA 3) LCVG 4) 5) 6) 7) 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0107-811060-08/82568-09/81057-19/20

CAUSES: MATERIAL DEFECT OR TEAR

EFFECTS/RATIONALE:

INCREASES DONNING DIFFICULTY, OTHERWISE NO IMPACT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 838

FLIGHT:

3/3

ITEM:

VENT MANIFOLD AND DUCTS

FAILURE MODE: BOOT ATTACHMENT LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- LCVG 3)
- 4)
- 5)
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

3/3

PRE-EVA: EVA:

3/3

POST-EVA:

3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0107-811060-08/82568-09/81057-19/20

CAUSES: MATERIAL DEFECT OR TORN

EFFECTS/RATIONALE:

BOOT BECOMES LOOSE AND MAY BE DIFFICULT DONNING OR DOFFING,

OTHERWISE NO IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 839

FLIGHT:

3/3

ITEM: MULTIPLE CONNECTOR (LCVG HALF) FAILURE MODE: OXYGEN LEAKAGE IN VENT LOOP

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LCVG
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9693-03/9697-04

CAUSES: SEAL CUT OR DEFECTIVE, LOOSE HOSE CLAMP

## EFFECTS/RATIONALE:

LEAKAGE OF SUIT ATMOSPHERE INTO VENT LOOP AT CONNECTOR MAY RESULT IN MINIMAL DEGRADATION OF VENT LOOP FLOW THROUGHOUT THE LCVG BUT WITHOUT A SIGNIFICANT FAILURE (I.E., DISCONNECTION) THE LEAK SHOULD NOT RESULT IN A MISSION OR CREWMEMBER IMPACT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 840 FLIGHT: 3/2R

ITEM: CCA

FAILURE MODE: EARPHONES LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3)

4)

5)

6)

7)8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/2R

EVA: 3/2R POST-EVA: 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: 0101-80001-02

CAUSES: DEFECTIVE/BROKEN THREAD, FASTENER FAILS OPEN

EFFECTS/RATIONALE:

ONE LOOSE EARPHONE WILL NOT RESULT IN AN IMPACT; HOWEVER, IF BOTH

ARE LOOSE, MISSION TERMINATION RESULTS.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 841 FLIGHT: 3/3

ITEM: CCA

FAILURE MODE: SNAP FAILS CLOSED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) SSA

2) CCA

3)

4)

5)

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3

EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0101-80001-02

CAUSES: SNAP WORN OR BENT

EFFECTS/RATIONALE:

DIFFICULTY IN DOFFING CAN RESULT BUT, OTHERWISE, NO IMPACTS TO

MISSION OR CREWPERSON SAFETY.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 842

FLIGHT:

3/2R

ITEM:

CCA

FAILURE MODE: MICROPHONE BOOM SHIFTS OUT OF RANGE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE HDW/FUNC

3/2R

PRE-EVA:

EVA: POST-EVA: 3/2R 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: 0101-80001-02

CAUSES: DEFECTIVE OR WORN FASTENER, IMPACT

EFFECTS/RATIONALE:

LOSS OF ONE MICROPHONE PRESENTS NO IMPACTS DUE TO AVAILABILITY OF SECOND MICROPHONE. IF BOTH ARE LOST, TERMINATE MISSION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 843

FLIGHT:

3/3

ITEM:

HARD TORSO SHELL

FAILURE MODE: O2 LINE LEAKAGE TO SSA

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/3

EVA:

3/3 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: SV772375-21

CAUSES: TUBE PUNCTURED

## EFFECTS/RATIONALE:

02 LEAKAGE TO SSA WILL NOT SUBSTANTIALLY REDUCE FLOW TO HELMET;

POST-EVA:

THEREFORE, NO MISSION OR CREWPERSON IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 844 FLIGHT: 2/1R

ITEM: HARD TORSO SHELL FAILURE MODE: H20 LEAKAGE INTO SSA

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) HUT

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV772375-21

CAUSES: SEAL FAILURE, TUBE PUNCTURE

EFFECTS/RATIONALE:

GRADUAL LOSS OF H2O SUPPLY AND THEREFORE COOLING CAPABILITY. FREE WATER IN SUIT CAN GET INTO VENT LOOP AND CAUSE FAILURE OF CCC. MISSION TERMINATION. IF SOP ALSO LOST OR PURGE VALVES BLOCKED BY ICE, CREWPERSON CAN BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 845

FLIGHT:

2/1R

ITEM:

HARD TORSO SHELL

FAILURE MODE: VENT RETURN FLOW PARTIALLY OR TOTALLY BLOCKED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV772375-21

CAUSES: CONTAMINATION, HAIR, FLOCK, LINT

## EFFECTS/RATIONALE:

LOW VENT FLOW WILL REQUIRE MISSION TERMINATION AND POSSIBLE SOP USAGE. IF SOP ALSO FAILS, CREWPERSON CAN BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 846

FLIGHT: 1/1

ITEM: HARD T

HARD TORSO SHELL

FAILURE MODE: GIMBAL PIVOT SOCKET FAILURE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2

EVA: 1/1 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: SV772375-21

CAUSES: MATERIAL DEFECT, DEFECTIVE BOND, IMPACT

EFFECTS/RATIONALE:

BELLOWS CAN SEPARATE FROM HUT WITH GIMBAL PIVOT SOCKET FAILURE AND CAUSE UNCONTROLLABLE DEPRESSURIZATION. LOSS OF CREWPERSON.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 847 FLIGHT: 3/3

ITEM: HARD TORSO SHELL FAILURE MODE: EEH BRACKET LOOSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) HUT

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3 EVA: 3/3

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: SV772375-21

CAUSES: DEFECTIVE BOND, IMPACT

EFFECTS/RATIONALE:

POSSIBLE DISCOMFORT DURING DONNING/DOFFING. NO MISSION OR

CREWPERSON IMPACTS.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 2/2 MDAC ID: 848

HUT ASSEMBLY ITEM:

FAILURE MODE: IDB DETACHES OR FOOD BAR DETACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

3/3 PRE-EVA:

2/2 EVA:

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0102-80002-105

CAUSES: VELCRO ADHESIVE DEFECTIVE

EFFECTS/RATIONALE:

A DISLODGED IDB OR FOOD BAR CAN POSITION ITSELF IN MANNER WHICH CAUSES THE CREWPERSON DISCOMFORT OR WHICH INHIBITS OPTIMUM CREWPERSON PERFORMANCE. MISSION TERMINATION CAN RESULT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 849

FLIGHT:

1/1

ITEM:

HUT ASSEMBLY

FAILURE MODE: BROKEN GIMBAL TRAVEL STOP STRAP

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) HUT
- 4)
- 5)
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA: POST-EVA:

1/1 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0102-80002-105

CAUSES: DEFECTIVE MATERIAL, ABRASION, CLAMP SCREWS MISSING

EFFECTS/RATIONALE: STRAP FALURE WILL CAUSE UNNECESSARY LOADING OF BELLOWS AT TRAVEL EXTREMES. AXIAL PEELING OF BELLOWS CAN RESULT IN GROSS

DEPRESSURZATION. CREWPERSON LOSS.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 2/2 MDAC ID: 851

ITEM:

HUT TMG

FAILURE MODE: LOOSE OR HAS HOLE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1)

2)

3)

4)

5) 6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

2/2 PRE-EVA: 2/2 EVA:

2/2 POST-EVA:

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0102-82782-32

CAUSES: DEFECTIVE MATERIAL OR LOOP TAPE, SEAM SEPARATION, TEAR

EFFECTS/RATIONALE:

LOCAL "HOT/COLD" SPOTS CAN POSSIBLY CAUSE SIGNIFICANT CREWPERSON DISCOMFORT. POSSIBLE MISSION TERMINATION.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

852

FLIGHT:

2/2

ITEM:

ARM TMG

FAILURE MODE: LOOSE OR HAS HOLE IN IT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

## BREAKDOWN HIERARCHY:

- 1)
- 2)
- 3)
- 4)
- 5)
- 6) 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0103-82405-10/0103-82406-07

CAUSES: MATERIAL/LOOP TAPE DEFECT, SEAM SEPARATION

EFFECTS/RATIONALE:

LOCAL "HOT/COLD" SPOTS CAN CAUSE CREWPERSON DISCOMFORT. IF SIGNIFICANT DISCOMFORT RESULTS, CREWPERSON MAY TERMINATE MISSION.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 3/2R MDAC ID: 853

DOFFING LEVER SUBASSEMBLY ITEM: FAILURE MODE: TORSION SPRING BREAKS

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1)

2)

3)

4)

5) 6)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3 EVA: /NA

POST-EVA: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 23869

CAUSES: MATERIAL DEFECT, CORROSION

EFFECTS/RATIONALE:

LOSS OF LEVERAGE IN UNLATCHING BODY SEAL CLOSURE. THIS IS AN OPTIONAL ITEM AND ITS FAILURE WOULD BE AN IMPACT ONLY IF THE BODY SEAL CLOSURE WERE DIFFICULT IN OPERATION. IF BOTH WERE FAILED MISSION TERMINATION WOULD RESULT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 854

FLIGHT:

3/3

ITEM:

DONNING AID HANDLES

FAILURE MODE: LATCH FAILS OPEN

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

/NA

EVA: POST-EVA:

/NA 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: A/L 9857/9858

CAUSES: MATERIAL DEFECT/DEFORMATION

EFFECTS/RATIONALE:

INADVERTENT RELEASE OF HANDLES FROM BRACKET INCREASES DONNING

DIFFICULTY ONLY.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 3/3 MDAC ID: 855

DONNING AID HANDLES ITEM:

FAILURE MODE: HANDLES WILL NOT INSTALL

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1)

2)

3)

4)

5)

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: EVA:

/NA 3/3

/NA

POST-EVA:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: A/L 9857/9858

CAUSES: MATERIAL DEFORMATION, IMPACT, CONTAMINATION

EFFECTS/RATIONALE:

DONNING DIFFICULTY IS INCREASED. NO OTHER IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 856 FLIGHT: 2/2 ITEM: WAIST/BRIEF/LTA/BOOT TMG FAILURE MODE: LOOSE OR HAS HOLE LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) SSA 3) LTA 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2 EVA: 2/2 POST-EVA: 2/2 REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER:

\_\_\_\_\_

CAUSES: DEFECTIVE MATERIAL/THREAD, SEAM SEPARATION, TEAR

EFFECTS/RATIONALE:

LOCAL "HOT/COLD" SPOTS CAN CAUSE CREWPERSON DISCOMFORT. IF DISCOMFORT IS SIGNIFICANT, MISSION WOULD BE TERMINATED.

