GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT INITIATION

Date: 10/30/80

Until

Project Title: Science Support for Earth Radiation Budget Satellite (ERBS)/Stratospheric Areosol and Gas Experiment (SAGE)

Project No: G-35-675

Project Director: Dr. D. M. Cunnold

Sponsor: NASA, Langley Research Center; Hampton, VA 23665

From

Agreement Period:

Contract No. NAS1-16357 Type Agreement:

\$182,420 NASA (Partially funded for \$26,528 thru 8/6/81) Amount: 9,601 GIT (G-35-353) (Partially funded for \$1,396 thru 8/6/81) \$192,021 TOTAL

8/7/80

Reports Required: Science Team Progress Reports; Monthly Financial Management Report; Informal Final Report

Sponsor Contact Person (s):

Technical Matters

Technical Matters	Contractual Matters
	(thru OCA)
Mr. L. R. McMaster	Mr. E. Steelman Ketchum
Technical Representative	Contracting Officer
Mail Stop 234	Mail Stop 126
National Aeronautics & Spa	
Langley Research Cneter	Langley Research Center
Hampton, VA 23665	Hampton, VA 23665
804/827-2466 23 *	804/827-3247
Defense Priority Rating: NoneOffice Assigned to:	1 Science (School/ KXEXXXXXX)
COPIES TO:	
Project Director	Library, Technical Reports Section
Division Chief (EES)	EES Information Office
School/Laboratory Director	EES Reports & Procedures
Dean/Director-EES	Project File (OCA)
Accounting Office	Project Code (GTRI)
Procurement Office	Other OCA Research Property Coordinator
Security Coordinator (OCA)	
Reports Coordinator (OCA)	

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fective Completion Date: 5/	/31/87	(Performance) 5/31/87	(Reports)
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None			
X Final In	voice or Final Fiscal Report		1.
X Closing	Documents		
X Final R	port of Inventions - Questionn	aire sent to P.I.	
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OFFICE OF THE COMPTROLLER

January 19, 1981

Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Dear Mr. Ketchum:

Enclosed are the Monthly Contractor Financial Managment Reports (Form 533M) for Contract No. NAS1-16357 for the months of October and November, 1980.

If you have questions or require additional information, please let us know.

Sincerely,

David V. Welch, Manager Grants and Contracts Accounting

DVW/BITS/jb Enclosure cc: Dr. D. M. Cunnold Dr. C. E. Weaver Mr. J. W. Dees Mr. O. H. Rodgers File G-35-675 Tech Rep. M/S 234 NASA Exp. Scientist Cost Acctg. M/S 135 - 2 copies

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NASA-Langle	ey Research Cent	er		Geor	gia Tech	Research	Institute	. COSTS	J. CONTRA	D. PEE		
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Overhead		1	1	1	9			8	9	9	
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Total Cost		3	3	3	26			23	26	26	
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OFFICE OF THE COMPTROLLER

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March 13, 1981

Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

Enclosed is the Monthly Contractor Financial Management Report (Form 533M) for contract No. NAS1-16357 for the month of January, 1981.

If you have questions or require additional information, please let us know.

Sincerely,

David V. Welch, Manager Grants and Contracts Accounting

DVW/EITS/jb Enclosure cc: Dr. D. M. Cunnold Dr. C. E. Weaver Mr. J. W. Dees / Mr. O. H. Rodgers File G-35-675 Tech Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135 - 2 copies

MATIONAL AERONAUTICS AND SPACE ADMINISTRATION MONTHLY CONTRACTOR FINANCIAL MANAGEMENT						pproved	104 0 0011					
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ATLANTA, GEORGIA 30332

OFFICE OF THE COMPTROLLER

April 29, 1981

Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

Enclosed is the Monthly Contractor Financial Management Report (Form 533M) for contract No. NAS1-16357 for the month of March, 1981

If you have questions or require additional information, please let us know.

Sincerely.

David V. Welch, Manager Grants and Contracts Accounting

DVW/BITS/jb Enclosure cc: Dr. D. M. Cunnold Dr. C. E. Weaver/ 3 Mr. J. W. Deesign File G-35-675 Tech Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135 - 2 copies



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	CONTRACTOR FINAL			EPORT		Approved t Bureau No.	. 104-R0011		31/81	TH ENDING AND NUME		
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Overhead				4	9			5	9	9		
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Total Costs		1	1	10	26			16	26	26		
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G-35-675

OFFICE OF THE COMPTROLLER

June 5, 1981

Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

Enclosed is the Monthly Contractor Financial Management Report (Form 533M) for contract No. NAS1-16357 for the month of April & February, 1981.

If you have questions or require additional information, please let us know.

Sincerely,

David V. Welch, Manager Grants and Contracts Accounting

DVW/BITS/jb Enclosure cc: Dr. D. M. Cunnold Dr. C. E. Weaver/ Mr. J. W. Dees Mr. O. H. Rodgers File G-35-675 Tech Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135 - 2 copies

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Fringe Ben	efits				1			1	1	1		
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Direct L	abor Hours	(,1)	(1.)	.6	1.4			.8	1.4	1.4	
Direct L	abor Dollars	(1)	(1)	6	14			8	14	14	
Overhead		-	<u>بر</u>	4	9			5	9	9 1	
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OFFICE OF THE COMPTROLLER

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June 30, 1981

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Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

Enclosed is the Monthly Contractor Financial Management Report (Form 533M) for contract No. NAS1-16357 for the month of May, 1981.

If you have questions or require additional information, please let us know.

Sincerely.

run

David V. Welch, Manager Grants and Contracts Accounting

DVW/BITS/jb Enclosure cc: Dr. D. M. Cunnold Dr. C. E. Weaver Mr. J. W. Dees Mr. O. H. Rodgers TTTE G-35-675 Tech Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135 - 2 copies

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MONTHLY	CONTRACTOR FIN	ANCIAL MAN	AGEMENT	EPUKI	Duage	Dureau No	. 104-R0011	5/31/8	31	21		
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ATLANTA, GEORGIA 30332

G-35-675

OFFICE OF THE COMPTROLLER

July 30, 1981

Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

Enclosed is the Monthly Contractor Financial Management Report (Form 533M) for contract No. NAS1-16357 for the month of June, 1981.

If you have questions or require additional information, please let us know.

Sincerely,

David V. Welch, Manager Grants and Contracts Acctg.

DVW/BITS/el Enclosure

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cc: Dr. D. M. Cunnold Dr. C. E. Weaver Mr. J. W. Dees File G-35-675 Tech Rep. M/S 234 NASA Exp. Scientist Cost Accounting M/S 135 - 2 copies

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		DURING	MONTH	CUM. T	ODATE		DETAIL		COSTS	HOURS	10. U
S. REPORT	FING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	ORDER OUT STAND
			b	¢	d.	•.	b	с.	•		
Direct L	abor Hours	1	.1	.8	1.9			1.1	1.9	1.9	
Direct 1	abor Dollars	1	1	8	19	•	-	11	19	19	
Overhead		-	_	6	14			8	14	14	
Fringe B		-	-	1	2			1	2	2	1
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ATLANTA, GEORGIA 30332

GRANTS AND CONTRACTS ACCOUNTING DEPARTMENT 404/894-4624

September 10, 1981

Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

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THE

MPTROLLER

Enclosed is the Monthly Contractor Financial Management Report (From 533M) for contract No. NAS]-16357 for the month of July, 1981.

If you have questions or require additional information, please let us know.

Sincerely,

David V. Welch, Manager Grants and Contracts Accounting

DVW/BITS/jb Enclosure cc: Dr. D. M. Cunnold Dr. C. E. Weaver Mr. J. W. Dees File G-35-675 Tech Rep. M/S 234 NASA Extp. Scientist Cost Accounting M/S 135 - 2 copies

	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MONTHLY CONTRACTOR FINANCIAL MANAGEMENT I					Approved t Bureau No	; . 104-R0011	2. REPORT FOR MONTH ENDING AND NUMBER OPERATING DAYS 7/31/81 23			
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Direct Labo	or Dollars	1	1	9	19			10	19	19	
Overhead		1	1	7	14		-	7	14	14	
Fringe Bene	efits		-	1	2			1	2	2	
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OFFICE OF THE COMPTROLLER

October 5, 1981

GRANTS AND CONTRACTS ACCOUNTING DEPARTMENT 404/894-4624

Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

Enclosed is the Monthly Contractor Financial Management Report (Form 533M) for contract No. NAS1-16357 for the month of August, 1981.

If you have questions or require additional information, please let us know.

Sincerely,

David V. Welch, Manager Grants and Contracts Accounting

DVW/BITS/e1 Enclosure CC: Dr. D. M. Cunnold School Director Mr. J. W. Dees File G-35-675 Tech Rep. M/S 234 NASA Exp. Scientist Cost Accounting M/S 135 - 2 copies

MONTHLY	TIONAL AERONAUTICS	AND SPACE ADM	INISTRATION AGEMENT R	EPORT		Approved 1 Bureau No.	. 104-R0011	2. REPORT FO OPERATIN 8/31/8		2		
Attn: Mr. Financial M Hampton, VA		tchum		Atlanta,	Tech Rese Georgia	30332		*. costs \$ 182 -		ACT VALUE)-	
1. DESCRIPTION OF	Cost Reimbursa	able		NAS 1-16		TEST DEPINI	TIZED AMEND.	4. FUND LIMI \$ 182	\$ 182 \$ -0-			
CONTRACT	C. SCOPE OF WORK ERBS/SAGE			1 cm	NTR. REP (SI		9/30 81	s 19		5. TOTAL PY	TS REC'D	
6. REPORT		7. CC		CUM. TO DATE			ED COSTS/HRS. T	BALANCE	COSTS	HOURS	10. UN- FILLED ORD	
	6. REPORTING CATEGORY ACTUAL		PLANNED	ACTUAL	PLANNED	a	b.	OF CONTRACT C.	CON- TRACTOR ESTIMATE 8.	CONTRACT VALUE b.	ORD OU STANDING	
Direct Labo	or Hours	.1	.1	1.0	1.9			.9				
Direct Labo	or Dollars	1	1	10	19			ġ	19	19		
Overhead		1	1	8	14			6	14	14		
Fringe Bene	efits	-	-	1	2			1	2	2		
Other Direc	<u>:t Costs</u>	-	-		3			3	3	3		
Total Costs	<u>\$</u>	2	2	19	38			19	38	38		
					· · · · ·							
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ATLANTA, GEORGIA 30332

OFFICE OF THE COMPTROLLER

November 16, 1981

GRANTS AND CONTRACTS ACCOUNTING DEPARTMENT 404/894-4624

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Mr. E. Steelman Ketchum, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

ş

Enclosed is the Monthly Contractor Financial Management Report (Form 533M) for contract No. NAS1-16357 for the month of September, 1981.

If you have questions or require additional information, please let us know.

Sincerely,

David V. Welch, Manager Grants and Contracts Accounting

DVW/BITS:el Enclosure

cc: Dr. D. M. Cunnold Dr.C. E. Weaver Mr. J. W. Dees ✓ File G-35-675 Tech Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135- 2 copies

0-0-0/0	TIONAL AERONAUTICS	AND SPACE ADM	INISTRATION		Form	pproved		2. REPORT FOR MONTH ENDING AND NUMBER OPERATING DAYS				
	CONTRACTOR FI			EPORT	Budget	Bureau No.	104-R0011	9/30/8	1	22		
TO: NASA-Lang]	ey Research Cen	iter		FROM					S. CONTRA	CT VALUE		
Attn: Mr.	E. Steelman Ket	chum		Georgia	Tech Rese	arch Inst	itute	. COSTS		b. FEE		
Financial Hampton, V	Management Divi A. 23665	sion M/S 12	5	Atlanta,	Georgia	30332		\$ 182	•	\$ -0-		
1. DESCRIPTION	a, TYPE			MENT NO.		TEST DEFINI	TIZED AMEND.	4. FUND LIMITATION \$ 182 \$ -0-				
OF	Cost Reimbu	irsable		the second part of the second s	1-16357				. BILLING			
CONTRACT	C. SCOPE OF WORK ERBS/SAGE			d. AUTH. CO	NTR. REP (SI	(naturo)	10-10-81		MTS BILLED	S 19	TS REC'D	
	· · · · · · · · · · · · · · · · · · ·	7. 00	STS INCURRE	D/HOURS WOR	RED	8. ESTIMATE	COSTS/HRS.		9. ESTIMA	A		
		DURING	MONTH	CUM. T	ODATE		TAIL			HOURS	10. UN- FILLED	
6. REPOR	TING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	ORDER OUT- STANDING	
			6,	e	d.	•.	<u>b.</u>	C,		<u>b,</u>		
Direct Lab	or Hours	1	.1	1.1	1.9			.8	1.9	1.9		
Direct Lab	or Dollars	1	1	11	19			8	19	19		
Overhead		-	-	8	14			6	14	14		
Fringe Ben	efits	-	-	1	2			1	2	2		
Other Dire	ct Costs	-	-	-	3			3	3	3		
Total Cost	S	1	1	20	38			18	38	38		
											•	
	<u> </u>											

ATLANTA, GEORGIA 30332

OFFICE OF THE COMPTROLLER

July 1, 1982

Mr. E. Steelman Ketchum Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

Dear Mr. Ketchum:

Enclosed are the Monthly Contractor Financial Management Reports (Form 533M) for contract No. NAS1-16357 for the months of March, April and May, 1982.

If you have questions or require additional information, please let us know.

Sincerely,

David V. Welch, Manager Grants and Contracts Accounting

DVW/BITS/dld Enclosure

cc: Dr. D. M. Cunnold Dr. C. S. Kiang Mr. D. S. Hasty File G-35-675 Tech Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135 - 2 copies

MONTHL	Y CONTRACTOR FIN	IANCIAL MANA	GEMENT R	EPORT	Budget	Bureau No.	104-R0011	5/31/82			21
Attn: Mr.	ley Research Cent . E. Steelman Ket Management Divis	cnum			gia Tech I nta, Georg		Institute ?	s 182	3. CON TH	5 - 0 -	
L. DESCRIPTION	A. TYPE			MENT NO.		EST OFFINIS	TIZED AMEND-	4. FUND LIMI \$ 132	TATION	s = 0 -	
OF	Cost Reimbur	sable		a second second second second second	AS1-16357		DATE	8. BILLING 4. INVOICE AMTS BILLED 6. TOTAL PY			TARECID
CONTRACT	ERBS/SAGE			d. AUTH. CO	чтн. нер. (51 <u>8</u>	nature)	IDATE	s 50		\$ 45	
·····		7. CC	STS INCURRE	D/HOURS WOR	KED	8. ESTIMATE	DCOSTS/HRS. 1	FOCOMPLETE		. ESTIMATED FINAL	
		DURING	MONTH	CUM. T	ODATE	DE	TAIL		COSTS	HOURS	10. UN- FILLED
6. REPOI	RTING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANN ED		b.	BALANCE OF Contract	CON- THACTOR ESTIMATE	CONTRACT VALUE	ORDERS OUT- STANDING
Direct La	Direct Labor Hours		.3	2.8	4.4			1.6	4.4	4.4	
1 1 						,	-				
Direct La	bor Dollars	3	3	19 🗰	44			16	44	44	
Overhead		2	2	19	32			13	32	32	
Fringe Be	nefits	-	-	2	3			1	3	3	
Other Dir	ect Costs		-	1	6			5	6	6	
Total Cos	ts	5	5	50	85			35	85	85	
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e								1		·	

	CONTRACTOR TIM		<i>y</i>	FROM			_		S. CONTRA	CT VALUE		
Attn: Mr. Financial M Hampton, VA	ey Research Cent E. Steelman Ket Management Divis 23665	chum	i	Atla	nta, Geor	gia 30332		\$ 182		b. FEE \$ - 0 -	-	
I. DESCRIPTION	A. TYPE			MENT NO.			TIZED AMEND.	4. PUND LIMI \$ 182	TATION	s - 0		
OF	Cost Reimbur	sable		and the second se	AS1-16357					LING		
CONTRACT	C. SCOPE OF WORK ERBS/SAGE		-	d. AUTH. CO	NTR. REP (SI	(neture)	6 28 82	s 50	MTS BILLED 5. TOTAL PY \$ 45		TS REC'D	
		7. 60	STS INCURRE	D/HOURS WOR	KED	8. ESTIMATE	D COSTS/HRS. 1	TO COMPLETE S. ESTIMATED FINAL				
		DURING	MONTH	CUM. T	ODATE	DE	TAIL		COSTS/HOURS		10. UN-	
6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED		b.	BALANCE OF Contract c,	CON- CONTRACT		ORDERS	
Direct Labo	or Hours ,	.3	.3	2.8	4.4			1.6	4.4 4.4			
Direct Labo	r Dollars	3	3	19	44			16	44	44		
Overhead		2	2	19	32			13	32	32		
Fringe Bene	fits	-	-	2	3			1	3	3		
Other Direc	t Costs	-	-	1	6			5	6	6		
Total Costs		5	5	50	85			35	85	85		
	· · · · · · · · · · · · · · · · · · ·											
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MUNITET	CONTRACTOR FI							4/30/				
o, NASA-Langle	ey Research Cent	ter		FROM	ada Taab	Decenado	Inctituto	COSTS -	S. CONTR.	ACT VALUE		
Attn: Mr. Financial M	E. Steelman Kei Aanagement Divis	tchum	5	Atla	nta, Geor	gia 30332		\$182		\$ - 0		
Hampton, V/	A. TYPE			B. CONTRAC MENT NO.	T NO. AND LA	TEST DEFINIT	IZED AMEND-	4. FUND LIMI \$182	TATION	\$ - 0		
I. DESCRIPTION	Cost Reimbur	rsable		NAST	-16357			\$102	1.01	J - U		
OF CONTRACT	C. SCOPE OF WORK			a construction of the second se	NTRAEP. (SI	(mature)	DATE	. INVOICE A	MTS BILLED		TS REC'D	
	ERBS/SAGE						6/2/82	\$ 45		s 40		
		7. C	OSTS INCURRE	D/HOURS WOR		B. ESTIMATED		TOCOMPLETE	9. ESTIMA	TED FINAL	T. Carl	
		DURING	MONTH	CUM. T	ODATE	DE	TAIL		COSTS	HOURS	10. UN-	
6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED		ь,	BALANCE OF Contract C.	CON- TRACTOR ESTIMATE B:	TRACTOR CONTRACT ESTIMATE VALUE		
Direct Labo	or Hours	.3	.3	2.5	4.4			1.9	4.4	4.4		
Direct Labo	n Dollars	3	3	25	44			19	44	44		
Overhead		2	2	17	32			15	32	32		
Fringe Bene	fits	-	-	2	3			1	3	3		
Other Direc	t_Costs		-	1	6			5	6	6		
Total Costs		5	5	45	85			40	85	85		
								•			·	
1	•• ••••••••••••••••••••••••••••••••••••	_										
				1		4						

				FROM					S. CONTRA	ACT VALUE		
Attn: Mr.	y Research Cent E. Steelman Ket lanagement Divis 23665	chum		Atlant	a Tech Re a, Georgi	a 30332		s 182		s - 0 -		
ate is the two and the set	. TYPE Cost Reimbu			B. CONTRAC MENT NO. NASI-		TEST DEFINI	TIZED AMEND.	\$ 182	TATION	s - 0 -		
DESCRIPTION	COSE RETINDU	rsabie		1			frances (LLING		
CONTRACT	C. SCOPE OF WORK			d. AUTH. CO	TR. PEP. (SI	(naturo)	DATE	S. INVOICE A	MTS BILLED		TS REC'D	
	ERBS/SAGE			e			6/28/82	\$ 40		\$ 33		
		7. 60	OSTS INCURRE	D/HOURS WOR	KED	8. ESTIMATE	D COSTS/HRS.	TO COMPLETE		TED FINAL	10. UN-	
		DURIN G	MONTH	CUM. T	ODATE	DE	TAIL		COSTS	HOURS	FILLED	
6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED	•.	b.	BALANCE OF CONTRACT C.	CON- TRACTOR ESTIMATE 8,	CONTRACT VALUE b.		
Direct Labo	r Hours .	.3	.3	2.2	4.4			2.2	4.4 4.4			
Direct Labo	n Dollanc	3	3	22	44		1	22	44	44		
		3	3	15	32		1	17	44 44 32 32		i.	
Overhead				13								
Fringe Bene	fits	-	-	2	3	L		1	3	3		
Other Direc	t Costs		-	1	6			5	6	6		
Total Costs		6	6	40	85			45	85	85		
· · · · · ·												
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Associate Vimpresident (Finance)

Georgia Institute of Technology Atlanta. Georgia 30332

(404) 894-4622

May 25, 1983

Mr. C. L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, Virginia 23665

G-35-675

Mr. Crowder:

Enclosed are the Cumulative Monthly Contractor Financial Management Reports for contract no. NAS1-16357 for the months June 1982 through April 1983.

