DASH NO. REV STATUS
 REVISIONS

 DASH | -01 | -02 | -03 | -04 | REV | DESCRIPTION | DATE | APPROVED

 REV | - INITIAL RELEASE | 05/11/11 | K. SEARS

Notes:

DWG. NO.

CAGE NO. 1. Engineering Drawing Practices in accordance with ISO 128.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN mm

THIRD ANGLE PROJECTION



DWN	D. YORK	04/03/10
СНК	C. EMMONS	04/03/10
ORIG	J. DELGADILLO	04/03/10
PROD MGR	F. COLE	04/03/10
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MGR		

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DWG TITLE

VISTA MCS, INTEGRATED TEST PROCEDURE

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۱	SIZE	CAGE NO.	DWG NO.	REV
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	٨٨	0P0N7	99-343-0006	
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VIS - PRO - VER - 01001-9008

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1.0 SCOPE/INTRODUCTION

This procedure details the tests, measurements, and performance criteria for the Integrated Acceptance Test of the Vista Optical Telescope Mount Control System.

1.1 **EQUIPMENT CONFIGURATION**

The system components provided by General Dynamics C4 Systems VertexRSI (VRSI). Richardson Controls Facility are interconnected per the System Schematic 99-343-0002 (VPO Dwg. No. VIS-DWG-VER-01001-9002).

The MCU and the PMU are not part of the system being delivered to meet the requirements of the Tech. Spec and the SOW, and thus can be considered as test equipment. For this reason, the units testing have been placed in Appendixes.

1.2 **TEST CONDITIONS**

All tests will be performed under ambient conditions of temperature, atmospheric pressure, and humidity. All heating and air conditioning equipment intended to provide a controlled environment must be installed and operating.

1.3 **TEST DATA**

This document provides for the recording of test data. Test steps followed by the word "Record" require a measurable value to be recorded in the space provided. Test steps followed by the word "Check" require a mark (✓) to be made in the space provided upon successful completion of the observation or function. Any additional data generated during the performance of this test (recordings, notes, calculations, etc.) are considered to be part of this test procedure and shall be attached hereto.

ACCEPTANCE/REJECT CRITERIA 1.4

Most individual test measurements have tolerance limits specified in this procedure. The basis for acceptance of the equipment is:

- All measurements are within the tolerance allowed.
- All test functions or observations are successfully completed. b.

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∞						
HS	1.5	ACRONYMS				
9		The following acronyms may appear in this test procedure.				
сьае DPON7 No. 99-343-0006		AZ/ALT PDU Azimuth/Altitude Power Drive Unit CCU Central Control Unit CCW Counter Clockwise CW Clockwise DAQ Data Acquisition Unit DVM Digital Volt Meter ALT Altitude Axis FOG Fiber Optic Gyroscope MCU Mount Control Unit CASS PDU Cassegrain Power Drive Unit PMU Portable Maintenance Unit MCS Mount Control System CASS C.W. Cassegrain Cablewrap LVDT Linear Variable Differential Transformer				
	2.0	APPLICABLE DOCUMENTS				
		The following documents form a part of this Test Procedure to the extent specified herein. VIS-SPE-ATC-01000-0006 (Record)				
	3.0	TEST EQUIPMENT				
		The following items are required for the performance of this testing:				
	3.1	COMMERCIAL TEST EQUIPMENT				
		a. Dynamic Signal Analyzer Manufacture/Model No. Serial No. Calibration Due Date Af 35670 A (Record) T-234 (Record) 5/5/06 (Record)				
		b. Function Generator Manufacture/Model No. Serial No. Calibration Due Date Calibration Generator Calibration Generato				
	INCORPORAT PROCUREME C4 SYSTEMS BE DISCLOS	MENT IS FOR REFERENCE ONLY AND MAY NOT BE TED INTO A DESIGN OR USED FOR MANUFACTURE OR INTO A DESIGN OR USED FOR				

CONTRACTOR OF THE PARTY OF THE					000-007-0030-070-0700-0700-0700-0700-07				
တ									and the control of th
		C.	Strip Chart Recorder						
ŗ,			Manufacture/Model No.		AST	home	S DAG	(Record)	
ശ			Serial No.			7	-367	(Record)	
000			Calibration Due Date				125/	66 (Record)	
43-		d.	Digital Volt Meter				ď		
99-343-0006			Manufacture/Model No.			JUKE	: 179	(Record)	
Q,			Serial No.				-605	(Record)	
DWG.			Calibration Due Date			_ {	118/0	(Record)	
		e.	DC Power Supply				g		
0P0N7			Manufacture/Model No.		TZ	<u>amuz</u>	72-66	Z홍 (Record)	
0P			Serial No.			1	-589	(Record)	
щ			Calibration Due Date			No	ne Require	ed_	
CAGE NO.		f.	Temperature Sensor						
			Manufacture/Model No.					(Record)	
			Serial No.			*		(Record)	
			Calibration Due Date					(Record)	
		g.	True-RMS Data Acquistion	s Instru	ment		080	Book	
			Manufacture/Model No.			JOR		(Record)	
			Serial No.				7-511	(Record)	
			Calibration Due Date				421/0.	S (Record)	
	3.2	VER	RTEXRSI SUPPLIED SPEC	IAL TE	ST EQL	JIPMEN	<u>[</u>		:
		a.	Three Phase Isolation To	ansforn	ner				
		b.	Data Acquisition Unit Ho	st Com _l	outer				
		c.	Anemometer Host Comp	outer					
	3.3	EQI	JIPMENT UNDER TEST						
						P/N		S/N	
		Mount	Control Unit (MCU)		99-3	Roll -	U-01 3	326	
			T Power Drive Unit (AZ/AL)	PDU)	99-3	13-2000	-01	901	
			Power Drive Unit (CASS PD		99-31	43-201	 	001	
		0, 100		,			***************************************		
			W. L. C.	SIZE	CAGE NO		DWG NO.	10.0000	REV
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ann eine freisionelis de				
10				
		P/N	S/N	
	Regeneration Cabinet	99-143-2053	00 [
စ	Portable Maintenance Unit (PMU)	99-343-3000-0	149	
000	AZ Drive Motor #1	99-343-300-0	Communication	
99-343-0006	AZ Drive Motor #2	99-343-350001		
C-66	AZ Drive Motor #3	99-343-3500-61	Company of the Compan	
	AZ Drive Motor #4	99-343-3500-01	Constitution, and the second	
NO.	CASS Drive Motor #1	99-343-3500-02	genintanoptag	
	CASS Drive Motor #2	99-343-3500-02	GEORGE CONTRACTOR	
0P0N7	CASS Cablewrap Drive Motor	99-543-3500-02	Commission	
Ю	Data Acquisition Unit	99-343-3300-01		
	ALT FOG	-		
ON	Anemometer #1	1086M	577	
	Anemometer #2	1086M	579	
	Anemometer #3			
	ALT Drive Motor #1	99-343-3501-01	Charles (California)	
	ALT Drive Motor #2	99-343-3521-01	and the second	
	Isolation Transformer	99-343-4500-01		
	Record the revision and date of as observed on the Self-Test S		I CASS CCU Softw	/are
		MCU Software Revision	n <u>/ . 86 . 7 . 7</u> (Rec	ord)
		Date	e <u>2005/9/3 o</u> (Rec	ord)
	AZ	Z/ALT CCU Software Revision	n <u> </u>	ord)
		Date	e <u>2005/1414</u> (Rec	ord)
		CASS CCU Software Revision	n <u>1.277, 6. 6</u> (Rec	ord)
		Date	e <u>2005/11/08</u> (Rec	ord)
	4.0 <u>FUNCTIONAL TEST</u>			
	The following tests will verif equipment. In general, the te they may be performed in any o	sts will be performed in the	of the servo sys order listed; howe	tem ver,
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DEFINITION OF MAINTENANCE REQUIREMENTS SPECIFIC TO THIS EQUIPMENT.

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7									
ЭН	4.1	POWER UP/SETUP							
9	4.1.1	Power Up							
99-343-0006	4.1.1.1	Verify that the equipment is configured per the System Schematic(Check)							
;-66	NOTE:	A test transformer is used for conducting the Integrated Acceptance Test due to unavailability of 400 VAC, 3Ø Utility Power at Mexia, Texas.							
DWG. NO.	4.1.1.2	Verify that the customer interfaces are as shown below.							
0P0N7		Input 3Ø to AZ/ALT PDU 230 VAC ± 10%(Check)							
		Input 1Ø Utility Power to CASS PDU 230 VAC ± 10% (Check)							
CAGE NO.		Input 1Ø to AZ/ALT PDU, CASS PDU, DAQ, and MCU 230 VAC ± 10%. (Check)							
	4.1.1.3	Verify power is applied to all system equipment under test. (Check)							
	4.1.1.4	Verify that the MCU powers up in the LCU Mode. (Check)							
	4.1.1.5	Enter Stop Mode at the MCU. (Check)							
	4.2	BRAKE FAULT							
		The PDU contains circuitry which will disable the motor drive if the brake fails to enable. A fault message will be displayed if the brake fails to energize or if remains enabled after the axis is disabled.							
	4.2.1	Enter an active mode and verify that the brakes are energized and motors are enabled.							
	4.2.2	Verify proper AZ Brake Released indication to LCU per Table 1. (Check)							
		SIZE CAGE NO. DWG NO. RE							
	INCORPORATE	NT IS FOR REFERENCE ONLY AND MAY NOT BE DINTO A DESIGN OR USED FOR MANUFACTURE OR FROM SOURCES OTHER THA GENERAL DYNAMICS VPO DWG. NO.							
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	EQUIPMENT.	SCALE NONE WEIGHT: SHEET 11 OF 125							

12							
.0006 est	4.2.3 Create a brake fault by temporarily disconnecting the brake pressure switch from the AZ/ALT PDU (J61). Enter an active mode and verify that the attempts to enable for about 1 sec and then disables the axis and issues BRAKE Fault Message. Verify proper AZ BRAKE FLT indication to LC Table 6.						
99-343-0006		I ADIC U.	,	AZ 1 Dis	connect J	61 <u>/</u> (Che	eck)
36				,	Active Mo	de(Che	eck)
DWG. NO.				А	xis Disabl	les(Che	eck)
0P0N7	NOTE:	Brake faults are latching fau to clear them.	Its that require		•	ng <u> (</u> Che	
CAGE NO.	4.2.4	Reconnect the J61 Cable and o	clear faults.			٨	
	4.2.5	Deposit 4.2.4 through 4.2.4 for	^7#2 ^7#2 a	ad A7#/	1 hrakes	(Che	eck)
	4.2.5	Repeat 4.2.1 through 4.2.4 for A	MZ #2, MZ #3 ai			de <u>//</u> (Che	eck)
			AZ LCU I	Brake Re	eleased S	tat (Che	eck)
				AZ2 Dis	connect J	62 (Che	eck)
					Active Mo	de <u> (</u> Che	eck)
				AZ #2	Brake Fa	ult(Che	eck)
				AZ LCU	Brake Fa	nult(Che	eck)
			Reconnec	ct J62 &	Clear Fau	ults(Che	eck)
					Active Mo	ode (Che	eck)
			AZ LCU	Brake R	eleased S	itat <u> (</u> Che	eck)
				AZ3 Dis	connect J	63 <u>/</u> (Che	eck)
	Active Mode(Check)						eck)
	AZ #3 Brake Fault(Check)						
	AZ LCU Brake Fault (Check					eck)	
			SIZE CAGE NO A4 OPO		DWG NO.	43-0006	REV
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<u>ي</u>								
•			R	econnec	ct J63 8	Clear Fau	ults(Ch	eck)
andres Auto Auto						Active Mo	ode (Ch	eck)
900			Α	Z LCU I	Brake F	Released S	Stat(Ch	eck)
99-343-0006					AZ4 Di	sconnect .	J64 (Ch	eck)
<u>က</u> က						Active Mo	ode (Ch	eck)
					AZ#	4 Brake Fa	ault (Ch	eck)
Š					AZ LCI	J Brake Fa	ault (Ch	eck)
OPON7			Re	connec	t J64 &	Clear Fau	ilts/_ (Ch	eck)
NO. 0	4.2.6	With the AZ Axis disabled, ter simulate released brakes (app BRAKE FAULT" Message is dis	ly +24	VDC to	A1A9F	² 44-11). ۱	Verify that the Z LCU.	"AZ
***************************************	4.2.7	Repeat 4.2.1 through 4.2.6 for	Δltituda	Δvie			(Ch	eck)
	-t. &. <i>l</i>	Nepeat 4.2.1 tillough 4.2.0 loi /	Ailitude	AXIS.		Active Mo	ode (Ch	eck)
			Al	_T LCU	Brake I	Released S	Stat <u>/</u> (Ch	eck)
		ALT	1, 3 Dis	connect	a Wire	from TB3-	-72 <u>/</u> (Ch	eck)
						Active Mo	ode(Ch	eck)
				Δ	LT #1,:	3 Brake Fa	ault (Ch	eck)
			ALT	LCU Br	ake FL	T per Tabl	e 7 <u> (</u> Ch	eck)
			Re	connect	: Wire &	Clear Fau	ults (Ch	eck)
						Active Mo	ode (Ch	eck)
			AL	T LCU I	Brake F	· Released S	Stat (Ch	eck)
		ALT2, 4 Dis	connect	the oth	er Wire	from TB3-	-72 <u> (</u> Ch	eck)
						Active Mo	ode (Ch	eck)
				А	LT #2, 4	4 Brake Fa	ault(Ch	eck)
	THIS DOCUME	ENT IS FOR REFERENCE ONLY AND MAY NOT BE	SIZE A4	CAGE NO.		DWG NO.	43-0006	REV
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4									
Ľ,			ALT	LCU Bi	rake FL	T per Tabl	e7	(Che	ck)
99-343-0006							ults		
9-34					AL ⁻	Γ Brake Fa	ault	(Che	ck)
တ			ALT	LCU Bi	ake FL	T per Tabl	e 7	(Che	ck)
NO.	4.2.8	Repeat 4.2.1 through 4.2.6 for	Casseg	rain Axi	S.	Active Mo	ode	(Che	ck)
0P0N7			CAS	S LCU			Stat		
0P			5, 15				J52 <u>/</u>		-
CAGE NO.							ode 🖊		
				C	CASS #		ault	•	Í
			CASS				e 8 <u></u>		2000
8 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			R	econne	ct J52 &	Clear Fau	ults	(Che	ck)
						Active Mo	ode	(Che	ck)
			CAS	S LCU	Brake R	Released S	Stat	(Che	ck)
S. D. Mary Carlo				CA	SS2 Dis	sconnect .	J53	(Che	ck)
6						Active Mo	ode	(Che	ck)
				C	CASS #2	2 Brake Fa	ault	(Che	ck)
			CASS	LCU Br	ake FL	Γ per Tabl	e 8	(Che	ck)
			R	econnec	ct J53 &	Clear Fau	ults	(Che	ck)
						Active Mo	ode	(Che	ck)
			CAS	S LCU	Brake R	Released S	Stat	(Che	ck)
				CASS	C.W. Dis	sconnect .	J54	(Che	ck)
4						Active Mo	ode	(Che	ck)
			SIZE	CAGE NO		DWG NO.			REV
	INCORPORATED	IT IS FOR REFERENCE ONLY AND MAY NOT BE INTO A DESIGN OR USED FOR MANUFACTURE OR	A4 VPO DWG	0P01			43-0006	3	
	C4 SYSTEMS VE BE DISCLOSED OPERATION OR	FROM SOURCES OTHER THA GENERAL DYNAMICS RTEMS. THE CONTENTS OF THIS DOCUMENT MAY ONLY TO CUSTOMERS HAVING INTERFACE, MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	VPO DVVG		PRO-V	/ER-010	001-900	3	
1	EQUIPMENT.		SCALE NO	ONE	WEIGHT:		SHEET 14	OF 1	25

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SIZE	CAGE NO.	DWG NO.	REV
A4	0P0N7	99-343-0006	

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SCALE NONE WEIGHT: SHEET 15 OF 125

16									
HS		For C	ASS = $(3.6^{\circ}/\text{sec})(\frac{1}{4})(\frac{1}{0})$	$\frac{\sec}{.02}$) = 4	5.0°				
900	4.3.1.1	Befor	re starting this test, place opriate range of travel and	e the m	ount ax	es at a posit	ion whi	ch will all	ow the
99-343-0006					A	Z Position T Position	O-0	© (R	ecord)
99-3					AL ⁻	T Position	45	<u>. </u>	ecord)
					CAS	S Position	0.	<u>ೆ</u> (R	ecord)
OPON7 NO.	4.3.1.2	a.	Switch off the normal CASS A14-1 (+) A14-2 generator. Set the fund This provides a rate cor	(-) ALT tion ger	-) C3-3 erator t	+) C3-4 (-)) a to ±10V peak	nd con	nect the fu	ınction
100 C C C C C C C C C C C C C C C C C C		b.	Verify that Channel 1 of generator.	f the stri	p chart	recorder is co	onnecte	ed to the fu	ınction
CAGE NO.		c.	Connect Channel 2 of t Rate Loop Board A25-8 Max overload motor cur	3 (C25-8					
		d.	Using the PMU in the H the chart recorder to co		t setting	s and record.			nd set
		Channel 1 <u> </u>							
ā					С	hannel 2	12.5	(R	ecord)
					Cha	rt Speed		(R	ecord)
	4.3.1.3	using midpo	rd one cycle of the triang the following scale fact pint angle. Midpoint ar me angles are the angles	or. Re	cord the the ave	e approximat erage of the	te AZ, two e	ALT and	CASS
ē			AZ 10V = 11.9A						1.40
3			ALT 10V = 20.4A						
			CASS 10V = 2.67A						
			CASS CW 10V = 1.73A						
			A	AZ Moto	r Rated	Current 2		Amps	
			Al Plot AZ	. Runnin	g Curre	nt <u>PSG -5.</u>	.93	Amps (Re	ecord)
			AL	_T Moto	Rated	Current2	0.0	Amps	
Ì	7			SIZE A 1	CAGE NO			2 0006	REV
	INCORPORATED PROCUREMENT C4 SYSTEMS VE	INTO A DE FROM SOU ERTEXRSI	REFERENCE ONLY AND MAY NOT BE ESIGN OR USED FOR MANUFACTURE OR IRCES OTHER THA GENERAL DYNAMICS THE CONTENTS OF THIS DOCUMENT MAY	A4 VPO DWG		1		3-0006	
	BE DISCLOSE	ONLY T	TO CUSTOMERS HAVING INTERFACE, NCE REQUIREMENTS SPECIFIC TO THIS			PRO-VER-	<u>-0100</u>		
9				SCALE NO	DNE	WEIGHT:		SHEET 16 C)F 125

17					
SH		AZP)ot ALT	Running Curre	POS 6.32 nt <u>NEG -6.39</u>	Amps (Record)
9				Current 5.3	
99-343-0006		A3Plot CASS	Running Curre	psc 1.15 nt <u>psc -1.16</u>	Amps (Record)
99-3		CASS C.W	V. Motor Rated	Current 5.3	Amps
CTROCINCIANO MINISTRAÇÃO		P3 Pbt CASS C.W.	Running Curre	nt NSC -1.20	Amps (Record)
DWG. NO.					(Record)
0P0N7					(Record)
10			CAS	S Angle	(Record)
CAGE NO.	4.3.1.4	The running currents will be characterize the balance and/or on the normal rate command in	r friction. Remo		
	AL 1885 CO.	on the normal rate command in	F 3.0.		(Check)
	4.3.1.5	Using the PMU in full LO Rate with the strip chart recording the C.W. C25-8) with PMU in full le recording. Record the average	e current comm ow rate. Mark current below.	nand (AZ, CASS A angles every 10° Repeat in the op	A25-8, ALT, CASS on the strip chart posite direction.
		A4 Plot	AZ NEG Avg	Current	(Record)
				Current	(Record)
		A6 Plot	ALT NEG Avg	Current	Record)
		A6 Pbt	ALT POS Avg	Current	(Record)
		A7 Plot	CASS POS Avg	Current	49A (Record)
		As Plot (CASS NEG Avg	Current	(Record)
		R7 Pet CASS	S CW POS Avg	Current	SSA (Record)
		ABPLAT CASS	S CW NEG Avg	Current	· <u>48</u> (Record)
	4.3.2	Rate Loop			
		The Rate Loop is tested for bar Rotor Resonance.	andwidth, step	response, accele	ration and Locked
				P	
	THIS DOCUM	MENT IS FOR REFERENCE ONLY AND MAY NOT BE	SIZE CAGE NO A4 OPO	i	43-0006 REV
	INCORPORAT PROCUREME C4 SYSTEMS	ILEN I IS FOR REFERENCE ONLY AND WAT NOT BE TED INTO A DESIGN OR USED FOR MANUFACTURE OR NT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY SED ONLY TO CUSTOMERS HAVING INTERFACE,	VPO DWG. NO.	PRO-VER-01	
	OPERATION (EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 17 OF 125

	<u>\$</u>										
H		4.3.2.1	Rate	Loop Bandwidth and Lo	cked Rot	or Re	esonan	<u>ce</u>			
	900			test demonstrates the Ra the feedback is 70% of t			dwidth	defined as	the frequenc	y at	
	99-343-0006	4.3.2.1.1	a.	Replace the normal rate off the normal rate com (C22-8 for ALT, CASS (inputs and set to 0.22V) wave.	mand inp CW). Cor	ut to nnect	the rate	loop (A22 ction gene	2-8 for AZ, CA rator to the ab	SS) oove	
SMU	OPON7 NO.		b.	Connect Channel 1 o Connect the axis rate for (CASS), C1-14 (ALT), C to monitor rate feedback	eedback a 1-1 (CAS	it the S CW	Rate Lo	oop Board	A10-1 (AZ), E	35-8	
7000	NO.				С	hanne	el 1 Gai	1	(Rec	ord)	
L			Channel 2 Gain (Record)								
			Chart Speed (Record)								
			c. Using the PMU, enable the axis and set the chart recorder channels to convenient settings for the peak-to-peak excursions of the rate signals.								
		R9 Plot	d. Slowly increase the function generator frequency up through 100 Hz, while marking convenient frequencies as they occur. Appropriate personnel shall be stationed on the mount to monitor the mount structure while going through the resonant frequency.							shall	
			e.	A Dynamic Signal Analy test set-up printout to thi	•		ed for th	is test. Att	ach the analyz	zer's	
		4.3.2.1.2		ALT Axis to 45.0°. Reconstruction voltage is 70% of the initial part of the initial pa	al value.						
		4.3.2.1.3		at Sections 4.3.2.1.1 and ecord the results below.	4.3.2.1.2	for th	e ALT,	CASS and	I CASS C.W.	Axis	
			k 16	Aly, Als Plot CASS 3 dB Bandwidth 33-(Hz (Record) L6, Al7 Plot CASS C.W. 3 dB Bandwidth 22-5 Hz (Record)							
		4.3.2.1.4		, AI + MIST CASS C , that the 3 dB Bandwidths			width	26=2	<u> </u>	ord)	
		710.6.11.7	VOIN	(Check)							
		Turo 2000	ENT 10 55	D DEFENDE ONLY AND MAY NOT 27	l i .	AGE NO		DWG NO.	43-0006	REV	
		INCORPORATI PROCUREMEN C4 SYSTEMS	ED INTO A D NT FROM SO VERTEXRSI	R REFERENCE ONLY AND MAY NOT BE DESIGN OR USED FOR MANUFACTURE OR DURCES OTHER THA GENERAL DYNAMICS THE CONTENTS OF THIS DOCUMENT MAY TO CUSTOMERS HAVING INTERFACE,	VPO DWG. N	IO.		<u> </u>	001-9008	.1	
				ANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NON		WEIGHT:		SHEET 18 OF	125	

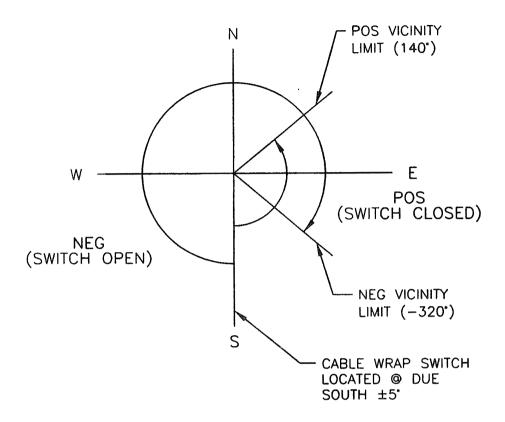
19										
E 2	4.3.2.1.5	in the	nine the Lock response rec	ced Rotor Recording. Rec	esonand cord the	ce of the function	e axis by n genera	/ looking for ator output	or a definable frequency at	dip this
9000		point.	splot	AZ Locke	ed Roto	Resona	ance	9.8	Hz (Rec	ord)
99-343-0006	P	JZ P	lot	ALT Locke	d Roto	= 45°) Resona	ance B	COLO A	MEASUGIO MEASUGIO Hz (Rec SMUUSTOR	ord)
DWG. NO.		MY	plot (CASS Locke	ed Roto	Resona	ance 🔨	107 DETE	SMOUSTOR ETECHZ (Rec	ord)
	A	16 Pl	+ CAS	S CW Locke	ed Roto	Resona	ance <u>N</u>	ी तहाह	ered Hz (Rec	ord)
0P0N7	4.3.2.1.6	Repea	at 4.3.2.1.5 in	Azimuth for	an Altit	ude lool	c angle o	of 90° and	0°.	
CAGE NO.		214	3P6+	AZ Locke	ed Roto	Reson	ance	10.0	Hz (Red	ord)
ΰž			_			= 90°)				
		A	19 Plot	AZ Locke	ed Roto	Reson	ance	9.8	Hz (Red	ord)
	(ALT = 0°)									
	4.3.2.2	esponse								
		rates the Ra	ate Loo	p's abili	ty to re	spond to	a step chang	je in		
		Overs	shoot = $\left(\frac{\text{Max}}{\text{Final}}\right)$	Value -1)*	100%					
		Settlin		art Time) - (¯ ue)	(Time at which the feedback is within 5% of the final					
	4.3.2.2.1	a.	Drive the AL							
		b.	With the segenerator to	etup uncha 0.5V peak-1	nged fr to-peak	om the 0.05 H	bandw z, squar	idth test, e wave.	set the fund	ction
		C.	Enable the convenient strecord.	axis using settings for t	the PM the peal	k-to-pea	k excurs	sions of th	order channe e rate signals	and
									Sov_(Red	
						Channe	el 2 Gair		5 <u>0 √</u> (Red	cord)
						Cha	rt Speed	d	(Red	cord)
					SIZE	CAGE NO	, 1	DWG NO.		REV
	INCORPORAT PROCUREME	TED INTO A D INT FROM SO	REFERENCE ONLY A ESIGN OR USED FOR I URCES OTHER THA GE	MANUFACTURE OR ENERAL DYNAMICS	A4 VPO DWG	0P01 3. NO.	٧7	99-34	43-0006	_
	C4 SYSTEMS BE DISCLOS OPERATION	VERTEXRSI. SED ONLY	THE CONTENTS OF THE	IS DOCUMENT MAY VING INTERFACE,		VIS-F	PRO-V	/ER-010	001-9008	
	EQUIPMENT.	OPERATION OR MAINTENANCE REQUIREMENTS SPECIFIC TO T				ONE	WEIGHT:		SHEET 19 OF	125

20						zvoucos spindelii kien oli spininkien		
;	4.3.2.2.2	Record the percent of overshoot.			~ !	Imideadáin (gyapaga		
		A21, A20 Plot	AZ Ov	ershoot <u>13</u>	(Recor	.d)		
9000	4.3.2.2.3	Repeat Sections 4.3.2.2.1 and 4.3 and record the results below.	3.2.2.2 for the	ALT, CASS and	CASS C.W. Ax	(is		
99-343-0006		AZZ, AZS Plot	ALT Ov	ershoot $25.$	S % (Recor	d)		
99		Dy. Azs Plot	CASS Ov	ershoot	3% (Recor	d)		
ń		126, AZZ Pb+ C						
NO.	4.3.2.2.4	Verify all overshoots are < 45%, a	and that the 5%	% settling time is <	<1 sec.	And the Section of the Section of		
0P0N7					(Chec	ck)		
90	4.3.2.2.5	Reconnect the normal rate loop in	puts.		(Chec			
CAGE NO.	4.3.3	Maximum Rate Loop Accelerati	on		(Chec	<i>(</i> /)		
	4.3.3			m acceleration c	anahility with t	he		
		This test will demonstrate the loop's maximum acceleration capability, with the acceleration limiter circuit, by commanding the motors from full rate one direction to full rate the opposite direction.						
	4.3.3.1	Enable the axis using the PMU a in the NEG direction, and set the for the peak-to-peak excursions chart recorder to the Rate Loop B	e chart record of the rate sig soard A10-1 (<i>P</i>	er channels to con nals and record.	onvenient settin Connect the st B5-8 (CASS).	ıgs :rip		
			Char	t Speed	- (Reco	rd)		
	4.3.3.2	Record the acceleration.		•		·		
		AZB PLST AZ POSA	Acceleration _	1.35	Deg/sec ² (Reco	rd)		
		AZ NEG A	Acceleration _	1.22	Deg/sec ² (Reco	rd)		
	4.3.3.3	Repeat 4.3.3.1 and 4.3.3.2 for the	e Altitude Axis					
			Channe	I 1 Gain <u> </u>	<u>⋝ </u>	rd)		
			Char	t Speed	(Reco	rd)		
		ALT PC	OS Acceleration	on <u>1.32</u>	°/sec² (Reco	rd)		
				on				
		ALTINE	_O Acceleration	JII	7000 (11000	,		
	THIS DOCUM		SIZE CAGE NO. OPON		43-0006	REV -		
	INCORPORAT PROCUREMEI C4 SYSTEMS	THE A PERIOD OF HOSE FOR MANUSACTURE OF	PO DWG. NO.	PRO-VER-010	001-9008			
	OPERATION (EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	CALE NONE	WEIGHT:	SHEET 20 OF 1	25		

production of the second second second									
21									
нs	4.3.3.4	Verify the AZ and A	LT accelerat	tion values a	are equal to	o 1.0 deg/s	ec ² + 40%, -0		
99-343-0006	4.3.3.5	Enable the CASS A	ction Record	d the accele	ration.				
343		A30 Plot	CASS POS	Acceleratio	n	<i></i>	eg/sec² (Rec	ord)	
-66		K 30 Piol	CASS NEG	Acceleratio	n_3.	4	Deg/sec² (Rec	ord)	
DWG. NO.	4.3.3.6	Verify the accelerat	ion values a	re equal to 2	2.5 deg/sed	c ² + 40%, -	0%. (Ch	eck)	
0P0N7	4.3.3.7	Verify that the CAS Divergence fault) w	SS Cablewra	ap remained S Axis during	synchrong the accel	ized (didn' eration tes	ts.	C.W. eck)	
	4.4	TRAVEL RANGE/L	<u>IMITS</u>						
CAGE NO.		The following tests hardware travel lin 460° of travel (Refor 556° of travel (Found and a Cassegrain an indication of PC mount will have lim addition, Software Range during MCL	nit operation er to Figure Refer to Figu overlap of 19 OS/NEG zone nit switches r Limits will p	The Azim 1). The Case 1). The Case 26°. To avoin 26°. To avoin 26°. To avoin 27°. To avoin 28°. To avoin	nuth Axis ssegrain a results in id uncertais provided the extremenount from	is capable xis is capa an Azimut inty in the It to the LC les of trave	of a minimur ble of a minir h overlap of overlapping a U and MCU. I in both axes	n of num 100° irea, The	
		Software Limit:	commands exceeds th	The Software Limit is set at the MCU. The MCU monitors commands and position feedback, initiating an alarm if either exceeds the Software Limit. The Software Limits are tested in Appendix B.					
		Velocity Limits:	extremes of	Axis slew speed is limited to 0.5°/sec of full capacity near extremes of travel. Bi-directional control remains available from MCU, PMU or LCU.					
		Vicinity Limit:	activated, f	the motors a	are inhibite	ed from furf	verify that v her travel into nity Limit Regi	the	
		Pre Interlock:	activated, condition	the brakes	are set, erridden	the motors	verify that, v s disabled. sing the Ma	This	
		Interlock Limit: The Interlock Limits will be checked to verify that when activated, the Interlock Chain is broken which results in motor controller power removal.							
					ENO.	DWG NO.	43-0006	REV	
	INCORPO PROCURE	CUMENT IS FOR REFERENCE ONLY A RATED INTO A DESIGN OR USED FOR EMENT FROM SOURCES OTHER THA G EMS VERTEXRSI. THE CONTENTS OF TH	MANUFACTURE OR ENERAL DYNAMICS	VPO DWG. NO.	20N7				
	BE DISC	CLOSED ONLY TO CUSTOMERS HA ON OR MAINTENANCE REQUIREMENTS	VING INTERFACE,		S-PRO-		001-9008 SHEET 21 OF	125	
				SCALE NONE	VVEIGHT	•	JIELI ZI OF	.20	

CAGE NO.