HIGHEST CRITICALITY HDW/FUNC DATE: SUBSYSTEM: EMU 3/3 FLIGHT: MDAC ID: 857 COMFORT GLOVE ITEM: FAILURE MODE: DAMAGED LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) SSA 3) GLOVE ASSEMBLY 4) 5) 6) 7)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

8) 9)

PART NUMBER: 0106-84906-03/04

CAUSES: TEAR, SEAM SEPARATION

EFFECTS/RATIONALE:

THIS IS A CREW OPTION ITEM AND ITS FAILURE WILL HAVE NO IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 858 FLIGHT: 2/2

ITEM: GLOVE TMG

FAILURE MODE: HOLE OR SEPARATION IN TMG

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) GLOVE ASSEMBLY

4)

5)

6) 7)

8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/2

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: 0106-88074-01/02

CAUSES: WEAR, MATERIAL/THREAD DEFECT, TEAR, DEFECTIVE VELCRO

EFFECTS/RATIONALE:

LOCAL "HOT/COLD" SPOTS WHICH CAN CAUSE CREWPERSON DISCOMFORT. IF DISCOMFORT IS SIGNIFICANT, MISSION TERMINATION CAN RESULT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 859

FLIGHT:

3/3

ITEM:

GLOVE TMG

FAILURE MODE: TMG DETACHES FROM RESTRAINT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) GLOVE ASSEMBLY

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3

EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: 0106-88074-01/02

CAUSES: DEFECTIVE MATERIAL/LOOPTAPE/THREAD

EFFECTS/RATIONALE:

THIS WILL ONLY RESULT IN SOME EXCESS TMG MOVEMENT WHICH SHOULD

NOT REDUCE GLOVE FUNCTION OR IMPACT SAFETY.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 860 FLIGHT: 3/3

ITEM: GLOVE TMG

FAILURE MODE: FINGER TIPS LOOSE OR ABRADED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) GLOVE ASSEMBLY
- 4)
- 5)
- 6) 7)
- 8)
- 9j

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 3/3 EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: 0106-88074-01/02

CAUSES: CONTACT WITH SHARP OBJECT, DEFECTIVE MATERIAL/BOND

EFFECTS/RATIONALE:

THIS FALURE MAY SLIGHTLY INCREASE DIFFICULTY OF EVA ACTIVITIES WHICH EMPLOY "FINGER-TIP" ACTIVITIES (I.E., SWITCH MOVEMENTS) BUT SHOULD NOT IMPACT MISSION OR SAFETY.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 3/3 MDAC ID: 861

RESTRAINT ASSEMBLY ITEM:

FAILURE MODE: BIO-POCKET/POSIMETER DETACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

EMU 1)

- 2) SSA
- 3) LCVG
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC 3/3 PRE-EVA: 3/3 EVA: POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0107-82968-07

CAUSES: MATERIAL/THREAD DEFECT/TEAR

EFFECTS/RATIONALE:

THE LOCATION OF THESE ITEMS SHOULD INHIBIT THEIR TRANSLATION TO OTHER AREAS IN SSA. NO IMPACT IS DETECTED.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

862

FLIGHT:

2/2

ITEM:

RESTRAINT ASSEMBLY

FAILURE MODE: H20 FLOW RESTRICTED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LCVG
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/2

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: 0107-82968

CAUSES: IMPACT CAUSES KINK IN LINE; MATERIAL DEFECT

EFFECTS/RATIONALE:

PROBABLE DEGRADATION IN COOLING CAPABILITY. TERMINATE MISSION.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 3/3 MDAC ID: 863

**EVVA TMG** ITEM:

FAILURE MODE: HOLE OR SEPARATION IN MATERIAL

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) HELMET

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

3/3 PRE-EVA: 3/3 EVA:

3/3 POST-EVA:

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0108-84032-01

CAUSES: MATERIAL/THREAD DEFECT, SEAM SEPARATION

EFFECTS/RATIONALE:

LOCAL "HOT/COLD" SPOTS SHOULD NOT CAUSE SIGNIFICANT CREW

DISCOMFORT; THEREFORE, NO IMPACTS.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 864

FLIGHT:

2/2

ITEM:

MITTEN ASSEMBLY

FAILURE MODE: INSULATION TORN OR SEPARATED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) GLOVE ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

POST-EVA:

PRE-EVA:

3/3

EVA:

2/2 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER:

CAUSES: THREAD/MATERIAL DEFECT/TEAR

EFFECTS/RATIONALE: LOCAL HOT SPOT CAN CAUSE DISCOMFORT. ASSUMING REQUIRED FOR MISSION SUCCESS IF UNABLE TO EMPLOY MISSION, MISSION TERMINATION

RESULTS.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

FLIGHT: 2/1R MDAC ID: 865

ARM BEARING ASSEMBLY ITEM:

FAILURE MODE: LOWER PRIMARY RESTRAINT BRACKET BROKEN/FAILED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) ARM ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

2/2 PRE-EVA: 2/1R EVA:

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9657-06

CAUSES: MATERIAL DEFECT, IMPACT, KEEPER SCREW BACKED OUT,

DEFECTIVE THREADLOCK

EFFECTS/RATIONALE:

LOSS OF PRIMARY AXIAL LOAD RESTRAINT INTEGRITY. IF COMBINED WITH

LOSS OF SECONDARY RESTRAINT OR COMPLETE LOSS OF ATTACHMENT

SCREWS, CREWMEMBER COULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 866

FLIGHT:

2/1R

ITEM:

LOWER ARM RESTRAINT AND BLADDER ASSEMBLY

FAILURE MODE: AXIAL RESTRAINT SEAM SEPARATION OR SIZING INSERT

MOVES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) ARM ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0103-82351-16

CAUSES: FABRIC DEFECT, DEFECTIVE THREAD OR CORD

#### EFFECTS/RATIONALE:

BLADDER IS STILL UNDER TMG AND CAN ACCEPT OPERATING SUIT PRESSURES BUT IS SUBJECT TO ABRASION AND WEAR. IF BLADDER WERE TO ALSO FAIL, CREWPERSON LOSS CAN RESULT.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU 867 MDAC ID:

2/1R FLIGHT:

BOOT DISCONNECT ITEM:

FAILURE MODE: LOSS OF AXIAL RESTRAINT (PRIMARY OR SECONDARY)

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

EMU 1)

SSA 2)

3) LTA

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

2/2 PRE-EVA:

2/1R EVA: 2/2 POST-EVA:

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9752-01

CAUSES: DEFECTIVE MATERIAL, SCREW BACKS OUT, INEFFECTIVE

THREADLOCK

EFFECTS/RATIONALE:

SUIT LOADS WILL BE ASSUMED BY REMAINING RESTRAINT WHICH, IF ALSO FAILED, CAN RESULT IN CREWPERSON LOSS DUE TO INABILITY TO SUIT TO WITHSTAND LOADS AT BOOT.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 868

FLIGHT:

3/3

ITEM:

CCA

FAILURE MODE: LOSS OF ATTACHMENT EAR SEAL

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSSA
- 3)
- 4)
- 5)
- 6)
- 7) . 8)
  - 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

3/3

EVA: POST-EVA:

3/3 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER:

CAUSES: MATERIAL DEFECT, WEAR

EFFECTS/RATIONALE:

CREWPERSON DOES NOT LOSE EAR COMMUNICATIONS BUT DOES GET

INCREASED NOISE. NO IMPACTS.

HIGHEST CRITICALITY HDW/FUNC DATE: SUBSYSTEM: EMU FLIGHT: 3/3 MDAC ID: 869 CCA ITEM: FAILURE MODE: LOSS OF ABSORPTION ATTACHMENT LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU SSA 2) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC 3/3 PRE-EVA: 3/3 EVA: POST-EVA: 3/3 REDUNDANCY SCREENS: A [ ] B [ ] C [ ] LOCATION: PART NUMBER:

CAUSES: MATERIAL DEFECT, WEAR

EFFECTS/RATIONALE:

NO IMPACTS TO COMMUNICATION CAPABILITY, MISSION OR CREWPERSON.

DATE: SUBSYSTEM: MDAC ID:	EMU 870			HI	GHEST		CALITY	HDW/FUN
ITEM: FAILURE MODE	CCA E: CHIN ST	RAP FA	AILS OP	EN				·
LEAD ANALYS	T: G. RAFFA	ELLI	SI	UBSY	S LEAD	): G. 1	RAFFAE	ELLI
BREAKDOWN H: 1) 2) 3) 4) 5) 6) 7) 8)	IERARCHY:							
		PRE- EVA:	CRITICATION PHASE -EVA:	ALIT	IES HDW/F 2/2 2/2 3/3			
REDUNDANCY S	SCREENS:	<b>A</b> [	]	В [	]	С	[ ]	

LOCATION:

PART NUMBER:

CAUSES: MATERIAL DEFECT/WEAR, MECHANICAL FAILURE OF SNAP

EFFECTS/RATIONALE:

THIS CAN RESULT IN THE ENTIRE CCA SHIFTING SUCH THAT COMMUNICATOINS IN EITHER DIRECTION IS IMPACTED.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

871 MDAC ID:

FLIGHT:

1/1

ITEM:

SCYE BEARING ASSEMBLY

FAILURE MODE: SEPARATION OF BEARING RACES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- EMU 1)
- 2) SSA
- 3) ARM ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

2/2 PRE-EVA:

1/1 EVA:

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9782-04

CAUSES: MATERIAL FATIGUE, IMPACT, MATERIAL DEFECT/FRACTURE

EFFECTS/RATIONALE:

SEPARATION OF ARM FROM SSA CAN RESULT WITH UNCONTROLLABLE EMU

DEPRESSURIZATION. LOSS OF LIFE.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID:

872

FLIGHT:

2/1R

ITEM:

SCYE BEARING ASSEMBLY

FAILURE MODE: LOSS OF PRIMARY AXIAL RESTRAINT BRACKET SWIVEL

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) ARM ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER:

CAUSES: MATERIAL FATIGUE/WEAR

#### EFFECTS/RATIONALE:

PRIMARY LOAD BEARING CAPABILITY WOULD BE LOST. MISSION TERMINATION RESULTS. IF SECONDARY FUNCTION ALSO LOST, ARM SEPARATION WOULD RESULT IN LOSS OF CREWPERSON.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 873 FLIGHT: 2/1R

ITEM: BODY SEAL CLOSURE (LTA SIDE)

FAILURE MODE: LOSS OF PRIMARY AXIAL RESTRAINT BRACKET

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9787-05

CAUSES: LOOSE OR MISSING SCREWS, MATERIAL DEFECT/FATIGUE, IMPACT

EFFECTS/RATIONALE:

LOSS OF PRIMARY RESTRAINT LOAD BEARING CAPABILITY WILL RESULT IN MISSION TERMINATION. IF THE REDUNDANT RESTRAINT ALSO FAILS, THE CREWPERSON WILL BE LOST.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 874 FLIGHT: 2/1R

ITEM: WAIST BEARING

FAILURE MODE: UPPER PRIMARY EXIAL RESTRAINT BRACKET FAILS

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 2/1R EVA: POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9698-08

CAUSES: LOOSE OR MISSING SCREWS, MATERIAL DEFECT/FATIGUE.