If you have questions or require additional information, please let me know.

Sincerely,

Sybil P. Small, Assistant Manager Grants and Contracts Accounting

SPS/LMK/dld Enclosure

cc: Dr. D. M. Cunnold Dr. C. S. Kiang Mr. D. S. Hasty File R5380-0A0 Tech Rep M/S 234 NASA Expt. Scientist Cost Accounting M/S 135 - 2 copies

MONTHLY	CONTRACTOR FIN	ANCIAL MANA	AGÉMENT R	EPORT	Budget	Bureau No.	104-R0011	4/30/83 21				
Attn: M	gley Research Ce r. C. L. Crowder 1 Management Div VA 23665		.26		Tech Res , Georgia	earch Inst 30332	titute	3. CONTRACT VALUE a. COSTS b. FEE \$ 84 \$ - 0 -				
1. DESCRIPTION	Cost Reimburs			b. CONTRACT MENT NO. NAS1-		TEST DEFINIT	ZED AMEND-					
CONTRACT	C. SCOPE OF WORK ERBS/SAGE			d. AUJH. CON	TR. REP. (SI		DATE 0.5-25-23			b. TOTAL PYTS REC'D		
	·		STS INCURRE	D/HOURS WOR		8. ESTIMATED	COSTS/HRS. 1	· · · · · · · · · · · · · · · · · · ·			10. UN-	
6. REPORT	TING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED	•.	ь.	BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	FILLED ORDERS OUT- STANDING	
Direct Labor	irect Labor Hours		.1	<u>د.</u> 4.4	4.4			c	4.4	4.4		
						· · · ·						
Direct Labo	r Dollars	1	1	44	44			-	44	44	•	
Overhead			-	29	31			2	31	31		
Fringe Bene	fits	-	-	4	4			-	4	4		
Other Direct	t Costs	-	-	2	6			4	6	6		
Total Costs		2	1	79	85			6	85	85		
								1				
	 											
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MONTHLY CONTRACTOR FINANCIAL MANAGEMENT REPORT June 1982 - March 1983

Reporting Category	June 1982	July 1982	August 1982	Sept. 1982	Oct. 1982	Nov. 1982	Dec. 1982	Jan. 1983	Feb. 1983	March 1983
Direct Labor Hours	.3	•1	.2	.2	.2	.1	.1	.1	-	.2
Direct Labor Dollars	3	1	2	2	2	1	1	1	-	2
Overhead	2	-	1	1	1	1	-	_	1	2
Fringe Benefits	-	-	1		-	-	-	-	-	1
Other Direct Costs	-	-	-	-	-	-	-	-		-
Total Costs	5	1	4	3	3	2	1	1	2	5

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G-35-475

Georgia Institute of Technology Atlanta, Georgia 30332

(404) 894-4622

An Equal Education

to co w file

June 10, 1983

Mr. C. L. Crowder, Contracting Officer -NASA ---- Lang ley Research Center ---Financial Management Division M/S 126 Hampton, Virginia 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended May 31, 1983.

If you have questions or require additional information, please contact this office.

Sincerely,

Sybil P. Small, Assistant Manager Grants and Contracts Accounting

SPS/LMK/vdh Enclosure

A Unit of the University System of Georgia

Dr. C. S. Kiang cc: Dr. D. M. Cunnold Mr. D. S. Hasty Technical Rep M/S 234 NASA Expt. Scientist Cost Accounting M/S 135 - 2 copies File: R5380-0A0

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MONTHLY	CONTRACTOR FIN	ANCIAL MAN	AGEMENT R	EPORT	Budget	Bureau No.	104-R0011	5/31/83 22					
O: NASA-LANGL	EY RESEARCH CEN	TER		FROM							ACT VALUE		
Attn: Mr.	C.L. Crowder Management Divi A 23665		26	At1	anta, Geo	orgia 303		\$	34		5. FEE \$ -0-		
	a, TYPE	1 1		D. CONTRAC	T NO. AND LA	TEST DEPINI	TIZED AMEND		UND LIMI	TATION			
1. DESCRIPTION	Cost Reimb	ursable	Į.	'	NASI-1	6357		36	4	5. 01	\$ _0_		
	. SCOPE OF WORK			d. AUTH. CO	TR. REP. (SI	nature)	DATE	a. 1N			b. TOTAL PY	TS RECID	
	ERBS/SAGE					moor	_6/10/83	Statement and	79	1	\$ 73		
				D/HOMAS WOR			D COSTS/HRS.	TOCO	MPLETE	S. ESTIMA	TED FINAL	10. UN	
6. REPORT	ING CATEGORY	ACTUAL	DURING MONTH	ACTUAL	PLANN ED				LANCE OF TRACT	CON- TRACTOR	CONTRACT	FILLER ORDER	
			b	c,	d,	fi •••	b.		c.	ESTIMATE 8,	b,	STANDI	
Direct Labor	Hours		_	4.4	4.4	1				4.4	4.4		
	· · · ·							1.1	4			1.1	
Direct Labor	Dollars	·	-	44	44				-	44	44		
Overhead		-	-	29	31			1 1 1	2	31	31		
Fringe Benefi	ts	-	-	4	4	1		1	-	4	4		
Other Direct	Costs	-	-	2	6				4	6	6		
								1 1. 1 1.			·		
Total Costs		-		79	85				6	85	85		
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ATLANTA, GEORGIA 30332

ASSOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT.

-35-675

(404) 894-4624 OR 2629

Gr

October 18, 1983

Mr. C.L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for contract no. NAS1-16357 for the month ended September 30, 1983.

If you have questions or require additional information, please contact this office.

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Sincerely,

Sybil P. Small, Assistant Manager Grants and Contracts Accounting

SPS/LMK/j1v

Enclosure

cc: Dr. C.S. Kiang Dr. D.H. Cunnold Mr. D.S. Hasty Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135 - 2 Copies File: R5380-0A0

ATTN: MR.	EY RESEARCH CENT C.L. CROWDER MANAGEMENT DIVIS A 23665			ATLANTA	A TECH RES A, GEORGLA	3 0332		*. COST#	3. CONTAN	5. FEE			
1. DESCRIPTION	W, TYPE			b. CONTRAC MENT NO.			IZED AMEND.	\$ 97 \$-0-					
OF CONTRACT	Cost Reimbursa c. scope of work ERBS/SAGE	ble		-	NAS 1-16:	(nature)	10/18/83		TS BILLED	LING TOTAL PY \$ 81	TS REC'D		
	L	7. CC	STS INCURRE	D/HQURS WOR			COSTS/HRS.	TO COMPLETE	9. ESTIMAT		10. UN- FILLED		
6. REPOR	TING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED	•.	b.	BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	ORDERS OUT- STANDIN		
DIRECT LABOR	DIRECT LABOR HOURS		.1	4.9	5.1			.2	5.1	5.1			
DIRECT LABOR	DOLLARS	1	1	49	51			2	51 h	51			
OVERHEAD		-	-	32	35			3	35	35			
FRINGE BENEF	TTS	-	-	4	5			1	5	5			
OTHER DIRECT	COSTS	-	-	2	6			4	6 ,	6			
TOTAL COSTS		1	1	87	97			10	97	97			
									1	1			
									:				
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ASSOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT. (404) 894-4624 OR 2629



G-35-675

November 10, 1983

Mr. C.L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NAS1-16357 for the month ended October 31, 1983.

If you have questions or require additional information, please contact this office.

Sincerely,

Sybil P. Small, Assistant Manager Grants & Contracts Accounting

SPS/LMK/jlv

Enclosure

cc: Dr. C.S. Kiang Dr. D.M. Cunnold Mr. F.H. Huff Ms. Suzanne Zimmerman Tech. Rep. M/S 234 NASA Expt. Sciencist Cost Accounting M/S 135 - 2 Copies File: R5380-0A0

Attn: Mr	gley Research C r. C.L. Crowder 1 Management Di VA 23665		/S 126	Atlanta	Tech Res Georgia	a 30332		\$ 97				
1. DESCRIPTION OF	Cost Reimb			MENT NO.	NO. AND LAT		ZED AMEND.	4. FUND LIMI \$ 97		\$ - 0 -		
CONTRACT	C. SCOPE OF WORK ERBS/SAGE		_		NTR. REP. SIL	naguro) T	DATE	S 88 S 86			YTS REC'D	
		7. CO	STS INCURRE	ED/HOLAS WOR	O DATE	8. ESTIMATED COSTS/HRS. DETAIL		TOCOMPLETE	9. ESTIMATED FINAL COSTS/HOURS		10. UN-	
6. REPOR	TING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED	•.	BALAN OF CONTR B. b. c,		CON- TRACTOR Estimate 4,	CONTRACT VALUE b,	FILLED ORDERS OUT- STANDING	
Direct La	abor Hours .	.1	.1	5.0	5.1			1	5.1	5.1		
Direct La	abor Dollars	1	1	50	51			1	51	51		
Overhead		-	-	32	35			3	35	35		
Fringe Be	enefits		-	4	5			1	5	5		
Other Dir	rect Costs			2	6			4	6	6		
Total Cos	sts	1	1	88	97			9	97	97		
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	•											

G-35-675

ASSOCIATE VICE PRESIDENT (FINANCE)

Gr

GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629

December 13, 1983

Mr. C.L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NAS1-16357 for the month ended November 30, 1983.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/jlv

Enclosure

	NACA TANC	LEY RESEARCH CI	ENTED		TROMI					I. CONTRA	CT VII	,
1		. C.L. CROWDER			Conneda	mach D			a. COSTS		D. FEE	
		MANAGEMENT DI		1 1 2 6	Insti	a Tech R	esearch					
	HAMPTON,		VISION M/	5 120	Atlanta	i, GA 3	0332		\$ 97		\$ - 0	
-	IIAIII ION,	W. TYPE			b. CONTRAC	T NO. AND LA	TEST DEFINITI	ZED AMEND.	4. FUND SIME	TATION		
1	1. DESCRIPTION				MENT NO.				\$ 97		\$ - 0 -	
	OF	Cost Rein	mbursable			AS 1-1635				5, 815		
	CONTRACT	C. SCOPE OF WORK			d. AUTH. CO	NTA, REP. (SI	(natura)	DATE	H. INVOICE A	MTS BILLED	D, TOTAL PY	TS REC'D
		ERBS/SAG	E		0		1	12/13/8	\$ 88		\$ 87	
_				STS INCURRE	D/HOURS WOR	KED 3	B. ESTIMATED	the second s	the second se	9. ESTIMAT	ED FINAL	
1				MONTH		ODATE	DET	AIL			HOURS	10. UN- Filled
•	6. REPOR	TING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	ORDERS OUT- STANDI
-				b	e,	<u>d,</u>	•	<u>b,</u>	с,		0,	
1	Direct La	bor Hours	-		5.0	5.1			-	5.1	5.1	
1.1	Direct La	bor Dollars	-		50	51			1	51	51	
	Overhead		-	-	32	35			3	35	35	
i i	Fringe Ber	nefits	-	-	4	5			1	5	5	
	Other Dire	ect Costs	_	-	2	6	10.20		4	6	6	
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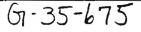


ASSOCIATE VICE PRESIDENT (FINANCE)



GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629



EMPLOYMENT OPPORTUNITY IN

January 17, 1984

Mr. C.L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NAS1-16357 for the month ended December 31, 1983.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/jlv

Enclosure

10:				FROM				1	. CONTRA	CT VALUE	
	Y RESEARCH CENTE			GEORGIA '	TECH RESE	RCH INSTI	TUTE	9. COSTS		h. FEC	-
ATTN: R.	C.L. CROWDER ANAGEMENT DIVISI			GLONGIA							
HAMPTON, VA	ANAGEMENT DIVISI 23665	ON M/S 126		ATT.ANTA	GEORGIA	30332		\$ 97		\$ - 0 -	
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05	COST REIMBURS	ABLE		NAS 1-	-16357					LLING	
CONTRACT	. SCOPE OF WORK			d. AUTH. CO	NTR. REP. SI		DATE		MTS BILLED	b. TOTAL PY	TS REC'D
	ERBS/SAGE			2			1/17/84	\$ 89		\$ 88	
·		7. 00	STS INCURRE	D/HOURS WOR		B. ESTIMATED	COSTS/HRS.	TOCOMPLETE	9. ESTIMA	TED FINAL	
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			1						· · · ·		
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OTHER DIRECT	COSTS	1	1	3	6			3	6	6	4
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ASSOCIATE VICE PRESIDENT (FINANCE)



GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629

February 14, 1984

Mr. C.L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NAS1-16357 for the month ended January 31, 1984.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/jlv

Enclosure

10:	<u></u>			FROM				1/51/0-	S. CONTRA	CT VALUE	
	Y RESEARCH CENTED C.L. CROWDER	R		GEORGIA	A TECH RE	SEARCH IN	STITUTE	A. COSTS		b, FEE	-
	ANAGEMENT DIVISIO	ON M/S 126			A, GEORGI			\$ 116		\$ -0-	
IIII ION, VI	N. TYPE			S. CONTRACT	T NO. AND LA	TEST DEFINI	TIZED AMEND.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	TATION		
1. DESCRIPTION	Cost Reimbu:	rsahle		NA	AS 1-16357			\$ 116		\$ -0-	
CONTRACT	C. SCOPE OF WORK			d. AUTH. COM			DATE	A. INVOICE A		D. TOTAL PY	TS ACC'D
	ERBS/SAGE			12		:	2/14/84	\$ 91		\$ 88	
		7. CC	STS INCURRE	D/HOURS WOR	KED	8. ESTIMATE	DCOSTS/HRS.	TOCOMPLETE	9. ESTIMA	TED FINAL	
		DURING	MONTH	CUM. T	ODATE	DE	TAIL		COSTS,	HOURS	10. UN- FILLED
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			<u>b,</u>	c	d,		b.	c.	<u> </u>	b	
DIRECT LABOR	HOURS *	.1	.1	5.1	6.1	1		1	6.1	6.1	
DIRECT LABOR	DOLLARS	11	1	51	61			10	61	61	
OVERHEAD		1	1	33	41			8	41	41	
FRINGE BENEFI	TS		-	4	7			3	7	7	
OTHER DIRECT	COSTS	-	-	3	7			4	7	7	
TOTAL COSTS		2	2	91	116			25	116	116	
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DISCLAIMER:	FOR PURPOSES OF	THIS REPORT	IT WAS A	SSUMED THA	AT THE PR	OFESSORS	WORKED A 4	O HOUR WEI	K. MANY	WORK MORE	THAN THIS
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ASSOCIATE VICE PRESIDENT (FINANCE)

Gr

GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629

March 8, 1984

Mr. C.L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NAS1-16357 for the month ended February 29, 1984.

If you have questions or require additional information, please contact this office.

Sincerelv.

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/jlv

Enclosure

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Hampton.	VA 23665	VISION M	5 120	ATLANTA	, GEORGI	A 30332		\$116		\$ - 0 -	
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DIRECT LABO	R DOLLARS	8	8	59	59			2	61	61	
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OVERHEAD		5	5	38	38			3	41	41	
Attn: Mr. C Financial Ma Hampton, VA ^{a. TY} ^{b. DESCRIPTION} OF CONTRACT c. SC 6. REPORTING C DIRECT LABOR H DIRECT LABOR H DIRECT LABOR D OVERHEAD FRINGE BENEFIT OTHER DIRECT C TOTAL COSTS					-			1		11.2	
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Attn: Mr. C.L. Crowder Financial Management Div Hampton, VA 23665 *. TYPE DESCRIPTION OF CONTRACT C	_	-	3	3			4	7	7.		
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ATLANTA, GEORGIA 30332

ASSOCIATE VICE PRESIDENT (FINANCE)



GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629

FOUAL EDUCATION AND EMPLOYMENT OPPORTUNITY INSTITUTION

April 16, 1984

Mr. C.L. Crowder, Contracting Office NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NAS1-16357 for the month ended March 31, 1984.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/jlv

Enclosure

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CONTRACT	Cost Reimburs	abie		d. AUTH. CO	NTR. REP. (SI	enature)	DATE	A. IN VOICE AN		b. TOTAL PY	TS REC'D
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DIRECT LABOR	HOURS*	-	-	5.9	5.9			.2	6.1	6.1	
DIRECT LABOR	DOLLARS	-	-	59	59			2	61	61	
OVERHEAD			-	38	38			3	41	41	
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OTHER DIRECT	COSTS	1	1	4	4			3	7	7	
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ASSOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629

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N EQUAL EDUCATION AND EMPLOYMENT OPPORTUNITY INSTITUTION

May 15, 1984

Mr. C.L. Crowder, Contracting Office NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NAS1-16357 for the month ended April 30, 1984.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/vdh

Enclosure

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		y Research Center			FROM					3. CONTRA		
		C.L. Crowder				Tech Rese		titute	n. COSTS		16. FLL	
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			DURING	MONTH	CUM. T	O DATE	DI	ETAIL		COSTS.	/HOURS	10. UN-
	6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED	. 1.		BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	ORDERS OUT-
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	Direct	Labor Hours *	.1	.1	6.0	6.0			.1	6.1	6,1	
	Direct	Labor Dollars	. 1	1	60	60			1	61	61	
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	Fringe	Benefits	<u>-</u>	-	6	6	<u> </u>		1	7	7	
	Other D	Direct Costs	-	-	4	4			3	7	7	
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GEORGIA INSTITUTE OF TECHNOLOGY

ATLANTA, GEORGIA 30332

ASSOCIATE VICE PRESIDENT (FINANCE)

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GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629

June 13, 1984

Mr. C.L. Crowder, Contracting Office NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NASI-16357 for the month ended May 31, 1984.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/vdh

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Enclosure

Attn: Mr.	y Research Center C.L. Crowder			FROMI Geor Atla	gia Tech inta, Geor	Research I gia 30332	nstitute	n, COSTS		ACT VALUE	
Financial M Hampton, VA	anagement, M/S 126 23665	5				•		\$ 136		s -0-	
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OF CONTRACT	C. SCOPE OF WORK ERBS/SAGE			d. APTH. CO	NTR. REP. (SI		6/13/84	S 110		6. TOTAL PY	TS REC'D
			COSTS INCURA	1	RED OATE	B. ESTIMATED		OCOMPLETE		TED FINAL	10. UN.
5. REPOR	TING CATEGORY	ACTUAL		ACTUAL	PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE,	FILLED ONDERS OUT STAND
Direct Labo	or Hours*	.1	.1	e, 6.1	d, 6.1	•.	<u>b.</u>	.7	6.8	6.8	
Direct Labo	or Dollars	1	1	61	61			7	68	68	1
Overhead		1	1	39	39			9	48	48	
Fringe Ben	efits	-	_	6	6			3	9	9	
Other Dire	ct Costs	-	-	4	4			7	11	11	
Total Cost	S	2	2	110	110			26	136	136	
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~DISCIAIME				as assumed	i that the	proressor	worked a	40 hour s	week. Man	y work mo	

ATLANTA, GEORGIA 30332

SSOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT

(404) 894-4624 OR 2629

August 2, 1984

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Mr. C.L. Crowder, Contracting Office NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the monthly Contractor Financial Management Report for contract no. NASI-16357 for the month ended June 30, 1984.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/so

Enclosure

	CONTRACTOR FINAL			EPOPT		pproved Bureau No.	104-80011			DING AND NUN	ANER OF
			UCMENT R		Budget	Dureau No.	104-R0011	6/30/84		21	
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Overhead		1	1	40	40			8	48	48	
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Other Direc	t Costs	2	2	6	6			5	11	11	5
Total Costs		3	3	113	113			23	136	136	
* Disclaime	r: For purposes		eport it	vas assum	ed that t	he profes	sor worke	d a 40 ho	ur week.	Many wor	Ik .
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ATLANTA, GEORGIA 30332

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SSOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629

September 20, 1984

Mr. C.L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended August 31, 1984. There was no activity in the month of July, 1984.