Figure 1, Azimuth Travel



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CAGE NO. SIZE 0P0N7 **A4**

99-343-0006

REV

VPO DWG. NO.

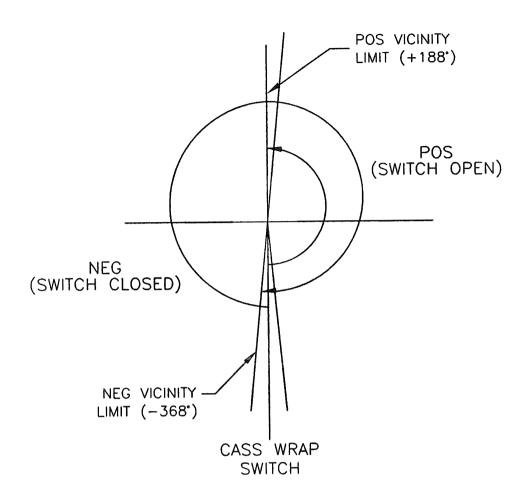
VIS-PRO-VER-01001-9008

SCALE NONE

WEIGHT:

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Figure 2, Cassegrain Travel



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A4	0P0N7
SIZE	CAGE NO.

DWG NO.

99-343-0006

REV

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SCALE NONE

WEIGHT:

SHEET 23 OF 125

24							
	4.4.1	AZ/ALT Limits - Hardware				orazionikoj (Openepijanskim	
9000	4.4.1.1	Place the system in a Maintena Vicinity Limit.	nce Mode and	slowly drive POS	into the AZ P		
99-343-0006	4.4.1.2	Record the angle at which POS drives out of limit.		. Verify that the cinity Limit ${\not \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$	axis automatic	ally	
N O O	4.4.1.3	Verify that commands do not all				e e e e e e e e e e e e e e e e e e e	
0P0N7	4.4.1.4	Verify that the fault message, "A	AZ (ALT) POS \	/ICINITY LIMIT", i	is displayed. (Che	eck)	
CAGE NO.	4.4.1.5	Verify proper AZ (ALT) POS VIC	CINITY LIMIT in	ndication to LCU p	er Table 1.	eck)	
	4.4.1.6	Drive the mount out of the lim speed in the POS direction. Ve	it by at least trify that only the	5°. Using the PNe PNe POS Vicinity Lin	MU, command nit is activated. (Che		
	4.4.1.7						
			AZ POS Pre-I				
		N. C. H. J	able the meter		led (Che	∍ck)	
	4.4.1.8	Verify that commands do not er	lable the motor	5.	(Che	∍ck)	
	4.4.1.9	Verify that the fault message displayed and the green LED no	e, "AZ (ALT) ext to the AZ (A	POS PRE-INTER ALT) Limit Override	RLOCK LIMIT" e Switch is ON (Che	•	
	4.4.1.10	Verify proper AZ (ALT) POS Pro	e-Interlock Lim	it indication to LCl		Í	
	4.4.1.11	Press the AZ (ALT) Limit Overs the green LED is OFF, the fac- the PMU.	ride Switch and ult message cle	d verify that the re ears and the moto	ed LED is now	ON,	
					(Che	eck)	
	Tue pocus	MENT IS FOR REFERENCE ONLY AND MAY NOT BE	SIZE CAGE NO A4 OPO		43-0006	REV	
	INCORPORAT PROCUREME C4 SYSTEMS	MENT IS FOR REFERENCE ONLY AND MAY NOT BE TED INTO A DESIGN OR USED FOR MANUFACTURE OR INT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY SED ONLY TO CUSTOMERS HAVING INTERFACE.	VPO DWG. NO.	PRO-VER-01			
	OPERATION EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 24 OF	125	

25								
нѕ	4.4.1.12	With the motor enabled, release that the motor disables, the greated LED is OFF and the fault messa	en LED next to	the override swit	Switch and ver ch is ON, the r	ify ed		
900					(Ched	ck)		
99-343-0006	4.4.1.13	Press the AZ (ALT) Limit Overrice the motor will drive out of the PC	de Switch agair OS Pre-Interlock	n and enable the r k Limit.	4			
ဂ					(Che			
DWG. NO.	4.4.1.14	After clearing the POS Pre-Interdoes not cause an axis fault.	lock Limit, verif	y that releasing th				
7					(Che			
OPON7	4.4.1.15	Bypass the Pre-Interlock Limit Limit. Record the POS Interloc is broken and 3Ø power is remo	k Limit Position	. Verify that the /	AZ Interlock cha	ock ain		
CAGE NO.			POS I	NTLK Limit	[A (Reco	rd)		
			I	NTLK Chain Brok	en(Che	ck)		
	4.4.1.16	Verify that the fault message, LCU indication per Table 1.	rerify that the fault message, "AZ NEG/POS Interlock", is displayed and pCU indication per Table 1.					
	4.4.1.17	Bypass the AZ POS/NEG Interlock Limit and reset CBs. Slowly drive to mechanical buffer. Record the point at which the structure contacts the buffer						
			POS Buffe	er PositionN	I/A (Reco	ord)		
	4.4.1.18	Clear all limits and remove all b	ypass jumpers.		(Che	ck)		
	4.4.1.19	Complete the following table Follow instructions in the prece	for AZ NEG, A ding paragraph	ALT POS and Nos.	EG Travel Lim	ıits.		
			AZ NEG	ALT POS A	LT NEG			
	4.4.1.1)	Activate Vicinity Limit			(Che	ck)		
	4.4.1.2a)	Vicinity Limit Position	36.57	91.30	_1,5°_(Reco	ord)		
	4.4.1.2b)	System Drives Out of Vicinity Li	mit		(Che	ck)		
	4.4.1.3	Commands into Limit Disabled			(Che	ck)		
				15000		DEV/		
	THIS DOCUM	MENT IS FOR REFERENCE ONLY AND MAY NOT BE	A4 OPO		43-0006	REV -		
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	BE DISCLOS OPERATION EQUIPMENT:	SED ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 25 OF 125			

COLUMN CONTRACTOR PROGRAM	26										
Property of party of Total Control	to the superconduction and all to				AZ NEG	<u>ALT</u>	POS	ALT	NEG		
700	E o	4.4.1.4	Fault Message and Alarms	ууман						(Chec	ck)
A COLUMN TRANSPORTE	မ	4.4.1.5	Fault Reported to LCU					4		(Chec	k)
ACCURRENCE ANTON	99-343-0006	4.4.1.6	Full Speed Into Vicinity Limit					1_		(Chec	ck)
ordenavation	43-	4.4.1.7a)	Bypass Vicinity Limit				<u>/_ </u>	1	<i></i>	(Chec	ck)
Authority, and the way	66-3	4.4.1.7b)	Pre-Interlock Limit Position	مي <u>ا</u> ــــ	33.95	5 92	.567	[.	655	(Reco	rd)
Section of the sectio	·	4.4.1.7c)	Brakes Set, Motors Disabled							(Chec	ck)
A CONTRACTOR	NO.	4.4.1.8	Commands Disabled					<u>L</u>		(Chec	ck)
		4.4.1.9	Fault Message, Alarms and Gree LED ON	en _			/	L		(Chec	ck)
AND PARKET STATES AND ADDRESS.	0P0N7	4.4.1.10	LCU Fault Indication				/			(Chec	ck)
Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner, which i		4.4.1.11a)	Press Limit Override Switch				/	——-b		(Chec	ck)
THE RESERVE OF THE PERSON NAMED IN	CAGE NO.	4.4.1.11b)	Red LED ON, Green LED OFF	-			/			(Ched	ck)
L		4.4.1.11c)	Fault Message Clears and Moto Enables	r 			A		/	(Ched	ck)
		4.4.1.12a)	Release Switch and Motor Disak	oles _			/		/	(Ched	ck)
		4.4.1.12b)	Green LED ON, Red LED OFF, Fault Message	and _			/		/	(Ched	ck)
		4.4.1.13	Press Limit Override Switch and Drives Out							(Ched	ck)
		4.4.1.14a)	Clear Limit Switch	_						(Ched	ck)
		4.4.1.14b)	Release Override Switch and No Faults) 		Vyhannonhuotaanan				(Ched	ck)
		4.4.1.15a)	Bypass Pre-Interlock Limit	_						(Che	ck)
		4.4.1.15b)	Activate INTERLOCK Limit						V	(Che	ck)
		4.4.1.15c)	Interlock Limit Position		NIA				<u> </u>	(Reco	ord)
		4.4.1.15d)	Interlock Chain Broken			- National Control		L	/	(Che	ck)
		4.4.1.15e) Motor Controller Power Removed 4.4.1.16 Verify Fault indication @ MCU & @ LCU		ed _						(Che	ck)
				_						(Che	
		-	-NT 10 FOR REFERENCE COMM AND	SIZE A4	CAGE NO.		DWG NO.		3-000	06	REV -
		INCORPORATED INTO A DESIGN OR USED FOR MANUFACTURE OR PROCUREMENT FROM SOURCES OTHER THA GENERAL DYNAMICS C4 SYSTEMS VERTEXRSI THE CONTENTS OF THIS DOCUMENT MAY			D DWG. NO.						
		BE DISCLOS	ED ONLY TO CUSTOMERS HAVING INTERFACE, IN MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE	VIS-F	WEIGHT:	-VER-01001-9008 T: SHEET 26 OF 125				
				JUMEL							

Tr.				adel a filosophia e usa a a componente con							
27											
				AZ	NEG	ALT POS	<u>Al</u>	_T NEG			
5	4.4.1.17a) Bypass In	terlock Limit		N/A			Control control de la control	(Che	ck)	
9	4.4.1.17b) Mechanic	al Buffer Position		N/A				(Reco	ord)	
99-343-0006	4.4.1.18	Clear Lim	its & Remove Jumpers	U. M. Carlotte					(Che	ck)	
343-	4 4 4 9 9	\			h	from DOC	dire	otion oo	blo w	ran	
-66	4.4.1.20	verity the indicating	at as AZ axis passes changes to NEG.	s inroug	n zero	HOIII POS	uire	Guori, Ga	IDIC W	ιαμ	
									_ (Che	ck)	
NO.	4.4.1.21	Verify pro	pper AZ cablewrap indi	cation to	LCU pe	er Table 1.			<i>1</i> :		
17.000 00 17.000 PE SENSE									_(Che	ck)	
0P0N7	4.4.2	Cassegra	<u>ain/Limits - Hardware</u>								
0	4.4.2.1	Complete	the following table fo	r Casse	grain tra	avel limits.	Follo	ws instr	uctions	s in	
CAGE NO.		the prece	eding paragraphs.								
υz					<u>C</u>	ASS POS	CAS	S NEG			
		4.4.1.1	Activate Vicinity Limit				,	V	(Chec	ck)	
		4.4.1.2a) Vicinity Limit Position				187°	35	2.7	(Reco	rd)	
		4.4.1.2b) System Drives Out of Vicinity Limit					Committee	1	(Chec	ck)	
		4.4.1.3	Commands into Limit I	ommands into Limit Disabled					(Chec	ck)	
						A		~			
		4.4.1.4	Fault Message and Ala	arms					(Ched	ck)	
		4.4.1.5	LCU Fault Indication						(Ched	-	
		4.4.1.6	Full Speed Into Vicinity	y Limit					(Ched	•	
	A CONTRACTOR OF THE CONTRACTOR	4.4.1.7a)	Bypass Vicinity Limit		-			<u> </u>	(Ched	•	
		4.4.1.7b)	Pre-Interlock Limit Pos			71.29	34	16.61	(Reco	•	
		4.4.1.7c)	Brakes Set, Motors Di	sabled					(Ched	,	
		4.4.1.8	Commands Disabled						(Ched	ck)	
		4.4.1.9	Fault Message, Alarm LED ON	s and Gr	een	1	i		(Che	ck)	
		4.4.1.10	LCU Fault Indication						(Che	•	
			Press Limit Override S	Switch					(Che	•	
			Red LED ON, Green I					(Che			
		•	c) Fault Message Clears and Mo				-		-	•	
		,	Enables					1/	(Che	ck)	
	SIZ				CAGE NO.	DWG		12 00	0e	REV	
	INCORPORA	ated into a desigi	FERENCE ONLY AND MAY NOT BE N OR USED FOR MANUFACTURE OR S OTHER THA GENERAL DYNAMICS	VPO DWG.				43-00			
	PROCUREMENT FROM SOURCES OTHER THA GENERAL DYNAMICS C4 SYSTEMS VERTEXRS! THE CONTENTS OF THIS DOCUMENT MAY BE DISCLOSED ONLY TO CUSTOMERS HAVING INTERFACE.					RO-VER	-010	-01001-9008			
•		OPERATION OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS EQUIPMENT.			SCALE NONE WEIGHT:			SHEET 27 OF 125			

28					CASS POS	CASS	NEG		e de la constitución de constitución de la constitu	
HS.				_	<u> </u>	<u>OAOC</u>			disupprocession distribution (4)	
မ		4.4.1.12a)	Release Switch and M	otor Disables ַ	i de la companya de l	Name and Administration of the Control of the Contr		(Check	()	
99-343-0006		4.4.1.12b)	Green LED ON, Red L Fault Message	ED OFF, and	W	<i>L</i>		(Check	<)	
99-34		4.4.1.13	Press Limit Override S Drives Out	witch and			/	(Check	<)	
DWG. NO.		4.4.1.14a)	Clear Limit Switch	-				(Check	<)	
0P0N7		4.4.1.14b)	Release Override Swit Faults	ch and No	i/			(Check	۲)	
		4.4.1.15a)	Bypass Pre-Interlock L	imit				(Check	k)	
CAGE NO.		4.4.1.15b)	Activate INTERLOCK	Limit				(Check	k)	
		4.4.1.15c)	Interlock Limit Position		95.54	347	1.42	(Recor	d)	
		4.4.1.15d)	Interlock Chain Broker	1				(Checl	k)	
		4.4.1.15e)	Motor Controller Powe	r Removed				(Checl	k)	
		4.4.1.16	Verify Fault indication LCU	@ MCU & @			<u>/</u>	(Chec	k)	
		4.4.1.17a)	Bypass Interlock Limit		N/A	N	I/A	(Chec	k)	
	er Shirton China	4.4.1.17b)	Mechanical Buffer Pos	sition	N/A	N	I/A	(Recor	d)	
		4.4.1.18	Clear Limits & Remove	e Jumpers		i		(Chec	k)	
	4.4.2.2		at as CASS Axis passent on changes to NEG.	es through zer	o from POS	direction	on, the	cablewr (Che		
	4.4.2.3	Verify p	roper cablewrap indicat	ion to LCU per	Table 3.			_ (Che	ck)	
	4.4.3	Casseg	<u>rain - Cablewrap Dive</u>	rgence Limit						
	4.4.3.1	Limit. V	e an LVDT Fault that verify that the CASS Intended to the two CASS rer.	erlock chain is	broken and to	motor c	controlle	r powe	r is otor	
				SIZE CAGE N	o. Dwo	G NO.		Т	REV	
	THIS DOO	UMENT IS FOR RE	EFERENCE ONLY AND MAY NOT BE	A4 0P0			13-00	06	•••	
	THIS DOCUMENT IS FOR REFERENCE ONLY AND MAY NOT BE INCORPORATED INTO A DESIGN OR USED FOR MANUFACTURE OR PROCUREMENT FROM SOURCES OTHER THA GENERAL DYNAMICS C4 SYSTEMS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY DESCRIBE			VPO DWG. NO.						
	OPERATIO	C4 SYSTEMS VERTEXES! THE CONTENTS OF THIS DOCUMENT MA BE DISCLOSED ONLY TO CUSTOMERS HAVING INTERFACE OPERATION OR MAINTENANCE REQUIREMENTS SPECIFIC TO THI EQUIPMENT.			SCALE NONE WEIGHT:			SHEET 28 OF 125		

29								
r.	4.4.3.2	Verify that the fault message, reported at the MCU.	"CASS	CABLE	WRAP	DIVERGE	NCE LIMIT", g	jets
9		, , , , , , , , , , , , , , , , , , ,					(Che	eck)
99-343-0006	4.4.3.3	Verify proper CASS CABLEW Table 3.	RAP DI	VERGE	NCE IN	NTLK indic	n	
-66								eck)
	4.4.3.4	Clear fault and reset Motor Con	itroller c	ircuit br	eakers.			y come de contracto de la cont
DWG. NO.							(Che	ck)
0P0N7	4.4.3.5 Simulate an LVDT fault that will result in a NEG CASS Cablewrap Diverger							
0							(Che	eck)
CAGE NO.	4.4.3.6	.4.3.6 Verify that the fault message, "CASS CABLEWRAP DIVERGENCE LIMIT", gets reported to the MCU and to the CASS LCU.						
							(Che	ek)
	4 4 4	Mala alter I lesita						
	4.4.4	<u>Velocity Limits</u>						
	Velocity Limits add another level of protection to the mount by reducing its velocity near the travel extremes. The maximum limited velocity was verified in the factory to be approximately 0.5°/sec. This test verifies proper switch activation and responses.							
	4.4.4.1	Drive the mount in AZ POS dir the status message, "AZ VELO						AND THE PERSON OF THE PERSON O
	4.4.4.2	Verify proper AZ Velocity Limit	indicatio	n to LC	U per T	able 1.		,
		tom, properties to seem, and			•		(Che	eck)
	4.4.4.3	Record the angle of POS activa	ation.					
			AZ	POS Ve	locity Li	imit <u> 2</u>	<u>6 - 8</u> (Reco	ord)
	4.4.4.4	Repeat Section 4.4.4.1 for the				*	(Che	eck)
	4.4.4.5 Record the angle of NEG activation.							, , ,
	7.7.7.0	TRECORD THE dright of TREE dollars		NEG Ve	locity Li	imit 4	4.5 (Reco	ord)
	4.4.4.6 Repeat Sections 4.4.4.1 through 4.4.4.5 for ALT and CASS.							
			SIZE	CAGE NO		DWG NO.	42 0006	REV
	INCORPORATE	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR IT FROM SOURCES OTHER THA GENERAL DYNAMICS	A4 VPO DWG	0P01	N /	99-34	43-0006	_
	C4 SYSTEMS V BE DISCLOSE	VERTEXRS: THE CONTENTS OF THIS DOCUMENT MAY ED ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS		VIS-F	PRO-\	/ER-010	001-9008	
	EQUIPMENT.		SCALE N	ONE	WEIGHT:		SHEET 29 OF	125

30									
HS		4.4.4.1a)	Drive ALT Axis POS	to VEL Limit			(Ch	eck)	
90		4.4.4.1b)	"ALT VELOCITY LIM @ MCU	IT" message			(Ch	eck)	
99-343-0006		4.4.4.2	LCU Limit Indication I	Per Table 2			, , , , , , , , , , , , , , , , , , ,	eck)	
343		4.4.4.3	ALT POS Velocity Lir		27.	200		cord)	
-66		4.4.4.4a)	Drive ALT Axis NEG		0,,		<u></u>	eck)	
DWG. NO.		•	"ALT VELOCITY LIM @ MCU				4	eck)	
ΩŽ		4.4.4.5	ALT NEG Velocity Lir	nit		7.	စ. Υ °(Re	cord	
0P0N7		4.4.4.1a)	Drive CASS Axis POS	S to VEL Limit			(Ch	eck)	
0P		4.4.4.1b)	"CASS VELOCITY LI @ MCU	MIT" message				eck)	
CAGE NO.		4.4.4.2	LCU Limit Indication I	Per Table 3			(Ch	eck)	
		4.4.4.3	CASS Pos Velocity L	imit		17	-8_5° (Re	cord)	
		4.4.4.4a)	Drive CASS Axis NEO	G to VEL Limit			(Ch	eck)	
		4.4.4.4b)	CASS VELOCITY LIN	/IIT" message			(Ch	eck)	
		4.4.4.5	CASS NEG Velocity I	_imit		3	5 7 °(Re	cord)	
	4.5	The War	NG HORN ACTIVATION	— 5 second dela	y before	Azimuth,	Altitude or C	CASS	
	4.5.1	Place the	vement to provide pers e Warning Horn Switc e Warning Horn Switch	h in the ON po			S Control Boa		
	4.5.2	Horn sou	e STOP Mode, enter a unds for approximatel 5 second delay.				y that the Wa not enabled	rning	
4.5.3 Enter STOP Mode. Enter any active CASS Mode and verify Horn is not sounded and the motors enable immediately.							rning		
	4.5.4		e Maintenance or LCU rify that the Warning l ay.				enable AZ or	ALT	
							(Cł	neck)	
	INCORPORATE	D INTO A DESIGN	FERENCE ONLY AND MAY NOT BE N OR USED FOR MANUFACTURE OR	SIZE CAGE NO VPO DWG. NO.		DWG NO. 99-3	43-0006	REV	
	C4 SYSTEMS V BE DISCLOSE	ERTEXRSI. THE C	S OTHER THA GENERAL DYNAMICS CONTENTS OF THIS DOCUMENT MAY CUSTOMERS HAVING INTERFACE,		PRO-V	ER-010	001-9008		
	OPERATION O EQUIPMENT.	R MAINTENANCE	REQUIREMENTS SPECIFIC TO THIS	SCALE NONE WEIGHT:			SHEET 30 OF 125		

31								
HS	4.5.5	Disable the PMU or the LCU the Warning Horn is activated	•					
99-343-0006	4.5.6	Place the AZ/ALT Warning H AZ/ALT Mode and verify that enable immediately.						
DWG. NO.	4.5.7	Enter the Maintenance or LCL ALT Axis, verify that the War immediately.						
0P0N7	4.5.8	Place the Warning Horn Switch	n in the ON pos	ition on the CASS	(Check) Control Board.			
CAGE NO.	4.5.9	From the STOP Mode enter a Horn sounds for approximatel after the 5 second delay.						
	4.5.10	Enter STOP Mode. Enter any Horn is not sounded and the m						
	4.5.11	Enter the Maintenance or LC control and enable the CASS control is available after the ho	Axis, verify tha		rn is activated and			
	4.5.12	Disable the PMU or LCU and Warning Horn is activated indic	•		•			
	4.5.13 Place the CASS Warning Horn Switch in the OFF position. Enter any a CASS Mode and verify that the Warning Horn is not sounded and the menable immediately.							
	4.5.14	Enter the Maintenance or LC Axis, verify that the Warning immediately.						
					(Check)			
	INCORPORATED	NT IS FOR REFERENCE ONLY AND MAY NOT BE INTO A DESIGN OR USED FOR MANUFACTURE OR	A4 OPOI		43-0006 -			
	C4 SYSTEMS VE BE DISCLOSED	FROM SOURCES OTHER THA GENERAL DYNAMICS ERTEXRSI THE CONTENTS OF THIS DOCUMENT MAY DO ONLY TO CUSTOMERS HAVING INTERFACE, MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	VPO DWG. NO. VIS-F	PRO-VER-01	001-9008			
	EQUIPMENT.	3, 201, 10, 10, 1110	SCALE NONE	WEIGHT:	SHEET 31 OF 125			

32								
	4.6	ALT OVERSPEED DETECTION	<u>1</u>					
99-343-0006		The Overspeed Detection System. It provides Altitude over contact closure to the AZ/ALT speeds. The AZ/CASS motor of at the factory. The ALT Velocity verifies proper activation and respective.	erspeed PDU w controlle ty trip p	l protect then axi er oversp point wa	tion by o s veloc peed de	disabling to ities exce etection fu	he motors via ed 125% of sl nction was tes	dry lew ted
NO.	4.6.1	On MCU, set faults to latched.					(Che	eck)
0P0N7	4.6.2	Drive ALT axis to 45°.					(Che	eck)
No.	4.6.3	Remove CI IC from ALT RLB to	Pe	5			(Che	
the ALT INTLK Chain is broken and the ALT motors are disabled, and the fa "ALT OVERSPEED INTLK", is displayed at the MCU.								that ult,
	4.6.5	Chec Verify proper ALT overspeed INTLK indication to LCU per Table 2. (Chec						
	4.6.6	Verify that the fault message, "ALT OVERSPEED INTLK", has cleared at the MCU and at the LCU.						top. the eck)
	4.6.7	Reset the ALT Motor Controller	Circuit	Breaker	S.			ŕ
			~ "	EG			(Che	,
	4.6.8	Set the PMU rate knob to fully the ALT INTLK chain is broke message, "ALT OVERSPEED I	n and t	he ALT	motors	are disal	T Axis. Verify only the foliation of the	ault
4.6.9 Verify proper ALT OVERSPEED INTLK indication to LCU per Table 2.							able 2. (Che	eck)
	Verify that the ALT motors remain disabled after the mount came to a stop. Verify that the fault message, "ALT OVERSPEED INTLK", has cleared at the MCU and at the LCU.							erify and
							(Che	eck)
			SIZE	CAGE NO		DWG NO.		REV
	THIS DOCUM	MENT IS FOR REFERENCE ONLY AND MAY NOT BE	A4	0P01		99-34	43-0006	_
	INCORPORAT PROCUREME C4 SYSTEMS	ED INTO A DESIGN OR USED FOR MANUFACTURE OR NT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY SED ONLY TO CUSTOMERS HAVING INTERFACE,	VPO DWG		PRO-\	/ER-010	001-9008	
	OPERATION EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE WEIGHT:			SHEET 32 OF 125		

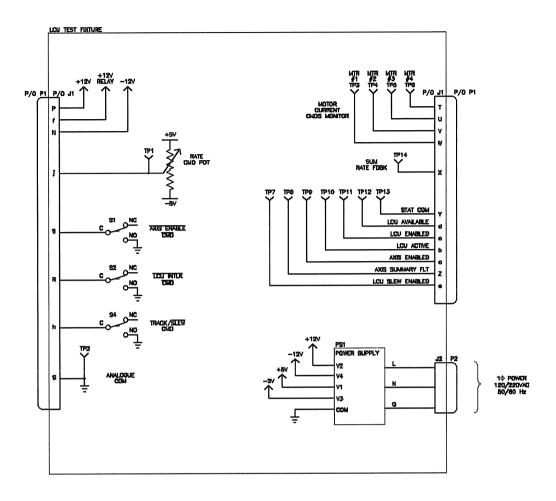
33									
	4.6.11	Reset the ALT Motor Controller	circuit k	oreakers	and re	install ALT	RLB CI IC.	eck)	
900	5.0	LCU INTERFACE TESTING							
99-343-0006		The Interface between the AZ/ALT PDU and the CASS PDU will be verified in this section. The following tests will be performed to verify that the interfaces are per the customer's specifications.							
Š.		 Verification of the Hands Verification of LCU Rate LCU Status Monitoring Verification of LCU (AZ, AZ) 	Deman ALT and	ds/Feed d CASS	lback			J	
0P0N7		5. Verification of dual rate command A test fixture will be used to verify the rate demands and feedback signals. Refeto Figure 3 for a schematic diagram of the LCU Test Fixture.							
NO.	5.1	AZ LCU INTERFACE VERIFIC	ATION						
	5.1.1	Connect LCU test fixture to A6.	A cable	and ve	rify that	Switch 1,	Axis Enable 0	Cmd	
		is in the UP position.					(Che	eck)	
	5.1.2	Verify that Switch 2, LCU INTL	Cmd is	s not in	the INT	LK position	/		
	5.1.3	Verify that Switch 4, Track/Slew Cmd is set to the Slew position. Verify that an open exists across TP7 (LCU Slew Enabled) and TP13 (Status Common).							
	5.1.4	Verify that no axis fault is present by measuring across TP8 (Axis Summary Flt) and TP13 (Status Common) with an ohm-meter and verifying continuity between TPs.							
							(Ch	,	
	5.1.5	With an Ohm meter, measure across TP13 (Status Common) and TP12 (LCU Available). Verify that continuity exists between TPs.							
	5.1.6	Cycle power to the MCU and ve	erifv tha	t the M0	SU powe	ers up in th	`	eck)	
		Cycle perior to an an area	,		•	·		eck)	
	5.1.7	Verify that the LCU is enabled and TP13 (Status Common).	by mea	suring a	a short :	across TP	11 (LCU Enab	led)	
							(Ch	eck)	
		·	SIZE	CAGE NO		DWG NO.	40.0000	REV	
	INCORPORATE PROCUREMEN	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR IT FROM SOURCES OTHER THA GENERAL DYNAMICS	VPO DWG				43-0006		
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			SCALE NONE WEIGH		WEIGHT:		SHEET 33 OF 125		

CAGE .

Mariana compressor					Land to the second seco			1
34								
SH	5.1.8	With the AZ LCU not in Active TP10 (LCU Active) and TP13 (S				here exist	s an open acro	oss
99-343-0006	5.1.9	Depress the AZ/ALT LCU Active there exists a short across TP10	e Switc	h inside	the AZ	/ALT PDU 3 (Status	(Che Verify that n Common).	8
99-3	5.1.10	Verify that LCU Test Fixture rate					(Che	J.
DWG.							(One	CK)
0P0N7								
CAGE NO.								Agent Persons (Agent)
								20.000
								The second secon
								s
						\$		
	THIS DOCUM	ENT IS FOR REFERENCE ONLY AND MAY NOT BE	SIZE A4	CAGE NO		DWG NO. 99-34	43-0006	REV
	INCORPORATI PROCUREMEN C4 SYSTEMS BE DISCLOS	ED INTO A DESIGN OR USED FOR MANUFACTURE OR IT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY ED ONLY TO CUSTOMERS HAVING INTERFACE,	VPO DWO	3. NO.			001-9008	
	OPERATION O EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE N	ONE	WEIGHT:	THE PERSON NAMED IN COLUMN	SHEET 34 OF	125

CAGE NO.