IMPACT, INEFFECTIVE THREADLOCK

#### EFFECTS/RATIONALE:

LOSS OF PRIMARY LOAD BEARING CAPABILITY SHOULD RESULT IN MISSION TERMINATION. IF SECONDARY RESTRAINT ALSO FAILS, GROSS LOSS OF STRUCTURAL INTEGRITY WILL RESULT IN CREWPERSON LOSS.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 875

FLIGHT:

2/1R

ITEM:

WAIST BEARING

FAILURE MODE: LOSS OF BALL BEARING RETAINER SCREW

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- LTA 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: A/L 9698-08

CAUSES: STRIPPED/FRACTURED SCREW, MATERIAL DEFECT/FATIGUE

EFFECTS/RATIONALE:

LOSS OF ONE SCREW WILL NOT IMPACT CREWPERSON BUT LOSS OF SECOND SCREW CAN RESULT IN LOSS OF BALL BEARING RETAINER AND THE SSA PERSSURE INTEGRITY, THEREBY CAUSING LOSS OF LIFE.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 876 FLIGHT: 2/1R

ITEM: WAIST BEARING

FAILURE MODE: LOSS OF LOWER PRIMARY AXIAL RESTRAINT BRACKET

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT

# EFFECTS/RATIONALE:

LOSS OF PRIMARY LOAD BEARING CAPABILITY WILL CAUSE SECONDARY RESTRAINT TO SUSTAIN LOADS; HOWEVER, IF THE SECONDARY WERE ALSO LOST, THE CREWPERSON COULD BE LOST WHEN SSA PRESSURE INTEGRITY FAILS.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 877 FLIGHT: 2/1R

ITEM: WAIST BEARING

FAILURE MODE: LOSS OF PRIMARY AXIAL RESTRAINT BRACKET, FRONT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, SCRE FRACTURE, DEFECTIVE

THREADLOCK

#### EFFECTS/RATIONALE:

LOSS OF PRIMARY AXIAL LOAD BEARING CAPABILITY WILL CAUSE SECONDARY RESTRAINT TO SUSTAIN LOADS. LOSS OF SECONDARY RESTRAINT CONCURRENT WITH THE PRIMARY RESULTS IN GROSS LOSS OF PRESSURE INTEGRITY AND CREWPERSON LOSS OF LIFE.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 878

FLIGHT:

2/1R

ITEM:

WAIST BEARING

FAILURE MODE: LOSS OF PRIMARY AXIAL RESTRAINT BRACKET REAR PIN

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/1R POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT/FRACTURE

# EFFECTS/RATIONALE:

FAILURE OF THE PIN WILL CAUSE EFFECTIVE LOSS OF THE PRIMARY AXIAL RESTRAINT AND RESULT IN THE SECONDARY RESTRAINT BEING REQUIRED TO SUSTAIN SUIT LOADS. IF THE SECONDARY RESTRAINT BRACKET TO ALSO FAIL, THE CREWPERSON WOULD BE LOST.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 879

FLIGHT:

2/1R

ITEM:

WAIST BEARING

FAILURE MODE: LOSS OF REAR RESTRAINT BRACKET SCREW

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- EMU 1)
- 2) SSA
- LTA 3)
- 4)
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT/FRACTURE, SCREW

STRIPPED/BACKS OUT

#### EFFECTS/RATIONALE:

LOSS OF PIN SET SCREW WILL RESULT IN LOSS OF PRIMARY RESTRAINT BUT SECONDARY RESTRAINT STILL HELD BY BRACKET. HOWEVER, IF THE BRACKET ITSELF LOST TWO SIDE SCREWS, BOTH RESTRAINT COULD BE LOST AS COULD THE CREWPERSON.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

MDAC ID: 880 FLIGHT: 1/1

WAIST BEARING ITEM:

FAILURE MODE: TETHER BRACKET FRACTURES/YIELDS

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

#### BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2

EVA: 1/1 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ ]

LOCATION:

PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT

## EFFECTS/RATIONALE:

A FAILURE OF THE TETHER BRACKET TO MAINTAIN THE CONNECTION OF THE EVA CREWPERSON TO THE SHUTTLE CAN RESULT IN UNCONTROLLED CREWPERSON SEPARATION AND LOSS OF LIFE.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

2/1R FLIGHT: 881 MDAC ID:

LOWER TORSO RESTRAINT BLADDER ASSEMBLY ITEM:

FAILURE MODE: LOSS OF HIP JOINT RING

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

# BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 8) 9)

# CRITICALITIES

FLIGHT PHASE HDW/FUNC 2/2 PRE-EVA: 2/1R EVA:

2/2 POST-EVA:

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0104-82335-22

IMPACT, DEFECTIVE MATERIAL, FATIGUE CAUSES:

#### EFFECTS/RATIONALE:

A FAILURE OF THE HIP JOINT RING WILL RESULT IN PARTIAL TO TOTAL LOSS OF THE PRIMARY AXIAL RESTRAINT FOR THE HIP AREA WITH LOAD DEPENDENCE TRANSFERRED TO THE SECONDARY RESTRAINT. IF THE SECONDARY RESTRAINT WERE ALSO LOST, SUIT LOADS COULD RESULT IN GROSS

FAILURE OF SUIT PRESSURE INTEGRITY AND CREWPERSON LOSS.

DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 882

FLIGHT:

2/1R

ITEM:

LOWER TORSO RESTRAINT BLADDER ASSEMBLY

FAILURE MODE: CROTCH BUCKLE YIELDS/FRACTURES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1)

2)

3)

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA:

2/2

EVA:

2/1R

POST-EVA:

2/2

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: 0104-82335-22

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT

EFFECTS/RATIONALE:

LOSS OF PRIMARY LOAD RESTRAINT FOR CROTCH AREA TRANSFERS LOADS TO SECONDARY RESTRAINT. IF SECONDARY RESTRAINT ALSO FAILS, CREWPERSON CAN BE LOST.

HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: EMU

MDAC ID: 883

FLIGHT:

3/3

ITEM:

LOWER TORSO RESTRAINT BLADDER ASSEMBLY

FAILURE MODE: WEBBING DETACHES FROM KEEPER RING

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

### BREAKDOWN HIERARCHY:

- 1) EMU
- SSA 2)
- 3) LTA
- 4)
- 5)
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE HDW/FUNC 3/3 PRE-EVA: 3/3 EVA: 3/3 POST-EVA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0104-82335-22

CAUSES: FABRIC TORN/WORN, THREAD BREAKS

## EFFECTS/RATIONALE:

IF THE WEBBING DETACHES FROM THE KEEPER RING, MINOR DEFORMATION OF THE LTA CAN RESULT. BECAUSE THE DEFORMATION WOULD BE MINOR, MOBILITY SHOULD NOT BE SEVERELY RESTRICTED NOR SHOULD CREWPERSON DISCOMFORT BE A FACTOR. NO IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 884 FLIGHT: 3/3 ITEM: WAIST/BRIEF/LTA/BOOT TMG FAILURE MODE: SCISSOR POCKET LOOSE/TORN LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: 1) EMU 2) SSA 3) LTA 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

POST-EVA:

3/3

LOCATION: PART NUMBER:

CAUSES: THREAD DEFECTIVE/TORN, MATERIAL DEFECT/WEAR/TEAR

EFFECTS/RATIONALE:

INABILITY TO USE POCKET FOR RETENTION OF EVA SCISSORS SHOULD NOT IMPACT MISSION OR CREWPERSON.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 885

FLIGHT: 3/3

ITEM: DONNING AID HANDLES FAILURE MODE: FAIL ENGAGED TO LTA

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) LTA
- 4)
- 5)
- 6)
- 7)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 3/3

EVA: 3/3 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9857/9858

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE, CONTAMINATION

EFFECTS/RATIONALE:

THE MISSION AND THE CREWPERSON WILL NOT BE IMPACTED DUE TO THE PRESENCE OF DONNING AID HANDLES.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 886 FLIGHT: 2/2

ITEM: HELMET ASSEMBLY

FAILURE MODE: FRESNEL LENS DETACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) EMU
- 2) SSA
- 3) HELMET
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/2 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9672-01

CAUSES: MATERIAL DEFECTIVE, IMPACT

EFFECTS/RATIONALE:

DIFFICULTY IN READING DCM DISPLAY AND CONTROLS. POSSIBLE IRRITATION TO CREWPERSON DUE TO "FREE" LENS IN HELMET. MISSION TERMINATION.

HIGHEST CRITICALITY HDW/FUNC DATE: SUBSYSTEM: EMU MDAC ID: 887 FLIGHT: 1/1 RESTRAINT MODIFIED ITEM: FAILURE MODE: GIMBAL RING FRACTURES/YIELDS LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI BREAKDOWN HIERARCHY: EMU 1) 2) SSA 3) GLOVE ASSEMBLY 4) 5) 6) 7)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2 EVA: 1/1 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

8) 9)

PART NUMBER: 0106-85894-11/12

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE

EFFECTS/RATIONALE:

THE GIMBAL RING IS CRITICAL TO SUSTAINING GLOVE LOADS. IF LOST, THE PRESSURE INTEGRITY OF THE GLOVE ASSEMBLY WILL ALSO BE LOST IN AN UNCONTROLLABLE MANNER RESULTING IN LOSS OF LIFE.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU

MDAC ID: 888 FLIGHT: 2/2

ITEM: RESTRAINT ASSEMBLY FAILURE MODE: ZIPPER DETACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

- 2) SSA
- 3) LCVG

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/2 POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 0107-82968-07

CAUSES: FABRIC DEFECT/WEAR, MECHANICAL SEPARATION

EFFECTS/RATIONALE:

A DETACHED ZIPPER CAN RESULT IN POOR LCVG FIT AND THEREFORE

DEGRADED COOLING. MISSION TERMINATION WILL RESULT.

DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EMU MDAC ID: 889

FLIGHT: 2/2

ITEM: EXTRAVEHICULAR VISOR ASSEMBLY

FAILURE MODE: CRACKED/SCRATCHED PROTECTIVE VISOR

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1) EMU

2) SSA

3) HELMET

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC

PRE-EVA: 2/2 EVA: 2/2

POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9813-12

CAUSES: IMPACT

EFFECTS/RATIONALE:

REDUCED OR IMPAIRED VISION WILL RESULT IN MISSION TERMINATION.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 890 FLIGHT: 2/2 ITEM: EXTRAVEHICULAR VISOR ASSEMBLY FAILURE MODE: EYE SHADES JAMMED/STUCK IN ONE POSITION

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

- 1) **EMU**
- 2) SSA
- 3) HELMET
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 2/2 EVA: 2/2 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9813-12

CAUSES: IMPACT, THERMAL STRESS

EFFECTS/RATIONALE:

INABILITY TO EMPLOY EYESHADES DURING A MISSION WHICH REQUIRES THEM CAN RESULT IN SIGNIFICANTLY IMPAIRED VISION AND MISSION IMPACTS.

DATE: HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: EMU MDAC ID: 891 FLIGHT: 2/2

ITEM: EXTRAVEHICULAR VISOR ASSEMBLY FAILURE MODE: TENSION BAND BREAKS/YIELDS

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:

1)
2)
3)
4)
5)
6)
7)
8)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRE-EVA: 3/3 EVA: 2/2 POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: A/L 9813-12

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT

EFFECTS/RATIONALE:

A FAILURE CAN HAVE ONE OF TWO CONSEQUENCES: 1) A LOOSE EVVA NOT HELD IN POSITION, OR 2) STICKS THE EVVA IN ONE POSITION. THE LATTER CONSEQUENCE IS THE MOST CRITICAL IN THAT MISSION TERMINATION CAN RESULT IF THE EVVA CANNOT BE EMPLOYED.


#### APPENDIX F

# NASA FMEA TO IOA WORKSHEET CROSS REFERENCE/RECOMMENDATIONS

This section provides a cross reference between the NASA FMEA and corresponding IOA analysis worksheet(s) included in Appendix E. The Appendix F identifies: NASA FMEA Number, IOA Assessment Number, NASA criticality and redundancy screen data, and IOA recommendations.

# Appendix F Legend

# Code Definition

Code	<u>Definition</u>
Blank	The IOA and the NASA are in agreement.
1	The IOA recommends inclusion of this failure mode into the NASA FMEA.
2	The IOA recommends inclusion of this fialure mode into the NASA CIL.
3	The IOA recommends deletion of the failure mode from the IOA analysis.
4	The IOA recommends incorporation of the identified failure mode as a "cause" into a specific NASA FMEA.
5	The IOA recommends downgrading the NASA FMEA criticality.
6	The IOA recommends upgrading the NASA FMEA criticality.
7	The IOA recommends upgrading the NASA FMEA criticality and adding the failure mode to the CIL.
8	The IOA recommends removal of the NASA failure mode from the CIL.
9	The IOA agrees with the NASA analysis.
10	The IOA recommends a change to a screen.
11	The IOA recommends the failure mode be removed from the NASA FMEA. Analysis of this event is more applicable to a hazard analysis.
12	The IOA recommends the NASA failure mode effects to be modified.
13	The EVC should be covered by the communications

and tracking reports by the IOA.