Also enclosed is a corrected report for the month ended June 30, 1984. Some incorrect figures were inadvertently used on the first one.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/so

Enclosure

6. REPORTING CATEGORY ACTUAL PLANNED ACTUAL PLANNED OF CON- CONTRACT TRACTOR		TIDHAL AERONAUTICS AN CONTRACTOR FINA			EPORT		pproved Bureau No.		2. REPORT FC OPERATING 8/31/8		DING AND NUM	23
Attn: Mr. G.L. Crowder Financial Management, M/S 126 Georgia Tech Research Corporation Atlanta, Georgia 3032 1.001 3 - 0 - Hampton, VA Cost Reimbursable Contract 1.16 3 - 0 - 1.16 3 - 0 - L. Descentrion Contract 1.16 1.16 3 - 0 - 1.16 3 - 0 - L. Descentrion Contract 1.16	NASA-Langle	w Research Cente	r		FROM:					S. CONTR		
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7. COSTS INCURRED/HOURS WORKED 8. ESTIMATED COSTS/HRS.TO COMPLETE 9. ESTIMATED FINAL DURING MORTH CUN. TO DATE DETAIL BALANCE CONTRACT		ERBS/SAGE					-	9/20/84	\$ 118		\$ 109	-
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B. REPORTING CATEGORY ACTUAL PLANNED ACTUAL PLANNED ACTUAL PLANNED B. C. CONTRACT CONTRACT <t< td=""><td></td><td></td><td>DURING</td><td>MONTH</td><td>CUM. TO</td><td>DATE</td><td>DET</td><td>TAIL</td><td></td><td></td><td></td><td>IO. UN-</td></t<>			DURING	MONTH	CUM. TO	DATE	DET	TAIL				IO. UN-
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Direct Labor Dollars 1 1 62 62 6 68 68 Direct Labor Dollars 1 1 62 62 6 68 68 Overhead 2 2 42 42 6 48 48 Fringe Benefits 1 1 7 7 2 9 9 Other Direct Costs 1 1 7 7 4 11 11 Total Costs 5 5 118 118 18 136 136 *Disclaimer: for purposes of this report it was assumed that the professor worked a 40 hour week. Many work monot than this. 10 10 10				0.		<u> </u>			K		0	
Direct Labor Dollars 1 1 62 62 6 68 68 Overhead 2 2 42 42 6 48 48 Fringe Benefits 1 1 7 7 2 9 9 Other Direct Costs 1 1 7 7 4 11 11 Total Costs 5 5 118 118 18 136 136 *Disclaimer: for purposes of this report it was assumed that the professor worked a 40 hour week. Many work no than this. 10	Direct Labor	Hours*	.1	.1	6.2	. 6.2			.6	6.8	6.8	
Diffect Labor boliars 1									~			
Overhead 2 2 1 1 7 7 2 9 9 Fringe Benefits 1 1 7 7 4 11 11 11 Other Direct Costs 1 1 7 7 4 11 11 Total Costs 5 5 118 118 18 136 136 *Disclaimer: for purposes of this report it was assumed that the professor worked a 40 hour week. Many work mother than this. 1 1 1 1	Direct Labor	Dollars	1	1	62	62			6	68	68	
Pringe Benefits 1	Overhead		2	2	42	42			6	48	48	
Other Direct costs 1 1 1 1 1 Total Costs 5 5 118 118 18 136 136 *Disclaimer: for purposes of this report it was assumed that the professor worked a 40 hour week. Many work mother than this. 1 <t< td=""><td>Fringe Benef:</td><td>its</td><td>1</td><td>1</td><td>7</td><td>7</td><td></td><td></td><td>2</td><td>9</td><td>9</td><td></td></t<>	Fringe Benef:	its	1	1	7	7			2	9	9	
*Disclaimer: for purposes of this report it was assumed that the professor worked a 40 hour week. Many work mo than this.	Other Direct	Costs	1	1	7	7			4	11	11	
*Disclaimer: for purposes of this report it was assumed that the professor worked a 40 hour week. Many work mo than this.				5	119	118			18	136	136	
*Disclaimer: for purposes of this report it was assumed that the professor worked a 40 hour week. Many work mo than this.	Total Costs		5		110	,110			10	130		
	*Disclaimer:	for purposes o	this re	port it w	as assumed	that th	e professo	or worked	a 40 hour	week.	Many work	more
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ATTN: MR. FINANCIAL M HAMPTON, VA	C.L. CROWDER MANAGEMENT, M/S 23665	126		ATLAN		IA 30332		\$ 136	-	5 - 0 -	
1 DESCRIPTION	COST REIMBUR	SABLE		MINT NO.	NAS 1-1635		SZED AMEND	4. I'UND LIMI' \$136		s - 0 -	
CONTRACT	C. SCOPE OF WORK ERBS/SAGE			1. AUTH. CO	NTA, REP. (SI	(nalura)	10ATE 8/2/84	A. INVOICE AN \$113		H. TOTAL I'Y	15 91 6 0
		7. C	STS INCURRE	D/HOURS WOI				TOCOMPLETE		TED FINAL	10. 04.
6. REPOR	TING CATEGORY	ACTUAL	PLANNED	CUM. T	PLANNED	. DE1	b.	BALANCE OF CONTRACT C.	CON- TRACTOR ESTIMATE	CONTRACT VALUE	
DIRECT LABO	OR HOURS*	1	.1	_6.2	6.2			.6	6.8	6.8	
DIRECT LABO	OR DOLLARS	1	1	62	62			6	68	68	
OVERHEAD	<u>.</u>	1	1	40	40			8	48	48	
FRINGE BENI	EFITS	-	-	6	6			3	9	9	i
OTHER DIREC	CT COSTS	2	2	6	6			5	11	11	
TOTAL COSTS	5	4	4	114	114			22	136	136	: : : : : :
*Disclaimer	r: For purposes than this.	of this rep			i that the		r worked	a_40 hour	week. Ma	ny work re	<u>)re</u>
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ATLANTA, GEORGIA 30332

SOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT.

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(404) 894-4624 OR 2629

January 8, 1985

Mr. C.L. Crowder, Contracting Officer NASA-Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended November 30, 1984.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda M. Krantz, Accountant III Grants and Contracts Accounting

LMK/vdh

Enclosure

cc: Dr. C.S. Kiang Dr. D.M. Cunnold Mr. D. Farmer Ms. Suzanne Zimmerman Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-2 Copies File: R5380-0A0

OF THE UNIVERSITY SYSTEM OF GEORGIA

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	5 120					oration	\$ 136			
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•			MENT NO.	•			\$ 136	!	\$-0-	
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			d. AUTH. CON	NTR. REP. (SI	(mature)			MTS BILLED		TS REC'D
ERBS/SAGE			_						\$ 119	
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HOURS *	-		6.8	6.8		1	-	6.8	6.8	
DOLLARS .	-	-	68	68			-	68	68	
			4.0	1.0				//8	48	
	1	<u> </u>	40	40				40	40	
775	-	1.0	8	8			1	9	9	
10										
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	1	1	122	132			4	136	136	
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For purposes of	the this	report it	was assum	ned that t	he profes	sor worke	d a 40 ho	ir week.	Many work	more
than this.										
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	Mr. C.L. Crowder al Management, M/ , VA 23665 A. TYPE <u>Cost Reimb</u> C. SCOPE OF WORK ERBS/SAGE TING CATEGORY HOURS * DOLLARS TS COSTS	al Management, M/S 126 , VA 23665 A. TYPE Cost Reimbursable C. SCOPE OF WORK ERBS/SAGE 7. C DURING ACTUAL ACT	Mr. C.L. Crowder al Management, M/S 126 , VA 23665 . TYPE <u>Cost Reimbursable</u> c. scope of work <u>ERBS/SAGE</u> 7. COSTS INCURRE <u>DURING MONTH</u> ACTUAL PLANNED a. b. HOURS* 	Mr. C.L. Crowder al Management, M/S 126 , VA 23665 . TYPE . Cost Reimbursable . SCOPE OF WORK ERBS/SAGE . SCOPE OF WORK ERBS/SAGE . COSTS INCURRED/HOURS WOF DURING MONTH CUM. T COSTS INCURRED/HOURS WOF DURING MONTH CUM. T ACTUAL PLANNED ACTUAL ACTUAL PLANNED ACTUAL HOURS* - - 6.8 1 1 1 48 TS - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - 8 COSTS - - - - 8 COSTS - - - - 8 COSTS - - - - 8 COSTS - - - - - - - - - - - - -	MOLET RESEARCH CENTRA Mr. C.L. Crowder al Management, M/S 126 , VA 23665 . TYPE Cost Reimbursable . SCOPE OF WORK ERBS/SAGE TING CATEGORY ACTUAL PLANNED . COSTS INCURRED/HOURS WORKED DURING MONTH CUM. TO DATE . COSTS INCURRED/HOURS WORKED DURING MONTH CUM. TO DATE 	MOLET ADSEARCH CENTER M/S 126 al Management, M/S 126 VA 23665 Atlanta, Georgia Tech Research Corp Atlanta, Georgia 30332 Atlanta, Georgia 30332 b. CONTRACT NO. AND LATEST DEFINIT NASI-16357 C. SCOPE OF WORK ERBS/SAGE TING CATEGORY ACTUAL PLANNED ACTUAL PLANNED ACTUAL PLANNED ACTUAL PLANNED ACTUAL PLANNED C. SCOPE OF WORK ACTUAL PLANNED ACTUAL PLANNED ACTUAL PLANNED ACTUAL ACTUAL PLANNED C. SCOPE OF WORK ACTUAL PLANNED ACTUAL ACTUAL PLANNED ACTUAL ACTUAL ACTUAL PLANNED ACTUAL ACTUAL ACTUAL PLANNED ACTUAL ACTUAL	NOLE I RESPARCH CENTER MALE CL. Crowder al Management, M/S 126 , VA 23665 Atlanta, Georgia Tech Research Corporation Atlanta, Georgia J0332 . Cost Reimbursable Cost Reimbursable . Cost Reimbursable Cost Reimbursable . Cost S INCURRED/HOURS WORKED . COSTS INCURRED/HOURS WORKED . COSTS INCURRED/HOURS WORKED . Cost S INCURRED/HOURS WORKED/HOURS WORKED . Cost S INCURRED/HOURS WORKED/HOURS WORKED/H	NULEI RESEARCH CENTER WE. C.L. Crowder al Management, M/S 126 , VA 23665 c. TYPE Cost Reimbursable c. scope or work ERBS/SAGE Costs INCURRED/HOURS WORKED C. COSTS 68 68 - 1 1 48 48 - COSTS 8 8 1 2 COSTS 8 8 C. COSTS	NULLI NO LATER CLATER AND LATER CONCLUENCE al Management, M/S 126 VA 23665 - TYPE Cost Reimbursable - Cost Reimbursable - Cost Reimbursable - Cost Reimbursable - Cost SincurRec/Hours WORKED - Cost SincurRec/H	NULEI RESPLACE LEARER HT. C.L. COwder al Management, M/S 126 , VA 23665 . TYPE Cost Reimbursable . Cost Reim

SOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 DR 2629

. April 17, 1985

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the months ended January 31, 1985, February 28, 1985 and March 31, 1985.

GEOLIGIA INSTITUTE OF TECHNOL

ATLANTA, GEORGIA 30332

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GY

If you have questions or require additional information, please contact this office.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

Enclosures

	Attn: Mr. C. L. Crowder							03/ 51/ 03			<u></u>
who have carry	rey Research Center	n.	•.	FROMi	Tech bes	arch Corp	obation		CONTRA		
Attn: Mr.	. C. L. Crowder		1		Georgia			. COSTS		b. PEE	
	Management, M/S 12	26		, Acranca,	deorgiu				1	s - 0 -	
Hampton, N	A 23665							\$ 182		5-0-	
1.100.000.000	A. TYPE			B. CONTRACT	NO. AND LA	TEST DEFINIT	IZED AMEND.	4. FUND LIMI			
1. DESCRIPTION	Cost Reimbursab	le	· •	NAS1	-16357			182		\$ - 0 -	
CONTRACT	. SCOPE OF WORK			d. AUTH CON	TR. REP. (5)	Ana fure 1	DATE	- INVOICE A		LLING	
	ERBS/SAGE							\$ 160.		\$ 133	IS NEC D
		7.0	OSTS INCURRE	D/HOURS WOR		A FETIMATE	Statement of the second se	O COMPLETE		And the second s	
	· ·	and the second se	MONTH	CUM. TO	and the second s		TAIL	COMPLETE		TED FINAL	10. UN.
S. REPOR	TING CATEGORY							BALANCE			FILLED
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	•								ESTIMATE .	VALUE	STA TH
				1		1				1	
Direct Lal	bor Hours *	1.3	1.3	8.2	8.2				9.3	9.3	
			4.9						•		
Direct La	bor Dollars	13	13	82	. 82			11	93	93	
								**			
Overhead		9	9	58	58			6	64	64	
Fringe Ber	nefits	4	4	12	12			2	14	14	
tringe bei								<u> </u>			
Other Dire	ect Costs			8	8			3	11	11	
	· ·	/					1.				
•					· ·				1		
Total Cos	+ =	26	26 .	160	160			22	182		
IULAI CUS		20	20 .	100	100				102	182	
· · · ·			4		4						
		1						61			
* Disclai	mer: For purposes	of this r	report it	was assume	d that t	ne profess	or worked	la 40 hour	week. M	any work I	ore
	than this										
	than this.										
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-	MANAGUZUUU	ey Research Center	,		FROM	· · ·			3. CONTRACT VALUE				
	Attn: Mr.	C. L. Crowder			Georgia	Tech Resea	rch Corpo	ration	a. COSTS				
	Financia] Hampton, V/	Management, M/S 12	Atlanta,	Georgia	30332.		\$ 182	s 182 s - 0 -					
F	riamp correction in	R. TYPE	S. CONTRACT	NO. AND LAT	EST DEFINITI	ZED AMEND.	4. FUND LIMI	TATION					
	1. DESCRIPTION	Cost Reimburs	able		NAS1-16	357		·	\$ 182		\$ - 0	-	
	OF CONTRACT	COSL RETINUUTS	able		d. AUTH. CON		nature) ^ _	DATE	. INVOICE A	8. BILLING E AMTS BILLED 5. TOTAL PYTS REC			
		ERBS/SAGE					04/17/85	s 134		\$ 131			
Γ					D/HOURS WOR		- the second second		OCOMPLETE	01 60 I IMM	TED FINAL	10. UN.	
		ING CATEGORY	DURING MONTH		CUM. TO	DATE	DET	AIL	BALANCE	COSTS/	HOURS	FILLED	
	. REFUN		ACTUAL PLANNED		ACTUAL PLANNED		•		OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	OADERS OUT- STANDING	
T													
ł	Direct Labo	or Hours *			6.9	6,9			/	9.3	9.3		
	Direct Labo	or Dollars			69	69			24	93	93		
	Overhead		1 .	1	49	49			15	64	64		
	Fringe Ben	efits			8	8		•	6	14	14		
	Other Direc	ct Costs			8	8	•		3	11	11		
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Ī	Total Cost	S	1	1 .1	134	134			48	182	182	Q	
Ī	•							•					
	* Disclaime	er: For purposes	of this re	port it v	was assume	that the	professo	r worked	a 40 hour	week. Ma	any work m	ore	
	1	than this.											
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	TRUMI				3. CONTRACT VALUE						
Attn: Mr. C. L. Crowder Financial Management, M/S 12 Hampton, VA 23665	Georgia Tech Research Corporation Atlanta, Georgia 30332				\$ 182 5 - 0 -						
1. DESCRIPTION OF Cost Reimbursa	MENT NO.	-16357	TEST DEPINITI	ZEO AMENO-	4. FUND LIMITATION 5 182 5 - 0 -						
CONTRACT C. SCOPE OF WORK		· · · ·	d. AUTH. CONTR. REP. (Sidnatura) DATE . INVOICE AMTS BILLED .							\$ 130	
	7. 60	STS INCURRE	D/HOURS WOR		S. ESTIMATED	COSTS/HRS. 1	OCOMPLETE		TED FINAL		
8. REPORTING CATEGORY	ACTUAL	PLANNED	CUM. TO DATE		DETAIL		BALANCE OF Contract 4.	CON- TRACTOR ESTIMATE	CONTRACT VALUE	IN. UN. FILLED ONDERS OUT- STATUNG	
Direct Labor Hours *			6.9	6.9			,	9.3	9.3		
			· · · · · · · · · · · · · · · · · · ·		,						
Direct Labor Dollars			69	-69			_ 24	93	93		
Overhead			48	48			16	64	64		
Fringe Benefits			8	8			6	14	14		
Other Direct Costs			8	8	·		3	11.	11		
•	1.		-				· · · ·			-0-	
Total Costs			133	133			49	182	182		
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G 35- 675 GEORGIA INSTITUTE OF TECHNOLOGY

SSOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT.

(404) 894-4624 OR 2629

May 30, 1985

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended April 30, 1985.

If you have questions or require additional information, please contact this office.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

Enclosure

			- Standard and the	Inerit	· ·						
NASA-Langle	ey Research Cente	r	1	FROM				1 1 8. COSTS	1. CONTRA		
	C. L. Crowder	Georgia						b. PEE			
Financial M	Management, M/S 1	Atlanta,	Georgia	30332			* • •				
Hampton, VA	A 23665		1	Atlanta, Georgia 30332				\$ 182	1.4. 1	\$ -0-	
	TYPE			S. CONTRACT	T NO. AND LA	TEST DEPINIT	IZED AMEND-	4. FURD LIMIT	ATION		
		1	4. č			1 <i>I</i>		\$ 182		s - 0	-
I. DESCRIPTION	Cost Reimbursab	le		NAS1-1	6357						
	SCOPE OF WORK			d. AUTH COI		and time 14	DATE	A INVOICE AN	8. NI	b. TOTAL PY	
· · · · ·	ERBS/SAGE						05/30/85	\$ 166		\$ 133	is need
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		DURING	MONTH	CUM. TO DATE		DET	AIL	1	COSTS	HOURS-	TO. UN. FILLED
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Direct Labor Ho	nure *	.3	1.3	8.5	8.5			.8.	9.3	9.3.	
	501 5			0.0	0.0						
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1			1							1	
Direct Labor Do	ollars	3	3	. 85 .	85			8	93	93	
Overhead		· 2	12	60	60	1		4	64	64	
Fringe Benefits		1	1	13	13			1	14	14	
ri inge benerre.		-		10	10			1*			
Other Direct Co	osts	• 0	0	8	8			3	11	11	- I
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tal Costs	· ·	6	6	166	166			16	182	182	
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ATLANTA, GEORGIA 30332

ASSOCIATE VICE PRESIDENT (FINANCE) GRANTS AND CONTRACTS ACCOUNTING DEPT.