Figure 3, LCU Test Fixture



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SIZE CAGE NO. OPON7

DVVC

99-343-0006

REV -

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SCALE NONE

WEIGHT:

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36			8	1200				TO THE RESERVE OF THE PARTY OF
0	5.1.11	Issue an Axis Enable Cmd by the verify that short exists across and that the Azimuth motors becomes	tagging TP9 (A	xis Enab	sition, l oled) a	JP Positio nd TP13 (Status Comm	ion)
ດດດ							(Che	eck)
39-343-0006	5.1.12	Verify that the velocity and direction the Rate Demand Pot.	ction of	the Azin	nuth m	otors can r		ě
ກ							(Che	
j Z	5.1.13	Measure the bi-direction full spe speed, record the travel over a 3	eed of t 30 seco	the moto and perio	rs. Wi d and d	th the moto calculate th	ors rotating at ne axis velocity	: full /.
)PON7		A31 Plot					°/sec (Reco	
ō		A311 - C1		AZ NEG	DIR _	2.02	°/sec (Rec	ord)
Ñ.	5.1.14	Verify that the axis velocities are	e ±2.0°/	sec ±10°	% .		(Che	م ماد)
	-	With the motors running at	امر الم	ocity m	Agelira	across T		,
	5.1.15	Feedback) and TP2 (Analogue +5 VDC ±10% going in the NE direction.	Comn	non) and	verify	that the v	oltage reading going in the F	g is POS
							(Che	eck)
	5.1.16	Toggle S1 Switch to Disable the	e AZ ax	is.			△ (Che	eck)
	5.1.17	Place Switch 4, Track/Slew Cm across TP7 (LCU Slew Enabled					at continuity ex	kists
		,					(Che	eck)
	5.1.18 Enable axis and measure the bi-directional full track speed of the r the motors rotating at full track speed, record the travel over a 30 s and calculate the axis velocity.							eriod
		A32 Pla-	_	AZ POS	DIR _	0.2.	ႍ [°] /sec (Rec	ord)
		13261.0	AZ NEG DIR °/sec (Record)					
	5.1.19	Verify that the axis velocities ar	e ±0.2°	/sec ± 10)%.		(Ch	eck)
			SIZE	CAGE NO.	17	DWG NO.	40.0000	REV
	INCORPORAT	MENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR NOT EPOM SOURCES OTHER THA GENERAL DYNAMICS	A4 VPO DW	OPON 3. NO.	1/	99-34	43-0006	
	C4 SYSTEMS BE DISCLOS	NT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY SED ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS			'RO-\	/ER-010	001-9008	
	EQUIPMENT.		SCALE N	IONE	WEIGHT:		SHEET 36 OF	125

CAGE

5								
2	5.1.20	Feedba +0.5 V	ne motors running at full tra ack) and TP2 (Analogue Co DC ± 10% going in NEG di	ommon) and verify that	t the voltage r	eading is		
		direction	on.			(Check)		
ָרָלָי ביי						_ (Check)		
93-34 1	5.1.21	that th	e the Axis. Place Switch 2, ne AZ Interlock chain is b ler 3∅ power.	LCU INTLK Cmd to the roken which results in	the removal	on. Verify of motor (Check)		
						_ (Check)		
	5.1.22	Verify Comm	that an open exists between on).	n TP8 (Axis Summary F				
Ś			,			_ (Check)		
5				···				
	5.1.23	Place	Switch 2 not in the INTLK Po	osition and reset AZ Mot	or Controller C			
0						_ (Check)		
	5.1.24	Simulate an LCU power failure by turning off the LCU simulator power switch. Verify that the AZ Interlock chain is broken resulting in removal of motor controller 3Ø power.						
		•				(Check)		
						_ (0110011)		
	5.2	AZ LC	U MONITORING SIGNAL T	ESTING				
	5.2.1	Table 1 depicts the faults/status that are reported to the AZ LCU. It will be verified that the appropriate contact action occurs per Table 1 when the fault/status is simulated per other sections of this test procedure. Place a check (✓) in the verification column upon proper operation. (Check) Table 1, Azimuth LCU Monitor Signals						
	ſ			ODEN ACROSS ACC LAND.	VERIFICATION			
		SIGNAL#	FAULT/STATUS	OPEN ACROSS A6C-L AND:	VERIFICATION (✓)			
	Ī	11	AZ NEG VICINITY LIMIT	A6C-U				
		2	AZ POS VICINITY LIMIT	A6C-T				
		3	AZ NEG PRE-INTLK LIMIT	A6C-S				
		4	AZ POS PRE -INTLK LIMIT	A6C-R				
		5	AZ CABLEWRAP-NEG DIRECTION	A6C-N				
		6	AZ VELOCITY LIMIT	A6C-P				
		7	AZ PARKED	A6C-M				
	1							

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EQUIPMENT.

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	A4 0P0N7 99-343-0006								
	VPO DWG. NO.								
	VIS-PRO-VER-01001-9008								
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		SIGNAL#	FAULT/STATUS	OPE	N ACROSS	A6C-V AND): VERIFIC		
		8	DOME CRANE AZ INTLK		A6C	-W	V		
And the state of		9	AZ BRAKES RELEASED		A6C	;-b	~		
9		10	AZ/ALT CCU OFF		A6C	:-Z			2000
3		11	YOKE ACCESS HATCH OPEN INTL	.K	A6C	:-Y			
-5 1		12	AZ STOW PIN ENGAGED INTLK		A6C	:-X			
99-343-0006		13	AZ NEG/POS INTLK LIMIT		A60	;-a			
8		14	PIER ACCESS INTLK		A6C			/	
		15	MOBILE PLATFORM INTLK		A6C)-J			
OPON7	5.3 5.3.1	Conne	CU INTERFACE VERIFIC ect LCU test fixture to A7/ ne UP position.			ify that s	Switch 1,	p	
NO.	(Check) 5.3.2 Verify that Switch 2, LCU INTLK Cmd is not in the INTLK position. (Check)								
	5.3.3	Verify open	that Switch 4, Track/Slevexists across TP7 (LCU S	w Cmd Iew Ena	is set to ibled) ai	the Sle nd TP13	ew positio (Status C	Common).	at an eck)
	5.3.4	Verify and T TPs.	that no axis fault is pres P13 (Status Common) wi	ent by i ith an O	measuri hm Met	ng acros er and v	ss TP8 (A erifying c	ontinuity betv	veen
	5.3.5	With a Ohm Meter, measure across TP13 (Status Common) and TP12 (LCU Available). Verify that continuity exists between TPs.							LCU
	5.3.6	Cycle	power to the MCU and ve	erify tha	t the MC	CU powe	rs up in th		neck)
	5.3.7 Verify that the LCU is Enabled by measuring a short across TP11 (LCU Enabled and TP13 (Status Common).								
	5.3.8 With the LCU not in Active Condition, verify that there exists an open across TP10 (LCU Active) and TP13 (Status Common). Check) Depress the AZ/ALT LCU Active Switch inside the AZ/ALT PDU. Verify that now there exists a short across TP10 (LCU Active) and TP13 (Status Common). (Check)								
								now	
					CACENC	Т	DWG NO.		REV
				SIZE	CAGE NO	·		43-0006	IXE V
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				1		I			

39										
HS	5.3.10	Verify that LCU Test Fixture rate	e demands are r	not acce	pted by th	e AZ/ALT PDU	J.			
,						(Che	1			
99-343-0006	5.3.11	Issue an Axis Enable Cmd by toggling the S1 Switch, verify that a short exists across TP9 (Axis Enabled) and TP13 (Status Common) and that the Altitude motors become enabled. (Check)								
	5.3.12	Verify that the velocity and dire from the Rate Demand Pot.	ction of the Altit	tude mo	tors can r	,				
DWG. NO.						(Che	,			
0P0N7	5.3.13	Measure the bi-directional full speed of the motors. With the motors rotating at full speed, record the travel over a 30 second period and calculate the axis velocity.								
ш		A33 Plot				°/sec (Reco				
CAGE NO.		ASS 4001	ALT NEG	DIR	2-00	°/sec (Reco	ord)			
	5.3.14	Verify that the axis velocities are	e ±2.0°/sec ± 10)%.		(Che	eck)			
	5.3.15	With the motors running at Feedback) and TP2 (Analogue +5 VDC ± 10% going in the NE direction.	e Common) and	l verify	that the v	oltage reading	g is POS			
	5.3.16	Toggle S1 Switch to disable the	ALT Axis.			√ (Che	eck)			
	5.3.17	Place Switch 4, Track/Slew Cm across TP7 (LCU Slew Enabled	d to the Track p d) and TP13 (Sta	osition. atus Cor	Verify than mon).	at continuity ex				
	5.3.18	Measure the bi-directional full tat full track speed, record the axis velocity.	rack speed of th travel over a 3	ne motor 0 secor	rs. With th nd period	ne motors rota and calculate	ting the			
		A34 Plot		-		°/sec (Rec				
	5.3.19	Verify that the axis velocities ar	re ±0.2°/sec ± 10	D%.		(Che	eck)			
			SIZE CAGE NO. A4 OPON		DWG NO.	 43-0006	REV			
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ANALOGO SE SERVICIO DE LA CONTRACTOR DE	AMERICAN ARCHITECTURE CONTRACTOR AND ARCHITECTURE	CHICANA CHICA CONTROL						
40								
9000	5.3.20	Feedba +0.5 V	ack) and TP2 (Analogu	ll track velocity, measure a e Common) and verify tha e NEG direction and -0.5 V	t the voltage re DC ± 10% goi	eading is ng in the		
99-343-0006	5.3.21	Disable	e the Alt Axis.			(Check)		
DWG. NO.	5.3.22	Place t Interloo power.	he Switch 2, LCU INTL k chain is broken whi	K Cmd to the INTLK positi	on. Verify that	the ALT		
- K		powor.				(Check)		
0P0N7	5.3.23	Verify to		ween TP8 (Axis Summary I	Fault) and TP1	3 (Status		
CAGE NO.						(Check)		
	5.3.24	Place S	Switch 2 not in the INTL	K position and reset ALT mo	otor controller C	29		
						_(Check)		
	5.3.25	Simulate an LCU power failure by turning off the LCU simulator power supply. Verify that the ALT Interlock chain is broken resulting in removal of motor controller 3Ø power. (Check)						
	5.4	ALT L	CU MONITOR SIGNAL	TESTING				
	5.4.1	Table 2 depicts the faults/status that are reported to the ALT LCU. It will be verified that the appropriate contact action occurs per Table 2 when the fault/status is simulated per other sections of this test procedure. Place a check (\checkmark) in the verification column upon proper operation.						
		Table 2, Altitude LCU Monitor Signals SIGNAL # FAULT/STATUS OPEN ACROSS A7C-L AND: VERIFICATION						
				A7C-U	(1)			
		01	ALT NEG VICINITY LIMIT					
02 ALT POS VICINITY LIMIT A7C-T								
		03	ALT NEG PRE-INTLK LIMIT	A7C-S				
		04	ALT POS PRE -INTLK LIMIT	A7C-R				
		05	ALT VELOCITY LIMIT	A7C-P				
		06	ALT PARKED	A7C-M				

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VPO DWG. NO.