APPENDIX = NASA FMEA TO 10A WORKSHEET CROSS REFERENCE / RECOMMENDATIONS

IDI	ENTIFIERS		NASA	!	:: IOA RECOMMENDATIONS *							
NASA FMEA NUMBER	; IDA ; ASSESSMENT NUM	BER !! HW/F		11	HW/F	I A B	C	(SEE LEGEND CODE)	: ISSUE			
=======================================	=		;	==¦¦ 		======   P F			:}===== }			
	EMU-145   EMU-166	11 /	1	11			ſ	!	1 A			
	EMU-175	11 7	!	11		' 'PF	p	. 4				
	: EMU-177		) !	- ! !			•	11	! !			
	EMU-195		!	11		:		: 3	i			
	: EMU-202		į	11		. P F	р		. X			
	EMU-224	$\ddot{i}$	.;	11				1.2	; X			
	: EMU-225	11 /	1	- 11		! P F		•	. X			
	EMU-226	11 /	i	- 11		   P F		1.2	. X			
	: EMU-304	11 /		11			P	1 4	1			
	EMU-319	11 /		11				ii	;			
	EMU-320	11 1	1		2/1R		P	1 1,2	; X			
	EMU-321	11 /	1	- 11		:		1 1,2	1 %			
	: EMU-342	11 /	1	! !		1		1 1	}			
	; EMU-360	11 /		11		1		1 3	1			
	: ENU-361	11 /	1	11		PP	P	1 1	1 X			
	: EMU-384	11 /	;	11				1,2	; X			
	EMU-385	11 /	1	11				1,2	X			
	EMU-386	11 /		11				1 1	;			
	EMU-387	11 /	1	11		1		1,2	1 %			
	EMU-394	$\frac{1}{11}$		- 11				1 1,2	: X			
	EMU-395	11 /		- 11		:		1 4	1			
	EMU-428	H I		11		ł		1 3	1			
	ENU-439	11 /	1	11		PF	P	1 1,2	; X			
	: EMU-440	11 /	1	11				1 1,2	i X			
	ENU-442	11 /	i	11				1 3	1			
	: EMU-460	11 /	1	11	1	:		1 3	;			
	: EMU-461	11 /	Ì	11	2/1R	l P F	p	1 1.2	; X			
	: EMU-463	11 /	1	11			P	1.2	; X			
	: EMU-464	11 /	1	;;		PF		1 1,2	i X			
	: EMU-468	11 /	1	11				1 1	* 1			
	EMU-476	11 /	1	1:				1 1	1 X			
	ENU-478	H = I	;	11			P	1 1	i X			
	EMU-479	11 /	1	1:	2/1R	PF	P	1.2	; X			
	: EMU-480	H = I	i	11	2/1R	PP	P	1,2	t X			
	EMU-485	11 /	;	11	2/2	1 }		1 1,2	i X			
	EMU-486	11 /	;	; ;	2/1R	PF	ř	1 1,2	l X			
	EMU-487	11 /	1	11	2/1R	PF	P	1 1,2	; X			
	: EMU-488	-11 - I	;	;;	2/1R	PF	P	1 1,2	ł X			
	EMU-496	-11 - I	ł	11	3/3	) 		1 1	1			
	1 ENU-509	11 /	1	;;		;		1 13	i			
	ENU-510	11 /	1	11		<u>;</u>		: 13	ì			
	: EMU-511	11 /	;	11		1		1 13	;			
	EMU-512	11 /	1	1 1	1	1		1 13	1			
	EMU-513	-11 - I	1	11	1	<b>;</b>		13	!			
	,	31	!	11		<u>'</u>		<u>:</u>	1			

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	; ENU-515	1 2		:			,		!			13	7		
	; EMU-516	) 1 ) 1		!			;		•			13	1		
	: ENU-517	11		!			:		1			13	1		
	: EMU-604	1 1		1				2/2	-			1.2	† X		
	ENU-612	, ,		;			1		1		1	1,2	1 %		
	: EMU-616	- 11		1			1		1			: 3	;		
	: EMU-617			1			1		) i		;	1 3	1		
	: EMU-618			ļ			;		!		1	1 3	1		
	1 EMU-675			1			1	2/2	i			1 7	; X		
	: EMU-676	1		ł			1	1 2/2	i			1.7	1 %		
	EMU-677	1 1	/	!			} }	2/2	}		!	; 7	1 %		
	EMU-678	1	1	1			1	1 2/2	}			1 7	1 X		
	EMU-679	3 : 1	1	1			ł	1 2/2	1			1 7	1 %		
	: EMU-680	1	1 /	ł			ļ		;			1 1,2	X		
	: EMU-681	1	. /	i			ţ		l P	P	۴	1 1	; X		
	: EMU-742X	i	1 /	i			i		;			11	; 		
	: EMU-803X	i	1 /	į			;		; P	F		1.2	i X		
	: EMU-805X	i	1 /	1			;		;			1 1,2	; X		
	: EMU-813X	1		i			i		i			1,2	X		
	: EMU-820X	1		1			1					1 1.2	; X		
	: EMU-825X	-		1			;		1			1 1,2	, X		
	: EMU-826X	;		ì				1 2/2	1			1 1,2	i X		
	: EMU-829X	1		i				1 2/2				1 1,2	; A		
	EMU-834X	ł		ł					;	_		1 1,2	; A		
100-FM1	: EMU-784X	;		i				1 2/1R	; P	۲	F	1.6			
100-FM2	: EMU-785X	1		i	P	የ የ		1 /	i			i ! 9	1		
100-FM3	: EMU-786%	1		ł	_			1 /	í			i 7	1		
100-FM4	: EMU-787X	;				FP		1 /	i I			<b>†</b> †	•		
101-FM1	: EMU-840X	!			•	የየ	-	$\frac{1}{4} \frac{I}{I}$	i 1			1	:		
	: EMU-842X	1	1 3/2R 1 3/28			PP no		1 3/3	,			1.5	:		
101-FM2	ENU-BAIX			i	P	P P		1 3/3	i !			!	i		
101-FM3	: EMU-868X		1 3/3	i				$\frac{1}{1}$ $\frac{I}{I}$	!			!			
101-FM4	: EMU-869X	1							!				!		
101-FM5	: EMU-B70X		1 2/2	1				1				•	{		
102-FN1	: EMU-601		1 1/1	!				2/1R	P	P	F	1.5	1 X		
102-FM10	EMU-611   EMU-846X		1 1/1	!				1 /	}		•	1	1		
102-FM11 102-FM12	1 EMU-847X		3/3	!				I = I	1			1	1		
102-FM13	: EMU-848%		3/3					1 2/2	1			1 7	i X		
102-FM14	: EMU-849X		1/1	1				11 /	;			1 1	i		
102-FM15	: EMU-804X		1 2/1R	1	Ρ	P P		11 /	;			1	i		
102-FM16	: EMU-605		1 2/1R			P P		11 /	1			1	i t		
102-FM17	EMU-606		1 3/3	!				H /	i			1 9	i		
102-FM19	: EMU-615		1 1/1	;				(1 2/1R	; P	P	F	1.5	X		
102 FM19	: EMU-806X		2/2	;				H /	1			) 	1		
102-FM2	: EMU-600		2/2	1				11 /	;			1	ì		
102-FM20	: ENU-613		1/1	1				11 /	ŀ			$\perp$ $\langle$ $\rangle$	1		
102-FM21	: EMU-614		1/1	į.				11 2/1R	; P	P	F	15	; X		
102-FM22	; EMU-610		1 2/1R		P	P F		H = I	1			1	i i		
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102-FM23	: SMU-607	11 3/3	;			·-,	,   /	.,-=: 			; ;	====== 		
102-FM24	: EMU-510A	11 3/3	;			1	1 /	1			÷ 9			
102-FM25	804-UM3	11 3/2	9 1 5	F	٩	ŀ	2/2	:			; <b>5</b>	χ		
102-FM26	: EMU-309	11 3/3	<u> </u>			į	2/2	!			1.7	X		
102-FM27	EMU-619	11 3/3	;			1	1 /	;			1			
102-FM <b>2</b> 8	: EMU-851X	11 3/3	1			1	2/2	1			1 T	X		
102-FM3	: EMU-402	11 1/1	ì			1	2/1R	F	Ρ	F	1.5	Х		
102-FM4		11 3/3	i			)		1			F i			
102-FM5		11 3/3	ļ			1		i			1 9			
102-FM6			1 P	F	P	1 1	•	!		F	1 10			
102-FM7		11 3/3	¦			1 1		:			1			
102-FMB				•	Ρ	1 1		}			<u> </u>			
102-FM9			}	P	Р	1 1		ļ			;			
103-FM1		11 1/1	ì			11		i P	Ρ	F	15 :	X		
103-FM10		11 2/2	;		_	11		!	_		}			
103-FM11		11 2/18		NA	_	11			F		10 !			
103-FM12		11 2/18		F	P	- 13	/	;			;			
103-FM13. FM14	·	11 2/18	! P	NA	٢	11	0.45	1		-	1 9			
103-FM15 103-FM16		1/1    2/18	i	_	г.	1;	2/1R	1 1	Р	ŀ	15	χ		
103-FM17		2/18    2/18		F NA	P n·	11	/,	i	_		i i			
103-FM18	·	:: 2/18 :: 2/18			r p	11	1	i i	F		1 10			
103-FM19		:: 2/18    1/1	1 F	Г	Г	11	2/1R	i in	p	F	i : : : : : : : : : : : : : : : : : : :	v		
103-FM2		1/1	;			- 1 1	27 £ft. -/	1 F !	۲	r	) J	X		
103-FM20		11 2/2	1			11	1	1			1 1			
103-FM21		1 2/2	1			11	,	! !			1 ,			
103-F#22			; Р	۶	Р	11	,	!						
103-FM23		1 3/3	:	'	•	11	2/2	, !			17	ų		
103-FM2A			; Р	NA	P	11	/	1			19 1	A		
103-FN3			; P			11		!Р			1			
103-FM4	: EMU-430 :	1 2/2	1			11	1	 !						
103-FM5		1 1/1				11		P	ρ	F	. 5	X		
103-FM6. FM8		1 2/1R		NA	Ρ	11	/				1 9	,		
103-FM7	: EMU-814X :	1 2/1R		NA	P	11	1	i i	F		! 10			
103-FM9	: EMU-631	1 1/1	:			11	2/1R	; P	ρ		; 5	X		
104-FM1	: EMU-658 :	1 1/1	1			11	2/1R	P	Ρ	F	1 5	χ		
104-FM10	: EMU-B24X :	1 2/1R	; P	F	P	!!	/ !	ł			1	:		
104-FM11	1 EMU-647	1 2/18	} P	NA	P	! !	/ :	1	F		1 10	1		
104-FM12	: EMU-874X :	1 2/1R	} P	NA	Ρ	! !	7 1	!			1 7	!		
104-FM13	EMU-548	1/1	1			1 [	2/1R :	P	P	F	1 5	X :		
104-FM14	: EMU-375X		1.7	F	F	1 7	/F :				1 10	!		
104-FK15	: EMU-876%			NA		: !	1 1				i <b>q</b>			
104-FM15	EMU-877X			NA		1 I	7				1.9	!		
104-FM17	: EMU-878X ;			NA		П	/ 1		F		1 10	;		
104-FM18	: EMU-879X			NA		Н	/ 1		F		1 10	;		
104-FM19	: EMU-880X :		i			1 1	/ l				!	i		
104-FM2	EMU-073X   1			NA		! !	/ }				1 9	1 i		
104-FM20	EMU-827X			F		;;	/ /				}	ļ		
104-FM21	! EMU-649		!			Н	/ :	_	_	_	1			
104-FM22	EMU-650		1			::	2/1R	P	P	F	5 !	X :		
	1	i	i			11	}					1		