(404) 894-4624 OR 2629

June 17, 1985

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended May 31, 1985.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accouning

LAG/djt

Enclosure

Attn: Mr. Financial	ley Research Cen . C. L. Crowder Management, M/S	FROM: Georgia Tech Research Corporation Atlanta, Georgia 30332.				3. CONTRACT VALUE a. COSTS b. FEE \$ 182 \$ _						
Hampton 1	Cost Reimbur	sable		b. CONTRACT NO. AND LATEST DEFINITIZED AMEND- MENT NO. NAS1-16357								
CONTRACT	ERBS/SAGE	30016			NTR. REP ₂ (SI	(nejure)	06/18/85			ED 6. TOTAL PYTS REC'D \$ 133		
				DHOURS WOR			D COSTS/HRS.	TOCOMPLETE	9. ESTIMAT	TED FINAL	10, UN. FILLEO ORDERS OUT- STANDING	
6. REPOR	TING CATEGORY	ACTUAL	PLANNED	CUM. T	PLANNED	. DE	b,	BALANCE OF Contract c,	CON- TRACTOR ESTIMATE	CONTRACT VALUE		
Direct Labor	Hours *	.3	.3	8.8	8.8			.5	9.3	9.3		
Direct Labor	Dollars	3	. 3	88 .	88			5	93	93		
Overhead		2	2	62	62			2	64	64		
Fringe Benef	its	0	0	13	13			1	14	14		
Other Direct	Çosts			8	8			3	11	11		
al Costs		5	5	171	171			11	182	182		
*Disclaimer:	For purposes o Many work more		t it was	assumed 1	that the p	rofessor	worked a	40 hour we	ek.			
)									



DESIGNING TOMORROW TODAY

Georgia Institute of Technology Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629

August 14, 1985

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

6,35-615

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended June 30, 1985.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accouning

LAG/vdh

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Enclosure

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01				FROM					3. CONTRA	CT VALUE	
NASA-Langley	Research Center							A. COSTS		b. FEE	
	L. Crowder					earch Corp	oration			•	
Financial Ma	nagement, M/S 126			Atlanta	, Georgia	30332	•	\$ 182		\$ - 0 -	
Hampton, VA	23665		. CONTRACT	NO. AND LA	TEST DEPINITI	ZED AMEND.		ATION			
	· · · · · · · ·			MENT NO.				\$ 182		\$ - 0 -	
I. DESCRIPTION				NAS1-1	6357				U. PIL		
	C. SCOPE OF WORK			d. AUTH, CON		nature)	DATE	. IN VOICE AN		. TOTAL PY	TS NEC'D
							00/14/05	\$ 178		\$ 157	
	ERBS/SAGE			D/HOURS WOR	NED.			TO COMPLETE			
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		DURING	MONTH	CUM. TO	DATE	DET	AIL	BALANCE			FILLED
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		ACTUAL	PLANNED	ACTUAL	PLANNED			CONTRACT	ESTIMATE	VALUE	STANDING
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State State A	·				1						
Direct Labor	Hours *	3	.3	9.1	9.1			2	9.3	9.3	
			· · · ·								
					1.223						
Direct Labor	Dollars	3	3	91 ·	91			2	93	93	
Overhead		2	2	64	64			0 ·	64	64 .	
Fringe Benef	fits	1	1	14	- 14			0	14	14	
									100.000		
Other Direct	Costs	1	1	9	9			2	11	11	
									,		
Tatal Costa		7	7	178	178			4	182	182	•
Total Costs				1/0	- 10					1	
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*Dicclaimon:	For purposes of	this rend	rt it was	assumed	that the	professor	worked a	40 hour we	ek. Many	work mor	e than
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Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629

DESIGNING TOMORROW TODAY

September 20, 1985

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended August 31, 1985.

635.0

1. -

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accouning

LAG/vdh

Enclosure

MONTHLY	CONTRACTOR FINA	NCIAL MANA	GEMENT R	EPORT Budget Bureau No. 104-R0011				08/31/85		22	
Financial 1	NASA-Langley Research Center Attn: Mr. C. L. Crowder Financial Management, M/S 126					FROM: Georgia Tech Research Corp Atlanta, Georgia 30332				ACT VALUE	0 -
Hampton, V					16357	TEST DEFINIT	IZED AMEND-	\$ 185 4. FUND LIMI" \$ 185		1	0 -
CONTRACT	C. SCOPE OF WORK ERBS/SAGE			d. AUTH CONTR. REP. (Stenature) DATE			09/20/85	s 180		5. TOTAL PY	TS AEC'D
			MONTH	ED/HOURS WOR		8. ESTIMATED COSTS/HRS. 1 DETAIL		TO COMPLETE		TED FINAL	10. UN-
6. REPORTING CATEGORY Direct Labor Hours *		ACTUAL	PLANNED	ACTUAL	PLANNED			BALANCE OF Contract C,	CON- TRACTOR ESTIMATE	CONTRACT	FILLED ORDERS OUT- STANDING
		.1	.1	9.2	9.2			,2	2.4	9.4	
Direct Labor Dollars		1	1	92	92			2	94	94	
Overhead	Overhead		1	65	65			1	66 .	66	
Fringe Bene	efits	0	0.	14	14			Q	14	14	
Other Direc	ct Costs	0	0	9	9			2	11	- 11	
•										ļ	
Total Cost	8	2	2	180	180			. 5	185	185	
*Disclaime	r: For purposes this.	of this re	port it w	as assumed	that the	professo	r worked	a 40 hou <u>r</u>	week, M	any work m	ore than
NOTE: No	Expenditures Dur	ing July,	985								
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GEORGIA TECH 1845-1985

Georgia Institute of Technology Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta. Georgia 30332-0259 Telephone: (404) 894-4624; 2629

DESIGNING TOMORROW TODAY

October 24, 1985

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended September 30, 1985.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

Enclosure

		· · · · · · · · · · · · · · · · · · ·				09/30/85 20					
	ey Research Cente	FROM				3. CONTRACT VALUE					
Attn: Mr.	Georgia Tech Research Corp.				R. COSTS		b. FEC				
	Management, M/S 1	26				ia 30332					
Hampton, V								\$ 185		\$ - 0 -	
	N, TYPE			S. CONTRACT MENT NO.	NO. AND LA	TEST DEFINITI	ZED AMEND.	4. FUND LIMIT	TATION		
DESCRIPTION	Cost Reimbursabl	e		NAS1-1	6357			\$ 185		\$ - 0 -	
OF CONTRACT	OF									LING	
CONTRACT	C. SCOPE OF WORK ERBS/SAGE		.1	d. AUTHY CON	TA) REP. (SI)	Signaluib) DATE 10/24/85		•	MTS BILLED 5. TOTAL PY		TS NEC'O
		7. 0	OSTS INCURRE	D/HOURS WOR	KED	8. ESTIMATED	COSTS/HRS.	TOCOMPLETE	9. ESTIMAT	TED FINAL	1.1
		DURING	MONTH	CUM. TO DATE		DET	AIL		COSTS/HOURS		FILLED
6. REPORTING CATEGORY		ACTUAL	PLANNED	ACTUAL	PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	STANDING
Disect Yel		n ,	<u>b.</u>	9.3	9.3 ·		<u> </u>	• .1	9.4	9.4.	
Direct Lab	oor Hours *	.1	.1	9.3	9.5			•1	9.4	9.4	
Direct Lab	oor Dollars	1	1	93 .	93	·		1	94	94	
Overhead		0	0	65	65			1	66	66	
Fringe Ber	nefits	0	0.	14	14			0	14	14	
Other Dire	ect Costs	0	0	9	9			2	11	· 11	
Total Cost	18	1	1	181	181			4	185	185	
*Disclaime	er: For purposes	of this r	eport it v	as assume	d _{that th}	e professo	r worked	a 40 hour	week. Ma	ny work'n	ore than
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GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624: 2629

November 21, 1985

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended October 31, 1985.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

Enclosure

	TIONAL AERONAUTICS			and and		pproved		OPERATIN	G DAYS	DING AND NUS	IDEN OF
MONTHLY	CONTRACTOR FIN	ANCIAL MANA	GEMENT R	EPORT	Budget	Bureau No	. 104-R0011	10/31/8	5	2	3
O: NACA TANCT	EV DECEADOU OFN			FROM						ACT VALUE	
NASA-LANGL	EY RESEARCH CEN C. L. CROWDER	IER		CEOPCE	TECH RES	SEADCH CC	DD	4. COSTS		D. FEE	
		100					MI.			\$ - 0 - \$ - 0 - \$ - 0 - LING b. TOTAL PYTS REC \$ 175 TED FINAL HOURS FILIORD CONTRACT OUTRACT	
	MANAGEMENT, M/S	120		AILANIA	, GEORGIA	A 20322		\$ 185		5 0	
HAMPTON, V	A 23665			L CONTRACT		TEST DERINI	TIZED AMEND-	1. 101			
	H. ITPE			MENT NO.	NO. AND LA		TILED AMERIC			5 - 0	-
I. DESCRIPTION	COST REIMBURS	ABLE					e e	\$ 185			
OF				NAS1-16	357		1				
CONTRACT	C. SCOPE OF WORK			d. auty con	TR. REAL (SI	ipature)]	DATE		MTS BILLED		IS NEC.D
	ERBS/SAGE			1. com			11/21/85	\$ 183		\$ 175	
		7. 00	STS INCURRE	D/HOURS WOR		8. ESTIMATE	D COSTS/HRS.	TOCOMPLETE	9. ESTIMA	TED FINAL	1.2.5.2.0.3
		DURING	MONTH	CUM. T	ODATE	DE	ETAIL	1000	COSTS	HOURS	10. UN-
6. REPORT	TING CATEGORY		1					BALANCE	CON-	1.	ORDERS
		ACTUAL	PLANNED	ACTUAL	PLANNED			OF	TRACTOR		OUT-
									ESTIMATE		STANDING
		A .	b,	c,	<u>d,</u>	.	b,	C	64 ,	b,	
Direct Lab	or Hourst	.1	.1	9.4	9.4			-0-	9.4	9.4	
Direct Lab	or nours.	• •	• •	7.4	5.4						
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Direct Lab	rect Labor Dollars		1	94	94			-0-	94	94	
	irect Labor Dollars									1	
Overhead		1	1	66	66			-0-	66	66	
		1 2 3 3 1					-				
Fringe Ben	efits	-0-	-0-	14	14			-0-	14	14	
			1								
Other Dire	ct Costs	-0-	-0-	9	9	· · · · · · · · · · · · · · · · · · ·		2	11	11	
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				1	1					13	
Total Cost	8	. 2	2	183	83			2	185	185	· · · · · · · · · · · · · · · · · · ·
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DESIGNING TOMORROW TODAY

orgia Institute of Technology Frants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta. Georgia 30332-0259 Telephone: (404) 894-4624; 2629

December 16, 1985

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended November 30, 1985.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

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	CONTRACTOR FINAL		GEMENT R	EPORT	Budget	Bureau No.	104-R0011	11/30	/85	18	
ATTN: MR. O FINANCIAL MA	Y RESEARCH CENTER C. L. CROWDER ANAGEMENT, M/S 126 23665			ATLANTA,	GEORGIA			s 185		ST VALUE) -
HAMPTON VA	Cost Reimbursabl		•	b. CONTRACT MENT NO. NAS1-163		TEST DEPINIT	IZED AMEND.	4. FUND LIMI		\$ - () -
OF CONTRACT	C. SCOPE OF WORK ERBS/SAGE			d. AUTH. CON			DATE 12/16/85			5. TOTAL PY	TEREC'D
		7. CO		D/HOURS WOR			COSTS/HRS.	TOCOMPLETE		TED FINAL	.10. UN.
6. REPORT	TING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED			BALANCE OF Contract	CON- TRACTOR ESTIMATE	CONTRACT	FILLED ORDERS OUT- STANDING
Direct Labor	r Hours *	- 0 -	- 0 -	e 9.4	9.4	.	<u> </u>	- 0 -	9.4	9.4	
Direct Labor	r Dollars	- 0 -	" - 0 -	94	94			- 0 -	94	94	
Overhead	s ¹	- 0 -	- 0 -	66	66		x	- 0 -	66	66 66	
Fringe Benei	fits	- 0 -	- 0 -	14	14			- 0 -	14	66 14	
Other Direct	t Costs	- 0 -	- 0	9	· 9			2	11	11	
Total Costs		0 -	- 0 -	183	183			2	185	185	
*Disclaimer:	: For purposes of Many work more			s assumed	that the	professor	worked a	40 hour v	veek.		
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GEOPGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

Georgia Institute of Technology Grants and Contracts Accounting Dept Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629

January 21, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended December 31, 1985.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0307 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

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MONTHLY	CONTRACTOR FINA	NCIAL MANA	GEMENT R	EPORT		Bureau No.	104-R0011	12/31/8	5	17	
P: NASA-Langle	y Research Cente	r		FROMI					S. CONTRA	ACT VALUE	
	C. L. Crowder			Georgia	Tech Rese	earch Corp		A. COSTS		b. FEE	
	Management, M/S 1	26			x 100117						
Hampton, V/	A 23665				Georgia				• •• •	s - 0	-
	4, TYPE			b. CONTRACT MENT NO.	T NO. AND LA	TEST DEFINIT	IZED AMEND.	4. FUND LIMI		s - 0	-
1. DESCRIPTION OF	Cost Reimbursabl	e		NAS1-163	57			• 100		LLING	•
CONTRACT	ERBS/SAGE			d. AUTH. CON	TR. REP. GI	(neture)	DATE			b. TOTAL PY	TS REC'D
				is may	unn	<u>kr</u>	01/21/86	s 183		s 179	
		7. C	STS INCURRE	D/HOURS WOR	KED	8. ESTIMATED	COSTS/HRS. T	OCOMPLETE		TED FINAL	10. UN-
		DURING	MONTH	CUM. TO	DATE	DET	TAIL		COSTS	/HOURS	FILLED
6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT	ORDERS OUT- STANDING
		н.	b,	<u>c</u> .	d.	•.	b.	с.	A ,	b.	
Direct Labo	or Hours*	0	0	9.4	9.4			0	9.4	9.4	
Direct Labo	or Dollars	0	0	94	94			0	94	94	
Overhead		0	0	66	66			0	66	66	
Fringe Ben	efits	0	0	14	14			0	14	14	
Other Dired	ct Costs	0	0	9	9			2	11	11	
										<u> </u>	
Total Cost	5	0	0	183	183			2	185	185	
*Disclaime	r: For purposes Many work mor	of this re	aport it i	was assume	d that t	he profes	sor worked	a 40 hoι	r week.		
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Georgia Institute of Technology

Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629



GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

February 18, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended January 31, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0307 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

	CONTRACTOR FINAN			FROM		Bureau No.		01/31/8		21	
Attn: Mr. Financial	ey Research Center C. L. Crowder Management, M/S 12 A <u>23665</u>			Georgia Te P O Box 1 Atlanta, (100117		ation	s 185		b, FEE	
nampton, v.	A. 23003	······································		S. CONTRACT	NO. AND LA	TEIT DEFINIT	ZED AMEND-	4. FUND LIMI	TATION	J	
. DESCRIPTION	Cost Reimbursabl	e		The second second second second	-16357		e de la composition de la comp	\$ 185		\$ - 0	
OF Contract	C. SCOPE OF WORK			d. AUTH, CON	TR. REP. (51	neture)	DATE	. INVOICE A		LLING	TS REC'D
	ERBS/SAGE			1		-	02/18/86	\$ 183		\$ 180	
		7. CC	STS INCURRE	D/HOURS WOR	KED			TOCOMPLETE	9. ESTIMA	TED FINAL	
	A CONTRACTOR OF A	DURING	MONTH	CUM. TO	DATE	DET	AIL		COSTS	HOURS	IO. UN-
6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED d.		ь.	BALANCE OF Contract c.	CON- TRACTOR ESTIMATE	CONTRACT VALUE	ORDERS OUT- STANDING
Direct Labo	r Hours*	0	0	9.4	9.4			0	9.4	ь. 9.4	
		4						. (
Direct Labo	r Dollars	0	0	94	94			0	94	94	
Overhead	A .	0	0	66	66			0	66	66	
Fringe Bene	fits	0 - 144 - 1	0	14	14			0	14	14	
Other Direc	t Costs	0	0.	9	9			2	11	11	
									-		
Total Costs		. 0	0	183	183			2	185	185	
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*Disclaimer	: For purposes of	this rep	ort it wa	s assumed	that the	professor	worked	a 40 hour	week. Ma	my work m	ore than
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Georgia Institute of Technology Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629



GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

March 14, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended February 28, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0307 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

MONTHLY	CONTRACTOR FINAN	ICIAL MANA	GEMENT R	EPORT	Budget	Bureau No.	104-R0011	02/28/86		20	•	
ATTN: MR. (Y RESEARCH CENTER C. L. CROWDER ANAGEMENT, M/S 12 23665_			P. O. Box Atlanta.	Georgia	30384		а. созта \$ 185	••	CONTRACT VALUE b. FEE \$ _ 0 _ \$ _ 0 _ N \$ _ 0 _ S BILLING ILLED b. TOTAL PYTS REC' \$ 180 ESTIMATED FINAL CONTRACT ORDER CONTRACT YALUE D. .4 9.4 95 96 66 66 66 <		
1. DESCRIPTION	Cost Reimbur	sable		B. CONTRACT MENT NO. NAS1-1	NO. AND LA	TEST DEFINIT	IZED AMEND-	4. FUND LIMIT			-	
	C. SCOPE OF WORK ERBS/SAGE			d. AUTH. COM	TR. REP. (51	gature)	03/14/86	4. INVOICE AN \$ 183		b. TOTAL PY	SREC'D	
	-	7. CC		CUM. T	KED		D COSTS/HRS.	COMPLETE			10. UN-	
6. REPORT	ING CATEGORY	ACTUAL -	PLANNED	ACTUAL	PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	VALUE	ORDERS OUT- STANDIN	
Direct Labor	Hours*	0	<u>ь,</u> О	9.4	9.4	.	b.	e. 0	9.4			
,								4				
Direct Labor 1	Dollars	0	.' 0	94	94			0	94	94		
Overhead	1	0	0	66	66			0	66	66		
Fringe Benefi	ts	0	0	14	14			.0	14	14		
Other Direct	Costs	0	0	9	9			2	11	11		
Total Costs		. 0	0	183	183			2	185			
Disclaimer:	For purposes of t	his repor	t it was	assumed th	nat the pr	ofessor	worked a 4		ek. Many	work more	than t	
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GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

April 11, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended March 31, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A, Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0307 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

Georgia Institute of Technology Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta. Georgia 30332-0259 Telephone: (404) 894-4624: 2629

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GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

May 12, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended April 30, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