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4.1										and company of the co
		SIGNAL#	FAULT/STATUS	ОРЕ	EN ACROSS	S A7C-V AND		CATION		
~~~~~		07	DOME CRANE ALT INTLK		A7C	-W	- V			
		08	ALT BRAKES RELEASED		A70	C-b		/		
9		09	AZ/ALT CCU OFF		A70	C-Z				
9		10	ALT STOW PIN ENGAGED INTLK		A70	C-X				
4 ک		11	ALT NEG/POS INTLK LIMIT		A70	C-a	V			
99-343-0006 		12	ALT OVERSPEED INTLK		A70	C-J				
, N		13	ALT AUX DRIVE ENABLED INTLK		A70	C-K	i/			
	5.5	<u> </u>	LCU INTERFACE VERI			::	S i	Avia Enabl	o C	md
OPONZ	5.5.1		ect LCU test fixture to A8, e UP position.	4 cable	and ver	rity that s	SWITCH 1,	,	e Ci	
NO.	5.5.2	Verify	that Switch S2, LCU INTI	_K Cmd	is not ir	n the INT	LK positi	9	Che	ck)
	5.5.3	Verify open e	that Switch 4, Track/Sleexists across TP7 (LCU S	w Cmd Ilew Ena	is set to abled) a	o the Sle	ew positio (Status C	Common).	hat Che	
	5.5.4	Verify that no axis fault is present by measuring across TP8 (Axis Summary Flt) and TP13 (Status Common) with an Ohm Meter and verifying continuity between TPs.								
	5.5.5	With a Availa	an Ohm Meter, measure ble). Verify that continuit	across y exists	TP13 betwee	(Status( n TPs.	Common	,		ĊŰ
	5.5.6	Cycle	power to the MCU and ve	erify tha	t the MC	CU powe	rs up in th	ne LCU Mod		
	5.5.7		that the LCU is Enabled P13 (Status Common).	by mea	suring a	a short a	cross TP		nabl , Che	
	5.5.8 With the LCU not in Active condition, verify that there exists an open across TP10 (LCU Active) and TP13 (Status Common).									
	5.5.9									
				<b>-</b>					<del></del>	
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				SCALE N	ONE	WEIGHT:		JACET 41	Ji.	123

42						e der beer lyne en de
	5.5.10	Verify that LCU Test Fixture rate	e demands are i	not accepted by	A P	8
99-343-0006	5.5.11	Issue an Axis Enable Cmd by across TP9 (Axis Enabled) and motors become enabled.	toggling the S TP13 (Status	1 switch, verify Common) and	that a short exthat the Casseg	rists rain
	5.5.12	Verify that the velocity and controlled from the Rate Demar		Cassegrain n	notors can now	**
OPON7 NO.	5.5.13	Measure the bi-directional full s speed, record the travel over a second	30 second perio	nd and calculate	e the axis velocity	/.
NO.	5.5.14	Verify that the axis velocities are			a	
		·			(Che	
	5.5.15	With the motors running a feedback) and TP2 (Analogue ±5 VDC ± 10% going in the Podirection.	e Common) and OS direction an	d verify that the	e voltage reading	g is IEG
	5.5.16	Place Switch 4, Track/Slew Cm across TP7 (LCU Slew Enabled	d to the Track p l) and TP13 (Sta	osition. Verify atus Common).	that continuity ex	ĺ
	5.5.17	Measure the bi-directional full to at full track speed, record the axis velocity.	travel over a 3	0 second perio	od and calculate	the
		A36 Plot			<u>৪</u> °/sec (Rec	
	5.5.18	Verify that the axis velocities ar			(Che	
With the motors running at full track velocity, measure across TP14 (State Feedback) and TP2 (Analogue Common) and verify that the voltage re +0.5 VDC ±10% going in the POS direction and -0.5 VDC ± 10% going NEG direction.						
				40.5	(Che	eck)
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	EQUIPMENT.	ON WARRICIANNOE REGUINEMENTO OF EOUTO TO THIS	SCALE NONE	WEIGHT:	SHEET 42 OF	125

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НS	5.5.20	Disable the axis.
9000-	5.5.21	Place Switch 2, LCU INTLK Cmd to the INTLK position. Verify that the CASS Interlock chain is broken which results in the removal of motor controller power.
99-343-0006	5.5.22	Verify that an open exists between TP8 (Axis Summary Fault) and TP13 (Status
ï	0.0.22	Common). (Check)
DWG.	5.5.23	Place Switch 2 not in the INTLK position and reset CASS Motor Controller CB's.
cage OPON7	5.5.24	Simulate an LCU power failure by turning off the LCU Simulator power supply. Verify that the CASS Interlock chain is broken resulting in removal of motor controller power.  (Check)
	5.6	CASS LCU MONITOR SIGNAL TESTING
	5.6.1	Table 3 depicts the fault/status that are reported to the CASS LCU. It will be

verified that the appropriate contact action occurs per Table 3 when the fault/status is simulated per other sections of this test procedure. Place a check (✓) in the verification column upon proper operation.

Table 3, Cassegrain LCU Monitor Signals

SIGNAL#	FAULT/STATUS	OPEN ACROSS A8C-L AND:	VERIFICATION (✓)
1	CASS NEG VICINITY LIMIT	A8C-U	
2	CASS POS VICINITY LIMIT	A8C-T	
3	CASS NEG PRE-INTLK LIMIT	A8C-S	
4	CASS POS PRE -INTLK LIMIT	A8C-R	
5	CASS CABLEWRAP-NEG DIRECTION	A8C-N	
6	CASS VELOCITY LIMIT	A8C-P	
SIGNAL#	FAULT/STATUS	OPEN ACROSS A8C-V AND:	VERIFICATION (✓)
7	CASS BRAKES RELEASED	A8C-b	
7 8	CASS BRAKES RELEASED  CASS CCU OFF	A8C-b A8C-Z	
			i
8	CASS CCU OFF	A8C-Z	i

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			AND DESCRIPTION OF THE PARTY OF		NAMES ASSOCIATION OF THE PROPERTY OF THE PROPE			
44								
	5.7	DATA ACQUISTION UNIT						
99-343-0006		The Data Acquisition Unit (D Detectors (RTDs), 6 LVDTs and signal conditions the RTDs, A sensor readings available over (3) analogue test points are rethree are received from the CAS	6 analogue a CanC ceived	ogue tes e and t open Inte from the	st points he LVD erface t e AZ/AL	The data T signals o a Host ( T PDU a	a Acquisition U and makes Computer. The nd the remain	Jnit the ree ing
NO.		The Signal Meter readings by section of this test procedure.	the DA	Q will b	e tested	d in the M	ICU Signal Me	eter
0P0N7	5.7.1	Verify that the DAQ Host Com Application Software. Record th	nputer h	nas bee on inforr	n loade nation.	d with the	TWINCAT P	
							· · · · · · · · · · · · · · · · · · ·	<b>'</b>
CAGE NO.	5.7.2	Annotate the BK5120 Coupler N Switches 1-6 are used to set up used to set up the coupler's bau	the co	Address upler's r	s and ba node ID	aud rate s DIP Swi	etting below. [ tches 7 and 8	OIP are
		•			Switch	n 1	(Reco	ord)
					Switch	n 2	(Reco	ord)
					Switch	າ 3	(Reco	ord)
					Switch	າ 4	(Reco	ord)
					Switch	า 5	(Reco	ord)
					Switch	า 6	(Reco	ord)
					Switch	า 7	(Reco	ord)
					Switcl	า 8	(Reco	ord)
	5.7.3	Verify that the BK5120 Coupler is entered at the TWINCAT PLC	Netwo	rk Addre ation so	ess and ftware.	baud rate	annotated ab	ove
							(Che	eck)
	5.7.4	Verify that the Data Acquisition	Unit Ca	ın Open	Port (J	41) is coni	nected to the H	lost
		Computer Can Open Port.					(Che	eck)
	5.7.5	Verify that the Host Computer h	nas esta	blished	commu	nication w		JUNY
							(Che	eck)
			SIZE	CAGE NO.		DWG NO.		REV
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	EQUIPMENT.		SCALE N	ONE	WEIGHT:		SHEET 44 OF	125

out-ondersones with	Carron and the contract of the							
45								
5	5.7.6	Configure the Host Computer T information for the Beckhoff mo	WINCA dules ir	T PLC S	Software d to the	to be ab 34 RTD's	le to retrieve da s, 6 LVDT's and	ta 6
ဖ		Analogue Test Points.					(0)	
99-343-0006	5.7.7	Out of the possible thirty-four (tested. Annotate the ones chosen			orts, rai	ndomly se	(Chec	
99.						DA	Q Port	
ń					RTD	1	(Recor	d)
NO.					RTD	2	(Recor	d)
0P0N7					RTD	3	(Recor	·d)
0					RTD	4	(Recor	d)
CAGE NO.					RTD	5	(Recor	d)
Auto-organisa (n. 1917)	5.7.8	For the five (5) selected RTD in rear panel port.	put port	s, conne	ect the F	RTD to the	appropriate DA	۷Q
							(Chec	:k)
	5.7.9	From the DAQ Host Computer, below. The scale factor for the the Beckhoff Twincat program.	obtain t RTD n	he RTD neasure	measu ment is	red tempe 100 bits/c	erature and reco deg C reported o	rd on
					RTD 1		°C (Recor	·d)
					RTD 2		°C (Recor	·d)
					RTD 3		°C (Recor	d)
					RTD 4		°C (Recor	d)
					RTD 5		°C (Recor	rd)
	5.7.10	Alter the temperature sensed displayed changes accordingly.	by the	e RTDs	and vew temper	erify that erature.	the temperatu	ıre
							°C (Recor	rd)
					RTD 2		°C (Reco	rd)
					RTD 3		°C (Reco	rd)
					RTD 4		°C (Reco	rd)
					RTD 5		°C (Reco	rd)
			SIZE	CAGE NO		DWG NO.	Τ	REV
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	OPERATION ( EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NO	ONE	WEIGHT:		SHEET 45 OF 12	25

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HS	5.7.11	If a secondary temperature for the five RTDs selected		sor is av	ailable	, record	the measi	ured temperati	ures
900						RTD 1		°C (Rec	ord)
99-343-0006						RTD 2		°C (Rec	ord)
99-3						RTD 3		°C (Rec	ord)
No. 1 Sec. 15. Company of the London of the						RTD 4	<b></b>	°C (Rec	ord)
DWG. NO.	_					RTD 5		°C (Rec	ord)
0P0N7	5.7.12	If available, verify that the with those displayed on the				ature re	adings ag	ree within ±0	.4°C
CAGE NO.							RT	D 1 (Cł	neck
υŻ	-						RT	D 2 (Cł	neck
								D 3 (Cł	
								D 4 (Cl	
	5.7.13	Connect the LVDTs to the	e DAC	<b>)</b> .			RT	D 5 (Cl	neck
	5.7.14	Put the LVDTs at a no measured nominal displa	ominal	positio	n and LVDT	record s using t	below the	e Host Comp	eck) outer rs:
		LVDT Input: 15Vpp =	5.3 V	rms					
		OSC/DEM Output:	<u>± 0</u> .	8347 VI mm	OC				
		A/D Output:	± 3,	276.8 bi VDC	<u>ts</u>				
		Displayed Output:	<u>± 2,</u>	734.97 l mm	oits				
						LVDT 1		mm (Red	ord)
						LVDT 2 _.		mm (Red	cord)
					CAGE NO		DWG NO.	42.0000	REV
	INCORPOR PROCURE	UMENT IS FOR REFERENCE ONLY AND MAY I MATED INTO A DESIGN OR USED FOR MANUFACTI MENT FROM SOURCES OTHER THA GENERAL DY MENTERED THE CONTENTS OF THIS DOCUME	URE OR 'NAMICS	A4 VPO DWG				43-0006	
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				JOALE NO	r i V lee	10111.		J./EE. 40 OI	

47							
HS				LVDT 3		mm (Rec	ord)
				LVDT 4		mm (Rec	ord)
9000				LVDT 5		mm (Rec	ord)
99-343-0006				LVDT 6		mm (Rec	ord)
66	5.7.15	Change the LVDT position displacement for the LVDTs.	and record f	he new	Host Co	mputer measi	ured
DWG. NO.				LVDT 1		mm (Rec	ord)
0P0N7				LVDT 2		mm (Rec	ord)
0P				LVDT 3		mm (Rec	ord)
CAGE NO.				LVDT 4		mm (Rec	ord)
				LVDT 5	- AMMERICAN PROPERTY OF THE PR	mm (Rec	ord)
				LVDT 6		mm (Rec	ord)
	5.7.16	Verify that the reported displace	ements chang	ed accor	dingly.		
					LVD	T 1 (Ch	eck)
					LVD	T 2 (Ch	eck)
					LVD	T 3 (Ch	eck)
					LVD	T 4 (Ch	eck)
					LVD	T 5 (Ch	eck)
					LVD	T 6 (Ch	eck)
	5.8	ANEMOMETER TESTING					
		Three anemometers will be lo monitoring of the wind by the anemometers will be serially c the anemometer's wind velocity	M1 Mirror Su onnected (RS	pport Loc	cal Contro	l Unit (CFE).	The
,	5.8.1	Load the utility software provide	ed with the ar	emomete	er or Hype	erterminal to a	host
		computer.				(Ch	eck)
			SIZE CAGE N		DWG NO.	40.0000	REV
	INCORPORATE PROCUREMEN	NT IS FOR REFERENCE ONLY AND MAY NOT BE D INTO A DESIGN OR USED FOR MANUFACTURE OR F FROM SOURCES OTHER THA GENERAL DYNAMICS	VPO DWG. NO.		L	43-0006	
	BE DISCLOSE	ERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY D ONLY TO CUSTOMERS HAVING INTERFACE, R MAINTENANCE REQUIREMENTS SPECIFIC TO THIS			/ER-01	001-9008	405
			SCALE NONE	WEIGHT:		SHEET 47 OF	125

48								
ΗS	5.8.2	Using a RS-422 cable, connect	anemoi	meter#	1 to the h	ost comp	outer.	
12		(Check)						
99-343-0006	5.8.3	Verify that a communication lir and host computer.	nk has k	oeen es	tablished	l betwee	n anemometer	#1
-343							(Che	eck)
66	5.8.4	Place a fan directly in front of a		eter #1.			. / (0)-	
DWG. NO.	5.8.5	Plot A37, 1 Record the wind information fro		ost com	puter wit	h the fan	(Che	eck) R
	0.0.0	TROOTA THE WINA INFORMATION NO			-		<pi (ghe<="" th=""><th>ek)</th></pi>	ek)
0P0N7	5.8.6		ow. Re	ecord th			on from the h	
)		computer.				5 6 h	KPH (Red	ord
CAGE NO.	5.8.7	Verify that the wind measureme	ent chan	ged acc	cordingly			To provide the second s
	500	Cat the fan to Hi. Decord the w	ind info	rmation	from the	host com	(Che	∍ck)
	5.8.8	Set the fan to Hi. Record the w	ina inio	malion			KPK (Reco	ord)
	500	No wife the at the accident was a surrounced	ent in ara	and from	am provid	Na maas	vuromont	
	5.8.9	Verify that the wind measureme	ent incre	aseu ii	om previo	ous meas	(Che	eck)
	5.8.10	Repeat Sections 5.8.2 - 5.8.9 fo						
	Act A39	7-A4/ Connec	t Anemo	ometer #	#2 to Hos	st Compu	ter (Che	∍ck)
				Commu	ınication	Establish	ed(Che	∍ck)
			Place	Fan in	front of A	nemome	ter(Che	∍ck)
		Win	d inform	nation w	ith Fan C	Off <u>~ C</u>	SKPA (Reco	ord)
		Wind inform	nation w	ith Fan	set to Lo	w <u>≈ 16</u>	KPH (Reco	ord)
			Repo	orted W	ind Spee	d Increas	sed(Che	eck)
		Wind info	rmation	with Fa	an set to	Hi_ <u>≈</u> 2	SKPH (Reco	ord)
			Repo	orted W	ind Spee	d Increas	sed(Che	eck)
		Connec	t Anemo	ometer i	#3 to Hos	st Compu	iter (Che	eck)
	٠	UPO HAS METER Connection Connection						
	Tive Pooling	ENT IO FOR REFERENCE ONLY AND MAY NOT BE	SIZE A4	CAGE NO	·	0WG NO. 99-34	43-0006	REV
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	BE DISCLOS OPERATION C EQUIPMENT	ED ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE N		WEIGHT:		SHEET 48 OF	125

49						
НЅ			Commur	nication Establishe	ed (Check)	
			Place Fan in fro	ont of Anemomete	er (Check)	
-000		Wind	l information wi	th Fan Off	(Record)	
99-343-0006		Wind Inform	ation with Fan	set to Low	(Record)	
36			Reported Wir	nd Speed Increas	ed (Check)	
DWG. NO.		Wind info	rmation with Fa	n set to Hi	(Record)	
N7			Reported Wir	nd Speed Increas	ed (Check)	
0P0N7	5.9	BRAKE DECELERATION				
CAGE NO.		This test will demonstrate the br	ake's decelerat	ion capability.		
	5.9.1	Set the strip chart recorder excursions of the rate signals a Rate Loop Board A1-1 (AZ), C1	nd record. Cor -1 (ALT) and A	nnect the strip cha 1-1 (CASS).	gs for the peak art recorder to the	
	502	Enable the axis using the PMII			POS direction.	
	5.9.2 Enable the axis using the PMU and command AZ full rate in the POS direction.  (Check)					
	5.9.3	While the AZ axis running at ful brakes to be set immediately.	I velocity, create	e an Axis fault tha	at would cause the  (Check)	
	5.9.4	From the strip chart recording axis velocity by the time elapse the calculated brake deceleration	ed to bring the on value.	axis to a comple	on by dividing the te stop. Annotate	
					deg/sec ² (Record)	
	5.9.5	Verify that the AZ Brake decele	ration is betwee	en 4 to 60 deg/sed	c². (Check)	
	5.9.6	Repeat Paragraph 5.9.1 throug	h 5.9.5 tests for Char	the Altitude axis.		
					(Record)	
				s and Cmd Full R	/	
			SIZE CAGE NO	DWG NO.	REV	
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(Check)  sec² (Record)  (Check)  (Record)  (Record)  (Check)  (Check)  sec² (Record)  (Check)
(Check) (Record) (Record) (Check) (Check) (Check)
(Record) (Record) (Check) (Check) (Check)
(Check) (Check) sec² (Record)
(Check) sec² (Record)
sec ² (Record)
(Check)
•
M1 Mirror is y, two sets of ected that the nped the M1
(01 - 12)
(Check) n. (Check)
ON and slows
(Check)
(Check)
(Check)
a M1 Mirror
(Check)
0006 - -9008

-	Commence and the Commence of t					
51						ACCOUNTS AND A COUNTY AND A COU
	5.10.6	Using the PMU, drive in the PO	S direction to 30	degrees.		Appellable from the second sec
		-			(Che	ck)
90(	5.10.7	Verify that the M1 Mirror Restra	int System is no	o longer restraining	g the M1 Mirro	r.
3-00		•			(Che	9
No. 99-343-0006	5.10.8	Simulate a failure of the restra FCC cabinet, actuator, or with a by disconnecting the J18 cab Maintenance Restraint distributi from the eight clamps that are we the M1 Mirror Restraint system	iny of the eight le to the Altitu on box. The J1 vired in series t	clamps that restrande junction-box Solution cable carries the hat provides posit	ain the M1 Miri coming from e feedback sig	ror) the nal
0P0N7				sconnect J18 Cab	ole (Che	ck)
	5.10.9	Using the PMU, drive the axis ir	n the NEG direc	tion between 20 a	and 19 degrees	i.
CAGE NO.	J. 1 J. 1	g g g g	-		(Che	
υž	5.10.10	Verify that the M1 Mirror Restra	int system has l	been activated.	•	
	J. 13110	<b>,</b>	•		(Che	ck)
	5.10.11	Continue driving in the NEG of degrees, the ALT Interlock Chamotor amplifier power.	lirection. Verify in is broken cau	y that as the axis using the removal	drives below of a 3-Phase A	19 ALT
		• •			(Che	eck)
	5.10.12	Verify that an M1 Mirror Restra	iined Failure fai	ult is issued to the		
					(Che	•
	5.10.13	Reconnect the J18 connector controller circuit breakers.	to the ALT jund	ction-box and res		
					(Che	,
	5.10.14	Drive the ALT axis to 30 degree no longer restraining the M1 Mi	es and verify the rror.	at the M1 Mirror R	Restraint syster	n is
					(Che	eck)
			•			
			SIZE CAGE NO		40.0000	REV
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52							
E.							e e de la companya d
99-343-0006							
NO.							
0P0N7							
	APP	ENDI	( A				
CAGE NO.	PORTABLE MA	AINTE	NANC	E UNI	Γ		
		SIZE	CAGE NO		DWG NO.		REV
	THIS DOCUMENT IS FOR REFERENCE ONLY AND MAY NOT BE INCORPORATED INTO A DESIGN OR USED FOR MANUFACTURE OR PROCUREMENT FROM SOURCES OTHER THA GENERAL DYNAMICS	A4 vpo dwo	0P01 3. NO.		<u> </u>	43-0006	-
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53 **APPENDIX A CONTENTS** PORTABLE MAINTENANCE UNIT .......54 5.11 99-343-0006 5.11.2 5.11.3 Alternate PMU Connection Point...... 57 5.11.4 Power OFF Control ...... 59 5.11.5 PMU Display ...... 59 5.11.6 DWG. NO. **0P0N7** CAGE NO.

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DWG NO.

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REV -

VPO DWG. NO.

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54						
НS	5.11	PORTABLE MAINTENANCE UNIT				
99-343-0006		The Portable Maintenance Unit (PMU) can be selected to drive the AZ/ALT Axes or the CASS Axes. It can be plugged in at either PDU or at the dedicated PMU J-Boxes. The PMU can be enabled through the Maintenance MCU Screen or when the MCU is not powered up.				
-66		Plug in the PMU at the AZ/ALT PDU and give control to the AZ/ALT Axes (CASS Control LED not lit).				
OPON7 NO.	5.11.1	Place the MCU in the STOP Mode. Verify that the POWER ON LED is illuminated on the PMU and verify the status message, "AZ/ALT PMU AVAILABLE", is present at the MCU.				
Total Common Com	5.11.2	PMU Operations-AZ/ALT Axes				
CAGE NO.						
	5.11.2.1	Enable the PMU through the MCU by executing the Maintenance Mode. Verify that the ENABLE LED is illuminated on the PMU and that the CASS CONTROL LED is not lit.				
		(Check)				
	5.11.2.2	Take control with the PMU by pressing the ACTIVE Button and verify the ACTIVE LED is lit and status message, "AZ/ALT PMU IN CONTROL", appears at the MCU.				
		(Check)				
	5.11.2.3	Verify proper AZ/ALT PMU IN CONTROL indication to AZ and ALT LCU per Table 6 and Table 7. (Check)				
	5.11.2.4	Select the HI Rate. Verify that the HI LED is lit and AZ and ALT do not display a fault condition.				
		(Check)				
	5.11.2.5	Enable the AZ and then the ALT Axis by pressing the Axis Enable Button at the PMU and measure the bi-directional full speed of the motor. With the motor rotating at full speed, record the travel over approximately a 50-60° travel region and calculate the axis velocity.				
		LENGTH OF TRAVEL AXIS TEST (Secs) (deg) (deg/sec)				
	Ay AZ PO	OS 2203 60° 2.14 (Record)				
	PLOT AZ N	EG 29.5% 63° Z.03 (Record)				
		SIZE CAGE NO. DWG NO. REV				
	INCORPORATI	ENT IS FOR REFERENCE ONLY AND MAY NOT BE DID INTO A DESIGN OR USED FOR MANUFACTURE OR DIVIDITION OF DESIGN OR USED THE CEMERAL DYNAMICS OF THE PROPERTY OF THE CEMERAL DYNAMICS OF THE CEMERAL DYNAMIC				
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55					
5			AVEL leg)	AXIS VELOCITY (deg/sec)	
99-343-0006	PLOT ALT NEG _ 2	20.03	40°	2.09 (F	Record)
;-66	<b>5.11.2.6</b> Verify the	e full speed is equal or (	greater than the	desired speed.	
NO.			AZ Desired S		
0P0N7				A	AZ (Check)
9P				AL	_T(Check)
CAGE NO.	5.11.2.7 Simulate LED is lit	an axis fault (limit, bra and only the correspo	ke) for each ax nding axis is inh	ibited.	_
					AZ(Check)
			<b>.</b>		_T (Check)
	<b>5.11.2.8</b> Clear the	e fault and select the LC	Rate and veri	y the LO LED is ii	i. <u> </u>
	<b>5.11.2.9</b> Enable e	each axis and measure	the bi-direction	al full speed of the	axis.
	1		AVEL deg)	AXIS VELOCITY (deg/sec)	
	AZ POS	56.52	300	Control Control	Record)
	PLOT AZ NEG	59.72	30°	,	Record)
	Ays ALT POS 3	7.87 7	<u>0</u> _	,	Record)
		40.24	<u> </u>	0.50 (I	Record)
	<b>5.11.2.10</b> Verify th	e full speed is 20% to 3	30% of the spee	,	e HI Rate Mode. AZ (Check) LT (Check)
			SIZE   CAGE NO	. DWG NO.	REV
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56										
SH	5.11.2.11			modes at th y that the PM				ake contro	ol with the AZ	and
90				•					(Che	eck)
99-343-0006	5.11.2.12			verify the ACCONTROL", o		.ED is (	OFF and	I the MCU	status messa	
ő	5.11.3	PMII (	Operation-C	ASS Axis					(0)	,
	A CANADA					D		0.00		201
DWG.	5.11.3.1	LED is	s lit, the "AZ		VAILAE	BLE" me	essage o		CASS CONTF the "CASS P	
0P0N7									(Che	eck)
CAGE NO.	5.11.3.2	the A	ss the ACTI CTIVE LED rs at the MC	is lit and th	t the Po e statu	ortable I s mess	Maintena age, "C	ance Unit ASS PMI	(PMU) and ve	OL",
C									(Che	∍ck)
	5.11.3.3	Verify	proper CAS	S PMU IN CO	ONTRO	L indica	tion to C	CASS LCU	per Table 8.	
	4								(Che	Í
	5.11.3.4	Repea below	at Sections 5 Verify that	5.11.2.4 throu CASS Cable	gh 5.11 wrap ax	i.2.10 fc kis veloc	or the CA city follow	ASS Axis a	and record res s motors' veloc	ults city.
			5.11.2.4	HI Rate					(Che	eck)
			5.11.2.5	Record Spe						
	N.	19	80	5°/21.7	250	CAS			°/sec (Rec	
	PL	01	S	o°/22.0					≥_°/sec (Rec	ord)
					CASS I	Desired	Speed	3.6°/s	sec	
			5.11.2.6	Verify Axis	Velocity	/			(Ch	eck)
			5.11.2.7	Fault LED					(Ch	eck)
			5.11.2.8	LO LED					(Ch	eck)
			5.11.2.9	Record Sp	eed			C1 E	2	
	ASO		30	o°/56.58	3 500	CA	SS POS		o/sec (Rec	ord)
					SIZE	CAGE NO		DWG NO.	40.0000	REV
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57						
НS		30 / 59.3:	CASS NE	G O. S	°/sec (Reco	ord)
900		8	ed (10% to 20% of Sle	ew Speed)	(Che	∍ck)
99-343-0006	5.11.3.5	Verify that for all of the CASS V synchronized with the CASS axis		he CASS Ca		
DWG. NO.	5.11.3.6	Attempt to enter a new mode at LCU and verify that the PMU re		to take cont	(Che trol with the CA	\SS
0P0N7	5.11.4	Alternate PMU Connection Po	<u>pint</u>			
CAGE NO. <b>0</b>	5.11.4.1	Connect the PMU at the CASS that the CASS Control LED is n		rol to the AZ	/ALT axes. Ve	
6	5.11.4.2	Repeat Sections through 5.11.1	l through 5.11.2.4 ar	d record the		
	ACCIDENTIAL SECTION SE	5.11.1 Messages			(Che	eck)
		5.11.2.1 Maintenance N	/lode		(Che	eck)
		5.11.2.2 PMU in Contro	ıl		(Che	eck)
		5.11.2.4 HI Rate			(Che	∍ck)
	5.11.4.3	Enable the AZ and then the Averify that bi-directional full spe		hieved.	Enable Button  AZ(Che	eck)
	5.11.4.4	Simulate an axis fault (limit, brought LED is lit and only the correspond	ake) for each axis a anding axis is disable	nd verify the d.		ULT
	5.11.4.5	Clear the fault and select the L	O Rate and verify the	А	ALT (Cho	
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	EQUIPMENT.		SCALE NONE WEIG	нт∙	SHEET 57 OF	125

58						
НS	5.11.4.6	Enable each axis and verify achieved.	that bi-direction	onal speed contro	I of the motor	r is
90		acilieveu.		,	AZ(Che	ck)
3-00				А	LT <u>                       (</u> Che	ck)
99-343-0006	5.11.4.7	Disable the AZ and ALT Axis.			(Che	
DWG.	5.11.4.8	Press the CASS Control Button is lit, the "AZ/ALT PMU AVA AVAILABLE" message is displa	ILABLE" mes		CASS Control L	.ED
0P0N7					(Che	ck)
0P	5.11.4.9	Depress the ACTIVE Button a message, "CASS PMU IN CON			e	
CAGE NO.				Ut d CACC door	(Che	•
	5.11.4.10	Select the HI Rate. Verify that condition.	the HI LED IS I	iit and CASS does	,	
					(Che	,
	5.11.4.11	Repeat Sections 5.11.4.3 throresults below.	ough 5.11.4.7	for the CASS Axi		
		5.11.4.3 Bi-directional S	Speed Control		(Che	eck)
		5.11.4.4 Axis Fault			(Che	eck)
	Action to the second se	5.11.4.5 LO LED			(Che	eck)
		5.11.4.6 LO Rate			(Che	eck)
		5.11.4.7 Disable the CA	ASS Axis		(Che	eck)
	5.11.4.12	Connect PMU at PMU J-Box Nand status capability.	lo. 1 and verify	that the PMU ha	s complete con	ıtrol
		and contact corporation,			(Che	∍ck)
	5.11.4.13	Connect PMU at PMU J-Box Nand status capability.	lo. 2 and verify	y that the PMU ha	s complete cor	ıtrol
					(Che	eck)
						l per
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20						
ro.	5.11.5	Power OFF Control				
900	5.11.5.1	Power OFF the MCU and ver control and status capabilities.	rify the PMU r	emains enabled	and has comp	lete
99-343-0006	5.11.5.2	Power up the MCU and verify P	PMU remains in	control.	(Che	
6	5.11.5.3	Allow the MCU to take control a	and put the syst	em in Stop Mode	. (Che	·
NO.					(Che	eck)
0P0N7	5.11.5.4	At the PMU, select the AZ/ALT (MCU cable A2J21), verify the and verify that the ENABLED control is available at the PMU	fault message, indicator at the	, "MCU-AZ/ALT ( ne PMU_is illumi	CCU LINK DOW nated and AZ/A AP/AUT L	/N", ALT C&
CAGE NO.				(	(Che	eck)
S O	5.11.5.5	Reconnect the MCU-AZ/ALT Co	CU Data Link.		1	
					(Che	eck)
	5.11.5.6	At the PMU, select the CASS At that the CASS Control LED is li				erify
		that the CAGO Control LLD is in	t. Tut the syste	sin in Glop Mode.	(Che	eck)
	5.11.5.7	Disconnect the MCU-CASS Comessage, "MCU-CASS CCU Lat the PMU is illuminated and	ink Down", and	d verify that the E	4), verify the f ENABLED indicate	ault ator
		CASS LCU.			(Che	eck)
	5.11.5.8	Reconnect the MCU-CASS CC	U Data Link ca	ble.	(Che	eck)
	5.11.6	PMU Display				
		The PMU 2-line LCD displays hardware generated faults and display faults/messages, the to is dedicated for CASS.	status messag	ge. When the PN	<i>I</i> IU display is se	et to
	5.11.6.1	At the MCU, turn all error cor angle readout agrees with the M		Verify that the	PMU Display a	xes
					(Che	eck)
	5.11.6.2	Enable the AZ Axis with the LO PMU Display follows the MCU		, drive POS and I		
					(Che	eck)
			SIZE CAGE NO		40.000	REV
	INCORPORATE	ENT IS FOR REFERENCE ONLY AND MAY NOT BE D INTO A DESIGN OR USED FOR MANUFACTURE OR	A4 OPOI	N/   99-3	43-0006	_
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	OPERATION O EQUIPMENT.	R MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 59 OF	125

09					
НЅ		Repeat 5.11.6.2 for the ALT and	d CASS Axes.		
10		•		А	LT (Check)
-000				CA	SS (Check)
99-343-0006	5.11.6.3	Depress the Rate Selection/Displays 5 seconds. Verify that the displays	splay Control N ay readout cha	Membrane Switch nges to Status/Fau	ult Messages.
DWG. NO.	5.11.6.4	Verify that the messages being Status and Fault Windows. No at the PMU Display.	scrolled on the	e PMU Display ag Irdware generated	(Check) ree with the MCU faults will appear
0P0N7					(Check)
	5.11.6.5	Create a new fault and verify the display and the MCU.	nat the new me	ssage is being rep	
CAGE NO.					(Check)
	5.11.6.6	Reset the fault and verify that the	ne message cle	ears at the MCU ar	(Check)
	5.11.6.7	Disconnect the AZ/ALT CCU A7COM1). Verify the fault methe MCU and on the PMU displ	essage, "PMU-l	PMU Display Liı PMU LINK DOWN	nk (AZ/ALT CCU
					(Check)
	5.11.6.8	Create any CASS fault and ver PMU display.	rify that fault is	reported to the M	CU and not to the (Check)
	5.11.6.9	Reconnect the AZ/ALT CCU - 0	CASS CCU PM	U Displav Link Cal	
	0.11.0.0	TROOFINGS IN THE TREE TO SEE			(Check)
			SIZE CAGE NO	l l	REV
	INCORPORATE	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR IT FROM SOURCES OTHER THA GENERAL DYNAMICS	A4 OPOI VPO DWG. NO.	N7   99-34	43-0006   -
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	EQUIPMENT.		SCALE NONE	WEIGHT:	SHEET 60 OF 125

				CONTRACTOR		and the contribution of the contribution of
61						
HS						
99-343-0006						
DWG. NO.	APF	PENDIX B				
0P0N7	MOUNT	CONTROL	TINU			
CAGE NO.						
		size cage	NO.	DWG NO.	43-0006	REV
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	6.9	<u>IMAGE JITTER</u>	
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64					
НЅ	5.12	FAULTS AND STATUS			
99-343-0006		Fault and status messages are (via contact closure). Fault me sound until they are acknowled flashing) as they occur.	ssages will fla	sh and cause the	audible alarm to
		Appropriate contact action verthrough Table 3 and Table 6 th status sequences are detailed in	rough Table 8	(Appendix C). Ad	rified by Table 1 dditional fault and
DWG. NO.	5.12.1	MCU Latching Faults			
0P0N7	5.12.1.1	On the Site/Setup Screen, set la	atched faults Of	Ν.	(Check)