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NASA FMEA NUMBER	IDA I ASSESSMENT NUMBER	11	HW/F	i A	-	C	;;		SC A	В	C		ISSUE 			
104-FM23	: EMU-828X	-,,-	2/1R		NA		-	1	: :	F		! 10	!			
104-FM24	: EMU-651	) } 1 1	2/1R	P	NA	۴	1:	1	i i	F		10	}			
104-FM25	EMU-651A	11	2/1R	P	NA	Ρ	1 1	1	!	F		1 10	;			
104-FM26	EMU-881X	1 1	2/1R	P	NA	P	1 1	1	1			; 9	1			
104-FM27	: EMU-882X	; ; 1 1	2/1R	١ ٢	NA	P		1	ļ i			1 9	1			
104-FM28	: EMU-883X	) i	3/3	† 1			В	1	1			Ç	{			
104-FM29	: EMU-652	11	1/1	ŀ			11	2/1R	1 P	P	F	1 5	<b>X</b>			
104-FN3	: EMU-657	::	3/2R	l P	P	P	1 1	2/2	i			1 7	1 X			
104-FM30	: EMU-830X	11	2/1R	P	NA	P	11	1	}	F		1 10	1			
104-FN31	: EMU-867X	11	2/1R	l P	NA	P	11	7	1	F		10	1			
104-FM32	: ENU-654	11	2/1R	<b>P</b>	NA	Ρ	11	1	<b>!</b>	F		1 10	1			
104-FM33	: EMU-654A	11	2/1R	l P	NA	P	1 1	1	l P			1 10	!			
104-FM34	: EMU-653	1 1	1/1	}			; ;	2/1R	l P	P	F	1 5	i X			
104-FM35	: EMU-833X	11	2/1R	i P	F	P	11	1	ł			1	ŀ			
104-FM36	: EMU-B31X	11	3/2R	: P	F	P	11	1	!			¦ 9	!			
104-FH37	: EMU-832X	11	3/3	; 1			;;	2/2	1			1 7	l X			
104-FM38	: EMU-655	11	3/3	ļ			11	1	1			l	1			
104-FM39	: EMU-835X	11	3/3	1			1 1	1	ŀ			1 1	1			
104-FM4	: EMU-656	11	2/2	!				1	1			) 1	i i			
104-FM40	1 EMU-856X	11	3/3	}			; ;	2/2	i			17	l X			
104-FM41	: EMU-B84X	::	3/3	!			11	1	;			<b>)</b>	1			
104-FM5	: EMU-659	11	3/1R	P	F	P	1 1	1.	;			1 9	!			
104-FM6	EMU-885X	1 1	3/3	1			11	1	1			! <del>1</del>	ŀ			
104-FM7	: EMU-854X	11	3/3	1			1 1	1	;				1			
	: EMU-855X	11	3/3	i			11	1	<u>'</u>			) 				
104-FMB	: EMU-853%	11	3/3	!			1 1	1	) 1			1 9	;			
104-FM9	: EMU-646	::	1/1	1			!;	2/1R	i P	P	F	1 5	ł X			
105-FM1	: EMU-622	11	1/1	1			;;	1	ŀ			; 7	1			
105-FH2	: EMU-B09X	11	2/1R	l P	F	P	;;	1	:			1 9	!			
105-FM3	: EMU-807X	11	2/2	1			11	1	!			; 9	1			
105-FM4	: EMU-886X	11	2/2	ļ			;;	1	;			<b>;</b>	}			
105-FM5	: EMU-808X	11	2/2	i			!!	1	;				i			
105-FM6	: EMU-620	::	3/1R	P	NA	P	;;	1	;			<b>;</b>	}			
105-FM7	EMU-621	11	2/2	l l			; ;	2/1R	l P	P	P	6	:			
106-FM1	: EMU-637	11	3/2R	<b>!</b> P	F	Ρ	! :	1	1			1 9	;			
106-FM10	: EMU-642	11	1/1	-			11	2/1R	l P	P	F	: 5	; х			
106-FM11	: EMU-822X	11	2/1R		F	P	; ;	1	!			1	!			
106-FM12	: EMU-823X		3/2R	P	P	P	!!	2/2	ŀ			6	i x			
106-FM13	: EMU-643	::	2/2	;			;;	1	1			1	1			
106-FX14	: EMU-645	11	2/2	;			11	ŧ	1				1			
106-FM15	1 EMU-644	1 1	2/2	¦			1 1	1	<u>}</u>			1	i .			
106-FM16	: ENU-859X	11	3/3	i			! !	1	1			<u> </u> -				
106-FM17	: EMU-858X	11	2/2	1			11	1	1				i			
106-FM18	: EMU-860X	11	3/3	;			::	7	ŀ							
106-FM19	: EMU-864X	11	2/2	1			1 1	1	;			; !	1			
106-FM2	: EMU-640A	11	1/1	ì			1 1	7				1 9				
106-FM20	: EMU-857X	11	3/3	;			;;	1	t 1	_			i			
106-FM3	: EMU-640	11	2/1R	P	NA	P	11	1		F		1 10				
106-F <b>M4</b>	: EMU-987X	11	1/1	1			11	/	¦			_				
AAC EMP	: EMU-639	11	3/3	1			;;	2/2	ï			1 7	1			
106-FM5	i Chu osi	11					1;									

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1 106-FM6	: EMU-819X		2/2 3/3	i I			ì		1		11 7	; X				
1 105-FM7	: EMU-638	11		i 1			1		i i n	ח ר	;	1 X				
1 106-FM8	EMU-641	11	1/1		n	Ρ			; F	PF	; 3 ; 7	i A				
1 106-FM9	: EMU-821X	11	2/1R	. r		г	1		1		1 7	i X				
1 107-FM1	EMU-888X	1 1	3/3 3/3	! !			!		1		! 9	s A				
: 107-FN10	: EMU-664	11	3/3	) 			;		•		1 7	1				
107-FM11	: EMU-837X	1 !	3/3	i I			1				1	f I				
1 107-FM12	: EMU-438X	11	3/3 2/1R	1 1 D	P	P	1		1 1		1	!				
1 107-FM13	: EMU-665		3/3	1 F 1	Г	Г	?		;		1	i				
1 107-FM14	! EMU-839X	11	3/3	1			1 .		t t		1	1				
1 107-FM15	: EMU-667			P	P	Р	1		) 		1 9	1				
107-FM16   107-FM17	; EMI-777	11	2/1R 2/2	1	٢	Г	1		! !		1 7	i i				
	EMU-666		2/2	! }			1		1		1 9	,				
1 107-FM2	: EMU-660A	11	2/2	) )			i		1		; 7 ; 9	i i				
1 107-FM3 1 107-FM4	; EMU-660 ; EMU-661	11	3/3	!			1		, !		!	:				
: 107-FM5	: EMU-834X	1 I	3/3	!			:		!		!	!				
1 107-FN6	: EMU-662	11	2/1R	P	ρ	Р	;		!		!	!				
: 107-FM7	: EMU-861X	11	3/3	! ! !	•	•	;		! !		!	1				
107-FH8	: EMU-862X	11	2/2				;		: !			:				
: 107-FM9	: EMU-663	11	3/3	!			;		!		1	:				
108-FM1	: EMU-810X	11	2/2				1		:		:	!				
1 108-FM10	: EMU-863X		3/3	) )			1		!		•	1				
108-FM2	: EMU-889X	11	2/2				i		, !							
1 108-FM3	: EMU-625	11	2/2				;		!		1					
108-FM4	: EMU-890X		2/2				i		:			•				
108-FM5	: EMU-B11X	Н	3/3	) }				3/2R	l P	P P	1 6	1				
1 108-FN6	EMU-B12X	11	3/2R	P	F	۴	1		<u> </u>	P	10	1				
108-FM7	: EMU-626	11	3/3	P	P	F	ŀ	2/2	4		1 7	1 X				
108-FM8	: EMU-623	; ; ; ;	2/2				11	1	:		1	ļ.				
i 1	: EMU-624	11	2/2	t			11	3/3	;		1 5.8	; X				
108-FM9	: EMU-891X	11	3/2R	P	F	P	11	1	;		1 9	1				
110-FM1	: EMU-669	11	2/1R	P	ዖ	P	1 1	1	t		; 9	1				
110-FM2	: EMU-670	11	3/3				1 1		ļ		1 0	ł				
110-FM3	: EMU-670A	11	3/3				1 !		:		1	;				
110-FM4	: EMU-671	; ;	2/1R	P	P	P	1		;		1 9	1				
110-FM5	: EMU-672	1;	3/3	1			1 1		;		1 7	1 X				
: 110-FM6	: EMU-674	11	3/3				! !		,		1	1				
110-FM7	: EMU-673	: :	2/1R	Ρ	P	P	11		1		1 9	1				
111-FM1	1 EMU-247	11	1/1	_	_		11				1	1				
111-FM2	: EMU-246	11	2/1R		P	P	1 1		1			1				
112-FM1	: EMU-249	11	2/2		_	_	11				1	1				
112-FM2	: EMU-252	11	3/2R	P	F	P	11				1 6	; X				
112-FM3	: EMU-250	11	2/2	_	_	_	11				i : 1	i				
112-FM4	EMU-251	11	3/2R		F	P	11		i		. 6	! X				
112-FM5	: EMU-253	11	1/1		_		1 1				i	i				
112-FM6	: EMU-254	11	2/1R 3			P	11		i		i	i				
112-FH7	: EMU-248	11	2/1R :		P	P	11		i 1		1	1				
: 113A-FM1	EMU-227	11	2/2		r	c	11		i		i 1	i 1				
: 113A-FM2	: EMU-228	11	3/1R	۲	٢	ρ	11		! !		1 1	1				
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113A-FM3	: EMU-222	-, ,  }	2/2				-::	2/1R				6	, 1 X	
113A-FM4		!!	2/1R	1 P	P	P	!!	1	1			! !	; i	
1138-FM1	EMU-230		2/1R	; P	Ρ	٤	11	1	1			1 <del>1</del>	!	
1138-FM2	: EMU-231	!!	2/1R	; P	F	P	11	1	) i			) 1	;	
1108-FM3	: EMU-229	! !	2/1R	: P	P	Ρ	1 1	1	} 1			}	!	
113C-FM1	: EMU-234	1 1	2/2	1			1 !	1	i L			} !	1	
113C-FM2	: EMU-233	11	2/1R	; P	P	۴	;;	2/2	}			; 5	: X	
113C-FM3	: EMU-232	11	2/1R	l P	P	Ρ	1 1	1	:			7	ł	
113D-FM1	EMU-236	11	2/1R	1 P	P	P	11	1	1			1	;	
113D-FM2	: EMU-237	; ;	2/1R	1 P	P	۴	11	1	;			t i	;	
113D-FM3	: EMU-238	13	3/3	;			Н	2/1R	l P	P	Ρ	1 7	X	
	: EMU-239	1 1	3/3	ŀ			11	2/1R	} P	Ρ	P	<b>;</b> 7	; X	
113D-FM4	: EMU-235	11	2/1R	1 P	P	P	: :		ļ			1 9	;	
1130-FM5, FM6	EMU-240	11	2/2	}			11	1	; 1			1	;	
1130-FM7	: EMU-712X	; ;	3/3	;			; ;	1	1			t t	1	
113E-FM1	: EMU-242	11	2/1R	; P	P	P	11	1	ł			!	:	
113E-FM2	ENU-243	11	3/3	1			1 !	2/1R	i P	P	P	1 7	; X	
113E-FM3	: EMU-245	1 1	2/1R	1 P	٩	P	! !		;			!	;	
113E-FM4	: EMU-244	11	2/2	;			11	2/1R	l P	P	Ρ	1 6	<b>X</b>	
113E-FM5	: EMU-241	11	2/1R	1 P	P	P	11	1	1			<b>;</b>	;	
113E-FM6	: EMU-713X	11	3/3	í			1 1	1	1 .			<del>1</del> 1	;	
114-FM1, FM2	: EMU-209	11	3/1R	<b>!</b> P	P	P	1 1	3/2R	j 1			1 5	1	
114-FM3, FM4	EMU-210	11	2/2	}			13	1	!			<b>; 9</b>	ł	
114-FN5	! EMU-212	11	2/1R	1 9	F	P	11	I	!			1	1	
114-FM6	: EMU-211	; ;	2/1R	1 P	Ρ	P	11	1	;			<b>¦</b>	ł	
114-FH7	EMU-752X	11	3/1R	1 P	P	P	1 1	3/2R	!			<b>5</b>	; X	
115-FM1	EMU-259	1 1	2/2	!			1 1	1	}			1	i i	
115-FM10	: EMU-268	11	2/2	1			11	1	;			1 1	1	
115-FM11	: EMU-270	11	3/1R	1 P	NA	P	1	1	1			<b>;</b> 9	!	
115-FM12	: EMU-269	11	3/1R	1 P	F	P	11	1	1			1 9	1	
115-FM13	: EHU-257	1 1	2/2	;			11	3/1R	P	F	P	1 6	: X	
115-FM14	EMU-258	; ;	2/1R	1 P	P	P	1 1	1	1			1	l	
115-FH15	: EMU-258A	11	2/1R	; P	P	P	1	. 7	ļ			1	1	
115-FM16	EMU-255	11	2/1R	; P	P	P	1	1	;			1 9	1	
115-FM17	: ENU-714X	11	2/2	1			1	1	;			1	1	
115-FM18	: EMU-256	1 1	2/1R	P	F	P	1	1	1			; 9	!	
115-FM19	: EMU-715X	1 1	3/1R	1 8	F	P	- } }		1			1 7	1	
115-FM2	: EMU-260	1 1	2/2	1			1 1		i			1	;	
: 115-FM20	: EMU-753X	) ) i i	2/1R		P	٩	;		ŀ			1	1	
115-FM21	: EMU-754X	11	2/1R	ŀF	F	P	11		!	F		1 5.10	X	
1 115-FM3	: EMU-261	f 1	2/2	1			7		1			1	;	
115-FM4	: EMU-262	1 1		;			1		1			<u> </u>	1	
: 115-FM5	EMU-265	11	2/1R	1 P	NA	A P	)		1			1 9		
115-FM6	: EMU-266	11	2/2	ì			1		1			1	•	
: 115-FM7	: EMU-263	1 1	2/2	ļ			1		,			1	1	
115-FM8	: EMU-264	; ;	2/2	¦ .			1		1				•	
115-FM9	EMU-267	11	2/2	i			1		,			1 9	:	
116-FM1	: EMU-271	11	2/2	}			;		ļ			!	i	
116-FM2	: EMU-272	11	2/2	;			ł		ì			1		
120A-FM1	EMU-275	11	3/1R	P	F	P	;		ŧ			1 5	; X	
	•	11					1					1	,	