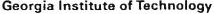


	MONTHLY	CONTRACTOR FINAN	ICIAL MANA	GEMENT R	EPORT	Budget	Bureau No.	104-R0011	03/31/8	36	2	1
1	Attn: Mr. Financial N	ey Research Center C. L. Crowder Management, M/S 120			FROM: Georgia T P. O. Box Atlanta,	100117	arch Corpo 30384 ·	ration	n, COSTS	3. CONTRA	b. FEE	
•	Hampton, VA	A 23665 	ble		b. CONTRACT MENT NO.		TEST DEFINIT	IZED AMEND-	\$ 185 4. FUND '-IMI' \$ 185		<u>\$ - 0 -</u> \$ - 0 -	
	OF CONTRACT	C. SCOPE OF WORK ERBS/SAGE			d. AUTHY CON			DATE 04/11/86	A. IN VOICE AN \$ 183		LLING b. TOTAL PY \$ 180	TS REC'D
				NONTH	D/HOURS WOR	KED D DATE	8. ESTIMATED		TOCOMPLETE		TED FINAL HOURS	10. UN-
	6. REPORT	TING CATEGORY	ACTUAL	PLANNED -	ACTUAL	PLANNED	•	. b.	BALANCE OF CONTRACT C.	CON- TRACTOR Estimate	CONTRACT VALUE b,	ORDERS OUT- STANDING
	Direct Lab	or Hours*	0	0	9.4	9.4			0	9.4	. 9.4	
	Direct Lab	Direct Labor Dollars		0	94	94			0	94	94	
	Overhead		0	0	66	66			0	66	66	
	Fringe Ben	efits	0	0 .	• 14	14			0.	14	14	
-	Other Dire	ct Costs	0	0	9	9			2	11	11	
	Total Cost	s	0	0	183	183			2	185	185	
-	Disclaimer	: For purposes of	this rep	ort it wa	s assumed	that the	professor	worked a	40 hour	veek. Ma	ny work mc	re than t
			· · · · ·									
	G-35-675/R	5380-0A0					*				~	
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	· · · · · · · · · · · · · · · · · · ·	NCIAL MANA		TEROMI	- Dudger	Bureau No. 1		04/30/86-	_		_
Attn: Mr. Financial M	ey Research Cente C. L. Crowder Management, M/S 1	•			c 100117		ration	a. costs \$ 237	•	b, FEE	
Hampton, VA	23665		*	b. CONTRACT	T NO. AND LA	TEST DEFINITI	ZED AMEND.	4. FUND LIMIT			
1. DESCRIPTION	Cost Reimbursa	hle		NAS1-16	5357			\$ 237		\$ - 0	
OF CONTRACT	C. SCOPE OF WORK			d. AUTH. CON		(return)	DATE				TAREC'D
		-			1 I A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1		05-12-86	\$ 193			
	ERBS/SAGE	7.0		D/HOURS WOR	KED	And and the American Street of the Street of		TOCOMPLETE		l	
			MONTH	1	O DATE	DET					10. UN FILLED
6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED	-		BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	\$ - 0 LLING b. TOTAL PY \$ 180 TED FINAL /HOURS CONTRACT VALUE b. 11.5 115 86 17 19 19 1 237	ORDER OUT- STANOIN
		A ,	b,	<u> </u>	d,	•	<u>b.</u>	c	<u>,</u>	D.	
Direct Labor	Hours*	.5	.5	9.9	9.9			1.6	11.5	11.5	
					`						
Direct Labor	Dollars	5	., 5	99	99			16	115	115	
Overhead	3	. 4	4	70	70			16	86	86	
Fringe Benefi	ts	1	1	15	15			2	17	17	
Other Direct	Costs	0	0 .	9	. 9			10	19	19	
				,	100					, , ,	
Total Costs		. 10	10	193	193		1	44	237	237	
)isclaimer:	For purposes of	this repor	t it was	assumed th	nat the p	rofessor w	orked a 4	0 hour wee	ek. Many	work more	than
										:	
						-					
G-33-675/R538	80-0A0	_	·	-	1 .			· · ·			

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' NASA-Langle	y Research Cente	r		FROMI		1 -		04/30/86	S. CONTRA	CT VALUE	
	C. L. Crowder			Georgia	rech Resea x 100117	arch Corp	oration	a COSTS	•	b. FEE	
	lanagement, M/S 1				Georgia	30384					
Hampton, VA	23665		•	1				\$ 237	••	s - 0	
	A. TYPE	,		b. CONTRAC	T NO. AND LA	TETT DEFINI	TIZED AMEND-	4 FUND LIMIT	TATION	s - 0	
I. DESCRIPTION OF	Cost Reimbursa			NAS1-1	6357	1		• 251	1 01	ULING	
CONTRACT	C. SCOPE OF WORK		** <u>***</u>	d. AUTH. CO	NTR. REP. (SI.	(mature)	DATE	. INVOICE AN		b. TOTAL PY	13 REC'D
	ERBS/SAGE					•	05-12-86	\$ 193		\$ 180	
	EKAS/SALE	7. 0	OSTS INCURRE	ED/HOURS WOR	HED		D COSTS/HRS.	TOCOMPLETE	9 ESTIMA	TED FINAL	
		DURING	MONTH	CUM. T	ODATE	DE	TAIL			/HOURS	10. UN. FILLED
6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL	PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT	ORDERS OUT-
		•	b,	C,	d, .	.	. <u>b</u> .	e.	•.	<u>b.</u>	
Direct Labor	Hours*	.5	.5	9.9	9.9			1.6	11.5	- 11.5	
							*			·	
Direct Labor	Dollars	5	· 5	99	99			16	115	115	
Overhead	•	4	4	70	70			16	86	86	
Fringe Benefi	.ts	11	1	15	15			2	17	17	
Other Direct	Costs	0	0	9	9			10	19	19	
•											
Total Costs		. 10	.10	193	193			44	237	237	
		_		····							
Disclaimer:	For purposes of	this repor	t it was	assumed t	hat the p	rofessor	worked a	to hour we	ek. Many	work more	than t
	·····								· ·		
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Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624: 2629



GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

June 20, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended May 31, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

	CONTRACTOR FIN		ADEMENT R		- Induger	Ducau NU.	. 104-R0011	05/31/			22
Attn: Financi	ngley Research Mr. C. L. Cros al Management , VA 23665	wder		P. O. I	a Tech R Box 100 a, Georg	117		n. costs \$ 237		b. FEE	-
1. DESCRIPTION OF	Cost Reimbu	rsable	···· ·	MENT NO.	-16357	TEST DEFINI	TIZED AMEND.	4. FUND LIMI \$ 237		\$ - 0	-
CONTRACT	C. SCOPE OF WORK ERBS/SAGE		•		NTR. REP (SI		06/20/86	A. INVOICE A \$ 227	MTS BILLED	5. TOTAL PY	
		-	OSTS INCURRE	L			DCOSTS/HRS.	TOCOMPLETE		TED FINAL	10. UN-
5. REPOR	TING CATEGORY	ACTUAL	PLANNED -	ACTUAL	PLANNED		b.	BALANCE OF CONTRACT C.	CON- TRACTOR ESTIMATE	CONTRACT VALUE	FILLED ORDERS OUT- STANDIN
Direct Lab	or Hours*	1.8	1.8	11.7	11.7			(.2)	11.5	11.5	
					•						
Direct Lab	oor Dollars	18	. 18	117	117			(2)	115	115	
Overhead		13	13	83	83			3	86	86	
•Fringe Ben	nefits	3	. 3 5	18	18			(1).	17	17	
Other Dire	ect Costs	0	0	9	9			10	19	19	
Total Cost	S	34	34	227	227	-		10	237	237	
*Disclaime Many work	er: For purpo k more than th	ses of th	is repor	t it wa	s assume	d that	the prof	essor wo	rked a	10 hour	week.
									4	N at	
G-33-675/F	R5380-0A0 ""							¥.			



Georgia Institute of Technology Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629

GEORGIA TECH 1885-1985 DESIGNING TOMORKOW TODAY

July 31, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended June 30, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cwmold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Fat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

MONTHLY	CONTRACTOR FINA	NCIAL MANA	GEMENT R	EPORT	Budget	Bureau No	. 104-R0011	06/30/	86-	21	
Attn: Mr.	ey Research Cente C. L. Crowder Management, M/S ⁻¹ A 23665			P. O. Box	fech Rese x 100117 Georgia		poration	a. costs \$ 237		h. FEE	3
L DESCRIPTION	Cost Reimburs	able		MENT NO.	1-16357	TjEST DEFINI 1 	TIZED AMEND.		TATION	\$ - 0	_
OF CONTRACT	C. SCOPE OF WORK			d. AUTH. COM	TR. DEP. (SI	duature)	DATE	A INVOICE A			TA BEC'D
							07/31/86				IS NEC D
	ERBS/SAGE	1 10		D/HOURS WOR	V~ -			1		<u> </u>	
				1			DCOSTS/HRS.	TOCOMPLETE		ACT VALUE b. FEE 5 - C 5 -	10. UN
6. REPORT	TING CATEGORY	ACTUAL	UAL PLANNED ACTUAL		PLANNED			BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	FILLEE ORDERS OUT- STANDIN
Direct Lab	or Hours*	.3	.3	12.0	d. 12.0		<u> </u>	<u>c.</u> (.5)	•. 11.5		
	1										
Direct Lab	rect Labor Dollars		3	120	120			(5)	115	115	
Overhead		2	2	85	85			1	86	86	
Fringe Ben	efits	1	1	19	. 19			(2)	17 ·	17	
Other Dire	ct Costs	0	0 '	9	9			10	19	19	
Total Cost	S	6	6	233	233			4	237	237	
*Disclaime	r: For purposes Many work mon			as assume	d that th	e profes	sor worked	a 40 hour	week.		
	Many work mot		ца. 								
										×	
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DESIGNING TOMORROW TODAY

Georgia Institute of Technology Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629

September 17, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended August 31, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

								00/31/0	00		.1
NASA-Langley	Research Center			FROMI					J. COUTRI	ACT VALUE	
Attn: Mr. (C. L. Crowder					arch Corpo	ration	n. COSTS	1	h. FEE	
	anagement, M/S 126	5			к 100117				1	-	
Hampton, VA	23665				Georgia			\$ 237		s - 0	•
	A. TYPE			b. CONTRAC	T NO. AND LA	TEST DEFINIT	IZED AMEND.	4. FUND LIMI			
1. DESCRIPTION								\$ 237		\$ - 0	-
OF CONTRACT	Cost Reimbursat	ble		NAS1-1						LLING	
CONTRACT	C. SCOPE OF WORK		4		TR. REP. (SI		DATE		MTS BILLED	S. TOTAL PY	TS REC'D
	ERBS/SAGE			Annauce -	many men	wanter and	09/17/86	\$ 237		\$ 225	
		7. 00	STS INCURRE	D/HOURS WOR	KED	B. ESTIMATED	COSTS/HRS.	TOCOMPLETE		TED FINAL	10. UN-
		DURING	MONTH	CUM. T	ODATE	DET	TAIL		COSTS	HOURS	FILLED
6. REPORT	FING CATEGORY		Second Second					BALANCE	CON-	CONTRACT	ORDERS OUT-
		ACTUAL	PLANNED	ACTUAL	PLANNED	1		CONTRACT	TRACTOR	VALUE	STANDING
			<u>b.</u>	<u>e.</u>	d,		b	c		b	
Direct Labor	11 and a sh	0	0	12.0	12.0			(.5)	11.5	11.5	
Direct Labor	Hours*	0		12.0	12.0			(.5)	11.5	11.5	
									,		
	D 11		0	120	120			(5)	115	115	
Direct Labor	Dollars	0	0	120	120			(3)	115		
Overhead		0	0	87	87			(1)	86	86	
Overneau		·									
n		0	0	19	19	a.		(2)	17	17	
Fringe Benefi		0	0	19 .	19			(2).	17	1/	
Other Direct	Conto	0	0	11	11			8	19	19	
Other Direct	COSES		0						15	- 17	
· · ·											
Total Costs		0	0	237	237			0	237	237	
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DESIGNING TOMORROW TODAY

Georgia Institute of Technology Grants and Contracts Accounting Dept Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629

October 13, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended September 30, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Mr. D. Farmer 0420 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0



	CONTRACTORTIN	ANCIAL MAN	NGEMENT-K	CTUKI	nuage	Mureau No	. 104-10011	09/30/8	6	21	
Attn: Mr. C.	gement, M/S 126			P. O. Box	Tech Resea x 100117 Georgia		oration	s 237	3 СОНТЛ	ACT VALUE) _
1. DESCRIPTION	Cost Reimbur	sable		ь. сонтлас мент но. NAS 1-16		TEST DEFIN	ITIZED AMEND.	4. FUND LIMI \$ 237	•	5 - 0	-
CONTRACT	ERBS/SAGE				NTR. REP. (51	-	10/13/86	s 237		6. TOTAL PY	
		7. CC			O DATE		DCOSTS/HRS. 1	TOCOMPLETE		TED FINAL HOURS	10. UN-
6. REPORT	ING CATEGORY	ACTUAL	PLANNED	ACTUAL C.	PLANNED	•	Ъ.	BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE 8.	CONTRACT VALUE b.	FILLED ORDERS OUT- STANDING
Direct Labor H	ours*	0	0	12.0	12.0			(.5)			
Direct Labor D	Pollars	0	0	120	120			(5)	115	115	
Overhead			87			(1)	86	86			
Fringe Benefit	S	0	0	19 .	19			(2)	17	17	
Other Direct C	osts	0	0		11			8	19	19	
Total Costs		0	0	237	237		0 237 23		237		
G-35-675/R5380	-0A0							-			
				_]
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DESIGNING TOMORROW TODAY

Georgia Institute of Technology Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629

November 12, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended October 31, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

			indit;et	-rucan ru		10/31/86 23					
10: NASA - Lang	gley Research Ce	nter		FROMI	Teeh Deet	arch Corr	oration			ACT VALUE	
Attn: Mr.	C. L. Crowder			Georgia Tech Research Corporation P. O. Box 100117 Atlanta, Georgia 30384				N. COSTS			
	lanagement, M/S	126									
Hampton, VA								\$ 237		s - 0-	
	H. TYPE			b. CONTRAC	T NO. AND LA	TEST DEFIN	ITIZED AMEND.		TATION		
1. DESCRIPTION	Cost Roim	Cost Reimbrusable						\$ 237		\$ - 0	
OF CONTRACT	COSE REIM	NAS	d. AUTH. CONTR. REP. (Signatura) DATE					LLING			
			N 111. Acr. (5)	(interior)	11/12/86	\$ 237	AMTS BILLED D. TOTAL PYTS REC'D				
	ERBS/SAGE			I.C.						\$ 235	
		-		D/HOURS WOR			DCOSTS/HRS.	TOCOMPLETE	a si sud i min	TED FINAL	10. UN-
6 REPORT	ING CATEGORY	DURING	MONTH	CUM. T	DATE	00	TAIL	BALANCE		T	FILLED
		ACTUAL	PLANNED	ACTUAL	PLANNED			OF	CON-	CONTRACT	ORDERS OUT-
			1	'				CONTRACT	ESTIMATE	VALUE	STANDING
			<u>b,</u>	с,	d		<u>b.</u>	c	•.	b	
Direct Labor Hours*		0	0	12.0	12.0			(.5)	11.5	11.5	
										<u> </u>	
•								11			l
					1						
Director Labor Dollars		0	0	120	120			_(5)	. 115	115	1
				1							
Overhead		0	0	87	87			(1)	86	86	L
Fringe Benefi	ts	0	0	19.	19			(2).	17	17	
	•										
Other Direct	Costs	0	0	11	11			8	19	19	<u>8. </u>
Total Costs		0	0	237	237			0	237	237	
					· · · · · · · · · · · · · · · · · · ·		-				
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DESIGNING TOMORROW TODAY

G - 35-6/S Georgia Institute of Technology Grants and Contracts Accounting Dept. Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 Telephone: (404) 894-4624; 2629

December 9, 1986

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended November 30, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Linda A. Gill, Accountant III Grants and Contracts Accounting

1

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

					natiget bateau No. 1000011			11/30/86 18				
	ngley Research Ce	enter		FROM				S. CONTRACT VALUE				
	. C. L. Crowder			Georgia Tech Research Corporation				n. COSTS	1	h, FEE		
	Management, M/S	126		P. O. Box					,			
Hampton, V	Hampton, VA 23665					30384		\$ 237		\$ 2	0 -	
	H. TYPE			S. CONTRAC	T NO. AND LA	TEST DEFINI	TIZED AMEND.					
I. DESCRIPTION		12.2		NAS1-16357				\$ 237	•	s -	0 -	
OF	Cost Reimburs	able								LLING		
CONTRACT	C. SCOPE OF WORK			d. ADTH CONTR BED ASIANATURA			DATE		MATS BILLED S. TOTAL P		TS REC'D	
	ERBS/SAGE			6			12/9/86	\$ 237		\$ 235		
		7. 60	STS INCURRE	D/HOURS WORKED 8.		B. ESTIMATE	D COSTS/HRS.	TOCOMPLETE	9. ESTIMATED FINAL			
		DURING	MONTH	CUM. T	ODATE	DE	TAIL		COSTS	HOURS	TILLEO	
6. REPORT	6. REPORTING CATEGORY		PLANNED	ACTUAL	PLANNED	•		BALANCE OF CONTRACT	CON- TRACTOR ESTIMATE	CONTRACT VALUE	ORDERS OUT- STANDING	
			b,	c,	d,		b.	<u> </u>		b		
Direct Labor Hours*		0	0	12.0	12.0			(.5)	11.5	11.5		
•												
Direct Labor Dollars		0	0	120	120	·		(5)	115	115		
Overhead	Overhead		0	87	87			(1)	86	86		
Fringe Benefi	its	0	0	19	19			(2)	17	17		
Other Direct	Costs	0	0	11	11			8	19	19		
Total Costs		0	0	237	237			0	237	237		
G-35-675/R53	380-0A0	_										
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<u>a Tech</u>

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Office of Grants and Contract Accounting

Georgia Institute of Technology Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 404-894-4624; 2629

January 13, 1987

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended December 31, 1986.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerelv.

Linda A. Gill, Accountant III Grants and Contracts Accounting

LAG/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

MONTHLY	CONTRACTOR FIN	ANCIAL MAN	AGEMENT R	EPORT	Budge	Budget Bureau No. 104-R0011 12/31/86 18						
Attn: Mr. Financial	10: NASA - Langley Research Center Attn: Mr. C. L. Crowder Financial Management, M/S 126 Hampton, VA 23665					FROM: Georgia Tech Research Corporation P. O. Box 100117 Atlanta, Georgia 30384				3. CONTRACT VALUE A. COSTS		
1. DESCRIPTION	", TYPE			MENT NO.		TEST DEFINI	TIZED AMEND.	4. FUND LIMI \$ 237	TATION	s - 0	-	
OF CONTRACT	Cost Reimbursa	ble		NAS1-16357						LLING		
Contract	C. SCOPE OF WORK ERB/SAGE	d. AUTH, CONTR. REP. (Signatura) TOATE 01/13/87			\$ 237	MTS BILLED	5 235	TS REC'D				
	EKD/ SAGE	D/HOURS WOR	KED	B. ESTIMATE	D COSTS/HRS. 1			TED FINAL				
5. REPORTING CATEGORY			CUM. TO DATE			TAIL			HOURS	10. UN- FILLED		
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Overhead		0	0	87	87			(1)	86	86		
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Georgia Institute of Technology Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 404+894+4624; 2629

February 12, 1987

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended January 31, 1987.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Randall Bailey, Financial Mgmt Associate Grants and Contracts Accounting

RB/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

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	CONTRACTOR FINA		AGEMENT R	EPORT	Budge	Budget Bureau No. 104-R0011 01/31/87					
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Georgia Institute of Technology Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 404 • 894 • 4624; 2629

March 19, 1987

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

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Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended February 28, 1987.

side and the second second

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Randall Bailey, Finanatal Mgmt Associate Grants and Contracts Accounting

RB/djt

cc: Dr. C. S. Kiang 0340 Dr. D. M. Cunnold 0340 Ms. Suzanne Zimmerman 0340 Ms. Pat Heitmuller 0420 Tech. Rep. M/S 234 NASA Expt. Scientist Cost Accounting M/S 135-(2 copies) File G-35-675/R5380-0A0

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Georgia Institute of Technology Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 404 • 894 • 4624; 2629

April 21, 1987

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended March 31, 1987.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Randall Bailey, Financial Mgmt. Associate Grants and Contracts Accounting

RB/djt

cc: Dr. C. S. Kiang, Geophysical Sci. - 0340
Dr. D. M. Cunnold, Geophysical Sci. - 0340
Ms. Suzanne Zimmerman , Geophysical Sci. - 0340
Ms. Pat Heitmuller, OCA - 0420
Tech. Rep. M/S 234
NASA Expt. Scientist
Cost Accounting M/S 135 - (2 copies)
OCA/CSD - 0420
File G-35-675/R5380-0A0

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<u>rgia Tech</u>

Georgia Institute of Technology Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 404 • 894 • 4624; 2629

May 20, 1987

F

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended April 30, 1987.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Randall Bailey, Financial Mgnt Associate Grants and Contracts Accounting

RB/djt

cc: Dr. C. S. Kiang, Geophysical Sci. 0340
Dr. D. M. Cunnold, Geophysical Sci. 0340
Ms. Suzanne Zimmerman, Geophysical Sci. 0340
OCA/CSD 0420 (2 copies)
Tech. Rep. M/S 234
Cost Accounting M/S 135 (2 copies)
NASA Expt. Scientist
File G-35-675/R5380-0A0

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Office of Grants and Contract Accounting

Georgia Institute of Technology Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 404•894•4624; 2629

June 19, 1987

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended May 31, 1987.