CAGE NO.	5.12.1.2	Clear all fault conditions. Wh condition (Emergency Stop) an indicator appears in top portion Screen, and audible alarm at Mo	d verify the sy of screen, flas	stem is disabled,	the flashing fault
	5.12.1.3	Acknowledge the fault. Verify the top portion of the screen retalarm is OFF.	at both the fau urn to normal v	It message and th video (not flashing	e fault indicator in
	5.12.1.4	Activate a second emergency condicator on the top portion of the flashing and the audible alarm is	ne screen are f	erify the new mess lashing, the existir	sage and the fault ng message is not
	5.12.1.5	Clear both fault conditions (and that the first fault message clean	I reset motor c rs and the secc	ontroller circuit brond remains.	,
	5.12.1.6	Acknowledge the second fault the system remains disabled.	message, verif		
	5.12.1.7	Enter an active mode. Verify th			(Check)
	5.12.1.8	Execute the STOP Mode. On t	he Site/Setup S	Screen, set latched	d faults OFF. (Check)
	INCORPORAT PROCUREME C4 SYSTEMS	MENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR NT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI THE CONTENTS OF THIS DOCUMENT MAY	SIZE CAGE NO OPO!		43-0006 -
	BE DISCLOS	SED ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 64 OF 125

				aus au de de de dat de la recentration de la financia del la financia de la finan			
65	1						
HS.	5.12.1.9	Repeat 5.12.1.2 thr	ough 5.12.	1.4.			
90		5.12.1	.2 Act	ivate Fault		(Che	ck)
99-343-0006		5.12.1	.3 Ack	nowledge Fault		(Che	·
9-34		5.12.1		ivate Second Fa		(Che	,
တ	5.12.1.10	Clear both faults, v system is disabled.	erify that th			displayed and	the
DWG. NO.				/	extering node	(Che	eck)
N2	5.12.1.11	Change the mode t	o an active	mode! Verity th	nat the axes reena	ble. (Che	eck)
0P0N7	5.12.2	<u>Faults</u>					•
CAGE NO.	5.12.2.1	Fault Table					
2		All fault messages following table lists disabling/interlock appropriate switch state and verify that that the appropriat Table 2 and Table check ( ) in the vecause additional me	the fault maction that or mechar the proper contact a factor (ALT LC)	nessages that we should take point take point the Market	vill be activated wi lace. Each test MCU, verify the a splayed. At the LC er Table 1 and T and Table 8 (CAS	th the approprishall activate ppropriate disact list of the contract of the co	iate the able erify CU), ee a
		SYSTEM DISABLI	NG/INTLK [	DEFINITION:			
		Motor Level:	motor cor	ntinues to opera NGLE MOTOR"	Brakes are not set ate. Status mess ', appears when	sage, "AZ, ALT	or
		Axis Level:	Other axe	es continues to	tors disabled in a function in select ASS DISABLED", a	ed mode. Sta	nly. atus
		Axis Interlock:	Breaks th motor con brakes.	e appropriate a troller power rei	axis interlock chai moved and immed	n which results liate setting of a	s in axis
		Non Disabling:	All motors	continue to fun	ction.		
				SIZE CAGE NO	D. DWG NO.		REV
	INCORPORATI	IENT IS FOR REFERENCE ONLY A ED INTO A DESIGN OR USED FOR I	MANUFACTURE OR	A4 0P0		43-0006	-
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	EQUIPMENT.	NUMBERADIOE MEGINEMENTO	J. 2011 10 10 11110	SCALE NONE	WEIGHT:	SHEET 65 OF	125

Table 4, Fault Table

ALT MOTOR CONTROL 1 FAULT  Disconnect  AZ/ALT PDU Motor ALT MOTOR CONTROL 2 FAULT  Disconnect  AZ/ALT PDU Motor Disconnect  X  AZ LUBE OVERFLOW  Disconnect AZ/ALT PDU J70 Cable	`
EQUIPMENT ROOM EMERGENCY Activate E-Stop  ACTIVATE E-STOP	ATION
CONE EMERGENCY  Activate E-Stop  X (AZ/ALT/CASS)  AZ MOTOR #1#2 EMERGENCY  Activate E-Stop  X (AZ/ALT/CASS)  AZ MOTOR #3#4 EMERGENCY  Activate E-Stop  X (AZ/ALT/CASS)  ALT MOTOR #1 EMERGENCY  Activate E-Stop  X (AZ/ALT/CASS)  ALT MOTOR #2 EMERGENCY  Activate E-Stop  X (AZ/ALT/CASS)  ALT MOTOR #2 EMERGENCY  Activate E-Stop  X (AZ/ALT/CASS)  ALT PIER EMERGENCY  ACTIVATE E-Stop  X (AZ/ALT/CASS)  ACTIVATE E-Stop  X (AZ/ALT/CASO)	
AZ MOTOR #1#2 EMERGENCY Activate E-Stop X (AZ/ALT/CASS) AZ MOTOR #3#4 EMERGENCY Activate E-Stop X (AZ/ALT/CASS) ALT MOTOR #1 EMERGENCY Activate E-Stop X (AZ/ALT/CASS) ALT MOTOR #2 EMERGENCY Activate E-Stop X (AZ/ALT/CASS) ALT MOTOR #2 EMERGENCY Activate E-Stop X (AZ/ALT/CASS) ALT PIER EMERGENCY Activate E-Stop X (AZ/ALT/CASS) ALT PIER EMERGENCY Activate E-Stop X (AZ/ALT/CASS) X (	
AZ MOTOR #3#4 EMERGENCY Activate E-Stop  ALT MOTOR #1 EMERGENCY Activate E-Stop  ALT MOTOR #2 EMERGENCY Activate E-Stop  X (AZ/ALT/CASS)  ALT PIER EMERGENCY Activate E-Stop  X (AZ/ALT/CASS)  ALT PIER EMERGENCY Activate Switch  X (ALT)  ALT AUX DRIVE EN INTLK  Remove Handcrank from cradle  CASS INSTRUMENT NOT INSTALLED  Activate Switch AZ/ALT REGEN OVERTEMP FLT  CASS REGEN OVERTEMP FLT  Remove Regen Cabinet J7 Cable  CASS REGEN OVERTEMP FLT  Remove Regen Cabinet J8 Cable  AZ MOT 1 3-PHASE OFF AZ MOTOR CONTROL 1 FAULT  AZ MOT 3 3-PHASE OFF AZ MOTOR CONTROL 2 FAULT  AZ MOT 3 3-PHASE OFF AZ MOTOR CONTROL 3 FAULT  AZ MOT 4 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  AZ MOT 3 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  Disconnect  ALT MOT 2 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  Disconnect  ALT MOTOR CONTROL 5 FAULT  Disconnect  AZ MOTOR CONTROL 5 FAULT  Disconnect  AZ MOTOR CONTROL 2 FAULT  Disconnect  AZ MALT PDU Motor  Disconnect AZ/ALT PDU Motor  Disconnect  AZ MALT PDU Motor  Disconnect AZ/ALT PDU M	
ALT MOTOR #1 EMERGENCY Activate E-Stop X (AZ/ALT/CASS) ALT MOTOR #2 EMERGENCY Activate E-Stop X (AZ/ALT/CASS) ALT PIER EMERGENCY Activate E-Stop X (AZ/ALT/CASS) X (AZ/ALT/CASSONCH X (AZ/ALT/CASSO	
ALT MOTOR #2 EMERGENCY Activate E-Stop X (AZ/ALT/CASS) ALT PIER EMERGENCY Activate E-Stop X (AZ/ALT/CASS) M1 MIRROR RESTRAINT FAILURE Activate Switch X (ALT)  ALT AUX DRIVE EN INTLK Remove Handcrank from cradle  CASS INSTRUMENT NOT INSTALLED AZ/ALT REGEN OVERTEMP FLT CASS REGEN OVERTEMP FLT Remove Regen Cabinet J7 Cable  CASS REGEN OVERTEMP FLT AZ MOTO 1 3-PHASE OFF AZ MOTOR CONTROL 1 FAULT AZ MOT 3 3-PHASE OFF AZ MOTOR CONTROL 2 FAULT Disconnect AZ MOTO 3-PHASE OFF AZ MOTOR CONTROL 3 FAULT AZ MOTO 3-PHASE OFF AZ MOTOR CONTROL 1 FAULT Disconnect AZ MOTOR CONTROL 2 FAULT Disconnect AZ MOTOR CONTROL 3 FAULT AZ MOTOR CONTROL 1 FAULT Disconnect AZ MOTOR CONTROL 2 FAULT AZ M	
ALT PIER EMERGENCY  Activate E-Stop  X (AZ/ALT/CASS)  M1 MIRROR RESTRAINT FAILURE  Activate Switch  Remove Handcrank from cradle  CASS INSTRUMENT NOT INSTALLED  AZ/ALT REGEN OVERTEMP FLT  CASS REGEN OVERTEMP FLT  CASS REGEN OVERTEMP FLT  CASS REGEN OVERTEMP FLT  AZ MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 2 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 3 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 3 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 4 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 3 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 3 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 4 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 4 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 2 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 2 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 0 3-PHASE OFF AZ/ALT PDU Motor Disconnect	<i>[</i>
M1 MIRROR RESTRAINT FAILURE  Activate Switch  ALT AUX DRIVE EN INTLK  Remove Handcrank from cradle  CASS INSTRUMENT NOT INSTALLED  AZ/ALT REGEN OVERTEMP FLT  CASS REGEN OVERTEMP FLT  AZ MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 2 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 3 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 3 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 3 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOT 4 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOTOR CONTROL 3 FAULT  AZ MOTOR CONTROL 4 FAULT  AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  ALT MOTOR CONTROL 1 FAULT  Disconnect  ALT MOTOR CONTROL 2 FAULT  AZ/ALT PDU Motor Disconnect  ALT MOTOR CONTROL 2 FAULT  Disconnect  AZ/ALT PDU Motor Disconnect  AZ/ALT PDU Motor Disconnect  ALT MOTOR CONTROL 2 FAULT  DISCONNECT  AZ/ALT PDU Motor Disconnect	
ALT AUX DRIVE EN INTLK  Remove Handcrank from cradle  CASS INSTRUMENT NOT INSTALLED  AZ/ALT REGEN OVERTEMP FLT  CASS REGEN OVERTEMP  CASS REGEN  CASS REGEN  CASS REGEN  CASS REGEN  CASS REGEN  CAS	
ACTION DRIVE ENTITLE  CASS INSTRUMENT NOT INSTALLED  AZ/ALT REGEN OVERTEMP FLT  CASS REGEN OVERTEMP  CASS REGEN	
ACTIVATE SWITCH  ACTIVA	/
Cabinet J7 Čable  CASS REGEN OVERTEMP FLT  Cabinet J7 Čable  Remove Regen Cabinet J8 Cable  AZ MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ MOTOR CONTROL 1 FAULT  AZ MOTOR CONTROL 2 FAULT  AZ MOTOR CONTROL 2 FAULT  AZ MOTOR CONTROL 3 FAULT  AZ MOTOR CONTROL 3 FAULT  AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF AZ/ALT PDU Motor Disconnect  AZ/ALT PDU Motor DISCONNECT	
AZ MOT 1 3-PHASE OFF AZ MOTOR CONTROL 1 FAULT  AZ MOT 2 3-PHASE OFF AZ MOTOR CONTROL 2 FAULT  AZ MOT 3 3-PHASE OFF AZ MOTOR CONTROL 3 FAULT  AZ MOTOR CONTROL 3 FAULT  AZ MOT 4 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  AZ MOT 1 3-PHASE OFF AZ MOTOR CONTROL 3 FAULT  AZ MOT 3 3-PHASE OFF AZ MOTOR CONTROL 3 FAULT  AZ MOT 4 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 2 FAULT  ALT MOTOR CONTROL 2 FAULT  Disconnect  AZ/ALT PDU Motor Disconnect  X  DISCONNECT  X	<i></i>
AZ MOTOR CONTROL 1 FAULT  AZ MOT 2 3-PHASE OFF AZ MOTOR CONTROL 2 FAULT  AZ MOT 3 3-PHASE OFF AZ MOTOR CONTROL 3 FAULT  AZ MOT 3 3-PHASE OFF AZ MOTOR CONTROL 3 FAULT  AZ MOT 4 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 2 FAULT  AZ/ALT PDU Motor Disconnect  X  AZ/ALT PDU Motor Disconnect  AZ/ALT PDU Motor Disconnect  X	
AZ MOTOR CONTROL 2 FAULT  AZ MOT 3 3-PHASE OFF  AZ MOTOR CONTROL 3 FAULT  AZ MOTOR CONTROL 3 FAULT  AZ MOT 4 3-PHASE OFF  AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF  ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 2 FAULT  ALT MOTOR CONTROL 2 FAULT  AZ/ALT PDU Motor  Disconnect  X  AZ/ALT PDU Motor  Disconnect  X  AZ/ALT PDU Motor  Disconnect  X  AZ/ALT PDU Motor  Disconnect  AZ/ALT PDU Motor  Disconnect  X  AZ/ALT PDU Motor  Disconnect  X	/
AZ MOTOR CONTROL 3 FAULT  AZ MOT 4 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 1 FAULT  ALT MOT 2 3-PHASE OFF ALT MOTOR CONTROL 2 FAULT  AZ LUBE OVERFLOW  Disconnect  X  X  AZ MALT PDU Motor Disconnect  X  AZ MALT PDU Motor Disconnect  X  AZ MALT PDU Motor Disconnect  X	,
AZ MOT 4 3-PHASE OFF AZ MOTOR CONTROL 4 FAULT  ALT MOT 1 3-PHASE OFF ALT MOTOR CONTROL 1 FAULT  ALT MOTOR CONTROL 1 FAULT  ALT MOT 2 3-PHASE OFF ALT MOTOR CONTROL 2 FAULT  AZ LUBE OVERFLOW  AZ LUBE OVERFLOW  AZ MALT PDU Motor Disconnect  X  AZ MALT PDU Motor Disconnect  X  AZ MALT PDU Motor Disconnect  X	
ALT MOT 1 3-PHASE OFF ALT MOTOR CONTROL 1 FAULT  ALT MOT 2 3-PHASE OFF ALT MOTOR CONTROL 2 FAULT  AZ/ALT PDU Motor Disconnect  X  AZ/ALT PDU Motor X  Disconnect  X  AZ/ALT PDU Motor Disconnect  X	1
ALT MOT 2 3-PHASE OFF ALT MOTOR CONTROL 2 FAULT  AZ LUBE OVERFLOW  AZ/ALT PDU Motor Disconnect  X  X  X  Disconnect AZ/ALT PDU J70 Cable	<i>/</i>
AZ LUBE OVERFLOW PDU J70 Cable	<i>p</i>
	1
DOME CRANE INTLK Activate Switch X (AZ/ALT)	
AZ LUBE PUMP CB OFF AZ/ALT PDU CB X	
AZ MOTOR 1 OVERTEMP Disconnect A2P17-1 Wire X	
AZ MOTOR 2 OVERTEMP Disconnect A2P17-5 Wire X	î
AZ MOTOR 3 OVERTEMP Disconnect A2P17-9 Wire X	
AZ MOTOR 4 OVERTEMP Disconnect A2P17-10 Wire X	
ALT MOTOR 1 OVERTEMP Disconnect A2P18-1 Wire X	
ALT MOTOR 2 OVERTEMP Disconnect A2P18-5 Wire X	
M2 UNIT NOT INSTALLED Activate Switch X (ALT)	
OSS NOT INSTALLED Activate Switch X (ALT)	
YOKE ACCESS HATCH INTLK Activate Switch X (AZ)	
AZ LUBE PUMP PRESSURE LOW Turn OFF Pump Motor X	

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			SYSTEM INTER	LOCK	(√)
FAULT MESSAGE	FAULT LOCATION	MOTOR LEVEL DISABLE	AXIS LEVEL DISABLE	AXIS INTERLOCK	VERIFICATION @ MCU & @ LCU INTERFACE
DSP BOOT FAILURE	DSP BD		X (ALT)		
CASS MOTOR 1 POWER OFF CASS MOTOR CONTROL 1 FAULT	CASS PDU Motor Disconnect	х			1/
CASS MOTOR 2 POWER OFF CASS MOTOR CONTROL 2 FAULT	CASS PDU Motor Disconnect	х			1/
CASS CABLEWRAP MTR POWER OFF CASS CABLEWRAP M/C FLT	CASS PDU Motor Disconnect		х		1/
CASS MOT 1 OVERTEMP	Disconnect A2P17-1 Wire	Х			
CASS MOT 2 OVERTEMP	Disconnect A2P17-5 Wire	Х			
CASS CABLEWRAP MTR OVERTEMP	Disconnect A2P17-2 Wire		Х		
PIER ACCESS INTLK	Activate Switch			X (AZ)	
MOBILE PLATFORM INTLK	Activate Switch			X (AZ/ALT)	
AZ FLOOR ACCESS INTLK	Activate Switch			X (ALT)	

## 5.12.3 Status

The following table lists the externally generated status messages. (Status messages that are generated internally are tested with the applicable test in the procedure). At the MCU, verify that the proper message is displayed. At the LCU Interface, verify that the appropriate contact action occurs per Table 1 through Table 3, and Table 6 through Table 8. Place a  $(\checkmark)$  in the verification column upon proper operation.

Table 5. Status Table

	Table o, Otatao Tablo	
STATUS MESSAGE	STATUS LOCATION	VERIFICATION (✔) @ MCU AND @ LCU INTERFACE
AZ Single Motor	AZ Motor Disconnect	
ALT Single Motor	ALT Motor Disconnect	
CASS Single Motor	CASS Motor Disconnect	
AZ Preload OFF	AZ Motor Disconnect	
CASS Preload OFF	CASS Motor Disconnect	
AZ Cablewrap Neg Dir	AZ Cablewrap in NEG Wrap	
CASS Cablewrap Neg Dir	CASS Cablewrap in NEG Wrap	
ALT Imbalance Pin Extended	Activate Switch	
*AZ Parked	Activate Switch	
*ALT Parked	Activate Switch	
*AZ/ALT CCU OFF	CCU Power Switch	
*CASS CCU OFF	CCU Power Switch	

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-indexes constructed										
89										
н		* Status/Fault reported only to LCU.								
	5.13	POSITION LOOP TESTS								
900		The Posi	ition Loop	is tested	for bandw	idth and s	tep respo	nse.	die programmente del Robe	
99-343-0006	5.13.1				arameters	located o	n the Axis	s Loop Parameter Scr	een	
99-3		via the Site/Setup Screen.  TYPE II								
DWG.	AZ AZ ALT ALT CASS CASS SINGLE DUAL SINGLE DUAL SINGLE DUAL									
0P0N7		Max Velocity	2.0	2.0	7.0	2.0	<u>3.6</u>	<u> </u>		
0PC		Deadband	0.0	0.0	0.0	0.0	0.0	(Record)		
ш		Hysteresis	1.5	1.5	1.5	1.5	1.5	<u>ℓ ≤ </u> (Record)		
CAGE NO.		Lag Break 1	0.035	<u>එ.එ</u>	<u>0.03</u> /	0,0	<u>0.05</u>	<u>ರಿ-೦</u> (Record)		
		Lead Break	0.05	<u> 224</u>	20.0	0.24	0.05	<u>ಿ.3೦</u> (Record)		
	A Control of Manager Control of	Crossover Freq.	0.13	1.00	0.125	(.00	0.25	1.25 (Record)	WEATHER STREET, No. 40	
	Lag Break 2 <u> </u>									
		Sqrt Trans Pt 0.044 0.015 0.044 0.044 0.044 0.044 (Record)								
		Trans Pt Hyst 1-50 5.00 1.50 1.50 1.50 (Record)								
	A CONTRACTOR OF THE CONTRACTOR	Max Accel	0.50	<u>0.So</u>	0.50	0.50	<u>0.50</u>	<u></u>	STATE SPECIAL	
		Scan Accel	1.00	0.50	_{.00.}_	<u>0,5</u> 0		(Record) (Che	eck)	
			_						Í	
	5.13.2	<u>Positior</u>	ı Loop Ba	<u>ındwidth</u>						
		This tes which th	t demonst e feedbac	rates the k is 70%	Position Lof the initia	oop's Bar al value.	ndwidth de	efined as the frequenc	y at	
		a. C	onnect a	function (	generator	set at 2V	peak-to-p	peak (±1V), 0.05 Hz, 3	Sine	
	Wave to A4TP4 at the appropriate PDU and to Channel 1 of the chart recorder.									
	<b>b.</b> Connect the position feedback, A4TP1 at the appropriate PDU to									
	Channel 2 of the chart recorder.									
									÷	
					0.75	LONGENO	Lov	NG NO	T REV	
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WEIGHT: **SCALE NONE** 

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SOLITON CONTRACTOR AND CONTRACTOR AN										
	C.	At the MCU, select the S for the axis under test. commanded angle.								
	d.	Select the Test Function Screen and, from there, select the Position Loop Test Screen. Set the scale factor to .01°/V (this creates $\pm 0.010^\circ$ movement) and select Execute.								
	e.	Verify that all error corrections are OFF.								
	f.	Enable the axis to be tested and set the chart recorder channels to convenient settings for the peak-to-peak excursions of the position signals and record.								
NOTE:	Disal	ole all axes not currently	being tested							
			Cha	annel 1 C	Gain	(Rec	ord)			
4			Cha	annel 2 C	Gain	(Rec	ord)			
			(	Chart Sp	eed	(Rec	ord)			
PLOT	g.	Slowly increase the fun- marking convenient freq				ough 10 Hz w	/hile			
	h.	A dynamic signal analyz test set-up printout to thi	•		this test. Atta	ach the analyz	er's			
5.13.3		Record the frequency at which the feedback peak-to-peak voltage is 70% of the nitial value.								
		152, AS3 PLOT	AZ 3 dB B	andwidth	n <u>20</u>	Hz (Red	ord)			
5.13.4		eat Section 5.13.3 for the ts below.								
		ASY, ASS PLOT								
		A56, A57 PLOTO	CASS 3 dB B	andwidth	1_1.5	Hz (Red	ord)			
5.13.5	Verif	y that the bandwidths are	>0.8 Hz and	<2.5 Hz		(Ch	eck)			
NOTE:	1.4 H	e recorded AZ, ALT and data the Vista Telescope nined with the measured	Control Sys	stem Si	mulation wi	ns are lower t Il need to be	:han : re-			
				E NO	DWG NO.		REV			
		OR REFERENCE ONLY AND MAY NOT BE	A4 OP	0N7	I -	43-0006	_			
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OPERATION EQUIPMENT.	OR MAINTEI	NANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIG	HT:	SHEET 69 OF	125			

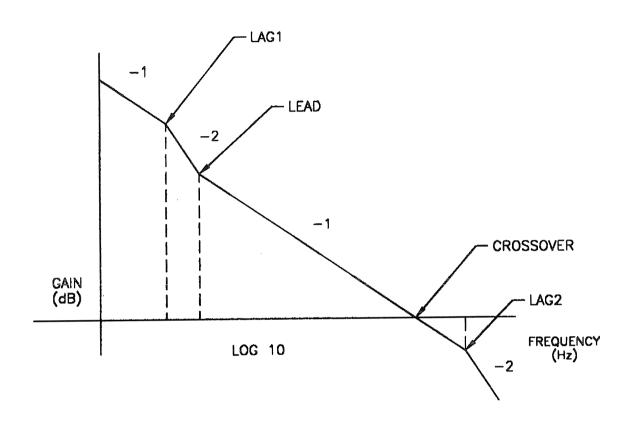
69

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DWG. NO.

0P0N7

Figure 4, Position Loop Filter
Type II



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SIZE	CAGE NO.

DWG NO.

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99-343-0006

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SCALE NONE

WEIGHT:

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71									Management (SEC) State of the s
HS	5.13.6	Position	Loop Step Response	<u> </u>					u nebodius (10 aug 40 mm
90		This test demonstrates the Position Loop's ability to respond to a step change in commanded rate.							
13-00		In the follo	owing tests:						
99-343-0006		Ov	ershoot = $\left(\frac{\text{MAX VAL}}{\text{FINAL VAI}}\right)$	<u>UE</u> -1)	* 100%				
DWG. NO.		Se	Settling time = (Start time) - (Time at which the feedback is within 5% of the final value)						
0P0N7	5.13.6.1	a. With the setup unchanged from the bandwidth test, set the function generator to 4V peak-to-peak ( $\pm 2V$ ), 0.02 Hz square wave. This creates $\pm 0.02^\circ$ position loop steps.							
CAGE NO.		<b>b.</b> Enable the axis to be tested and set the chart recorder channels to convenient settings for the peak-to-peak excursions of the position signals and record.							
	NOTE:	Disable all axes not currently under test.							
		Channel 1 Gain (Record)							
					Chann	el 2 Gair	n	(Red	ord)
					Cha	rt Speed	d	(Red	ord)
	5.13.6.2	Record the percentage of overshoot.  ASS PLOT AZ Overshoot ZG \( \frac{1}{2} \) (Record							
	5.13.6.3	Repeat S	Section 5.13.6.2 for the						
		DCIOW.	A59 P67 A60 P6	gar	ALT C	vershoc	ot <u>35</u>	<u>6</u> (Red	cord)
			AGO PLO	57	CASS C	vershoo	t_'27	<u>. 3%</u> (Red	cord)
	5.13.6.4	Verify that	at overshoots are <40°	% and th	nat the 5	% settli	ng time is	_	neck)
	5.13.6.5	Set the function generator to 4V peak-to-peak ( $\pm 2V$ ), 0.02 Hz square wave and the Pos Loop Scale Factor to 0.2°/V. This creates $\pm 0.4^\circ$ position loop steps. At the Signal Meters Screen, set the Position FB output range to $\pm 0.6^\circ$ about the commanded angle.						s. At t the	
				Louze	I CACE NO		DWG NO.		REV
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72					
ΗS	5.13.6.6	Enable the axis to be tested as settings for the peak-to-peak exc	nd set the cha	rt recorder chann position signals ar	els to convenient nd record.
90		country for the peak to peak to	Channe	I 1 Gain <u> </u>	V (Record)
99-343-0006			Channe	1 2 Gain <u></u>	(Record)
99-3			Char	t Speed	· (Record)
	5.13.6.7	Record the percentage of oversl	noot.	1 - 4	q
DWG.		PGI PLOT	AZ Ov	ershoot	(Record)
0P0N7	5.13.6.8	Repeat Section 5.13.6.7 for the	ALT and CASS	Axis and record tershoot	the results below.  (Record)
0P(		A63 PLO	CASS O	vershoot	(Record)
CAGE NO.	5.13.6.9	Verify that overshoots are <40%	and that the 5	% settling time is	
δž					(Check)
	5.13.6.10	Set the function generator to 1\ the Position Loop Scale Factor steps. At the Signal Meters Scale about the commanded angle.	to 0.001°/V.	This creates $\pm 0.00$	005° position loop
		•			(Check)
	5.13.6.11	Enable the axis to be tested an the peak-to-peak excursions of	the position sig	recorder to convenient and record.  If I Gain	
				el 2 Gain	(Record)
		_		rt Speed	(Record)
	5.13.6.12	Record the percentage of overs	hoot. AZ O	vershoot <u>185</u>	(Record)
	5.13.6.13	Repeat Section 5.13.6.12 for the	e ALT and CAS	SS. Record the re	sults below.
		A65 PU	OT ALT O	vershoot <u>/                                  </u>	(Record)
		R66 P	CASS O	vershoot <u>23</u>	S & (Record)
	5.13.6.14	Verify the overshoots are <40%	and that the 5	% settling time is	<3 secs.
					(Check)
			SIZE CAGE NO OPO		43-0006 REV
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73								
5	5.13.6.15	Disable the Position Loop Test.  (Check)						
9000	5.14	POINTING REPEATABILITY/ENCODER RE-REFERENCING						
0P0N7 No. 99-343-0006	precision measuring devices that establish a mechanical reference point. Aft the mechanical reference point has been established, the axis is driven away from the reference point positions and then commanded back to the reference point using the MCU Position Designate Mode. It will be verified that the axis driven							
CAGE OPO		The Azimuth, Altitude and Cassegrain encoders are pseudo-absolute encoders that have an incremental track and a reference track. Upon CCU power-up, in order to ensure that the absolute position of the axis has not been lost (due to possible axis movement while the PDU CCU was powered down), an encoder referencing procedure occurs where the axis is manually slowly driven through three reference pulses and the absolute position is then calculated and registered.						
	5.14.1	Azimuth Pointing Repeatability						
	5.14.1.1	Record below the measuring device to be used for this test.						
		Measuring Device Type (Record)  L-7-19  Manufacturer/Model No (Record)  Device Resolution (Record)  Serial No. 97063086 (Record)						
		Calibration Due Date (Record)						
	5.14.1.2 Lock down the measuring device on a stationary surface in such a way that go consistent measurements can be obtained when the rotating axis is driven to t reference position.							
5.14.1.3 Record the Azimuth reference position.  AZ Ref Position 253.750° (Reference)								
	INCORPORAT PROCUREMEI C4 SYSTEMS BE DISCLOS	SIZE CAGE NO.  A4 0P0N7 99-343-0006 -  WHENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR NOT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI THE CONTENTS OF THIS DOCUMENT MAY SED ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS SCALE NONE WEIGHT: SHEET 73 OF 125						
SCALE NONE WEIGHT: SHEET 7								

74										
HS.	5.14.1.4	Using the PMU or the MCU, driv	ve approximately 1.0° from the reference position. (Check)							
9000-	5.14.1.5	Allow the MCU to take control or	f the MCS. Record the Azimuth Position.  254.750° (Record)							
99-343-0006	5.14.1.6	Using the appropriate EN/DIS Function of the MCU, disable the axes not under test.								
DWG. NO.	5.14.1.7		Mode, command the AZ Axis to the reference							
0P0N7	position annotated above(Check)									
PO	5.14.1.8	Verify that the AZ Axis is driven back to the reference position and once it reaches the reference position it holds position.								
CAGE NO.	5.14.1.9	Verify that the axis was driven back to the mechanical reference position within 0.28 arc-sec pk (0.2 arc-sec rms).  Pointing Repeatability								
		Pointing Repeatability w/i 0.28 arc-sec pk (Check)								
	5.14.1.10		ately 60° away from the reference position (Check)							
	5.14.1.11	Allow the MCU to take control of	of the MCS. Record the Azimuth Position.							
	5.14.1.12	With the MCU in control, using Axis to the reference position no								
	5.14.1.13	Verify that the AZ Axis is driven the reference position it holds p	back to the reference position and once it reaches position.							
	5.14.1.14	Verify that the axis was driven back to the mechanical reference position within 2.8 arc-sec pk (2 arc-sec rms).  Pointing Repeatability (Record)								
		Poin	ting Repeatability w/i 2.8 arc-sec pk (Check)							
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75									
HS.	5.14.2	Azimuth Pointing Accuracy							
99-343-0006		Within the high precision measuring device field of view, the axis will be commanded from the MCU to small incremental positions from the reference point. It will be verified that the axis moves by the commanded amount by comparing the MCU encoder position delta to the angular displacement of the hig precision measuring device.							
9)	5.14.2.1	With the measuring device lock test, record the Azimuth reference	e position.						
DWG.			AZ Ref	Position <u>252</u>	<u> → ১৪</u> ° (Reco	rd)			
0P0N7	5.14.2.2	Using the MCU, command the at measuring device is still within smaller delta position. Record the	its field of view	w, if not, comman	n. Verify that t d the MCU to	he a			
		MCU Comma	anded AZ Delta	Position O S	⊙ <i>5</i> _° (Reco	rd)			
CAGE NO.	5.14.2.3	Verify that the AZ is holding posi							
		,			(Che	ck)			
	5.14.2.4	Record the measuring device de angular displacement from the n	elta position. C nechanical refe	Convert the position rence position.	n change to a	xis			
	NOTE.	Record the measuring device de angular displacement from the number of the AZ axis. Pointing	suring Device A is Angular Disp	Z Position <u>308</u> 19-4 lacement <u>.005</u>	Hh (Reco 104 e/se-sec 39 ° (Reco	rd) erd)			
	5.14.2.5	Calculate the AZ axis Pointing Delta Position from the Measuri	ng Device Axis	Angular Displacer	nent.				
				Accuracy <u>O</u> O					
	5.14.2.6	Convert the AZ Pointing Accur COS (ALT angle). Use ALT angle.	acy to XALT P angle of 20° wl	ointing Accuracy hich is the lowest	by multiplying ALT operatio	by nal			
		angle	XALT Pointing	Accuracy <u>O - O</u>	og⊈° (Reco	ord)			
	5.14.2.7	The above AZ Pointing Accuracy Radial Error (BRE) for AZ and A	cy error will be						
					(Che	eck)			
	5.14.3 Azimuth Encoder Re-referencing Procedure								
	5.14.3.1	Lock down the Measuring Device on a stationary surface as done in Paragraph 5.14.1.2.							
		(Check)							
			SIZE CAGE NO		40.0000	REV			
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9/									
Ľ,	5.14.3.2	Record the Azimuth reference position.							
				AZ R	ef Position	1 <u>252</u>	2,738° (Rec	ord)	
900	5.14.3.3	Power down the AZ	ZALT PDU (	Central Control	Unit (CCl	J).	a		
3-0(							(Che	eck)	
99-343-0006	5.14.3.4	From the PMU, dr	ive the AZ	Axis approxin	nately 20°	POS fr	om the refere	nce	
6,		position.					√ (Che	eck)	
DWG.	5.14.3.5	Power Up the AZ/A	LT CCU				( )	,	
άž	0.14.0.0	1 Over op the Azirt	L1 000.				(Che	eck)	
0P0N7	5.14.3.6	Verify that the MC indicating that enco				JNREFE	RENCED FAL	JLT,	
,,							(Che	eck)	
CAGE NO.	5.14.3.7	From the PMU, I					at the AZ TA	APE	
		UNREFERENCED	FAULT Clea	irs.	S85°		) / (Che	ook)	
	= 4400	^ £1 11 ^ <b>7</b> ^ <b></b>	'a a a da a a a lib	e vetes drive to	285°	ough, roc		•	
	5.14.3.8	After the AZ Axis E reference position u						licai	
		•	J	· ·		•	(Che	eck)	
	5.14.3.9	Verify that the axis	has precise	ly driven back t	to the refe	rence po	sition.		
		•	•	.0	619"=	1.197	-an <u>c-522</u> (Che	eck)	
	5.14.4	Altitude Pointing I	Repeatabili	<u>ty</u>					
	5.14.4.1	Repeat Paragraphs	5.14.1.1 th	rough 5.14.1.1	4 for the A	Altitude A	xis.		
		5.14.1.1	Measuring	Device Type			(Rec	ord)	
			Mfg/Model	No.			(Rec	ord)	
			Device Re	solution			(Rec	ord)	
			Serial No.				(Rec	ord)	
			Cal Due D	ate		***************************************	(Rec	ord)	
		5.14.1.2	5.14.1.2 Lock Down Meas Device					eck)	
		5.14.1.3	ALT Ref P	osition			° (Rec	ord)	
				SIZE CAGE N	O. [	WG NO.		REV	
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HS		5.14.1.4	Drive 1.0° d	off				(Che	ck)
රා		5.14.1.5	(a.) MCU T	akes Co	ontrol			(Che	ck)
99-343-0006		5.14.1.5	(b.) ALT Po	sition			water to feel to the second se	° (Reco	ord)