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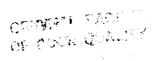
: IDENT	IFIERS	11	Ni	ASA					10A RECOMMENDATIONS *								
NASA   FMEA NUMBER	ASSESSMENT NUMBER	{ }	CRIT HW/F	; Si	CREE B	C	1 1	CRIT HW/F	1 A	8	C		ISSUE				
: 120A-FM2		1 1'	2/1R		P	P	- i i	/	;			;					
120A-FM3	EMU-273		2/1R	۲ ۲	P	Ρ	11	i	}			!					
1 1208-FM1	1 EMU-276	11	2/18	1 8	۴	P	1		1			1 9					
: 1208-FM2. FM3	EMU-277	! !	2/1R	P	F	P	11	1	:			!					
: 120B-FM4	EMU-279	: :	3/1R	; p	11	P	1	1	!	p		1.9					
1208-FM5	: EMU-278	; ; ; ;	3/3				1 1	3/2R	; ?	N.	a P	1 6					
1 120C-FM1	: EMU-282	1 1	2/1R	P	P	Ρ	11	1	1			₹ <b>†</b>					
120C-FM2	: EMU-281	: :	3/3	l I			1 1	1	1			1 9					
: 120C-FM3	: EMU-280	1 1 3 2	2/1R	۱ ۲	P	Ρ	13	1	1			; ;					
121-FM1	: EMU-201	1 1	2/1R	P	F	P	2 1	1	}			1 9					
121-FM2	: EMU-199	11	2/2	ŀ			! !	1	;			1					
121-FM3	: EMU-198	H	2/1R	P	P	P	1:	1	} (			! • !					
121-FM4	: EMU-200	1 † 1 i	2/2	ŀ			!!	1	1			1					
121-FM5	EMU-197	11	2/1R	P	P	P	1 1	1	!			†					
122-FM1	: EMU-204	11	2/2				::	1	) 1			<u> </u>					
122-FM2	: ENU-205	H	2/1R	P	F	P		1	1			; 9					
122-FH3	: EMU-716X	1 1	2/1R	P	F	F'	11	1	1			:					
122-FM4	1 EMU-206	, ,	2/1R	P	F	7	;;	1	1			1 9					
122-FM5	: EMU-203	H	2/1R	P	P	P	1 1	7	1			! !					
123-FM1	EMU-185	: :	2/1R	P	ē	P	;;	1	1			; i					
123-FM10	: EMU-187	1 1	2/1R	P	P	P	! :	1	ì			;					
}	! ENU-188 :	11	2/1R 1	P	P	Р	1 1	1	;			!	}				
1 123-FM11	EMU-190	::	2/1R 3	P	Ρ	P	<u> </u>	1	;			) 					
123-FM12	! EMU-751% :	! !	1/1				) ; † !	1	i i				;				
123-FM2	1 EMU-717X	1	2/1R 3	P	P	P	; ;	1	ļ			19 (	!				
123-FM3	: EMU-184 :	11	2/1R	P	p	Ρ	11	1	1			¦	;				
123-FM4	: EMU-178	1 !	2/18 1	₽	P	Р	11	1	) 1	F	F	1 10	;				
123-FM5	EMU-182	1 1	2/2				1 1	2/1R	1 P	₽	P	1 6	X :				
123-FM6	: ENU-179 :	! !	2/1R 1	P	P	P	1 1	1	: }			! !	}				
,	EMU-181	! !	2/1R :	P	P	Ρ	11	1	1			!	;				
123-FM7	: EMU-183	11	2/1R :	P	P	P	11	1	1	F		10.12					
123-FM8	: EMU-189 :	11	2/2				1 1	2/1R	1 P	P	P	1 6	χ :				
123-FM9	: EMU-180 :	!!	2/2				11	2/1R	i P	Ρ	F	1 6	X :				
	: EMU-186 :	;	2/2 1				11	2/1R	P	P	P	1 6	X f				
125-FM1	EMU-147	ļ	3/1R :	Ρ	NA	P	! !	I	1	F	!	1 2,9,10	Х ;				
125-FM2	: EMU-148 :	i	2/1R 1		P		; ;	1	<b>}</b>	F	;	1 10	í				
125-FM3	EMU-149	1 1	2/1R	P	P	P	1 1	1	:		1		;				
125-FM4	; EMU-150 !	1	2/2 3				11	2/1R	! P	F	P	19	j 1				
	: EMU-151 :	1	2/2				1 1	2/1 <b>R</b>	۱۴	F	P	19	1				
126-FM1			2/18/1				3 F	1	•		;	9 ;	;				
126-FM2		1	2/1R	۴	P	P	1 1	1	1		1		ì				
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127-FM2	EMU-156	1	2/2				1 1	2/1R	l F	F	Р :	6 1	X i				
127-FM3		1	2/1R		P	P		/	) 		}	1	ì				
128-FM1		1	2/2 1				;	7	i		1	1	!				
128-FM2		1	2/2				1 1	2/1R	P	٢	P	6 1	X :				
128-FM3		1	2/1R 1	P	P	P	: :	1	;		1	1	!				
131/162-FM1		1	2/2				11	2/18			6	6	X :				
		H	2/2 1				1 1	2/1R	1 2	F	Р :	: <b>6</b>	х ;				
131/162-FM2		i	2/1R :	P	P	P	1 1	/	) <del>1</del>		ŀ	1	1				
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; NASA ; FMEA NUMBER	: IOA ::   ASSESSMENT NUMBER	1 C	RIT :	SC A	REE!	NS C	1 1	CRIT :	SC A	REE B	NS C	OTHER (SEE LEGEND CODE)	ISSUE
			2/1R				-11	/	; ;			1	: ! !
1 131/162-FM3	EMU-101	1	2/1R (	P	P	P	!!	1	1			i i	}
1	: EMU-104	1	2/1R 1	P	P	P	1 1	1	<u> </u>			ŧ 1	t t
1 131/162-F#4	: EMU-719X }	1	3/1R	P	F	P	1;	1	į			,	
1 131/162-FM5	EMU-71BX	11	2/1R 1	P	F	P	1 1	3/1R	1			1 5	; X
1 131/162-FM6	EMU-720%	1	2/1R	P	P	٩	1 L	/	;			1 9	
132A-FM1	: EMU-284		2/2	i			11	3/2R	P	P		1.5	; X
132A-FM2, FM3			2/2				1 1	1	1			1 9	i
132A-FM4			2/1R				; ;	1	!			1 9	
			2/1R		P	P	! ;	/		_	_	1 9	. v
			2/2	,			11		l P	F		1 5	X
			2/2		_	_	11	/	i			1 9	•
			2/1R				: :	/	i			. 9	; ,
			2/1R		P	•	11	<i>'</i> .	•	_		i + a +o	i !
			3/1R		NA		11	/	i ı	F		1 7,10	5 A F
			2/1R		P		11	1	i ,	F		1 10	<b>!</b> 1
•			2/1R			P	; ;	′.	i 1	ŗ		10	, ,
			2/1R	P	P	P	1 1	i ,	i ,			i I	<b>,</b>
• •			2/1R		•	P	1 1	,	1			1 0 12	i I
			3/2R		NA		1 1	1	1	NA		1 9,12	† †
			3/1R	ir	۲	P	1 1	/ 2/1R	i 1 5	Ь		1 9,10 1 7	, X
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			2/2	! !			1	7	!			1	, ,
			2/18	-	Р	P	11	,	1			1 9	<del>!</del>
			2/2	:	·	•		2/1R	P	Ρ	Ρ	: 6	: X
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			2/2	! !			1 1		}			F. I	; 
			2/1R	P	F	P	11	7	ļ			1	1
		11	2/1R	P	P	P	!!	1	1			; 9	1
	: EMU-144 :	11	3/3	;			11	1	1			1	i
1 139-FM2, FM3	: EMU-146	) ; } į	3/3	1			11	1	1			1	ì
1 139-FM5	: EMU-143	! !	2/18	P	P	P	1 1	1	i i			!	, 1
1 140-FM1	: EMU-721X		2/1R		Ρ	P	1 1	1	ì			) 	ì
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			2/1R		P	P	1 1	J	1	_		1	;
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			2/1R		•	٦	1 1	,	) J			s 7 s	! !
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,			2/2 2/2	) •			11					16	, A
141-FM2		i i 	LIL	! !			11	T1 11/	1 J	1	,	; <del>·</del>	. ^
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141-FMS		2/1R			P		7	!	F		1 10	Ì		
142-7 <b>M1</b>		3/1R		NA					F		1 2,10	, x		
14 <b>2</b> -5M2		1 3/1R		NA		- 11			F		1 2,6,10			
142-8M3		2/18		P	P	1:	,	:				1		
143-FM1		3/18			ŗ	11	3/18	:			!	!		
143-FM2		2/1R		NA		1 1			F		, ; 10	:		
143-FM3		1 2/1R		Р		11	;	:			!	:		
145-FM1	· -·	11 2/1R		•	P	11	1	1			' ! !	1		
145-FM2		1 2/2		•	•	11	,	i			, 1			
145-FM3		3/2R		МΔ	p	11	2/1R	<u>.</u>			! 7	L x		
146-FM1		2/1R		P	_			!			3	!		
146-FM2		1 2/1R			_	11		:			!	!		
146-FN3		1 2/1R		NA		11		·			. 9	:		
146-FM4		11 3/3	!	1411	'	11		!			• • !	1		
147-FM1		1 2/1R	! Р	Р	P	!!	,	!	P		, !	!		
147-FM2		1 2/2	!	•	•	11	2/1R		, P	P	}	. x		
147-FM3		3/2R	! P	NA	р	;;	/	!	1	'	, <u>,</u>	:		
149-FM1		1 2/2	!	1971	•	11	2/1R	. P	Р	р	1   1	! x		
148-FM2		1 2/1R	! P	F	Р	11	f T		P		10.12	· ^		
148-FM3		1 2/1R	 ! P	-	þ		,	!	•		1 10112	!		
148-FN4		1 2/1R		•	P	11	,	!			! 9	!		
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150-FM10		3/2R	! P	F	Р	11	2/2	į.			¦ 6	: 1		
150-FM11		3/1R			P	1:		•			. <u>-</u> : 9	1		
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150-FM8		1 2/2	!			11		!			!	!		
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161-FM1		1 3/3	· }			1 !	1/1		,		7	1 X		
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172-FM3		1 2/1R				11	7					:		
174-FM1		1 3/3	 !	,	•	11	7	:		!	= 	!		
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20 <b>0-</b> FM1		1/1	· }			;;	2/1R				5			
ESA 1019	· LINE VALL .					, ,	-, -,,			, ,	-			