Sugar St.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerelv.

C Randall Bailey, Financial Mgmt Associate Grants and Contracts Accounting

RB/djt

ddd Lhuir ini

cc: Dr. C. S. Kiang, Geophysical Sci. 0340
Dr. D. M. Cunnold, Geophysical Sci. 0340
Ms. Suzanne Zimmerman, Geophysical Sci. 0340
OCA/CSD 0420 (2 copies)
Tech. Rep. M/S 234
Cost Accounting M/S 135 (2 copies)
NASA Expt. Scientist
File G-35-675/R5380-0A0

Enclosure

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Office of Grants and Contract Accounting

Georgia Institute of Technology Lyman Hall/Emerson Building Atlanta, Georgia 30332-0259 404•894•4624; 2629

August 12, 1987

Mr. C. L. Crowder, Contracting Officer NASA - Langley Research Center Financial Management Division M/S 126 Hampton, VA 23665

Mr. Crowder:

Enclosed is the Monthly Contractor Financial Management Report for Contract No. NAS1-16357 for the month ended July 31, 1987.

If you have questions or require additional information, please contact me at (404) 894-6759.

Sincerely,

Randall Bailey, Financial Mgmt Associate Grants and Contracts Accounting

RB/djt

cc: Dr. C. S. Kiang, Geophysical Sci. 0340
Dr. D. M. Cunnold, Geophysical Sci. 0340
Ms. Suzanne Zimmerman, Geophysical Sci. 0340
Ms. Luch Blunschi, Geophysical Sci. 0340
•OCA/CSD 0420 (2 copies)
Tech. Rep. M/S 234
Cost Accounting M/S 135 (2 copies)
NASA Expt. Scientist
File G-35-675/R5380-0A0

Enclosure

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Georgia Institute of Technology

A UNIT OF THE UNIVERSITY SYSTEM OF GEORGIA

ATLANTA, GEORGIA 30332

SCHOOL OF GEOPHYSICAL SCIENCES

404/894-3893

June 3, 1985

Mr. J. Y. Taylor Contracting Officer NASA/Langley Research Center Contract Center Mail Stop 126 Hampton, Virginia 23665

Re: NASA Contract No. NAS1-16357 Georiga Tech No. G-35-675

Dear Mr. Taylor:

Enclosed please find one copy of my Progress Report from the May 1985 team meeting at NASA Ames, California.

Sincerely,

Derek M. Cunnold

DMC/spz

Science Team Progress Report for May, 1985 Meeting NASA Ames, California

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Science Support for Earth Radiation Budget Satellite (ERBS)/Stratospheric Aerosol and Gas Experiment (SAGE)

> Dr. Derek M. Cunnold School of Geophysical Sciences Georgia Institute of Technology

The reprocessed SAGE I data has been decoded and collated for processing on our Data General computer by our graduate student, Mike Newchurch. This data is now being processed into Fourier coefficients in order to compare the revised SAGE data against the SBUV data (which also is now being revised). Results should be available within one month.

The principal activity during this period was the analysis of results from our new three-dimensional model of the atmosphere. A paper discussing the longitudinal variations of ozone in the model was presented at the AMS meeting on stratospheric dynamics held in Boulder in April. These first results from the 18 wave version of the model were encouraging in that the January zonal mean dynamics looked quite realistic. The stationary waves at mid-latitudes in winter also looked realistic. Thus the ozone distribution shown in Figure (i) and the distribution of longitudinal variability shown in Figure (ii) could be interpreted in terms of transport and chemistry. The interaction of these physical phenomena has a substantial effect on the ozone budget at mid-latitudes in winter. In the stratosphere this is a region which can be studied using SAGE (and SBUV) satellite data. We are, therefore, emphasizing this region in our studies and plan to compare model results and satellite observations of this region.

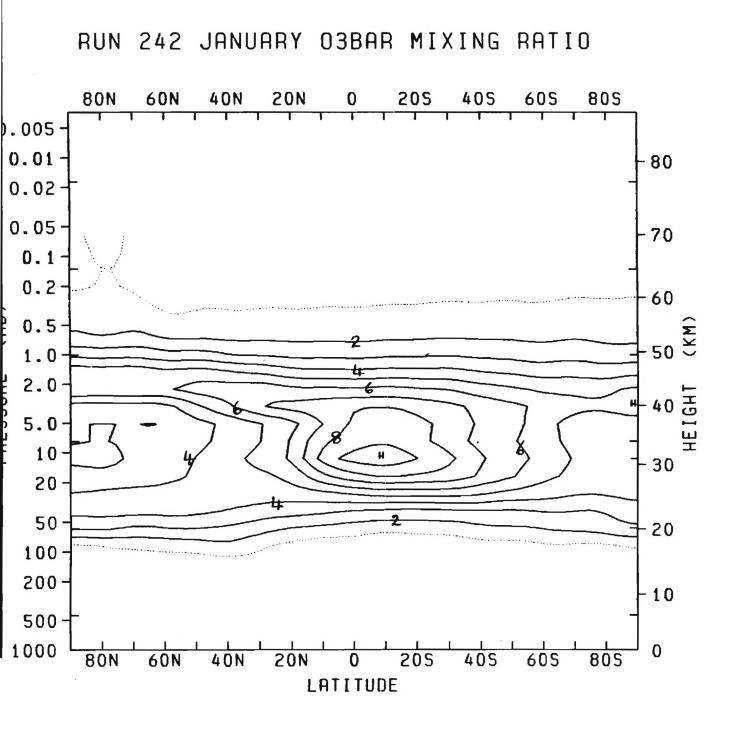
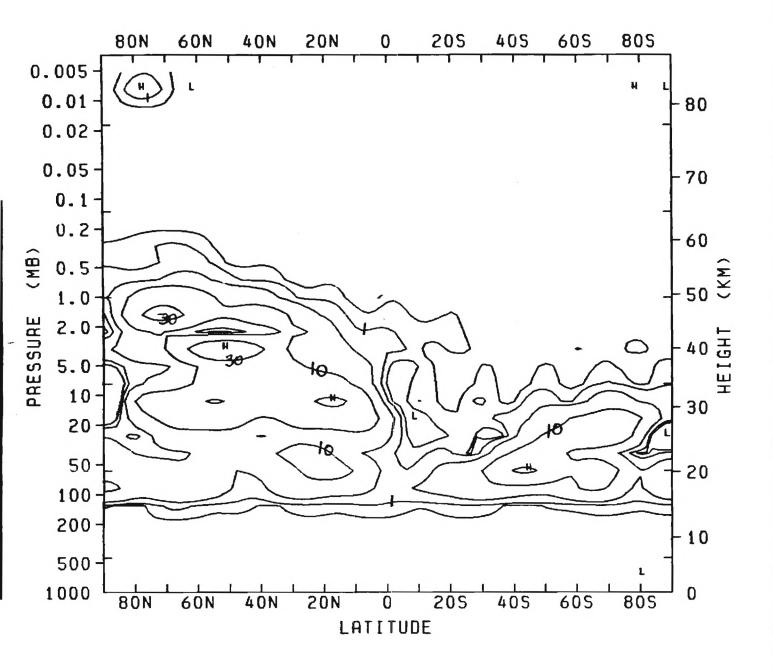




Figure (i): Zonal mean mixing ratio (ppmv) of ozone for January. Note the maximum at 2 mb at mid-latitude in winter.



LOW= -6.66E -14 HIGH= 5.94 E -13 STANDARD= NONE INTERVAL= 0.00 E -20

Figure (ii): Mean square longitudinal variability of ozone in January. Units are (10-1 ppmv)². Note the complex sturcture near 2 mb at mid-latitude in winter.

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G-35-675

Science Team Progress Report for October, 1985 Meeting Georgia Institute of Technology Atlanta, Georgia

Science Support for Earth Radiation Budget Satellite (ERBS)/Stratospheric Aerosol and Gas Experiment (SAGE)

215

Dr. Derek M. Cunnold School of Geophysical Sciences Georgia Institute of Technology

1. SAGE I Zonal Mean Ozone

The comparison of ozone observations from SAGE I (retrieval version 1) with SAGE I (retrieval version 2) has been completed. Retrieval version 2 differs from version 1 in that a correction has been made for perceived biases in tropical stratospheric temperatures determined by NOAA and species mixing ratios have been corrected for differences between geometric and geopotential altitude (which was used for inferring neutral density). The latter effect would be expected to result in differences of approximately 5% between the two retrievals at 2 mb and only a few percent at 10 mb. Figure 1 shows a comparison of the two retrieval results as a function of latitude at these pressure levels. For this comparison days on which both SAGE and SBUV ozone observations existed were selected. It should be noted that our processing of the two sets of SAGE^m results was not identical and minor differences may be produced by this. In general, however, we see that version 2 ozone results are approximately 5% larger at mid-latitudes at 2 mb but the differences are \leq 2% at 10 mb (and of the opposite sign). In the tropics, at 2 mb the version 2 results are approximately 5% smaller. This difference is presumably produced by the adjustment for tropical temperature biases. The differences are larger than the 2 mb results at 1 mb and smaller at 5 mb.

Recalling our comparison of version 1 results with SBUV ozone observations, we inferred that SAGE was overestimating ozone by approximately 20% at tropical latitudes at pressures below 5 mb. Thus, the version 2 results produce latitudinal gradients which although in better agreement with the SBUV results are approximately only half as large in magnitude. The discrepancy remains primarily at tropical latitudes and although the differences between SBUV and the version 2 results are less than for version 1, they remain substantial.

2. Longitudinal ozone variability

In the processing of version 2 we chose to average vertically over 5 km instead of over 8 km as we did for version 1 processing. This meant that above approximately 38 km where the ozone retrieval already employed 5 km smoothing, no additional smoothing was used. The reason for using 5 km smoothing instead of 8 km was that it is difficult to replicate the SBUV smoothing (except via a full SBUV retrieval) which is in the 5-10 km range but is scale size dependent. It has been pointed out that our smoothing procedure does not preserve layer ozone amounts and it was, therefore, decided that it is best to use the minimum smoothing consistent with the SBUV procedure.

Figure 2 shows sample effects of vertical smoothing on midlatitude SAGE ozone profiles. At most heights, 5 km smoothing results in larger ozone variance than 8 km smoothing. This is particularly true at higher altitudes where SAGE is known to produce fairly low signal/noise ozone observations. At 1 mb, for example, where the comparison of SAGE and SBUV ozone observations suggest a SAGE signal to noise ratio of approximately unity, 8 km smoothing reduces the variance by approximately 40%. Figure 2 also shows that vertical smoothing can <u>introduce</u> variance to altitudes such as 2 mb where the variance is low.

Of particular physical significance in Figure 2 is the miniin ozone variance at approximately 2 mb. This minimum remum mains even if the unity signal to noise level at 1 mb is allowed As is well known, the correlation between ozone and temperfor. ature changes from positive to negative with increasing altitude near 2 mb. Based on these SAGE observations, this transition occurs between 2 and 5 mb (at these latitudes and this season of the year). Recent calculations of our three-dimensional model exhibit this transition under these conditions at approximately 2 Moreover, the model indicates a minimum in ozone variability mb. associated with this transition (actually 1 km above the transition height) with the normalized ozone variance being up to an order of magnitude lower than at neighboring model levels. This minimum is associated with the substantial change in the phase of an "ozone wave" with increasing height. As a result, at this level, horizontal planetary wave fluxes of ozone are up-gradient (and the gradient is weak) and the altitude is below the height at which ozone responds rapidly through chemistry to temperature perturbations. There is thus little tendency for local generation of ozone peturbations.

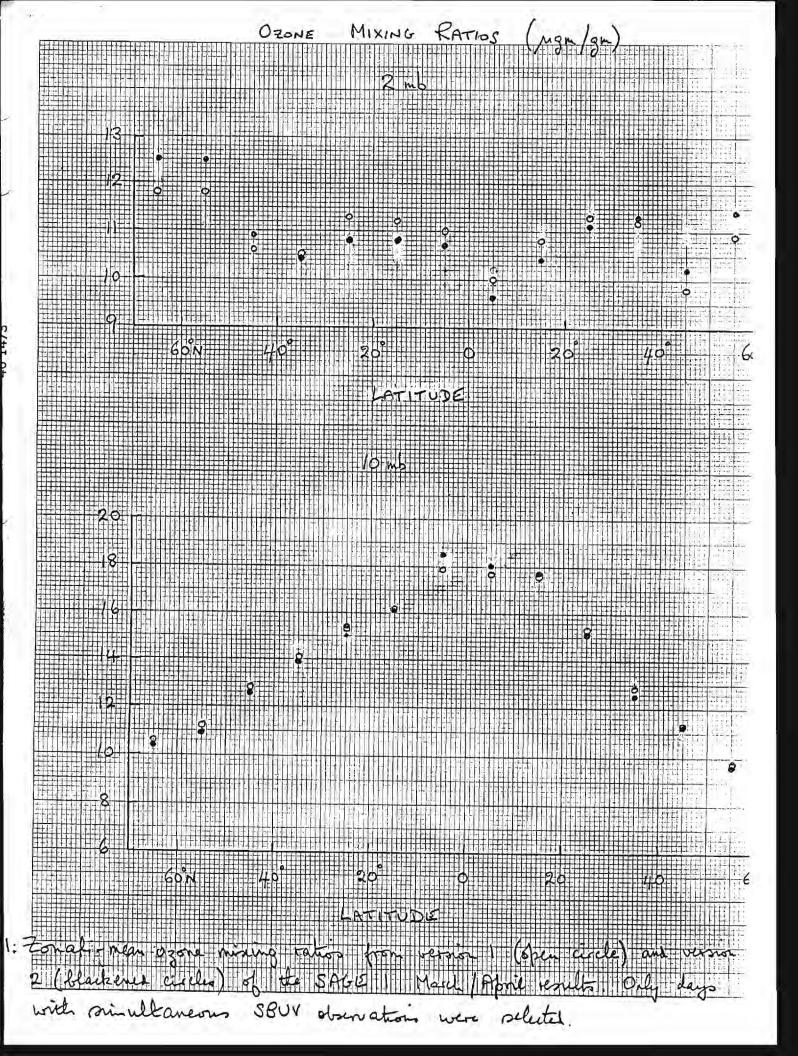
It is interesting to study not only the correlation between ozone and temperature but also the relative amplitudes of ozone and temperature variations. From the SAGE observations after normalizing the ozone and temperature variations by the local zonal mean values of ozone and temperature, the ratio of the normalized standard deviation of ozone to that of temperature at 1 mb at mid-latitudes is approximately 4 in spring and 3 in fall. At 10 mb, this ratio is also approximately 3. Since SAGE data at 1 mb, for example, contains noise, these ratios were calculated by retaining only that part of the ozone variance which is correlated with temperature (or correlated with temperature variations shifted 90° in phase). The latter part of the variance is significant (~ 10%) at altitudes below 2 mb where ozone and temperature variations are approximately in phase.

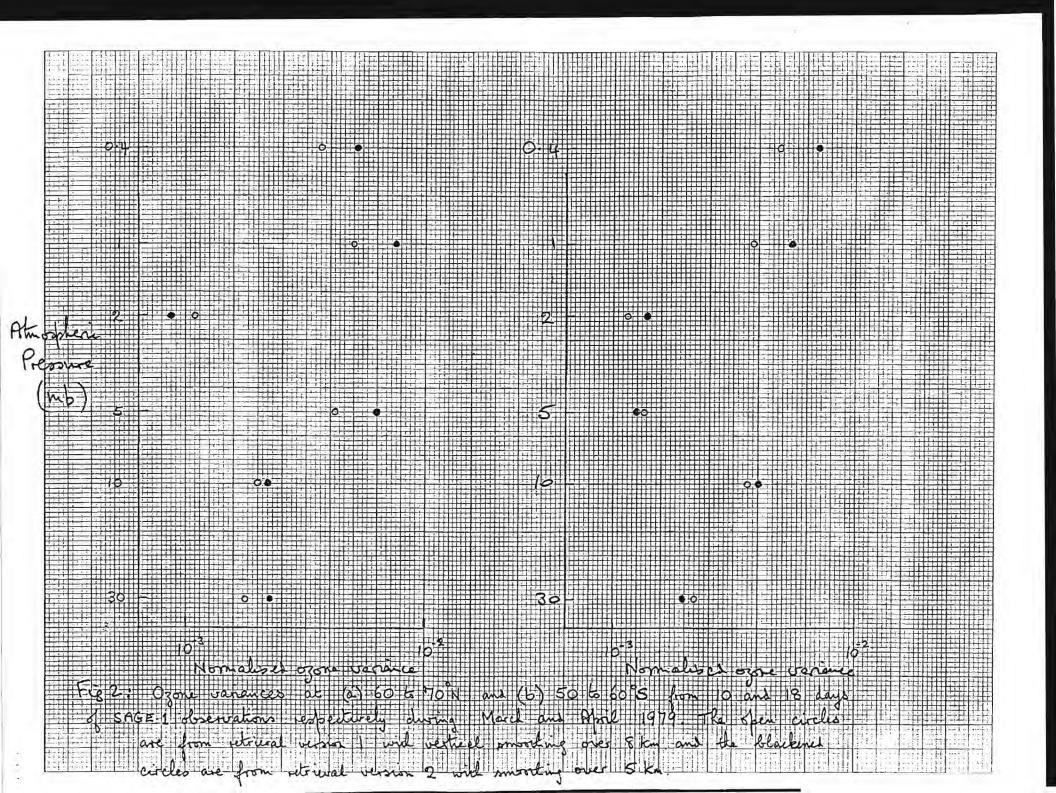
Table 1 shows the ratio of the ozone to temperature standard deviation determined in the model for January. The ratios are similar to those derived from the SAGE data. A more detailed comparison would require model results for March/April and additional discussion of the noise content of both the temperature and ozone observations. At 1 mb, the ratio is controlled by the temperature sensitivity of the ozone photochemistry and the similarity of the results suggests that the model and the atmosphere may possess similar chemistries. It is worth noting that version 2 SAGE results possess a slightly higher correlation with temperature than the version 1 results.

Pressure (mb)	Model Level	Ratio
0.2	11	1.7
0.4	13	2.4
1.0	15	3.5
1.5	16	2.2
2.3	17	0.8
3.4	18	4.7
7.7	20	4.0
17.3	22	2.9
39.0	24	1.7
		20 1

TABLE 1: Ratio of ozone standard deviation, normalized by its zonal-mean, to temperature standard deviation, normalized by its zonal-mean, for model January at 50°N.

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ATLANTA, GEORGIA 30332

SCHOOL OF GEOPHYSICAL SCIENCES

September 22, 1986

Dr. Len McMaster Technical Officer NASA Langley Research Center Mail Stop 275 Hampton, Virginia 23665

Re: NASA Contract No. 1-16357 Georgia Tech No. G-35-675

Dear Len:

Enclosed please find two copies of a paper that relates my progress on this contract through July 1986.