9-343	5.14.1.6 Disable				ınder tes	st		(Che	ck)
တ	The second secon	5.14.1.7	Commande	ed to AL	T Ref P	os		(Che	ck)
DWG. NO.		5.14.1.8	(a.) Drives	to Ref F	os			(Che	ck)
0P0N7		5.14.1.8	(b.) Holds F	Position				(Che	eck)
0P(	11 (14 (15 (14 (14 (14 (14 (14 (14 (14 (14 (14 (14	5.14.1.9	(a.) Pointin	g Repe	atability			(Reco	ord)
CAGE NO.		5.14.1.9	(b.) Pointin	g Repe	atability	w/i 0.28	arc-sec p	ok (Che	eck)
	5.14.1.10 Drive 20° off							(Che	eck)
	5.14.1.11 (a.) MCU Takes				ontrol			(Che	eck)
		5.14.1.11	(b.) ALT Po	osition		_	parada na sana ana ana ana ana ana ana ana an	° (Reco	ord)
		5.14.1.12	Command	to ALT	Ref Pos	<b>;</b>		(Che	eck)
		5.14.1.13	(a.) Drives	to Ref F	Pos			(Che	eck)
		5.14.1.13	(b.) Holds l	Position				(Che	eck)
		5.14.1.14	(a.) Pointin	g Repe	atability			(Reco	ord)
		5.14.1.14	(b.) Pointin	g Repe	atability	w/i 2.8 a	arc-sec pł	( (Che	eck)
	5.14.5	Altitude Pointing	Accuracy						
	5.14.5.1	Repeat Paragraph	s 5.14.2.1 th	rough 5	.14.2.7	for the A	ltitude Ax	is.	
	5.14.2.1 ALT Ref Position						-111/1	° (Reco	ord)
	5.14.2.2 MCU Cmd ALT Delta				elta Pos			° (Reco	ord)
		5.14.2.3	.2.3 ALT Holding Position					(Che	eck)
				SIZE	CAGE NO	1	DWG NO.	42 000s	REV
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5		5.14.2.4 (a	a.) Meas [	Device ALT delta	pos	(Record)	
<b>10</b>		5.14.2.4 (k	o.) Meas [	Device ALT Ang.	Displ	(Record)	
99-343-0006	5.14.5.2	5.14.2.5 A Calculate the Beam R		ng Accuracy r (BRE) of the X	(Record) inting Errors.		
-66		BRE Poir	iting Error	= (XALT Error ² + A	ALT Error ² ) ^{1/2}	(Record)	
NO.	5.14.5.3	Verify that the BRE P	ointing Eri	or is ≤ 0.14 arc :	sec pk.	(Check)	
0P0N7	5.14.6	Altitude Encoder Re	-Reference	cing Procedure			
w	5.14.6.1	Repeat Paragraphs 5	.14.3.1 thi	ough 5.14.3.9 fo	or the Altitude Axi	S.	
CAGE NO.		5.14.3.1	Lock-	down Measuring	Device	(Check)	
		5.14.3.2	: Alt Re	f Position		° (Record)	
		5.14.3.3	Powe	r-down CCU		(Check)	
		5.14.3.4	Drive	20° POS		(Check)	
		5.14.3.5	Powe	r UP CCU		(Check)	
		5.14.3.6	S AZ an	d ALT TAPE UN	IREFERENCED	FAULT issued. (Check)	
		5.14.3.7	' Re-re	ference ALT End	coder	(Check)	
		5.14.3.8	B Drive	to Ref Position		(Check)	
		5.14.3.9	Axis [	Axis Drives Precisely to Ref Position (Check)			
	5.14.7	Cassegrain Pointing	Repeata	bility			
	5.14.7.1	Repeat Paragraphs 5	5.14.1.1 th	rough 5.14.2.7 fo	or the Cassegrair	n Axis.	
	5.14.1.1 Measuring Device Type Died Indicator (Rec						
Mfg/Model No. Westward/Star						/Stan (Record)	
	Device Resolution 0.00/ 00.8] m (Reco						
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		OR MAINTENANCE REQUIREMENTS SPE			WEIGHT:	SHEET 78 OF 125	

79		
HS.		Serial No(Record)
ശ		Cal Due Date (Record)
-000	5.14.1.2	Lock Down Meas Device(Check)
99-343-0006	5.14.1.3	CASS Ref Position 213,000 ° (Record)
တ	5.14.1.4	Drive 1.0° off(Check)
DWG. NO.	5.14.1.5	(a.) MCU Takes Control (Check)
0P0N7	5.14.1.5	(b.) CASS Position 214.59 ° (Record)
0P(	5.14.1.6	Disable Axes not under test (Check)
CAGE NO.	5.14.1.7	Commanded to CASS Ref Pos (Check)
	E 11 1 0	(a.) Drives to Ref Pos (Check)
	5.14.1.8	
	5.14.1.8	
	5.14.1.9	(a.) Pointing Repeatability QVC-Sec (Record)
	5.14.1.10	Drive 60° off (Check)
	5.14.1.11	(a.) MCU Takes Control (Check)
	5 1 4 1 1 1	(b.) CASS Position 260.82 ° (Record)
	5.14.1.11 5.14.1.12	(b.) CASS Position 260.82° (Record)  Command to CASS Ref Pos (Check)
	5.14.1.12	
	5.14.1.13	
	3.14.1.14	Pointing Repeatability $3/4 \text{ of } 14\text{ th}$ (Record) $= 4-7 \text{ avc} - \text{sec}$
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80				
Ξ	5.14.8	Cassegrain Pointing	g Accurac <u>y</u>	
96	5.14.8.1	Repeat Paragraphs 8	5.14.2.1 through 5.14.2.5 for the CA	SS axis.
99-343-0006		5.14.2.1	CASS Ref Position	<u>Zl3.⊙</u> ° (Record)
99-3		5.14.2.2	MCU Cmd Cass Delta Pos	<u>⊘. ⊙ 36</u> ° (Record)
		5.14.2.3	CASS Holding POS	(Check)
DWG. NO.		5.14.2.4	(a.) Meas Device CASS delta Pos	20.9 44 (Record)
0P0N7		5.14.2.4	(b.) Meas Device CASS Ang. Disp	1 = 0.036 S(Record)
0		5.14.2.5	CASS Pointing Accuracy	0.000575 (Record)
CAGE NO.	5.14.9	CASS Encoder Re-	Referencing Procedure	= 2.37 ave-see
	5.14.9.1	Repeat Paragraphs	5.14.3.1 through 5.14.3.9 for the CA	SS Axis.
		5.14.3.1	Lock-down Measuring Device	(Check)
		5.14.3.2	CASS Ref Position	213.000 (Record)
		5.14.3.3	Power-down CCU	(Check)
		5.14.3.4	Drive 20° off	(Check)
		5.14.3.5	Power UP CCU	(Check)
		5.14.3.6	CASS TAPE UNREFERENCED F	AULT issued.  (Check)
		5.14.3.7	Re-reference CASS Encoder 25	30.55 (Check)
		5.14.3.8	Drive to Ref Position	(Check)
		5.14.3.9	Axis Drives Precisely to Ref Position	on(Check)
				on (Check)
	7		AA ODON7	NG NO. REV 99-343-0006 -
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CAGE NO.

## 5.15 TRACKING ACCURACY

The following test will verify the tracking accuracy (or jitter) while the MCS is in the MCU Velocity Test Mode of Operation. The AZ, ALT and CASS Position Loop error signals from the Signal Meter will be used to measure the position loop tracking error or jitter. Since the Velocity Test does not allow for independent velocities between the axes, individual Velocity tests will be run. Position Loop errors will be captured with true-RMS Data Acquisition Instrument and with a strip chart recorder (for Reference only). The data will be analyzed to determine the tracking error or jitter. The Cassegrain position errors will be mapped (converted) from the Cassegrain error to the On-Sky absolute pointing errors as described on the Pointing and Tracking Analysis Report. The Azimuth errors will be converted to be On-Sky (cross-altitude) errors by multiplying the Azimuth errors by the cosine of the Altitude angle. The strip chart recorder captured peak position errors will be converted to rms assuming a 3-Sigma Gaussian distribution. The Beam Radial Error (BRE) will be computed from the three (3) axis errors by performing an RSS calculation. It will be verified that the open loop tracking will be accurate to within 0.1 arc-sec rms over 15 seconds of tracking and to within 0.2 arc-sec rms over 5 minutes of tracking.

The Cassegrain Rotator axis position loop error data captured will be reduced. It will be verified that the CASS tracking is accurate to within 31 arc-sec rms.

## 5.15.1 Tracking Accuracy Test #1

This test measured the Tracking Accuracy (over 15 seconds) when AZ, CASS are traveling at maximum tracking velocity (0.133°/sec) while ALT is holding position.

Connect true RMS data acquisition instrument Channel 1 input to A4TP1 of the 5.15.1.1 AZ/ALT PDU. Connect Channel 2 of the input to A4TP2 of the AZ/ALT PDU. Connect Channel 3 of the input to A4TP1 of the CASS PDU.

. /	(Check)
	(Check)

At the MCU, select the Signal Meters Screen, select the AZ Position Error output 5.15.1.2 for Signal Meter #1, ALT Position Error output for Signal Meter #2 and CASS Position Error output for Signal Meter #4. Set the range of the signal meters selected to ±0.001°.

(Check)

Set the recorder to convenient settings and record. 5.15.1.3

Channel 1 Gain 👲 3 V (Record)

Channel 2 Gain _ + I V (Record)

(Record) Channel 3 Gain

(Record) Chart Speed

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82							
HS	5.15.1.4	Select the Velocity Test Scr parameter to the following va			t Functions Men	u Screen. Set	t the
99-343-0006		Length o AZ Axis ALT Axi	ox Velocity of Test Enable/Dir s Enable/Dir oxis Enable/[		0.067 30 sec POS OFF OFF		eck)
DWG. NO.	5.15.1.5	Execute the preview at the following values are calculate		he Ve	locity Test Scree	en. Verify that	the
CAGE OPON7		AZ Velocity 0.134 Travel 4.02		<u>CAS</u> 0.241 0.00	<u>S</u> deg/sec deg	) / (Ch	eck)
0 2	5.15.1.6	Record the Altitude starting a	angle.		20	32° (Red	
	5.15.1.7	Execute the test mode and strip chart recorder and on the			and Altitude po	sition errors or iment.	
	5.15.1.8	Record the AZ and the ALT Instrument.	Position E	rrors f	rom the true-RM		,
		PLOTAG7			or <u>0.00006</u>		
	5.15.1.9	Convert the position errors position error to XALT position	on error by n	nultiply		angle).	
	ė	Al	_T Position E	Error _	<u>6.0216</u> ar	c-sec rms (Rec	cord)
	5.15.1.10	XALT Position Error arc-sec rms (Respect the Velocity Test Screen from the Test Functions Menu Screen. Superameter to the following values and store.  % of Max Velocity					
	\$		OFF 1-	105115	Louis		•
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84						
НS	5.15.2.2	At the MCU, select the Signal Meters Screen, select the AZ Position Error Output for Signal Meter #1, ALT Position Error output for Signal Meter #2 and CASS Position Error output for Signal Meter #4. Set the range of the signal meters				
99-343-0006		selected to ±0.001°.				
343-(	5.15.2.3	Set the recorder to convenient settings and record.				
-66	0.10.2.0	Channel 1 Gain (Record)				
ON THE RESERVE OF THE PERSON O		Channel 2 Gain (Record)				
DWG. NO.		Channel 3 Gain (Record)				
0P0N7						
0P0	m 4 m 6 4	Chart Speed (Record)				
3	5.15.2.4	Select the Velocity Test Screen from the Test Functions Menu Screen. Set the parameter to the following values and store.				
CAGE NO.		% of Max Velocity 0.034				
		Length of Test 30 sec AZ Axis Enable/Dir POS				
		ALT Axis Enable/Dir OFF				
		CASS Axis Enable/Dir OFF (Check)				
	5.15.2.5	Execute the preview at the bottom of the Velocity Test Screen. Verify that the				
		following values are calculated.				
	A7 ALT CASS					
		AZ ALT CASS				
		AZ         ALT         CASS           Velocity         0.068         0.068         0.122         deg/sec				
		Velocity         0.068         0.068         0.122         deg/sec           Travel         2.04         0.00         0.00         deg				
	5.15.2.6	Velocity         0.068         0.068         0.122         deg/sec           Travel         2.04         0.00         0.00         deg   (Check)				
	5.15.2.6	Velocity 0.068 0.068 0.122 deg/sec   Travel 2.04 0.00 0.00 deg    (Check)  Record the Altitude starting angle.  (Check)				
	5.15.2.6 5.15.2.7	Velocity         0.068         0.068         0.122         deg/sec           Travel         2.04         0.00         0.00         deg   (Check)				
		Velocity 0.068 0.068 0.122 deg/sec  Travel 2.04 0.00 0.00 deg  (Check)  Record the Altitude starting angle.  Execute the test mode and record the Azimuth position errors on the true-RMS				
		Velocity       0.068       0.068       0.122       deg/sec         Travel       2.04       0.00       0.00       deg         (Check)         Record the Altitude starting angle.       26.48       ° (Record)         Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.         Learning       (Check)         Record the AZ position error from the true-RMS Data Acquistion Instrument.				
	5.15.2.7 5.15.2.8	Velocity 0.068 0.068 0.122 deg/sec  Travel 2.04 0.00 0.00 deg  (Check)  Record the Altitude starting angle.  Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.  (Check)  Record the AZ position error from the true-RMS Data Acquisition Instrument.  AZ Position Error 0.0058 Deg rms (Record)				
	5.15.2.7	Velocity       0.068       0.068       0.122       deg/sec         Travel       2.04       0.00       0.00       deg         (Check)         Record the Altitude starting angle.       26.48       ° (Record)         Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.         (Check)         Record the AZ position error from the true-RMS Data Acquistion Instrument.				
	5.15.2.7 5.15.2.8	Velocity 0.068 0.068 0.122 deg/sec  Travel 2.04 0.00 0.00 deg  (Check)  Record the Altitude starting angle.  Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.  (Check)  Record the AZ position error from the true-RMS Data Acquistion Instrument.  AZ Position Error 0.0058 Deg rms (Record)  Convert the position error to arc-secs by multiplying by 3600. Convert the AZ				
	5.15.2.7 5.15.2.8	Velocity 0.068 0.068 0.122 deg/sec  Travel 2.04 0.00 0.00 deg  (Check)  Record the Altitude starting angle.  Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.  (Check)  Record the AZ position error from the true-RMS Data Acquistion Instrument.  AZ Position Error 0.0058 Deg rms (Record)  Convert the position error to arc-secs by multiplying by 3600. Convert the AZ position error to XALT position error by multiplying by Cos (ALT angle).  AZ Position Error 0.0088 arc-sec rms (Record)				
	5.15.2.7 5.15.2.8	Velocity 0.068 0.068 0.122 deg/sec  Travel 2.04 0.00 0.00 deg  (Check)  Record the Altitude starting angle.  Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.  (Check)  Record the AZ position error from the true-RMS Data Acquistion Instrument.  AZ Position Error 0.0058 Deg rms (Record)  Convert the position error to arc-secs by multiplying by 3600. Convert the AZ position error to XALT position error by multiplying by Cos (ALT angle).				
	5.15.2.7 5.15.2.8	Velocity 0.068 0.068 0.122 deg/sec  Travel 2.04 0.00 0.00 deg  (Check)  Record the Altitude starting angle.  Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.  (Check)  Record the AZ position error from the true-RMS Data Acquistion Instrument.  AZ Position Error 0.0058 Deg rms (Record)  Convert the position error to arc-secs by multiplying by 3600. Convert the AZ position error to XALT position error by multiplying by Cos (ALT angle).  AZ Position Error 0.0088 arc-sec rms (Record)				
	5.15.2.8 5.15.2.9 This documincorporati	Velocity 0.068 0.068 0.122 deg/sec  Travel 2.04 0.00 0.00 deg  (Check)  Record the Altitude starting angle.  Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.  (Check)  Record the AZ position error from the true-RMS Data Acquistion Instrument.  AZ Position Error 0.00058 Deg rms (Record)  Convert the position error to arc-secs by multiplying by 3600. Convert the AZ position error to XALT position error by multiplying by Cos (ALT angle).  AZ Position Error 0.008 arc-sec rms (Record)  XALT Position Error 0.008 arc-sec rms (Record)  XALT Position Error 0.008 arc-sec rms (Record)				
	5.15.2.8  5.15.2.9  This document incorporation procurement calculations of the control of the c	Velocity 0.068 0.068 0.122 deg/sec  Travel 2.04 0.00 0.00 deg  (Check)  Record the Altitude starting angle.  Execute the test mode and record the Azimuth position errors on the true-RMS Data Acquisition Instrument.  (Check)  Record the AZ position error from the true-RMS Data Acquistion Instrument.  AZ Position Error 0.0058 Deg rms (Record)  Convert the position error to arc-secs by multiplying by 3600. Convert the AZ position error to XALT position error by multiplying by Cos (ALT angle).  AZ Position Error 0.088 arc-sec rms (Record)  XALT Position Error 0.088 arc-sec rms (Record)  XALT Position Error 0.088 arc-sec rms (Record)				

82									
	5.15.2.10		Select the Velocity Test Screen from the Test Functions Menu Screen parameter to the following values and store.						
99-343-0006				% of Ma Length AZ Axis ALT Axi	ax Velocity	0.0 30 OF ir PC	sec F S	((	Check)
NO.	5.15.2.11			view at the are calculat		the Velocit	ty Test Sc	creen. Verify th	at the
0P0N7		_						1	
0			\/_l!b	<u>AZ</u>	ALT	CASS	d = = /= = =		
ı			Velocity	0.002	0.002	0.004	deg/sec	,	
NO.			Travel	0.00	0.06	0.00	deg	\ \(\(\chi_{\chi}\)	Check)
	5.15.2.12	Execute tl Acquisitio			ecord the A	Altitude pos	ition errors	s on the true-rms	s Data
	5.15.2.13		•				-	istion Instrumen	t.
	5.15.2.14	•	•		arc-secs by			<u>6</u> Deg rms (Ro	ecora)
				Al	LT Position	Error	0746	arc-sec rms (R	ecord)
	5.15.2.15			•	reen from t alues and s		inctions M	lenu Screen. S	et the
		% of Max Velocity 0.019 Length of Test 30 sec AZ Axis Enable/Dir OFF ALT Axis Enable/Dir OFF CASS Axis Enable/Dir POS							Check)
	5.15.2.16		•	view at the are calculat		the Velocit	y Test So	creen. Verify th	at the
		Г		AZ	ALT	CASS			
		· ·	Velocity	0.038	0.038	0.068	deg/sec	,	
			Travel	0.00	0.00	2.04	deg		
								(C	Check)
					SIZE	CAGE NO.	DWG NO	<del>)</del> .	REV
		ENT IS FOR REFEI			on I	0P0N7	99	-343-0006	
		IT FROM SOURCES				NO.			

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98											
ΗS	5.15.2.17	Execute the test mode and rec Data Acquisition Instrument.	ord the Casseg	rain position	errors	s on the true-l	RMS				
90						(Ch	neck)				
99-343-0006	5.15.2.18	Record the CASS position error	or from the true-	RMS Data Ad	tiaiupc	tion Instrume	nt.				
-34		PLOT AZI CA	SS Position Err	or <u>0.00</u> 0	292	Deg rms (Red	cord)				
рмс. NO. <b>99</b>	5.15.2.19	5.15.2.19 Convert the CASS position error to arc-secs by multiplying by 3600. CASS position error to the On-sky pointing error by dividing the pos 54.5, giving the peak focal plane error to the time-RMS rotary er convert time-RMS rotary error to RMS focal plane error by multiplying									
0P0N7		time rms (Red	cord)								
0		On-Sky CASS Posi	tion Error	. <u>006</u> arc	-sec t	time rms (Red	cord)				
CAGE NO.	On-Sky E	Entire Focal Plane Position Erro	0.0025	arc-sec time	e & sp	ace rms (Red	cord)				
	5.15.2.20	Verify that the CASS Position E	Error above is le	ess than 31 ar	rc-sec	rms.					
						(Cl	heck				
	5.15.2.21	Calculate the Beam Radial Erro	or (BRE).								
	BRE = ((XAL ⁻	T Error) ² + (ALT Error) ² + (On-Sky	Focal Plane CAS	S Error) ² ) ^{1/2}	205		c rms cord)				
	5.15.2.22	Verify that the BRE error is less	s than 0.1 arc-s	ec rms.		(Ch	neck)				
	5.15.3	Tracking Accuracy Test #3		, 6 mi	in.t.		io only				
		This test measures the Trackir holding position while ALT is tr		er 15 second	ds) wh	nen AZ,CASS					
	5.15.3.1	Connect true-RMS Data Acqu AZ/ALT PDU, Connect Chann PDU, and Connect Channel 3	el 2 of the reco	order input to	A4TF	P2 of the AZA he CASS PDI	/ALT				
	5.15.3.2	At the MCU, select the Signal for Signal Meter #1, ALT Postion Error output for Sign selected to ±0.001°.	sition Error out	out for Signa	l Met	sition Error ou er #2 and C	utput ASS				
						(Ch	eck)				
			SIZE CAGE NO			12 0000	REV				
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	EQUIPMENT.		SCALE NONE	WEIGHT:		SHEET 86 OF	125				

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HS	5.15.3.3	Set the recorder to convenient settings and record.										
စ		Channel 1 Gain (Record)										
000-		Channel 2 Gain (Record)										
99-343-0006		Channel 3 Gain (Record)										
66	PER CONTRACTOR DE CONTRACTOR D	Chart Speed (Record)										
DWG. NO.	5.15.3.4	Select the Velocity Test Screen from the Test Functions Menu Screen. Set the parameter to the following values and store.  % of Max Velocity 0.0024 Length of Test 30 sec AZ Axis Enable/Dir POS ALT Axis Enable/Dir OFF CASS Axis Enable/Dir OFF  (Check)										
cage OPON7 No.												
	5.15.3.5	Execute the preview at the bottom of the Velocity Test Screen. Verify that the following values are calculated.										
		AZ ALT CASS										
		Velocity 0.0048 0.0048 0.0086 deg/sec										
		Travel 0.00 0.144 0.00 deg (Check)										
	5.15.3.6	Record the Altitude starting angle.  8-4-° (Record)										
	5.15.3.7	Execute the test mode and record the Azimuth, Altitude and CASS position errors on the true-rms Data Acquisition Instrument.										
		(Check)										
	5.15.3.8	Record the AZ and ALT position errors from the true-rms Data Acquisition Instrument.										
		AZ Position Error 6.0000 Deg rms (Record)										
	5.15.3.9	ALT Position Error <u>O OOOIS</u> Deg rms (Record)  Convert the position errors to arc-secs by multiplying by 3600. Convert the AZ										
	5.15.5.9	position error to XALT positioin error by multiplying by Cos (ALT angle).										
		AZ Position Error O.O. I Y Y arc-sec rms (Record)										
		ALT Position Error <u>0.0648</u> arc-sec rms (Record)										
		XALT Position Error O.OOO 4 arc-sec rms (Record)										
		SIZE CAGE NO. DWG NO. REV										
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	EQUIPMENT.											

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	5.15.3.10	Record the CASS position error	from th	e true-r	ms Data	a Acquisiti	on Instrument.				
and the second s		·					Deg rms (Reco				
99-343-0006	5.15.3.11	Convert the CASS position error to the On- 54.5, giving the peak focal p convert time-rms rotary error to	Sky poi lane en	nting er	ror by c	lividing the -rms rota	e position erro ry error. Fina	r by ally,			
TO STOLL BROADER WITH THE PARTY OF THE PARTY		CASS Posit	ion Erro	r		_ arc-sec	time rms (Rec	ord)			
NO.		On-Sky CASS Posit	ion Erro	r		_ arc-sec	time rms (Rec	ord)			
0P0N7	On-Sky E	Entire Focal Plane Position Error	April Control	-A	arc-sed	c time & sp	pace rms (Rec	ord)			
11	5.15.3.12	Verify that the CASS Position E	rror abo	ve is le	ss than	31 arcsec					
NO.	E 4E 2 42	Calculate the Boom Badial Erro	r (DDE)				(Che	eck)			
	5.15.3.13	5.3.13 Calculate the Beam Radial Error (BRE).  BRE = ((XALT Error) ² + (ALT Error) ² + (On-Sky Focal Plane CASS Error) ² ) ^{1/2}									
		BRE = ((XALI Error) + (ALI Erro	r)- + (On	-5ку го			rc-sec rms (Rec	ord)			
				0.4			rc-sec mis (Rec	iora)			
	5.15.3.14	Verify that the axis BRE error is	iless th	an 0.1 a	irc-sec i	ms.	(Che	eck)			
	5.15.4	Tracking Accuracy Test #4									
		This test measures the Tracking traveling at half their maximum at half its maximum tracking ve	tracking	ı velocit	y (0.067	ninutes) wh	hen AZ,CASS ile ALT is trave	are eling			
	5.15.4.1	Connect the true-RMS Data A the AZ/ALT PDU, connect Claz/ALT PDU, and connect ChaPDU.	hannel	2 of th	e recor	der input	to A4TP2 of 4TP1 of the CA	the ASS			
				0	14	41 AZ D-	(Che	,			
	5.15.4.2	At the MCU, select the Signal for Signal Meter #1, ALT Pos Position Error output for Signal selected to ±0.001°.	ition Er	ror outp	out for S	Signal Me	ter #2 and CA	ASS			
							(Ch	eck)			
			SIZE	CAGE NO		DWG NO.	42 000c	REV			
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	EQUIPMENT.		SCALE NO	ONE	WEIGHT:		SHEET 88 OF	125			

DWG. NO.

89										
HS	5.15.4.3	Set the	recorder	to convenier	nt settings			-fr	en> - /	
									<u> 30</u> (	
-0006						Chan	nel 2	: Gain	10 (	Record)
99-343-0006						Chan	nel 3	Gain	4 V (	Record)
တ						Cł	nart S	Speed		Record)
DWG. NO.	5.15.4.4			ity Test Scr following va			t Fur	nctions Mer	nu Screen.	Set the
0P0N7				Length of AZ Axis ALT Axis	Enable/Dir s Enable/D	ir	0.03 360 POS OFF	sec S		
CAGE NO.				CASS A	xis Enable	/Dir	OFF	-		(Check)
0 2	5.15.4.5	Evecute	the nre	view at the	hottom of	the Ve	locity	Test Scre	en Verify	,
	0.10.4.0			are calculate		1110 10	ioony	1001 0010	· · · · · · · · · · · · · · · · · · ·	
				<u>AZ</u>	<u>ALT</u>	CAS	<u>s</u>			
			Velocity	0.068	0.068	0.122		deg/sec		
			Travel	24.48	0.00	0.00		deg		(Check)
	5.15.4.6	Record	the Altitu	de starting a	angle.			_8_	6.48 (	,
	5.15.4.7			mode and Instrument.	record the	e Azimı	uth p	osition erro	,	true-rms (Check)
	F 4 F 4 O	Darand	41a a A 7 .a	:4:	- fuana tha	turio mos	a Dat	to Apprilaitie		,
	5.15.4.8		•	osition errors				· ·	_ Deg rms (	
	5.15.4.9	-		ition errors						
		position	error to	XALT position	•			•		
									c time rms (	
				XALT Po	sition Erro	r <u>0.0</u>	15	arc-se	c time rms (	(Record)
					SIZE	CAGE NO		DWG NO.		REV
	INCORPORATI	ED INTO A DESI	GN OR USED FO	Y AND MAY NOT B OR MANUFACTURE O	R VDO DWC	1090	١/	99-3	343-000	b -
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	OPERATION O EQUIPMENT	OR MAINTENANC	E REQUIREMEN	TS SPECIFIC TO THI	SCALE NO		WEIG		SHEET 89 OF 125	

90								
Ξ	5.15.4.10	Select the Velocity Test Screen		st Functions Menu	Screen. Set the			
99-343-0006		% of Max V Length of T AZ Axis En ALT Axis E	/elocity est able/Dir	0.001 360 sec OFF NEG OFF	(Check)			
DWG. NO.	5.15.4.11	Execute the preview at the bo following values are calculated.	ttom of the Ve	elocity Test Scree	n. Verify that the			
0P0N7			ALT CAS 002 0.004 72 0.00	deg/sec	(Check)			
CAGE NO.	5.15.4.12	Execute the test mode and reconcept Acquisition Instrument.	ord the Altitude	position errors on				
	5.15.4.13	Record the ALT position error for ATY A			(Check) Instrument. Deg rms (Record)			
	5.15.4.14	Convert the position error to are	-		-sec rms (Record)			
	5.15.4.15	Select the Velocity Test Scree parameter to the following value	n from the Tes					
		% of Max \ Length of I AZ Axis Er ALT Axis E CASS Axis	Гest nable/Dir	0.019 360 sec OFF OFF POS	(Check)			
	5.15.4.16	Execute the preview at the botollowing values are calculated.		elocity Test Scree				
			ALT CAS 038 0.068 00 24.62	deg/sec	(Check)			
	5.15.4.17	Execute the test mode and rec Data Acquisition Instrument.	cord the Casse	grain position erro	ors on the true-rms  (Check)			
	THIS DOCUM	IENT IS FOR REFERENCE ONLY AND MAY NOT BE	SIZE CAGE NO OPO		43-0006 REV			
	PROCUREMEI C4 SYSTEMS BE DISCLOS	ED INTO A DESIGN OR USED FOR MANUFACTURE OR VIT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRS! THE CONTENTS OF THIS DOCUMENT MAY SED ONLY TO CUSTOMERS HAVING INTERFACE, DEPARTMENTS ASSECTION OF THIS PROPERTY.	VPO DWG. NO. VIS-	PRO-VER-01	-VER-01001-9008			
	OPERATION ( EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 90 OF 125			

91											
	5.15.4.18	Record the CASS position error from the true-rms Data Acquisition Instrument.									
		PLOT A75 CASS Position Error 0.0009 Deg rms (Record)	)								
99-343-0006	5.15.4.19	Convert the CASS position error to arc-secs by multiplying by 3600. Convert the CASS position error to the On-Sky pointing error by dividing the position error by 54.5, giving the peak focal plane error to the time-rms rotary error. Finally, convert time-rms rotary error to RMS focal plane error by multiplying by (1/6) ^{1/2} .	; ,								
		CASS Position Error arc-sec time rms (Record)									
NO.		On-Sky CASS Position Error <u>\$ -\obegan 57</u> arc-sec time rms (Record)									
0P0N7	On-Sk	y Entire Focal Plane Position Error <u>ಎಎಎಎ</u> arc-sec time & space rms (Record)	)								
90	5.15.4.20	Verify that the CASS Position Error above is less than 31 arc-sec rms.  (Check)									
NO.	5.15.4.21	Calculate the Beam Radial Error (BRE).	,								
		BRE = ((XALT Error) ² + (ALT Error) ² + (On-Sky focal plane CASS Error) ² ) ^{1/2}									
		<u>⊘.o26</u> arc-sec rms (Record)	)								
•	5.15.4.22	Verify that the BRE error is less than 0.1 arc-secs rms.  (Check)	)								
	5.15.5	Tracking Accuracy Test #5									
		This test measures the Tracking Accuracy when the AZ, ALT and CASS axes are position commanded to follow a triangular wave of $\pm 0.02^{\circ}$ having a 0.02 Hz frequency. This test demonstrates the tracking performance at very low tracking rates and through direction reversals for each axis.	Z								
	i d	Set up the tests as follows:									
		a. Connect a function generator set at 4V peak-to-peak (±2V), 0.02 Hz triangular wave to AZ/ALT PDU and CASS PDU A4TP4 and to Channel 1 of the chart recorder.	i								
		<ul> <li>b. Connect the AZ Position Error, A4TP1 at the AZ/ALT PDU to Channel 2 of the chart recorder.</li> </ul>	f								
		c. Connect the ALT Position Error, A4TP2 at the AZ/ALT PDU to Channel 3 of the chart recorder.	f								
		d. Connect the CASS Position Error, A4TP1 at the CASS PDU to Channel 4 of the chart recorder.	ļ								
		e. At the MCU, select the Signal Meters screen. Select AZ Position Error for Meter No. 1, ALT Position Error for Meter No. 2 and CASS Position Error for Meter No. 4. Set the range of the signal meters selected to ±0.001°.									
	THIS DOO	SIZE CAGE NO. DWG NO. RECUMENT IS FOR REFERENCE ONLY AND MAY NOT BE ADDRESS OF A DESIGN OF USED FOR MANUFACTURE OF THE COLUMN OF USED FOR MANUFACTURE OF THE COLUMN OF THE	:V -								
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SHEET 91 OF 125

NUMBER OF STREET, STATE OF STATE OF STREET, STATE OF STATE OF STREET, STATE OF STREET, STATE OF STREET, STATE OF STAT	92							
SH	ALE AND ADDRESS OF THE PARTY OF		f.		e scale factor	rom there, select to 0.01°/V (this		
and the second of the latest special and the second special and the	99-343-0006		g. h.	movement) and select E Verify that all error corre Set the chart recorder cl excursions of the positio	ctions are OFF. nannels to conv	renient settings fo	r the peak-to-p	eak