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1 210-FM2	1 EMU-296	, <u> </u>	1/1	1			11	1	i i		!	1
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1 213B-FM3	: EMU-303	1 1	2/1R	P	F	۴	11	1	;		1	1
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	: EMU-316	11	3/2R	P	P	۴	11	1	¦		}	1
	: EMU-314	1 1	1/1	1			1 1	1	;		1 9	1
1 213E-FM4	: EMU-315	11	1/1	i !			1 1	1	! }		} 	;
	1 EMU-318	11	1/1	1			11	1	) 1		1 9	!
	: EMU-301	11	2/1R	F	P	P	!   !	2/2	t i		1 5	; X
	EMU-300	1 !	2/1R	P	F	P	) 1   1	1	}		1 9	;
1 215-FM3	: EMU-297	Н	1/1	!			: 1	1	:		<b>19</b>	!
1 215-FM4	: EMU-298	1 1	1/1	!			11	I = I	ľ		1	) †
1 215-FMS	1 EMU-298A	11	2/1R	٤ ۽	P	P	; ;	1/1	) }		: 6	; X
1 215-FM6	: EMU-299	11	2/1R	P	F	P	11	1	<b>!</b>		1 9	1
: 300-FM1	: EMU-508	::	3/3	!			11	1	;		1	1
: 300-FM2	: EMU-505		3/3	i			11	1	ł		! 9	1
1			3/1R		NA	P	1 1	1	}	F	1 2,10	1 X
1 300-FM3	: EMU-507		2/2	;			11	3/3	i		1 5	; X
1 300-FM4			3/3	1			; ;	1	•		1	i
1 300-FM5			3/3	•			1 1	1	•		1	i
1 300-FM6			2/2	1	_	_	11		<b>.</b> -	_	1.5	; X
: 300-FH7			3/2R		F	P	11	3/1R	; P	F	6	; X
: 311-FM1, FM3			3/2R		P	P	11	/			i	i I
311-FM2			3/2R			P	11	1	i		i	1
1 311-FM4			2/18			P	1 1		i i		1	1 1
1 314-FM1			3/1R		NA		11	<i>f</i> .	1		1 <b>9</b>	1
1		11	3/1R		NA		1 1	1	i i		; 7   9	i !
1			3/1R		NA D		11	,	i •		1 7	!
1 314-FM2			2/1R			P	;;	<i>f</i> ,	1		1	•
1 314-FN3	·		2/1R	i	Ρ	P	1 2	<i>t</i>	1		; ; 9	1
1 321-FM1, FM2			2/2	i ,			11	<i>I I</i>	•		1 7 1 9	• !
: 321-FM3			2/2	1 1 D	P	F	11	i i			19	!
: 321-FM4			2/1R 2/2	, r ,	٢	Г	) ! ) !	3/1R	: ! P	NA P	2.5	; X
: 330-FM1			2/2	۱ ,			11	3/1K	1 F !	ite f	1 410 1	· · · · · · · · · · · · · · · · · · ·
; 330-FM10			2/2	1			11		1 ?		! 9	!
1 330-FM11	= :	11 11	LIL	1			11	LIL	!		1	· !
i	1	1 1 		·			1 i			======	' 	, =======

# ORIGINAL PAGE IS OF POOR QUALITY

: IDENTI	FIERS	!!				 		10	A F	RECOM	MENDATIONS +		
NASA	I IDA ASSESSMENT NUMBER	11	CRIT HW/F	SC A	B	С	11	HW/F	l A	B	_	(SEE LEGEND CODE)	I ISSUE
; 330-FM12		11		: :			-:: !!	/	! !			1	; ;
1 330-FM13	: EMN-382	) }	2/2	í			1 1	1	1			19	<b>1</b>
: 330-FM14	: EMU-382	1 I	3/3	;			1 1	1	1			1	! !
1 330-FM15	: EMU-378	: 1	2/2	ì			! 1	1	1			1 7	! !
1 330-FM16	: EMU-379	11	2/2	) )			! !		1			† 7	! 1
1 330-FM17	: EMU-731%	1 1	2/2	† }			; ;		1			i i	1
: 330- <b>FM18</b>	EMU-732X	1 1	2/2	;			! !		)			1	† 1
330-FM19		;;	2/2	; ;			11		;			1	i
1 330-FM2		1 ;	3/1R	l P	NA	P	1 !		1			1 9	:
: 330-FM20		11	2/2	;		_	11		;			!	
1 330-FM3		1 1	2/1R	l P	۶	P	11		i i	_	_	1 9	
1 330-FM4		!!	2/2		_		11	2/1R	! P	P	۲	i ò	¦ X
330-FM5		!;	2/1R	¦ F	P	P	11	/	i .	þ		1 10	i
330-FM6		11	2/2		_	_	11	2/1R	. P	P	P		X .
1 330-FM7		;;	3/2R	٠.	P	P	} ;	1	;			i •	i
1 330-FM8		11	3/2R	<b>.</b> P	P	P	11	1	i •			; 1	i !
1 330-FM9		H	2/2 3/2R	i	,-	Б	11		,			i 1	l }
: 350-FM1		11			F	P	11	,	i ,			<b>i</b> 1	i 1
1 350-FM10		11	2/1R   3/3	. r	r	г	11		( )			1 <b>3</b>	! !
350-FM11   350-FM12		11	3/3	) ;			11		i •			; !	! !
; 350-FM13		!!	3/3	•			11		י פי	Р	Đ	! 6	: X
: 350-FM14		11	3/3	! !			- 11		! !	1	•	19	. ^
: 350-FM15		11	2/2	!			11	7	! !			9	
: 350-FM16		11	3/1R	! P	F	Р	- 11	I	!			 ! 9	!
: 350-FM17		11	2/2			•	11	,	1			 ! <del>9</del>	
350-FM18			2/1R	P	F	₽		1				; 9	! }
		11	2/2				11	1				 	
: 350-FM20		11	2/2	!			11	1	i			1	ļ
1 350-FM21		!!	3/3	1			1 1	/ :				1 9	
1 350-FM22	: EMU-490	11	2/1R	P	F	Ρ	1 1	1	1			1 9	
; !	: EMU-494	11	2/1R 1	٦	F	P	11	7 1	ļ			1 9	
!	1 EHU-495	1 }	2/1R	P	F	Ρ	1 1	/ :	1			1 9	i
) 1	1 EMU-497	; ;	2/1R (	P	F	Ρ	1 1	/ :	!			1 9	
1 350-FM23		; ;	2/2	ŀ			;;	;	1			: 9	
1 350-FM24		; ;	3/1R :		NA		1 1	I = 1	i	F		2,10	X
: 350-FM25		1 1	2/1R			Ρ	11	1 1	ļ			1	
: 350-FM26		: ;	3/1R		NA		11	/ /		F	1	2,10	X
		1 1	2/1R		F	P	11	/ /					
		1	3/3 (				11	/ 1				1	
: 350-FM29		!!	3/3 1	_		•	11					11	
		!!	2/18 1		P	P	1 1	<i>i</i> i				; •	
		11	2/1R 3		P	P	11	/ ;	i				
		! !	2/1R (	۲	Ρ	P	1 ?	/ i	,		i	i • ••	i
		11	3/3 }	Б	F	D	11					11 7	1
			3/2R (			P	11	/ 1		F		2,10	X
		i i 11	3/1R   2/1R		NA F	P	11	/ ;	•	Г	1	: 2,10   9	A
		!	3/1R (		F	P	11	2/1R :	!		1	6	X
		1 1 1 1	2/1R 1		r F	r P	11	/ / !	'			<b>u</b> 	. A !
: 34V=fH34 !		! ! 	#/ IN 1	,	'		11	, !					:
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#### ORIGINAL PAGE 10 OF POOR QUALITY