Sincerely,

Derek M. Cunnold

404/894-3893

DMC/spw

AN ANALYSIS OF PRELIMINARY SAGE II DATA ON OZONE AND NO,

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ABSTRACT

Zonal mean mixing ratios of ozone and NO₂ measured by SAGE II on several days in March and April, 1985 are compared against zonal means for this time of year previously measured by SAGE I, SBUV, and LIMS. After allowing for calculated diurnal variations of these gases, agreement within 15% is found for ozone and 20% for NO₂. It is noted that the profile error bars given on the SAGE II data tapes need to be carefully interpreted and that the measured tropical variances suggest that these error bars are being somewhat overestimated. Planetary waves in both ozone and NO₂ in the middle stratosphere should be derivable from the SAGE II measurements.

INTRODUCTION

SAGE II observations began in October 1984. A preliminary data set covering the period November 1984 to May 1985 has been distributed to the SAGE Science Team. From this data set the months of March and April 1985 have been selected because we previously analyzed SAGE I observations for March and April, 1979 /5/. Both the SAGE I and II ozone measurements are based on measurements of the earth's limb at 0.6 μ m /6,2/. However, whereas the SAGE I NO₂ measurements were based on measurements at 0.45 μ m, the SAGE II NO₂ measurements are based on the differential absorption between two neighboring wavelengths close to 0.45 μ m. This is expected to create a more accurate measurement of NO₂.

During the data retrieval vertical profiles have been smoothed over 5 km at heights where the extinction is less than 2×10^{-5} /km. This produces smoothing of all the NO₂ profiles and of ozone profiles above approximately 37 km altitude. In our analysis we have smoothed the ozone profiles below 37 km altitude in both SAGE I and SAGE II using

$$\vec{x} (Z_1) = \exp \{ \frac{1}{h} \int_{Z_1}^{Z_1 + h/2} Inx \, dZ \}$$

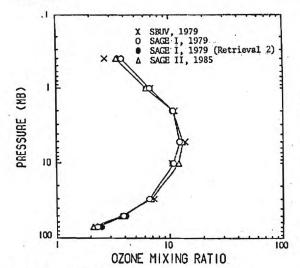
where x(Z) is the ozone mixing ratio at altitude Z and h = 5 km. The data has then been analyzed on the standard meteorological levels which are roughly 5 km apart.

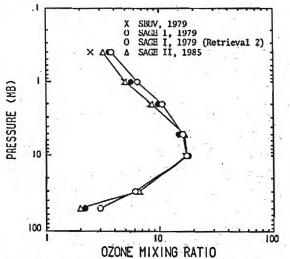
The temperature data analyzed here is that accompanying each SAGE constituent profile. It is provided to the SAGE team by the Upper Air Branch of NOAA from the mapped data which is routinely derived from the TIROS satellites and radiosondes. These temperature profiles have generally been smoothed horizontally and vertically somewhat more than the SAGE constituent profiles. These profiles provide a reference height for each constituent profile and are used to relate geometric altitudes to pressure levels in the SAGE I data and in this version of the SAGE II data.

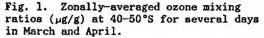
Horizontal variations in the SAGE data are analyzed as described in Cunnold /5/. Thus, each day of data (defined by Universal Time) is analyzed separately in terms of longitudinal Fourier components using generalized least squares estimation by which each measurement is inversely weighted according to the variance of the measurement. The components are assigned to the average latitude of the measurements on that day. Except at the extreme latitudes of the SAGE observations, a single day of observations typically traverses approximately 5° latitude. The observations are then grouped into 10° latitude bins. Because our interest is in longitudinal variations, we have selected only those days which contain no more than one orbit of missing data.

OZONE ZONAL MEANS

Figures 1 and 2 show a comparison of ozone zonal means for March and April at mid-latitudes and in the tropics. The preliminary SAGE II data for 1985 is being compared against two retrievals of SAGE I data for 1979 and SBUV data for 1979. Note that SAGE I version 1 is now officially non-existant and has been removed from the archives; the currently archived version (version 2), however, contains mixing ratio errors such that the correct ozone mixing ratios lie between those of versions 1 and 2 (but closer to 2). Note also that the SBUV data set is the original data which has not been adjusted for the Bass and Paur /l/ ozone cross section measurements. Although there are several versions of each satellite data set (including a new version of SAGE II now being produced) these adjustments typically change the concentrations by a factor of less than 10% in a way which is only weakly dependent on latitude and height. Thus, in particular, longitudinal variances normalized by the zonal mean concentrations do not differ significantly from one version to another.







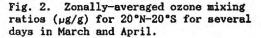


Figure 1 exhibits excellent agreement between the four data sets with 15% being the range of the zonal means except at 0.4 mb. At this level the smaller SBUV values almost certainly reflect the diurnal variation of ozone which should be neglible at altitudes below 1 mb but which should have a magnitude of roughly 25% at 0.4 mb (e.g., /7/). In the tropics there exists a wider spread in the measurements at 2, 1 and 0.4 mb. This difference between the SBUV and SAGE I measurements was previously noted by Cunnold /5/. Note, however, the excellent agreement between SAGE II and SBUV and the closer agreement with SAGE I version 2 than with version 1. Assuming that version 2 is more correct than version 1, the spread between the data sets in both tropics and mid-latitudes (excluding SBUV measurements at 0.4 mb) is 15%.

We thus consider the SAGE II ozone data for this time period to have been validated to 15%. Using simultaneous SBUV II measurements and improved SAGE II retrievals, we hope to be able to validate the SAGE II data at all heights and latitudes to better than 10%. The projected accuracy of the SAGE II measurements is similar to that of the SAGE I measurements and is approximately 5%. If percentage differences at 1, 2, 5, 10 and 30 mb are averaged for both the tropics and mid-latitudes (including 50°N, not shown), there is less than 1% difference between the SAGE II and the SBUV ozone measurements on average and the SAGE II measurements are approximately 2% smaller than those for SAGE I version 2.

TROPICAL VARIANCES OF OZONE

An estimate of the precision of the SAGE measurements is obtained by examining the longitudinal variances of ozone in waves 1 through 4 in the tropics where we should expect that physically-generated variations are small. Figure 3 shows these values for both SAGE I and SAGE II. The noise in SAGE corne measurements consists of an uncertainty of approximately 0.25 km in the reference height for the profile and measurement noise which dominates the uncertainties above 2 mb (there are about equal contributions at 2 mb; see /5/). SAGE II evidently contains a slightly smaller (10-20%) uncertainty in the reference height than SAGE I, and at altitudes above 2 mb, measurement noise is less for SAGE II (by roughly a factor of 5 in variance at 0.4 mb).

These uncertainties may be compared against the profile error bars supplied on the data tapes. Those error bars, however, refer to 1 km vertical resolution. In comparing the results in Figure 3, the "theoretical" profile error variances need to be reduced by a factor of 2 because we are retaining only 4 waves (8 out of 15 degrees of freedom) and, at heights above 2 mb, they should also be reduced by a factor of 5 to reflect the vertical averaging over 5 km. Note that at lower altitudes, where the reference height uncertainty dominates, vertical averaging should not affect the error bars. The smaller measurement noise for SAGE II is reflected in the error variances at 0.4 mb and after a reduction by a factor of ten these error variances are slightly larger than the measured tropical variances. Since the error bars are derived assuming a vertical correlation between measurements of 1 km, this suggests that this correlation distance is being over-estimated. At lower altitudes, the reference height uncertainty in the tropics is evidently less than 0.25 km (perhaps only 0.15 km). It is not obvious how to extrapolate this uncertainty to middle latitudes because of the more intense large scale wave activity at mid-latitudes which might increase the reference height uncertainty there. Overall, the error variances provide a conservative estimate of the observed ozone uncertainties. Note that at 50 and 70 mb the reference height uncertainty results in large variances because of the large vertical ozone gradient in the tropics.

Between 0.4 and 30 mb, the combined variability in the 4 waves is 20×10^{-4} . A wavenumber breakdown, given in Table 1, shows that, where the reference height uncertainty dominates, much of this variability is in wave 1 and in the zonal mean. This is probably associated with the dominance of wave 1 variations in temperature and geopotential height which are mapped into reference height uncertainties also in wave 1. In contrast, at 0.4 mb, where measurement errors dominate, the spectrum is fairly white but the substantial variance in the zonal mean may be noted, which suggests that there may be longer term (> 1 day) variations in noise level. Table 1 suggests that ozone wave amplitudes need to exceed 3% in wave 1 and 2% in wave 1-4 to be observable (i.e., the longitudinal variance must exceed approximately 20×10^{-4}).

mb	e (ratio to zone Wave l	al mean ²) (SAGE Wave 2	II March/April Wave 3	1985) Wave 4	Variance of zonal mean
30.0 5.0 0.4	11.0 6.0 8.0	2.0 4.0 5.0	1.0 2.0 3.0	1.0 1.0 4.0	13.0 3.0 37.0
(b) Temp	erature ("k ²) ((Coincident with	SAGE II, April	1985)	Vanianas af
(b) Temp mb	erature ("K²) ((Wave l	Wave 2	Wave 3	Wave 4	Variance of zonal mean

TABLE 1 Wavenumber breakdown of tropical variances (20°N-20°S)

MID-LATITUDE OZONE VARIATIONS

Table 2 shows considerable ozone activity in excess of the measurement noise levels at midlatitudes in March and April. A significant minimum in ozone activity is found at 30 mb, a tendency which is also found in our 6 wave numerical model of the atmosphere /4/. Similar levels of activity are found in the 2 SAGE observations and in the model. Note, however, that the model exhibits a minimum of activity at 5 mb but is absent in the observations. In the model this is associated with different irregularity production mechanisms operating at 2 and 10 mb and is related to a correlation between ozone and temperature of approximately zero at 5 mb. If this correlation is examined in the SAGE observations (see Table 3), the transition between heights at which ozone variations are in phase with temperature variations and heights where the variations are out of phase seems to vary in the atmosphere. Note that if variations between latitude bins are included (see Table 3), the SAGE I and SAGE II results are not significantly different at most levels. The brackets at 0.4 mb for SAGE II (in Table 3) reflect the lack of activity there in April 1985 and thus the probable dominance of measurement noise at that time.

Apart from the variability from day to day in the real atmosphere which could be smoothing out the ozone variance minimum at approximately 5 mb, the correspondence between observed and modeled ozone-temperature covariances is acceptable. Additional studies should indicate whether it is possible to use measured factors similar to those given in Table 3 to derive conclusions about atmospheric chemistry and transport.

Pressure level	SAGE II	SAGE I	6 wave
(mb)	March/April 1985	March/April 1979	model
50	227	126	1000
30	34	31	120
10	66	44	155
5	115	58	55
2	190	79	170
1	70	166	190

<u>TABLE 2</u> Variances of ozone at mid-latitudes (40-70 °N) expressed as a ratio to the zonal mean squared \times 10⁴.

<u>TABLE 3</u> Ratio of amplitudes of longitudinal ozone variations to the amplitudes of correlated temperature variations (= $r\sigma_{03}/\sigma_{T}$) at midlatitudes of the Northern Hemisphere.

Pressure	SAGE II	SAGE I	3D (6 wave) model	
level (mb)	(April, 1985)	(March/April, 1979)	(April)	
50.0 30.0 10.0 5.0 2.0 1.0 0.4	$\begin{array}{c} 6.8 \pm 4.4 \\ 4.0 \pm 0.5 \\ 0.5 \pm 1.7 \\ -2.0 \pm 1.6 \\ -3.8 \pm 0.9 \\ -2.4 \pm 0.3 \\ (-0.3 \pm 1.1) \end{array}$	$\begin{array}{c} 3.6 \pm 0.5 \\ 2.5 \pm 0.2 \\ 2.8 \pm 0.4 \\ 2.6 \pm 1.3 \\ -1.8 \pm 2.5 \\ -4.3 \pm 1.5 \\ -4.5 \pm 0.2 \end{array}$	4.2 2.6 2.1 -0.3 -3.7 -5.6 -3.6 -3.6	

ZONAL MEANS OF NO2

Figures 4 and 5 show the zonal means for SAGE II NO₂ versus those for SAGE I (version 2). One way to discuss the differing surrise and sunset comparisons is to consider the mean of sunrise and sunset values together with the sunset/sunrise ratio. Figure 4 shows that at mid-latitudes at 5 and 10 mb (the mixing ratio peak where NO₂ concentrations are measured most precisely), SAGE II measurements are 40% larger than those for SAGE I; however, in the tropics there is excellent agreement between the SAGE I and SAGE II measurements (Figure 5). Furthermore, at mid-latitudes the SAGE II measurements lie within the range of balloon measurements and, more particularly, are in excellent agreement with the LIMS measurements at 32°N at 1:30 pm for May 1979. Based on Chu and McCormick /3/, NO₂ mixing ratios in May should be similar to those in March and April except at 5 mb where they are expected to be approximately 10% larger. The discussion of the diurnal variation of NO₂ by Roscoe /8/ indicates that mixing ratios at 1:30 pm should be approximately a factor of 2 smaller than this average at 2 mb but equal to the average at 5, 10 and 30 mb. Given that all these measurement techniques have an accuracy of approximately 20%, we consider that Figures 4 and 5 constitute validation of the SAGE II NO₂ measurements to this accuracy.

The sunset/sunrise ratios shown in Table 4, on the other hand, are not in such good agreement. The SAGE I ratios have been found to be in good agreement with theory /3/ but the SAGE II ratios are considerably smaller. Part of this problem in the SAGE II measurements has already been identified as an error in the reference altitudes for sunrise measurements (sunrise ozone measurements, for example, are 4-7% larger than sunset measurements at all levels). Correction of this problem may produce agreement with Sage I values at 30, 10 and 5 mb leaving a problem at 2 mb only.

Pressure		GE II	SAGE I		
level mb	30-40°N Mar/Apr 1985	50°N Mar 31, 1985	30-40°N Mar/Apr 1979	35°N Mar 12, 1979	
30 10 5 2	$1.00 \\ 1.24 \\ 1.33 \\ 0.44$	1.04 1.31 1.28 0.54	1.19 1.62 1.67 0.91	$1.03 \\ 1.66 \\ 1.80 \\ 1.25$	

TABLE 4 NO₂ Sunset to Sunrise Ratios

TROPICAL VARIANCES OF NO2

SAGE measurements of NO₂ are expected to be both less accurate and less Precise than SAGE O₃ measurements. Figure 6 contains a comparison of the tropical NO₂ variances with the profile error variances given on the data tapes. The tropical variances indicate that the SAGE II measurements of NO₂ are 3 or 4 times more precise than those of SAGE I. The error variances suggest that they are just twice as precise at 5 and 10 mb but we are currently

unsure how to relate these error variances to the measured variances. Figure 6 suggests that it is unlikely that longitudinal variations in NO₂ could have been observed by SAGE I but that such variations should be observable between 1 and 10 mb in the SAGE II measurements. In contrast to the ozone measurements, the tropical variance appears to be roughly independent of wavenumber. We conclude that 0.3 ppbv variations (3% of the zonal mean) should be observable at 5 mb (and 10 mb) and 2 ppbv fluctuations (4% of the zonal mean) should be observable at 2 mb. This suggests that the precision of the SAGE II NO₂ measurements is excellent.

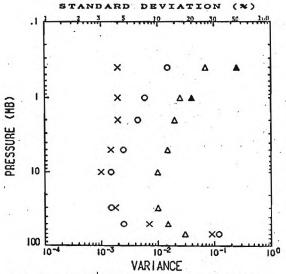


Fig. 3. Longitudinal variances of ozone (normalized by the zonal-mean squared) and standard deviations (as % of the zonal mean) in the tropics for several days in March and April. SAGE I values are denoted by 0's, SAGE II values by X's. Also shown are the measurement error bars given on the data tapes for SAGE II (Δ) and, where different, for SAGE I (Δ).

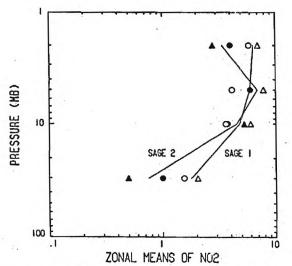
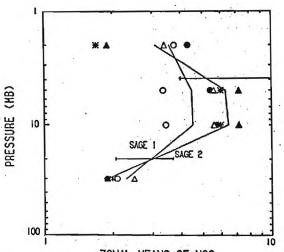


Fig. 5. Zonally-averaged NO₂ mixing ratios (ppbv) in the tropics for several days in March and April. The continuous profiles join the averages of the sunset and sunrise values.



ZONAL MEANS OF NO2

Fig. 4. Zonally-averaged NO₂ mixing ratios (ppbv) at 30-40°N for several days in March and April. The horizontal lines indicate the range of climatological measurements by balloons in this latitude range. LIMS measurements in May 1979 at 32°N at 1:30 pm (local time) are denoted by an "*" (from /9/).

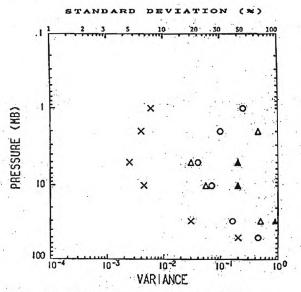


Fig. 6. Longitudinal variances of NO₂ (normalized by the zonal-mean squared) and standard deviations (as % of the zonal mean) in the tropics for several days in March and April. SAGE I values are denoted by O's, SAGE II values by X's. Also shown are the measurement error bars given on the data tapes for SAGE II (Δ) and, where different, for SAGE I (Δ).

CONCLUSIONS

The preliminary version of the SAGE II ozone data has been compared against SAGE I data and SBUV data for the same months in 1979. The comparison shows agreement within 15% for all three data sets except at two locations. At 0.4 mb the SBUV measurements are approximately 25% smaller corresponding presumably to the diurnal variation of ozone there. In the tropics above 5 mb, the SAGE I (version 2) results which have been corrected for temperature biases in the NOAA data are in significantly better agreement with the SBUV and SAGE II data than was true for the SAGE I (version 1) results.

The longitudinal variations in the SAGE II measurements in the tropics indicate that the SAGE II ozone measurements are more precise than the SAGE 1 ozone measurements. This feature is reflected in the profile error bars provided with the data. These error bars are nominally for 1 km resolution and need to be adjusted above 2 mb by \sqrt{n} for a resolution of n km. The tropical variances indicate that the precision of the measurements is being somewhat underestimated and is dependent on the planetary wavenumber. Between 0.4 and 30 mb, variations having a magnitude of 3% of the zonal mean in wave 1 and 2% in waves 2-4 should be observable in the SAGE II ozone data. Mid-latitude variations exceeding these magnitudes roughly exhibit the expected (i.e., modeled) variation with altitude and covariances with temperature.

The preliminary SAGE II NO₂ sunset-sunrise average measurements exhibit agreement with SAGE I NO₂ measurements at tropical and mid-latitudes for the same months in 1979 to better than 20%. Even better agreement is found with the May, 1979 mid-latitude LIMS measurements for 1:30 pm local time at 30, 10, and 5 mb. SAGE II NO₂ sunset-sunrise ratios are found to be too small but these may be corrected when the sunrise retrievals are adjusted for reference altitude errors. The tropical variances of NO₂ indicate that the SAGE II NO₂ measurements are substantially more precise than those of SAGE I and that planetary wave activity exceeding 3% of the zonal mean may be observable at the NO₂ mixing ratio peak (5-10 mb).

ACKNOWLEDGEMENT

This research was supported by NASA Contract NAS1-16357.

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Final Report

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for

Science Support for Earth Radiation Budget Satellite (ERBS)/Stratospheric Aerosol and Gas Experiment (SAGE)

Contract No. 1-16357

February, 1987

Derek M. Cunnold School of Geophysical Sciences Georgia Institute of Technology Atlanta, Georgia 30332

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Research Activities

Our contributions to the SAGE II (and SAGE I) science team activities have focused on the validation of the ozone and NO, measurements. The objective has been to validate both the constituent concentrations and mixing ratios and the assigned error estimates. Here it should be noted that the sun-scanning capability, which is an integral part of the SAGE measurements, permits a profile by profile assessment of measurement precision. Our contributions to date have emphasized the comparison of ozone zonal mean and longitudinal variations between SAGE I and the Nimbus 7 SBUV (Cunnold, 1984; Cunnold et al, 1984), the comparison of SAGE I and ozone against umkehr ozone (Newchurch et al, 1986) and the study of preliminary SAGE II ozone and NO, data (Cunnold and Chu, 1986; copy attached).