water special strategy	99-3				Char	nnel 1 Gain	<u> </u>	ord)
ŝ.	**************************************					nnel 2 Gain		
DMG	NO.				Char	nnel 3 Gain 🔽	<u>2.5 √</u> (Rec	ord)
Compare of the compared of the	0P0N7				Char	nnel 4 Gain	Sv_(Rec	ord)
Contraction of the second section of						hart Speed	(Rec	ord)
200	NO.	5.15.5.1	Reco	ord the Altitude starting and	gle.	4	(Rec	ord)
		5.15.5.2		ole the axes and record the true-rms Data Acquisition				
							(Ch	eck)
		5.15.5.3		ord the AZ and ALT po ument.	sition errors fr	om the true-rms	Data Acquis	ition
			PLOT	- A76, A77	AZ Position Err	or <u>0.00018</u>	Deg rms (Rec	ord)
				A		or <u>0.000008</u>		
		5.15.5.4		vert the position errors to tion error to XALT position				; AZ
				AZ Posit	tion Error 💍 🤆	೨ <u>6                                    </u>	time rms (Rec	ord)
		e de la constanta de la consta		ALT Posi	tion Error <u>O.</u>	つて <u>88</u> arc-sec	time rms (Rec	ord)
				XALT Posi	tion Error <u>O. C</u>	0458_arc-sec	time rms (Red	ord)
		5.15.5.5	Reco	ord the CASS Position Erro	or from the true-	RMS Data Acquis	sition Instrume	nt.
			plo7	676,877 CA	SS Position Err	or <u>(0,000</u> 5)	Deg rms (Red	ord)
		5.15.5.6	CAS 54.5	vert the CASS Position Erros S Position Error to the On , giving the peak focal p vert time-RMS rotary error	I-Sky pointing e lane error to tl to RMS focal pl	rror by dividing the he time-RMS rota ane error by multi	ne position erro ary error. Fin plying by (1/6)	or by nally, ^{1/2} .
				CASS Posi	tion Error <u></u>	<u> 1296</u> arc-sec	time rms (Red	ord)
					0 7F   0:0F:::	DIMONO		REV
		THIS DO	OCUMENT IS FO	OR REFERENCE ONLY AND MAY NOT BE	SIZE CAGE NO OPOL		43-0006	
		PROCUF C4 SYST BE DIS	REMENT FROM S EMS VERTEXRS CLOSED ONLY	DESIGN OR USED FOR MANUFACTURE OR SOURCES OTHER THA GENERAL DYNAMICS I THE CONTENTS OF THIS DOCUMENT MAY TO CUSTOMERS HAVING INTERFACE,	VPO DWG. NO.	PRO-VER-01	001-9008	
		OPERAT EQUIPM	ION OR MAINTE	NANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 92 OF	125

93											
HS		On-Sky CASS Positi	on Error <u>O</u> .c	oc24_arc-sec	time rms (Record)						
	On-Sky	Entire Focal Plane Position Error	0,00097	arc-sec time & sp	pace rms (Record)						
99-343-0006	5.15.5.7	Verify that the CASS Position E	Verify that the CASS Position Error above is less than 31 arc-sec rms. (Check)								
99-3	5.15.5.8	Calculate the Beam Radial Erro	r (BRE).		(00013)						
		BRE = ((XALT Error) ² + (ALT Er	rror) ² + (On-Sky	/ Focal Plane CAS	SS Error) ² ) ^{1/2}						
DWG. NO.		©.05 4 arc-sec rms (Record)									
0P0N7	5.15.5.9	5.15.5.9 Verify that the BRE error is less than 0.1 arc-sec rms.  (Check)									
A CONTRACTOR OF THE CONTRACTOR	5.16	TRACKING TEST #6 - STAR T	RACK MODE								
CAGE NO.		The Star Track Mode of Operati	ion generates p	ointing angles ba	sed upon:						
	<ol> <li>Stored parameters describing targets</li> <li>Real Time</li> <li>Location of station</li> </ol>										
		The MCU has the capability to 10 common radio-source stars trajectories can be defined by parameter values.	is loaded in the	MCU as default.	Different pointing						
	5.16.1	Connect the true-RMS Data A A4TP1 of the AZ/ALT PDU, couthe AZ/ALT PDU, and connect PDU.	nnect Channel	2 of the recorder	input to A4TP2 of						
					(Check)						
	5.16.2	At the MCU, select the Signal I for Signal Meter #1, the ALT I CASS Position Error output for meters selected to ±0.001°CA	Position Error or or Signal Mete	output for Signal r #4.  Set the ra	Meter #2 and the ange of the signal						
	5.16.3	Set the recorder to convenient	settings and red	cord.	(Oncok)						
	±			nnel 1 Gain	Record)						
			Char	nnel 2 Gain 🚣 🤇	$\bigcirc$ $>$ $\bigcirc$ (Record)						
			Char	nnel 3 Gain 👤 🥻	(Record)						
			С	hart Speed	(Record)						
			SIZE CAGE NO	DWG NO.	REV						
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	EQUIPMENT.		SCALE NONE	WEIGHT:	SHEET 93 OF 125						

AND THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS	94						
HS		5.16.4	Select Star Track Set #1, enter and Declination values that wor half sidereal rate for the Azimuth	uld result in a t	rajectory traveling	e Right Ascer at approxim	nsion ately
	900			Right	Ascension 185.	6379 (Re	cord)
	99-343-0006			[	Declination <u></u> <u> 2. 3</u>	275_(Re	cord)
No.	39-3				Epoch 519	<u>್                                    </u>	cord)
	<b>,</b>	5.16.5	Set the appropriate site location	values needed			
DWG.	Ō.				Latitude3		
_	***************************************			٠	Longitude		
	0P0N7				Altitude		·
	0	5.16.6	Select the Self-Test Function appropriate time and date for co	and set and ronducting this to	ecord the Real T est.	ime Clock to	o the
CAGE	NO.		oppropriate and a	J		<u>19:20</u> (Re	cord)
<u> </u>					Date	3 <b>/</b> 6 <u>S_</u> (Re	cord)
		5.16.7	Execute the Preview Function MCU time.	and verify tha	t the star is visib	le for the cu	ırrent
			WICO time.			(Cl	neck)
		5.16.8	From the previewed information	on, calculate t	he approximate /	AZ and ALT	axis
			velocities for the selected trajec				
				AZ Target Ve	elocity <u>の. の</u> の	<u>⊆</u> °/sec (Re	cord)
					elocity <u>0.00</u> 3		
		5.16.9	On the Slave Screen, turn on Position for CASS to the starting	Slaving for Ca	ssegrain. Enter a ition for the Star T	ı Slave Refe rack Test.	rence
							heck)
		5.16.10	Execute the Star Track Test a errors on the strip chart recorder. Run the test for approximately the end of the test. Calculate the	er and on the tr 10 minutes.  R	ue-rms Data Acquecord the position	at the start a	ment.
		ACT.	AZ 71.585	ALT 75.15	CASS		
		Start Po	(200)	4-6-9-2	165.12		cord)
		End Po		7.004°	166.99	`	cord)
		_		.854	<u>/.84</u> 555	•	cord)
		1	st Time <u>555</u> /elocity	<u>555</u> .0033	6.0037		cord)
		V	GIOURY O. O O O O				· <del>-</del> · /
				SIZE CAGE NO	DWG NO.	SOUTH AND THE STATE OF THE STAT	REV
		THIS DOCUM	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR	A4 OPO	N7 99-3	43-0006	
		PROCUREMEN C4 SYSTEMS ' BE DISCLOS	IT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI THE CONTENTS OF THIS DOCUMENT MAY FD ONLY TO CUSTOMERS HAVING INTERFACE.	VPO DWG. NO. VIS-I	PRO-VER-01	001-9008	
		OPERATION O EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	SHEET 94 C	F 125	

92							
5	5.16.10.1	Record the AZ and the ALT Polynoment.	osition Errors fi	rom the tr	ue-RMS	Data Acquisi	ition
90			AZ Position Erro	or <u>0.00</u>	2002	Deg rms (Rec	ord)
3-00		Al	_T Position Erro	or <u>0.00</u> c	0014	Deg rms (Rec	ord)
99-343-0006	5.16.10.2	Convert the position errors to position error to XALT position e	error by multiply	ing by Co	s (ALT a	ingle).	
	PLO-	7 B78 AZI	Position Error _	0.07	L arc-	sec rms (Rec	ord)
NO.	·	AUT @ 26° ALTI	Position Error _	02050	<u>⊃</u>	sec rms (Rec	ord)
0P0N7		XALT	Position Error <i>C</i>	0.064	₹_ arc-	sec rms (Rec	ord)
0 0	5.16.10.3	Record the CASS Position Erro	r from the true-	RMS Data	a Acquisi	tion Instrumer	nt.
CAGE NO.		CAS	SS Position Erro	or <u>0.0</u>	<u> </u>	Deg rms (Rec	ord)
Q ON	5.16.10.4	Convert the CASS Position Error to the On- 54.5, giving the peak focal pl convert time-RMS rotary error to	-Sky pointing ei ane error to th	rror by div ne time-Rl	iding the MS rotai	position errory error. Fin	r by ally,
			ion Error <u>2</u> -				
		On-Sky CASS Posit	ion Error	) Y L	arc-sec t	ime rms (Rec	ord)
	On-Sky l	Entire Focal Plane Position Error	0.0167	arc-sec t	ime & sp	ace rms (Rec	ord)
	5.16.11	Calculate the Beam Radial Erro	or (BRE).				
		BRE = ((XALT Error) ² + (ALT E	rror) ² +(On-Sky	Focal Pla	ne CAS	S Error) ² ) ^{1/2}	
			, , ,			c-sec rms(Rec	ord)
	5.16.12	Verify that the axis BRE error is	less than 0.1 a	arc-sec rm	S.	(Ch	eck)
	6.0	Ka MEASUREMENT				(CII	eck)
		The following tests will measure velocity feed forward. The Kastate error present when follow be performed at or above the r CASS 0.133°/sec, 0.00275°/sec	a of the system ving a constant naximum tracki	n determir ly acceler ng velociti	nes the a ating tar ies and a	amount of ste get. The test accelerations	eady t will
			SIZE CAGE NO	). D\	WG NO.		REV
	INCORPORATE	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR	A4 OPO	<b>N7</b>	99-34	13-0006	_
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	EQUIPMENT.	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	Ţ	SHEET 95 OF	125

96							
HS HS	6.1	Ka MEASUI	REMEN	IT SET-UP			
ыс. 80-343-0006		b. At the	ect Cha	annel 2 to A ²	TP2 and record Char Char Caxis velocity (F	the settings.  Innel 1 Gain  Innel 2 Gain  hart Speed	PDU A4TP1 and Record) Record) Record) Record) Record)
CAGE OPON7		CHANNEL  1 2	<u>SI</u> AZ R	GNAL ate CMD	MINIMUM -15%	<u>MAXIMUM</u> <u>+ℓ≤%</u> (R	ecord)
	6.1.1	(0.003°/sec ²	² ), 90%	Velocity F	eed Forward (\		x Accel to 0.003 Velocity of 0.067 chart recorder(Check)
	6.1.2	Record the	steady		ef a ta	0.80	೨೦५೭_ (Record)
	6.1.3	Calculate th	e Ka u	sing the follo	wing formula a	nd record.	
	6.4.4	Ka = Accele			on 60	Ka =	<i>ᠯ_                                    </i>
	6.1.4	Verify that th	ne Ka i	s greater tha	in ou.	Ka >	60 (Check)
	6.1.5	Repeat the	Ka test	set without	Velocity Feed fo	orward and record	I the results below.
			1.	Set Up		-	S 6 (Record)
			2.	0% VFF		POS Error	(Record)
	PLE	T A80	3.	Steady Sta	ate Error	0-00	>298 (Record)
			4.	Ka		10	(Record)
			5.	Ka > 6			(Check)
	INCORPORA PROCUREM C4 SYSTEM BE DISCLO	JMENT IS FOR REFEREN ATED INTO A DESIGN OR ENT FROM SOURCES OT S VERTEXRSI. THE CONT IS OR MAINTENANCE REQ	USED FOR HER THA GI ENTS OF TH OMERS HA	MANUFACTURE OR ENERAL DYNAMICS IS DOCUMENT MAY VING INTERFACE,	SIZE CAGE NO OPOI VPO DWG. NO. VIS-F		43-0006 - 001-9008
					SCALE NUNE	WEIGHT.	SILE   90 OF 129

97												
НЅ	6.1.6		Rep	eat the	Ka Tes	ts for the Alt	itude ax	ris.				
40			Wit	h 90% V	elocity	Feed Forw	ard					
99-343-0006					1.	Set Up					5 %_ (Red	
-343									POS E	rror <u></u>	<u>. ಎಂ  </u> (Red	cord)
DWG. NO.					2.	Ka Test at % Max Aco % Max Ve	cel .006	(0.003			(Ch	ieck)
And the definition of the second		PLC	57	184	3.	Steady Sta	ate Erroi	•		0.0	<u> </u>	cord)
0P0N7					4.	Ka				1	2 <i>5</i> (Red	cord)
CAGE NO.					5.	Ka > 60					(Ch	eck)
0 2			<u>Wit</u>	h 0% Ve	locity	Feed Forwa	<u>ırd</u>					
					1.	Set Up					15% (Red	
									POS E	rror <u>f</u> c	(Red	cord)
					2.	Ka Test at % Max Ac % Max Ve	cel .006	(0.003			(Ch	neck)
		bro.		485	3.	Steady Sta	ate Erroi	ſ		0.00	003 <u>~</u> (Red	cord)
					4.	Ka					<u>9.                                    </u>	cord)
					5.	Ka > 6					(Ch	neck)
	6.1.7		Rep	eat the	Ka Tes	ts for the Ca	ıssegrai	n axis.				
			•			Feed Forw						
			AAIC	11 30 /6 V	1.	Set Up	rai u		Rate C	$MD \stackrel{+}{=} l$	<u> </u>	cord)
						·				ā	Red	
					2.	Ka Test at % Max Ac % Max Ve	cel .0.00	2(0.03	6°/s²)			neck)
		PLO		<b>A</b> \$3	3.	Steady Sta	ate Erro	r		0.00	<u>0048</u> (Red	cord)
							SIZE A4	CAGE NO		DWG NO.	43-0006	REV
	THIS DOCUMENT IS FOR REFERENCE ONLY AND MAY NOT BE INCORPORATED INTO A DESIGN OR USED FOR MANUFACTURE OR PROCUREMENT FROM SOURCES OTHER THA GENERAL DYNAMICS C4 SYSTEMS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY							S. NO.				
	BE OI	E DISCLOSEI	D ONL	Y TO CUST	OMERS HAY	VING INTERFACE, SPECIFIC TO THIS	00117				001-9008	. 405
	c c						SCALE N	UNE	WEIGHT:		SHEET 97 OF	125

88										
НS			4.	Ka				_6	2-5 (Rec	ord)
90			5.	Ka > 60					(Che	eck)
9-00-		With 0% Velocity Feed Forward								
99-343-0006			1.	Set Up			Rate Cl	VID	(Rec	ord)
6							POS Er	ror <u>±0.0</u>	) <u> (</u> Rec	ord)
DWG. 7 NO.			2.	Ka Test at % Max Aco % Max Ve	cel .002	(0.036°	•		(Che	eck)
0P0N7	PLOT	P84	3.	Steady Sta	ate Erro	r		0.00	5276 (Rec	ord)
CAGE NO.		·	4.	Ka					[Rec	ord)
CA			5.	Ka > 6					<u></u> Electrical Che	eck)
	6.2	MANUAL P	OSITIC	N MODE						
		adjust the p	osition an be a	incremental adjusted by	lly. The	amoun rement	it of a m parame	novement ters. The	with the mean produced by e operator has	each
	6.2.1	AZ/ALT Axe	<u>es</u>							
	6.2.1.1	Enter the M to the currer							d position is ed	qual
						Comma	nd = Cu	rrent ± 0.0	01° <u>/</u> (Cho	eck)
							AZ Com	nmand <u>27</u>	28.052(Rec	ord)
						P	ALT Con	nmand <u>&amp;</u>	3-304 (Rec	ord)
	6.2.1.2		ne axis						ment Function d that the total	I AZ
	6.2.1.3	Command t	he Azin	nuth Axis Ni	EG 0.20	0° by fir	st chang	ging any ir	(Cne ncrement step	eck) size
		to 0.2000° a					·			
									(Che	eck)
					SIZE	CAGE NO	1	DWG NO.	42 0006	REV
	INCORPORATE PROCUREMEN	NT IS FOR REFEREN D INTO A DESIGN OR T FROM SOURCES OTI	USED FOR N HER THA GE	MANUFACTURE OR NERAL DYNAMICS	VPO DWG	0P0 <b>1</b> 3. no.	N/	99-34	43-0006	
	C4 SYSTEMS V BE DISCLOSE OPERATION O	ERTEXRSI. THE CONTE ED ONLY TO CUSTO R MAINTENANCE REQU	ENTS OF THIS OMERS HAV	S DOCUMENT MAY /ING INTERFACE,		VIS-F		/ER-010	001-9008	
	EQUIPMENT.				SCALE N	ONE	WEIGHT:		SHEET 98 OF	125

overview contract of the contr			Macani wa kata mata mata kata kata kata kata kat	ZIOROGO ZANGO Z				
66								
Ηχ	6.2.1.4	Verify that the Azimuth Axis dri total AZ Offset is -0.1000°.	ves to	-0.100° 1	from the	e initial po	sition and that	the
90		total AZ Office to 1.1000 .					√ (Che	eck)
99-343-0006	6.2.1.5	Execute the Manual Offset St0.1000°.	tore Fu	nction a	ınd ver	ify that th	e stored offse	t is
-66							(Che	eck)
DWG. NO.	6.2.1.6	Command the Azimuth Axis PC the axis drives to + 0.900 from the stored offset remains -0.100	the in	_				
							(Che	eck)
0P0N7	<b>6.2.1.7</b> Execute the Recall Stored Function. Verify that the axis drives to -0.100° from the initial position, the total offset is -0.1000° and the stored offset remains -0.1000°.				٥.			
CAGE NO.		An R					(Che	
	6.2.1.8 Enter 0.000° into the Azimuth Total Offset. Verify that the axis drives to the initial position and that the stored offset remains -0.1000°.							
			_		16 (1		(Che	,
	6.2.1.9	Execute the Manual Offset Store Function. Verify that the stored offset now reads 0.000°.					ads	
							(Che	eck)
	6.2.1.10	Repeat Paragraphs 6.2.1.2 thro	ough 6.2	2.1.9 for	the Alti	tude Axis.	-	
						6.2	1.2(Che	eck)
						6.2.	1.3 (Che	eck)
						6.2.	1.4 (Che	eck)
							1.5(Che	ŕ
						6.2.	1.6(Che	eck)
						6.2.	.1.7(Che	eck)
						6.2.	.1.8 (Che	eck)
						6.2.	.1.9 / (Che	eck)
			SIZE	CAGE NO.		DWG NO.	40.0000	REV
	INCORPORATE	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR	A4 VPO DWO	1090	17	99-34	43-0006	_
	C4 SYSTEMS V BE DISCLOS	IT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY BD ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	VEO DVV		PRO-\	/ER-010	001-9008	
	EQUIPMENT.	ON MENTION TO THIS		ONE	*/EIO!!=		011555 00 05	405

WEIGHT:

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100					
НЅ	6.2.2	CASS Axes			
99-343-0006	6.2.2.1	Enter the Manual Position Mode and to the current position ±0.01°. Record	•		-
43-0			Comm	and = Current $\pm$ 0.	01° (Check)
99-3			CA	ASS Command 📙	<u>8.83</u> (Record)
DWG. NO.	6.2.2.2	Command the CASS Axis POS 0. and verify that the axis drives to the CASS Offset is 0.1000°.		~	
0P0N7					(Check)
0P	6.2.2.3	Command the CASS Axis NEG 0.20° 0.2000° and using the CASS "-" Func	•	changing any incr	ement step size to
CAGE NO.					(Check)
	6.2.2.4	Verify that the CASS Axis drives to -0 CASS Offset is -0.1000°.	.10° fron	n the initial position	
					(Check)
	6.2.2.5	Execute the Manual Offset Store F -0.1000°.	unction	and verify that th	ne stored offset is
					(Check)
	6.2.2.6	Command the CASS Axis POS 1.00° the axis drives to +0.90° from the initi stored offset remains -0.1000°.	_		-
					(Check)
	6.2.2.7	Execute the Recall Stored Function. initial position, the total offset is -0.100	-		
	6.2.2.8	Enter 0.000° into the CASS Total Of	fset Ve	erify that the axis	,
	0.2.2.0	position and that the stored offset rem		•	(Check)
	6.2.2.9	Execute the Manual Offset Store Fun 0.000°.	ction. Ve	erify that the store	
		0.000 .			(Check)
		SIZE A A	CAGE NO		43 0006 REV
	INCORPORATE PROCUREMEN	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR IT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY			43-0006   -
	BE DISCLOSE	ED ONLY TO CUSTOMERS HAVING INTERFACE,  R MAINTENANCE REQUIREMENTS SPECIFIC TO THIS		PRO-VER-01	
	EQUI MENT	SCALE	NONE	WEIGHT:	SHEET 100 OF 125

101							
Ξ	6.3	PRESET POSITION MODE					
99-343-0006		The Preset Position Mode has for forty pointing angles. The frequently used signal sources.	ese pointing a				
99-34		Use of the Preset Position Det coordinates and name each inc			I store the position		
า๋	6.3.1	AZ/ALT Axes					
DWG. NO.	6.3.1.1	Select the Preset Position Fur		_			
0P0N7		(1 - 40). Enter and store position coordinates for the Azimuth and Altitude Axes and input a name for the selected position.					
0					(Check)		
CAGE NO.	6.3.1.2	Select AZ/ALT Axis in the Pre Preset Position(s) and verify coordinate and that the names	that the sys	tem drives to the	ne stored position		
	Pos No. 5 15		545° 75-0 38° 70-0 0.000° 88.		Drives To Preset ±0.001°  (Check) (Check) (Check) (Check)		
	6.3.1.4	Verify that offsets may be adde		node.	(Check)		
	6.3.2	CASS Axes					
	6.3.2.1	Select the Preset Position Fur (1 - 40). Enter and store position.					
		NT IS FOR REFERENCE ONLY AND MAY NOT BE	size cage N		43-0006 -		
	INCORPORATE PROCUREMEN' C4 SYSTEMS V BE DISCLOSE	D INTO A DESIGN OR USED FOR MANUFACTURE OR F FROM SOURCES OTHER THA GENERAL DYNAMICS ERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY D ONLY TO CUSTOMERS HAVING INTERFACE,	VPO DWG. NO.	PRO-VER-01	001-9008		
	OPERATION OF EQUIPMENT.	R MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 101 OF 125		

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нѕ 9000	6.3.2.2	Preset Position	Axis in the Pre on(s) and verify I that the names	that th	ne syst	em driv	es to the	e stored posi	
DWG. 99-343-0006	2	Pos. No.	Pos. Name  CASTEHI  CASTETI  C	CASS Preset	(Re ک (Re	ecord) ecord) ecord)	(Ch		
0P0N7	6.3.2.3	Recall the Mar	nual Offset Scree	en.				(Che	eck)
CAGE NO.	6.3.2.4	Verify that offs	ets may be adde	d to the	base m	ode.		(Che	,
	6.4	STOW MODE	ALT MANUAL E	BRAKE	RELEA	SE			·
		The Stow Modavailable.	de is another for	m of Pr	reset Po	ositionin	g. Four s	stow positions	are
	6.4.1	Stow Mode F	unctional Test						
	6.4.1.1	Select the Sto four stow posit	w Detail Window tions.	and er	nter pos	ition cod	ordinates a	and names for	the
		NAME	AZ	0	ALT	C	ASS		
		No. 1 5/00/	225.38	<u> </u>	7.201			(Record)	
		No. 2 5/302	<u> </u>	≥ಶಿ	9.0			(Record)	
		No. 3 5756 3	1 70.00	ຼັ	20			(Record)	
		No. 4 Staw	1 66,000		0.5		<u></u>	(Record)	
	6.4.1.2		CASS Axis in the ALT and CASS A						
	6.4.1.3	Verify that whe	en the axes reacl	n the sto	red pos	ition the	e brakes a		,
								(Che	eck)
				SIZE A4	CAGE NO		DWG NO.	43-0006	REV
	INCORPO PROCURI C4 SYSTI	CUMENT IS FOR REFERENCE PRATED INTO A DESIGN OR USE EMENT FROM SOURCES OTHER EMS VERTEXRSI. THE CONTENT	D FOR MANUFACTURE OR THA GENERAL DYNAMICS S OF THIS DOCUMENT MAY	VPO DWG	S. NO.			001-9008	
		CLOSED ONLY TO CUSTOME ON OR MAINTENANCE REQUIRE INT.		SCALE N		WEIGHT:	/ LIX-U I	SHEET 102 OF	125
				JOALL IV					

103						
НS	6.4.1.4	Depress the Manual Brake Re not disengaged.	leased Button a	and verify that th	e ALT Brakes	are
10					(Che	eck)
99-343-0006	6.4.1.5	Remove the Azimuth stow pin STOW PIN ENGAGED INTLK broken. Verify that the AZ INTL Pin Extended INTLK Fault presented.	a, is displayed ∴K chain canno	, and that the A	ault message, ' Z INTLK chair	"AZ n is
And the second s					(Che	eck)
DWG. NO.	6.4.1.6	Verify proper AZ STOW PIN EN	IGAGED fault in	ndication to LCU	oer Table 1.	
Z N					(Che	eck)
0P0N7	6.4.1.7	Remove either Altitude stow pir STOW PIN ENGAGED INTLK broken.	n from its cradle ", is displayed,	and verify the fa and that the Al	ult message, "A _T INTLK chair	ALT n is
CAGE NO.					(Che	eck)
CA	6.4.1.8	Verify that the ALT INTLK cha extended INTLK Fault present.	in cannot be re	established with	the ALT Stow	Pin
		·			(Che	eck)
	6.4.1.9	Depress the Manual Brake R	Released Butto	n and verify tha	t the ALT Bra	kes
		disengage.			(Che	
						,
	6.4.1.10	Verify that the message, ALT MCU and reported to the LCU p	MANUAL BRAI per Table 2.	KE RELEASED,	is displayed at	tne
		Wee and reported to the 200 p	7		(Che	eck)
	6.4.1.11	Verify proper ALT STOW PIN E	NGAGED fault	indication to LCU	J per Table 2.	
		• • •			(Che	eck)
	6.4.1.12	Activate the CASS stow pin an ENGAGED INTLK", is displayed	d verify that the	e fault message, ' CASS INTLK cha	'CASS STOW in is broken.	PIN
					(Che	eck)
	6.4.1.13	Verify that the CASS INTLK cl Pin Extended INTLK Fault pres		reestablished wi	th the CASS S	tow
					(Che	∍ck)
	6.4.1.14	Verify proper CASS STOW PIN	I ENGAGED Fa	ault indication to L	CU per Table 3	3.
					(Che	•
	6.4.1.15	Verify that the status message CASS LCU (per Table 8).	, "AZ STOWEI	O", is issued to th	e MCU and to	the
					(Che	eck)
			SIZE CAGE NO	. DWG NO.		REV
	THIS DOCUM	ENT IS FOR REFERENCE ONLY AND MAY NOT BE	A4 0P01	<b>N</b> 7 99-3	43-0006	
	PROCUREMEN C4 SYSTEMS	ED INTO A DESIGN OR USED FOR MANUFACTURE OR NT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY ED ONLY TO CUSTOMERS HAVING INTERFACE,	VPO DWG. NO. VIS-F	PRO-VER-01	001-9008	
	OPERATION O EQUIPMENT	OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	WEIGHT:	SHEET 103 OF	125

104						
HS	6.4.1.16	Execute STOP Mode. Enter FCASS Axes to another position Mode.				
9000		Widde.			(Che	∍ck)
99-343-0006	6.4.1.17	Insert the AZ and ALT Stow messages, "AZ STOWED" and			I verify the sta	atus
6		-			AZ <u> </u>	eck)
DWG. NO.				А	LT (Che	∍ck)
ne transport action to monaching of	6.4.1.18	Verify proper AZ and ALT Stor Table 7, appropriately.	wed message i			
0P0N7				•	AZ (Che	eck)
				А	LT (Che	eck)
CAGE NO.	6.4.1.19	Remove the Stow Pin from the "AZ STOWED" and "ALT STOW		ion and verify the	status messag	jes,
	Mary miles of the control of the con			•	AZ (Che	∍ck)
				A	LT <u>/</u> (Che	eck)
	6.4.1.20	Return the AZ, ALT and CAS messages, "AZ STOW PIN EINTLK", and "CASS STOW PIN	NGAGED INT	LK", "ALT STOW	/ PIN ENGAG	SED
			0400   4   1		(Che	,
	6.4.1.21	Verify that the AZ, ALT and Reset the motor controller CBs		c chain can now		
	6.4.1.22	Verify that the CASS STOWED	message clear	rs.	(Che	eck)
	0.7.1.22	verify that the or too or over	111000ag0 0.0a.		(Che	eck)
	6.4.1.23	Enter Position Designate Mode that the mount drives to this ne	and command w position. Exe	the axes to anoth ecute STOP Mode	er position. Ve	erify
					(Che	eck)
	6.4.2	Stow No. 2, 3, 4				
	6.4.2.1	Select AZ/ALT/CASS axis in the verify that the mount drives to the disables the motors.			ets the brakes	and
					(Che	eck)
			SIZE CAGE NO A4 OPOI		43-0006	REV
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	BE DISCLOS	ED ONLY TO CUSTOMERS HAVING INTERFACE, R MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NONE	PRO-VER-010	SHEET 104 OF	125
	H		I	1	I .	

105							
Η̈́	6.4.2.2	Repeat 6.4.2.1 for Stow No. 3 a	and Stow No. 4.		Licha	ok)	
9000-	6.5	POSITION DESIGNATE MODE			(Che	;CK)	
99-343-0006		The Position Designate Mode provides closed position loop operation on axis pointing angles as they are received.					
	6.5.1	AZ/ALT Axes					
Z NO.	6.5.1.1	Select AZ/ALT Axis. Execute mount is driven to the command		_	and verify that	the	
0P0N7	6.5.1.2	Verify that after reaching the co	mmanded posi	tion, the motors re	(Cheemain enabled.	·	
CAGE NO.					(Che	ck)	
O O	6.5.1.3	Recall the Manual Offset Scree	n.		(Che	eck)	
	6.5.1.4	Verify that offsets may be adde	d to the base m	iode.	(Che	eck)	
	6.5.2	CASS Axes					
	6.5.2.1	Select CASS Axis. Execute mount is driven to the command			nd verify that		
	6.5.2.2	Verify that after reaching the co	mmanded posi	tion, the motors re	· · · · · · · · · · · · · · · · · · ·	ŕ	
	6.5.2.3	Recall the Manual Offset Scree	n.		_		
,					t_/ (Che	eck)	
	6.5.2.4	Verify that offsets may be adde	d to the base m	node.	(Che	eck)	
	6.6	SOFT STOP MODE					
	C.	The STOP Mode disables th deceleration.	e drives and	sets the brakes	after a contro	lled	
	6.6.1	Select AZ/ALT/CASS Axis.  Designate) which will cause the					
					(Che	eck)	
			SIZE CAGE NO		40.0000	REV	
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	EQUIPMENT.		SCALE NONE	WEIGHT:	SHEET 105 OF	125	

processor and the same of the	Contractive and the second	epidekaanse op verste van de deel op de deel op de	TANKS AND CONTROL OF THE PROPERTY OF THE PROPE					CONTROL OF THE PROPERTY.
106	Conference - Confe							
HS	6.6.2	2	While the motors do the decelerate	ecelerate, the b	ng at full velo orakes are se	ocity execute et and the mo	the STOP Mode. Verify tor controller is disabled a	that after
9							AZ (Che	eck)
00	99-343-0006			ON OT	V 2 E			
43				PLOT A85			ALT (Che	eck)
9-3							CASS (Che	eck)
တ			OLOBIAL BAC	TEDO				
undenset's STL VIA	6.7		SIGNAL ME	IERS				
DWG. NO.			The MCU ca	ın display eigh	it signals sim	nultaneously i	n a bar graph format. E	ach
			signal has a	minimum and AZ/ALT POLL	maximum ra	ange selection points locate	n. The first three signals d on the PMU bracket.	are The
0P0N7			4th 5th and	6th signals are	output to the	e CASS PDU	analog test points located	d on
9			the PMU bra	cket. The out	puts are limit	ted to ±5 VDC	C. The Data Acquisition U Analogue test points	Unit and
			makes the ir	nformation avai	ilable over th	าe DAQ's Car	n Open interface.  The se	cale
CAGE NO.					gue test poir	its is $\pm 10V =$	±32,768 bits reported on	the
				incat program.				
	6.7.1	1	At the Signal the data below		Vindow, sele	ect the followin	ng available signals and s	tore
	L	ea Dead						
	NOTE: O		Only AZIAL	T eignale may	he output t	to the AZIAI "	T PDU test points and o	nlv
	NOI	E:	Only AZ/AL CASS signa	T signals may Is may be out	be output to the C	to the AZ/AL ASS test poi	T PDU test points and onts.	only
	NOT		CAŠS signa	Is may be out	put to the C	ASS test poi	nts.	only
		SIGNAL	CAŠS signa	Is may be out	put to the C	ASS test poi	nts. TWINCAT VAR	only
		SIGNAL AZ Rate	CASS signa  NAME  Command	Is may be out STORE AS	MIN100	MAX.	TWINCAT VAR  Box 2, Var 74	only
		SIGNAL  AZ Rate (	CASS signa  NAME  Command  Command	STORE AS  1 2	MIN. -100 -100	MAX. 100 100	TWINCAT VAR  Box 2, Var 74  Box 2, Var 73	only
		SIGNAL  AZ Rate (  ALT Rate  AZ Position	CASS signa  NAME  Command  Command  on FB	STORE AS  1 2 3	MIN100 -100 10.000	MAX.  100  100  50.000	TWINCAT VAR  Box 2, Var 74  Box 2, Var 73  Box 2, Var 72	only
		SIGNAL  AZ Rate ( ALT Rate  AZ Position  CASS Rate	NAME Command Command Command Command Command Command	STORE AS  1 2 3 4	MIN100 -100 10.000 -100	MAX.  100  100  50.000  100	TWINCAT VAR  Box 2, Var 74  Box 2, Var 73  Box 2, Var 72  Box 2, Var 71	only
		SIGNAL  AZ Rate ( ALT Rate  AZ Position  CASS Rate  +15V (CA	CASS signa  NAME  Command  Command  on FB  ate Command  ASS CCU)	STORE AS  1 2 3 4 5	MIN100 -100 10.000 -100 0	MAX.  100  100  50.000  100  20	Box 2, Var 74 Box 2, Var 73 Box 2, Var 72 Box 2, Var 71 Box 2, Var 70	only
		AZ Rate OAZ Position CASS Rate +15V (CASS Po	NAME Command C	STORE AS  1 2 3 4 5 6	MIN100 -100 10.000 -100 0 50	MAX.  100  100  50.000  100  20  90	TWINCAT VAR  Box 2, Var 74  Box 2, Var 73  Box 2, Var 72  Box 2, Var 71	only
		AZ Rate ( ALT Rate AZ Position CASS Rate +15V (CAC CASS Poc -15V (AZ	CASS signa  NAME  Command  Com	1 2 3 4 5 6 7	MIN100 -100 10.000 -100 0 50 -20	MAX.  100  100  50.000  100  20  90  0	Box 2, Var 74 Box 2, Var 73 Box 2, Var 72 Box 2, Var 71 Box 2, Var 70	only
		AZ Rate OAZ Position CASS Rate +15V (CASS Po	CASS signa  NAME  Command  Com	STORE AS  1 2 3 4 5 6	MIN100 -100 10.000 -100 0 50	MAX.  100  100  50.000  100  20  90	Box 2, Var 74 Box 2, Var 73 Box 2, Var 72 Box 2, Var 71 Box 2, Var 70	only
		SIGNAL  AZ Rate ( ALT Rate  AZ Position  CASS Rat  +15V (CAT  CASS PO  -15V (AZ  ALT Position	NAME Command C	STORE AS  1 2 3 4 5 6 7 8 osition Designation the AZ Raw and the volta	MIN.  -100  -100  10.000  -100  0  50  -20  40.000  ate Mode, driete Commandage at AZ/AL direction and	MAX.  100  100  50.000  100  20  90  0  80.000  ve AZ Axis fud Meter displant and a	Box 2, Var 74 Box 2, Var 73 Box 2, Var 72 Box 2, Var 71 Box 2, Var 70	etion e of er is