I DE	NTIFIERS	1 1					- } ; - • • •	); IOA RECOMMENDATIONS ₹						
NASA FMEA NUMBER	l IDA   ASSESSMENT NUMBER	11		1 A	8	C	1;	,	1 A E	3 C	(SEE LEGEND CODE)	I ISSUI		
350-FM4	: EMU-483	-11-	2/2	 ¦			-,, ;;		;		1 9	, !		
350-FMS	4 EMU-761X	11	3/1R	1	NA	P	1 1	i	{ F	:	1 2,10	ļχ		
350-FM6	1 EMU-762X	1 1	3/1R	P	F	P	1 1	/	i i		1	ì ·		
350-FM7	1 EMU-763X		3/3	i I			1 1	1	1		!	i i		
J50-FM8	1 EMU-754X	1 1	3/3	1			1 1	1	1		1	!		
350-FH9	! EMU-765%	1 1	3/3	ì			11	1	1		\$ 1	<b>!</b>		
351-FM1	: EMU-458	$\mathbb{H}$	3/2R	; P	F	P	1 1	2/2	ļ		ió	; X		
351-FM2	EMU-457	11	3/1R	1 P	F	P	11	1	1		; 9	} 1		
351-FM3	: EMU-459	11	2/1R	{ P	F	P	1 !	1	!		1 9	;		
351-FM4	: EMU-780X	11	2/1R	P	F	P	1 1	1	) }		:	!		
351-FM5	: EMU-781%	11	3/3	;			1 1	1	1		!	1		
351-FM6	: EMU-782X	;;	3/3	1			11	1	ŧ		!	<u>:</u> i		
360-FM1, FM6	: EMU-392	11	3/2R	l P	P	۴	11	1	ł		:	!		
360-FM2	: EMU-393	11	3/2R	P	P	٢	11	1	1		!	1 i		
360-FM3, FMB	EMU-733X	11	3/2R	1 P	P	P	11	1	1		1	<b>¦</b>		
360-FM4, FM9	: EMU-734X	1 1	3/2R	P	P	P	11	1	;		1	:		
360-FM5, FM10	1 EMU-391	11	3/2R	l P	P	P	1 1	1	1		!	<b>¦</b>		
360-FM7	: EMU-393A	11	2/2	) 1			1 1		: P P		: 5,8	, x		
361-FM1	1 EMU-396	11	3/3	1 1			11	2/2	1		1 2,6	<b>X</b>		
	EMU+398	11	3/3	!			1 !	2/2	!		1 2,6	X		
361-FM2	: EMU-735X	!!	3/3	!			1 1	2/2	! !		1 2,6	χ		
361-FM3	: EMU-397	11	3/3	ì			1 1	7			1 9	;		
361-FM4	: EMU-399	::	3/3	i			1 1	2/2	1		1 2,5	X		
361-FM5	: EMU-736X	1!	3/3	1			11	2/2	ł		1 2,6	X		
362-FM1	: EMU-410	; ;	2/2	1 }			11	1	1			ł		
362-FM2	EMU-400	11	3/2R		F	P	1 1	1	1		•			
	: EMU-401	11	3/2R		F	F	1 1	1	}		! 9	i		
362-FM3	: EMU-411	1 1	3/2R		P	NA	1 1	3/3	ì		1.5			
362-FM4	1 EMU-402	11	3/2R		F	P	3 1	1	!		i _			
	: EMU-403	1	3/2R		F	P	11	/	:		1 9			
362-FM5	: EMU-412	11	3/2R		P		11	2\2	<b>:</b>		i 5			
362-FM6	: EMU-404	11	3/2R		F		11	/			i .			
710 547	: EMU-405	11	3/2R		F		11	/	<b>.</b>		1 9			
362-FM7	: EMU-406	11	3/2R		NA		11	- /	i 1		; 9 ; 9			
710 540	EMU-407	11	3/2R		NA		11	7/7	i F		i 7 i 5.8	Х		
342-FM8	: EMU-413	11	3/2R		F	NA P	11	3/3 /	1 1		1 J.O. 1			
362- <b>FM</b> 9	: EMU-408 : EMU-409	!!	3/2R 3/2R 3/2R 3/2R 3/2R 3/2R 3/2R 3/2R		r F	r P	11	1	! !		1 1			
364-FM1	EMU-423	11	3/2K i 2/2		7	r	11	1	! !		1 !			
364-FM10	EMU-419	3 1 3 5 1 8	2/1R		ρ	۶	11	1	!		; 7			
364-FM11	1 ENU-417A	11	2/2		•	,	11	1	: !		. , ! !			
364-FM12	1 EMU-418A	!!	2/1R 1	F	P	p	11	;			!			
364-FM13	EMU-415	11	2/2		•		11	7	¦		· [			
364-FM14	: EMU-414	11	2/2				11	1	- ! !		9			
364-FM15	1 EMU-416	1;	2/2				11	1	}		! !			
364-FM16	: EMU-414A	11	2/2				11	1	• 1		,   9			
364-FM17	: EMU-415A	11	2/1R	P	F	Р	11	2/2	! }		5	X		
364-FM18		11	2/1R		P	•	3 3	1 1	:		, 	.•		
364-FM19	: EMU-425	1 1	2/2			-	11	1			! !			
364-FH2		11	2/2					7			! !			
	· ·= ·	11					11							

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IDE	IDENTIFIERS :		IASA			3 3	10A RECOMMENDATIONS +							
NASA FMEA NUMBER	ASSESSMENT NUMBER		; SC ; A	REE B	NS C		CRIT HW/F	SC	REE	NS C	: OTHER : (SEE LEGEND CODE)	: ISSUE		
:=====================================	•	::====== :: 2/2	:==== 	===	.==	-	,====== 	; !			; 9	;		
364-594		11 2/2	;			1 1	, , , , , , , , , , , , , , , , , , ,	;			I i	ŀ		
364-FM5		11 2/2	;				1	i			1 9	1		
364-FM6		11 2/2	;			1 5	1	ŀ			1	ļ		
354-FM7		11 2/2	1			1 6	1	1			: 9	1		
364-FMB		11 2/2	!			1 1	1	:			1 9	1		
364-FM9	· · · · · · · · · · · · · · · · · · ·	11 2/2	1			11	1	1			1	1		
365-FM1		11 3/2R	; P	P	P	7 7	1	į	Ρ		!	! !		
365-FM2		11 3/2R	; P	Ρ	P	1 1	1	;		F	1 9	1		
365-FM3		11 3/2R	i P	Ρ	P	; ;	1	1			1 9	!		
365-FM4		11 3/2R	i P	Ρ	P	13	1	!			1 1	1		
		11 3/2R	; P	P	Ρ	1 1	1	2			1 9	!		
365-FM5		11 2/2	1			11	1	,			1	;		
365-FM6		11 3/2R	i P	۴	۴	1 3	1	ŀ			3 1	i i		
365-FM7		11 3/3	;			13	3/2R	1 P	P	Р	1 6	1		
365-FM8		11 3/2R	! P	P	P	1 1	1	!			; 9	!		
365-FM9	EMU-431	11 2/2	!			11	3/2R	; P	P	P	1 5.8	1 X		
366-FM1	: EMU-444	11 3/3	;			11	1	:			!	!		
366-FM2	: EMU-437	11 2/1R	l P	F	F	1 1	1	i			† † † † † † † † † † † † † † † † † † †	1		
		11 2/1R	i P	۴	P	: :	1	;			: 9	1		
366-FM3		11 2/2	!			1	2/1R	!- P	F	P	: 6	<b>1</b> X		
366-FM4		11 2/1R	; P	P	F	; ;	1	l			ì	1		
366-FM5	: EMU-701X	11 3/1R	1 P	F	P	11	1	} 1			1 9	•		
366-FM6	: ENU-702X	11 3/1R	1 P	F	Р	1 1	1	;			1 9	1		
367-FM1	: EMU-445	11 2/2	1			1	1	i I			1 9	<u> </u>		
367-FM2	: EMU-450	11 2/2	!			1 1	1	} t			!	1		
367-FM3	: EMU-449	11 2/2	1			11	1	i			1 9	1		
367-FM4	: EMU-446	11 2/2	;			1 1	1	1			‡ 	!		
367-FM5	: EMU-447	11 2/2	1			1	2/1R	; P	Ρ	P	: 6	i X		
367-FM6	: ENU-448	11 2/2	) 1			1 1	1	ţ			F 1	;		
368-FM1	: EMU-451	11 2/2	}			1 1	1	!			1	!		
368-FN2	: EMU-453	11 2/2	ì			il	2/1R	P	F	þ	1 6	i X		
368-FM3	: EMU-452	11 2/2				1 1		!			) 1	;		
368-FM4	: EMU-454	11 2/1R	; P	F	P	; ;		ŀ			! 9	!		
368-FM5		11 2/2	!			11		1			1	i i		
368-FM5			1			1 1		l			!	ì		
368-FM7	= '	11 2/2	1			13		ŀ			! 	!		
368-FM8	·	11 2/2	1			11		1						
384-FM1		11 3/3	;			1 1		!				1		
385-FM1	· —	11 2/1R		P	P	11		1			1	;		
385-FM2		11 2/1R		P	Ş	!!					1	i		
		11 2/1R	1 P	٢	Ρ	1 3		i			į.	i		
385-FM3		11 3/3	1			1 1		1				i		
385-FM4		11 2/2	:			1 1		í			1 7	i ·		
385-FM5		11 3/3	1					i			1 2.6	1 X		
410-FM1		11 2/2	!			1 1		i			1 9	i		
410-FM2		11 3/3	1			1		;			: 2,6	1 X		
410-FM3		11 3/3	1			1 1		i			1 2,6	! X		
410-FM4		11 2/2						1			1 9	i , •		
410-FM5		11 3/3	i			11		i			1 2,6	1 1		
	1 8	11	;			1	;	1			i	i		

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IDENTIFIERS			NASA	I		11	: IDA RECOMMENDATIONS \$								
NASA FMEA NUMBER	ACCCCMENT NUMBER	11 HM/E	: A	CREE	ε		HW/F	COREENS	( OTHER (SEE LEGEND CODE)	: [59UE					
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410-FM6. FM7	: EMU-324A	11 2/2	;				1	:	;	1					
410-FMB		[1 2/2	1			11	1	i	: 7 1	•					
410-FM9	, Elle Car	11 2/2	i			11		•	, V , 2	;					
411-FM1	: EMU-335	11 2/2	1			11	į,		) 7 ) 5						
412A-FM1		11 2/2	i			11		i •	F E	1					
4129&E-FM1	. 210 000	11 2/2	i			1 1	ž ž	I	! 0	1					
	: EMU-339		1			11	1	•	, , , ,						
116-FH1			ì			11	,	! !		f					
418-FM1	: EMU-343	11 2/2	,			11	7	i 1	 ! <b>Q</b>	1					
	: ENU-345	11 2/2	1			11	,	!	!						
418-FM2	, 2,,,,		i i			!!	,	; }	!	i i					
		11 2/2	) !			1 1	1	! !	· : 9	1					
41B-FM3	1 EMU-347	11 2/2	i				,	) J	, , ! Q	!					
418-FM4	: EMU-341	(( 2/2	i 		r.	1 1	, 2/2	1	1	1 X					
419-FM1		11 3/2R	; }	P	P			i 1	, 0	!					
419-FM2	. 4.14	2/2	i			11	1	i •	;						
419-FM3	, 2::5 3:5	11 2/2	i			11	1	i 1	17 10						
420-FM1	, 2115 44.	11 2/2	1			1 7	1	i	, 7 ; g						
420-FM2	, 2,,,,	11 2/2	;	_	_	11	1	;	; 7 ; 0	i I					
423-FM1. FM2	,	11 2/18	1 8	۴	۴	11	- /	i	i 7	1					
423-FM3 -	,	11 2/2	}			1 1	<i>‡</i>		;	i ;					
423-FM4	, 6.10 74.	11 2/2	1			11	$I_{ij}$	:	: 9 : 5	:					
424-FM1	1 2110 001	11 2/2	!			13	1		<del>1 9</del>	i 1					
424-FN2	EMU-355	11 2/2	1			1 1	<i>t</i>	1		i					
425-FM1	EMU-332	:: 3/2R			٩	11	1	1	<u>.</u>						
	EMU-333	H 3/28	1 8	٢	۴	1 1	1	i	1	i					
425-FM2	: EMU-328	11 2/2	1			11	1	1	1 9	i					
425-FM3	: EMU-329	11 2/2	1			11	1	:	; <del>9</del>	i					
425-FM4	: EMU-334	11 2/2	1			11	1	1	1 9	i					
425-FM5	: EMU-335	11 2/2	i			; ;	1	1	1 7	i					
425-FM6		11 2/2	!			H	1	\$	! 9	i					
425-FM7		11 2/2	!			11	1	•	! <del>9</del>	i •					
425-FM8		11 2/2	1			; ;		1	i	i					
425-FM9		11 2/2	ì			1 1	1	1	1						
440-=FM5		2/1R	1 7	P	۴	11	1	:	i 1	i t					
470-FM1	. =	11 2/2	1			!!	1	i	; ;	i T					
470-FM2		11 2/2	;			3.7	1	:	i	į.					
470-FM3		11 2/2	;			11	1	1	r •						
480-FM1		11 2/18			ř	1 i	1	1	1	į.					
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