During these validation activities some comparisons against three-dimensional numerical model results have also been made. Relationships between measured parameters, such as between ozone and temperature, have been studied. In these studies it is most important to separate variances having a natural origin from variances associated with measurement errors. In view of the roughly 10% precision of the SAGE measurements, the validation activities have taken precedence, and the scientific results regarding correlations between the measured parameters have so far been interpreted cautiously.

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AN ANALYSIS OF PRELIMINARY SAGE II DATA ON OZONE AND NO,

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ABSTRACT

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INTRODUCTION

SAGE II observations began in October 1984. A preliminary data set covering the period November 1984 to May 1985 has been distributed to the SAGE Science Team. From this data set the months of March and April 1985 have been selected because we previously analyzed SAGE I observations for March and April, 1979 /5/. Both the SAGE I and II ozone measurements are based on measurements of the earth's limb at 0.6 μ m /6.2/. However, whereas the SAGE I NO₂ measurements were based on measurements at 0.45 μ m, the SAGE II NO₂ measurements are based on the differential absorption between two neighboring wavelengths close to 0.45 μ m. This is expected to create a more accurate measurement of NO₂.

During the data retrieval vertical profiles have been smoothed over 5 km at heights where the extinction is less than 2×10^{-5} /km. This produces smoothing of all the NO₂ profiles and of ozone profiles above approximately 37 km altitude. In our analysis we have smoothed the ozone profiles below 37 km altitude in both SAGE I and SAGE II using

$$\bar{x}(Z_1) = \exp \left\{ \frac{1}{\bar{h}} \int_{Z_1}^{Z_1 + h/2} \frac{lm(dZ)}{L_1 - h/2} \right\}$$

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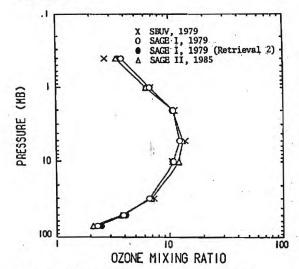
where x(Z) is the ozone mixing ratio at altitude Z and h = 5 km. The data has then been analyzed on the standard meteorological levels which are roughly 5 km apart.

The temperature data analyzed here is that accompanying each SAGE constituent profile. It is provided to the SAGE team by the Upper Air Branch of NOAA from the mapped data which is routinely derived from the TIROS satellites and radiosondes. These temperature profiles have generally been smoothed horizontally and vertically somewhat more than the SAGE constituent profiles. These profiles provide a reference height for each constituent profile and are used to relate geometric altitudes to pressure levels in the SAGE I data and in this version of the SAGE II data.

Horizontal variations in the SAGE data are analyzed as described in Cunnold /5/. Thus, each day of data (defined by Universal Time) is analyzed separately in terms of longitudinal Fourier components using generalized least squares estimation by which each measurement is inversely weighted according to the variance of the measurement. The components are assigned to the average latitude of the measurements on that day. Except at the extreme latitudes of the SAGE observations, a single day of observations typically traverses approximately 5° latitude. The observations are then grouped into 10° latitude bins. Because our interest is in longitudinal variations, we have selected only those days which contain no more than one orbit of missing data.

OZONE ZONAL MEANS

Figures 1 and 2 show a comparison of ozone zonal means for March and April at mid-latitudes and in the tropics. The preliminary SAGE II data for 1985 is being compared against two retrievals of SAGE I data for 1979 and SBUV data for 1979. Note that SAGE I version 1 is now officially non-existant and has been removed from the archives; the currently archived version (version 2), however, contains mixing ratio errors such that the correct ozone mixing ratios lie between those of versions 1 and 2 (but closer to 2). Note also that the SBUV data set is the original data which has not been adjusted for the Bass and Paur /l/ ozone cross section measurements. Although there are several versions of each satellite data set (including a new version of SAGE II now being produced) these adjustments typically change the concentrations by a factor of less than 10% in a way which is only weakly dependent on latitude and height. Thus, in particular, longitudinal variances normalized by the zonal mean concentrations do not differ significantly from one version to another.



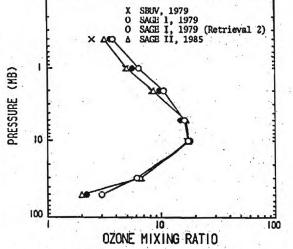


Fig. 1. Zonally-averaged ozone mixing ratios $(\mu g/g)$ at 40-50°S for several days in March and April.

Fig. 2. Zonally-averaged ozone mixing ratios $(\mu g/g)$ for 20°N-20°S for several days in March and April.

Figure 1 exhibits excellent agreement between the four data sets with 15% being the range of the zonal means except at 0.4 mb. At this level the smaller SBUV values almost certainly reflect the diurnal variation of ozone which should be neglible at altitudes below 1 mb but which should have a magnitude of roughly 25% at 0.4 mb (e.g., /7/). In the tropics there exists a wider spread in the measurements at 2, 1 and 0.4 mb. This difference between the SBUV and SAGE I measurements was previously noted by Cunnold /5/. Note, however, the excellent agreement between SAGE II and SBUV and the closer agreement with SAGE I version 2 than with version 1. Assuming that version 2 is more correct than version 1, the spread between the data sets in both tropics and mid-latitudes (excluding SBUV measurements at 0.4 mb) is 15%.

We thus consider the SAGE II ozone data for this time period to have been validated to 15%. Using simultaneous SBUV II measurements and improved SAGE II retrievals, we hope to be able to validate the SAGE II data at all heights and latitudes to better than 10%. The projected accuracy of the SAGE II measurements is similar to that of the SAGE I measurements and is approximately 5%. If percentage differences at 1, 2, 5, 10 and 30 mb are averaged for both the tropics and mid-latitudes (including 50°N, not shown), there is less than 1% difference between the SAGE II and the SBUV ozone measurements on average and the SAGE II measurements are approximately 2% smaller than those for SAGE I version 2.

TROPICAL VARIANCES OF OZONE

An estimate of the precision of the SAGE measurements is obtained by examining the longitudinal variances of ozone in waves 1 through 4 in the tropics where we should expect that physically-generated variations are small. Figure 3 shows these values for both SAGE I and SAGE II. The noise in SAGE ozone measurements consists of an uncertainty of approximately 0.25 km in the reference height for the profile and measurement noise which dominates the uncertainties above 2 mb (there are about equal contributions at 2 mb; see $\frac{5}{3}$). SAGE II evidently contains a slightly smaller (10-20%) uncertainty in the reference height than SAGE I, and at altitudes above 2 mb, measurement noise is less for SAGE II (by roughly a factor of 5 in variance at 0.4 mb).

These uncertainties may be compared against the profile error bars supplied on the data tapes. Those error bars, however, refer to 1 km vertical resolution. In comparing the results in Figure 3, the "theoretical" profile error variances need to be reduced by a factor of 2 because we are retaining only 4 waves (8 out of 15 degrees of freedom) and, at heights above 2 mb, they should also be reduced by a factor of 5 to reflect the vertical averaging over 5 km. Note that at lower altitudes, where the reference height uncertainty dominates, vertical averaging should not affect the error bars. The smaller measurement noise for SAGE II is reflected in the error variances at 0.4 mb and after a reduction by a factor of ten these error variances are slightly larger than the measured tropical variances. Since the error bars are derived assuming a vertical correlation between measurements of 1 km, this suggests that this correlation distance is being over-estimated. At lower altitudes, the reference height uncertainty in the tropics is evidently less than 0.25 km (perhaps only 0.15 km). It is not obvious how to extrapolate this uncertainty to middle latitudes because of the more intense large scale wave activity at mid-latitudes which might increase the reference height uncertainty there. Overall, the error variances provide a conservative estimate of the observed ozone uncertainties. Note that at 50 and 70 mb the reference height uncertainty results in large variances because of the large vertical ozone gradient in the tropics.

Between 0.4 and 30 mb, the combined variability in the 4 waves is 20×10^{-4} . A wavenumber breakdown, given in Table 1, shows that, where the reference height uncertainty dominates, much of this variability is in wave 1 and in the zonal mean. This is probably associated with the dominance of wave 1 variations in temperature and geopotential height which are mapped into reference height uncertainties also in wave 1. In contrast, at 0.4 mb, where measurement errors dominate, the spectrum is fairly white but the substantial variance in the zonal mean may be noted, which suggests that there may be longer term (> 1 day) variations in noise level. Table 1 suggests that ozone wave amplitudes need to exceed 3x in wave 1 and 2x in wave 1-4 to be observable (i.e., the longitudinal variance must exceed approximately 20×10^{-4}).

(a) Ozon mb	e (ratio to zona Wave l	Wave 2	Wave 3	Wave 4	Variance of zonal mean
30.0	11.0	2.0	1.0	1.0	13.0
5.0	6.0	4.0	2.0	1.0	3.0
0.4	8.0	5.0	3.0	4.0	37.0
(b) Temp	erature (^v k²) ((Coincident with	SAGE II, April	1985)	Variance of
mb	Wave l	Wave 2	Wave 3	Wave 4	zonal mean
	0.14	0.14	0.09	0.09 0.17 0.29	0.18 0.01 0.71

TABLE 1 Wavenumber breakdown of tropical variances (20°N-20°S)

MID-LATITUDE OZONE VARIATIONS

Table 2 shows considerable ozone activity in excess of the measurement noise levels at midlatitudes in March and April. A significant minimum in ozone activity is found at 30 mb, a tendency which is also found in our 6 wave numerical model of the atmosphere /4/. Similar levels of activity are found in the 2 SAGE observations and in the model. Note, however, that the model exhibits a minimum of activity at 5 mb but is absent in the observations. In the model this is associated with different irregularity production mechanisms operating at 2 and 10 mb and is related to a correlation between ozone and temperature of approximately zero at 5 mb. If this correlation is examined in the SAGE observations (see Table 3), the transition between heights at which ozone variations are in phase with temperature variations and heights where the variations are out of phase seems to vary in the atmosphere. Note that if variations between latitude bins are included (see Table 3), the SAGE I and SAGE II results are not significantly different at most levels. The brackets at 0.4 mb for SAGE II (in Table 3) reflect the lack of activity there in April 1985 and thus the probable dominance of measurement noise at that time.

Apart from the variability from day to day in the real atmosphere which could be smoothing out the ozone variance minimum at approximately 5 mb, the correspondence between observed and modeled ozone-temperature covariances is acceptable. Additional studies should indicate whether it is possible to use measured factors similar to those given in Table 3 to derive conclusions about atmospheric chemistry and transport.

Pressure level	SAGE II	SAGE I	6 wave
(mb)	March/April 1985	March/April 1979	model
50	227	126	1000
30	34	31	120
10	66	44	155
5	115	58	55
2	190	79	170
1	70	166	190

<u>TABLE 2</u> Variances of ozone at mid-latitudes (40-70 °N) expressed as a ratio to the zonal mean squared $\times 10^4$.

<u>TABLE 3</u> Ratio of amplitudes of longitudinal ozone variations to the amplitudes of correlated temperature variations (= $r\sigma_{03}/\sigma_{T}$) at midlatitudes of the Northern Hemisphere.

Pressure	SAGE II	SAGE I	3D (6 wave) model	
level (mb)	(April, 1985)	(March/April, 1979)	(April)	
50.0 30.0 10.0 5.0 2.0 1.0 0.4	$\begin{array}{c} 6.8 \pm 4.4 \\ 4.0 \pm 0.5 \\ 0.5 \pm 1.7 \\ -2.0 \pm 1.6 \\ -3.8 \pm 0.9 \\ -2.4 \pm 0.3 \\ (-0.3 \pm 1.1) \end{array}$	$\begin{array}{c} 3.6 \\ \pm 0.5 \\ 2.5 \\ \pm 0.4 \\ 2.8 \\ \pm 1.3 \\ -1.8 \\ \pm 2.5 \\ -4.3 \\ \pm 0.2 \\ -4.5 \\ \pm 0.2 \end{array}$	4.2 2.6 2.1 -0.3 -3.7 -5.6 -3.6	

ZONAL MEANS OF NO2

Figures 4 and 5 show the zonal means for SAGE II NO₂ versus those for SAGE I (version 2). One way to discuss the differing surrise and sunset comparisons is to consider the mean of sumrise and sunset values together with the sunset/sunrise ratio. Figure 4 shows that at mid-latitudes at 5 and 10 mb (the mixing ratio peak where NO₂ concentrations are measured most precisely), SAGE II measurements are 40% larger than those for SAGE I; however, in the tropics there is excellent agreement between the SAGE I and SAGE II measurements (Figure 5). Furthermore, at mid-latitudes the SAGE II measurements lie within the range of balloon measurements and, more particularly, are in excellent agreement with the LIMS measurements at 32°N at 1:30 pm for May 1979. Based on Chu and McCormick /3/, NO₂ mixing ratios in May should be similar to those in March and April except at 5 mb where they are expected to be approximately 10% larger. The discussion of the diurnal variation of NO₂ by Roscoe /8/ indicates that mixing ratios at 1:30 pm should be approximately a factor of 2 smaller than this average at 2 mb but equal to the average at 5, 10 and 30 mb. Given that all these measurement techniques have an accuracy of approximately 20%, we consider that Figures 4 and 5 constitute validation of the SAGE II NO₂ measurements to this accuracy.

The sunset/sunrise ratios shown in Table 4, on the other hand, are not in such good agreement. The SAGE I ratios have been found to be in good agreement with theory /3/ but the SAGE II ratios are considerably smaller. Part of this problem in the SAGE II measurements has already been identified as an error in the reference altitudes for sunrise measurements (sunrise ozone measurements, for example, are 4-7% larger than sunset measurements at all levels). Correction of this problem may produce agreement with Sage I values at 30, 10 and 5 mb leaving a problem at 2 mb only.

Pressure	i SAC	JE II	SAGE I		
level	30-40°N	50°N	30-40°N	35°N	
mb	Mar/Apr 1985	Mar 31, 1985	Mar/Apr 1979	Mar 12, 1979	
30	$1.00 \\ 1.24 \\ 1.33 \\ 0.44$	1.04	1.19	1.03	
10		1.31	1.62	1.66	
5		1.28	1.67	1.80	
2		0.54	0.91	1.25	

TABLE 4	NO	Sunset	to	Sunrise	Ratios
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TROPICAL VARIANCES OF NO2

SAGE measurements of NO_2 are expected to be both less accurate and less Precise than SAGE O_3 measurements. Figure 6 contains a comparison of the tropical NO_2 variances with the profile error variances given on the data tapes. The tropical variances indicate that the SAGE II measurements of NO_2 are 3 or 4 times more precise than those of SAGE I. The error variances suggest that they are just twice as precise at 5 and 10 mb but we are currently

unsure how to relate these error variances to the measured variances. Figure 6 suggests that it is unlikely that longitudinal variations in NO₂ could have been observed by SAGE I but that such variations should be observable between 1 and 10 mb in the SAGE II measurements. In contrast to the ozone measurements, the tropical variance appears to be roughly independent of wavenumber. We conclude that 0.3 ppbv variations (3% of the zonal mean) should be observable at 5 mb (and 10 mb) and 2 ppbv fluctuations (4% of the zonal mean) should be observable at 2 mb. This suggests that the precision of the SAGE II NO₂ measurements is excellent.

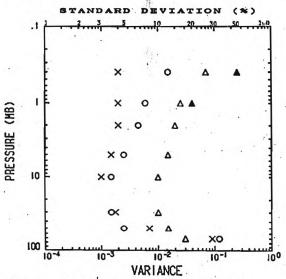


Fig. 3. Longitudinal variances of ozone (normalized by the zonal-mean squared) and standard deviations (as % of the zonal mean) in the tropics for several days in March and April. SAGE I values are denoted by O's, SAGE II values by X's. Also shown are the measurement error bars given on the data tapes for SAGE II (Δ) and, where different, for SAGE I (Δ).

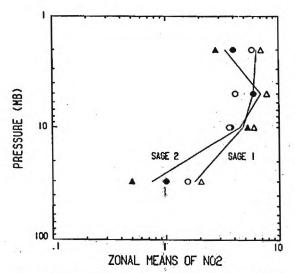
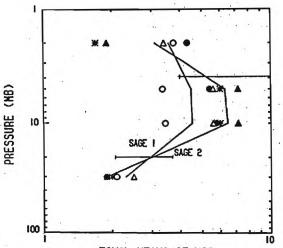


Fig. 5. Zonally-averaged NO₂ mixing ratios (ppbv) in the tropics for several days in March and April. The continuous profiles join the averages of the sunset and sunrise values.



ZONAL MEANS OF NO2

Fig. 4. Zonally-averaged NO₂ mixing ratios (ppbv) at 30-40 °N for several days in March and April. The horizontal lines indicate the range of climatological measurements by balloons in this latitude range. LIMS measurements in May 1979 at 32 °N at 1:30 pm (local time) are denoted by an "*" (from /9/).

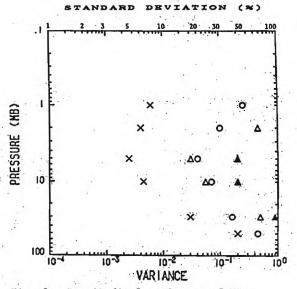


Fig. 6. Longitudinal variances of NO₂ (normalized by the zonal-mean squared) and standard deviations (as % of the zonal mean) in the tropics for several days in March and April. SAGE I values are denoted by O's, SAGE II values by X's. Also shown are the measurement error bars given on the data tapes for SAGE II (Δ) and, where different, for SAGE I (Δ).

CONCLUSIONS

The preliminary version of the SAGE II ozone data has been compared against SAGE I data and SBUV data for the same months in 1979. The comparison shows agreement within 15% for all three data sets except at two locations. At 0.4 mb the SBUV measurements are approximately 25% smaller corresponding presumably to the diurnal variation of ozone there. In the tropics above 5 mb, the SAGE I (version 2) results which have been corrected for temperature biases in the NOAA data are in significantly better agreement with the SBUV and SAGE II data than was true for the SAGE I (version 1) results.

The longitudinal variations in the SAGE II measurements in the tropics indicate that the SAGE II ozone measurements are more precise than the SAGE 1 ozone measurements. This feature is reflected in the profile error bars provided with the data. These error bars are nominally for 1 km resolution and need to be adjusted above 2 mb by \sqrt{n} for a resolution of n km. The tropical variances indicate that the precision of the measurements is being somewhat underestimated and is dependent on the planetary wavenumber. Between 0.4 and 30 mb, variations having a magnitude of 3% of the zonal mean in wave 1 and 2% in waves 2-4 should be observable in the SAGE II ozone data. Mid-latitude variations exceeding these magnitudes roughly exhibit the expected (i.e., modeled) variation with altitude and covariances with temperature.

The preliminary SAGE II NO₂ sunset-sunrise average measurements exhibit agreement with SAGE I NO₂ measurements at tropical and mid-latitudes for the same months in 1979 to better than 20%. Even better agreement is found with the May, 1979 mid-latitude LIMS measurements for 1:30 pm local time at 30, 10, and 5 mb. SAGE II NO₂ sunset-sunrise ratios are found to be too small but these may be corrected when the sunrise retrievals are adjusted for reference altitude errors. The tropical variances of NO₂ indicate that the SAGE II NO₂ measurements are substantially more precise than those of SAGE I and that planetary wave activity exceeding 3% of the zonal mean may be observable at the NO₂ mixing ratio peak (5-10 mb).

ACKNOWLEDGEMENT

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