		SIGNAL  AZ Rate ( ALT Rate  AZ Position  CASS Rat  +15V (CAT  CASS PO  -15V (AZ  ALT Position	NAME Command C	STORE AS  1 2 3 4 5 6 7 8 osition Designate the AZ Rafa and the voltar Reverse the	MIN.  -100  -100  10.000  -100  0  50  -20  40.000  ate Mode, driete Commandage at AZ/AL direction and	MAX.  100  100  50.000  100  20  90  0  80.000  ve AZ Axis fud Meter displated and verify that the	TWINCAT VAR  Box 2, Var 74  Box 2, Var 73  Box 2, Var 72  Box 2, Var 71  Box 2, Var 70  Box 2, Var 69	etion e of er is 5%
		SIGNAL  AZ Rate ( ALT Rate  AZ Position  CASS Rat  +15V (CAT  CASS PO  -15V (AZ  ALT Position	NAME Command C	STORE AS  1 2 3 4 5 6 7 8 osition Designate the AZ Rafa and the voltar Reverse the	MIN.  -100  -100  10.000  -100  0  50  -20  40.000  ate Mode, driete Commandage at AZ/AL direction and	MAX.  100  100  50.000  100  20  90  0  80.000  ve AZ Axis fud Meter displant and a diverify that the AZ Ra	Box 2, Var 74 Box 2, Var 73 Box 2, Var 72 Box 2, Var 71 Box 2, Var 70 Box 2, Var 69	etion e of er is 5% eck)

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EQUIPMENT.

VDO DIAK	) NO		
<b>A4</b>	0P0N7	99-343-0006	_
SIZE	CAGE NO.	DWG NO.	REV

VPO DWG. NO.

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107					
HS	6.7.3	Repeat Section 6.7.2 with ALT, and the voltage reported to DAC			n the AZ/ALT PDU
ဖွ			А	LT Rate Cmd Me	ter (Check)
99-343-0006			Vol	Itage at AZ/ALT T	P2 (Check)
9-343		Repor	ted Voltage at [	DAQ Host Compu	ter (Check)
6	6.7.4	Repeat Paragraph 6.7.2 with C PDU and the voltage reported to	ASS, measurin o DAQ Host Co	ng the voltages at emputer.	TP1 in the CASS
DWG. NO.			CA	SS Rate Cmd Me	eter (Check)
			V	oltage at CASS T	P1 (Check)
0P0N7		Repor	ted Voltage at I	DAQ Host Compu	ter (Check)
CAGE NO.	6.7.5	Verify that +15V meter registe TP2 in the CASS PDU and the ± 0.2V.	rs 75% ± 5% t voltage reporte	toward the right a ed to DAQ Host (	and the voltage at Computer is +2.5V
				+15V Me	eter (Check)
			V	oltage at CASS T	P2 (Check)
		Repor	ted Voltage at l	DAQ Host Compu	iter (Check)
	6.7.6	Using the Position Designate 50.000°, CASS = 80.000°.	Mode drive th	e mount to AZ	= 40.000°, ALT =
					(Check)
	6.7.7	Verify the AZ Position meter reat TP3 in the AZ/ALT PDU and 2.5V ± 0.2V.	gisters 75% ± 5 the reported vo	i% towards the rigolating is the DAC	ht and the voltage Host Computer is
				AZ Position Me	eter (Check)
	( Page )		Vo	ltage at AZ/ALT T	P3 (Check)
		Repo	ted Voltage at	DAQ Host Compu	uter (Check)
	6.7.8	Verify the CASS Position met voltage at TP3 in the CASS Computer is 2.5V ± 0.2V.	er registers 75 PDU and the	% ± 5% towards reported voltage	the right and the at the DAQ Host
			(	CASS Position Me	eter (Check)
			V	oltage at CASS 7	P3 (Check)
		Repo	rted Voltage at	DAQ Host Compu	uter (Check)
			SIZE CAGE NO		42 0006 REV
	INCORPORATI PROCUREMEN	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR NT FROM SOURCES OTHER THA GENERAL DYNAMICS	A4 OPO		43-0006   -
	C4 SYSTEMS BE DISCLOS OPERATION O	VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY IED ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	VIS-F	PRO-VER-01	
	EQUIPMENT.		SCALE NONE	WEIGHT:	SHEET 107 OF 125

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SH.	6.7.9	Verify that the AZ/ALT CCU -15V meter registers 25% $\pm$ 5% towards the left from center.						
99-343-0006	6.7.10	Verify the ALT Position meter registers 25% $\pm$ 5% towards the right. (Check)						
	6.8	TEST TRAJECTORIES-AZ/ALT						
rii		The MCU has the following three test trajectory algorithms.						
DWG.		1. Acceleration						
0P0N7		2. Velocity						
10		3. Flyby						
CAGE NO.	These test trajectories screens are accessed via the Test Functions selection. The Acceleration and Velocity Tests have been performed or sections of this test procedure.							
	6.8.1 <u>Flyby Trajectory Test</u>							
	The Flyby Trajectory Test simulates a target trajectory which causes point at high Altitude angles. This test the mount's capability to cont a target as it passes near keyhole, requiring high Azimuth velocities.							nt to king
		This test is used to demonstrate near zenith passes, so it will be tested at the upper limit.						
	6.8.1.1	For the following test, select the Azimuth rate feedback and the Altitude rate feedback to be output on AZ/ALT PDU Analog Test Points 1 and 2. Setup the strip chart recorder to monitor TP1/TP2. Record the following meter sign parameters and strip chart settings.						
			TP1		TP2			
			(AZ Sum F	Rate)	(ALT Sum Ra	te)		
		Signal Min	-50		-50	(Recor	rd)	
		Signal Max	+50		+50	(Recor	rd)	
		Strip Chart Scale	2V/cm		2V/cm	(Recor	⁻ d)	
		Strip Chart Speed	250 mm/ı	min	250 mm/mir	n_(Recor	rd)	
	THIS DOCUM	THIS DOCUMENT IS FOR REFERENCE ONLY AND MAY NOT BE		SIZE A4	OPON7	DWG NO. 99-34	43-0006	REV -
	INCORPORATI PROCUREMEN C4 SYSTEMS BE DISCLOS	INCORPORATED INTO A DESIGN OR USED FOR MANUFACTURE OR PROCUREMENT FROM SOURCES OTHER THA GENERAL DYNAMICS C4 SYSTEMS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY BE DISCLOSED ONLY TO CUSTOMERS HAVING INTERFACE,			VPO DWG. NO. VIS-PRO-VER-01001-9			
	OPERATION OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS EQUIPMENT.			SCALE NONE WEIGHT.			SHEET 108 OF 125	

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109									Prints - contention of the content on the content of the content o
HS	6.8.1.2	Select the Flyby Test Screen. store.	Set th	e parar	neters	to the follo	owing v	alues a	and
99-343-0006		Max EL (at Range AT I Target Velo Length of T % Feed Fo AZ Axis En ALT Axis E	Max EL ocity est rward Vo able/Dir		86.000 15,000 10 km/ 100 se 1.0 POS ON	km sec		(Che	ck)
OPON7 NO.	6.8.1.3	Execute the Preview Function at the following values are calcuvalues for Azimuth travel and the	ılated fo	or veloc	ity and	accelerat	creen. ion. F	Verify t	hat the
ш					<u>AZ</u>	<u>ALT</u>			
CAGE NO.		Max Velo	ocity		0.548	0.016		_(Chec	,
		Max Acc	eleration	Ì	0.003	0.000	***************************************	_(Chec	:k)
					Travel	51.08	2°		
					in ALT	85.56			o.
	6.8.1.4 Drive the mount to the Altitude angle 10° below the minimum Altitude calculated in the preview menu. Drive Azimuth to an angle which will allow the full travel required for the test and record.  (Check)								
				Sta	rting Az	imuth		_ (Reco	ord)
	6.8.1.5	Place the system in the STC Verify that the mount is driver current Azimuth position. Recoreached.	to the	minimu	ım Altitı	ude angle	while h	nolding	the
			Γ	Orives to	Min A	LT, Holds /	۹Z	(Che	ck)
				Tim	ne of Mi	n ALT		_ (Reco	ord)
	6.8.1.6	Allow the system to run through the test. Verify that the system goes to the maximum Altitude angle and returns to the minimum ALT angle and stops.  Record the maximum Altitude angle and the time at which the minimum Altitude angle is returned to. Record the final Azimuth position.							
				Ma	ax ALT	Angle		_ (Reco	ord)
				Ŋ	∕lin ALT	Time		_ (Reco	ord)
			SIZE A4	CAGE NO		DWG NO. 99-34	13_N	006	REV
	INCORPORAT PROCUREMEN	IENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR NT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY	VPO DWG	. NO.					
	BE DISCLOS	VERTEXES: THE CONTENTS OF THIS DOCUMENT WATER SED ONLY TO CUSTOMERS HAVING INTERFACE, OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS				/ER-010			125
	Eddi MENT		SCALE NO	ONE	WEIGHT:		SHEE	T 109 OF	125

179					
HS	ELL VI ESCUENCIA			Min ALT & St	top (Check)
	ACCOUNTY OF THE PROPERTY OF TH			Final AZ	(Record)
99-343-0006	6.8.1.7	From the strip chart recordings record below.	s, calculate the	peak velocity and	d acceleration and
-343			AZ	Max Velocity	(Record)
66			AZ Max	Acceleration	(Record)
DWG. NO.	6.8.1.8	Calculate the test time by tak minimum Altitude points. Calcu	•		e time at the two
				Test Time	(Record)
0P0N7				AZ Travel	(Record)
	6.8.1.9	Verify that the following parameters specified.	eters meet the	predicted value w	rithin the tolerance
CAGE NO.			AZ Ma	ax Velocity ± 0.1°/	sec (Check)
			AZ Max Accele	eration ± 0.005°/se	ec2 (Check)
				AZ Travel ± 3	3.0° (Check)
				Test Time ± 10	sec(Check)
	6.9	IMAGE JITTER			
		The Image Jitter compensates Azimuth error signal into the ac			
	6.9.1	With the MCU in control, usin 125°, ALT to 45°, and CASS to #2, and #3.			
					(Check)
	6.9.2	Verify that the Image Jitter corr	ection is enable	ed.	(Charle)
	6.9.3	Place the MCU in Manual Posit	tion Mode		(Check)
		doo alo moo in manda i oon			(Check)
	6.9.4	While in Manual Position Mod Motor Controller command, C3		Azimuth Axis by	removing AZ #4
		enable			(Check)
			SIZE CAGE NO		REV
	INCORPORATE	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR INTERPON POLICIES OTHER THA CENERAL DYNAMICS	A4 OPON	N7   99-3	43-0006   -
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	EQUIPMENT.		SCALE NONE	WEIGHT:	SHEET 110 OF 125

7					TO THE STATE OF TH
HS	6.9.5	Command the Azimuth Axis PO	oS 0.100° using	the AZ "+" Incren	nent Function. (Check)
99-343-0006	6.9.6	Verify that the CASS position co	ommand chang	es to 49.93°.	(Check)
99-34;	6.9.7	Command the Azimuth Axis NE	:G -0.200° from	the present posit	
DWG. NO.	6.9.8	Verify that the CASS position co	ommand chang	es to 50.07°.	(Check)
0P0N7	6.9.9	Reenable the Azimuth Axis by wire.	reconnecting th	e motor controller	
CAGE NO.	6.9.10	Verify that the CASS position co	ommand now b	ecomes 50.000°.	(Check)
	6.9.11	Enter STOP Mode. Commar Designate Mode.	nd the ALT Ax	kis UP 10.000° ι	using the Position
	6.9.12	Enter STOP Mode. Place the CASS position command remain		ual Position Mod	e. Verify that the (Check)
	6.9.13	While in Manual Position Mod controller enable command wire	•	Azimuth Axis b	y removing motor
	6.9.14	Command the Azimuth Axis PC	OS 0.200° using	the AZ "+" Increr	(Check) nent Function(Check)
	6.9.15	Verify that the CASS position co	ommand chang	es to 49.89°.	(Check)
	6.9.16	Command the Azimuth Axis NE	EG 0.400° from	the present positi	on. (Check)
	6.9.17	Verify that the CASS position c	ommand chang	es to 50.12°.	(Check)
	6.9.18	Reenable the Azimuth Axis by wire.	reconnecting th	ne motor controlle	
					(Check)
	THIS DOCUM	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR	A4 OPO		43-0006 -
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112					
HS	6.9.19	Verify that the CASS position c	ommand now b	ecomes 50.000°.	
9					(Check)
99-343-0006	6.9.20	Disable the Image Jitter correct	tion.		(Check)
89-3	6.10	CASSEGRAIN SLAVE MODE			
DWG. NO.		In the Slave Mode, the CASS A Altitude Trajectories.	Axis motion is g	enerated based o	n the Azimuth and
	NOTE:	Slave Mode is disabled when	executing ST	OP Mode.	
0P0N7	6.10.1	On the Slave screen, verify tha	t slaving for Ca	ssegrain is OFF.	(Check)
CAGE NO.	6.10.2	Using the Position Designate Notes to 100°.	Mode, command	d AZ to 160°, ALT	to 25° and CASS
	6.10.3	On the Slave Screen, turn on Position for CASS to an Azimut			(Check) a Slave Reference
	6.10.4	Using the Position Designate Nath CASS position remains at		d AZ to 160° and	(Check) ALT to 25°. Verify
	6.10.5	Command AZ to 165° and ALT	to 20°.		(Check)
	6.10.6	Verify that the CASS Axis drive Axes reach their commanded p		95.30° as the Az	(Check) (Check)
	6.10.7	Enter Stop Mode.			(Check)
	6.10.8	In the Preset Detail Window, Enter the Preset Position Mode			
	6.10.9	Verify that the CASS Axis dr Altitude Axes reach their comm			
			SIZE CAGE NO		42 0006 REV
	INCORPORATE PROCUREMEN	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR IT FROM SOURCES OTHER THA GENERAL DYNAMICS	A4 OPOI		43-0006   -
	C4 SYSTEMS \ BE DISCLOSI OPERATION C	/ERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY ED ONLY TO CUSTOMERS HAVING INTERFACE, R MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	VIS-F	PRO-VER-01	001-9008
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113									
Ľ,	6.10.10	Enter Stop Mode.					(Che	eck)	
99-343-0006	6.11	SOFTWARE TRAVEL LIMITS  The MCU Monitors commands exceeds the software limit. The software limit.							
		section of this test procedure.							
NO.	6.11.1	AZ POS Limits - Software							
0P0N7	6.11.1.1	Set the Software Limits to 0.1°	beyond		cified tra DS 136.		as follows:		
NO.				AZ NE	EG 43.9	° (-316.1°)	)		
3 Z				ALT F	POS 91.	1°			
				ALT N	NEG -1.1	1°			
		CASS POS 188.1°							
	CASS NEG 11.0° (-349.0°) (Check)								
	6.11.1.2	Use the Position Designate Mode, command the Azimuth Position to the POS Travel Limit (136.0° POS). Verify that the mount drives to the commanded position and indication is POS. The Software Limit may appear due to position overshoot. Clear the fault message if it appears.							
	6.11.1.3	Command 0.001° past the POS brakes are set and the fault me	S Softwa ssage, '	are Limi 'COMM	t (136.1 AND > I	01° POS) REGION A	and verify that	the	
	6.11.1.4	Enter Maintenance Mode and Verify that the fault message, ' passes through the Software Li	'AZ + S	OFTWA	the mou NRE LIM	unt into th IIT", appea	e Software Li	imit. ition	
	6.11.1.5	With the axis in the limit condithat commands out of the limit			Position	Designate	e Mode and ve	erify	
							(Che	eck)	
	Tille pooling	ENT IS EAD DEEEDENCE ONLY AND MAY NOT BE	SIZE A4	CAGE NO		DWG NO. 99-34	43-0006	REV	
	INCORPORATE PROCUREMEN C4 SYSTEMS N	ENT IS FOR REFERENCE ONLY AND MAY NOT BE DINTO A DESIGN OR USED FOR MANUFACTURE OR T FROM SOURCES OTHER THA GENERAL DYNAMICS FERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY DONLY TO CUSTOMERS HAVING INTERFACE,	VPO DWG	. NO.			001-9008	1	
	OPERATION O EQUIPMENT.	R MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	SCALE NO		WEIGHT:		SHEET 113 OF	125	

114								
	6.11.2	AZ NEG Limits - Software						
99-343-0006	6.11.2.1	Using the Position Designate M Travel Limit (44° NEG) and ve display changes in 0.001° incres	erify the	ommand comm	d the Az and is	zimuth Pos executed	sition to the N and the posi	tion
99-3		0 1 0 0040 mask that Co	. <b>£</b> 4	Linait (	12 2000	NEC) on		· I
0,	6.11.2.2	Command 0.001° past the Sobrakes are set and the fault mes	ssage, "	COMMA	+3.699 \ND>RE	EGION AZ	ː-", appears.	
NO.							(Che	,
0P0N7	6.11.2.3	Enter Maintenance Mode and Verify that the fault message, " passes through the NEG Softwa	AZ - SC	FTWAF	RE LIMI	nt into the IT'', appea	e Software Li irs as the posi	tion
	0.44.0.4	Varify that commands out of the	limit ar	o accen	tad		(Cne	eck)
NO.	6.11.2.4	Verify that commands out of the	i IIIIII ai	е ассер	ieu.		(Che	eck)
	6.11.3	ALT NEG Limits - Software						
	6.11.3.1	Travel Limit (-1.0°). Verify that the mount drives to the commanded position. The Software Limit may appear due to position overshoot. Clear the fault if it appears.						
				NEO	0 (	Linda Z	(Che	,
	6.11.3.2	Execute a command of 0.001° past the NEG Software Limit (-1.101°) and verify that the brakes are set and the fault message, "COMMAND > REGION ALT-", appears.						
							(Che	1
	6.11.3.3	Enter the Maintenance Mode a Verify that the fault message, "a passes through the Software Li	ALT - S	OFTWA	the mo	ount into th IIT", appea	ne Software Li ars as the posi	mit. tion
							(Che	, I
	6.11.3.4	With the mount in the Software and verify that commands out of					n Designate M	
	6.11.4	ALT POS Limits - Software					(Cire	eck)
	6.11.4.1	Using the Position Designate N	Mode. co	mmanc	I the mo	ount to the	POS Travel L	imit
		(91.0°). Verify that the mount Altitude Display increments from	drives	o the c	omman	ded positi	on. Verify that	the
							(Ch	eck)
			SIZE	CAGE NO	- 1	DWG NO.	40.0000	REV
	INCORPORATE	ENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR	A4 VPO DWG	0P01	<b>\</b> 7	99-34	43-0006	_
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115								
0	6.11.4.2	Execute a command of 0.001° that the brakes are set and the	past the POS Softwar e fault message, "COI	e Limit (9° MMAND >	1.101°) and ve REGION AL	erify T+",		
0006		appears.			(Che	∍ck)		
99-343-0006	6.11.4.3	Enter the Maintenance Mode a Verify that the fault message, "A passes through the Software Line	ALT + SOFTWARE LIN	ount into th /IIT", appea	ne Software Li ars as the posi	tion		
NO.	6.11.4.4	With the mount in the limit cond	ition enter the Position	n Designat		•		
Acceptance of the	0.11.4.4	that commands out of the limit a		, 200.g. lat	ā			
0P0N7	0.44.5	OACO NEO Liveita Coftware			(Che	eck)		
	6.11.5	CASS NEG Limits - Software				150		
CAGE NO.	6.11.5.1	Using the Position Designate Travel Limit (11.1° NEG). Vector position. The Software Limit refault if it appears.	erify that the mount	drives to	the comman	ded		
		radit if it appoars.			(Che	eck)		
	6.11.5.2	Execute a command of 0.01° past the NEG Software Limit (10.99° NEG) and verify that the brakes are set and the fault message, "COMMAND > REGION CASS-", appears.  (Check)						
	6.11.5.3	Enter the Maintenance Mode a Verify that the fault message position passes through the So	, "CASS - SOFTWAF	RE LIMIT"	ne Software Li , appears as	imit.		
	6.11.5.4	With the mount in the Software and verify that commands out o	Limit condition, enter to the limit are executed	the Position d.		lode eck)		
	6.11.6	CASS POS Limits - Software						
	6.11.6.1	Using the Position Designate Travel Limit (188° POS). Verify Verify that the CASS Display in	y that the mount drives	to the con	nmanded posi [.]	POS tion. eck)		
	Tine poors	MENT IS FOR REFERENCE ONLY AND MAY NOT BE	SIZE CAGE NO.  A4 0P0N7	DWG NO. 99-34	43-0006	REV		
	INCORPORAT PROCUREMEI C4 SYSTEMS	MENT IS FOR REFERENCE ONLY AND MAY NOT BE FED INTO A DESIGN OR USED FOR MANUFACTURE OR NIT FROM SOURCES OTHER THA GENERAL DYNAMICS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY SED ONLY TO CUSTOMERS HAVING INTERFACE,	VPO DWG. NO.  VIS-PRO-\					
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116					
HS 10	6.11.6.2	Execute a command of 0.01° verify that the brakes are set CASS+", appears.	past the POS and the fault i	Software Limit (1 nessage, "COMN	88.11° POS) and MAND > REGION
9000		CAGO: , appears.			(Check)
99-343-0006	6.11.6.3	Enter the Maintenance Mode a Verify that the fault message, position passes through the Sof	, "CASS + SO	FTWARE LIMIT"	', appears as the
មាំ .			ere the	D. W Designed	(Check)
DWG. NO.	6.11.6.4	With the mount in the limit cond that commands out of the limit a		Position Designat	
0P0N7					(Check)
0F	6.12	AXIS DISABLE			
CAGE NO.		The MCU has three commar individual axis without affecting		allow the opera	tor to disable an
	6.12.1	Enter any active mode and	verify that mo	tors are enabled	d and the brakes
		released.			√ (Check)
	6.12.2	Select the AZ EN/DIS Function disabled and the status messa DISABLED", are displayed.	on at the MCU ages, "DISABL!	. Verify that the E AZ KEY DEPR	e Azimuth Axis is
				4	(Check)
	6.12.3	Verify proper AZ DISABLED ind	ication to LCU p	er Table 6.	
		C. C. C. C. A.Z. ENVIDIO E		of the the evic i	(Check)
	6.12.4	Select the AZ EN/DIS Function messages clear.	i again and vei	Try that the axis i	(Check)
	6.12.5	Select the ALT EN/DIS Function	on at the MCU	and verify that t	he Altitude Axis is
	02.5	disabled and the status messa DISABLED", are displayed.	ges, "DISABLE	ALT KEY DEPR	ESSED" and "ALT
		ALT DIOADI ED in	The Camera Coll	Tabla 7	(Check)
	6.12.6	Verify proper ALT DISABLED in	dication to LCO	per rable r.	(Check)
	6.12.7	Select the ALT EN/DIS Function messages clear.	n again and ve	erify that the axis	is enabled and the
					(Check)
			SIZE CAGE NO		AO OOOC
	INCORPORATE	MENT IS FOR REFERENCE ONLY AND MAY NOT BE ED INTO A DESIGN OR USED FOR MANUFACTURE OR NIT EPOM SOURCES OTHER THA GENERAL DYNAMICS	A4 OPON VPO DWG. NO.	N7 99-3	43-0006   -
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E .	6.12.8	Select the CASS EN/DIS Functions disabled and the fault message						
9000		status message, "CASS DISAE					(Check	A CONTRACTOR
99-343-0006	6.12.9	Verify proper CASS DISABLED	indication	to LC	U per Ta	able 8.	(Check	Contraction Traction
6	6.12.10	Select the CASS EN/DIS Fund the messages clear.	ction agair	n and	verify t	hat the ax		
NO.		•	·			1 10	(Check	
0P0N7	6.12.11	Verify that each time the Axis I not affected and the current mo				cecuted th		de la constantina de
CAGE NO.	6.13	PARAMETER STORAGE					(Check	)
υž	6.13.1	Store the data base parameters	s to a flopp	y disl	k and at	tach to thi	is document. (Check	•
							(Oneck	/
								Indicate the second
		ENT IS FOR REFERENCE ONLY AND MAY NOT BE	1	GE NO.	I	DWG NO. 99-34	42 0006	EV -
	INCORPORATE PROCUREMEN C4 SYSTEMS V BE DISCLOSE	ED INTO A DESIGN OR USED FOR MANUFACTURE OR T FROM SOURCES OTHER THA GENERAL DYNAMICS PERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY ED ONLY TO CUSTOMERS HAVING INTERFACE, R MAINTENANCE REQUIREMENTS SPECIFIC TO THIS	VPO DWG. N		PRO-V	/ER-010	001-9008	
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118							
7							
SH							
99-343-0006							
DWG. NO.	APF	PENDIX	(C				
0P0N7	LCU MONIT	ORING	SIGN	IALS			
CAGE NO.							
	THIS DOCUMENT IS FOR REFERENCE ONLY AND MAY NOT BE	SIZE A4	OPOI		DWG NO. 99-34	43-0006	REV
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**APPENDIX C CONTENTS** AZ LCU MONITORING SIGNAL TESTING ......120 6.14 99-343-0006 6.15 ALT LCU MONITOR SIGNAL TESTING......121 6.16 CASS LCU MONITOR SIGNAL TESTING...... 122 DWG. No. CAGE NO. SIZE CAGE NO. DWG NO. REV 99-343-0006 0P0N7 **A4** THIS DOCUMENT IS FOR REFERENCE ONLY AND MAY NOT BE INCORPORATED INTO A DESIGN OR USED FOR MANUFACTURE OR PROCUREMENT FROM SOURCES OTHER THA GENERAL DYNAMICS C4 SYSTEMS VERTEXRSI. THE CONTENTS OF THIS DOCUMENT MAY BE DISCLOSED ONLY TO CUSTOMERS HAVING INTERFACE, OPERATION OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS EQUIPMENT. VPO DWG. NO. VIS-PRO-VER-01001-9008

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WEIGHT:

**SCALE NONE** 

6.14.1

CAGE NO.

## 6.14 AZ LCU MONITORING SIGNAL TESTING

Table 6 depicts the faults/status that are reported to the AZ LCU via the CCU Relay Board. It will be verified that the appropriate contact action occurs per Table 6 when the fault/status is simulated per other sections of this test procedure. Place a check ( $\checkmark$ ) in the verification column upon proper operation.

// (Check)

Table 6, Azimuth LCU Monitor Signals

SIGNAL#	FAULT/STATUS	OPEN ACROSS A6B-H AND:	VERIFICATION (✓)	
1	AZ CURRENT CLAMPED	A6B-s	۵	
2	AZ SINGLE MOTOR	A6B-b	V	
3	AZ MOTOR CONTROLLER 1 FAULT	А6В-р		
4	AZ MOTOR CONTROLLER 2 FAULT	A6B-n		
5	AZ MOTOR CONTROLLER 3 FAULT	A6B-m		
6	AZ MOTOR CONTROLLER 4 FAULT	A6B-k	i/	
7	AZ MOTOR CONTROLLER 1 3Ø OFF	A6B-f		
8	AZ MOTOR CONTROLLER 2 3Ø OFF	A6B-e		
9	AZ MOTOR CONTROLLER 3 3Ø OFF	A6B-d		
10	AZ MOTOR CONTROLLER 4 3Ø OFF	A6B-c		
11	AZ MOTOR 1 OVERTEMP	A6B-j		
12	AZ MOTOR 2 OVERTEMP	A6B-i		
13	AZ MOTOR 3 OVERTEMP	A6B-h		
14	AZ MOTOR 4 OVERTEMP	A6B-g		
15	AZ LUBE OVERFLOW	A6B-Y	V	
16	AZ DISABLED	A6B-X		
17	AZ BRAKE FAULT	A6B-t		
18	AZ PRELOAD OFF	A6B-r		
19	AZ LUBE PUMP CB OFF	A6B-a		
20	AZ LUBE PUMP PRESSURE LO	A6B-Z		
21	AZ STOWED	A6B-W		
22	*AZ/ALT CONTROL BD FAULT	A6B-V		
23	**AZ/ALT STATUS BD FAULT	A6B-U		
24	AZ/ALT PMU IN CONTROL	A6B-T		
25	AZ/ALT REGEN OVERTEMP FAULT	A6B-S		
26	AZ MOTOR 1 / 2 E-STOP	A6B-R		
27	AZ MOTOR 3 / 4 E-STOP	A6B-P		
28	ALT MOTOR 1 E-STOP	A6B-N		
29	ALT MOTOR 2 E-STOP	A6B-M		
30	ALT PIER E-STOP	A6B-L		

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SIZE CAGE NO. DWG NO. A4 0P0N7 99-343-0006

REV

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SCALE NONE WEIGHT: SHEET 120 OF 125

6.15.1

SIGNAL#	FAULT/STATUS	OPEN ACROSS A6B-H AND:	VERIFICATION (✓)
31	EQUIPMENT ROOM E-STOP	A6B-K	
32	CONE E-STOP	A6B-J	

^{*}RemoveU102 on Control Board and create a PLD fault (i.e. AZ Lube Pump CB off).

## 6.15 <u>ALT LCU MONITOR SIGNAL TESTING</u>

Table 7 depicts the faults/status that are reported to the ALT LCU. It will be verified that the appropriate contact action occurs per Table 7 when the fault/status is simulated per other sections of this test procedure. Place a check  $(\checkmark)$  in the verification column upon proper operation.

Table 7, Altitude LCU Monitor Signals

SIGNAL#	FAULT/STATUS	OPEN ACROSS A7B-H AND:	VERIFICATION (✓)
1	ALT CURRENT CLAMPED	A7B-s	
2	ALT SINGLE MOTOR	A7B-b	
3	ALT MOTOR CONTROLLER 1 FAULT	А7В-р	
4	ALT MOTOR CONTROLLER 2 FAULT	A7B-n	V
5	ALT MOTOR CONTROLLER 1 3Ø OFF	A7B-f	
6	ALT MOTOR CONTROLLER 2 3Ø OFF	A7B-e	
7	ALT MOTOR 1 OVERTEMP	A7B-j	
8	ALT MOTOR 2 OVERTEMP	A7B-i	1
9	ALT DISABLED	A7B-X	-
10	ALT BRAKE FAULT	A7B-t	
11	ALT STOWED	A7B-W	
12	DSP BOOT FAILURE	A7B-D	
13	M1 MIRROR RESTRAINT FAILURE	A7B-A	
14	M2 UNIT NOT INSTALLED	A7B-F	
15	CASS INSTRUMENT NOT INSTALLED	A7B-E	
16	ALT IMBALANCE PIN CRADLE	A7B-C	
17	ALT MANUAL BRAKE RELEASED	A7B-G	
18	*AZ/ALT CONTROL BD FAULT	A7B-V	
19	**AZ/ALT STATUS BD FAULT	A7B-U	V
20	AZ/ALT PMU IN CONTROL	A7B-T	
21	AZ/ALT REGEN OVERTEMP FAULT	A7B-S	
22	AZ MOTOR 1 / 2 E-STOP	A7B-R	
23	AZ MOTOR 3 / 4 E-STOP	A7B-P	
24	ALT MOTOR 1 E-STOP	A7B-N	<i>V</i>
25	A7D M		
26	ALT PIER E-STOP	A7B-L	
27	EQUIPMENT ROOM E-STOP	A7B-K	

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SIZE	CAGE NO.	DWG NO.	REV
	0P0N7	99-343-0006	peat .

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SCALE NONE	WEIGHT:	SHEET 121 OF 1	125
SCALE NONE	WEIGHT:	SHEET IZT OF	120

^{**}Remove U16 on Status Board.

SIGNAL#	FAULT/STATUS	OPEN ACROSS A7B-H AND: VERIFIC	
28	CONE E-STOP	A7B-J	
29	OSS NOT INSTALLED	A7B-B	
30	AZ FLOOR ACCESS INTLK	A7B-Y	
31	MOBILE ACCESS PLATFORM INTLK	A7B-Z	
32	SPARE 4		

## CASS LCU MONITOR SIGNAL TESTING 6.16

Table 8 depicts the fault/status that are reported to the CASS LCU. It will be 6.16.1 verified that the appropriate contact action occurs per Table 8 when the fault/status is simulated per other sections of this test procedure. Place a check (✓) in the verification column upon proper operation.

Table 8. Cassegrain LCU Monitor Signals

SIGNAL#	FAULT/STATUS	OPEN ACROSS A8B-H AND:	VERIFICATION (√)	
1	CASS CURRENT CLAMPED	A8B-s	<u> </u>	
2	CASS SINGLE MOTOR	A8B-b		
3	CASS MOTOR CONTROLLER 1 FAULT	A8B-p		
4	CASS MOTOR CONTROLLER 2 FAULT	A8B-n		
5	CABLEWRAP MOTOR CONTROLLER FAULT	A8B-a		
6	CASS MOTOR CONTROLLER 1 1Ø OFF	A8B-f		
7	CASS MOTOR CONTROLLER 2 1Ø OFF	A8B-e	Var.	
8	CASS CABLEWRAP MOTOR CONTROLLER 1Ø OFF	A8B-c		
9	CASS MOTOR 1 OVERTEMP	A8B-j		
10	CASS MOTOR 2 OVERTEMP	A8B-i		
11	CASS CABLEWRAP MOTOR OVERTEMP	A8B-d		
12	CASS DISABLED	A8B-X		
13	CASS BRAKE FAULT	A8B-t		
14	CASS PRELOAD OFF	A8B-r		
15	CASS STOWED	A8B-W		
16	*CASS CONTROL BD FAULT	A8B-V		
17	**CASS STATUS BD FAULT	A8B-U		
18	CASS PMU IN CONTROL	A8B-T		
19	CASS REGEN OVERTEMP FAULT	A8B-S	V	
20	AZ MOTOR 1 /2 E-STOP	A8B-R		
21	AZ MOTOR 3 / 4 E-STOP	A8B-P	1	
22	ALT MOTOR 1 E-STOP	A8B-N		
23	ALT MOTOR 2 E-STOP	A8B-M		
24	ALT PIER E-STOP	A8B-L	L	
25	EQUIPMENT ROOM E-STOP	A8B-K		
26	CONE E-STOP	A8B-J		

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SIZE	CAGE NO.	DWG NO.	REV
A4	0P0N7	99-343-0006	_

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SHEET 122 OF 125 **SCALE NONE** WEIGHT:

123

99-343-0006

DWG.

0P0N7

CAGE NO.

SIGNAL#	FAULT/STATUS	OPEN ACROSS A8B-H AND:	VERIFICATION (✓)
27	SPARE 1		
28	SPARE 2		
29	SPARE 3		
30	SPARE 4		
31	SPARE 5		**************************************
32	SPARE 6		

* Remove Ulor on Board and creste a PLD

Agult Cie, CASS POS/PEG INTLE Limit)

LA Remove ULG on Status Board.

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SIZE CAGE NO. OPON7

DWG NO.

99-343-0006

REV

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SCALE NONE

WEIGHT:

SHEET 123 OF 125

CAGE 0PON7 NO. 99-343-0006 SH 124

## **NOTES**

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SIZE CAGE NO.

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DWG NO.

REV

A4 0P0N7

99-343-0006

VPO DWG. NO.

VIS-PRO-VER-01001-9008

SCALE NONE

WEIGHT:

SHEET 124 OF 125

125 125	SIGNATUR	E OF WITNESS	<u> </u>	
99-343-0006				
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DWG. NO.				
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	FOR:		DATE:	
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	BE DISCLOSED ONLY TO CUSTOMERS HAVING INTERFACE, OPERATION OR MAINTENANCE REQUIREMENTS SPECIFIC TO THIS EQUIPMENT.	SCALE NONE	WEIGHT:	SHEET 125 OF 125